II

111TH CONGRESS
2D SESSION

S. ——

To authorize the programs of the National Aeronautics and Space Administration for fiscal years 2011 through 2013, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JULY ——, 2010

Mr. ROCKEFELLER reported the following bill from the Committee on Commerce, Science, and Transportation; which was read twice and placed on the calendar

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A BILL

To authorize the programs of the National Aeronautics and Space Administration for fiscal years 2011 through 2013, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SEC. 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the ''National Aeronautics and Space Administration Authorization Act of 2010''.

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

TITLE VII—EARTH SCIENCE

TITLE VIII—SPACE SCIENCE

TITLE IX—AERONAUTICS AND SPACE TECHNOLOGY

TITLE X—EDUCATION

TITLE XI—RESCOPING AND REVITALIZING INSTITUTIONAL CAPABILITIES

TITLE XII—OTHER MATTERS

SEC. 2. FINDINGS.

Congress makes the following findings:

(1) The United States human space flight program has, since the first Mercury flight on May 5, 1961, been a source of pride and inspiration for the Nation.

(2) The establishment of and commitment to human exploration goals is essential for providing the necessary long term focus and programmatic consistency and robustness of the United States civilian space program.

(3) The National Aeronautics and Space Administration is and should remain a multi-mission agency with a balanced and robust set of core missions in science, aeronautics, and human space flight and exploration.

(4) In the 50 years since the establishment of NASA, the arena of space has evolved substantially. As the uses and users of space continue to expand, the issues and operations in the regions closest to Earth have become increasingly complex, with a growing number of overlaps between civil, commer-

cial and national security activities. These developments present opportunities and challenges to the space activities of NASA and the United States.

(5) The extraordinary challenges of achieving access to space both motivated and accelerated the development of technologies and industrial capabilities that have had widespread applications which have contributed to the technological excellence of the United States. It is essential to tie space activity to human challenges ranging from enhancing the influence, relationships, security, economic development, and commerce of the United States to improving the overall human condition.

(6) It is essential to the economic well-being of the United States that the aerospace industrial capacity, highly skilled workforce, and embedded expertise remain engaged in demanding, challenging, and exciting efforts that ensure United States leadership in space exploration and related activities.

(7) Crewmembers provide the essential component to ensure the return on investment from and the growth and safe operation of the ISS. The Russian Soyuz vehicle has allowed continued human presence on the ISS for United States crewmembers with its ability to serve as both a routine and backup

capability for crew delivery, rescue, and return. With the impending retirement of the Space Shuttle, the United States will find itself with no national crew delivery and return system. Without any other system, the United States and all the ISS partners will have no redundant system for human access to and from the ISS. It is therefore essential that a United States capability be developed as soon as possible.

(8) Existing and emerging United States commercial launch capabilities and emerging launch capabilities offer the potential for providing crew support assets. New capabilities for human crew access to the ISS should be developed in a manner that ensures ISS mission assurance and safety. Commercial services offer the potential to broaden the availability and access to space at lower costs.

(9) While commercial transportation systems have the promise to contribute valuable services, it is in the United States national interest to maintain a government operated space transportation system for crew and cargo delivery to space.

(10) Congress restates its commitment, expressed in the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155) and the National Aeronautics and Space

Administration Authorization Act of 2008 (Public Law 110–422), to the development of commercially developed launch and delivery systems to the ISS for crew and cargo missions. Congress reaffirms that NASA shall make use of United States commercially provided ISS crew transfer and crew rescue services to the maximum extent practicable.

(11) It is critical to identify an appropriate combination of NASA and related United States Government programs, while providing a framework that allows partnering, leveraging and stimulation of the existing and emerging commercial and international efforts in both near Earth space and the regions beyond.

(12) The designation of the United States segment of the ISS as a National Laboratory, as provided by the National Aeronautics and Space Administration Authorization Act of 2005 and the National Aeronautics and Space Administration Authorization Act of 2008, provides an opportunity for multiple United States Government agencies, university-based researchers, research organizations, and others to utilize the unique environment of microgravity for fundamental scientific research and potential economic development.

(13) For some potential replacement elements necessary for ISS sustainability, the Space Shuttle may represent the only vehicle, existing or planned, capable of carrying those elements to the ISS in the near term. Additional or alternative transportation capabilities must be identified as contingency delivery options, and accompanied by an independent analysis of projected availability of such capabilities.

(14) The United States must develop, as rapidly as possible, replacement vehicles capable of providing both human and cargo launch capability to low-Earth orbit and to destinations beyond low-Earth orbit.

(15) There is a need for national space and export control policies that protect the national security of the United States while also enabling the United States and its aerospace industry to undertake cooperative programs in science and human space flight in an effective and efficient manner and to compete effectively in the global market place.

SEC. 3. DEFINITIONS.

In this Act:

(1) ADMINISTRATOR.—The term ''Administrator'' means the Administrator of the National Aeronautics and Space Administration.

(2) APPROPRIATE COMMITTEES OF CONGRESS.—The term ''appropriate committees of Congress'' means—

(A) the Committee on Commerce, Science, and Transportation of the Senate; and

(B) the Committee on Science of the House of Representatives.

(3) CIS-LUNAR SPACE.—The term ''cis-lunar space'' means the region of space from the Earth out to and including the region around the surface of the Moon.

(4) DEEP SPACE.—The term ''deep space'' means the region of space beyond cis-lunar space.

(5) ISS.—The term ''ISS'' means the International Space Station.

(6) NASA.—The term ''NASA'' means the National Aeronautics and Space Administration.

(7) NEAR-EARTH SPACE.—The term ''near-Earth space'' means the region of space that includes low-Earth orbit and extends out to and includes geo-synchronous orbit.

(8) NOAA.—The term ''NOAA'' means the National Oceanic and Atmospheric Administration.

(9) OSTP.—The term ''OSTP'' means the Office of Science and Technology Policy.

(10) SPACE LAUNCH SYSTEM.—The term ''Space Launch System'' means the follow-on government-owned civil launch system developed, managed, and operated by NASA to serve as a key component to expand human presence beyond low-Earth orbit.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

SEC. 101. FISCAL YEAR 2011.

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

(1) For Exploration, $3,868,000,000, of which—

(A) $1,120,000,000 shall be for a multi-purpose crew vehicle, and associated program and other necessary support;

(B) $1,631,000,000 shall be for Space Launch System and associated program and other necessary support;

(C) $250,000,000 shall be for Exploration Technology Development;

(D) $155,000,000 shall be for Human Research;

(E) $300,000,000 shall be for Commercial Cargo;

(F) $312,000,000 shall be for Commercial Crew Development activities and studies related to commercial crew services; and

(G) $100,000,000 shall be for Robotic Precursor Studies and Instruments.

(2) For Space Operations, $5,508,500,000, of which—

(A) $2,779,800,000 shall be for the ISS program;

(B) $1,609,700,000 shall be for Space Shuttle, to support Space Shuttle flight operations and related activities; and

(C) $1,119,000,000 for Space and Flight Services, of which $428,600,000 shall be directed toward NASA launch support and infrastructure modernization program.

(3) For Science, $5,005,600,000, of which—

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

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

(C) $1,076,300,000 shall be for Astrophysics; and

(D) $641,900,000 shall be for Heliophysics.

(4) For Aeronautics, $929,600,000, of which—

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

(B) $350,000,000 shall be for Space Technology.

(5) For Education, $145,800,000, of which—

(A) $25,000,000 shall be for the Experimental Program to Stimulate Competitive Research; and

(B) $45,600,000 shall be for the Space Grant program.

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

(7) For Construction and Environmental Compliance and Restoration, $394,300,000.

(8) For Inspector General, $37,000,000.

SEC. 102. FISCAL YEAR 2012.

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

(1) For Exploration, $5,252,300,000, of which—

(A) $1,400,000,000 shall be for a multi-purpose crew vehicle and associated program and other necessary support;

(B) $2,650,000,000 shall be for Space Launch System and associated program and other necessary support;

(C) $437,300,000 shall be for Exploration Technology Development;

(D) $165,000,000 shall be for Human Research;

(E) $500,000,000 shall be for commercial crew capabilities; and

(F) $100,000,000 shall be for Robotic Precursor Instruments and Low-Cost Missions.

(2) For Space Operations, $4,141,500,000, of which—

(A) $2,952,250,000 shall be for the ISS operations and crew/cargo support; and

(B) $1,189,250,000 shall be for Space and Flight Services, of which $500,000,000 shall be directed toward the NASA launch support and infrastructure modernization program.

(3) For Science, $5,248,600,000, of which—

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

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

(C) $1,109,300,000 shall be for Astrophysics; and

(D) $647,600,000 shall be for Heliophysics.

(4) For Aeronautics, $1,070,600,000, of which—

(A) $584,700,000 shall be for Aeronautics Research; and

(B) $486,000,000 shall be for Space Technology.

(5) For Education, $145,800,000, of which—

(A) $25,000,000 shall be for the Experimental Program to Stimulate Competitive Research; and

(B) $45,600,000 shall be for the Space Grant program.

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

(7) For Construction and Environmental Compliance and Restoration, $363,800,000.

(8) For Inspector General, $37,800,000.

SEC. 103. FISCAL YEAR 2013.

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

(1) For Exploration, $5,264,000,000, of which—

(A) $1,400,000,000 shall be for a multi-purpose crew vehicle and associated program and other necessary support;

(B) $2,640,000,000 shall be for Space Launch System and associated program and other necessary support;

(C) $449,000,000 shall be for Exploration Technology Development;

(D) $175,000,000 shall be for Human Research;

(E) $500,000,000 shall be for commercial crew capabilities; and

(F) $100,000,000 shall be for Robotic Precursor Instruments and Low-Cost Missions.

(2) For Space Operations, $4,253,300,000, of which—

(A) $3,129,400,000 shall be for the ISS operations and crew/cargo support; and

(B) $1,123,900,000 shall be for Space and Flight Services, of which $400,000,000 shall be directed toward the NASA launch support and infrastructure modernization program.

(3) For Science, $5,509,600,000, of which—

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

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

(C) $1,149,100,000 shall be for Astrophysics; and

(D) $679,800,000 shall be for Heliophysics.

(4) For Aeronautics, $1,105,000,000, of which—

(A) $590,000,000 shall be for Aeronautics Research; and

(B) $515,000,000 shall be for Space Technology.

(5) For Education, $145,700,000, of which—

(A) $25,000,000 shall be for the Experimental Program to Stimulate Competitive Research; and

(B) $45,600,000 shall be for the Space Grant program.

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

(7) For Construction and Environmental Compliance and Restoration, $366,900,000.

