

111TH CONGRESS
2D SESSION

H. R. 5781

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

IN THE HOUSE OF REPRESENTATIVES

JULY 20, 2010

Mr. GORDON of Tennessee (for himself, Mr. HALL of Texas, Ms. GIFFORDS, and Mr. OLSON) introduced the following bill; which was referred to the Committee on Science and Technology

A BILL

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

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

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

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

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

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

TITLE I—AUTHORIZATION OF APPROPRIATIONS

- Sec. 101. Fiscal year 2011.
- Sec. 102. Fiscal year 2012.
- Sec. 103. Fiscal year 2013.
- Sec. 104. Fiscal year 2014.
- Sec. 105. Fiscal year 2015.

TITLE II—HUMAN SPACE FLIGHT

Subtitle A—Exploration

- Sec. 201. Reaffirmation of exploration policy.
- Sec. 202. Restructured Exploration program.
- Sec. 203. Space radiation.

Subtitle B—International Space Station

- Sec. 211. Extension of ISS operations.
- Sec. 212. ISS research management institution.
- Sec. 213. ISS research management plan.
- Sec. 214. Outreach plan for United States ISS research.
- Sec. 215. ISS cargo resupply requirements and contingency capacity through 2020.
- Sec. 216. Centrifuge.
- Sec. 217. Exploration technology development using the ISS.
- Sec. 218. Fundamental space life science and physical sciences and related technology research.

Subtitle C—Space Shuttle

- Sec. 221. Expanded scope of Space Shuttle Transition Liaison Office.
- Sec. 222. Post-Shuttle workforce transition initiative grant program.
- Sec. 223. Disposition of orbiter vehicles.

Subtitle D—Space and Flight Support

- Sec. 231. 21st Century Space Launch Complex Initiative.

Subtitle E—Commercial Crew Transportation

- Sec. 241. Affirmation of policy.
- Sec. 242. Commercial crew and related commercial space initiatives.
- Sec. 243. Federal assistance for the development of commercial orbital human space transportation services.

TITLE III—SCIENCE

Subtitle A—Earth Science

- Sec. 301. Earth science applications.
- Sec. 302. Essential space-based Earth science and climate measurements.
- Sec. 303. Commercial remote sensing data purchases pilot project.

Subtitle B—Space Science

- Sec. 311. Suborbital programs.
- Sec. 312. Explorer program.

- Sec. 313. Radioisotope thermoelectric generator material requirements and supply.

TITLE IV—AERONAUTICS

- Sec. 401. Environmentally friendly aircraft research and development initiative.
 Sec. 402. Research on NextGen airspace management concepts and tools.
 Sec. 403. Research on aircraft cabin air quality.
 Sec. 404. Research on on-board volcanic ash sensor systems.
 Sec. 405. Aeronautics test facilities.
 Sec. 406. Expanded research program on composite materials used in aerospace.

TITLE V—SPACE TECHNOLOGY

- Sec. 501. Space technology program.

TITLE VI—EDUCATION AND OUTREACH

- Sec. 601. STEM education and training.
 Sec. 602. Assessment of impediments to space science and engineering workforce development for minority and underrepresented groups at NASA.
 Sec. 603. Independent review of the National Space Grant College and Fellowship Program.

TITLE VII—INSTITUTIONAL CAPABILITIES REVITALIZATION

- Sec. 701. Institutional management.
 Sec. 702. James E. Webb Cooperative Education Distinguished Scholar Program.

TITLE VIII—ACQUISITION MANAGEMENT

- Sec. 801. Prohibition on expenditure of funds when 30 percent threshold is exceeded.
 Sec. 802. Project and program reserves.
 Sec. 803. Independent reviews.
 Sec. 804. Avoiding organizational conflicts of interest in major NASA acquisition programs.
 Sec. 805. Report to Congress.

TITLE IX—OTHER PROVISIONS

- Sec. 901. Cloud computing.
 Sec. 902. Review of practices to detect and prevent the use of counterfeit parts.
 Sec. 903. Preservation and management of lunar sites.
 Sec. 904. Continuity of moderate resolution land imaging remote sensing data.
 Sec. 905. Space weather.
 Sec. 906. Use of operational commercial suborbital vehicles for research, development, and education.
 Sec. 907. Study on export control matters related to United States astronaut safety and NASA mission operations.
 Sec. 908. Amendment to the National Aeronautics and Space Act of 1958.
 Sec. 909. Near-Earth objects.

1 **SEC. 2. FINDINGS.**

2 The Congress finds the following:

3 (1) 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 (2) NASA's programs have the potential to in-
8 spire our youth to pursue studies and careers in
9 science, technology, engineering, and mathematics,
10 and the agency should carry out its activities in a
11 manner that enhances the educational and outreach
12 potential of its programs.

13 (3) NASA should begin to reinvest in sustained
14 fashion in a long-term space technology research and
15 development activity. Such investments are an im-
16 portant catalyst for innovation, and they represent
17 the critically important "seed corn" on which
18 NASA's ability to carry out challenging and produc-
19 tive missions in the future will depend.

20 (4) The Space Shuttle workforce, both civil
21 servants and contractors, encompasses skills and ex-
22 perience that will be needed in the Nation's future
23 human space flight activities, and the transition of
24 that workforce to a challenging human space flight
25 and exploration program needs to be carried out in

1 as expeditious and nondisruptive a manner as possible.
2

3 (5) Human and robotic exploration of the solar
4 system will be a significant undertaking of humanity
5 in the 21st century and beyond, and it is in the national
6 interest that the United States should assume
7 a leadership role in a cooperative international exploration
8 initiative. Continuity of exploration goals is
9 critical if progress is to be maximized and costly inefficiencies
10 are to be minimized.

11 (6) Commercial activities have long contributed
12 to the vitality and strength of the Nation's space
13 and aeronautics programs, and the growth of a
14 healthy, self-sustaining United States commercial
15 space and aeronautics sector should continue to be
16 encouraged.

17 (7) Congress agrees with the finding of the Review
18 of United States Human Spaceflight Plans
19 Committee that: "While there are many potential
20 benefits of commercial services that transport crew
21 to low-Earth orbit, there are simply too many risks
22 at the present time not to have a viable fallback option
23 for risk mitigation."

24 (8) It is in the national interest for the United
25 States Government to develop a government system

1 to serve as an independent means—whether primary
2 or backup—of crewed access to low-Earth orbit and
3 beyond so that it is not dependent on either non-
4 United States or commercial systems for its crewed
5 access to space.

6 (9) Development of the next crewed space
7 transportation system to low-Earth orbit should be
8 guided by the Columbia Accident Investigation
9 Board’s recommendation that “the design of the sys-
10 tem should give overriding priority to crew safety,
11 rather than trade safety against other performance
12 criteria, such as low cost and reusability”.

13 (10) In an environment of constrained budgets,
14 responsible stewardship of taxpayer-provided re-
15 sources makes it imperative that NASA’s exploration
16 program be carried out in a manner that builds on
17 the investments made to date in the Orion, Ares I,
18 and heavy lift projects and other activities of the ex-
19 ploration program in existence prior to fiscal year
20 2011 rather than discarding them. A restructured
21 exploration program should pursue the incremental
22 development and demonstration of crewed and
23 heavy-lift transportation systems in a manner that
24 ensures that investments to provide assured access
25 to low-Earth orbit also directly support the expedi-

1 tious development of the heavy lift launch vehicle
2 system, minimize the looming human space flight
3 “gap”, provide a very high level of crew safety, and
4 enable challenging missions beyond low-Earth orbit
5 in a timely manner.

6 (11) NASA’s programs in astrophysics,
7 heliophysics, planetary science, and Earth science
8 and climate research have greatly increased our un-
9 derstanding of both our home planet and the rest of
10 the universe, and they have also provided numerous
11 benefits to our society.

12 (12) NASA’s aeronautics program is under-
13 taking research and development that benefits our
14 economic development and competitiveness, enhances
15 our quality of life and enables environmentally re-
16 sponsible aviation operations, and strengthens our
17 national defense.

18 (13) The ISS provides a unique research envi-
19 ronment and capabilities for basic and applied re-
20 search, as well as having the potential to serve as a
21 testbed for human space flight technologies and
22 operational concepts. It is critically important that
23 NASA make needed investments to promote produc-
24 tive ISS utilization, including a meaningful program

1 of grants in the life and physical sciences micro-
2 gravity research disciplines.

3 (14) It is in the national interest for the United
4 States to have an export control policy that protects
5 the national security while also enabling the United
6 States aerospace industry to compete effectively in
7 the global marketplace and the United States to un-
8 dertake cooperative programs in science and human
9 space flight in an effective manner.

10 (15) A strong, robust NASA program is in the
11 national interest. Ensuring that it can continue to
12 pursue cutting-edge space and aeronautical research
13 and development activities and push back the fron-
14 tier of space exploration requires a sustained and
15 adequate commitment in resources. However,
16 NASA's share of the Federal discretionary budg-
17 etary authority has declined significantly relative to
18 its post-Apollo historical average share of 2.07 per-
19 cent. It should be a national goal to restore NASA's
20 funding share to its post-Apollo historical average.

21 (16) NASA should be vigilant in taking all nec-
22 essary steps to control cost and schedule growth in
23 mission projects, including the development of an in-
24 tegrated cost containment strategy, and adopt meas-
25 ures that improve the performance and transparency

1 of its cost and acquisition management practices.
2 NASA should approach cost and schedule manage-
3 ment with the same level of innovation, rigor, and
4 technical excellence that it applies to the execution
5 of its mission projects.

6 (17) NASA has been inconsistent in its treat-
7 ment of termination liability costs for contracts
8 issued by different mission directorates and across
9 various agency programs relative to historical prac-
10 tice. This inconsistency has hampered NASA's abil-
11 ity to effectively execute its Exploration programs.

12 **SEC. 3. DEFINITIONS.**

13 In this Act:

14 (1) ADMINISTRATOR.—The term “Adminis-
15 trator” means the Administrator of NASA.

16 (2) ISS.—The term “ISS” means the Inter-
17 national Space Station.

18 (3) NASA.—The term “NASA” means the Na-
19 tional Aeronautics and Space Administration.

20 (4) NOAA.—The term “NOAA” means the Na-
21 tional Oceanic and Atmospheric Administration.

22 (5) OSTP.—The term “OSTP” means the Of-
23 fice of Science and Technology Policy.

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

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

4 There are authorized to be appropriated to the Ad-
5 ministrator for fiscal year 2011 \$19,000,000,000, to be
6 allocated as follows:

7 (1) For Science, \$5,015,700,000, of which—

8 (A) \$1,801,800,000 shall be for Earth
9 Science;

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

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

14 (D) \$646,900,000 shall be for
15 Heliophysics, of which \$5,000,000 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.

25 (2) For Aeronautics, \$579,600,000.

1 (3) For Space Technology, \$572,200,000, of
2 which \$1,000,000 shall be for the Commercial Reus-
3 able Suborbital Research project for defining user
4 requirements and identifying, assessing, and charac-
5 terizing commercial reusable suborbital vehicle capa-
6 bilities and risks for use as potential research and
7 development platforms.

8 (4) For Exploration, \$4,535,300,000 of
9 which—

10 (A) \$215,000,000 shall be for Human Re-
11 search;

12 (B) \$14,000,000 shall be for the Commer-
13 cial Orbital Transportation System demonstra-
14 tion program;

15 (C) \$50,000,000 shall be for commercial
16 crew transportation-related activities;

17 (D) \$4,156,300,000 shall be for the re-
18 structured exploration program described in
19 section 202; and

20 (E) \$100,000,000 shall be for the loan and
21 loan guarantee program described in section
22 243.

23 (5) For Space Operations, \$4,594,300,000, of
24 which—

1 (A) \$989,100,000 shall be for the Space
2 Shuttle program;

3 (B) \$2,804,800,000 shall be for the ISS,
4 of which \$75,000,000 shall be for fundamental
5 space life science and physical sciences and re-
6 lated technology research using ground-based,
7 free-flyer, and ISS facilities, including ISS Na-
8 tional Laboratory research;

9 (C) \$60,000,000 shall be for the Post-
10 Shuttle Workforce Transition Initiative grant
11 program described in section 222; and

12 (D) \$740,400,000 shall be for Space and
13 Flight Support, of which \$50,000,000 shall be
14 for the 21st Century Launch Complex Initia-
15 tive.

