IB

# Union Calendar No. 349

113TH CONGRESS
2D SESSION

# H. R. 4412

**[Report No. 113–470]**

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

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## IN THE HOUSE OF REPRESENTATIVES

APRIL 7, 2014

Mr. PALAZZO (for himself and Mr. SMITH of Texas) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

JUNE 5, 2014

Reported with an amendment, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed

[Strike out all after the enacting clause and insert the part printed in italic]

[For text of introduced bill, see copy of bill as introduced on April 7, 2014]

# A BILL

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

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

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

*(a) SHORT TITLE.—This Act may be cited as the "National Aeronautics and Space Administration Authorization Act of 2014".*

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

*TITLE VII—POLICY PROVISIONS*



***SEC. 2. DEFINITIONS.***

*In this Act:*

*(1) ADMINISTRATION.—The term "Administration" means the National Aeronautics and Space Administration.*

*(2) ADMINISTRATOR.—The term "Administrator" means the Administrator of the Administration.*

*(3) ORION CREW CAPSULE.—The term "Orion crew capsule" means the multipurpose crew vehicle described in section 303 of the National Aeronautics*

*and Space Administration Authorization Act of 2010 (42 U.S.C. 18323).*

*(4) SPACE ACT AGREEMENT.—The term "Space Act Agreement" means an agreement created under the authority to enter into "other transactions" under section 20113(e) of title 51, United States Code.*

*(5) SPACE LAUNCH SYSTEM.—The term "Space Launch System" means the follow-on Government-owned civil launch system developed, managed, and operated by the Administration to serve as a key component to expand human presence beyond low-Earth orbit, as described in section 302 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322).*

# *TITLE I—AUTHORIZATION OF APPROPRIATIONS*

***SEC. 101. FISCAL YEAR 2014.***

*There are authorized to be appropriated to the Administration for fiscal year 2014 $17,646,500,000 as follows:*

*(1) For Space Exploration, $4,113,200,000, of which—*

*(A) $1,918,200,000 shall be for the Space Launch System, of which $318,200,000 shall be for Exploration Ground Systems;*

*(B) $1,197,000,000 shall be for the Orion crew capsule;*

*(C) $302,000,000 shall be for Exploration Research and Development; and*

*(D) $696,000,000 shall be for Commercial Crew Development activities.*

*(2) For Space Operations, $3,778,000,000, of which $2,984,100,000 shall be for the International Space Station Program.*

*(3) For Science, $5,151,200,000, of which—*

*(A) $1,826,000,000 shall be for Earth Science;*

*(B) $1,345,000,000 shall be for Planetary Science, of which $30,000,000 shall be for the Astrobiology Institute;*

*(C) $668,000,000 shall be for Astrophysics;*

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

*(E) $654,000,000 shall be for Heliophysics.*

*(4) For Aeronautics, $566,000,000.*

*(5) For Space Technology, $576,000,000.*

*(6) For Education, $116,600,000.*

*(7) For Cross-Agency Support, $2,793,000,000.*

*(8) For Construction and Environmental Compliance and Restoration, $515,000,000.*

*(9) For Inspector General, $37,500,000.*

# *TITLE II—HUMAN SPACE FLIGHT*

## *Subtitle A—Exploration*

***SEC. 201. SPACE EXPLORATION POLICY.***

*(a) POLICY.—Human exploration deeper into the solar system shall be a core mission of the Administration. It is the policy of the United States that the goal of the Administration's exploration program shall be to successfully conduct a crewed mission to the surface of Mars to begin human exploration of that planet. The use of the surface of the Moon, cis-lunar space, near-Earth asteroids, Lagrangian points, and Martian moons may be pursued provided they are properly incorporated into the Human Exploration Roadmap described in section 70504 of title 51, United States Code.*

*(b) VISION FOR SPACE EXPLORATION.—Section 20302 of title 51, United States Code, is amended by adding at the end the following:*

*"(c) DEFINITIONS.—In this section:*

*"(1) ORION CREW CAPSULE.—The term 'Orion crew capsule' means the multipurpose crew vehicle described in section 303 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18323).*

*"(2) SPACE LAUNCH SYSTEM.—The term 'Space Launch System' means the follow-on Government-owned civil launch system developed, managed, and operated by the Administration to serve as a key component to expand human presence beyond low-Earth orbit, as described in section 302 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322).".*

*(c) KEY OBJECTIVES.—Section 202(b) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18312(b)) is amended—*

*(1) in paragraph (3), by striking "and" after the semicolon;*

*(2) in paragraph (4), by striking the period at the end and inserting "; and"; and*

*(3) by adding at the end the following:*

*"(5) to accelerate the development of capabilities to enable a human exploration mission to the surface of Mars and beyond through the prioritization of those technologies and capabilities best suited for such a mission in accordance with the Human Exploration Roadmap under section 70504 of title 51, United States Code.".*

*(d) USE OF NON-UNITED STATES HUMAN SPACE FLIGHT TRANSPORTATION CAPABILITIES.—Section 201(a)*

*of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18311(a)) is amended to read as follows:*

*"(a) USE OF NON-UNITED STATES HUMAN SPACE FLIGHT TRANSPORTATION CAPABILITIES.—*

*"(1) IN GENERAL.—NASA may not obtain non-United States human space flight capabilities unless no domestic commercial or public-private partnership provider that the Administrator has determined to meet safety and affordability requirements established by NASA for the transport of its astronauts is available to provide such capabilities.*

*"(2) DEFINITION.—For purposes of this subsection, the term 'domestic commercial provider' means a person providing space transportation services or other space-related activities, the majority control of which is held by persons other than a Federal, State, local, or foreign government, foreign company, or foreign national.".*

*(e) REPEAL OF SPACE SHUTTLE CAPABILITY ASSURANCE.—Section 203 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18313) is amended—*

*(1) by striking subsection (b);*

*(2) in subsection (d), by striking "subsection (c)" and inserting "subsection (b)"; and*

*(3) by redesignating subsections (c) and (d) as subsections (b) and (c), respectively.*

***SEC. 202. STEPPING STONE APPROACH TO EXPLORATION.***

*(a) IN GENERAL.—Section 70504 of title 51, United States Code, is amended to read as follows:*

***"§ 70504. Stepping stone approach to exploration***

*"(a) IN GENERAL.—In order to maximize the cost effectiveness of the long-term space exploration and utilization activities of the United States, the Administrator shall direct the Human Exploration and Operations Mission Directorate, or its successor division, to develop a Human Exploration Roadmap to define the specific capabilities and technologies necessary to extend human presence to the surface of Mars and the sets and sequences of missions required to demonstrate such capabilities and technologies.*

*"(b) INTERNATIONAL PARTICIPATION.—The President should invite the United States partners in the International Space Station program and other nations, as appropriate, to participate in an international initiative under the leadership of the United States to achieve the goal of successfully conducting a crewed mission to the surface of Mars.*

*"(c) ROADMAP REQUIREMENTS.—In developing the Human Exploration Roadmap, the Administrator shall—*

*"(1) include the specific set of capabilities and technologies that contribute to extending human presence to the surface of Mars and the sets and sequences of missions necessary to demonstrate the proficiency of these capabilities and technologies with an emphasis on using or not using the International Space Station, lunar landings, cis-lunar space, trans-lunar space, Lagrangian points, and the natural satellites of Mars, Phobos and Deimos, as testbeds, as necessary, and shall include the most appropriate process for developing such capabilities and technologies;*

*"(2) include information on the phasing of planned intermediate destinations, Mars mission risk areas and potential risk mitigation approaches, technology requirements and phasing of required technology development activities, the management strategy to be followed, related International Space Station activities, and planned international collaborative activities, potential commercial contributions, and other activities relevant to the achievement of the goal established in section 201(a) of the National Aeronautics and Space Administration Authorization Act of 2014;*

*"(3) describe those technologies already under development across the Federal Government or by non-government entities which meet or exceed the needs described in paragraph (1);*

*"(4) provide a specific process for the evolution of the capabilities of the fully integrated Orion crew capsule with the Space Launch System and how these systems demonstrate the capabilities and technologies described in paragraph (1);*

*"(5) provide a description of the capabilities and technologies that need to be demonstrated or research data that could be gained through the utilization of the International Space Station and the status of the development of such capabilities and technologies;*

*"(6) describe a framework for international cooperation in the development of all technologies and capabilities required in this section, as well as an assessment of the risks posed by relying on international partners for capabilities and technologies on the critical path of development;*

*"(7) describe a process for utilizing nongovernmental entities for future human exploration beyond trans-lunar space and specify what, if any, synergy could be gained from—*

*"(A) partnerships using Space Act Agreements (as defined in section 2 of the National Aeronautics and Space Administration Authorization Act of 2014); or*

*"(B) other acquisition instruments;*

*"(8) include in the Human Exploration Roadmap an addendum from the National Aeronautics and Space Administration Advisory Council, and an addendum from the Aerospace Safety Advisory Panel, each with a statement of review of the Human Exploration Roadmap that shall include—*

*"(A) subjects of agreement;*

*"(B) areas of concern; and*

*"(C) recommendations; and*

*"(9) include in the Human Exploration Roadmap an examination of the benefits of utilizing current Administration launch facilities for trans-lunar missions.*

*"(d) UPDATES.—The Administrator shall update such Human Exploration Roadmap as needed but no less frequently than every 2 years and include it in the budget for that fiscal year transmitted to Congress under section 1105(a) of title 31, and describe—*

*"(1) the achievements and goals reached in the process of developing such capabilities and tech-*

*nologies during the 2-year period prior to the submission of the update to Congress; and*

*"(2) the expected goals and achievements in the following 2-year period.*

*"(e) DEFINITIONS.—In this section, the terms 'Orion crew capsule' and 'Space Launch System' have the meanings given such terms in section 20302.".*

*(b) REPORT.—*

*(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Administrator shall transmit a copy of the Human Exploration Roadmap developed under section 70504 of title 51, United States Code, to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

*(2) UPDATES.—The Administrator shall transmit a copy of each updated Human Exploration Roadmap to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 7 days after such Human Exploration Roadmap is updated.*

***SEC. 203. SPACE LAUNCH SYSTEM.***

*(a) FINDINGS.—Congress finds that—*

*(1) the Space Launch System is the most practical approach to reaching the Moon, Mars, and beyond, and Congress reaffirms the policy and minimum capability requirements for the Space Launch System contained in section 302 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322);*

*(2) the primary goal for the design of the fully integrated Space Launch System, including an upper stage needed to go beyond low-Earth orbit, is to safely carry a total payload to enable human space exploration of the Moon, Mars, and beyond over the course of the next century as required in section 302(c) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322(c)); and*

*(3) In order to promote safety and reduce programmatic risk, the Administrator shall budget for and undertake a robust ground test and uncrewed and crewed flight test and demonstration program for the Space Launch System and the Orion crew capsule and shall budget for an operational flight rate sufficient to maintain safety and operational readiness.*

*(b) SENSE OF CONGRESS.—It is the sense of Congress that the President's annual budget requests for the Space Launch System and Orion crew capsule development, test,*

*and operational phases should strive to accurately reflect the resource requirements of each of those phases, consistent with the policy established in section 201(a) of this Act.*

*(c) IN GENERAL.—Given the critical importance of a heavy-lift launch vehicle and crewed spacecraft to enable the achievement of the goal established in section 201(a) of this Act, as well as the accomplishment of intermediate exploration milestones and the provision of a backup capability to transfer crew and cargo to the International Space Station, the Administrator shall make the expeditious development, test, and achievement of operational readiness of the Space Launch System and the Orion crew capsule the highest priority of the exploration program.*

*(d) GOVERNMENT ACCOUNTABILITY OFFICE REVIEW.—Not later than 270 days after the date of enactment of this Act, the Comptroller General shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the Administration's acquisition of ground systems in support of the Space Launch System. The report shall assess the extent to which ground systems acquired in support of the Space Launch System are focused on the direct support of the Space Launch System and shall identify any ground support projects or activities that the Administration is un-*

*dertaking that do not solely or primarily support the Space Launch System.*

*(e) UTILIZATION REPORT.—The Administrator, in consultation with the Secretary of Defense and the Director of National Intelligence, shall prepare a report that addresses the effort and budget required to enable and utilize a cargo variant of the 130-ton Space Launch System configuration described in section 302(c) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322(c)). This report shall also include consideration of the technical requirements of the scientific and national security communities related to such Space Launch System and shall directly assess the utility and estimated cost savings obtained by using such Space Launch System for national security and space science missions. The Administrator shall transmit such report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 180 days after the date of enactment of this Act.*

*(f) NAMING COMPETITION.—Beginning not later than 180 days after the date of enactment of this Act and concluding not later than 1 year after such date of enactment, the Administrator shall conduct a well-publicized competition among students in elementary and secondary schools*

*to name the elements of the Administration's exploration program, including—*

*(1) a name for the deep space human exploration program as a whole, which includes the Space Launch System, the Orion crew capsule, and future missions; and*

*(2) a name for the Space Launch System.*

*(g) ADVANCED BOOSTER COMPETITION.—*

*(1) REPORT.—Not later than 90 days after the date of enactment of this Act, the Associate Administrator of the Administration shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report that—*