(8) For Inspector General, $38,700,000.

TITLE II—POLICY, GOALS, AND OBJECTIVES FOR HUMAN SPACE FLIGHT AND EXPLORATION

SEC. 201. UNITED STATES HUMAN SPACE FLIGHT POLICY.

(a) USE OF NON-UNITED STATES HUMAN SPACE FLIGHT TRANSPORTATION CAPABILITIES.—It is the policy of the United States that reliance upon and use of non-United States human space flight capabilities shall be undertaken only as a contingency in circumstances where no United States-owned and operated human space flight capability is available, operational, and certified for flight by appropriate Federal agencies.

(b) UNITED STATES HUMAN SPACE FLIGHT CAPABILITIES.—Congress reaffirms the policy stated in section 501(a) of the National Aeronautics and Space Administration Authorization Act of 2005 (42 U.S.C. 16761(a)), that the United States shall maintain an uninterrupted capability for human space flight and operations in low-Earth orbit, and beyond, as an essential instrument of national security and of the capacity to ensure continued United States participation and leadership in the exploration and utilization of space.

SEC. 202. GOALS AND OBJECTIVES.

(a) LONG TERM GOAL.—The long term goal of the human space flight and exploration efforts of NASA shall be to expand permanent human presence beyond low-Earth orbit and to do so, where practical, in a manner involving international partners.

(b) KEY OBJECTIVES.—The key objectives of the United States for human expansion into space shall be—

(1) to sustain the capability for long-duration presence in low-Earth orbit, initially through continuation of the ISS and full utilization of the United States segment of the ISS as a National Laboratory, and through assisting and enabling an expanded commercial presence in, and access to, low-Earth orbit, as elements of a low-Earth orbit infrastructure;

(2) to determine if humans can live in an extended manner in space with decreasing reliance on Earth, starting with utilization of low-Earth orbit infrastructure, to identify potential roles that space resources such as energy and materials may play, to meet national and global needs and challenges, such as potential cataclysmic threats, and to explore the viability of and lay the foundation for sustainable economic activities in space;

(3) to maximize the role that human exploration of space can play in advancing overall knowledge of the universe, supporting United States national and economic security and the United States global competitive posture, and inspiring young people in their educational pursuits; and

(4) to build upon the cooperative and mutually beneficial framework established by the ISS partnership agreements and experience in developing and undertaking programs and meeting objectives designed to realize the goal of human space flight set forth in subsection (a).

SEC. 203. ASSURANCE OF CORE CAPABILITIES.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) the ISS, technology developments, the current Space Shuttle program, and follow-on transportation systems authorized by this Act form the foundation of initial capabilities for missions beyond low-Earth orbit to a variety of lunar and Lagrangian orbital locations; and

(2) these initial missions and related capabilities should be utilized to provide operational experience, technology development, and the placement

and assured use of in-space infrastructure and in-space servicing of existing and future assets.

(b) SPACE SHUTTLE CAPABILITY ASSURANCE.—

(1) DEVELOPMENT OF FOLLOW-ON SPACE TRANSPORTATION SYSTEMS.—The Administrator shall proceed with the development of follow-on space transportation systems in a manner that ensures that the national capability to restart and fly Space Shuttle missions can be initiated if required by the Congress, in an Act enacted after the date of enactment of this Act, or by a Presidential determination transmitted to the Congress, before the last Space Shuttle mission authorized by this Act is completed.

(2) REQUIRED ACTIONS.—In carrying out the requirement in paragraph (1), the Administrator shall authorize refurbishment of the manufactured external tank of the Space Shuttle, designated as ET-94, and take all actions necessary to enable its readiness for use in the Space Launch System development as a critical skills and capability retention effort or for test purposes, while preserving the ability to use this tank if needed for an ISS contingency if deemed necessary under paragraph (1).

SEC. 204. INDEPENDENT STUDY ON HUMAN EXPLORATION OF SPACE.

(a) IN GENERAL.—In fiscal year 2012 the Administrator shall contract with the National Academies for a review of the goals, core capabilities, and direction of human space flight, using the goals set forth in the National Aeronautics and Space Act of 1958, the National Aeronautics and Space Administration Authorization Act of 2005, and the National Aeronautics and Space Administration Authorization Act of 2008, the goals set forth in this Act, and goals set forth in any existing statement of space policy issued by the President.

(b) ELEMENTS.—The review shall include—

(1) a broad spectrum of participation with representatives of a range of disciplines, backgrounds, and generations, including civil, commercial, international, scientific, and national security interests;

(2) input from NASA's international partner discussions and NASA's Human Exploration Framework Team;

(3) an examination of the relationship of national goals to foundational capabilities, robotic activities, technologies, and missions authorized by this Act;

(4) a review and prioritization of scientific, engineering, economic, and social science questions to

be addressed by human space exploration to improve the overall human condition; and

(5) findings and recommendations for fiscal years 2014 through 2023.

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

SEC. 301. HUMAN SPACE FLIGHT BEYOND LOW-EARTH ORBIT.

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

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

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

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

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

(4) Developments in space infrastructure and technology can stimulate and enable increased space applications, such as in-space servicing, propellant resupply and transfer, and in situ resource utilization, and open opportunities for additional users of space, whether national, commercial, or international.

(5) A long term objective for human exploration of space should be the eventual international exploration of Mars.

(6) Future international missions beyond low-Earth orbit should be designed to incorporate capability development and availability, affordability, and international contributions.

(7) Human space flight and future exploration beyond low-Earth orbit should be based around a pay-as-you-go approach. Requirements in new launch and crew systems authorized in this Act should be scaled to the minimum necessary to meet the core national mission capability needed to conduct cis-lunar missions. These initial missions, along with the development of new technologies and in-space capabilities can form the foundation for mis-

sions to other destinations. These initial missions also should provide operational experience prior to the further human expansion into space.

(b) REPORT ON INTERNATIONAL COLLABORATION.—

(1) REPORT REQUIRED.—Not later than 120 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on the following assets and capabilities:

(A) Any effort by NASA to expand and ensure effective international collaboration on the ISS.

(B) The efforts of NASA, including its approach and progress, in defining near-term, cislunar space human missions.

(2) NASA CONTRIBUTIONS.—In preparing the report required by paragraph (1), the Administrator shall assume that NASA will contribute to the efforts described in that paragraph the following:

(A) A Space Launch System.

(B) A multi-purpose crew vehicle.

(C) Such other technology elements the Administrator may consider appropriate, and which the Administrator shall specifically identify in the report.

SEC. 302. SPACE LAUNCH SYSTEM AS FOLLOW-ON LAUNCH VEHICLE TO THE SPACE SHUTTLE.

(a) UNITED STATES POLICY.—It is the policy of the United States that NASA develop a Space Launch System as a follow-on to the Space Shuttle that can access cis-lunar space and the regions of space beyond low-Earth orbit in order to enable the United States to participate in global efforts to access and develop this increasingly strategic region.

(b) INITIATION OF DEVELOPMENT.—

(1) IN GENERAL.—The Administrator shall, as soon as practicable after the date of the enactment of this Act, initiate development of a Space Launch System meeting the minimum capabilities requirements specified in subsection (c).

(2) MODIFICATION OF CURRENT CONTRACTS.—In order to limit NASA's termination liability costs and support critical capabilities, the Administrator shall, to the extent practicable, extend or modify existing vehicle development and associated contracts necessary to meet the requirements in paragraph (1), including contracts for ground testing of solid rocket motors, if necessary, to ensure their availability for development of the Space Launch System.

(c) MINIMUM CAPABILITY REQUIREMENTS.—

(1) IN GENERAL.—The Space Launch System developed pursuant to subsection (b) shall be designed to have, at a minimum, the following:

(A) The initial capability of the core elements, without an upper stage, of lifting payloads weighing between 70 tons and 100 tons into low-Earth orbit in preparation for transit for missions beyond low-Earth orbit.

(B) The capability to carry an integrated upper Earth departure stage bringing the total lift capability of the Space Launch System to 130 tons or more.

(C) The capability to lift the multipurpose crew vehicle.

(D) The capability to serve as a backup system for supplying and supporting ISS cargo requirements or crew delivery requirements not otherwise met by available commercial or partner-supplied vehicles.

(2) FLEXIBILITY.—The Space Launch System shall be designed from inception as a fully-integrated vehicle capable of carrying a total payload of 130 tons or more into low-Earth orbit in preparation for transit for missions beyond low-Earth orbit. The Space Launch System shall, to the extent prac-

ticable, incorporate capabilities for evolutionary growth to carry heavier payloads. Developmental work and testing of the core elements and the upper stage should proceed in parallel subject to appropriations. Priority should be placed on the core elements with the goal for operational capability for the core elements not later than December 31, 2016.

(3) TRANSITION NEEDS.—The Administrator shall ensure critical skills and capabilities are retained, modified, and developed, as appropriate, in areas related to solid and liquid engines, large diameter fuel tanks, rocket propulsion, and other ground test capabilities for an effective transition to the follow-on Space Launch System.

(4) The capacity for efficient and timely evolution, including the incorporation of new technologies, competition of sub-elements, and commercial operations.

SEC. 303. MULTI-PURPOSE CREW VEHICLE.

(a) INITIATION OF DEVELOPMENT.—

(1) IN GENERAL.—The Administrator shall continue the development of a multi-purpose crew vehicle to be available as soon as practicable, and no later than for use with the Space Launch System. The vehicle shall continue to advance development of

the human safety features, designs, and systems in the Orion project.

(2) GOAL FOR OPERATIONAL CAPABILITY.—It shall be the goal to achieve full operational capability for the transportation vehicle developed pursuant to this subsection by not later than December 31, 2016. For purposes of meeting such goal, the Administrator may undertake a test of the transportation vehicle at the ISS before that date.

(b) MINIMUM CAPABILITY REQUIREMENTS.—The multi-purpose crew vehicle developed pursuant to subsection (a) shall be designed to have, at a minimum, the following:

(1) The capability to serve as the primary crew vehicle for missions beyond low-Earth orbit.

(2) The capability to conduct regular in-space operations, such as rendezvous, docking, and extravehicular activities, in conjunction with payloads delivered by the Space Launch System developed pursuant to section 302, or other vehicles, in preparation for missions beyond low-Earth orbit or servicing of assets described in section 804, or other assets in cis-lunar space.

(3) The capability to provide an alternative means of delivery of crew and cargo to the ISS, in

the event other vehicles, whether commercial vehicles or partner-supplied vehicles, are unable to perform that function.