16 (6) For Education, \$145,800,000.

17 (7) For Cross-Agency Support Programs,
18 \$3,111,400,000.

19 (8) For Construction and Environmental Com-
20 pliance and Restoration, \$407,300,000, of which
21 \$10,000,000 is an augmentation to the President's
22 requested funding level in order to support the
23 NASA laboratory revitalization initiative described in
24 section 701.

25 (9) For Inspector General, \$38,400,000.

1 **SEC. 102. FISCAL YEAR 2012.**

2 There are authorized to be appropriated to the Ad-
3 ministrator for fiscal year 2012 \$19,450,000,000, to be
4 allocated as follows:

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

6 (A) \$1,944,500,000 shall be for Earth
7 Science;

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

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

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

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

23 (2) For Aeronautics, \$598,700,000, of which
24 \$78,900,000 shall be for the Aviation Safety Pro-
25 gram, \$80,400,000 shall be for the Aeronautics Test
26 Program, \$83,900,000 shall be for the Airspace Sys-

1 tems Program, \$233,500,000 shall be for Funda-
2 mental Aeronautics, and \$122,000,000 shall be for
3 Integrated Systems Research.

4 (3) For Space Technology, \$1,012,200,000, of
5 which \$1,000,000 shall be for the Commercial Reus-
6 able Suborbital Research project.

7 (4) For Exploration, \$4,881,800,000 of
8 which—

9 (A) \$215,000,000 shall be for Human Re-
10 search;

11 (B) \$50,000,000 shall be for commercial
12 crew transportation-related activities;

13 (C) \$4,516,800,000 shall be for the re-
14 structured exploration program described in
15 section 202; and

16 (D) \$100,000,000 shall be for the loan and
17 loan guarantee program described in section
18 243.

19 (5) For Space Operations, \$3,930,300,000, of
20 which—

21 (A) \$86,100,000 shall be for the Space
22 Shuttle program;

23 (B) \$3,033,600,000 shall be for the ISS,
24 of which \$100,000,000 shall be for fundamental
25 space life science and physical sciences and re-

1 lated technology research using ground-based,
2 free-flyer, and ISS facilities, including ISS Na-
3 tional Laboratory research;

4 (C) \$40,000,000 shall be for the Post-
5 Shuttle Workforce Transition Initiative grant
6 program described in section 222; and

7 (D) \$770,600,000 shall be for Space and
8 Flight Support, of which \$50,000,000 shall be
9 for the 21st Century Launch Complex Initia-
10 tive.

11 (6) For Education, \$145,800,000.

12 (7) For Cross-Agency Support Programs,
13 \$3,189,600,000.

14 (8) For Construction and Environmental Com-
15 pliance and Restoration, \$373,800,000, of which
16 \$10,000,000 is an augmentation to the President's
17 requested level in order to support the NASA labora-
18 tory revitalization initiative described in section 701.

19 (9) For Inspector General, \$39,200,000.

20 **SEC. 103. FISCAL YEAR 2013.**

21 There are authorized to be appropriated to the Ad-
22 ministrators for fiscal year 2013 \$19,960,000,000, to be
23 allocated as follows:

24 (1) For Science, \$5,569,500,000, of which—

1 (A) \$2,089,500,000 shall be for Earth
2 Science;

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

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

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

10 (E) \$5,000,000 shall be an augmentation
11 to the total amount provided under subpara-
12 graphs (C) and (D) for Astrophysics and
13 Heliophysics in order to augment the funding
14 for the Science Mission Directorate's suborbital
15 research programs, to be allocated between the
16 Astrophysics and Heliophysics suborbital pro-
17 grams at the Administrator's discretion.

18 (2) For Aeronautics, \$609,400,000, of which
19 \$81,200,000 shall be for the Aviation Safety Pro-
20 gram, \$79,600,000 shall be for the Aeronautics Test
21 Program, \$87,300,000 shall be for the Airspace Sys-
22 tems Program, \$239,000,000 shall be for Funda-
23 mental Aeronautics, and \$122,300,000 shall be for
24 Integrated Systems Research.

25 (3) For Space Technology, \$1,059,700,000.

1 (4) For Exploration, \$4,888,500,000 of
2 which—

3 (A) \$215,000,000 shall be for Human Re-
4 search;

5 (B) \$5,000,000, shall be for the Explo-
6 ration Technology and Demonstration program;

7 (C) \$5,000,000 shall be for the Explo-
8 ration Precursor Robotic Missions program;

9 (D) \$50,000,000 shall be for commercial
10 crew transportation-related activities;

11 (E) \$4,513,500,000 shall be for the re-
12 structured exploration program described in
13 section 202; and

14 (F) \$100,000,000 shall be for the loan and
15 loan guarantee program described in section
16 243.

17 (5) For Space Operations, \$3,993,300,000, of
18 which—

19 (A) \$3,179,400,000 shall be for the ISS,
20 of which \$100,000,000 shall be for fundamental
21 space life science and physical sciences and re-
22 lated technology research using ground-based,
23 free-flyer, and ISS facilities, including ISS Na-
24 tional Laboratory research;

1 (B) \$40,000,000 shall be for the Post-
2 Shuttle Workforce Transition Initiative grant
3 program described in section 222; and

4 (C) \$773,900,000 shall be for Space and
5 Flight Support, of which \$50,000,000 shall be
6 for the 21st Century Launch Complex Initia-
7 tive.

8 (6) For Education, \$145,800,000.

9 (7) For Cross-Agency Support Programs,
10 \$3,276,800,000.

11 (8) For Construction and Environmental Com-
12 pliance and Restoration, \$376,900,000, of which
13 \$10,000,000 is an augmentation to the President's
14 requested funding level in order to support the
15 NASA laboratory revitalization initiative described in
16 section 701.

17 (9) For Inspector General, \$40,100,000.

18 **SEC. 104. FISCAL YEAR 2014.**

19 There are authorized to be appropriated to the Ad-
20 ministrator for fiscal year 2014 \$20,600,000,000, to be
21 allocated as follows:

22 (1) For Science, \$5,794,800,000, of which—

23 (A) \$2,216,600,000 shall be for Earth
24 Science;

1 (B) \$1,635,100,000 shall be for Planetary
2 Science;

3 (C) \$1,158,700,000 shall be for Astro-
4 physics;

5 (D) \$779,400,000 shall be for
6 Heliophysics, of which \$75,000,000 shall be an
7 augmentation to the Explorers program; and

8 (E) \$5,000,000 shall be an augmentation
9 to the total amount provided under subpara-
10 graphs (C) and (D) for Astrophysics and
11 Heliophysics in order to augment the funding
12 for the Science Mission Directorate's suborbital
13 research programs, to be allocated between the
14 Astrophysics and Heliophysics suborbital pro-
15 grams at the Administrator's discretion.

16 (2) For Aeronautics, \$615,100,000, of which
17 \$81,900,000 shall be for the Aviation Safety Pro-
18 gram, \$81,400,000 shall be for the Aeronautics Test
19 Program, \$88,300,000 shall be for the Airspace Sys-
20 tems Program, \$246,000,000 shall be for Funda-
21 mental Aeronautics, and \$117,500,000 shall be for
22 Integrated Systems Research.

23 (3) For Space Technology, \$1,063,900,000.

24 (4) For Exploration, \$5,106,800,000 of
25 which—

1 (A) \$215,000,000 shall be for Human Re-
2 search;

3 (B) \$10,000,000 shall be for the Explo-
4 ration Technology and Demonstration program;

5 (C) \$10,000,000 shall be for the Explo-
6 ration Precursor Robotic Missions program;

7 (D) \$50,000,000 shall be for commercial
8 crew transportation-related activities;

9 (E) \$4,721,800,000 shall be for the re-
10 structured exploration program described in
11 section 202; and

12 (F) \$100,000,000 shall be for the loan and
13 loan guarantee program described in section
14 243.

15 (5) For Space Operations, \$4,062,600,000, of
16 which—

17 (A) \$3,271,900,000 shall be for the ISS,
18 of which \$125,000,000 shall be for fundamental
19 space life science and physical sciences and re-
20 lated technology research using ground-based,
21 free-flyer, and ISS facilities, including ISS Na-
22 tional Laboratory research; and

23 (B) \$790,700,000 shall be for Space and
24 Flight Support, of which \$50,000,000 shall be

1 for the 21st Century Launch Complex Initia-
2 tive.

3 (6) For Education, \$145,800,000.

4 (7) For Cross-Agency Support Programs,
5 \$3,366,500,000.

6 (8) For Construction and Environmental Com-
7 pliance and Restoration, \$403,500,000, of which
8 \$10,000,000 is an augmentation to the President's
9 requested funding level in order to support the
10 NASA laboratory revitalization initiative described in
11 section 701.

12 (9) For Inspector General, \$41,000,000.

13 **SEC. 105. FISCAL YEAR 2015.**

14 There are authorized to be appropriated to the Ad-
15 ministrator for fiscal year 2015 \$20,990,000,000, to be
16 allocated as follows:

17 (1) For Science, \$5,899,000,000 of which—

18 (A) \$2,282,200,000 shall be for Earth
19 Science;

20 (B) \$1,654,400,000 shall be for Planetary
21 Science;

22 (C) \$1,131,600,000 shall be for Astro-
23 physics;

1 (D) \$825,800,000 shall be for
2 Heliophysics, of which \$75,000,000 shall be an
3 augmentation to the Explorers program; and

4 (E) \$5,000,000 shall be an augmentation
5 to the total amount provided under subpara-
6 graphs (C) and (D) for Astrophysics and
7 Heliophysics in order to augment the funding
8 for the Science Mission Directorate's suborbital
9 research programs, to be allocated between the
10 Astrophysics and Heliophysics suborbital pro-
11 grams at the Administrator's discretion.

12 (2) For Aeronautics, \$625,300,000, of which
13 \$82,700,000 shall be for the Aviation Safety Pro-
14 gram, \$82,200,000 shall be for the Aeronautics Test
15 Program, \$91,400,000 shall be for the Airspace Sys-
16 tems Program, \$250,000,000 shall be for Funda-
17 mental Aeronautics, and \$119,000,000 shall be for
18 Integrated Systems Research.

19 (3) For Space Technology, \$1,217,900,000.

20 (4) For Exploration, \$5,157,900,000 of
21 which—

22 (A) \$215,000,000 shall be for Human Re-
23 search;

24 (B) \$30,000,000 shall be for the Explo-
25 ration Technology and Demonstration program;

1 (C) \$30,000,000 shall be for the Explo-
2 ration Precursor Robotic Missions program;

3 (D) \$50,000,000 shall be for commercial
4 crew transportation-related activities;

5 (E) \$4,732,900,000 shall be for the re-
6 structured exploration program described in
7 section 202; and

8 (F) \$100,000,000 shall be for the loan and
9 loan guarantee program described in section
10 243.

11 (5) For Space Operations, \$4,030,500,000, of
12 which—

13 (A) \$3,232,800,000 shall be for the ISS,
14 of which \$125,000,000 shall be for fundamental
15 space life science and physical sciences and re-
16 lated technology research using ground-based,
17 free-flyer, and ISS facilities, including ISS Na-
18 tional Laboratory research; and

19 (B) \$797,700,000 shall be for Space and
20 Flight Support, of which \$50,000,000 shall be
21 for the 21st Century Launch Complex Initia-
22 tive.

23 (6) For Education, \$146,800,000.

24 (7) For Cross-Agency Support Programs,
25 \$3,462,200,000.

1 (8) For Construction and Environmental Com-
2 pliance and Restoration, \$408,500,000, of which
3 \$10,000,000 is an augmentation to the President’s
4 requested funding level in order to support the
5 NASA laboratory revitalization initiative described in
6 section 701.

7 (9) For Inspector General, \$41,900,000.

8 **TITLE II—HUMAN SPACE FLIGHT**
9 **Subtitle A—Exploration**

10 **SEC. 201. REAFFIRMATION OF EXPLORATION POLICY.**

11 Congress reaffirms its support for the exploration
12 policy set forth in sections 401 and 402 of the National
13 Aeronautics and Space Administration Authorization Act
14 of 2008 (Public Law 110–422; 122 Stat. 4788–4789).