*(A) describes the estimated total development cost of an advanced booster for the Space Launch System;*

*(B) details any reductions or increases to the development cost of the Space Launch System which may result from conducting a competition for an advanced booster; and*

*(C) outlines any potential schedule delay to the Space Launch System 2017 Exploration Mission–1 launch as a result of increased costs asso-*

*ciated with conducting a competition for an advanced booster.*

*(2) COMPETITION.—If the Associate Administrator reports reductions pursuant to paragraph (1)(B), and no adverse schedule impact pursuant to paragraph (1)(C), then the Administration shall conduct a full and open competition for an advanced booster for the Space Launch System to meet the requirements described in section 302(c) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322(c)), to begin as soon as practicable after the development of the upper stage has been initiated.*

***SEC. 204. ORION CREW CAPSULE.***

*(a) IN GENERAL.—The Orion crew capsule shall meet the practical needs and the minimum capability requirements described in section 303 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18323).*

*(b) REPORT.—Not later than 60 days after the date of enactment of this Act, the Administrator shall transmit a report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate—*

*(1) detailing those components and systems of the Orion crew capsule that ensure it is in compliance with section 303(b) of such Act (42 U.S.C. 18323(b));*

*(2) detailing the expected date that the Orion crew capsule will be available to transport crew and cargo to the International Space Station; and*

*(3) certifying that the requirements of section 303(b)(3) of such Act (42 U.S.C. 18323(b)(3)) will be met by the Administration.*

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

*(a) STRATEGY AND PLAN.—*

*(1) IN GENERAL.—The Administrator shall develop a space radiation mitigation and management strategy and implementation plan to enable the achievement of the goal established in section 201 that includes key research and monitoring requirements, milestones, a timetable, and an estimate of facility and budgetary requirements.*

*(2) COORDINATION.—The strategy shall include a mechanism for coordinating Administration research, technology, facilities, engineering, operations, and other functions required to support the strategy and plan.*

*(3) TRANSMITTAL.—Not later than 1 year after the date of enactment of this Act, the Administrator shall transmit the strategy and plan to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

*(b) SPACE RADIATION RESEARCH FACILITIES.—The Administrator, in consultation with the heads of other appropriate Federal agencies, shall assess the national capabilities for carrying out critical ground-based research on space radiation biology and shall identify any issues that could affect the ability to carry out that research.*

***SEC. 206. PLANETARY PROTECTION FOR HUMAN EXPLORATION MISSIONS.***

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

*(b) SCOPE.—The study shall—*

*(1) collate and summarize what has been done to date with respect to planetary protection measures to be applied to potential human missions such as to the*

*lunar polar regions, near-Earth asteroids, the moons of Mars, and the surface of Mars;*

*(2) identify and document planetary protection concerns associated with potential human missions such as to the lunar polar regions, near-Earth asteroids, the moons of Mars, and the surface of Mars;*

*(3) develop a methodology, if possible, for defining and classifying the degree of concern associated with each likely destination;*

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

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

*(c) COMPLETION DATE.—Not later than 2 years after the date of enactment of this Act, the Administrator shall provide the results of the study to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

## *Subtitle B—Space Operations*

### *SEC. 211. INTERNATIONAL SPACE STATION.*

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

*(1) The International Space Station is an ideal testbed for future exploration systems development, including long-duration space travel.*

*(2) The use of the private market to provide cargo and crew transportation services is currently the most expeditious process to restore domestic access to the International Space Station and low-Earth orbit.*

*(3) Government access to low-Earth orbit is paramount to the continued success of the International Space Station and National Laboratory.*

*(b) IN GENERAL.—The following is the policy of the United States:*

*(1) The United States International Space Station program shall have two primary objectives: supporting achievement of the goal established in section 201 of this Act and pursuing a research program that advances knowledge and provides benefits to the Nation. It shall continue to be the policy of the United States to, in consultation with its international partners in the International Space Station program, support full and complete utilization of the International Space Station.*

*(2) The International Space Station shall be utilized to the maximum extent practicable for the development of capabilities and technologies needed for the future of human exploration beyond low-Earth orbit and shall be considered in the development of the*

*Human Exploration Roadmap developed under section 70504 of title 51, United States Code.*

*(3) The Administrator shall, in consultation with the International Space Station partners—*

*(A) take all necessary measures to support the operation and full utilization of the International Space Station; and*

*(B) seek to minimize, to the extent practicable, the operating costs of the International Space Station.*

*(4) Reliance on foreign carriers for crew transfer is unacceptable, and the Nation's human space flight program must acquire the capability to launch United States astronauts on United States rockets from United States soil as soon as is safe and practically possible, whether on Government-owned and operated space transportation systems or privately owned systems that have been certified for flight by the appropriate Federal agencies.*

*(c) REAFFIRMATION OF POLICY.—Congress reaffirms—*

*(1) its commitment to the development of a commercially developed launch and delivery system to the International Space Station for crew missions as expressed in the National Aeronautics and Space Ad-*

*ministration Authorization Act of 2005 (Public Law 109–155), the National Aeronautics and Space Administration Authorization Act of 2008 (Public Law 110–422), and the National Aeronautics and Space Administration Authorization Act of 2010 (Public Law 111–267);*

*(2) that the Administration shall make use of United States commercially provided International Space Station crew transfer and crew rescue services to the maximum extent practicable;*

*(3) that the Orion crew capsule shall provide an alternative means of delivery of crew and cargo to the International Space Station, in the event other vehicles, whether commercial vehicles or partner-supplied vehicles, are unable to perform that function; and*

*(4) the policy stated in section 501(b) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18351(b)) that the Administration shall pursue international, commercial, and intragovernmental means to maximize International Space Station logistics supply, maintenance, and operational capabilities, reduce risks to International Space Station systems sustainability, and offset and minimize United States operations costs relating to the International Space Station.*

*(d) ASSURED ACCESS TO LOW-EARTH ORBIT.—Section 70501(a) of title 51, United States Code, is amended to read as follows:*

*"(a) POLICY STATEMENT.—It is the policy of the United States to maintain an uninterrupted capability for human space flight and operations in low-Earth orbit, and beyond, as an essential instrument of national security and the capability to ensure continued United States participation and leadership in the exploration and utilization of space.".*

*(e) REPEALS.—*

*(1) USE OF SPACE SHUTTLE OR ALTERNATIVES.—Chapter 701 of title 51, United States Code, and the item relating to such chapter in the table of chapters for such title, are repealed.*

*(2) SHUTTLE PRICING POLICY FOR COMMERCIAL AND FOREIGN USERS.—Chapter 703 of title 51, United States Code, and the item relating to such chapter in the table of chapters for such title, are repealed.*

*(3) SHUTTLE PRIVATIZATION.—Section 50133 of title 51, United States Code, and the item relating to such section in the table of sections for chapter 501 of such title, are repealed.*

*(f) EXTENSION CRITERIA REPORT.—Not later than 1 year after the date of enactment of this Act, the Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the feasibility of extending the operation of the International Space Station that includes—*

*(1) criteria for defining the International Space Station as a research success;*

*(2) any necessary contributions to enabling execution of the Human Exploration Roadmap developed under section 70504 of title 51, United States Code;*

*(3) cost estimates for operating the International Space Station to achieve the criteria required under paragraph (1);*

*(4) cost estimates for extending operations to 2024 and 2030;*

*(5) an assessment of how the defined criteria under paragraph (1) respond to the National Academies Decadal Survey on Biological and Physical Sciences in Space; and*

*(6) an identification of the actions and cost estimate needed to deorbit the International Space Station once a decision is made to deorbit the laboratory.*

*(g) STRATEGIC PLAN FOR INTERNATIONAL SPACE STATION RESEARCH.—*

*(1) IN GENERAL.—The Director of the Office of Science and Technology Policy, in consultation with the Administrator, academia, other Federal agencies, the International Space Station National Laboratory Advisory Committee, and other potential stakeholders, shall develop and transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a strategic plan for conducting competitive, peer-reviewed research in physical and life sciences and related technologies on the International Space Station through at least 2020.*

*(2) PLAN REQUIREMENTS.—The strategic plan shall—*

*(A) be consistent with the priorities and recommendations established by the National Academies in its Decadal Survey on Biological and Physical Sciences in Space;*

*(B) provide a research timeline and identify resource requirements for its implementation, including the facilities and instrumentation necessary for the conduct of such research; and*

*(C) identify—*

*(i) criteria for the proposed research, including—*

*(I) a justification for the research to be carried out in the space microgravity environment;*

*(II) the use of model systems;*

*(III) the testing of flight hardware to understand and ensure its functioning in the microgravity environment;*

*(IV) the use of controls to help distinguish among the direct and indirect effects of microgravity, among other effects of the flight or space environment;*

*(V) approaches for facilitating data collection, analysis, and interpretation;*

*(VI) procedures to ensure repetition of experiments, as needed;*

*(VII) support for timely presentation of the peer-reviewed results of the research;*

*(VIII) defined metrics for the success of each study; and*

*(IX) how these activities enable the Human Exploration Roadmap described in section 70504 of title 51, United States Code;*

*(ii) instrumentation required to support the measurements and analysis of the research to be carried out under the strategic plan;*

*(iii) the capabilities needed to support direct, real-time communications between astronauts working on research experiments onboard the International Space Station and the principal investigator on the ground;*

*(iv) a process for involving the external user community in research planning, including planning for relevant flight hardware and instrumentation, and for utilization of the International Space Station, free flyers, or other research platforms;*

*(v) the acquisition strategies the Administration plans to use to acquire any new capabilities which are not operational*

*on the International Space Station as of the date of enactment of this Act and which have an estimated total life cycle cost of $10,000,000 or more, along with a justification of any anticipated use of less than full and open competition and written approval therefor from the Administration's Assistant Administrator for Procurement; and*

*(vi) defined metrics for success of the research plan.*

*(3) REPORT.—*

*(A) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Comptroller General of the United States shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the progress of the organization chosen for the management of the International Space Station National Laboratory as directed in section 504 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18354).*

*(B) SPECIFIC REQUIREMENTS.—The report shall assess the management, organization, and performance of such organization and shall include a review of the status of each of the 7 required activities listed in section 504(c) of such Act (42 U.S.C. 18354(c)).*

***SEC. 212. BARRIERS IMPEDING ENHANCED UTILIZATION OF THE ISS'S NATIONAL LABORATORY BY COMMERCIAL COMPANIES.***

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

*(1) enhanced utilization of the International Space Station's National Laboratory requires a full understanding of the barriers impeding such utilization and actions needed to be taken to remove or mitigate them to the maximum extent practicable; and*

*(2) doing so will allow the Administration to encourage commercial companies to invest in microgravity research using National Laboratory research facilities.*

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

*(1) identify barriers impeding enhanced utilization of the International Space Station's National Laboratory;*

*(2) recommend ways to encourage commercial companies to make greater use of the International Space Station's National Laboratory, including corporate investment in microgravity research; and*

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

*(c) TRANSMITTAL.—Not later than one year after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate the results of the assessment described in subsection (b).*

***SEC. 213. UTILIZATION OF INTERNATIONAL SPACE STATION FOR SCIENCE MISSIONS.***

*The Administrator shall utilize the International Space Station for Science Mission Directorate missions in low-Earth orbit wherever it is practical and cost effective to do so.*

***SEC. 214. INTERNATIONAL SPACE STATION CARGO RESUPPLY SERVICES LESSONS LEARNED.***

*Not later than 120 days after the date of enactment of this Act, the Administrator shall transmit a report to*

*the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate that—*

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

*(2) indicates whether changes are needed to the manner in which the Administration procures and manages similar services upon the expiration of the existing Commercial Resupply Services contract; and*

*(3) identifies any lessons learned from the Commercial Resupply Services contract that should be applied to the procurement and management of commercially provided crew transfer services to and from the International Space Station.*

***SEC. 215. COMMERCIAL CREW PROGRAM.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that once developed and certified to meet the Administration's safety and reliability requirements, United States commercially provided crew transportation systems offer the potential of serving as the primary means of transporting American astronauts and international partner astronauts to and from the International Space Station and serving as International Space Station emergency crew rescue vehicles. At the same time, the budgetary assumptions used by the Administration in its planning for the Commer-*

*cial Crew Program have consistently assumed significantly higher funding levels than have been authorized and appropriated by Congress. It is the sense of Congress that credibility in the Administration's budgetary estimates for the Commercial Crew Program can be enhanced by an independently developed cost estimate. Such credibility in budgetary estimates is an important factor in understanding program risk.*

*(b) OBJECTIVE.—The objective of the Administration's Commercial Crew Program shall be to assist the development of at least one crew transportation system to carry Administration astronauts safely, reliably, and affordably to and from the International Space Station and to serve as an emergency crew rescue vehicle as soon as practicable within the funding levels authorized. The Administration shall not use any considerations beyond this objective in the overall acquisition strategy.*

*(c) SAFETY.—Consistent with the findings and recommendations of the Columbia Accident Investigation Board, the Administration shall—*