(4) The capacity for efficient and timely evolution, including the incorporation of new technologies, competition of sub-elements, and commercial operations.

SEC. 304. UTILIZATION OF EXISTING WORKFORCE AND ASSETS IN DEVELOPMENT OF SPACE LAUNCH SYSTEM AND MULTI-PURPOSE CREW VEHICLE.

(a) IN GENERAL.—In developing the Space Launch System pursuant to section 302 and the multi-purpose crew vehicle pursuant to section 303, the Administrator shall, to the extent practicable utilize—

(1) existing contracts, investments, workforce, industrial base, and capabilities from the Space Shuttle and Orion and Ares 1 projects, including—

(A) space-suit development activities for application to, and coordinated development of, a multi-purpose crew vehicle suit and associated life-support requirements with potential development of standard NASA-certified suit and life support systems for use in alternative com-

mercially-developed crew transportation systems; and

(B) Space Shuttle-derived components and Ares 1 components that use existing United States propulsion systems, including liquid fuel engines, external tank or tank-related capability, and solid rocket motor engines; and

(2) associated testing facilities, either in being or under construction as of the date of enactment of this Act.

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

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

(2) shall, to the extent practicable, minimize the modification and development of ground infrastructure and maximize the utilization of existing software, vehicle, and mission operations processes;

(3) shall complete construction and activation of the A-3 test stand with a completion goal of September 30, 2013;

(4) may procure, develop, and flight test applicable components; and

(5) shall take appropriate actions to ensure timely and cost-effective development of the Space Launch System and the multi-purpose crew vehicle, including the use of a procurement approach that incorporates adequate and effective oversight, the facilitation of contractor efficiencies, and the streamlining of contract and procurement requirements.

SEC. 305. NASA LAUNCH SUPPORT AND INFRASTRUCTURE MODERNIZATION PROGRAM.

(a) IN GENERAL.—The Administrator shall carry out a program the primary purpose of which is to prepare infrastructure at the Kennedy Space Center that is needed to enable processing and launch of the Space Launch System. Vehicle interfaces and other ground processing and payload integration areas should be simplified to minimize overall costs, enhance safety, and complement the purpose of this section.

(b) ELEMENTS.—The program required by this section shall include—

(1) investments to improve civil and national security operations at the Kennedy Space Center, to enhance the overall capabilities of the Center, and to reduce the long term cost of operations and maintenance;

(2) measures to provide multi-vehicle support, improvements in payload processing, and partnering at the Kennedy Space Center; and

(3) such other measures as the Administrator may consider appropriate.

(c) REPORT ON NASA LAUNCH SUPPORT AND INFRASTRUCTURE MODERNIZATION PROGRAM.—

(1) REPORT REQUIRED.—Not later than 120 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on the plan for the implementation of the NASA launch support and infrastructure modernization program.

(2) ELEMENTS.—The report required by this subsection shall include—

(A) a description of the ground infrastructure plan tied to the Space Launch System and potential ground investment activities at other NASA centers related to supporting the development of the Space Launch System;

(B) a description of proposed initiatives intended to be conducted jointly or in cooperation with Cape Canaveral Air Force Station, Florida, or other installations or components of the United States Government; and

(C) a description of plans to use funds authorized to be appropriated by this Act to improve non-NASA facilities, which plans shall include a business plan outlining the nature and scope of investments planned by other parties.

SEC. 306. REPORT ON EFFECTS OF TRANSITION TO SPACE LAUNCH SYSTEM ON THE SOLID AND LIQUID ROCKET MOTOR INDUSTRIAL BASES.

(a) REPORT REQUIRED.—Not later than 120 days after the date of the enactment of this Act, the Administrator shall submit to Congress a report setting forth an assessment, prepared by the Administrator, in consultation with the Secretary of Defense and the Secretary of Commerce, of the effects of the retirement of the Space Shuttle, and of the transition to the Space Launch System developed pursuant to section 302, on the solid rocket motor industrial base and the liquid rocket motor industrial base in the United States.

(b) MATTERS TO BE ADDRESSED.—In preparing the assessment required by subsection (a), the Administrator shall address the following:

(1) The effects of efficiencies and efforts to stream-line the industrial bases referred to in subsection (a) for support of civil, military, and commercial users.

(2) Such other matters as the Administrator, in consultation with the Secretary of Defense and the Secretary of Commerce, may consider appropriate.

SEC. 307. SENSE OF CONGRESS ON OTHER TECHNOLOGY AND ROBOTIC ELEMENTS IN HUMAN SPACE FLIGHT AND EXPLORATION.

It is the sense of Congress that a balance is needed in human space flight between using and building upon existing capabilities and investing in and enabling new capabilities. Technology development provides the potential to develop an increased ability to operate and extend human presence in space, while at the same time enhance the nation's economic development and aid in addressing challenges here on Earth. Additionally, the establishment of in-space capabilities, use of space resources, and the ability to repair and reuse systems in space can contribute to the overall goals of extending human presence in space in an international manner, consistent with section 301(a).

SEC. 308. DEVELOPMENT OF TECHNOLOGIES AND IN-SPACE CAPABILITIES FOR BEYOND NEAR-EARTH SPACE MISSIONS.

(a) DEVELOPMENT AUTHORIZED.—The Administrator may initiate activities to develop the following:

(1) Technologies identified as necessary elements of missions beyond low-Earth orbit.

(2) In-space capabilities such as refueling and storage technology, orbital transfer stages, innovative in-space propulsion technology, communications, and data management that facilitate a broad range of users (including military and commercial) and applications defining the architecture and design of such missions.

(3) Spacesuit development and associated life support technology.

(4) Flagship missions.

(b) INVESTMENTS.—In developing technologies and capabilities under subsection (a), the Administrator may make investments—

(1) in space technologies such as advanced propulsion, propellant depots, in situ resource utilization, and robotic payloads or capabilities that enable human missions beyond low-Earth orbit ultimately leading to Mars;

(2) in a space-based transfer vehicle including these technologies with an ability to conduct space-based operations that provide capabilities—

(A) to integrate with the Space Launch System and other space-based systems;

(B) to provide opportunities for in-space servicing of and delivery to multiple space-based platforms; and

(C) to facilitate international efforts to expand human presence to deep space destinations;

(3) in advanced life support technologies and capabilities;

(4) in technologies and capabilities relating to in-space power, propulsion, and energy systems;

(5) in technologies and capabilities relating to in-space propellant transfer and storage;

(6) in technologies and capabilities relating to in situ resource utilization; and

(7) in expanded research to understand the greatest biological impediments to human deep space missions, especially the radiation challenge.

(c) UTILIZATION OF ISS AS TESTBED.—The Administrator may utilize the ISS as a testbed for any technology or capability developed under subsection (a) in a manner consistent with the provisions of this Act.

(d) COORDINATION.—The Administrator shall coordinate development of technologies and capabilities under this section through an overall agency technology approach, as authorized by section 905 of this Act.

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

SEC. 401. COMMERCIAL CARGO DEVELOPMENT PROGRAM.

The Administrator shall continue to support the existing Commercial Orbital Transportation Services program, aimed at enabling the commercial space industry in support of NASA to develop reliable means of launching cargo and supplies to the ISS throughout the duration of the facility's operation. The Administrator may apply funds towards the reduction of risk to the timely start of these services, specifically—

(1) efforts to conduct a flight test;

(2) accelerate development; and

(3) develop the ground infrastructure needed for commercial cargo capability.

SEC. 402. COMMERCIAL CREW DEVELOPMENT PROGRAM.

(a) CONTINUATION OF PROGRAM DURING FISCAL YEAR 2011.—The Administrator shall continue, and may expand the number of participants and the activities of, the Commercial Crew Development (CCDEV) program in fiscal year 2011, subject to the provisions of this title.

(b) CONTINUATION OF ACTIVITIES AND AGREEMENTS OF FISCAL YEAR 2010.—In carrying out sub-

section (a), the Administrator may continue or expand activities and agreements initiated in fiscal year 2010 that reduce risk, develop technologies, and lead to other advancements that will help determine the most effective and efficient means of advancing the development of commercial crew services.

SEC. 403. REQUIREMENTS APPLICABLE TO DEVELOPMENT OF COMMERCIAL CREW TRANSPORTATION CAPABILITIES AND SERVICES.

(a) PROHIBITION ON CONTRACTS AND PROCUREMENT AGREEMENTS DURING FISCAL YEAR 2011.—The Administrator may not enter into any contract or procurement agreement with respect to follow-on commercial crew services during fiscal year 2011.

(b) SUPPORT.—The Administrator may, beginning in fiscal year 2012 through the duration of the program, support follow-on commercially-developed crew transportation systems dependent upon the completion of each of the following:

(1) HUMAN RATING REQUIREMENTS.—Not later than 60 days after the date of the enactment of this Act, the Administrator shall develop and make available to the public detailed human rating processes and requirements to guide the design of commercially-developed crew transportation capabilities,

which requirements shall be at least equivalent to proven requirements for crew transportation in use as of the date of the enactment of this Act.

(2) COMMERCIAL MARKET ASSESSMENT.—Not later than 180 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress an assessment, conducted, in coordination with the Federal Aviation Administration's Office of Commercial Space Transportation, for purposes of this paragraph, of the potential non-Government market for commercially-developed crew and cargo transportation systems and capabilities, including an assessment of the activities associated with potential private sector utilization of the ISS research and technology development capabilities and other potential activities in low-Earth orbit.

(3) PROCUREMENT SYSTEM REVIEW.—The Administrator shall review current Government procurement and acquisition practices and processes, including agreement authorities under the National Aeronautics and Space Act of 1958, to determine the most cost-effective means of procuring commercial crew transportation capabilities and related services in a manner that ensures appropriate account-

ability, transparency, and maximum efficiency in the procurement of such capabilities and services, which review shall include an identification of proposed measures to address risk management and means of indemnification of commercial providers of such capabilities and services, and measures for quality control, safety oversight, and the application of Federal oversight processes within the jurisdiction of other Federal agencies. A description of the proposed procurement process and justification of the proposed procurement for its selection shall be included in any proposed initiation of procurement activity for commercially-developed crew transportation capabilities and services and shall be subject to review by the appropriate committees of Congress before the initiation of any competitive process to procure such capabilities or services. In support of the review by such committees, the Comptroller General shall undertake an assessment of the proposed procurement process and provide a report to the appropriate committees of Congress within 90 days after the date on which the Administrator provides the description and justification to such committees.