15 **SEC. 202. RESTRUCTURED EXPLORATION PROGRAM.**

16 (a) REQUIREMENTS.—Not later than 180 days after
17 the date of enactment of this Act, the Administrator shall
18 develop a plan to restructure the exploration program in
19 existence prior to fiscal year 2011 in order to develop and
20 demonstrate in an integrated manner and as expeditiously
21 and efficiently as practicable a governmentally owned crew
22 transportation system and heavy lift transportation sys-
23 tem that satisfies the following requirements:

24 (1) The plan shall make maximum practicable
25 use of the design, development, and test work com-

1 pleted to date on the Orion crew exploration vehicle,
2 Ares I crew launch vehicle, heavy lift launch vehicle
3 system, and associated ground support and explo-
4 ration enabling systems and take best advantage of
5 investments and contracts implemented to date.

6 (2) The performance capabilities of the crew
7 transportation system shall be phased in a manner
8 that is consistent with available and anticipated re-
9 sources, with the initial operational goal of having
10 the crew transportation system developed under this
11 section available to assure crewed access to low-
12 Earth orbit and the ISS no later than December 31,
13 2015, in order to minimize the duration of the
14 United States human space flight gap following the
15 retirement of the Space Shuttle fleet. If one or more
16 United States commercial entities are certified to
17 provide ISS crew transportation and rescue services,
18 the crew transportation system developed under this
19 section shall be available as a backup ISS crew
20 transportation and rescue service as needed but shall
21 not be utilized as the primary means of ISS crew
22 transportation and rescue or otherwise compete with
23 the commercial system for ISS crew transportation
24 and rescue services.

1 (3) The crewed spacecraft element of the crew
2 transportation system shall be evolvable on a contin-
3 uous development path to support—

4 (A) ISS crew transportation and rescue ca-
5 pability;

6 (B) non-ISS missions to, from, and in low-
7 Earth orbit; and

8 (C) human missions beyond low-Earth
9 orbit.

10 (4) The crew transportation system shall be
11 able to serve as a testbed for demonstrating oper-
12 ations concepts for exploration missions beyond low-
13 Earth orbit, as well as for demonstrating tech-
14 nologies and carrying out risk reduction for the
15 heavy lift launch vehicle development program.

16 (5) The crew transportation system shall have
17 predicted levels of safety during ascent to low-Earth
18 orbit, transit, and descent from low-Earth orbit that
19 are not less than those required of the Ares I/Orion
20 configuration that has completed program prelimi-
21 nary design review.

22 (6) In order to make the most cost-effective use
23 of the funds available for the restructured explo-
24 ration program, the Administrator shall pursue the
25 expeditious and cost-efficient development of a heavy

1 lift launch system that utilizes the systems and
2 flight and ground test activities of the crew trans-
3 portation system developed under this section to the
4 maximum extent practicable. In developing the heavy
5 lift launch vehicle—

6 (A) the heavy lift launch vehicle shall be
7 sized to enable challenging missions beyond low-
8 Earth orbit and evolvable on a continuous de-
9 velopment path to enable the efficient and cost-
10 effective conduct of crewed missions to the full
11 range of destinations envisioned in the National
12 Aeronautics and Space Administration Author-
13 ization Act of 2008, namely Lagrangian points,
14 the Moon, near-Earth objects, and Mars and its
15 moons;

16 (B) not later than 180 days after the date
17 of enactment of this Act, the Administrator
18 shall carry out a review of the heavy lift launch
19 vehicle requirements needed to support crewed
20 missions to the full range of destinations envi-
21 sioned in the National Aeronautics and Space
22 Administration Authorization Act of 2008, and
23 shall select an exploration launch vehicle archi-
24 tecture to meet those requirements;

1 (C) the development of the heavy lift
2 launch vehicle authorized in this paragraph
3 shall be completed as expeditiously as possible
4 within available resources and shall take maximum benefit from the prior investments made
5 in the Orion, Ares I, and heavy lift projects and
6 from investments made in the restructured program on the development, demonstration, and
7 test of the crew transportation system; and

8
9
10 (D) the Administrator shall strive to meet
11 the goal of having the heavy lift launch vehicle
12 authorized in this paragraph available for operational missions by the end of the current decade.
13
14

15 (b) IMPLEMENTATION OF RESTRUCTURED PROGRAM.—The restructured exploration program shall be
16 implemented in a manner that—
17

18 (1) facilitates the planned transition of Space Shuttle program personnel to the restructured exploration program upon the retirement of the Space Shuttle fleet, while providing for cost effective management and vehicle development;
19
20
21

22 (2) provides for a robust flight and ground test and demonstration program;
23
24

1 (3) streamlines program management processes
2 to the maximum extent practicable while ensuring
3 that the Government’s ability to meet its responsibil-
4 ities for cost discipline, safety, and mission assur-
5 ance is maintained;

6 (4) working with industry, eliminates unneces-
7 sary NASA and industry institutional infrastructure,
8 other fixed costs, processes, and oversight, reducing
9 exploration program fixed costs to the extent prac-
10 ticable and maximizing the program’s affordability;

11 (5) incentivizes, through innovative manage-
12 ment practices, NASA program and project man-
13 agers and industry counterparts to establish and
14 maintain realistic cost and schedule estimates, and
15 take necessary steps to avoid cost and schedule
16 growth;

17 (6) seeks to minimize to the extent practicable
18 the operating costs of the crew transportation sys-
19 tem developed under the restructured exploration
20 program;

21 (7) enables the restructured exploration pro-
22 gram to undertake in an incremental fashion in-
23 creasingly challenging uncrewed and crewed dem-
24 onstration flights in and beyond low-Earth orbit;

1 (8) allows the systems developed under the re-
2 structured exploration program to serve as potential
3 testbeds for the demonstration of key enabling explo-
4 ration technologies and operational capabilities; and

5 (9) prepares for and enables human missions to
6 a variety of destinations in the inner solar system,
7 including cislunar space, the Moon, Lagrangian
8 points, near-Earth objects, and ultimately Mars and
9 its moons.

10 (c) **SUPPORT SYSTEMS.**—The restructured explo-
11 ration program shall continue work on ground systems
12 and other exploration-enabling technologies and capabili-
13 ties needed to support the exploration program as expedi-
14 tiously as possible within available resources.

15 (d) **INTERNATIONAL COLLABORATION.**—The Admin-
16 istrator shall explore potential international collaborations
17 that would enable more ambitious exploration missions in
18 a timely manner and within available resources than would
19 otherwise be possible, such as human lunar landings or
20 the incremental establishment of a lunar research outpost.

21 **SEC. 203. SPACE RADIATION.**

22 (a) **STRATEGY.**—The Administrator shall develop a
23 space radiation mitigation and management strategy and
24 implementation plan that includes key milestones, a time-
25 table, and estimation of budget requirements. The strat-

1 egy shall include a mechanism to coordinate NASA re-
2 search, technology, facilities, engineering, operations, and
3 other functions required to support the strategy and plan.
4 The Administrator shall transmit the strategy and plan
5 to the Congress not later than 12 months after the date
6 of enactment of this Act.

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

13 (c) RESEARCH ON SOLAR PARTICLE EVENTS.—The
14 Administrator shall carry out research on solar particle
15 events to improve the predictions and forecasts of solar
16 particle events that could affect human missions beyond
17 low-Earth orbit.

18 **Subtitle B—International Space** 19 **Station**

20 **SEC. 211. EXTENSION OF ISS OPERATIONS.**

21 The Administrator shall, in consultation with the ISS
22 partners, take all necessary measures to support the oper-
23 ation and full utilization of the International Space Sta-
24 tion through at least the year 2020, if it can continue to
25 be operated safely over that period. The Administrator

1 shall, in consultation with the ISS partners, seek to mini-
2 mize to the extent practicable the operating costs of the
3 ISS.

4 **SEC. 212. ISS RESEARCH MANAGEMENT INSTITUTION.**

5 (a) DESIGNATION.—Pursuant to section 507 of the
6 National Aeronautics and Space Administration Author-
7 ization Act of 2005 (42 U.S.C. 16767), the Administrator
8 shall designate an independent, nonprofit United States
9 institution, based on the result of a competitive solicita-
10 tion, for the management of fundamental space life science
11 and physical sciences and related technology research to
12 be conducted on the ISS, as well as all research, including
13 United States commercial research, that is funded by non-
14 NASA United States domestic entities and carried out on
15 the ISS.

16 (b) RESPONSIBILITIES.—The research management
17 institution designated under subsection (a) shall make rec-
18 ommendations to the Administrator for—

19 (1) competitively selecting, prioritizing, and
20 overseeing United States ISS research projects
21 across all United States users, sponsors, and dis-
22 ciplines, including domestic entities other than
23 NASA, seeking to carry out research on the ISS;

24 (2) establishing a process for governance of
25 United States ISS research users;

1 (3) conducting outreach and education to en-
2 hance the utilization of the ISS; and

3 (4) providing easily accessible information on
4 the United States capabilities, research facilities,
5 and resources associated with the United States re-
6 search use of the ISS.

7 (c) DEVIATIONS.—If the Administrator takes actions
8 that deviate from the recommendations provided by the
9 research management institution under subsection (b), the
10 Administrator shall transmit to the Congress a report ex-
11 plaining the reasons for such deviation.

12 (d) OTHER GOVERNMENT CONTRACTS.—Other gov-
13 ernment agencies engaged in research and development
14 are authorized to enter into contracts with the nonprofit
15 organization designated under subsection (a) if it is deter-
16 mined by those agencies to be beneficial to meeting their
17 mission requirements for use of the ISS.

18 **SEC. 213. ISS RESEARCH MANAGEMENT PLAN.**

19 (a) IN GENERAL.—The Administrator, in coordina-
20 tion with the Associate Administrator for the Space Oper-
21 ations Mission Directorate, shall require that the institu-
22 tion designated under section 212(a) prepare for the Ad-
23 ministrator a United States ISS research management
24 plan that—

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

3 (2) identifies the expertise and support avail-
4 able to researchers selected to carry out research on
5 the ISS;

6 (3) establishes a process for determining alloca-
7 tion schedules for research to be carried out on the
8 ISS;

9 (4) establishes a process for accommodating
10 logistical and transportation requirements for ISS
11 research payloads;

12 (5) prescribes flight schedules for research pay-
13 loads to the ISS (and research materials to be re-
14 turned to Earth, if necessary); and

15 (6) addresses other factors associated with the
16 selection, management, and oversight of United
17 States ISS research.

18 (b) TRANSMITTAL TO CONGRESS.—The plan shall be
19 transmitted to the Congress not later than 2 years after
20 the date of enactment of this Act.

21 **SEC. 214. OUTREACH PLAN FOR UNITED STATES ISS RE-**
22 **SEARCH.**

23 Not later than 2 years after the date of enactment
24 of this Act, the Administrator shall transmit to the Con-
25 gress a plan prepared by the institution designated under

1 section 212(a) for broadening and enhancing the outreach
2 to potential United States Government, academic, and
3 commercial users of the ISS.

4 **SEC. 215. ISS CARGO RESUPPLY REQUIREMENTS AND CON-**
5 **TINGENCY CAPACITY THROUGH 2020.**

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

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

23 (c) ADDITIONAL RESUPPLY OPTIONS.—The Admin-
24 istrator shall explore with ISS partners options for ensur-
25 ing the provision of needed upmass to and downmass from

1 the ISS in the event that adequate commercial cargo re-
2 supply capabilities are not available during any extended
3 period after the date that the Space Shuttle is retired.

4 **SEC. 216. CENTRIFUGE.**

5 (a) ASSESSMENT.—The Administrator shall carry out
6 an assessment of innovative options for deploying a vari-
7 able-gravity centrifuge on the ISS. The assessment shall
8 identify the requirements for a variable-gravity centrifuge
9 to support fundamental and applied research on the ISS,
10 including research to help mitigate the risk of long-term
11 spaceflight beyond low-Earth orbit. The assessment shall
12 also—

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

15 (2) provide an estimate of the potential cost
16 and timeline for developing and deploying the cen-
17 trifuge capabilities evaluated as part of the assess-
18 ment;

19 (3) evaluate the status of previous work on de-
20 velopment of an in-flight centrifuge for the ISS and
21 the cost and time that would be required to complete
22 the work and the launch the facility; and

23 (4) identify the potential for international col-
24 laboration and other potential partnerships or inno-
25 vative acquisition approaches that could facilitate

1 the development and deployment of a centrifuge fa-
2 cility for the ISS.