*(1) ensure that, in its evaluation and selection of contracts for the development of commercial crew transportation capabilities, safety is the highest priority; and*

*(2) seek to ensure that minimization of the probability of loss of crew shall be an important selection criterion of the Commercial Crew Transportation Capability Contract.*

*(d) COST MINIMIZATION.—The Administrator shall strive through the competitive selection process to minimize the life cycle cost to the Administration through the planned period of commercially provided crew transportation services.*

*(e) TRANSPARENCY.—Transparency is the cornerstone of ensuring a safe and reliable commercial crew transportation service to the International Space Station. The Administrator shall, to the greatest extent practicable, ensure that every commercial crew transportation services provider has provided evidence-based support for their costs and schedule.*

*(f) INDEPENDENT COST AND SCHEDULE ESTIMATE.—*

*(1) REQUIREMENT.—Not later than 30 days after the Federal Acquisition Regulation-based contract for the Commercial Crew Transportation Capability Contract is awarded, the Administrator shall arrange for the initiation of an Independent Cost and Schedule Estimate for—*

*(A) all activities associated with the development, test, demonstration, and certification of commercial crew transportation systems;*

*(B) transportation and rescue services required by the Administration for International Space Station operations through calendar year 2020 or later if Administration requirements so dictate; and*

*(C) the estimated date of operational readiness for the program each assumption listed in paragraph (2) of this subsection.*

*(2) ASSUMPTIONS.—The Independent Cost and Schedule Estimate shall provide an estimate for each of the following scenarios:*

*(A) An appropriation of $600,000,000 over the next 3 fiscal years.*

*(B) An appropriation of $700,000,000 over the next 3 fiscal years.*

*(C) An appropriation of $800,000,000 over the next 3 fiscal years.*

*(D) The funding level assumptions over the next 3 fiscal years that are included as part of commercial crew transportation capability contract awards.*

*(3) TRANSMITTAL.—Not later than 180 days after initiation of the Independent Cost and Schedule Estimate under paragraph (1), the Administrator shall transmit the results of the Independent Cost and Schedule Estimate to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

*(g) IMPLEMENTATION STRATEGIES.—*

*(1) REPORT.—Not later than 60 days after the completion of the Independent Cost and Schedule Estimate under subsection (f), the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report containing 4 distinct implementation strategies based on such Independent Cost and Schedule Estimate for the final stages of the commercial crew program.*

*(2) REQUIREMENTS.—These options shall include—*

*(A) a strategy that assumes an appropriation of $600,000,000 over the next 3 fiscal years;*

*(B) a strategy that assumes an appropriation of $700,000,000 over the next 3 fiscal years;*

*(C) a strategy that assumes an appropriation of $800,000,000 over the next 3 fiscal years; and*

*(D) a strategy that has yet to be considered previously in any budget submission but that the Administration believes could ensure the flight readiness date of 2017 for at least one provider.*

*(3) INCLUSIONS.—Each strategy shall include the contracting instruments the Administration will employ to acquire the services in each phase of development or acquisition and the number of commercial providers the Administration will include in the program.*

***SEC. 216. SPACE COMMUNICATIONS.***

*(a) PLAN.—The Administrator shall develop a plan, in consultation with relevant Federal agencies, for updating the Administration's space communications and navigation architecture for low-Earth orbital and deep space operations so that it is capable of meeting the Administration's communications needs over the next 20 years. The plan shall include lifecycle cost estimates, milestones, estimated performance capabilities, and 5-year funding profiles. The plan shall also include an estimate of the amounts of any reimbursements the Administration is likely to receive from other Federal agencies during the expected life of the up-*

*grades described in the plan. At a minimum, the plan shall include a description of the following:*

*(1) Steps to sustain the existing space communications and navigation network and infrastructure and priorities for how resources will be applied and cost estimates for the maintenance of existing space communications network capabilities.*

*(2) Upgrades needed to support space communications and navigation network and infrastructure requirements, including cost estimates and schedules and an assessment of the impact on missions if resources are not secured at the level needed.*

*(3) Projected space communications and navigation network requirements for the next 20 years, including those in support of human space exploration missions.*

*(4) Projected Tracking and Data Relay Satellite System requirements for the next 20 years, including those in support of other relevant Federal agencies, and cost and schedule estimates to maintain and upgrade the Tracking and Data Relay Satellite System to meet projected requirements.*

*(5) Steps the Administration is taking to meet future space communications requirements after all*

*Tracking and Data Relay Satellite System third-generation communications satellites are operational.*

*(6) Steps the Administration is taking to mitigate threats to electromagnetic spectrum use.*

*(b) SCHEDULE.—The Administrator shall transmit the plan developed under this section to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 1 year after the date of enactment of this Act.*

# *TITLE III—SCIENCE*

## *Subtitle A—General*

***SEC. 301. SCIENCE PORTFOLIO.***

*(a) BALANCED AND ADEQUATELY FUNDED ACTIVITIES.—Section 803 of the National Aeronautics and Space Administration Authorization Act of 2010 (124 Stat. 2832) is amended to read as follows:*

***"SEC. 803. OVERALL SCIENCE PORTFOLIO—SENSE OF THE CONGRESS.***

*"Congress reaffirms its sense, expressed in the National Aeronautics and Space Administration Authorization Act of 2010, 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, contrib-*

*utes to a robust and productive science program and serves as a catalyst for innovation and discovery.''.*

*(b) DECADAL SURVEYS.—In proposing the funding of programs and activities for the Administration for each fiscal year, the Administrator shall to the greatest extent practicable follow guidance provided in the current decadal surveys from the National Academies' Space Studies Board.*

***SEC. 302. RADIOISOTOPE POWER SYSTEMS.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that conducting deep space exploration requires radioisotope power systems, and establishing continuity in the production of the material needed to power these systems is paramount to the success of these future deep space missions. It is further the sense of Congress that Federal agencies supporting the Administration through the production of such material should do so in a cost effective manner so as not to impose excessive reimbursement requirements on the Administration.*

*(b) ANALYSIS OF REQUIREMENTS AND RISKS.—The Director of the Office of Science and Technology Policy and the Administrator, in consultation with other Federal agencies, shall conduct an analysis of—*

*(1) the requirements of the Administration for radioisotope power system material that is needed to carry out planned, high priority robotic missions in*

*the solar system and other surface exploration activities beyond low-Earth orbit; and*

*(2) the risks to missions of the Administration in meeting those requirements, or any additional requirements, due to a lack of adequate radioisotope power system material.*

*(c) CONTENTS OF ANALYSIS.—The analysis conducted under subsection (b) shall—*

*(1) detail the Administration's current projected mission requirements and associated timeframes for radioisotope power system material;*

*(2) explain the assumptions used to determine the Administration's requirements for the material, including—*

*(A) the planned use of advanced thermal conversion technology such as advanced thermocouples and Stirling generators and converters; and*

*(B) the risks and implications of, and contingencies for, any delays or unanticipated technical challenges affecting or related to the Administration's mission plans for the anticipated use of advanced thermal conversion technology;*

*(3) assess the risk to the Administration's programs of any potential delays in achieving the sched-*

*ule and milestones for planned domestic production of radioisotope power system material;*

*(4) outline a process for meeting any additional Administration requirements for the material;*

*(5) estimate the incremental costs required to increase the amount of material produced each year, if such an increase is needed to support additional Administration requirements for the material;*

*(6) detail how the Administration and other Federal agencies will manage, operate, and fund production facilities and the design and development of all radioisotope power systems used by the Administration and other Federal agencies as necessary;*

*(7) specify the steps the Administration will take, in consultation with the Department of Energy, to preserve the infrastructure and workforce necessary for production of radioisotope power systems and ensure that its reimbursements to the Department of Energy associated with such preservation are equitable and justified; and*

*(8) detail how the Administration has implemented or rejected the recommendations from the National Research Council's 2009 report titled "Radioisotope Power Systems: An Imperative for Maintaining U.S. Leadership in Space Exploration".*

*(d) TRANSMITTAL.—Not later than 180 days after the date of enactment of this Act, the Administrator shall transmit the results of the analysis to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

***SEC. 303. CONGRESSIONAL DECLARATION OF POLICY AND PURPOSE.***

*Section 20102(d) of title 51, United States Code, is amended by adding at the end the following new paragraph:*

*"(10) The direction of the unique competence of the Administration to the search for life's origin, evolution, distribution, and future in the Universe. In carrying out this objective, the Administration may use any practicable ground-based, airborne, or space-based technical means and spectra of electromagnetic radiation.".*

***SEC. 304. UNIVERSITY CLASS SCIENCE MISSIONS.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that principal investigator-led small orbital science missions, including CubeSat class, University Explorer (UNEX) class, Small Explorer (SMEX) class, and Venture class, offer valuable opportunities to advance science at low cost, train the next generation of scientists and engineers, and enable participants in the program to acquire skills*

*in systems engineering and systems integration that are critical to maintaining the Nation's leadership in space and to enhancing the United States innovation and competitiveness abroad.*

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

*(1) the status, capability, and availability of existing small orbital science mission programs and the extent to which each program enables the participation of university scientists and students;*

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

*(3) the opportunities such mission programs provide for training and education, including scientific and engineering workforce development, including for the Administration's scientific and engineering workforce; and*

*(4) the extent to which commercial applications such as hosted payloads, free flyers, and data buys could provide measurable benefits for such mission programs, while preserving the principle of independent peer review as the basis for mission selection.*

*(c) REPORT.—Not later than 270 days after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the review required under subsection (b) and on recommendations to enhance principal investigator-led small orbital science missions conducted by the Administration in accordance with the results of the review required by subsection (b).*

***SEC. 305. ASSESSMENT OF SCIENCE MISSION EXTENSIONS.***

*Section 30504 of title 51, United States Code, is amended to read as follows:*

***"§ 30504. Assessment of science mission extensions***

*"(a) ASSESSMENT.—The Administrator shall carry out biennial reviews within each of the Science divisions to assess the cost and benefits of extending the date of the termination of data collection for those missions that exceed their planned missions' lifetime. The assessment shall take into consideration how extending missions impacts the start of future missions.*

*"(b) CONSULTATION AND CONSIDERATION OF POTENTIAL BENEFITS OF INSTRUMENTS ON MISSIONS.—When deciding whether to extend a mission that has an operational component, the Administrator shall consult with any af-*

*fected Federal agency and shall take into account the potential benefits of instruments on missions that are beyond their planned mission lifetime.*

*"(c) REPORT.—The Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, at the same time as the submission to Congress of the Administration's annual budget request for each fiscal year, a report detailing any assessment required by subsection (a) that was carried out during the previous year.".*

## *Subtitle B—Astrophysics*

***SEC. 311. DECADAL CADENCE.***

*In carrying out section 301(b), the Administrator shall seek to ensure to the extent practicable a steady cadence of large, medium, and small astrophysics missions.*

***SEC. 312. EXTRASOLAR PLANET EXPLORATION STRATEGY.***

*(a) STRATEGY.—The Administrator shall enter into an arrangement with the National Academies to develop a science strategy for the study and exploration of extrasolar planets, including the use of the Transiting Exoplanet Survey Satellite, the James Webb Space Telescope, a potential Wide-Field Infrared Survey Telescope mission, or any other telescope, spacecraft, or instrument as appropriate. Such strategy shall—*

*(1) outline key scientific questions;*

*(2) identify the most promising research in the field;*

*(3) indicate the extent to which the mission priorities in existing decadal surveys address the key extrasolar planet research goals;*

*(4) identify opportunities for coordination with international partners, commercial partners, and other not-for-profit partners; and*

*(5) make recommendations on the above as appropriate.*

*(b) USE OF STRATEGY.—The Administrator shall use the strategy to—*

*(1) inform roadmaps, strategic plans, and other activities of the Administration as they relate to extrasolar planet research and exploration; and*

*(2) provide a foundation for future activities and initiatives.*

*(c) REPORT TO CONGRESS.—Not later than 18 months after the date of enactment of this Act, the National Academies shall transmit a report to the Administrator, and to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, containing the strategy developed under subsection (a).*

***SEC. 313. JAMES WEBB SPACE TELESCOPE.***

*It is the sense of Congress that—*

*(1) the James Webb Space Telescope will revolutionize our understanding of star and planet formation and how galaxies evolved, and advance the search for the origins of the universe;*

*(2) the James Webb Space Telescope will enable American scientists to maintain their leadership in astrophysics and other disciplines;*

*(3) the James Webb Space Telescope program is making steady progress towards a launch in 2018;*

*(4) the on-time and on-budget delivery of the James Webb Space Telescope is a high congressional priority; and*

*(5) maintaining this progress will require the Administrator to ensure that integrated testing is appropriately timed and sufficiently comprehensive to enable potential issues to be identified and addressed early enough to be handled within the James Webb Space Telescope's development schedule prior to launch.*

***SEC. 314. NATIONAL RECONNAISSANCE OFFICE TELESCOPE DONATION.***

*Not later than 90 days after the date of enactment of this Act, the Administrator shall transmit a report to the Committee on Science, Space, and Technology of the House*