(4) USE OF GOVERNMENT-SUPPLIED CAPABILITIES AND INFRASTRUCTURE.—In evaluating any

proposed development activity for commercially-developed crew or cargo launch capabilities, the Administrator shall identify the anticipated contribution of government personnel, expertise, technologies, and infrastructure to be utilized in support of design, development, or operations of such capabilities. This assessment shall include a clear delineation of the full requirements for the commercial crew service (including the contingency for crew rescue). The Administrator shall include details and associated costs of such support as part of any proposed development initiative for the procurement of commercially-developed crew or cargo launch capabilities or services.

(5) FLIGHT DEMONSTRATION AND READINESS REQUIREMENTS.—The Administrator shall establish appropriate milestones and minimum performance objectives to be achieved before authority is granted to proceed to the procurement of commercially-developed crew transportation capabilities or systems. The guidelines shall include a procedure to provide independent assurance of flight safety and flight readiness before the authorization of United States government personnel to participate as crew onboard

any commercial launch vehicle developed pursuant to this section.

(6) COMMERCIAL CREW RESCUE CAPABILITIES.—The provision of a commercial capability to provide ISS crew services shall include crew rescue requirements, and shall be undertaken through the procurement process initiated in conformance with this section. In the event such development is initiated, the Administrator shall make available any relevant government-owned intellectual property deriving from the development of a multi-purpose crew vehicle authorized by this Act to commercial entities involved with such crew rescue capability development which shall be relevant to the design of a crew rescue capability. In addition, the Administrator shall seek to ensure that contracts for development of the multi-purpose crew vehicle contain provisions for the licensing of relevant intellectual property to participating commercial providers of any crew rescue capability development undertaken pursuant to this section. If one or more contractors involved with development of the multi-purpose crew vehicle seek to compete in development of a commercial crew service with crew rescue capability, separate legislative authority must be enacted to enable the Admin-

istrator to provide funding for any modifications of the multi-purpose crew vehicle necessary to fulfill the ISS crew rescue function.

SEC. 404. REPORT ON INTERNATIONAL SPACE STATION CARGO RETURN CAPABILITY.

Not later than 120 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on potential alternative commercially-developed means for the capability for a soft-landing return on land from the ISS of—

(1) research samples or other derivative materials; and

(2) small to mid-sized (up to 1,000 kilograms) equipment for return and analysis, or for refurbishment and redelivery, to the ISS.

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

SEC. 501. CONTINUATION OF THE INTERNATIONAL SPACE STATION THROUGH 2020.

(a) POLICY OF THE UNITED STATES.—It shall be the policy of the United States, in consultation with its international partners in the ISS program, to support full and complete utilization of the ISS through at least 2020.

(b) NASA ACTIONS.—In furtherance of the policy set forth in subsection (a), NASA shall pursue international, commercial, and intragovernmental means to maximize ISS logistics supply, maintenance, and operational capabilities, reduce risks to ISS systems sustainability, and offset and minimize United States operations costs relating to the ISS.

SEC. 502. MAXIMUM UTILIZATION OF THE INTERNATIONAL SPACE STATION.

(a) IN GENERAL.—With assembly of the ISS complete, NASA shall take steps to maximize the productivity and use of the ISS with respect to scientific and technological research and development, advancement of space exploration, and international collaboration.

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

(1) INNOVATIVE USE OF U.S. SEGMENT.—The United States segment of the ISS, which has been designated as a National Laboratory, shall be developed, managed and utilized in a manner that enables the effective and innovative use of such facility, as provided in section 504.

(2) INTERNATIONAL COOPERATION.—The ISS shall continue to be utilized as a key component of international efforts to build missions and capabili-

ties that further the development of a human presence beyond near-Earth space and advance United States security and economic goals. The Administrator shall actively seek ways to encourage and enable the use of ISS capabilities to support these efforts.

(3) DOMESTIC COLLABORATION.—The operations, management, and utilization of the ISS shall be conducted in a manner that provides opportunities for collaboration with other research programs and objectives of the United States Government in cooperation with commercial suppliers, users, and developers.

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

(a) IN GENERAL.—The Administrator shall take all actions necessary to ensure the safe and effective operation, maintenance, and maximum utilization of the United States segment of the ISS through at least September 30, 2020.

(b) VEHICLE AND COMPONENT REVIEW.—

(1) IN GENERAL.—In carrying out subsection (a), the Administrator shall, as soon as is prac-

ticable after the date of the enactment of this Act, carry out a comprehensive assessment of the essential modules, operational systems and components, structural elements, and permanent scientific equipment on board or planned for delivery and installation aboard the ISS, including both United States and international partner elements, for purposes of identifying the spare or replacement modules, systems and components, elements, and equipment that are required to ensure complete, effective, and safe functioning and full scientific utilization of the ISS through September 30, 2020.

(2) DATA.—In carrying out the assessment, the Administrator shall assemble any existing data, and provide for the development of any data or analysis not currently available, that is necessary for purposes of the assessment.

(c) REPORTS.—

(1) REPORT ON ASSESSMENT.—

(A) REPORT REQUIRED.—Not later than 90 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on the assessment required by subsection (b).

(B) ELEMENTS.—The report required by this paragraph shall include, at minimum, the following:

(i) A description of the spare or replacement modules, systems and components, elements, and equipment identified pursuant to the assessment that are currently produced, in inventory, or on order, a description of the state of their readiness, and a schedule for their delivery to the ISS (including the planned transportation means for such delivery), including for each such module, system or component, element, or equipment a description of—

(I) its specifications, including size, weight, and necessary configuration for launch and delivery to the ISS;

(II) its function;

(III) its location; and

(IV) its criticality for ISS system integrity.

(ii) A description of the spare or replacement modules, systems and compo-

nents, elements, and equipment identified pursuant to the assessment that are not currently produced, in inventory, or on order, including for each such module, system or component, element, or equipment a description of—

(I) its specifications, including size, weight, and necessary configuration for launch and delivery to the ISS;

(II) its function;

(III) its location;

(IV) its criticality for ISS system integrity; and

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

(iii) A detailed summary of the delivery schedule and associated delivery vehicle requirements necessary to transport all spare and replacement elements considered essential for the ongoing and sustained functionality of all critical systems of the ISS, both in and of themselves and as an element of an integrated, mutually depend-

ent essential capability, including an assessment of the current schedule for delivery, the availability of delivery vehicles to meet that schedule, and the likelihood of meeting that schedule through such vehicles.

(2) GAO REPORT.—

(A) REPORT REQUIRED.—Not later than 90 days after the submittal to Congress under paragraph (1) of the assessment required by subsection (b), the Comptroller General of the United States shall submit to the appropriate committees of Congress a report on the assessment. The report shall set forth an evaluation of the assessment by the Comptroller General, including an evaluation of the accuracy and level of confidence in the findings of the assessment.

(B) COOPERATION WITH GAO.—The Administrator shall provide for the monitoring and participation of the Comptroller General in the assessment in a manner that permits the Comptroller General to prepare and submit the report required by subparagraph (A).

(d) UTILIZATION OF RESEARCH FACILITIES AND CAPABILITIES.—Utilization of research facilities and capabilities aboard the ISS (other than exploration-related research and technology development facilities and capabilities, and associated ground support and logistics), shall be planned, managed, and supported as provided in section 504. Exploration-related research and technology development facilities, capabilities, and associated ground support and logistics shall be planned, managed, and supported by the appropriate NASA organizations and officials in a manner that does not interfere with other activities under section 504.

(e) SPACE SHUTTLE MISSION TO ISS.—

(1) SPACE SHUTTLE MISSION.—The Administrator shall fly the Launch-On-Need Shuttle mission currently designated in the Shuttle Flight Manifest dated February 28, 2010, to the ISS in fiscal year 2011, but no earlier than June 1, 2011, unless required earlier by an operations contingency, and pending the results of the assessment required by paragraph (2) and the determination under paragraph (3)(A).

(2) ASSESSMENT OF SAFE MEANS OF RETURN.—The Administrator shall provide for an assessment by the NASA Engineering and Safety Cen-

ter of the procedures and plans developed to ensure the safety of the Space Shuttle crew, and alternative means of return, in the event the Space Shuttle is damaged or otherwise unable to return safely to Earth.

(3) SCHEDULE AND PAYLOAD.—The determination of the schedule and payload for the mission authorized by paragraph (1) shall take into account the following:

(A) The supply and logistics delivery requirements of the ISS.

(B) The findings of the study required by paragraph (2).

(4) FUNDS.—Amounts authorized to be appropriated by section 101(2)(B) shall be available for the mission authorized by paragraph (1).

(f) SPACE SHUTTLE MANIFEST FLIGHT ASSURANCE.—

(1) IN GENERAL.—The Administrator shall take all actions necessary to preserve Space Shuttle launch capability through fiscal year 2011 in a manner that enables the launch, at a minimum, of missions and primary payloads in the Shuttle flight manifest as of February 28, 2010.

(2) CONTINUATION OF CONTRACTOR SUPPORT.—The Administrator may not terminate any contract that provides the system transitions necessary for shuttle-derived hardware to be used on either the multi-purpose crew vehicle described in section 303 or the Space Launch System described in section 302.

SEC. 504. MANAGEMENT OF THE ISS NATIONAL LABORATORY.

(a) COOPERATIVE AGREEMENT WITH NOT-FOR PROFIT ENTITY FOR MANAGEMENT OF NATIONAL LABORATORY.—

(1) IN GENERAL.—The Administrator shall provide initial financial assistance and enter into a cooperative agreement with an appropriate organization that is exempt from taxation under section 501(c)(3) of the Internal Revenue Code of 1986 to manage the activities of the ISS national laboratory in accordance with this section.

(2) QUALIFICATIONS.—The organization with which the Administrator enters into the cooperative agreement shall develop the capabilities to implement research and development projects utilizing the ISS national laboratory and to otherwise manage the activities of the ISS national laboratory.

(3) PROHIBITION ON OTHER ACTIVITIES.—The cooperative agreement shall require the organization entering into the agreement to engage exclusively in activities relating to the management of the ISS national laboratory and activities that promote its long term research and development mission as required by this section, without any other organizational objectives or responsibilities on behalf of the organization or any parent organization or other entity.

(b) NASA LIAISON.—

(1) DESIGNATION.—The Administrator shall designate an official or employee of the Space Operations Mission Directorate of NASA to act as liaison between NASA and the organization with which the Administrator enters into a cooperative agreement under subsection (a) with regard to the management of the ISS national laboratory.

(2) CONSULTATION WITH LIAISON.—The cooperative agreement shall require the organization entering into the agreement to carry out its responsibilities under the agreement in cooperation and consultation with the official or employee designated under paragraph (1).