3 (b) TRANSMITTAL TO CONGRESS.—The Adminis-
4 trator shall transmit the assessment described in sub-
5 section (a) to the Congress not later than 1 year after
6 the date of enactment of this Act.

7 **SEC. 217. EXPLORATION TECHNOLOGY DEVELOPMENT**
8 **USING THE ISS.**

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

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

1 **SEC. 218. FUNDAMENTAL SPACE LIFE SCIENCE AND PHYS-**
2 **ICAL SCIENCES AND RELATED TECHNOLOGY**
3 **RESEARCH.**

4 (a) STRATEGIC PLAN FOR SCIENCE AND TECH-
5 NOLOGY RESEARCH.—

6 (1) DEVELOPMENT.—The Administrator, in
7 consultation with academia, other Federal agencies,
8 and other potential stakeholders, shall develop a
9 strategic plan for carrying out competitive, peer-re-
10 viewed fundamental space life science and physical
11 sciences and related technology research, including
12 research on phenomena such as the response of
13 fluids and materials to reduced gravity environments
14 that need to be understood in developing explo-
15 ration-related technologies and systems. The plan
16 shall—

17 (A) address the facilities and instrumenta-
18 tion that would enable and facilitate such re-
19 search;

20 (B) be consistent with the priorities and
21 recommendations established by the National
22 Academies in its decadal survey of life and
23 microgravity sciences;

24 (C) provide a research timeline and iden-
25 tify the resource requirements for its implemen-
26 tation;

1 (D) include an estimate of the number of
2 students, including undergraduate, graduate,
3 and post-doctoral students, and early-career re-
4 searchers that would be supported in carrying
5 out the plan; and

6 (E) identify—

7 (i) criteria for the proposed space re-
8 search, including—

9 (I) a justification for the research
10 to be carried out in the space micro-
11 gravity environment;

12 (II) the use of model systems;

13 (III) the testing of flight hard-
14 ware to understand and ensure its
15 functioning in the microgravity envi-
16 ronment;

17 (IV) the use of controls to help
18 distinguish among the direct and indi-
19 rect effects of microgravity, among
20 other effects of the flight or space en-
21 vironment;

22 (V) approaches for facilitating
23 data collection, analysis, and interpre-
24 tation;

1 (VI) procedures to ensure repeti-
2 tion of experiments as needed; and

3 (VII) support for timely presen-
4 tation of the peer-reviewed results of
5 the research;

6 (ii) instrumentation required to sup-
7 port the measurements and analysis of the
8 research to be carried out under the stra-
9 tegic plan, including the potential use of
10 instrumentation developed by other coun-
11 tries and the potential for a variable-grav-
12 ity centrifuge to support the research;

13 (iii) the capabilities needed to support
14 direct, real-time communications between
15 astronauts working on research experi-
16 ments onboard the ISS and the principal
17 investigator on the ground; and

18 (iv) a process for involving the exter-
19 nal user community in research planning,
20 including planning for relevant flight hard-
21 ware and instrumentation, and for utiliza-
22 tion of the ISS, free flyers, or other re-
23 search platforms.

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

1 the Administrator shall transmit the strategic plan
2 developed under paragraph (1) to the Congress.

3 (b) INTEGRATED RESEARCH MANAGEMENT ORGANI-
4 ZATION.—

5 (1) RESPONSIBLE OFFICIAL.—

6 (A) IN GENERAL.—The Administrator
7 shall ensure that a responsible official is des-
8 igned at NASA headquarters to lead a com-
9 petitive, integrated basic and applied research
10 program in fundamental space life science and
11 physical sciences and related technology.

12 (B) RESPONSIBILITIES.—The official des-
13 igned under subparagraph (A) shall be re-
14 sponsible for—

15 (i) leading near-term and long-term
16 strategic planning pursuant to the research
17 plan developed under subsection (a);

18 (ii) ensuring the input of the external
19 user community in science planning proc-
20 esses;

21 (iii) ensuring the implementation of
22 an integrated, multidisciplinary and inter-
23 disciplinary, competitive research program
24 in fundamental space life and physical
25 sciences and related technology;

1 (iv) supporting the appropriate inter-
2 action of research investigators and agency
3 managers and engineers in planning, de-
4 signing, testing, and operations related to
5 such research projects;

6 (v) monitoring progress of the pro-
7 gram in achieving the objectives and mile-
8 stones identified in the strategic plan de-
9 veloped under subsection (a)(1); and

10 (vi) other functions required to sup-
11 port the research program under this sec-
12 tion.

13 (C) COORDINATION AND COMMUNICA-
14 TIONS.—The Administrator shall ensure that
15 the responsible official coordinates and commu-
16 nicates the fundamental space life science and
17 physical sciences and related technology re-
18 search activities with relevant entities within
19 NASA, with the ISS research management in-
20 stitution designated under section 212(a), and
21 with other relevant agencies and organizations.

22 (2) BUDGET REQUEST.—The Administrator
23 shall, as part of the annual NASA fiscal year budget
24 request—

1 (A) identify and include a description of
2 research being carried out pursuant to section
3 204 of the National Aeronautics and Space Ad-
4 ministration Authorization Act of 2005 (42
5 U.S.C. 16633); and

6 (B) identify the percentage of the total re-
7 search budget for ISS research that the re-
8 search described in subparagraph (A) rep-
9 resents; and

10 (C) identify the programs proposed for
11 carrying out research activities on the ISS and
12 the proposed funding to support those research
13 programs, including a breakdown for each of
14 the programs identified of the funding re-
15 quested for competitive grants.

16 **Subtitle C—Space Shuttle**

17 **SEC. 221. EXPANDED SCOPE OF SPACE SHUTTLE TRANSI-** 18 **TION LIAISON OFFICE.**

19 Section 613(b) of the National Aeronautics and
20 Space Administration Authorization Act of 2008 (42
21 U.S.C. 17761(b)) is amended—

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

1 (2) in paragraph (3), by striking “2 years after
2 the completion of the last Space Shuttle flight” and
3 inserting “2 years after the award of the final grant
4 under section 222 of the National Aeronautics and
5 Space Administration Authorization Act of 2010”.

6 **SEC. 222. POST-SHUTTLE WORKFORCE TRANSITION INITIA-**
7 **TIVE GRANT PROGRAM.**

8 (a) ESTABLISHMENT.—

9 (1) IN GENERAL.—The Administrator, acting
10 through the Post-Shuttle Transition Liaison Office
11 established under section 613(b) of the National
12 Aeronautics and Space Administration Authorization
13 Act of 2008 (42 U.S.C. 17761(b)), as amended by
14 section 221, is authorized to make grants for the es-
15 tablishment, operation, coordination, and implemen-
16 tation of aerospace workforce and community transi-
17 tion strategies.

18 (2) TRANSFER.—The Administrator may trans-
19 fer amounts made available under this section to
20 other Federal agencies for the purpose of assisting
21 in the transition of aerospace workers and commu-
22 nities adversely affected by the termination of the
23 Space Shuttle program.

1 (b) USE OF FUNDS.—A recipient of a grant under
2 subsection (a) shall use the funds made available through
3 the grant to—

4 (1) conduct community and business outreach;

5 (2) develop and implement regional
6 revitalization and facilities reuse strategies;

7 (3) support entrepreneurship and new business
8 development initiatives; and

9 (4) support workforce retraining.

10 **SEC. 223. DISPOSITION OF ORBITER VEHICLES.**

11 (a) IN GENERAL.—Upon the termination of the
12 Space Shuttle Program, the Administrator shall decom-
13 mission any remaining Space Shuttle orbiter vehicles ac-
14 cording to established safety and historic preservation pro-
15 cedures prior to their designation as surplus government
16 property. The orbiter vehicles shall be made available and
17 located for display and maintenance through a competitive
18 procedure established pursuant to the disposition plan de-
19 veloped under section 613(a) of the National Aeronautics
20 and Space Administration Act of 2008 (42 U.S.C.
21 17761(a)), with priority consideration given to eligible ap-
22 plicants meeting all conditions of that plan which would
23 provide for the display and maintenance of orbiters at lo-
24 cations with the best potential value to the public, includ-
25 ing where the location of the orbiters can advance edu-

1 cational opportunities in science, technology, engineering,
2 and mathematics disciplines, and with an historical rela-
3 tionship with either the launch, flight operations, or proc-
4 essing of the Space Shuttle orbiters.

5 (b) SMITHSONIAN INSTITUTION ORBITER.—Notwith-
6 standing the procedures in subsection (a), the Smithso-
7 nian Institution shall be entitled to receive one of the re-
8 maining Space Shuttle orbiter vehicles. The Administrator
9 shall collaborate with the Secretary of the Smithsonian In-
10 stitution to determine which orbiter the Smithsonian Insti-
11 tution shall receive, and otherwise determine the timing
12 and procedures of transfer from NASA to the Smithsonian
13 Institution. The Smithsonian Institution, which, as of the
14 date of enactment of this Act, houses the Space Shuttle
15 Enterprise, shall determine any new location for the En-
16 terprise.

17 (c) DISPLAY AND MAINTENANCE.—The orbiter vehi-
18 cles made available under subsection (a) shall be displayed
19 and maintained through agreements and procedures es-
20 tablished pursuant to section 613(a) of the National Aero-
21 nautics and Space Administration Authorization Act of
22 2008 (42 U.S.C. 17761(a)).

1 **Subtitle D—Space and Flight**
2 **Support**

3 **SEC. 231. 21ST CENTURY SPACE LAUNCH COMPLEX INITIA-**
4 **TIVE.**

5 In carrying out the 21st Century Space Launch Com-
6 plex Initiative, the Administrator shall give priority to ac-
7 tivities in support of the program established in section
8 202.

9 **Subtitle E—Commercial Crew**
10 **Transportation**

11 **SEC. 241. AFFIRMATION OF POLICY.**

12 The Congress affirms the policy of—

13 (1) making use of United States commercially
14 provided ISS crew transportation and crew rescue
15 services to the maximum extent practicable;

16 (2) limiting, to the maximum extent practicable,
17 the use of the system developed under section 202
18 to non-ISS missions once commercial crew transpor-
19 tation and crew rescue services that meet safety re-
20 quirements become operational; and

21 (3) facilitating, to the maximum extent prac-
22 ticable, the transfer of NASA-developed technologies
23 to United States commercial orbital human space
24 transportation companies in order to help promote

1 the development of commercially provided ISS crew
2 transportation and crew rescue services.

3 **SEC. 242. COMMERCIAL CREW AND RELATED COMMERCIAL**
4 **SPACE INITIATIVES.**

5 (a) COMMERCIAL SERVICES OPPORTUNITIES.—
6 NASA shall seek, to the extent practicable, to make use
7 of commercially available space services, including com-
8 mercially available services to transport United States
9 Government astronauts to and from the ISS, provided
10 that—

11 (1) those commercial services have dem-
12 onstrated the capability to meet NASA-specified as-
13 cent, transit, entry, and ISS proximity operations
14 safety requirements;

15 (2) the services provider has completed, and
16 NASA has verified, crewed flight demonstrations or
17 operational flights that comply with NASA stand-
18 ards, policies, and procedures; and

19 (3) the per-seat cost to the United States is not
20 greater than the per-seat cost for the system devel-
21 oped under section 202.

22 (b) HUMAN-RATING.—The Administrator shall estab-
23 lish requirements, standards, and processes for the human
24 rating of space transportation systems that are equivalent
25 to NASA safety processes and procedures.

1 (c) TECHNOLOGY TRANSFER.—The Administrator
2 shall make available, on a nonexclusive basis, NASA-devel-
3 oped technologies for transfer to potential United States
4 commercial orbital human space transportation compa-
5 nies. NASA shall determine the appropriate means,
6 through cost-reimbursable arrangements or other mecha-
7 nisms, to transfer the technologies.