*of Representatives and the Committee on Commerce, Science, and Transportation of the Senate outlining the cost of the Administration's potential plan for developing the Wide-Field Infrared Survey Telescope as described in the 2010 National Academies' astronomy and astrophysics decadal survey, including an alternative plan for the Wide-Field Infrared Survey Telescope 2.4, which includes the donated 2.4-meter aperture National Reconnaissance Office telescope. Due to the budget constraints on the Administration's science programs, this report shall include—*

*(1) an assessment of cost efficient approaches to develop the Wide-Field Infrared Survey Telescope;*

*(2) a comparison to the development of mission concepts that exclude the utilization of the donated asset;*

*(3) an assessment of how the Administration's existing science missions will be affected by the utilization of the donated asset described in this section; and*

*(4) a description of the cost associated with storing and maintaining the donated asset.*

***SEC. 315. WIDE-FIELD INFRARED SURVEY TELESCOPE.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that the Administrator, to the extent practicable, should make progress on the technologies and capabilities needed*

*to position the Administration to meet the objectives of the Wide-Field Infrared Survey Telescope mission, as outlined in the 2010 National Academies' astronomy and astrophysics decadal survey, in a way that maximizes the scientific productivity of meeting those objectives for the resources invested. It is further the sense of Congress that the Wide-Field Infrared Survey Telescope mission has the potential to enable scientific discoveries that will transform our understanding of the universe.*

*(b) CONTINUITY OF DEVELOPMENT.—The Administrator shall ensure that the concept definition and pre-formulation activities of a Wide-Field Infrared Survey Telescope mission continue while the James Webb Space Telescope is being completed.*

***SEC. 316. STRATOSPHERIC OBSERVATORY FOR INFRARED ASTRONOMY.***

*The Administrator shall not use any funding appropriated to the Administration for fiscal year 2014 for the shutdown of the Stratospheric Observatory for Infrared Astronomy or for the preparation therefor.*

## *Subtitle C—Planetary Science*

***SEC. 321. DECADAL CADENCE.***

*In carrying out section 301(b), the Administrator shall seek to ensure to the greatest extent practicable that the Administration carries out a balanced set of planetary science*

*programs in accordance with the priorities established in the most recent decadal survey for planetary science. Such programs shall include, at a minimum—*

*(1) a Discovery-class mission at least once every 24 months;*

*(2) a New Frontiers-class mission at least once every 60 months; and*

*(3) at least one Flagship-class mission per decadal survey period, including a Europa mission with a goal of launching by 2021.*

***SEC. 322. NEAR-EARTH OBJECTS.***

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

*(1) Near-Earth objects pose a serious and credible threat to humankind, as many scientists believe that a major asteroid or comet was responsible for the mass extinction of the majority of the Earth's species, including the dinosaurs, approximately 65,000,000 years ago.*

*(2) Similar objects have struck the Earth or passed through the Earth's atmosphere several times in the Earth's history and pose a similar threat in the future.*

*(3) Several such near-Earth objects have only been discovered within days of the objects' closest approach to Earth, and recent discoveries of such large*

*objects indicate that many large near-Earth objects remain to be discovered.*

*(4) The efforts undertaken by the Administration for detecting and characterizing the hazards of near-Earth objects should continue to seek to fully determine the threat posed by such objects to cause widespread destruction and loss of life.*

*(b) DEFINITION.—For purposes of this section, the term "near-Earth object" means an asteroid or comet with a perihelion distance of less than 1.3 Astronomical Units from the Sun.*

*(c) NEAR-EARTH OBJECT SURVEY.—The Administrator shall continue to detect, track, catalogue, and characterize the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter in order to assess the threat of such near-Earth objects to the Earth, pursuant to the George E. Brown, Jr. Near-Earth Object Survey Act (42 U.S.C. 16691). It shall be the goal of the Survey program to achieve 90 percent completion of its near-Earth object catalogue (based on statistically predicted populations of near-Earth objects) by 2020.*

*(d) WARNING AND MITIGATION OF POTENTIAL HAZARDS OF NEAR-EARTH OBJECTS.—Congress reaffirms the policy set forth in section 20102(g) of title 51, United States*

*Code (relating to detecting, tracking, cataloguing, and characterizing asteroids and comets).*

*(e) PROGRAM REPORT.—The Director of the Office of Science and Technology Policy and the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, not later than 1 year after the date of enactment of this Act, an initial report that provides—*

*(1) recommendations for carrying out the Survey program and an associated proposed budget;*

*(2) analysis of possible options that the Administration could employ to divert an object on a likely collision course with Earth; and*

*(3) a description of the status of efforts to coordinate and cooperate with other countries to discover hazardous asteroids and comets, plan a mitigation strategy, and implement that strategy in the event of the discovery of an object on a likely collision course with Earth.*

*(f) ANNUAL REPORTS.—Subsequent to the initial report the Administrator shall annually transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report that provides—*

*(1) a summary of all activities carried out pursuant to subsection (c) since the date of enactment of this Act, including the progress toward achieving 90 percent completion of the survey described in subsection (c); and*

*(2) a summary of expenditures for all activities carried out pursuant to subsection (c) since the date of enactment of this Act.*

*(g) STUDY.—The Administrator, in collaboration with other relevant Federal agencies, shall carry out a technical and scientific assessment of the capabilities and resources to—*

*(1) accelerate the survey described in subsection (c); and*

*(2) expand the Administration's Near-Earth Object Program to include the detection, tracking, cataloguing, and characterization of potentially hazardous near-Earth objects less than 140 meters in diameter.*

*(h) TRANSMITTAL.—Not later than 270 days after the date of enactment of this Act, the Administrator shall transmit the results of the assessment carried out under subsection (g) to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

***SEC. 323. NEAR-EARTH OBJECTS PUBLIC-PRIVATE PARTNERSHIPS.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that the Administration should seek to leverage the capabilities of the private sector and philanthropic organizations to the maximum extent practicable in carrying out the Near-Earth Object Survey program in order to meet the goal of the Survey program.*

*(b) REPORT.—Not later than 180 days after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, Transportation of the Senate a report describing how the Administration can expand collaborative partnerships to detect, track, catalogue, and categorize near-Earth objects.*

***SEC. 324. RESEARCH ON NEAR-EARTH OBJECT TSUNAMI EFFECTS.***

*(a) REPORT ON POTENTIAL TSUNAMI EFFECTS FROM NEAR-EARTH OBJECT IMPACT.—The Administrator, in collaboration with the Administrator of the National Oceanic and Atmospheric Administration and other relevant agencies, shall prepare a report identifying and describing existing research activities and further research objectives that would increase our understanding of the nature of the effects*

*of potential tsunamis that could occur if a near-Earth object were to impact an ocean of Earth.*

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

***SEC. 325. ASTROBIOLOGY STRATEGY.***

*(a) STRATEGY.—The Administrator shall enter into an arrangement with the National Academies to develop a science strategy for astrobiology that would outline key scientific questions, identify the most promising research in the field, and indicate the extent to which the mission priorities in existing decadal surveys address the search for life's origin, evolution, distribution, and future in the Universe. The strategy shall include recommendations for coordination with international partners.*

*(b) USE OF STRATEGY.—The Administrator shall use the strategy developed under subsection (a) in planning and funding research and other activities and initiatives in the field of astrobiology.*

*(c) REPORT TO CONGRESS.—Not later than 18 months after the date of enactment of this Act, the National Academies shall transmit a report to the Administrator, and to*

*the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, containing the strategy developed under subsection (a).*

***SEC. 326. ASTROBIOLOGY PUBLIC-PRIVATE PARTNERSHIPS.***

*Not later than 180 days after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, Transportation of the Senate a report describing how the Administration can expand collaborative partnerships to study life's origin, evolution, distribution, and future in the Universe.*

***SEC. 327. ASSESSMENT OF MARS ARCHITECTURE.***

*(a) ASSESSMENT.—The Administrator shall enter into an arrangement with the National Academies to assess—*

*(1) the Administration's revised post-2016 Mars exploration architecture and its responsiveness to the strategies, priorities, and guidelines put forward by the National Academies' planetary science decadal surveys and other relevant National Academies Mars-related reports;*

*(2) the long-term goals of the Administration's Mars Exploration Program and such program's abil-*

*ity to optimize the science return, given the current fiscal posture of the program;*

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

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

*(b) TRANSMITTAL.—Not later than 18 months after the date of enactment of this Act, the Administrator shall transmit the results of the assessment to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

## *Subtitle D—Heliophysics*

***SEC. 331. DECADAL CADENCE.***

*In carrying out section 301(b), the Administrator shall seek to ensure to the extent practicable a steady cadence of large, medium, and small heliophysics missions.*

***SEC. 332. REVIEW OF SPACE WEATHER.***

*(a) REVIEW.—The Director of the Office of Science and Technology Policy, in consultation with the Administrator, the Administrator of the National Oceanic and Atmospheric Administration, the Director of the National Science Foundation, and heads of other relevant Federal agencies, shall enter into an arrangement with the National Academies to*

*provide a comprehensive study that reviews current and planned ground-based and space-based space weather monitoring requirements and capabilities, identifies gaps, and identifies options for a robust and resilient capability. The study shall inform the process of identifying national needs for future space weather monitoring, forecasts, and mitigation. The National Academies shall give consideration to international and private sector efforts and collaboration that could potentially contribute to national space weather needs. The study shall also review the current state of research capabilities in observing, modeling, and prediction and provide recommendations to ensure future advancement of predictive capability.*

*(b) REPORT TO CONGRESS.—Not later than 14 months after the date of enactment of this Act, the National Academies shall transmit a report containing the results of the study provided under subsection (a) to the Director of the Office of Science and Technology Policy, and to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

## *Subtitle E—Earth Science*

***SEC. 341. GOAL.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that the Administration is being asked to undertake impor-*

*tant Earth science activities in an environment of increasingly constrained fiscal resources, and that any transfer of additional responsibilities to the Administration, such as climate instrument development and measurements that are currently part of the portfolio of the National Oceanic and Atmospheric Administration, should be accompanied by the provision of additional resources to allow the Administration to carry out the increased responsibilities without adversely impacting its implementation of its existing Earth science programs and priorities.*

*(b) GENERAL.—The Administrator shall continue to carry out a balanced Earth science program that includes Earth science research, Earth systematic missions, competitive Venture class missions, other missions and data analysis, mission operations, technology development, and applied sciences, consistent with the recommendations and priorities established in the National Academies' Earth Science Decadal Survey.*

*(c) COLLABORATION.—The Administrator shall collaborate with other Federal agencies, including the National Oceanic and Atmospheric Administration, non-government entities, and international partners, as appropriate, in carrying out the Administration's Earth science program. The Administration shall continue to develop first-of-a-kind in-*

*struments that, once proved, can be transitioned to other agencies for operations.*

*(d) REIMBURSEMENT.—Whenever responsibilities for the development of sensors or for measurements are transferred to the Administration from another agency, the Administration shall seek, to the extent possible, to be reimbursed for the assumption of such responsibilities.*

***SEC. 342. DECADAL CADENCE.***

*In carrying out section 341(b), the Administrator shall seek to ensure to the extent practicable a steady cadence of large, medium, and small Earth science missions.*

***SEC. 343. VENTURE CLASS MISSIONS.***

*It is the sense of Congress that the Administration's Venture class missions provide opportunities for innovation in the Earth science program, offer low-cost approaches for high-quality competitive science investigations, enable frequent flight opportunities to engage the Earth science and applications community, and serve as a training ground for students and young scientists. It is further the sense of Congress that the Administration should seek to increase the number of Venture class projects to the extent practicable as part of a balanced Earth science program.*

***SEC. 344. ASSESSMENT.***

*The Administrator shall carry out a scientific assessment of the Administration's Earth science global datasets*

*for the purpose of identifying those datasets that are useful for understanding regional changes and variability, and for informing applied science research. The Administrator shall complete and transmit the assessment to the Committee on Science, Space, and Technology in the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 180 days after the date of enactment of this Act.*

# *TITLE IV—AERONAUTICS*

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

*It is the sense of Congress that—*

*(1) a robust aeronautics research portfolio will help maintain the United States status as a leader in aviation, enhance the competitiveness of the United States in the world economy and improve the quality of life of all citizens;*

*(2) aeronautics research is essential to the Administration's mission, continues to be an important core element of the Administration's mission and should be supported;*

*(3) the Administrator should coordinate and consult with relevant Federal agencies and the private sector to minimize duplication and leverage resources; and*

*(4) carrying aeronautics research to a level of maturity that allows the Administration's research results to be transitioned to the users, whether private or public sector, is critical to their eventual adoption.*

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

*The Administrator shall ensure that the Administration maintains a strong aeronautics research portfolio ranging from fundamental research through integrated systems research with specific research goals, including the following:*

*(1) ENHANCE AIRSPACE OPERATIONS AND SAFETY.—The Administration's Aeronautics Research Mission Directorate shall address research needs of the Next Generation Air Transportation System and identify critical gaps in technology which must be bridged to enable the implementation of the Next Generation Air Transportation System so that safety and productivity improvements can be achieved as soon as possible.*