(c) PLANNING AND COORDINATION OF ISS NATIONAL LABORATORY RESEARCH ACTIVITIES.—The Adminis-

trator shall provide initial financial assistance to the organization with which the Administrator enters into a cooperative agreement under subsection (a), in order for the organization to initiate the following:

(1) Planning and coordination of the ISS national laboratory research activities.

(2) Development and implementation of guidelines, selection criteria, and flight support requirements for non-NASA scientific utilization of ISS research capabilities and facilities available in United States-owned modules of the ISS or in partner-owned facilities of the ISS allocated to United States utilization by international agreement.

(3) Interaction with and integration of the International Space Station National Laboratory Advisory Committee established under section 602 of the National Aeronautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17752) with the governance of the organization, and review recommendations provided by that Committee regarding agreements with non-NASA departments and agencies of the United States Government, academic institutions and consortia, and commercial entities leading to the utilization of the ISS national laboratory facilities.

(4) Coordination of transportation requirements in support of the ISS national laboratory research and development objectives, including provision for delivery of instruments, logistics support, and related experiment materials, and provision for return to Earth of collected samples, materials, and scientific instruments in need of replacement or upgrade.

(5) Cooperation with NASA, other departments and agencies of the United States Government, the States, and commercial entities in ensuring the enhancement and sustained operations of non-exploration-related research payload ground support facilities for the ISS, including the Space Life Sciences Laboratory, the Space Station Processing Facility and Payload Operations Integration Center.

(6) Development and implementation of scientific outreach and education activities designed to ensure effective utilization of ISS research capabilities including the conduct of scientific assemblies, conferences, and other fora for the presentation of research findings, methods, and mechanisms for the dissemination of non-restricted research findings and the development of educational programs, course supplements, interaction with educational programs

at all grade levels, including student-focused research opportunities for conduct of research in the ISS national laboratory facilities.

(7) Such other matters relating to the utilization of the ISS national laboratory facilities for research and development as the Administrator may consider appropriate.

(d) RESEARCH CAPACITY ALLOCATION AND INTEGRATION OF RESEARCH PAYLOADS.—

(1) ALLOCATION OF ISS RESEARCH CAPACITY.—As soon as practicable after the date of the enactment of this Act, but not later than October 1, 2011, ISS national laboratory managed experiments shall be guaranteed access to, and utilization of, not less than 50 percent of the United States research capacity allocation, including power, cold stowage, and requisite crew time onboard the ISS through September 30, 2020. Access to the ISS research capacity includes provision for the adequate upmass and downmass capabilities to utilize the ISS research capacity, as available. The Administrator may allocate additional capacity to the ISS national laboratory should such capacity be in excess of NASA research requirements.

(2) ADDITIONAL RESEARCH CAPABILITIES.—If any NASA research plan is determined to require research capacity onboard the ISS beyond the percentage allocated under paragraph (1), such research plan shall be prepared in the form of a requested research opportunity to be submitted to the process established under this section for the consideration of proposed research within the capacity allocated to the ISS national laboratory. A proposal for such a research plan may include the establishment of partnerships with non-NASA institutions eligible to propose research to be conducted within the ISS national laboratory capacity. Until September 30, 2020, the official or employee designated under subsection (b) may grant an exception to this requirement in the case of a proposed experiment considered essential for purposes of preparing for exploration beyond low-Earth orbit, as determined by joint agreement between the organization with which the Administrator enters into a cooperative agreement under subsection (a) and the official or employee designated under subsection (b).

(3) RESEARCH PRIORITIES AND ENHANCED CAPACITY.—The organization with which the Administrator enters into the cooperative agreement shall

consider recommendations of the National Academies Decadal Survey on Biological and Physical Sciences in Space in establishing research priorities and in developing proposed enhancements of research capacity and opportunities for the ISS national laboratory.

(4) RESPONSIBILITY FOR RESEARCH PAYLOAD.—NASA shall retain its roles and responsibilities in providing research payload physical, analytical, and operations integration during pre-flight, post-flight, transportation, and orbital phases essential to ensure safe and effective flight readiness and vehicle integration of research activities approved and prioritized by the organization with which the Administrator enters into the cooperative agreement and the official or employee designated under subsection (b).

TITLE VI—SPACE SHUTTLE RETIREMENT AND TRANSITION

SEC. 601. SENSE OF CONGRESS ON THE SPACE SHUTTLE PROGRAM.

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

(1) The Space Shuttle program represents a national asset consisting of critical skills and capa-

bilities, including the ability to lift large payloads into space and return them to Earth.

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

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

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

(1) it is essential that the retirement of the Space Shuttle and the transition to new human space flight capabilities be done in a manner that builds upon the legacy of this national asset; and

(2) it is imperative for the United States to retain the skills and the industrial capability to provide a follow-on Space Launch System that is primarily designed for missions beyond near-Earth space, while offering some potential for supplanting shuttle delivery capabilities to low-Earth orbit, particularly in support of ISS requirements, if necessary.

SEC. 602. RETIREMENT OF SPACE SHUTTLE ORBITERS AND TRANSITION OF SPACE SHUTTLE PROGRAM.

(a) IN GENERAL.—The Administrator shall retire the Space Shuttle orbiters pursuant to a schedule established by the Administrator and in a manner consistent with provisions of this Act regarding potential requirements for contingency utilization of Space Shuttle orbiters for ISS requirements.

(b) UTILIZATION OF WORKFORCE AND ASSETS IN FOLLOW-ON SPACE LAUNCH SYSTEM.—

(1) UTILIZATION OF VEHICLE ASSETS.—In carrying out subsection (a), the Administrator shall, to the maximum extent practicable, utilize workforce, assets, and infrastructure of the Space Shuttle program in efforts relating to the initiation of a follow-on Space Launch System developed pursuant to section 302 of this Act.

(2) OTHER ASSETS.—With respect to the workforce, assets, and infrastructure not utilized as described in paragraph (1), the Administrator shall work closely with other departments and agencies of the Federal Government, and the private sector, to divest unneeded assets and to assist displaced workers with retraining and other placement efforts. Amounts authorized to be appropriated by section

101(2)(B) shall be available for activities pursuant to this paragraph.

SEC. 603. DISPOSITION OF ORBITER VEHICLES.

(a) IN GENERAL.—Upon the termination of the Space Shuttle program as provided in section 602, the Administrator shall decommission any remaining Space Shuttle orbiter vehicles according to established safety and historic preservation procedures prior to their designation as surplus government property. The orbiter vehicles shall be made available and located for display and maintenance through a competitive procedure established pursuant to the disposition plan developed under section 613(a) of the National Aeronautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17761(a)), with priority consideration given to eligible applicants meeting all conditions of that plan which would provide for the display and maintenance of orbiters at locations with the best potential value to the public, including where the location of the orbiters can advance educational opportunities in science, technology, engineering, and mathematics disciplines, and with an historical relationship with either the launch, flight operations, or processing of the Space Shuttle orbiters. The Smithsonian Institution, which, as of the date of enactment of this Act, houses the Space Shuttle Enterprise, shall determine any new location for the Enterprise.

(b) DISPLAY AND MAINTENANCE.—The orbiter vehicles made available under subsection (a) shall be displayed and maintained through agreements and procedures established pursuant to section 613(a) of the National Aeronautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17761(a)).

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to NASA such sums as may be necessary to carry out this section. The amounts authorized to be appropriated by this subsection shall be in addition to any amounts authorized to be appropriated by title I, and may be requested by the President as supplemental requirements, if needed, in the appropriate fiscal years.

TITLE VII—EARTH SCIENCE

SEC. 701. SENSE OF CONGRESS.

It is the sense of Congress that—

(1) Earth observations are critical to scientific understanding and monitoring of the Earth system, to protecting human health and property, to growing the economy of the United States, and to strengthening the national security and international posture of the United States. Additionally, recognizing the number of relevant participants and activities involved with Earth observations within the United

States Government and internationally, Congress supports the strengthening of collaboration across these areas;

(2) NASA plays a critical role through its ability to provide data on solar output, sea level rise, atmospheric and ocean temperature, ozone depletion, air pollution, and observation of human and environment relationships;

(3) programs should utilize open standards consistent with international data-sharing principles and obtain and convert data from other government agencies, including data from the United States Geological Survey, and data derived from satellites operated by NOAA as well as from international satellites are important to the study of climate science and such cooperative relationships and programs should be maintained;

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

(5) land remote sensing observation plays a critical role in Earth science, and the national space

policy supports this role by requiring operational land remote sensing capabilities.

SEC. 702. INTERAGENCY COLLABORATION IMPLEMENTATION APPROACH.

The Director of OSTP shall establish a mechanism to ensure greater coordination of the research, operations, and activities relating to civilian Earth observation of those Agencies, including NASA, that have active programs that either contribute directly or indirectly to these areas. This mechanism should include the development of a strategic implementation plan that is updated at least every 3 years, and includes a process for external independent advisory input. This plan should include a description of the responsibilities of the various Agency roles in Earth observations, recommended cost-sharing and procurement arrangements between Agencies and other entities, including international arrangements, and a plan for ensuring the provision of sustained, long term space-based climate observations. The Director shall provide a report to Congress within 90 days after the date of enactment of this Act on the implementation plan for this mechanism.

SEC. 703. TRANSITIONING EXPERIMENTAL RESEARCH TO OPERATIONS.

The Administrator shall coordinate with the Administrator of NOAA and the Director of the United States Geological Survey to establish a formal mechanism that plans, coordinates, and supports the transitioning of NASA research findings, assets, and capabilities to NOAA operations and United States Geological Survey operations. In defining this mechanism, NASA should consider the establishment of a formal or informal Interagency Transition Office. The Administrator of NASA shall provide an implementation plan for this mechanism to Congress within 90 days after the date of enactment of this Act.

SEC. 704. DECADAL SURVEY MISSIONS IMPLEMENTATION FOR EARTH OBSERVATION.

The Administrator shall undertake to implement, as appropriate, missions identified in the National Research Council's Earth Science Decadal Survey within the scope of the funds authorized for the Earth Science Mission Directorate.

SEC. 705. EXPANSION OF EARTH SCIENCE APPLICATIONS.

It is the sense of the Congress that the role of NASA in Earth Science applications shall be expanded with other departments and agencies of the Federal government, State and local governments, tribal governments, aca-

demia, the private sector, nonprofit organizations, and international partners. NASA's Earth science data can increasingly aid efforts to improve the human condition and provide greater security.

SEC. 706. INSTRUMENT TEST-BEDS AND VENTURE CLASS MISSIONS.