8 (d) TECHNICAL ASSISTANCE AND FACILITIES.—The
9 Administrator shall make available, to the extent prac-
10 ticable, NASA facilities and equipment to assist in the
11 testing and demonstration of commercial crew transpor-
12 tation systems, including those associated with NASA’s
13 safety and mission assurance activities, such as NASA’s
14 Independent Verification and Validation facility for soft-
15 ware verification. The Administrator shall determine the
16 appropriate means, through cost-reimbursable arrange-
17 ments, agreements entered into under section 203(c)(5)
18 of the National Aeronautics and Space Act of 1958 (42
19 U.S.C. 2473(c)(5)), or other mechanisms, to provide tech-
20 nical assistance and access to facilities to the commercial
21 space sector.

22 (e) NASA INSIGHT AND OVERSIGHT PROCESSES.—
23 Any company that seeks to provide commercial crew trans-
24 portation services under contract to NASA shall enter into
25 an arrangement with NASA that allows NASA to obtain

1 ongoing insight into the design methodologies, processes,
2 technologies, test data, and production and quality control
3 practices employed in the development of the commercial
4 crew transportation system throughout the development,
5 test, demonstration, and production phases. NASA may
6 offer early warning of conditions that could lead NASA
7 to withhold certification of the crew transportation sys-
8 tems for the flight of United States Government personnel
9 or to decline to enter into a contract for services. NASA
10 may not require the company to make changes to its de-
11 sign, technologies, or processes during the development,
12 test, demonstration, or production phases.

13 (f) CONTRACTS FOR COMMERCIALLY AVAILABLE ISS
14 CREW TRANSPORTATION AND CREW RESCUE SERV-
15 ICES.—

16 (1) CERTIFICATION OF SAFETY AND RELI-
17 ABILITY.—Before entering into a contract for the
18 use of commercially available commercial crew trans-
19 portation or crew rescue services for United States
20 Government astronauts, the Administrator shall cer-
21 tify that a commercial ISS crew transportation and
22 crew rescue service provider with which a contract is
23 planned has demonstrated the safety and reliability
24 of its systems for crew transportation and crew res-
25 cue to be equivalent to NASA-promulgated safety

1 and reliability policies, procedures, and standards for
2 human spaceflight. Individual certifications made
3 under this paragraph shall be provided to the Com-
4 mittee on Science and Technology of the House of
5 Representatives and to the Committee on Commerce,
6 Science, and Transportation of the Senate.

7 (2) FLIGHT EXPERIENCE.—The Administrator
8 shall not enter into any contract or commit any
9 United States Government funds for a commercial
10 ISS crew transportation or rescue service to a serv-
11 ice provider until sufficient successful flight experi-
12 ence has been accrued by the service provider’s sys-
13 tem to provide to NASA the safety-related and reli-
14 ability-related data and information needed to deter-
15 mine whether to fly its astronauts on that system.
16 The Administrator shall require an amount of dem-
17 onstrated flight experience for a commercial crew
18 transportation system that is at least as much as
19 NASA requires under Alternative 1 as delineated in
20 the NASA Policy Directive NPD 8610.7D, effective
21 January 31, 2008, for common launch vehicle con-
22 figurations before Class A (high cost and high pri-
23 ority) payloads can be flown on them.

24 (3) ADMINISTRATOR’S ACTIONS.—To facilitate
25 the ability of commercial crew transportation pro-

1 viders to comply with NASA human spaceflight safe-
2 ty and reliability requirements, the Administrator
3 shall—

4 (A) develop and communicate the human-
5 rating requirements established under sub-
6 section (b) to commercial space companies;

7 (B) establish minimum acceptable safety
8 levels;

9 (C) provide technical assistance, to the
10 maximum extent practicable, to the commercial
11 space sector in understanding and applying
12 NASA human-rating requirements, standards,
13 and processes to commercial crew transpor-
14 tation and crew rescue systems;

15 (D) establish and communicate to the com-
16 mercial sector the process NASA will apply for
17 securing ongoing NASA insight into the design
18 methodologies, processes, technologies, test
19 data, and production and quality control prac-
20 tices employed in the development of the com-
21 mercial crew transportation system throughout
22 the development, test, demonstration, and pro-
23 duction phases;

24 (E) establish and communicate to the com-
25 mercial sector NASA's process for certifying

1 that commercial human spaceflight systems (in-
2 cluding mission control, operations, ground sys-
3 tems, and other supporting infrastructure) com-
4 ply with NASA human-rating requirements and
5 standards and related NASA policies and proce-
6 dures for safety and reliability, which process
7 shall be no less stringent than the NASA poli-
8 cies and procedural requirements established
9 for launch of Class A (high cost and high pri-
10 ority) payloads; and

11 (F) ensure that the certification estab-
12 lished under subparagraph (E) includes inde-
13 pendent verification and validation of compli-
14 ance with NASA policies, procedures, and
15 standards.

16 (g) ASAP REVIEW OF NASA’S HUMAN-RATING RE-
17 QUIREMENTS, STANDARDS, AND PROCESSES.—

18 (1) IN GENERAL.—The Aerospace Safety Advi-
19 sory Panel shall conduct a review to identify issues
20 pertinent to the establishment of human-rating re-
21 quirements, standards, and processes for commercial
22 crew transportation and rescue systems that are pro-
23 posed for transport of United States astronauts.

24 (2) REPORT.—Not later than 1 year after the
25 date of enactment of this Act, the Aerospace Safety

1 and Advisory Panel shall transmit to the Congress
2 a report describing—

3 (A) the Panel’s assessment of NASA’s cur-
4 rently established human-rating specifications
5 and guidance;

6 (B) the Panel’s view of the mandatory
7 safety requirements that must be met with re-
8 gard to human rating; and

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

14 (h) INDEMNIFICATION AND LIABILITY.—The Admin-
15 istrator shall not proceed with a request for proposals,
16 award any contract, or commit any United States Govern-
17 ment funds for a commercial ISS crew transportation or
18 rescue service to be provided by a commercial service pro-
19 vider until all indemnification and liability issues associ-
20 ated with the use of such systems by the United States
21 Government shall have been addressed and the Adminis-
22 trator has provided to the Congress a report describing
23 the indemnification and liability provisions that are
24 planned to be included in such contracts.

1 (i) PREDICTED LEVEL OF SAFETY.—The Adminis-
2 trator shall not award any contract or commit any United
3 States Government funds for a commercial ISS crew
4 transportation system service to a service provider unless
5 that commercial crew transportation system has a pre-
6 dicted level of safety during ascent to low-Earth orbit,
7 transit, and descent from low-Earth orbit that is not less
8 than that specified for the Government system in section
9 202(a)(5).

10 **SEC. 243. FEDERAL ASSISTANCE FOR THE DEVELOPMENT**
11 **OF COMMERCIAL ORBITAL HUMAN SPACE**
12 **TRANSPORTATION SERVICES.**

13 (a) ESTABLISHMENT.—The Administrator shall es-
14 tablish a program to provide financial assistance in the
15 form of direct loans or loan guarantees to commercial enti-
16 ties for the costs of development of orbital human space
17 transportation systems.

18 (b) ELIGIBLE PROJECTS.—A loan or loan guarantee
19 may be made under such program only for a project in
20 the United States to develop commercial orbital human
21 space transportation systems that would be used to pro-
22 vide transportation services to and from low Earth orbit.

23 (c) ELIGIBLE BORROWER.—A loan or loan guarantee
24 may be made under such program only for a borrower who

1 is determined by the Administrator to be eligible under
2 the criteria established pursuant to subsection (i).

3 (d) LIMITATIONS.—No loan or guarantee shall be
4 made unless the Administrator determines that—

5 (1) there is a reasonable prospect of repayment
6 of the principal and interest on the obligation by the
7 borrower; and

8 (2) the amount of the obligation (when com-
9 bined with amounts available to the borrower from
10 other sources which shall be a minimum of 25 per-
11 cent of the total expected project development cost)
12 is sufficient to carry out the total development
13 project.

14 (e) SUPERIORITY OF RIGHTS.—The rights of the Ad-
15 ministrator, with respect to any property acquired pursu-
16 ant to a loan, shall be superior to the rights of any other
17 person with respect to the property.

18 (f) TERMS AND CONDITIONS.—Notwithstanding any
19 other provision of law, a loan or loan guarantee made pur-
20 suant to this section shall—

21 (1) bear interest at an annual rate, as deter-
22 mined by the Administrator, of—

23 (A) in the case of a direct loan—

1 (i) the cost of borrowing to the De-
2 partment of the Treasury for obligations of
3 comparable maturity; or

4 (ii) 4 percent; and

5 (B) in the case of a guaranteed loan, the
6 current applicable market rate for a loan of
7 comparable maturity; and

8 (2) have a term not to exceed 30 years.

9 (g) CONSULTATION.—In establishing the terms and
10 conditions of a loan or loan guarantee under this section,
11 the Administrator shall consult with the Secretary of the
12 Treasury.

13 (h) FEES.—

14 (1) IN GENERAL.—The Administrator shall
15 charge and collect fees for loans and loan guarantees
16 in amounts the Administrator determines are suffi-
17 cient to cover applicable administrative expenses.

18 (2) AVAILABILITY.—Fees collected under this
19 subsection shall—

20 (A) be deposited by the Administrator into
21 the Treasury of the United States; and

22 (B) remain available until expended, sub-
23 ject to such other conditions as are contained in
24 annual appropriations Acts.

1 (3) LIMITATION.—In charging and collecting
2 fees under paragraph (1), the Administrator shall
3 take into consideration the amount of the obligation.

4 (i) REGULATIONS.—The Administrator shall issue
5 final regulations before making any loan or loan guarantee
6 under the program. Such regulations shall include—

7 (1) criteria that the Administrator shall use to
8 determine eligibility for loans and loan guarantees
9 under this section, including whether a borrower
10 demonstrates that a non-governmental market exists
11 for the orbital human space transportation service,
12 as evidenced by written statements of interest from
13 potential purchasers of the services;

14 (2) criteria that the Administrator shall use to
15 determine the amount of any fees charged under
16 subsection (h), including criteria related to the
17 amount of the obligation; and

18 (3) any other policies, procedures, or informa-
19 tion necessary to implement this section.

20 (j) AUDIT.—

21 (1) ANNUAL INDEPENDENT AUDITS.—The Ad-
22 ministrator shall enter into an arrangement with an
23 independent auditor for annual evaluations of the
24 program under this section.

1 (2) COMPTROLLER GENERAL REVIEW.—The
2 Comptroller General of the United States shall con-
3 duct a biennial review of the Administrator’s execu-
4 tion of the program under this section.

5 (3) REPORT.—The results of the independent
6 audit under paragraph (1) and the Comptroller Gen-
7 eral’s review under paragraph (2) shall be provided
8 directly to the Committee on Science and Tech-
9 nology of the House of Representatives and the
10 Committee on Commerce, Science, and Transpor-
11 tation of the Senate.

12 (k) REPORT TO CONGRESS.—Concurrent with the
13 submission to Congress of the President’s annual budget
14 request in each year after the date of enactment of this
15 section, the Secretary shall transmit to the Committee on
16 Science and Technology of the House of Representatives
17 and the Committee on Commerce, Science, and Transpor-
18 tation of the Senate a report containing a summary of
19 all activities carried out under this section.

20 (l) MINIMIZING RISK.—The Administrator shall pro-
21 mulgate regulations and policies to carry out this section
22 in accordance with Office of Management and Budget Cir-
23 cular No. A–129, entitled “Policies for Federal Credit
24 Programs and Non-Tax Receivables”, as in effect on the
25 date of enactment of this section.

1 (m) DEFINITIONS.—In this section:

2 (1) COST.—The term “cost” has the meaning
3 given such term under section 502 of the Federal
4 Credit Reform Act of 1990 (2 U.S.C. 661a).

5 (2) OBLIGATION.—The term “obligation”
6 means the loan issued under this section or the loan
7 or other debt obligation that is guaranteed under
8 this section.

9 (3) PROGRAM.—The term “program” means
10 the program established in subsection (a).

11 **TITLE III—SCIENCE**

12 **Subtitle A—Earth Science**

13 **SEC. 301. EARTH SCIENCE APPLICATIONS.**

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

1 sonnel for the purpose of aiding State, local, regional, trib-
2 al, and other Federal Government needs.