*(2) IMPROVE AIR VEHICLE PERFORMANCE.—The Administration's Aeronautics Research Mission Directorate shall conduct research to improve aircraft performance and minimize environmental impacts. The Associate Administrator for the Aeronautics Research Mission Directorate shall consider and pursue*

*concepts to reduce noise, emissions, and fuel consumption while maintaining high safety standards, and shall conduct research related to the impact of alternative fuels on the safety, reliability and maintainability of current and new air vehicles.*

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

*(4) DEMONSTRATE CONCEPTS AT THE SYSTEM LEVEL.—The Administration's Aeronautics Research Mission Directorate shall mature the most promising technologies to the point at which they can be demonstrated in a relevant environment and shall integrate individual components and technologies as appropriate to ensure that they perform in an integrated manner as well as they do when operated individually.*

***SEC. 403. UNMANNED AERIAL SYSTEMS RESEARCH AND DEVELOPMENT.***

*(a) IN GENERAL.—The Administrator, in consultation with the Administrator of the Federal Aviation Administration and other Federal agencies, shall carry out research*

*and technological development to facilitate the safe integration of unmanned aerial systems into the National Airspace System, including—*

*(1) positioning and navigation systems;*

*(2) sense and avoid capabilities;*

*(3) secure data and communication links;*

*(4) flight recovery systems; and*

*(5) human systems integration.*

*(b) ROADMAP.—The Administrator shall update a roadmap for unmanned aerial systems research and development and transmit this roadmap to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 180 days after the date of enactment of this Act.*

*(c) COOPERATIVE UNMANNED AERIAL VEHICLE ACTIVITIES.—Section 31504 of title 51, United States Code, is amended by inserting "Operational flight data derived from these cooperative agreements shall be made available, in appropriate and usable formats, to the Administration and the Federal Aviation Administration for the development of regulatory standards." after "in remote areas.".*

***SEC. 404. RESEARCH PROGRAM ON COMPOSITE MATERIALS USED IN AERONAUTICS.***

*(a) PURPOSE OF RESEARCH.—The Administrator shall continue the Administration's cooperative research program with industry to identify and demonstrate more effective and safe ways of developing, manufacturing, and maintaining composite materials for use in airframes, subsystems, and propulsion components.*

*(b) CONSULTATION.—The Administrator, in overseeing the Administration's work on composite materials, shall consult with relevant Federal agencies and partners in industry to accelerate safe development and certification processes for new composite materials and design methods while maintaining rigorous inspection of new composite materials.*

*(c) REPORT.—Not later than 1 year after the date of enactment of this Act, the Administrator shall transmit a report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate detailing the Administration's work on new composite materials and the coordination efforts among Federal agencies.*

***SEC. 405. HYPERSONIC RESEARCH.***

*Not later than 1 year after the date of enactment of this Act, the Administrator, in consultation with other Federal agencies, shall develop and transmit to the Committee*

*on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a research and development roadmap for hypersonic aircraft research with the objective of exploring hypersonic science and technology using air-breathing propulsion concepts, through a mix of theoretical work, basic and applied research, and development of flight research demonstration vehicles. The roadmap shall prescribe appropriate agency contributions, coordination efforts, and technology milestones.*

***SEC. 406. SUPERSONIC RESEARCH.***

*(a) FINDINGS.—Congress finds that—*

*(1) the ability to fly commercial aircraft over land at supersonic speeds without adverse impacts on the environment or on local communities could open new global markets and enable new transportation capabilities; and*

*(2) continuing the Administration's research program is necessary to assess the impact in a relevant environment of commercial supersonic flight operations and provide the basis for establishing appropriate sonic boom standards for such flight operations.*

*(b) ROADMAP FOR SUPERSONIC RESEARCH.—Not later than 1 year after the date of enactment of this Act,*

*the Administrator shall develop and transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a roadmap that allows for flexible funding profiles for supersonic aeronautics research and development with the objective of developing and demonstrating, in a relevant environment, airframe and propulsion technologies to minimize the environmental impact, including noise, of supersonic overland flight in an efficient and economical manner. The roadmap shall include—*

*(1) the baseline research as embodied by the Administration's existing research on supersonic flight;*

*(2) a list of specific technological, environmental, and other challenges that must be overcome to minimize the environmental impact, including noise, of supersonic overland flight;*

*(3) a research plan to address such challenges, as well as a project timeline for accomplishing relevant research goals;*

*(4) a plan for coordination with stakeholders, including relevant government agencies and industry; and*

*(5) a plan for how the Administration will ensure that sonic boom research is coordinated as appropriate with relevant Federal agencies.*

***SEC. 407. RESEARCH ON NEXTGEN AIRSPACE MANAGEMENT CONCEPTS AND TOOLS.***

*(a) IN GENERAL.—The Administrator shall, in consultation with other Federal agencies, review at least annually the alignment and timing of the Administration's research and development activities in support of the NextGen airspace management modernization initiative, and shall make any necessary adjustments by reprioritizing or retargeting the Administration's research and development activities in support of the NextGen initiative.*

*(b) ANNUAL REPORTS.—The Administrator shall report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate annually regarding the progress of the Administration's research and development activities in support of the NextGen airspace management modernization initiative, including details of technologies transferred to relevant Federal agencies for eventual operation implementation, consultation with other Federal agencies, and any adjustments made to research activities.*

***SEC. 408. ROTORCRAFT RESEARCH.***

*Not later than 1 year after the date of enactment of this Act, the Administrator, in consultation with other Federal agencies, shall prepare and transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a roadmap for research relating to rotorcraft and other runway-independent air vehicles, with the objective of developing and demonstrating improved safety, noise, and environmental impact in a relevant environment. The roadmap shall include specific goals for the research, a timeline for implementation, metrics for success, and guidelines for collaboration and coordination with industry and other Federal agencies.*

***SEC. 409. TRANSFORMATIVE AERONAUTICS RESEARCH.***

*It is the sense of Congress that the Administrator, in looking strategically into the future and ensuring that the Administration's Center personnel are at the leading edge of aeronautics research, should encourage investigations into the early-stage advancement of new processes, novel concepts, and innovative technologies that have the potential to meet national aeronautics needs. The Administrator shall continue to ensure that awards for the investigation of these concepts and technologies are open for competition among Administration civil servants at its Centers, sepa-*

*rate from other awards open only to non-Administration sources.*

***SEC. 410. STUDY OF UNITED STATES LEADERSHIP IN AERONAUTICS RESEARCH.***

*(a) STUDY.—The Administrator shall enter into an arrangement with the National Academies for a study to benchmark the position of the United States in civil aeronautics research compared to the rest of the world. The study shall—*

*(1) seek to define metrics by which relative leadership in civil aeronautics research can be determined;*

*(2) ascertain how the United States compares to other countries in the field of civil aeronautics research and any relevant trends; and*

*(3) provide recommendations on what can be done to regain or retain global leadership, including—*

*(A) identifying research areas where United States expertise has been or is at risk of being overtaken;*

*(B) defining appropriate roles for the Administration;*

*(C) identifying public-private partnerships that could be formed; and*

*(D) estimating the impact on the Administration's budget should such recommendations be implemented.*

*(b) REPORT.—Not later than 18 months after the date of enactment of this Act, the Administrator shall provide the results of the study to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

# *TITLE V—SPACE TECHNOLOGY*

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

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

*(1) enabling a new class of Administration missions beyond low-Earth orbit;*

*(2) developing technologies and capabilities that will make the Administration's missions more affordable and more reliable; and*

*(3) improving technological capabilities and promoting innovation for the Administration and the Nation.*

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

*(a) AMENDMENT.—Section 70507 of title 51, United States Code, is amended to read as follows:*

***"§ 70507. Space Technology Program authorized***

*"(a) PROGRAM AUTHORIZED.—The Administrator shall establish a Space Technology Program to pursue the research and development of advanced space technologies that have the potential of delivering innovative solutions and to support human exploration of the solar system or advanced space science. The program established by the Administrator shall take into consideration the recommendations of the National Academies' review of the Administration's Space Technology roadmaps and priorities, as well as applicable enabling aspects of the Human Exploration Roadmap specified in section 70504. In conducting the space technology program established under this section, the Administrator shall—*

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

*"(2) make use of small satellites and the Administration's suborbital and ground-based platforms, to the extent practicable and appropriate, to demonstrate space technology concepts and developments; and*

*"(3) undertake partnerships with other Federal agencies, universities, private industry, and other spacefaring nations, as appropriate.*

*"(b) SMALL BUSINESS PROGRAMS.—The Administrator shall organize and manage the Administration's Small Business Innovation Research program and Small Business Technology Transfer Program within the Space Technology Program.*

*"(c) NONDUPLICATION CERTIFICATION.—The Administrator shall include in the budget for each fiscal year, as transmitted to Congress under section 1105(a) of title 31, a certification that no project, program, or mission undertaken by the Space Technology Program is duplicative of any other project, program, or mission conducted by another office or directorate of the Administration.".*

*(b) COLLABORATION, COORDINATION, AND ALIGNMENT.—The Administrator shall ensure that the Administration's projects, programs, and activities in support of technology research and development of advanced space technologies are fully coordinated and aligned and that results from such work are shared and leveraged within the Administration. Projects, programs, and activities being conducted by the Human Exploration and Operations Mission Directorate in support of research and development of advanced space technologies and systems focusing on human space exploration should continue in that Directorate. The Administrator shall ensure that organizational responsibility for research and development activities in support of*

*human space exploration not initiated as of the date of enactment of this Act is established on the basis of a sound rationale. The Administrator shall provide the rationale in the report specified in subsection (d).*

*(c) REPORT.—Not later than 180 days after the date of enactment of this Act, the Administrator shall provide to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report comparing the Administration's space technology investments with the high-priority technology areas identified by the National Academies in the National Research Council's report on the Administration's Space Technology Roadmaps. The Administrator shall identify how the Administration will address any gaps between the agency's investments and the recommended technology areas, including a projection of funding requirements.*

*(d) ANNUAL REPORT.—The Administrator shall include in the Administration's annual budget request for each fiscal year the rationale for assigning organizational responsibility for, in the year prior to the budget fiscal year, each initiated project, program, and mission focused on research and development of advanced technologies for human space exploration.*

*(e) TABLE OF SECTIONS AMENDMENT.—The item relating to section 70507 in the table of sections for chapter 705 of title 51, United States Code, is amended to read as follows:*

*"70507. Space Technology Program authorized.".*

***SEC. 503. UTILIZATION OF THE INTERNATIONAL SPACE STATION FOR TECHNOLOGY DEMONSTRATIONS.***

*The Administrator shall utilize the International Space Station and commercial services for space technology demonstration missions in low-Earth orbit whenever it is practical and cost effective to do so.*

# *TITLE VI—EDUCATION*

***SEC. 601. EDUCATION.***

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

*(1) the Administration's missions are an inspiration for Americans and in particular for the next generation, and that this inspiration has a powerful effect in stimulating interest in science, technology, engineering, and mathematics (in this section referred to as "STEM") education and careers;*

*(2) the Administration's Office of Education and mission directorates have been effective in delivering Administration educational content because of the strong engagement of Administration scientists and*

*engineers in the Administration's education and outreach activities; and*

*(3) the Administration should be a central partner in contributing to the goals of the National Science and Technology Council's Federal Science, Technology, Engineering, and Mathematics (STEM) Education 5-Year Strategic Plan.*

*(b) IN GENERAL.—The Administration shall continue its education and outreach efforts to—*

*(1) increase student interest and participation in STEM education;*

*(2) improve public literacy in STEM;*

*(3) employ proven strategies for improving student learning and teaching;*

*(4) provide curriculum support materials; and*

*(5) create and support opportunities for professional development for STEM teachers.*

*(c) ORGANIZATION.—In order to ensure the inspiration and engagement of children and the general public, the Administration shall continue its STEM education and outreach activities within the Science, Aeronautics Research, Space Operations, and Exploration Mission Directorates.*

*(d) CONTINUATION OF EDUCATION AND OUTREACH ACTIVITIES AND PROGRAMS.—The Administrator shall con-*

*tinue to carry out education and outreach programs and activities through the Office of Education and the Administration mission directorates and shall continue to engage, to the maximum extent practicable, Administration and Administration-supported researchers and engineers in carrying out those programs and activities.*

*(e) CONTINUATION OF SPACE GRANT PROGRAM.—The Administrator shall continue to operate the National Space Grant College and Fellowship program through a national network consisting of a State-based consortium in each State that provides flexibility to the States, with the objective of providing hands-on research, training, and education programs, with measurable outcomes, to enhance America's STEM education and workforce.*

*(f) REAFFIRMATION OF POLICY.—Congress reaffirms its commitment to informal science education at science centers and planetariums as set forth in section 616 of the National Aeronautics and Space Administration Authorization Act of 2005 (51 U.S.C. 40907).*

***SEC. 602. INDEPENDENT REVIEW OF THE NATIONAL SPACE GRANT COLLEGE AND FELLOWSHIP PROGRAM.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that the National Space Grant College and Fellowship Program, which was established in the National Aeronautics*