The Administrator shall pursue innovative ways to fly instrument-level payloads for early demonstration or as co-manifested payloads. The Congress encourages the use of the ISS as an accessible platform for the conduct of such activities. Additionally, in order to address the cost and schedule challenges associated with large flight systems, NASA should pursue smaller systems where practicable and warranted.

SEC. 707. SENSE OF CONGRESS ON NPOESS FOLLOW-ON PROGRAM.

It is the Sense of the Congress that—

(1) polar orbiting satellites are vital for weather prediction, climate and environmental monitoring, national security, emergency response, and climate research;

(2) the National Polar Orbiting Environmental Satellite System has suffered from years of steadily rising cost estimates and schedule delays and an independent review team recommended that the Sys-

tem be restructured to improve the probability of success and protect the continuity of weather and climate data;

(3) the Congress supports the decision made by OSTP in February, 2010, to restructure the program to minimize schedule slips and cost overruns, clarify the responsibilities and accountability of NASA, NOAA, and the Department of Defense, and retain necessary coordination across civil and defense weather and climate programs;

(4) the Administrator of NOAA and the Secretary of Defense should maximize the use of assets from the NPOESS program as they establish the NOAA Joint Polar Satellite System at NASA's Goddard Space Flight Center, and the Department of Defense's Defense Weather Satellite System;

(5) the Administrator of NOAA and the Secretary of Defense should structure their programs in order to maintain satellite data continuity for the Nation's weather and climate requirements; and

(6) the Administrator of NOAA and the Secretary of Defense should provide immediate notification to the Congress of any impediments that may require Congressional intervention in order for the

agencies to meet launch readiness dates, together with any recommended actions.

TITLE VIII—SPACE SCIENCE

SEC. 801. TECHNOLOGY DEVELOPMENT.

The Administrator shall ensure that the Science Mission Directorate maintains a long term technology development program for space and Earth science. This effort should be coordinated with an overall Agency technology investment approach, as authorized in section 905 of this Act.

SEC. 802. SUBORBITAL RESEARCH ACTIVITIES.

(a) IN GENERAL.—The report of the National Academy of Sciences, *Revitalizing NASA's Suborbital Program: Advancing Science, Driving Innovation and Developing Workforce,* found that suborbital science missions were absolutely critical to building an aerospace workforce capable of meeting the needs of current and future human and robotic space exploration.

(b) MANAGEMENT.—The Administrator shall designate an officer or employee of the Science Mission Directorate to act as the responsible official for all Suborbital Research in the Science Mission Directorate. The designee shall be responsible for the development of short- and long term strategic plans for maintaining, renewing and extending suborbital facilities and capabilities, monitoring

progress towards goals in the plans, and be responsible for integration of suborbital activities and workforce development within the agency, thereby ensuring the long term recognition of their combined value to the directorate, to NASA, and to the Nation.

(c) ESTABLISHMENT OF SUBORBITAL RESEARCH PROGRAM.—The Administrator shall establish a Suborbital Research Program within the Science Mission Directorate that shall include the use of sounding rockets, aircraft, high altitude balloons, suborbital reusable launch vehicles, and commercial launch vehicles to advance science and train the next generation of scientists and engineers in systems engineering and systems integration which are vital to maintaining critical skills in the aerospace workforce. The program shall integrate existing suborbital research programs with orbital missions at the discretion of the designated officer or employee and shall emphasize the participation of undergraduate and graduate students and post-doctoral researchers when formulating announcements of opportunity.

(d) REPORT.—The Administrator shall report to the appropriate committees of Congress on the number and type of suborbital missions conducted in each fiscal year and the number of undergraduate and graduate students

participating in the missions. The report shall be made annually for each fiscal year under this section.

(e) AUTHORIZATION.—There are authorized to be appropriated to the Administrator such sums as may be necessary to carry out this section.

SEC. 803. OVERALL SCIENCE PORTFOLIO-SENSE OF THE CONGRESS.

Congress reaffirms its sense that a balanced and adequately funded set of activities, consisting of research and analysis grants programs, technology development, small, medium, and large space missions, and suborbital research activities, contributes to a robust and productive science program and serves as a catalyst for innovation.

SEC. 804. IN-SPACE SERVICING.

The Administrator shall continue to take all necessary steps to ensure that provisions are made for in-space or human servicing and repair of all future observatory-class scientific spacecraft intended to be deployed in Earth-orbit or at a Lagrangian point to the extent practicable and appropriate. The Administrator should ensure that agency investments and future capabilities for space technology, robotics, and human space flight take the ability to service and repair these spacecraft into account, where appropriate, and incorporate such capabilities into design and operational plans.

SEC. 805. DECADAL RESULTS.

NASA shall take into account the current decadal surveys from the National Academies' Space Studies Board when submitting the President's budget request to the Congress.

SEC. 806. ON-GOING RESTORATION OF RADIOISOTOPE THERMOELECTRIC GENERATOR MATERIAL PRODUCTION.

(a) FINDINGS.—The Congress finds the following:

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

(2) Missions such as Viking, Voyager, Cassini, and New Horizons have greatly expanded knowledge of our solar system and planetary characteristics and evolution.

(3) Radioisotope power systems are the only available power sources for deep space missions making it possible to travel to such distant destinations as Mars, Jupiter, Saturn, Pluto, and beyond and maintain operational control and systems viability for extended mission durations.

(4) Current radioisotope power systems supplies and production will not fully support NASA missions planned even in the next decade and, without a new domestic production capability, the United States

will no longer have the means to explore the majority of the solar system by the end of this decade.

(5) Continuing to rely on Russia or other foreign sources for radioisotope power system fuel production is not a secure option.

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

(b) IN GENERAL.—The Administrator shall, in coordination with the Secretary of Energy, pursue a joint approach beginning in fiscal year 2011 towards restarting and sustaining the domestic production of radioisotope thermoelectric generator material for deep space and other science and exploration missions. Funds authorized by this Act for NASA shall be made available under a reimbursable agreement with the Department of Energy for the purpose of reestablishing facilities to produce fuel required for radioisotope thermoelectric generators to enable future missions.

(c) REPORT.—Within 120 days after the date of enactment of this Act, the Administrator and the Secretary of Energy shall submit a joint report to the appropriate committees of Congress on coordinated agreements, planned implementation, and anticipated schedule, pro-

duction quantities, and mission applications under this section.

SEC. 807. COLLABORATION WITH ESMD AND SOMD ON ROBOTIC MISSIONS.

The Administrator shall ensure that the Exploration Systems Mission Directorate and the Space Operations Mission Directorate coordinate with the Science Mission Directorate on an overall approach and plan for interagency and international collaboration on robotic missions that are NASA or internationally developed, including lunar, Lagrangian, near-Earth orbit, and Mars spacecraft, such as the International Lunar Network. Within 90 days after the date of enactment of this Act, the Administrator shall provide a plan to the appropriate committees of Congress for implementation of the collaborative approach required by this section. The Administrator may not cancel or initiate any Exploration Systems Mission Directorate or Science Mission Directorate robotic project before the plan is submitted to the appropriate committees of Congress.

SEC. 808. NEAR-EARTH OBJECT SURVEY AND POLICY WITH RESPECT TO THREATS POSED.

(a) POLICY REAFFIRMATION.—Congress reaffirms the policy set forth in section 102(g) of the National Aero-

nautics and Space Act of 1958 (42 U.S.C. 2451(g)) relating to surveying near-Earth asteroids and comets.

(b) IMPLEMENTATION.—The Director of the OSTP shall implement, before September 30, 2012, a policy for notifying Federal agencies and relevant emergency response institutions of an impending near-Earth object threat if near-term public safety is at risk, and assign a Federal agency or agencies to be responsible for protecting the United States and working with the international community on such threats.

SEC. 809. SPACE WEATHER.

(a) FINDINGS.—The Congress finds the following:

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

(2) The effects of severe space weather events on the electric power grid, telecommunications and entertainment satellites, airline communications during polar routes, and space-based position, navigation and timing systems could have significant societal, economic, national security, and health impacts.

(3) Earth and Space Observing satellites, such as the Advanced Composition Explorer, Geostationary Operational Environmental Satellites, Polar Operational Environmental Satellites, and De-

fense Meteorological Satellites, provide crucial data necessary to predict space weather events.

(b) ACTION REQUIRED.—The Director of OSTP shall—

(1) improve the Nation's ability to prepare, avoid, mitigate, respond to, and recover from potentially devastating impacts of space weather events;

(2) coordinate the operational activities of the National Space Weather Program Council members, including the NOAA Space Weather Prediction Center and the U.S. Air Force Weather Agency; and

(3) submit a report to the appropriate committees of Congress within 180 days after the date of enactment of this Act that—

(A) details the current data sources, both space- and ground-based, that are necessary for space weather forecasting; and

(B) details the space- and ground-based systems that will be required to gather data necessary for space weather forecasting for the next 10 years.

TITLE IX—AERONAUTICS AND SPACE TECHNOLOGY

SEC. 901. SENSE OF CONGRESS.

It is the sense of Congress that—

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

(2) NASA aeronautics research should be guided by, and consistent with, the National Aeronautics Research and Development Policy that guides the Nation's aeronautics research and development activities;

(3) the OSTP-led National Science and Technology Council Aeronautics Science and Technology subcommittee remains essential to developing and coordinating national aeronautics research and development plans and their prioritization for funding, and that it is also important that the plans include a focus on research, development, technology, and engineering infrastructure plans, as well as research and development goals and objectives; and

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

SEC. 902. AERONAUTICS RESEARCH GOALS.

The Administrator should ensure that NASA maintains a strong aeronautics research portfolio ranging from fundamental research through systems research with specific research goals, including the following:

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

(2) ENVIRONMENTAL SUSTAINABILITY.—The Directorate shall consider and pursue concepts to reduce noise, emissions, and fuel consumption while maintaining high safety standards and shall pursue research related to alternative fuels.

(3) AVIATION SAFETY.—The Directorate shall proactively address safety challenges with new and current air vehicles and with operations in the Nation's current and future air transportation system.

SEC. 903. RESEARCH COLLABORATION.

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

(b) FEDERAL AVIATION ADMINISTRATION.—The Administrator shall continue to coordinate with, and work

closely with, the Administrator of the Federal Aviation Administration, under the framework of the Senior Policy Council, in development of the Next Generation Air Transportation Program. The Administrator shall encourage the Council to explore areas for greater collaboration, including areas where NASA can help to accelerate the development and demonstration of NextGen technologies.

SEC. 904. GOAL FOR AGENCY SPACE TECHNOLOGY.