3 **SEC. 302. ESSENTIAL SPACE-BASED EARTH SCIENCE AND**
4 **CLIMATE MEASUREMENTS.**

5 The Administrator, in cooperation with the Adminis-
6 trator of NOAA and other relevant Federal agencies, shall
7 enter into an arrangement with the National Academies
8 for a study, to be completed, and transmitted to the Con-
9 gress not later than 18 months after the date of enactment
10 of this Act, to provide a prioritized list and definition of
11 essential Earth science and climate measurements that
12 should be collected with space-based means, and main-
13 tained and archived by the Federal Government on a con-
14 tinuous basis. The study shall also identify which measure-
15 ments could potentially be obtained through international
16 partnerships, from data purchases or other arrangements
17 with private or commercial entities, or from other relevant
18 sources.

19 **SEC. 303. COMMERCIAL REMOTE SENSING DATA PUR-**
20 **CHASES PILOT PROJECT.**

21 (a) WORKSHOP.—Not later than 9 months after the
22 date of enactment of this Act, the Administrator shall or-
23 ganize a workshop including relevant commercial remote
24 sensing data providers, scientists, and remote sensing data
25 users, among other relevant stakeholders, to identify the

1 essential criteria for a pilot project for purchasing com-
2 mercial remote sensing data to support research in Earth
3 science and for applied uses of the data to address State,
4 local, regional, and tribal needs. The workshop shall ad-
5 dress lessons learned and recommendations related to past
6 experience with commercial data purchases, including
7 those outlined in the National Research Council report en-
8 titled “Toward New Partnerships in Remote Sensing:
9 Government, the Private Sector, and Earth Science Re-
10 search”.

11 (b) PILOT PROJECT.—Not later than 18 months
12 after the date of enactment of this Act, after consideration
13 of the results of the workshop under subsection (a) and
14 after obtaining relevant information from potential com-
15 mercial remote sensing data providers and users of such
16 data, the Administrator shall establish a pilot project for
17 the provision, through competitive solicitations, of com-
18 mercial remote sensing data to serve research and applied
19 uses of the data to serve State, local, regional, and tribal
20 needs.

21 **Subtitle B—Space Science**

22 **SEC. 311. SUBORBITAL PROGRAMS.**

23 (a) RESPONSIBLE OFFICIAL.—

24 (1) IN GENERAL.—The Administrator shall en-
25 sure that an individual who shall report directly to

1 the Associate Administrator of the Science Mission
2 Directorate is designated to lead NASA's suborbital
3 and airborne program.

4 (2) RESPONSIBILITIES.—The designated indi-
5 vidual shall be responsible for—

6 (A) leading near-term and long-term stra-
7 tegic planning for the suborbital and airborne
8 program;

9 (B) ensuring the implementation of stra-
10 tegic and other relevant plans;

11 (C) integrating NASA's suborbital and air-
12 borne programs;

13 (D) ensuring the productivity of the sub-
14 orbital facilities and assets as necessary to
15 carry out the plans;

16 (E) coordinating NASA's suborbital activi-
17 ties with associated NASA offices and Centers,
18 universities, and other external institutions; and

19 (F) monitoring progress on meeting the
20 strategic objectives for enhanced suborbital and
21 airborne activities, NASA workforce develop-
22 ment, and integration of suborbital activities
23 within NASA's overall plans and priorities.

24 (b) STRATEGIC PLAN.—Not later than 1 year after
25 the date of enactment of this Act, the Administrator shall

1 provide to the Congress a strategic plan to support the
2 full and productive use of NASA’s suborbital and airborne
3 assets as a foundation for meeting its scientific research,
4 engineering, workforce development, and education goals
5 and objectives across NASA centers and mission direc-
6 torates and in partnership with universities and other rel-
7 evant external institutions. The strategic plan shall—

8 (1) be developed in consultation with relevant
9 NASA offices and Centers and with input from uni-
10 versities, nonprofit research institutions, and private
11 industry;

12 (2) identify the needs and priorities for using
13 NASA’s airborne and suborbital assets to support
14 NASA’s scientific research, engineering, workforce
15 development, and educational goals;

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

21 (4) provide an estimate of the budget require-
22 ments and a schedule and timeline for implementing
23 the plan.

24 (c) TRAINING AND PROFESSIONAL DEVELOPMENT.—
25 The Administrator shall, to the extent practicable, expand

1 the opportunities within NASA's suborbital programs for
2 training science and engineering students and for pro-
3 viding professional development for early career profes-
4 sionals. Training and development activities shall be ex-
5 panded consistent with the goals and objectives of the
6 strategic plan to be developed under subsection (b).

7 **SEC. 312. EXPLORER PROGRAM.**

8 (a) REVIEW OF EXPLORER PROGRAM.—

9 (1) ESTABLISHMENT.—Not later than 120 days
10 after the date of enactment of this Act, the Adminis-
11 trator shall enter into an arrangement with the Na-
12 tional Academies to conduct a review of the Explorer
13 Program and offer any recommendations as it con-
14 siders necessary.

15 (2) SCOPE.—Such review shall address at least
16 the following:

17 (A) A review of existing or recent Explorer
18 program elements such as NASA's University
19 Class Explorer (UNEX), Small Explorer
20 (SMEX), Medium Class Explorer (MIDEX),
21 Explorers (EX), and Missions of Opportunity to
22 assess the degree of—

23 (i) innovation in instrumentation, and
24 other technology and space mission ele-
25 ments;

1 (ii) flexibility and new approaches in
2 management and collaboration;

3 (iii) project implementation within the
4 planned budget and schedule; and

5 (iv) training opportunities for space
6 scientists and engineers.

7 (B) The status, capability, and availability
8 of launch vehicles and infrastructure to support
9 the Explorer program elements.

10 (C) Projected launch capabilities and facili-
11 ties for Explorers, including private sector
12 launch capabilities.

13 (D) The frequency of Explorer missions.

14 (E) The balance of Explorer missions
15 among theme areas and between larger and
16 smaller mission sizes.

17 (F) The opportunities and challenges for
18 partner participation in Explorer missions, in-
19 cluding international and interagency collabora-
20 tions.

21 (G) The contributions of Explorers to a ro-
22 bust space science program, and the value of
23 the Explorer Program for the Nation's scientific
24 research and engineering community, including

1 its impact on training of younger researchers
2 and engineers.

3 (3) REPORT.—Not later than 16 months after
4 the date of enactment of this Act, the Administrator
5 shall transmit to the Congress the review and a plan
6 for responding to the recommendations of the re-
7 view.

8 **SEC. 313. RADIOISOTOPE THERMOELECTRIC GENERATOR**
9 **MATERIAL REQUIREMENTS AND SUPPLY.**

10 (a) ANALYSIS OF REQUIREMENTS AND RISKS.—The
11 Administrator, in consultation with other Federal agen-
12 cies, shall conduct an analysis of NASA requirements for
13 radioisotope power system material which is needed to
14 carry out planned, high priority robotic missions in the
15 solar system and other surface exploration activities be-
16 yond low-Earth orbit, as well as the risks to NASA mis-
17 sions in meeting those requirements, or any additional re-
18 quirements, due to a lack of adequate domestic production
19 of radioisotope power system material. The analysis
20 shall—

21 (1) detail NASA's current projected mission re-
22 quirements for radioisotope power system material;

23 (2) explain the assumptions used to determine
24 NASA's requirements for the material, including—

1 (A) the planned use of Advanced Stirling
2 Radioisotope Generator technology;

3 (B) the status of and timeline for com-
4 pleting development and demonstration of the
5 Advanced Stirling Radioisotope Generator tech-
6 nology, including the development of flight
7 readiness requirements; and

8 (C) the risks, implications, and contin-
9 gencies for NASA mission plans of any delays
10 or unanticipated technical challenges related to
11 the anticipated use of Advanced Stirling Radio-
12 isotope Generator technology;

13 (3) assess the risk to NASA programs of any
14 potential delays in achieving the schedule and mile-
15 stones for planned domestic production of radioiso-
16 tope power system material;

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

19 (5) estimate the incremental costs required to
20 increase the amount of material produced each year,
21 if such an increase is needed to support additional
22 NASA requirements for the material.

23 (b) TRANSMITTAL.—Not later than 180 days after
24 the date of enactment of this Act, the Administrator, in

1 consultation with other Federal agencies, shall transmit
2 the results of the analysis to the Congress.

3 **TITLE IV—AERONAUTICS**

4 **SEC. 401. ENVIRONMENTALLY FRIENDLY AIRCRAFT RE-** 5 **SEARCH AND DEVELOPMENT INITIATIVE.**

6 Section 302 of the National Aeronautics and Space
7 Administration Authorization Act of 2008 (42 U.S.C.
8 17721) is amended—

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

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

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

13 “(b) PLAN.—

14 “(1) IN GENERAL.—The Administrator shall
15 develop a plan and associated timetable for this ini-
16 tiative identifying key milestones, including projected
17 flight demonstrations to validate vehicle and tech-
18 nology concepts in a relevant environment.

19 “(2) SUBMISSION.—Not later than 270 days
20 after the date of enactment of the National Aero-
21 nautics and Space Administration Authorization Act
22 of 2010, the Administrator shall transmit the plan
23 to the Congress.”.

1 **SEC. 402. RESEARCH ON NEXTGEN AIRSPACE MANAGE-**
2 **MENT CONCEPTS AND TOOLS.**

3 The Administrator shall review at least annually the
4 alignment and timing of NASA's research and develop-
5 ment activities in support of the NextGen airspace man-
6 agement modernization initiative and shall make any nec-
7 essary adjustments by reprioritizing or retargeting
8 NASA's research and development activities in support of
9 the NextGen initiative.

10 **SEC. 403. RESEARCH ON AIRCRAFT CABIN AIR QUALITY.**

11 The Administrator shall initiate research on aircraft
12 cabin air quality that complements research conducted by
13 the Federal Aviation Administration and its Center of Ex-
14 cellence on Research in the Intermodal Transport Envi-
15 ronment, including research on innovative aircraft cabin
16 air quality sensors operating during ground and flight op-
17 erations and on innovative warning and mitigation tech-
18 nologies for poor air quality.

19 **SEC. 404. RESEARCH ON ON-BOARD VOLCANIC ASH SENSOR**
20 **SYSTEMS.**

21 (a) IN GENERAL.—The Administrator shall conduct
22 a study to assess the feasibility of establishing a project
23 focused on the development of a low-cost on-board volcanic
24 ash sensor system.

25 (b) SPECIFICATIONS.—The study shall consider, at a
26 minimum—

- 1 (1) NASA's unique capabilities;
- 2 (2) opportunities for collaboration, both nation-
3 ally and internationally; and
- 4 (3) projected resource requirements, research
5 milestones, and potential accomplishments.

6 **SEC. 405. AERONAUTICS TEST FACILITIES.**

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

9 (1) NASA must reverse the deteriorating condi-
10 tion of its aeronautics ground test facilities and in-
11 frastructure, as this condition is hampering the ef-
12 fectiveness and efficiency of aeronautics research
13 performed by both NASA and industry participants
14 making use of NASA facilities, thus reducing the
15 competitiveness of the United States aviation indus-
16 try;

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

20 (3) to ensure continued access to reliable and
21 efficient national-class test capabilities by research-
22 ers, NASA should seek to establish strategic part-
23 nerships with other Federal agencies, academic insti-
24 tutions, and industry.

1 (b) PLAN.—The Administrator shall develop a plan
2 to stabilize and, where possible, reverse the deterioration
3 of NASA’s aeronautics ground test facilities.