*and Space Administration Authorization Act of 1988 (42 U.S.C. 2486 et seq.), has been an important program by which the Federal Government has partnered with State and local governments, universities, private industry, and other organizations to enhance the understanding and use of space and aeronautics activities and their benefits through education, fostering of interdisciplinary and multi-disciplinary space research and training, and supporting Federal funding for graduate fellowships in space-related fields, among other purposes.*

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

*(1) a review of the National Space Grant College and Fellowship Program, including its structure and capabilities for supporting science, technology, engineering, and mathematics education and training consistent with the National Science and Technology Council's Federal Science, Technology, Engineering, and Mathematics (STEM) Education 5-Year Strategic Plan; and*

*(2) recommendations on measures, if needed, to enhance the Program's effectiveness and mechanisms by which any increases in funding appropriated by Congress can be applied.*

*(c) NATIONAL SPACE GRANT COLLEGE AND FELLOWSHIP PROGRAM AMENDMENTS.—*

*(1) PURPOSES.—Section 40301 of title 51, United States Code, is amended—*

*(A) by striking "and" at the end of paragraph (5);*

*(B) by striking the period at the end of paragraph (6) and inserting "; and"; and*

*(C) by adding at the end the following new paragraph:*

*"(7) support outreach to primary and secondary schools to help support STEM engagement and learning at the K-12 level and to encourage K-12 students to pursue postsecondary degrees in fields related to space.".*

*(2) REGIONAL CONSORTIUM.—Section 40306 of title 51, United States Code, is amended—*

*(A) in subsection (a)—*

*(i) by redesignating paragraphs (2) and (3) as paragraphs (3) and (4), respectively; and*

*(ii) by inserting after paragraph (1) the following new paragraph:*

*"(2) INCLUSION OF 2-YEAR INSTITUTIONS.—A space grant regional consortium designated in para-*

*graph (1)(B) may include one or more 2-year institutions of higher education."; and*

*(B) in subsection (b)(1), by striking "paragraphs (2)(C) and (3)(D)" and inserting "paragraphs (3)(C) and (4)(D)".*

# *TITLE VII—POLICY PROVISIONS*

***SEC. 701. ASTEROID RETRIEVAL MISSION.***

*(a) ASTEROID RETRIEVAL REPORT.—Not later than 180 days after the date of enactment of this Act, the Administrator shall provide to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the proposed Asteroid Retrieval Mission. Such report shall include—*

*(1) a detailed budget profile, including cost estimates for the development of all necessary technologies and spacecraft required for the mission;*

*(2) a detailed technical plan that includes milestones and a specific schedule;*

*(3) a description of the technologies and capabilities anticipated to be gained from the proposed mission that will enable future human missions to Mars which could not be gained by lunar missions;*

*(4) a description of the technologies and capabilities anticipated to be gained from the proposed*

*mission that will enable future planetary defense missions, against impact threats from near-Earth objects equal to or greater than 140 meters in diameter, which could not be gained by robotic missions; and*

*(5) a complete assessment by the Small Bodies Assessment Group and the National Aeronautics and Space Administration Advisory Council of how the proposed mission is in the strategic interests of the United States in space exploration.*

*(b) MARS FLYBY REPORT.—Not later than 60 days after the date of enactment of this Act, an independent, private systems engineering and technical assistance organization contracted by the Human Exploration Operations Mission Directorate shall transmit to the Administrator, the Committee on Science, Space, and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation of the Senate a report analyzing the proposal for a Mars Flyby human spaceflight mission to be launched in 2021. Such report shall include—*

*(1) a technical development, test, fielding, and operations plan using the Space Launch System and other systems to successfully mount a Mars Flyby mission by 2021;*

*(2) a description of the benefits in scientific knowledge and technologies demonstrated by a Mars*

*Flyby mission to be launched in 2021 suitable for future Mars missions; and*

*(3) an annual budget profile, including cost estimates, for the development test, fielding, and operations plan to carry out a Mars Flyby mission through 2021 and comparison of that budget profile to the 5-year budget profile contained in the President's Budget request for fiscal year 2015.*

*(c) ASSESSMENT.—Not later than 60 days after transmittal of the report specified in subsection (b), the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate an assessment by the National Aeronautics and Space Administration Advisory Council of whether the proposal for a Mars Flyby Mission to be launched in 2021 is in the strategic interests of the United States in space exploration.*

*(d) CREWED MISSION.—The report transmitted under subsection (b) may consider a crewed mission with the Space Launch System in cis-lunar space prior to the Mars Flyby mission in 2021.*

***SEC. 702. TERMINATION LIABILITY.***

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

*(1) The International Space Station, the Space Launch System, and the Orion crew capsule will enable the Nation to continue operations in low-Earth orbit and to send its astronauts to deep space. The James Webb Space Telescope will revolutionize our understanding of star and planet formation and how galaxies evolved and advance the search for the origins of our universe. As a result of their unique capabilities and their critical contribution to the future of space exploration, these systems have been designated by Congress and the Administration as priority investments.*

*(2) In addition, contractors are currently holding program funding, estimated to be in the hundreds of millions of dollars, to cover the potential termination liability should the Government choose to terminate a program for convenience. As a result, hundreds of millions of taxpayer dollars are unavailable for meaningful work on these programs.*

*(3) According to the Government Accountability Office, the Administration procures most of its goods and services through contracts, and it terminates very few of them. In fiscal year 2010, the Administration terminated 28 of 16,343 active contracts and orders—a termination rate of about 0.17 percent.*

*(4) Providing processes requiring congressional notification on termination of these high-priority programs would enable contractors to apply taxpayer dollars to making maximum progress in meeting the established technical goals and schedule milestones of these programs.*

*(b) ADMINISTRATION TERMINATION LIABILITY.—*

*(1) GENERAL RULE.—Termination liability costs for a covered program shall be provided only pursuant to this subsection.*

*(2) PROHIBITION ON RESERVING FUNDS.—The Administrator may not reserve funds from amounts appropriated for a covered program, or require the reservation of funds by the prime contractor, for potential termination liability costs with respect to a covered program.*

*(3) INTENT OF CONGRESS.—It is the intent of Congress that funds authorized to be appropriated for covered programs be applied in meeting established technical goals and schedule milestones.*

*(4) APPLICATION OF PRIOR RESERVED FUNDS.—Funds that have been reserved before the date of enactment of this Act for potential termination liability shall be promptly used to make maximum progress in*

*meeting the established goals and milestones of the covered program.*

*(5) NOTIFICATION.—The Administrator shall notify the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate at least 120 days in advance of initiating termination for convenience or termination for cause of a prime contract on a covered program.*

*(6) SUPPLEMENTAL APPROPRIATION REQUEST.—*

*(A) REQUEST.—If the Administrator initiates termination of a prime contract on a covered program pursuant to paragraph (5), and sufficient unobligated appropriations are not available to cover termination liability costs in the appropriations account that is funding the prime contract being terminated, the Administrator shall provide to Congress a notification that an authorization of appropriations is necessary not later than 120 days in advance of the proposed contract termination settlement for the covered program.*

*(B) INTENT OF CONGRESS.—It is the intent of Congress to provide additional authorization for appropriations as may be necessary to pay*

*termination liability costs on prime contracts for covered programs if Congress deems it appropriate that the Administration terminate such prime contracts. The Administration shall be responsible for applying these additional funds for payment of all allowable and reasonable negotiated termination liability costs if the Administration terminates a prime contract for a covered program. If the Administration terminates a prime contract for a covered program for the convenience of the Federal Government, then the Federal Government is responsible for payment of all allowable and reasonable negotiated termination liability costs on the prime contract.*

*(c) REPORTING.—Not later than 6 months after the date of enactment of this Act, and every 6 months thereafter for the duration of the prime contracts on covered programs, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report that provides—*

*(1) the estimated termination liability costs for each of the prime contracts; and*

*(2) the basis for how such estimate was determined.*

*(d) DEFINITIONS.—For purposes of this section:*

*(1) COVERED PROGRAM.—The term "covered program" means the International Space Station, the Space Launch System, the Orion crew capsule, and the James Webb Space Telescope.*

*(2) PRIME CONTRACT.—The term "prime contract" means a contract entered directly between a person or entity and the Federal Government for the performance of all or the majority of the responsibilities for developing, integrating, fielding, operating, or sustaining a covered program.*

*(3) PRIME CONTRACTOR.—The term "prime contractor" means a person or entity contracting directly with the Federal Government on a covered program.*

*(4) TERMINATION LIABILITY COSTS.—The term "termination liability costs" means any costs incurred by a prime contractor, or by any subcontractor of a prime contractor, for which the Federal Government is liable as a result of termination of a prime contract by the Administrator.*

***SEC. 703. BASELINE AND COST CONTROLS.***

*Section 30104 of title 51, United States Code, is amended—*

*(1) in subsection (a)(1), by striking "Procedural Requirements 7120.5c, dated March 22, 2005" and*

*inserting "Procedural Requirements 7120.5E, dated August 14, 2012"; and*

*(2) in subsection (f), by striking "beginning 18 months after the date the Administrator transmits a report under subsection (e)(1)(A)" and inserting "beginning 18 months after the Administrator makes such determination".*

***SEC. 704. PROJECT AND PROGRAM RESERVES.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that the judicious use of program and project reserves provides the Administration's project and program managers with the flexibility needed to manage projects and programs to ensure that the impacts of contingencies can be mitigated.*

*(b) REPORT.—Not later than 180 days after the date of enactment of this Act the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report describing—*

*(1) the Administration's criteria for establishing the amount of reserves held at the project and program levels;*

*(2) how such criteria relate to the agency's policy of budgeting at a 70-percent confidence level; and*

*(3) the Administration's criteria for waiving the policy of budgeting at a 70-percent confidence level and alternative strategies and mechanisms aimed at controlling program and project costs when a waiver is granted.*

***SEC. 705. INDEPENDENT REVIEWS.***

*Not later than 270 days after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report describing—*

*(1) the Administration's procedures for conducting independent reviews of projects and programs at lifecycle milestones and how the Administration ensures the independence of the individuals who conduct those reviews prior to their assignment;*

*(2) the internal and external entities independent of project and program management that conduct reviews of projects and programs at life cycle milestones; and*

*(3) how the Administration ensures the independence of such entities and their members.*

***SEC. 706. COMMERCIAL TECHNOLOGY TRANSFER PROGRAM.***

*Section 50116(a) of title 51, United States Code, is amended by inserting ", while protecting national security" after "research community".*

***SEC. 707. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ADVISORY COUNCIL.***

*(a) STUDY.—The Administrator shall enter into an arrangement with the National Academy of Public Administration to assess the effectiveness of the NASA Advisory Council and to make recommendations to Congress for any change to—*

*(1) the functions of the Council;*

*(2) the appointment of members to the Council;*

*(3) qualifications for members of the Council;*

*(4) duration of terms of office for members of the Council;*

*(5) frequency of meetings of the Council;*

*(6) the structure of leadership and Committees of the Council; and*

*(7) levels of professional staffing for the Council.*

*In carrying out the assessment, the Academy shall also assess the impacts of broadening the Council's role to advising Congress, and any other issues that the Academy determines could potentially impact the effectiveness of the Council. The Academy shall consider the past activities of the NASA Ad-*

*visory Council, as well as the activities of other analogous federal advisory bodies in conducting its assessment. The results of the assessment, including any recommendations, shall be transmitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

*(b) CONSULTATION AND ADVICE.—Section 20113(g) of title 51, United States Code, is amended by inserting "and Congress" after "advice to the Administration".*

*(c) SUNSET.—Subsection (b) shall expire on September 30, 2014.*

***SEC. 708. COST ESTIMATION.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that realistic cost estimating is critically important to the ultimate success of major space development projects. The Administration has devoted significant efforts over the past five years to improving its cost estimating capabilities, but it is important that the Administration continue its efforts to develop and implement guidance in establishing realistic cost estimates.*

*(b) GUIDANCE AND CRITERIA.—The Administrator shall provide to programs and projects and in a manner consistent with the Administration's Space Flight Program and Project Management Requirements—*

*(1) guidance on when an Independent Cost Estimate and Independent Cost Assessment should be used; and*

*(2) the criteria to be used to make such a determination.*

*(c) REPORT.—Not later than 270 days after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report—*

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

*(2) describing the mechanisms the Administration is using and will continue to use to ensure that adequate resources are dedicated to cost estimation;*

*(3) listing the steps the Administration is undertaking to advance consistent implementation of the joint cost and schedule process;*

*(4) identifying criteria used by programs and projects in determining when to conduct an Independent Cost Estimate and Independent Cost Assessment; and*

*(5) listing—*

*(A) the costs of each individual Independent Cost Estimate or Independent Cost Assessment*

*activity conducted in fiscal year 2011, fiscal year 2012, and fiscal year 2013;*

*(B) the purpose of the activity;*

*(C) identification of the primary Administration unit or outside body that conducted the activity; and*

*(D) key findings and recommendations.*

*(d) UPDATED REPORT.—Subsequent to submission of the report under subsection (c), for each subsequent year, the Administrator shall provide an update of listed elements in conjunction with subsequent congressional budget justifications.*