It is critical that NASA maintain an Agency space technology base that helps align mission directorate investments and supports long term needs to complement mission-directorate funded research and support, where appropriate, multiple users, building upon its Innovative Partnerships Program and other partnering approaches.

SEC. 905. IMPLEMENTATION PLAN FOR AGENCY SPACE TECHNOLOGY.

Within 120 days after the date of enactment of this Act, NASA shall submit a plan to the appropriate committees of Congress that outlines how NASA's space technology program will meet the goal described in section 904, including an explanation of how the plan will link to other mission-directorate technology efforts outlined in sections 608, 801, and 802 of this Act.

SEC. 906. NATIONAL SPACE TECHNOLOGY POLICY.

(a) IN GENERAL.—The President or the President's designee, in consultation with appropriate Federal agencies, shall develop a national policy to guide the space technology development programs of the United States through 2020. The policy shall include national goals for technology development and shall describe the role and responsibilities of each Federal agency that will carry out the policy. In developing the policy, the President or the President's designee shall utilize external studies that have been conducted on the state of United States technology development and have suggested policies to ensure continued competitiveness.

(b) CONTENT.—

(1) At a minimum, the national space technology development policy shall describe for NASA—

(A) the priority areas of research for technology investment;

(B) the basis on which and the process by which priorities for ensuing fiscal years will be selected;

(C) the facilities and personnel needed to carry out the technology development program; and

(D) the budget assumptions on which the policy is based, which for fiscal years 2011, 2012, and 2013 shall be the authorized level for NASA's technology program authorized by this Act.

(2) The policy shall be based on the premise that the Federal Government has an established interest in conducting research and development programs that help preserve the role of the United States as a global leader in space technologies and their application.

(3) CONSIDERATIONS.—In developing the national space technology development policy, the President or the President's designee shall consider, and include a discussion in the report required by subsection (c), of the following issues:

(A) The extent to which NASA should focus on long term, high-risk research or more incremental technology development, and the expected impact of that decision on the United States economy.

(B) The extent to which NASA should address military and commercial needs.

(C) How NASA will coordinate its technology program with other Federal agencies.

(D) The extent to which NASA will conduct research in-house, fund university research, and collaborate on industry research and the expected impact of that mix of funding on the supply of United States workers for industry.

(4) CONSULTATION.—In the development of the national space technology development policy, the President or the President's designee shall consult widely with academic and industry experts and with other Federal agencies. The Administrator may enter into an arrangement with the National Academy of Sciences to help develop the policy.

(c) REPORT.—

(1) POLICY.—Not later than 1 year after the date of enactment of this Act, the President shall transmit a report setting forth national space technology policy to the appropriate committees of Congress and to the Senate Committee on Appropriations and the House of Representatives Committee on Appropriations.

(2) IMPLEMENTATION.—Not later than 60 days after the President transmits the report required by paragraph (1) to the Congress, the Administrator

shall transmit a report to the same committees describing how NASA will carry out the policy.

SEC. 907. COMMERCIAL REUSABLE SUBORBITAL RESEARCH PROGRAM.

(a) IN GENERAL.—The report of the National Academy of Sciences, *Revitalizing NASA's Suborbital Program: Advancing Science, Driving Innovation and Developing Workforce,* found that suborbital science missions were absolutely critical to building an aerospace workforce capable of meeting the needs of current and future human and robotic space exploration.

(b) MANAGEMENT.—The Administrator shall designate an officer or employee of the Space Technology Program to act as the responsible official for the Commercial Reusable Suborbital Research Program in the Space Technology Program. The designee shall be responsible for the development of short- and long term strategic plans for maintaining, renewing and extending suborbital facilities and capabilities.

(c) ESTABLISHMENT.—The Administrator shall establish a Commercial Reusable Suborbital Research Program within the Space Technology Program that shall fund the development of payloads for scientific research, technology development, and education, and shall provide flight opportunities for those payloads to microgravity en-

vironments and suborbital altitudes. The Commercial Reusable Suborbital Research Program may fund engineering and integration demonstrations, proofs of concept, or educational experiments for commercial reusable vehicle flights. The program shall endeavor to work with NASA's Mission Directorates to help achieve NASA's research, technology, and education goals.

(d) REPORT.—The Administrator shall submit a report annually to the appropriate committees of Congress describing progress in carrying out the Commercial Reusable Suborbital Research program, including the number and type of suborbital missions planned in each fiscal year.

(e) AUTHORIZATION.—There are authorized to be appropriated to the Administrator $15,000,000 for each of fiscal years 2011 through 2013 to carry out this section.

TITLE X—EDUCATION

SEC. 1001. REPORT ON EDUCATION IMPLEMENTATION OUTCOMES.

Not later than 120 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on the metrics, internal and external relationships, and resources committed by NASA to each of the following:

(1) The development of a national STEM workforce.

(2) The retention of students in STEM disciplines as reflected by their education progression over time.

(3) The development of strategic partnerships and linkages between STEM formal and informal education providers.

SEC. 1002. SENSE OF CONGRESS ON THE EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH.

It is the sense of Congress that—

(1) the Experimental Program to Stimulate Competitive Research of NASA strengthens the research capabilities of jurisdictions that historically have not participated equally in competitive aerospace and aerospace-related research activities;

(2) the Experimental Program to Stimulate Competitive Research of NASA has provided the American taxpayer with an excellent return on investment;

(3) the Experimental Program to Stimulate Competitive Research of NASA has been successful in helping to achieve broader geographical distribution of research and development support by improv-

ing the research infrastructure in States that historically have received limited Federal research and development funds; and

(4) in order to continue improvement and to increase efficiency the award of grants under the Experimental Program to Stimulate Competitive Research of NASA should be coordinated with the award of grants under the Experimental Program to Stimulate Competitive Research of the National Science Foundation, the Department of Energy, the Department of Agriculture, the Department of Defense, the Environmental Protection Agency, and the National Institutes of Health.

SEC. 1003. SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS COMMERCIAL ORBITAL PLATFORM PROGRAM.

A fundamental and unique capability of NASA is in stimulating science, technology, engineering, and mathematics education in the United States. In ensuring maximum use of that capability, NASA shall—

(1) establish a program to annually sponsor scientific and educational payloads developed with United States student and educator involvement to be flown on commercially available orbital platforms, when available and operational, with the goal of

launching at least 50 such payloads (with at least one from each of the 50 States) to orbit on at least one mission per year;

(2) contract with providers of commercial orbital platform services for their use by the STEM-Commercial Orbital Platform program, preceded by the issuance of a request for proposal, not later than 90 days after the date of enactment of this Act, to enter into at least one funded, competitively-awarded contract for commercial orbital platform services and make awards within 180 days after such date; and

(3) engage with United States students and educators and make available NASA's science, engineering, payload development, and payload operations expertise to student teams selected to participate in the STEM-Commercial Orbital Platform program.

TITLE XI—RE-SCOPING AND REVITALIZING INSTITUTIONAL CAPABILITIES

SEC. 1101. SENSE OF CONGRESS.

It is the sense of Congress that NASA needs to re-scope, and as appropriate, down-size, to fit current and future missions and expected funding levels. Eighty percent of NASA's facilities are over 40 years old. Addition-

ally, in a number of areas NASA finds itself ''holding onto'' facilities and capabilities scaled to another era.

SEC. 1102. INSTITUTIONAL REQUIREMENTS STUDY.

Within 1 year after the date of enactment of this Act, the Administrator shall provide to the appropriate committees of Congress a comprehensive study that, taking into account the long term direction provided by this Act, carefully examines NASA's structure, organization, and institutional assets and identifies a strategy to evolve toward the most efficient retention, sizing, and distribution of facilities, laboratories, test capabilities, and other infrastructure consistent with NASA's missions and mandates. The Administrator should pay particular attention to identifying and removing unneeded or duplicative infrastructure. The Administrator should include in the study a suggested reconfiguration and reinvestment strategy that would conform the needed equipment, facilities, test equipment, and related organizational alignment that would best meet the requirements of missions and priorities authorized and directed by this Act. As part of this strategy, the Administrator should include consideration and application of the findings and recommendations of the National Research Council report, *Capabilities for the Future: An Assessment of NASA Laboratories for Basic Research,* prepared in response to section 1003 of the National Aero-

nautics and Space Administration Authorization Act of 2008 (42 U.S.C. 17812).

SEC. 1103. NASA CAPABILITIES STUDY REQUIREMENT.

Upon completion of the study required by section 1102, the Administrator shall contract with an independent entity to examine alternative management models for NASA's workforce, centers, and related facilities, including the possible evolution to a network of federally funded research and development centers. The study shall include a recommended implementation strategy, which shall identify any additional legislative authorities necessary to enable implementation of the recommended strategy, including recommended actions to provide aid and assistance to eligible communities to mitigate adverse impacts resulting from implementation of the proposed strategy. The Administrator shall provide the results of this study to the appropriate committees of Congress within 1 year after the date on which the study is begun.

SEC. 1104. SENSE OF CONGRESS ON COMMUNITY TRANSITION SUPPORT.

The Congress recognizes and supports current executive branch efforts to assist and provide aid to communities that are adversely impacted by NASA program changes, contract or program cancellations, or proposed institutional changes, so as to minimize the social and eco-

nomic impacts to those communities, workers, and businesses. Communities eligible for such aid would be those in close proximity to NASA mission-related centers and their component facilities located in Alabama, California, Florida, Louisiana, Maryland, Mississippi, New Mexico, Ohio, Texas, and Virginia which may be impacted by program changes authorized or directed by this Act or by the implementation strategy developed pursuant to section 1103.

SEC. 1105. WORKFORCE STABILIZATION AND CRITICAL SKILLS PRESERVATION.

Prior to receipt by the Congress of the study, recommendations, and implementation strategy developed pursuant to section 1103, none of the funds authorized for use under this Act may be used to transfer the functions, missions, or activities, and associated civil service and contractor positions, from any NASA facility without authorization by the Congress to implement the proposed strategy. The Administrator shall preserve the critical skills and competencies in place at NASA centers prior to enactment of this Act in order to facilitate timely implementation of the requirements of this Act and to minimize disruption to the workforce. The Administrator may not implement any reduction-in-force or other involuntary sep-

arations, except for cause, prior to receipt by the Congress of the implementation strategy required by section 1103.

TITLE XII—OTHER MATTERS

SEC. 1201. REPORT ON SPACE TRAFFIC MANAGEMENT.

The Administrator shall submit to the appropriate committees of Congress a report on a status on the initiation of discussions with other nations on a framework to address space traffic management concerns, as required by section 1102 of the National Aeronautics and Space Administration Act Authorization Act of 2008 (42 U.S.C. 17821).