4 **SEC. 406. EXPANDED RESEARCH PROGRAM ON COMPOSITE**
5 **MATERIALS USED IN AEROSPACE.**

6 The Administrator shall expand NASA’s research
7 program on composite materials used in aerospace appli-
8 cations to address—

9 (1) progressive damage analysis, aging, inspec-
10 tion techniques, and new manufacturing and repair
11 techniques; and

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

15 **TITLE V—SPACE TECHNOLOGY**

16 **SEC. 501. SPACE TECHNOLOGY PROGRAM.**

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

22 (1) early-stage concepts and innovation;

23 (2) development of innovative technologies in
24 areas such as in-space propulsion, power generation
25 and storage, liquid rocket propulsion, avionics, struc-

1 tures, and materials that may enable new ap-
2 proaches to human and robotic space missions; and

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

8 (b) PROCEDURE.—In establishing the space tech-
9 nology program under this section, the Administrator
10 shall—

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

14 (2) support the development of an organization
15 to investigate innovative concepts for technological
16 approaches, systems, architectures, or mission strat-
17 egies;

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

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

1 (c) DECADAL SURVEY.—The Administrator shall
 2 enter into an arrangement with the National Academies
 3 for a decadal survey study to make recommendations for
 4 research and development priorities for NASA’s space
 5 technology program over the next decade. Included in the
 6 decadal survey shall be an identification and prioritization
 7 of key technology research and development activities
 8 needed to enable a robust exploration technology program,
 9 from basic research and development through flight dem-
 10 onstrations. The Administrator shall transmit the results
 11 of the study to the Congress not later than 20 months
 12 after the date of enactment of this Act.

13 **TITLE VI—EDUCATION AND**
 14 **OUTREACH**

15 **SEC. 601. STEM EDUCATION AND TRAINING.**

16 (a) IN GENERAL.—In order to create the diverse,
 17 skilled scientific and technical workforce essential to meet-
 18 ing the challenges facing NASA and the Nation in the
 19 21st century, the Administrator shall develop, conduct,
 20 support, promote, and coordinate formal and informal
 21 educational and training activities that leverage NASA’s
 22 unique content expertise and facilities to—
 23 (1) contribute to improving science, technology,
 24 engineering and mathematics (STEM) education
 25 and training at all levels in the United States; and

1 (2) enhance awareness and understanding of
2 STEM, including space and Earth sciences, aero-
3 nautics, and engineering.

4 (b) PROGRAMS.—

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

7 (A) increase student interest and participa-
8 tion, including by women and underrepresented
9 minority students;

10 (B) improve public literacy and support;
11 and

12 (C) improve the teaching and learning of
13 space and Earth sciences, aeronautics, engi-
14 neering, and other STEM disciplines supported
15 by NASA.

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

18 (A) informal educational programming de-
19 signed to excite and inspire students and the
20 general public about space and Earth science,
21 aeronautics, engineering, and other STEM dis-
22 ciplines supported by NASA while strength-
23 ening their content knowledge in these dis-
24 ciplines;

1 (B) teacher training and professional de-
2 velopment opportunities for pre-service and in-
3 service elementary and secondary school teach-
4 ers designed to increase the content knowledge
5 of teachers in space and Earth science, aero-
6 nautics, engineering, and other STEM dis-
7 ciplines supported by NASA, especially through
8 hands-on research and technology experiences;

9 (C) research opportunities for secondary
10 school students, including internships at NASA
11 and its field centers, that provide secondary
12 school students with hands-on research and
13 technology experiences as well as exposure to
14 working scientists and engineers;

15 (D) research opportunities at NASA and
16 its field centers for undergraduate and graduate
17 students pursuing degrees in space and Earth
18 sciences, aeronautics, engineering, and other
19 STEM disciplines supported by NASA;

20 (E) competitive scholarships, fellowships,
21 and traineeships for undergraduate and grad-
22 uate students in space and Earth sciences, aer-
23 onautics, engineering, and other STEM dis-
24 ciplines supported by NASA; and

1 (F) competitive grants for institutions of
2 higher education (as defined under section
3 101(a) of the Higher Education Act of 1965
4 (20 U.S.C. 1001(a))), including 2-year institu-
5 tions of higher education, to establish or expand
6 degree programs or courses in space and Earth
7 sciences, aeronautics, engineering, and other
8 STEM disciplines supported by NASA.

9 (c) ORGANIZATION OF STEM EDUCATION PRO-
10 GRAMS.—

11 (1) DIRECTOR OF STEM EDUCATION.—The Ad-
12 ministrator shall appoint or designate a Director of
13 STEM Education, who shall have the principal re-
14 sponsibility to oversee and coordinate all NASA pro-
15 grams and activities in support of STEM education
16 and training, including space and Earth sciences,
17 aeronautics, and engineering.

18 (2) QUALIFICATIONS.—The Director shall be an
19 individual who, by reason of professional background
20 and experience, is specially qualified to advise the
21 Administrator on all matters pertaining to STEM
22 education and training, including space and Earth
23 sciences, aeronautics, and engineering, at NASA.

24 (3) DUTIES.—The Director shall—

1 (A) oversee and coordinate all programs in
2 support of STEM education and training, in-
3 cluding space and Earth sciences, aeronautics,
4 and engineering;

5 (B) represent NASA as the principal inter-
6 agency liaison for all STEM education and
7 training programs, unless otherwise represented
8 by the Administrator or the Associate Adminis-
9 trator for Education;

10 (C) prepare the annual budget and advise
11 the Associate Administrator for Education and
12 the Administrator on all budgetary issues for
13 STEM education and training relative to the
14 programs of NASA;

15 (D) establish, periodically update, and
16 maintain a publicly accessible online inventory
17 of STEM education and training programs and
18 activities;

19 (E) develop, implement, and update the
20 STEM education and training strategic plan re-
21 quired under subsection (d);

22 (F) increase, to the maximum extent prac-
23 ticable, the participation and advancement of
24 women and underrepresented minorities at

1 every level of STEM education and training;
2 and

3 (G) perform such other matters relating to
4 STEM education and training as are required
5 by the Administrator or the Associate Adminis-
6 trator for Education.

7 (d) STRATEGIC PLAN.—The Director of STEM Edu-
8 cation shall develop, implement, and update once every 3
9 years a STEM education and training strategic plan for
10 NASA. The plan shall—

11 (1) identify and prioritize annual and long-term
12 STEM education and training goals and objectives
13 for NASA;

14 (2) describe the role of each NASA program or
15 activity in contributing to the goals and objectives
16 identified under paragraph (1);

17 (3) specify the metrics that will be used to as-
18 sess progress toward achieving those goals and ob-
19 jectives; and

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

23 (e) OUTREACH TO STUDENTS FROM UNDERREP-
24 RESENTED GROUPS.—In carrying out a program author-
25 ized under this section, the Administrator shall give con-

1 sideration to the goal of promoting the participation of
2 individuals identified in sections 33 and 34 of the Science
3 and Engineering Equal Opportunities Act (42 U.S.C.
4 1885a; 1885b).

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

8 (1) consult with the Secretary of Education and
9 the Director of the National Science Foundation re-
10 garding activities designed to improve elementary
11 and secondary STEM education and training; and

12 (2) consult and partner with the Director of the
13 National Science Foundation in carrying out pro-
14 grams under this section designed to build capacity
15 in STEM education and training at the under-
16 graduate and graduate level.

17 **SEC. 602. ASSESSMENT OF IMPEDIMENTS TO SPACE**
18 **SCIENCE AND ENGINEERING WORKFORCE**
19 **DEVELOPMENT FOR MINORITY AND UNDER-**
20 **REPRESENTED GROUPS AT NASA.**

21 (a) ASSESSMENT.—The Administrator shall enter
22 into an arrangement for an independent assessment of any
23 impediments to space science and engineering workforce
24 development for minority and underrepresented groups at
25 NASA, including recommendations on—

1 (1) measures to address such impediments;

2 (2) opportunities for augmenting the impact of
3 space science and engineering workforce development
4 activities and for expanding proven, effective pro-
5 grams; and

6 (3) best practices and lessons learned, as identi-
7 fied through the assessment, to help maximize the
8 effectiveness of existing and future programs to in-
9 crease the participation of minority and underrep-
10 resented groups in the space science and engineering
11 workforce at NASA.

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

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

19 **SEC. 603. INDEPENDENT REVIEW OF THE NATIONAL SPACE**
20 **GRANT COLLEGE AND FELLOWSHIP PRO-**
21 **GRAM.**

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

24 (1) the National Space Grant College and Fel-
25 lowship Program, established in title II of the Na-

1 tional Aeronautics and Space Administration Au-
2 thorization Act of 1988 (42 U.S.C. 2486 et seq.),
3 has been an important program through which the
4 Federal Government has partnered with State and
5 local governments, universities, private industry, and
6 other organizations to enhance the understanding
7 and use of space and aeronautics activities and their
8 benefits through education, the fostering of inter-
9 disciplinary and multidisciplinary space research and
10 training, and supporting Federal funding for grad-
11 uate fellowships in space-related fields; and

12 (2) enhancing the National Space Grant College
13 and Fellowship Program’s effectiveness will support
14 the program’s maximum contribution to NASA’s
15 and the Nation’s goals for science, technology, engi-
16 neering and mathematics (STEM) education and
17 training.

18 (b) REVIEW.—The Administrator shall enter into an
19 arrangement with the National Academies for a review of
20 the National Space Grant College and Fellowship Pro-
21 gram, including its structure and capabilities for sup-
22 porting STEM education and training, and recommenda-
23 tions on measures, if needed, to enhance the program’s
24 effectiveness.

1 (c) TRANSMITTAL.—The Administrator shall trans-
2 mit the results of the review to the Congress not later than
3 18 months after the date of enactment of this Act.

4 **TITLE VII—INSTITUTIONAL** 5 **CAPABILITIES REVITALIZATION**

6 **SEC. 701. INSTITUTIONAL MANAGEMENT.**

7 (a) MODERNIZATION OF LABORATORIES, FACILITIES,
8 AND EQUIPMENT.—

9 (1) STRATEGY.—

10 (A) IN GENERAL.—The Administrator
11 shall develop a strategy for the maintenance,
12 repair, upgrading, and modernization of
13 NASA’s laboratories, facilities, and equipment.

14 (B) CRITERIA.—The strategy shall include
15 criteria for prioritizing deferred maintenance
16 tasks and also for upgrading or modernizing
17 laboratories, facilities, and equipment.

18 (2) PLAN.—The Administrator shall develop a
19 plan for implementing the strategy in paragraph (1),
20 including a timeline, milestones, and an estimate of
21 resources required for carrying out the plan.

22 (3) TRANSMITTAL TO CONGRESS.—The Admin-
23 istrator shall transmit to the Congress the strategy
24 under paragraph (1) and the plan under paragraph

1 (2) not later than 180 days after the date of enact-
2 ment of this Act.

3 (b) ESTABLISHMENT OF CAPITAL FUND.—

4 (1) IN GENERAL.—The Administrator shall es-
5 tablish a capital fund at each of NASA’s field cen-
6 ters for the modernization of facilities and labora-
7 tories.

8 (2) SOURCE OF FUNDING.—The Administrator
9 shall ensure to the maximum extent practicable that
10 all financial savings achieved by closing outdated or
11 surplus facilities at a NASA field center shall be
12 made available to that center’s capital fund for the
13 purpose of modernizing the field center’s facilities
14 and laboratories and for upgrading the infrastruc-
15 ture at the field center.

16 **SEC. 702. 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 in 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 VIII—ACQUISITION** 16 **MANAGEMENT**

17 **SEC. 801. PROHIBITION ON EXPENDITURE OF FUNDS WHEN** 18 **30 PERCENT THRESHOLD IS EXCEEDED.**

19 Section 103(e) of the National Aeronautics and Space
20 Administration Authorization of 2005 (42 U.S.C.
21 16613(e)) is amended by striking “beginning 18 months
22 after the date the Administrator transmits a report under
23 subsection (d)(1)” and inserting “beginning 18 months
24 after the Administrator makes such determination”.

1 **SEC. 802. PROJECT AND PROGRAM RESERVES.**

2 To ensure that the establishment, maintenance, and
3 allotment of project and program reserves contribute to
4 prudent management, not later than 180 days after the
5 date of enactment of this Act, the Administrator shall
6 transmit to the Congress a report describing NASA's cri-
7 teria for establishing the amount of reserves at the project
8 and program levels and how such criteria complement
9 NASA's policy of budgeting at a 70 percent confidence
10 level.

11 **SEC. 803. INDEPENDENT REVIEWS.**

12 Not later than 270 days after the date of enactment
13 of this Act, the Administrator shall transmit to the Con-
14 gress a report describing NASA's procedures for con-
15 ducting independent reviews of projects and programs at
16 lifecycle milestones and how NASA ensures the independ-
17 ence of the individuals who conduct those reviews prior
18 to their assignment.