***SEC. 709. AVOIDING ORGANIZATIONAL CONFLICTS OF INTEREST IN MAJOR ADMINISTRATION ACQUISITION PROGRAMS.***

*(a) REVISED REGULATIONS REQUIRED.—Not later than 270 days after the date of enactment of this Act, the Administrator shall revise the Administration Supplement to the Federal Acquisition Regulation to provide uniform guidance and recommend revised requirements for organizational conflicts of interest by contractors in major acquisition programs in order to address elements identified in subsection (b).*

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

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

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

*(B) the ownership of business units performing systems engineering and technical assistance functions, professional services, or management support services in relation to major acquisition programs by contractors who simultaneously own business units competing to perform as either the prime contractor or the supplier of a major subsystem or component for such programs;*

*(C) the award of major subsystem contracts by a prime contractor for a major acquisition program to business units or other affiliates of the same parent corporate entity, and particularly the award of subcontracts for software integration or the development of a proprietary software system architecture; or*

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

*(2) ensure that the Administration receives advice on systems architecture and systems engineering matters with respect to major acquisition programs from objective sources independent of the prime contractor;*

*(3) require that a contract for the performance of systems engineering and technical assistance functions for a major acquisition program contains a provision prohibiting the contractor or any affiliate of the contractor from participating as a prime contractor or a major subcontractor in the development of a system under the program; and*

*(4) establish such limited exceptions to the requirement in paragraphs (2) and (3) as may be necessary to ensure that the Administration has continued access to advice on systems architecture and systems engineering matters from highly-qualified contractors with domain experience and expertise, while ensuring that such advice comes from sources that are objective and unbiased.*

***SEC. 710. FACILITIES AND INFRASTRUCTURE.***

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

*(1) the Administration must reverse the deteriorating condition of its facilities and infrastructure, as*

*this condition is hampering the effectiveness and efficiency of research performed by both the Administration and industry participants making use of Administration facilities, thus reducing the competitiveness of the United States aerospace industry;*

*(2) the Administration has a role in providing laboratory capabilities to industry participants that are economically viable as commercial entities and thus are not available elsewhere;*

*(3) to ensure continued access to reliable and efficient world-class facilities by researchers, the Administration should seek to establish strategic partnerships with other Federal agencies, academic institutions, and industry, as appropriate; and*

*(4) decisions on whether to dispose of, maintain, or modernize existing facilities must be made in the context of meeting future Administration and other Federal agencies' laboratory needs, including those required to meet the activities supporting the Human Exploration Roadmap required by section 70504 of title 51, United States Code.*

*(b) POLICY.—It is the policy of the United States that the Administration maintain reliable and efficient facilities and that decisions on whether to dispose of, maintain, or*

*modernize existing facilities be made in the context of meeting future Administration needs.*

*(c) PLAN.—The Administrator shall develop a plan that has the goal of positioning the Administration to have the facilities, laboratories, tools, and approaches necessary to address future Administration requirements. Such plan shall identify—*

*(1) future Administration research and development and testing needs;*

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

*(A) the National Space Policy;*

*(B) the National Aeronautics Research, Development, Test, and Evaluation Infrastructure Plan;*

*(C) National Aeronautics and Space Administration Authorization Acts; and*

*(D) the Human Exploration Roadmap specified in section 70504 of title 51, United States Code;*

*(3) a strategy for the maintenance, repair, upgrading, and modernization of the Administration's laboratories, facilities, and equipment;*

*(4) criteria for prioritizing deferred maintenance tasks and also for upgrading or modernizing laboratories, facilities, and equipment and implementing processes, plans, and policies for guiding the Administration's Centers on whether to maintain, repair, upgrade, or modernize a facility and for determining the type of instrument to be used;*

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

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

*(d) POLICY.—Not later than 180 days after the date of enactment of this Act, the Administrator shall establish and make publically available a policy that guides the Administration's use of existing authorities to out-grant, lease, excess to the General Services Administration, sell, decommission, demolish, or otherwise transfer property, facilities, or infrastructure. This policy shall establish criteria for the use of authorities, best practices, standardized procedures, and guidelines for how to appropriately manage property, infrastructure, and facilities.*

*(e) TRANSMITTAL.—Not later than one year after the date of enactment of this Act, the Administrator shall transmit the plan developed under subsection (c) to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

*(f) ESTABLISHMENT OF CAPITAL FUND.—The Administrator shall establish a capital fund for the modernization of facilities and laboratories. The Administrator shall ensure to the maximum extent practicable that all financial savings achieved by closing outdated or surplus facilities at an Administration Center shall be made available to that Center for the purpose of modernizing the Center's facilities and laboratories and for upgrading the infrastructure at the Center.*

*(g) REPORT ON CAPITAL FUND.—Expenditures and other activities of the fund established under subsection (f) shall require review and approval by the Administrator and the status, including the amounts held in the capital fund, shall be reported to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate in conjunction with the Administration's annual budget request justification for each fiscal year.*

***SEC. 711. DETECTION AND AVOIDANCE OF COUNTERFEIT ELECTRONIC PARTS.***

*(a) REGULATIONS.—*

*(1) IN GENERAL.—Not later than 270 days after the date of enactment of this Act, the Administrator shall revise the National Aeronautics and Space Administration Supplement to the Federal Acquisition Regulation to address the detection and avoidance of counterfeit electronic parts.*

*(2) CONTRACTOR RESPONSIBILITIES.—The revised regulations issued pursuant to paragraph (1) shall provide that—*

*(A) Administration contractors who supply electronic parts or products that include electronic parts are responsible for detecting and avoiding the use or inclusion of counterfeit electronic parts or suspect counterfeit electronic parts in such products and for any rework or corrective action that may be required to remedy the use or inclusion of such parts; and*

*(B) the cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs under Administration contracts, unless—*

*(i) the covered contractor has an operational system to detect and avoid counterfeit parts and suspect counterfeit electronic parts that has been reviewed and approved by the Administration or the Department of Defense;*

*(ii) the covered contractor provides timely notice to the Administration pursuant to paragraph (4); or*

*(iii) the counterfeit electronic parts or suspect counterfeit electronic parts were provided to the contractor as Government property in accordance with part 45 of the Federal Acquisition Regulation.*

*(3) SUPPLIERS OF ELECTRONIC PARTS.—The revised regulations issued pursuant to paragraph (1) shall—*

*(A) require that the Administration and Administration contractors and subcontractors at all tiers—*

*(i) obtain electronic parts that are in production or currently available in stock from the original manufacturers of the parts or their authorized dealers, or from suppliers who obtain such parts exclusively*

*from the original manufacturers of the parts or their authorized dealers; and*

*(ii) obtain electronic parts that are not in production or currently available in stock from suppliers that meet qualification requirements established pursuant to subparagraph (C);*

*(B) establish documented requirements consistent with published industry standards or Government contract requirements for—*

*(i) notification of the Administration; and*

*(ii) inspection, testing, and authentication of electronic parts that the Administration or an Administration contractor or subcontractor obtains from any source other than a source described in subparagraph (A);*

*(C) establish qualification requirements, consistent with the requirements of section 2319 of title 10, United States Code, pursuant to which the Administration may identify suppliers that have appropriate policies and procedures in place to detect and avoid counterfeit electronic*

*parts and suspect counterfeit electronic parts; and*

*(D) authorize Administration contractors and subcontractors to identify and use additional suppliers beyond those identified pursuant to subparagraph (C) provided that—*

*(i) the standards and processes for identifying such suppliers comply with established industry standards;*

*(ii) the contractor or subcontractor assumes responsibility for the authenticity of parts provided by such suppliers as provided in paragraph (2); and*

*(iii) the selection of such suppliers is subject to review and audit by appropriate Administration officials.*

*(4) TIMELY NOTIFICATION.—The revised regulations issued pursuant to paragraph (1) shall require that any Administration contractor or subcontractor who becomes aware, or has reason to suspect, that any end item, component, part, or material contained in supplies purchased by the Administration, or purchased by a contractor or subcontractor for delivery to, or on behalf of, the Administration, contains counterfeit electronic parts or suspect counterfeit electronic*

*parts, shall provide notification to the applicable Administration contracting officer within 30 calendar days.*

*(b) REPORT.—Not later than 120 days after the revised regulations specified in subsection (a) have been implemented, the Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report updating the Administration's actions to prevent counterfeit electronic parts from entering the supply chain as described in its October 2011 report pursuant to section 1206(d) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18444(d)).*

*(c) DEFINITION.—In this section, the term "electronic part" means a discrete electronic component, including a microcircuit, transistor, capacitor, resistor, or diode that is intended for use in a safety or mission critical application.*

***SEC. 712. SPACE ACT AGREEMENTS.***

*(a) COST SHARING.—To the extent that the Administrator determines practicable, the funds provided by the Government under a funded Space Act Agreement shall not exceed the total amount provided by other parties to the Space Act Agreement.*

*(b) NEED.—A funded Space Act Agreement may be used only when the use of a standard contract, grant, or cooperative agreement is not feasible or appropriate, as determined by the Associate Administrator for Procurement.*

*(c) PUBLIC NOTICE AND COMMENT.—The Administrator shall make available for public notice and comment each proposed Space Act Agreement at least 30 days before entering into such agreement, with appropriate redactions for proprietary, sensitive, or classified information.*

*(d) TRANSPARENCY.—The Administrator shall publicly disclose on the Administration's website and make available in a searchable format each Space Act Agreement, with appropriate redactions for proprietary, sensitive, or classified information, not later than 60 days after such agreement is signed.*

*(e) ANNUAL REPORT.—*

*(1) REQUIREMENT.—Not later than 90 days after the end of each fiscal year, the Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on the use of Space Act Agreement authority by the Administration during the previous fiscal year.*

*(2) CONTENTS.—The report shall include for each Space Act Agreement in effect at the time of the report—*

*(A) an indication of whether the agreement is a reimbursable, nonreimbursable, or funded Space Act Agreement;*

*(B) a description of—*

*(i) the subject and terms;*

*(ii) the parties;*

*(iii) the responsible—*

*(I) mission directorate;*

*(II) center; or*

*(III) headquarters element;*

*(iv) the value;*

*(v) the extent of the cost sharing among Federal Government and non-Federal sources;*

*(vi) the time period or schedule; and*

*(vii) all milestones; and*

*(C) an indication of whether the agreement was renewed during the previous fiscal year.*

*(3) ANTICIPATED AGREEMENTS.—The report shall also include a list of all anticipated reimbursable, nonreimbursable, and funded Space Act Agreements for the upcoming fiscal year.*

*(4) CUMULATIVE PROGRAM BENEFITS.—The report shall also include, with respect to the Space Act Agreements covered by the report, a summary of—*

*(A) the technology areas in which research projects were conducted under such agreements;*

*(B) the extent to which the use of the Space Act Agreements—*

*(i) has contributed to a broadening of the technology and industrial base available for meeting Administration needs; and*

*(ii) has fostered within the technology and industrial base new relationships and practices that support the United States; and*

*(C) the total amount of value received by the Federal Government during the fiscal year pursuant to such Space Act Agreements.*

***SEC. 713. HUMAN SPACEFLIGHT ACCIDENT INVESTIGATIONS.***

*Section 70702(a) of title 51, United States Code, is amended by striking paragraph (3) and inserting the following:*

*"(3) any other orbital or suborbital space vehicle carrying humans—*

*"(A) that is owned by the Federal Government; or*

*"(B) that is being used pursuant to a contract or Space Act Agreement, as defined in section 2 of the National Aeronautics and Space Administration Authorization Act of 2014, with the Federal Government for carrying a researcher or payload funded by the Federal Government; or".*

***SEC. 714. FULLEST COMMERCIAL USE OF SPACE.***

*(a) REPORT.—Not later than 90 days after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on current and continuing efforts by the Administration to "seek and encourage, to the maximum extent possible, the fullest commercial use of space," as described in section 20102(c) of title 51, United States Code.*

*(b) ELEMENTS.—The report required under subsection (a) shall include—*

*(1) an assessment of the Administration's efforts to comply with the policy;*

*(2) an explanation of criteria used to define compliance;*

*(3) a description of programs, policies, and activities the Administration is using, and will continue to use, to ensure compliance;*

*(4) an explanation of how the Administration could expand on the efforts to comply; and*

*(5) a summary of all current and planned activities pursuant to this policy.*

*(c) BARRIERS TO FULLEST COMMERCIAL USE OF SPACE.—Not later than 90 days after the date of enactment of this Act, the Administrator shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on current and continuing efforts by the Administration to reduce impediments, bureaucracy, redundancy, and burdens to ensure the fullest commercial use of space as required by section 20102(c) of title 51, United States Code.*

***SEC. 715. ORBITAL DEBRIS.***

*(a) FINDINGS.—Congress finds that orbital debris poses serious risks to the operational space capabilities of the United States and that an international commitment and integrated strategic plan are needed to mitigate the growth of orbital debris wherever possible. Congress finds the delay in the Office of Science and Technology Policy's submission of a report on the status of international coordi-*

*nation and development of mitigation strategies to be inconsistent with such risks.*