SEC. 1202. NATIONAL AND INTERNATIONAL ORBITAL DEBRIS MITIGATION.

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

(1) A national and international effort is needed to develop a coordinated approach towards the prevention, negation, and removal of orbital debris.

(2) The guidelines issued by the Inter-Agency Space Debris Coordination Committee provide a consensus understanding of 10 national space agencies (including NASA) plus the European Space Agency on the necessity of mitigating the creation of space debris and measures for doing so. NASA's participation on the Committee should be robust, and NASA

should urge other space-relevant Federal agencies (including the Departments of State, Defense, and Commerce) to work to ensure that their counterpart agencies in foreign governments are aware of these national commitments and the importance in which the United States holds them.

(3) Key components of such an approach should include—

(A) a process for debris prevention through agreements regarding spacecraft design, operations, and end-of-life disposition plans to minimize orbiting vehicles or elements which are nonfunctional;

(B) the development of a robust Space Situational Awareness network that can identify potential collisions and provide sufficient trajectory and orbital data to enable avoidance maneuvers;

(C) the interagency development of an overall strategy for review by the President, with recommendations for proposed international collaborative efforts to address this challenge.

(b) INTERNATIONAL DISCUSSION.—

(1) IN GENERAL.—The Administrator shall, in consultation with such other departments and agencies of the Federal Government as the Administrator considers appropriate, continue and strengthen discussions with the representatives of other spacefaring countries, within the Inter-Agency Space Debris Coordination Committee and elsewhere, to deal with this orbital debris mitigation.

(2) INTERAGENCY EFFORT.—For purposes of carrying out this subsection, the Director of OSTP, in coordination with the Director of the National Security Council and using the President's Council of Advisors on Science and Technology coordinating mechanism, shall develop an overall strategy for review by the President, with recommendations for proposed international collaborative efforts to address this challenge.

SEC. 1203. REPORTS ON PROGRAM AND COST ASSESSMENT AND CONTROL ASSESSMENT.

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

(1) The adherence of NASA to program cost and schedule targets and discipline across NASA programs remains a concern.

(2) The James Webb Space Telescope has exceeded its cost estimate.

(3) In 2007 the Government Accountability Office issued a report on NASA's high risk acquisition performance.

(4) In response, NASA prepared a corrective action plan two years ago.

(b) REPORTS.—

(1) REPORTS REQUIRED.—Not later than 90 days after the date of the enactment of this Act, and not later than April 30 of each year thereafter, the Administrator shall submit to the appropriate committees of Congress a report on the implementation during the preceding year for the corrective action plan referred to in subsection (a)(4).

(2) ELEMENTS.—Each report under this subsection shall set forth, for the year covered by such report, the following:

(A) A description of each NASA program that has exceeded its cost baseline by 15 percent or more or is more than 2 years behind its projected development schedule.

(B) For each program specified under subparagraph (A), a plan for such decrease in scope or requirements, or other measures, to be

undertaken to control cost and schedule, including any cost monitoring or corrective actions undertaken pursuant to the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155), and the amendments made by that Act.

SEC. 1204. ELIGIBILITY FOR SERVICE OF INDIVIDUAL CURRENTLY SERVING AS ADMINISTRATOR OF NASA.

The individual serving in the position of Administrator of the National Aeronautics and Space Administration as of the date of the enactment of this Act comes from civilian life and is therefore eligible to serve in such position, in conformance with section 202 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2472(a)).

SEC. 1205. SENSE OF CONGRESS ON INDEPENDENT VERIFICATION AND VALIDATION OF NASA SOFTWARE.

It is the sense of Congress that—

(1) safety is at the heart of every NASA mission;

(2) the Office of Safety and Mission Assurance remains vital to assuring the safety of all NASA activities;

(3) among the most important activities of the Office of Safety and Mission Assurance is the performance of independent safety and mission assurance assessments and process verification reviews;

(4) as NASA embarks on a new path, independent verification and validation of software must be of the highest priority to ensure safety throughout all NASA programs;

(5) NASA's activities depend on software integrity to achieve their goals and deliver a successful mission to the American people;

(6) independent verification and validation is necessary to ensure that safety-critical software will operate dependably and support mission success;

(7) the creation of the Independent Verification and Validation Facility of NASA was the direct result of recommendations made by the National Research Council and the Report of the Presidential Commission on the Space Shuttle Challenger Accident;

(8) the mission-critical software of NASA must operate dependably and safely;

(9) the Independent Verification and Validation Facility of NASA plays an important role in assuring the safety of all NASA activities by improving

methodologies for risk identification and assessment, and providing recommendations for risk mitigation and acceptance; and

(10) the Independent Verification and Validation Facility shall be the sole provider of independent verification and validation services for software created by or for NASA.

SEC. 1206. COUNTERFEIT PARTS.

(a) IN GENERAL.—The Administrator shall plan, develop, and implement a program, in coordination with other Federal agencies, to detect, track, catalog, and reduce the number of counterfeit electronic parts in the NASA supply chain.

(b) REQUIREMENTS.—In carrying out the program, the Administrator shall establish—

(1) counterfeit part identification training for all employees that procure, process, distribute, and install electronic parts that will—

(A) teach employees how to identify counterfeit parts;

(B) educate employees on procedures to follow if they suspect a part is counterfeit;

(C) regularly update employees on new threats, identification techniques, and reporting requirements; and

(D) integrate industry associations, manufacturers, suppliers, and other Federal agencies, as appropriate;

(2) an internal database to track all suspected and confirmed counterfeit electronic parts that will maintain, at a minimum—

(A) companies and individuals known and suspected of selling counterfeit parts;

(B) parts known and suspected of being counterfeit, including lot and date codes, part numbers, and part images;

(C) countries of origin;

(D) sources of reporting;

(E) United States Customs seizures; and

(F) Government-Industry Data Exchange Program reports and other public or private sector database notifications; and

(3) a mechanism to report all information on suspected and confirmed counterfeit electronic parts to law enforcement agencies, industry associations, and other databases, and to issue bulletins to industry on counterfeit electronic parts and related counterfeit activity.

(c) REVIEW OF PROCUREMENT AND ACQUISITION POLICY.—

(1) IN GENERAL.—In establishing the program, the Administrator shall amend existing acquisition and procurement policy to purchase electronic parts from trusted or approved manufacturers. To determine trusted or approved manufacturers, the Administrator shall establish a list, assessed and adjusted at least annually, and create criteria for manufacturers to meet in order to be placed onto the list.

(2) CRITERIA.—The criteria may include—

(A) authentication or encryption codes;

(B) embedded security markings in parts;

(C) unique, harder to copy labels and markings;

(D) identifying distinct lot and serial codes on external packaging;

(E) radio frequency identification embedded into high-value parts;

(F) physical destruction of all defective, damaged, and sub-standard parts that are by-products of the manufacturing process;

(G) testing certifications;

(H) maintenance of procedures for handling any counterfeit parts that slip through;

(I) maintenance of secure facilities to prevent unauthorized access to proprietary information; and

(J) maintenance of product return, buy back, and inventory control practices that limit counterfeiting.

(d) REPORT TO CONGRESS.—Within one year after the date of enactment of this Act, the Administrator shall report on the progress of implementing this section to the appropriate committees of Congress.

SEC. 1207. INFORMATION SECURITY.

(a) MONITORING RISK.—

(1) UPDATE ON SYSTEM IMPLEMENTATION.—Not later than 120 days after the date of enactment of this Act, and on a biennial basis thereafter, the chief information officer of NASA, in coordination with other national security agencies, shall provide to the appropriate committees of Congress—

(A) an update on efforts to implement a system to provide dynamic, comprehensive, real-time information regarding risk of unauthorized remote, proximity, and insider use or access, for all information infrastructure under the responsibility of the chief information officer, and mis-

sion-related networks, including contractor networks;

(B) an assessment of whether the system has demonstrably and quantifiably reduced network risk compared to alternative methods of measuring security; and

(C) an assessment of the progress that each center and facility has made toward implementing the system.

(2) EXISTING ASSESSMENTS.—The assessments required of the Inspector General under section 3545 of title 44, United States Code, shall evaluate the effectiveness of the system described in this subsection.

(b) INFORMATION SECURITY AWARENESS AND EDUCATION.—

(1) IN GENERAL.—In consultation with the Department of Education, other national security agencies, and other agency directorates, the chief information officer shall institute an information security awareness and education program for all operators and users of NASA information infrastructure, with the goal of reducing unauthorized remote, proximity, and insider use or access.

(2) PROGRAM REQUIREMENTS.—

(A) The program shall include, at a minimum, ongoing classified and unclassified threat-based briefings, and automated exercises and examinations that simulate common attack techniques.

(B) All agency employees and contractors engaged in the operation or use of agency information infrastructure shall participate in the program.

(C) Access to NASA information infrastructure shall only be granted to operators and users who regularly satisfy the requirements of the program.

(D) The chief human capital officer of NASA, in consultation with the chief information officer, shall create a system to reward operators and users of agency information infrastructure for continuous high achievement in the program.

(c) INFORMATION INFRASTRUCTURE DEFINED.—In this section, the term ''information infrastructure'' means the underlying framework that information systems and assets rely on to process, transmit, receive, or store information electronically, including programmable electronic

devices and communications networks and any associated hardware, software, or data.

SEC. 1208. NATIONAL CENTER FOR HUMAN PERFORMANCE.

(a) IN GENERAL.—The National Center for Human Performance is located in Houston's Texas Medical Center which is home to 49 non-profit and academic patient care, biomedical research, and health educational institutions serving 6 million patients each year, and works collaboratively with individuals and organizations, including NASA, to advance science and research on human performance in space, health, the military, athletics, and the arts.

(b) DESIGNATION AS INSTITUTION OF EXCELLENCE.—The National Center for Human Performance is designated as an Institution of Excellence for Human Performance dedicated to understanding and improving all aspects of human performance.

SEC. 1209. ENHANCED-USE LEASING.

(a) SENSE OF THE CONGRESS.—It is the sense of the Congress that the NASA enhanced-use leasing program is a fiscally responsible program to further maintain the exploration-related infrastructure of our Nation's space centers while ensuring continued private utilization of these Federal assets, and every effort should be made to ensure effective utilization of this program.

SEC. 1210. SENSE OF CONGRESS CONCERNING THE STENNIS SPACE CENTER.

It is the sense of the Congress that the Stennis Space Center represents the national capability for development and certification of liquid propulsion technologies vital to our Nation's space flight program, and that the Federal government should fully utilize that resource and continue to make the testing facility available for further development of commercial aerospace capabilities.