19 **SEC. 804. AVOIDING ORGANIZATIONAL CONFLICTS OF IN-**
20 **TEREST IN MAJOR NASA ACQUISITION PRO-**
21 **GRAMS.**

22 (a) REVISED REGULATIONS REQUIRED.—Not later
23 than 270 days after the date of enactment of this Act,
24 the Administrator shall revise the NASA Supplement to
25 the Federal Acquisition Regulation to provide uniform
26 guidance and tighten existing requirements for preventing

1 organizational conflicts of interest by contractors in major
2 acquisition programs.

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

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

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

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

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

1 ware integration or the development of a pro-
2 prietary software system architecture; or

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

6 (2) ensure that NASA receives advice, when ap-
7 propriate, on systems architecture and systems engi-
8 neering matters with respect to major acquisition
9 programs from federally funded research and devel-
10 opment centers or other sources independent of the
11 prime contractor;

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

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

1 that such advice comes from sources that are objec-
2 tive and unbiased.

3 **SEC. 805. REPORT TO CONGRESS.**

4 The Administrator shall transmit to the Congress,
5 not later than April 30 of each year, an estimate of the
6 total termination liability as of the end of the second fiscal
7 quarter for all NASA contracts with a total value in excess
8 of \$200,000,000.

9 **TITLE IX—OTHER PROVISIONS**

10 **SEC. 901. CLOUD COMPUTING.**

11 (a) DEFINITION.—As defined by the National Insti-
12 tute of Standards and Technology, for purposes of this
13 section, the term “cloud computing” means a model for
14 enabling convenient, on-demand network access to a
15 shared pool of configurable computing resources that can
16 be rapidly provisioned with minimal management effort or
17 service provider interaction.

18 (b) REPORT.—Not later than 1 year after NASA has
19 entered into a contract for its first use of a non-Federal
20 cloud computing facility, the Comptroller General shall
21 transmit to the Congress a report detailing whether sen-
22 sitive but unclassified and classified NASA information
23 was processed on that facility and if so, how NASA en-
24 sured that data access and security requirements were in

1 place to safeguard NASA’s scientific and technical infor-
2 mation.

3 **SEC. 902. REVIEW OF PRACTICES TO DETECT AND PRE-**
4 **VENT THE USE OF COUNTERFEIT PARTS.**

5 Not later than 1 year after the date of enactment
6 of this Act, the Comptroller General shall transmit to the
7 Congress a review of NASA’s processes and controls to
8 detect and prevent the use of counterfeit parts in NASA
9 mission projects and related assets. The review shall ex-
10 amine—

11 (1) the trends in known and identified counter-
12 feit parts in NASA’s supply chain;

13 (2) NASA’s processes and controls to detect
14 counterfeit parts and prevent their incorporation
15 into NASA mission projects, instruments, and other
16 mission-related assets; and

17 (3) any gaps in NASA’s controls and processes
18 for detecting counterfeit part and preventing their
19 incorporation into NASA missions and related as-
20 sets.

21 **SEC. 903. PRESERVATION AND MANAGEMENT OF LUNAR**
22 **SITES.**

23 (a) INTERNATIONAL DIALOG.—The Director of
24 OSTP, in cooperation of the Administrator, other relevant
25 Federal agencies, commercial entities, and international

1 bodies, shall enter into a dialogue to identify the questions
2 and research needed to understand—

3 (1) the potential adverse impacts of various
4 uses of the Moon on scientific research activities;

5 (2) the potential adverse impacts of such uses
6 on lunar areas of historical, cultural, or scientific
7 value; and

8 (3) how to prevent or mitigate such impacts.

9 (b) GRANTS PROGRAM.—The Administrator, in co-
10 operation with other relevant Federal agencies and stake-
11 holders, shall establish a grants program to conduct re-
12 search for the purpose of identifying and characterizing
13 potential impacts related to lunar activities and describing
14 potential means for managing and mitigating the impacts.

15 (c) INTERNATIONAL FRAMEWORK.—As a result of
16 the dialog under subsection (a), the Director of OSTP
17 shall initiate an effort to establish a framework for identi-
18 fying, protecting, and preserving lunar areas determined
19 to be of significant historical, cultural, or scientific value.

20 (d) REPORT.—The Director of OSTP shall provide
21 a report on the results of the international dialog under
22 subsection (a) and the establishment of an international
23 framework under subsection (c), to be transmitted to the
24 Congress not later than 2 years after the date of enact-
25 ment of this Act.

1 **SEC. 904. CONTINUITY OF MODERATE RESOLUTION LAND**
2 **IMAGING REMOTE SENSING DATA.**

3 (a) REAFFIRMATION OF POLICY.—The Congress re-
4 affirms the finding in section 2(1) of the Land Remote
5 Sensing Policy Act of 1992 (15 U.S.C. 5601(1)) which
6 states that “The continuous collection and utilization of
7 land remote sensing data from space are of major benefit
8 in studying and understanding human impacts on the
9 global environment, in managing the Earth’s natural re-
10 sources, in carrying out national security functions, and
11 in planning and conducting many other activities of sci-
12 entific, economic, and social importance.”.

13 (b) CONTINUOUS LAND REMOTE SENSING DATA
14 COLLECTION.—The Director of OSTP shall take steps in
15 consultation with other relevant Federal agencies to en-
16 sure, to the maximum extent practicable, the continuous
17 collection of space-based medium-resolution observations
18 of the Earth’s land cover and to ensure that the data are
19 made available in such ways as to facilitate the widest pos-
20 sible use.

21 **SEC. 905. SPACE WEATHER.**

22 (a) STRATEGY AND IMPLEMENTATION PLAN.—The
23 Director of OSTP, in coordination with the Administrator
24 and with other relevant Federal agencies, space weather
25 coordinating bodies, industry, academia, and other stake-
26 holders, shall prepare a long-term strategy for a sustain-

1 able space weather program and develop a plan to imple-
2 ment the strategy. The implementation plan shall—

3 (1) define individual agency responsibilities for
4 carrying out the strategy;

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

7 (3) provide an estimate of the resources re-
8 quired for each agency to carry out its responsibil-
9 ities;

10 (4) establish a process for coordinating agency
11 responsibilities, programs, and budgets required for
12 implementing the plan; and

13 (5) identify opportunities for private sector and
14 international contributions to implementing the plan.

15 (b) STUDY ON PREDICTION.—The Director of OSTP
16 shall enter into an arrangement with the National Acad-
17 emies to assess the status of capabilities for space weather
18 prediction and recommend the highest priority basic re-
19 search, infrastructure, and operational needs required to
20 improve the Nation's ability to predict space weather
21 events. The study should also address the benefits of space
22 weather prediction. The Director shall transmit the results
23 of the study to the Congress not later than 18 months
24 after the date of enactment of this Act.

1 **SEC. 906. USE OF OPERATIONAL COMMERCIAL SUB-**
2 **ORBITAL VEHICLES FOR RESEARCH, DEVEL-**
3 **OPMENT, AND EDUCATION.**

4 (a) PLAN.—The Administrator shall prepare a plan
5 describing the processes required to support the potential
6 use of commercial reusable suborbital flight vehicles, once
7 demonstrated and proven successful on an operational
8 basis, for carrying out competitively selected scientific and
9 engineering investigations and educational activities. The
10 plan shall—

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

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

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

7 (b) COMMERCIAL REUSABLE SUBORBITAL CAPABILI-
8 TIES AND RISKS.—The Administrator shall assess and
9 characterize the potential capabilities and performance of
10 commercial reusable suborbital vehicles for addressing sci-
11 entific research, including research requiring access to low
12 gravity and microgravity environments, for carrying out
13 technology demonstrations related to science, exploration,
14 or space operations requirements, and for providing oppor-
15 tunities for educating and training space scientists and en-
16 gineers, once those vehicles become operational. The as-
17 sessment shall also characterize the risks of using poten-
18 tial commercial reusable suborbital flights to NASA-spon-
19 sored researchers, investigators, and scientific investiga-
20 tions and flight hardware. The Administrator shall make
21 a determination on the need to enter into arrangements
22 with commercial reusable suborbital service providers for
23 flights or flight services to acquire analytical data to in-
24 form the assessment.

1 (c) TRANSMITTAL.—The plan and assessment de-
2 scribed in subsections (a) and (b) shall be transmitted to
3 the Congress not later than 1 year after the date of enact-
4 ment of this Act.

5 (d) INDEMNIFICATION AND LIABILITY.—The Admin-
6 istrator shall not proceed with a request for proposals,
7 award any contract, commit any United States Govern-
8 ment funds, or enter into any other agreement for the pro-
9 vision of a commercial reusable suborbital vehicle launch
10 service until all indemnification and liability issues associ-
11 ated with the use of such systems by the United States
12 Government shall have been addressed and the Adminis-
13 trator has provided to the Congress a report describing
14 the indemnification and liability provisions that are
15 planned to be included in such contracts or agreements.

16 **SEC. 907. STUDY ON EXPORT CONTROL MATTERS RELATED**
17 **TO UNITED STATES ASTRONAUT SAFETY AND**
18 **NASA MISSION OPERATIONS.**

19 (a) ESTABLISHMENT.—The Director of OSTP, in
20 consultation with the Administrator and other relevant
21 Federal agencies, shall conduct a study to examine the
22 need for a process for granting real-time, limited waivers
23 to export control license restrictions or regulations that
24 are necessary for United States Government entities and
25 contractors to enter into technical discussions and to share

1 technical data with foreign government entities and con-
2 tractors to resolve anomalies that may—

3 (1) threaten the safety of United States astro-
4 nauts aboard cooperative crewed spacecraft such as
5 the ISS; or

6 (2) impair the operations of international civil
7 research and other spacecraft that involve the na-
8 tional interests of the United States.

9 (b) TRANSMITTAL.—The results of the study shall be
10 transmitted to the Congress not later than 1 year after
11 the date of enactment of this Act.

12 **SEC. 908. AMENDMENT TO THE NATIONAL AERONAUTICS**
13 **AND SPACE ACT OF 1958.**

14 Section 202 of the National Aeronautics and Space
15 Act of 1958 (42 U.S.C. 2472) is amended by adding at
16 the end the following new subsection:

17 “(d) The Administrator and the Deputy Adminis-
18 trator may be retired commissioned military personnel.”.

19 **SEC. 909. NEAR-EARTH OBJECTS.**

20 (a) RESPONSIBLE OFFICIAL.—The Administrator
21 shall designate a responsible official for coordinating
22 NASA’s near-Earth object observation activities and
23 NASA’s interactions with other Federal agencies and
24 international entities on near-Earth object surveys, de-
25 fense, and efforts related to addressing any threats to the

1 United States posed by near-Earth objects. The respon-
2 sible official shall report directly to the Administrator.

3 (b) REAFFIRMATION OF POLICY ON NEAR-EARTH
4 OBJECT SURVEY.—The Congress reaffirms the direction
5 set forth in section 321(d)(1) of the National Aeronautics
6 and Space Administration Authorization Act of 2005 (42
7 U.S.C. 16691(d)(1)) that directed the Administrator “to
8 plan, develop, and implement a Near-Earth Object Survey
9 program to detect, track, catalogue, and characterize the
10 physical characteristics of near-Earth objects equal to or
11 greater than 140 meters in diameter in order to assess
12 the threat of such near-Earth objects to the Earth”.

13 (c) PLAN.—Not later than 270 days after the date
14 of enactment of this Act, the Administrator shall transmit
15 to the Congress a plan for carrying out the direction re-
16 affirmed by subsection (b).

17 (d) AUTHORIZATION OF APPROPRIATIONS.—From
18 the funds authorized for Planetary Science in title I,
19 \$1,000,000 in fiscal year 2012 and \$1,000,000 in fiscal
20 year 2013 shall be for supporting competitively awarded
21 grants for investigation of innovative approaches to car-
22 rying out the congressionally mandated survey of near-
23 Earth objects equal to or greater than 140 meters in di-
24 ameter, and \$5,000,000 in fiscal year 2014 and
25 \$5,000,000 in fiscal year 2015 shall be for preliminary

- 1 design and development work on an innovative concept for
- 2 carrying out the Congressionally mandated survey of near-
- 3 Earth objects equal to or greater than 140 meters in di-
- 4 ameter.