*(b) REPORTS.—*

*(1) COORDINATION.—Not later than 90 days after the date of enactment of this Act, the Administrator shall provide the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate with a report on the status of efforts to coordinate with countries within the Inter-Agency Space Debris Coordination Committee to mitigate the effects and growth of orbital debris as required by section 1202(b)(1) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18441(b)(1)).*

*(2) MITIGATION STRATEGY.—Not later than 90 days after the date of enactment of this Act, the Director of the Office of Science and Technology Policy shall provide the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate with a report on the status of the orbital debris mitigation strategy required under section 1202(b)(2) of the National Aeronautics and*

*Space Administration Authorization Act of 2010 (42 U.S.C. 18441(b)(2)).*

***SEC. 716. REVIEW OF ORBITAL DEBRIS REMOVAL CONCEPTS.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that the amount of orbital debris in low-Earth orbit poses risks for human activities and robotic spacecraft and that this debris may increase due to collisions between existing debris objects. Understanding options to address and remove orbital debris is important for ensuring safe and effective spacecraft operations in low-Earth orbit.*

*(b) REVIEW.—The Administrator, in collaboration with other relevant Federal agencies, shall solicit and review concepts and technological options for removing orbital debris from low-Earth orbit. The solicitation and review shall also address the requirements for and feasibility of developing and implementing each of the options.*

*(c) TRANSMITTAL.—Not later than 270 days after the date of enactment of this Act, the Administrator shall provide a report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on the solicitation and review required under subsection (b).*

***SEC. 717. USE OF OPERATIONAL COMMERCIAL SUBORBITAL VEHICLES FOR RESEARCH, DEVELOPMENT, AND EDUCATION.***

*(a) POLICY.—The Administrator shall develop a policy on the use of operational commercial reusable suborbital flight vehicles for carrying out scientific and engineering investigations and educational activities.*

*(b) PLAN.—The Administrator shall prepare a plan on the Administration's use of operational commercial reusable suborbital flight vehicles for carrying out scientific and engineering investigations and educational activities. The plan shall—*

*(1) describe the purposes for which the Administration intends to use such vehicles;*

*(2) describe the processes required to support such use, including the criteria used to determine which scientific and engineering investigations and educational activities are selected for a suborbital flight;*

*(3) describe Administration, space flight operator, and supporting contractor responsibilities for developing standard payload interfaces and conducting payload safety analyses, payload integration and processing, payload operations, and safety assurance for Administration-sponsored space flight participants, among other functions required to fly Ad-*

*ministration-sponsored payloads and space flight participants on operational commercial suborbital vehicles;*

*(4) identify Administration-provided hardware, software, or services that may be provided to commercial reusable suborbital space flight operators on a cost-reimbursable basis, through agreements or contracts entered into under section 20113(e) of title 51, United States Code; and*

*(5) describe the United States Government and space flight operator responsibilities for liability and indemnification with respect to commercial suborbital vehicle flights that involve Administration-sponsored payloads or activities, Administration-supported space flight participants, or other Administration-related contributions.*

*(c) ASSESSMENT OF CAPABILITIES AND RISKS.—The Administrator shall assess and characterize the potential capabilities and performance of commercial reusable suborbital vehicles for addressing scientific research, including research requiring access to low-gravity and microgravity environments, for carrying out technology demonstrations related to science, exploration, or space operations requirements, and for providing opportunities for educating and training space scientists and engineers, once those vehicles*

*become operational. The assessment shall also characterize the risks of using potential commercial reusable suborbital flights to Administration-sponsored researchers and scientific investigations and flight hardware.*

*(d) TRANSMITTAL.—Not later than 1 year after the date of enactment of this Act, the Administrator shall transmit the plan and assessment described in subsections (b) and (c) to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

*(e) ANNUAL PROGRESS REPORTS.—In conjunction with the Administration's annual budget request justification for each fiscal year, the Administrator shall transmit a report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate describing progress in carrying out the Commercial Reusable Suborbital Research Program, including the number and type of suborbital missions planned in each fiscal year.*

*(f) INDEMNIFICATION AND LIABILITY.—The Administrator shall not proceed with a request for proposals, award any contract, commit any United States Government funds, or enter into any other agreement for the provision of a commercial reusable suborbital vehicle launch service for an Administration-sponsored spaceflight participant until*

*transmittal of the plan and assessment specified in subsections (b) and (c), the liability issues associated with the use of such systems by the United States Government have been addressed, and the liability and indemnification provisions that are planned to be included in such contracts or agreements have been provided to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

***SEC. 718. FUNDAMENTAL SPACE LIFE AND PHYSICAL SCIENCES RESEARCH.***

*(a) SENSE OF CONGRESS.—It the sense of Congress that fundamental, discovery-based space life and physical sciences research is critical for enabling space exploration, protecting humans in space, and providing societal benefits, and that the space environment facilitates the advancement of understanding of the life sciences and physical sciences. Space life and physical science research contributes to advancing science, technology, engineering, and mathematics research, and provides careers and training opportunities in academia, Federal laboratories, and commercial industry. Congress encourages the Administrator to augment discovery-based fundamental research and to establish requirements reflecting the importance of such research in keeping with the priorities established in the National Academies'*

*decadal survey entitled "Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era".*

*(b) BUDGET REQUEST.—The Administrator shall include as part of the Administration's annual budget request for each fiscal year a budget line for fundamental space life and physical sciences research, devoted to competitive, peer-reviewed grants, that is separate from the International Space Station Operations account.*

*(c) STRATEGIC PLAN.—*

*(1) DEVELOPMENT.—The Administrator, in consultation with academia, other Federal agencies, and other potential stakeholders, shall develop a strategic plan for carrying out competitive, peer-reviewed fundamental space life science and physical sciences and related technology research, among other activities, consistent with the priorities in the National Academies' decadal survey described in subsection (a).*

*(2) TRANSMITTAL.—Not later than 270 days after the date of enactment of this Act, the Administrator shall transmit the strategic plan developed under paragraph (1) to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

***SEC. 719. RESTORING COMMITMENT TO ENGINEERING RESEARCH.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that engineering excellence has long been a hallmark of the Administration's ability to make significant advances in aeronautics and space exploration. However, as has been noted in recent National Academies reports, increasingly constrained funding and competing priorities have led to an erosion of the Administration's commitment to basic engineering research. This research provides the basis for the technology development that enables the Administration's many challenging missions to succeed. If current trends continue, the Administration's ability to attract and maintain the best and brightest engineering workforce at its Centers as well as its ability to remain on the cutting edge of aeronautical and space technology will continue to erode and will threaten the Administration's ability to be a world leader in aeronautics research and development and space exploration.*

*(b) PLAN.—The Administrator shall develop a plan for restoring a meaningful basic engineering research program at the Administration's Centers, including, as appropriate, collaborations with industry, universities, and other relevant organizations. The plan shall identify the organizational approach to be followed, an initial set of basic research priorities, and a proposed budget.*

*(c) REPORT.—Not later than 180 days after the date of enactment of this Act, the Administrator shall transmit the plan specified in subsection (b) to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

***SEC. 720. LIQUID ROCKET ENGINE DEVELOPMENT PROGRAM.***

*The Administrator shall consult with the Secretary of Defense to ensure that any next generation liquid rocket engine made in the United States for national security space launch objectives can contribute, to the extent practicable, to the space programs and missions carried out by the Administration.*

***SEC. 721 REMOTE SATELLITE SERVICING DEMONSTRATIONS.***

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

*(1) the Administration plays a key role in demonstrating the feasibility of using robotic technologies for a spacecraft that could autonomously access, inspect, repair, and refuel satellites;*

*(2) demonstrating this feasibility would both assist the Administration in its future missions and provide other Federal agencies and private sector en-*

*tities with enhanced confidence in the feasibility to robotically refuel, inspect, repair, and maintain their satellites in both near and distant orbits; and*

*(3) the capability to refuel, inspect, repair, and maintain satellites robotically could add years of functional life to satellites.*

*(b) REPORT.—Not later than 120 days after the date of enactment of this Act, the Administrator shall transmit a report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate describing the Administration's—*

*(1) activities, tools, and techniques associated with the ultimate goal of autonomously servicing satellites using robotic spacecraft;*

*(2) efforts to coordinate its technology development and demonstrations with other Federal agencies and private sector entities that conduct programs, projects, or activities on on-orbit satellite inspection and servicing capabilities;*

*(3) efforts to leverage the work of these Federal agencies and private sector entities into the Administration's plans;*

*(4) accomplishments to date in demonstrating various servicing technologies;*

*(5) major technical and operational challenges encountered and mitigation measures taken; and*

*(6) demonstrations needed to increase confidence in the use of the technologies for operational missions, and the timeframe for these demonstrations.*

***SEC. 722. INFORMATION TECHNOLOGY GOVERNANCE.***

*(a) SENSE OF CONGRESS.—It is the sense of Congress that information security is central to the Administration's ability to protect information and information systems vital to its mission.*

*(b) STUDY.—The Comptroller General of the United States shall conduct a study to assess the effectiveness of the Administration's Information Technology Governance. The study shall include an assessment of—*

*(1) the resources available for overseeing Administration-wide information technology operations, investments, and security measures and the Chief Information Officer's visibility into and access to those resources;*

*(2) the effectiveness of the Administration's decentralized information technology structure, decision-making processes and authorities and its ability to enforce information security; and*

*(3) the impact of providing the Chief Information Officer approval authority over information tech-*

*nology investments that exceed a defined monetary threshold and any potential impacts of the Chief Information Officer having such authority on the Administration's missions, flights programs and projects, research activities, and Center operations.*

*(c) REPORT.—Not later than 1 year after the date of enactment of this Act, the Comptroller General shall transmit a report detailing the results of the study conducted under subsection (b) to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.*

***SEC. 723. STRENGTHENING ADMINISTRATION SECURITY.***

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

*(1) Following the public disclosure of security and export control violations at its research centers, the Administration contracted with the National Academy of Public Administration to conduct an independent assessment of how the Administration carried out Foreign National Access Management practices and other security matters.*

*(2) The assessment by the National Academy of Public Administration concluded that "NASA networks are compromised", that the Administration lacked a standardized and systematic approach to ex-*

*port compliance, and that individuals within the Administration were not held accountable when making serious, preventable errors in carrying out Foreign National Access Management practices and other security matters.*

*(b) REPORT.—Not later than 90 days after the date of enactment of this Act, the Administration shall report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on how it plans to address each of the recommendations made in the security assessment by the National Academy of Public Administration.*

*(c) REVIEW.—Within one year of enactment of this Act, the Comptroller General of the United States shall report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate its assessment of how the Administration has complied with the recommendations of the National Academy of Public Administration.*

***SEC. 724. PROHIBITION ON USE OF FUNDS FOR CONTRACTORS THAT HAVE COMMITTED FRAUD OR OTHER CRIMES.***

*None of the funds authorized to be appropriated or otherwise made available for fiscal year 2014 or any fiscal year thereafter for the Administration may be used to enter into a contract with any offeror or any of its principals if the offeror certifies, pursuant to the Federal Acquisition Regulation, that the offeror or any of its principals—*

*(1) within a three-year period preceding this offer has been convicted of or had a civil judgment rendered against it for—*

*(A) commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) contract or subcontract;*

*(B) violation of Federal or State antitrust statutes relating to the submission of offers; or*

*(C) commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating Federal criminal tax laws, or receiving stolen property;*

*(2) are presently indicted for, or otherwise criminally or civilly charged by a governmental entity*

*with, commission of any of the offenses enumerated in paragraph (1); or*

*(3) within a three-year period preceding this offer, has been notified of any delinquent Federal taxes in an amount that exceeds $3,000 for which the liability remains unsatisfied.*

***SEC. 725. PROTECTION OF APOLLO LANDING SITES.***

*(a) ASSESSMENT.—The Director of the Office of Science and Technology Policy, in consultation with all relevant agencies of the Federal Government and other appropriate entities and individuals, shall carry out a review and assessment of the issues involved in protecting and preserving historically important Apollo Program lunar landing sites and Apollo program artifacts residing on the lunar surface, including those pertaining to Apollo 11 and Apollo 17. The review and assessment shall, at a minimum, include determination of what risks to the protection and preservation of those sites and artifacts exist or may exist in the future, what measures are required to ensure such protection and preservation, the extent to which additional domestic legislation or international treaties or agreements will be required, and specific recommendations for protecting and preserving those lunar landing sites and artifacts.*

*(b) REPORT.—Not later than one year after the date of enactment of this Act, the Director shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate the results of the assessment required under subsection (a).*

***SEC. 726. ASTRONAUT OCCUPATIONAL HEALTHCARE.***

*(a) IN GENERAL.—The National Academies' Institute of Medicine report "Health Standards for Long Duration and Exploration Spaceflight: Ethics Principles, Responsibilities, and Decision Framework" found that the Administration has ethical responsibilities for and should adopt policies and processes related to health standards for long duration and exploration spaceflights that recognize those ethical responsibilities. In particular, the report recommended that the Administration "provide preventative long-term health screening and surveillance of astronauts and lifetime health care to protect their health, support ongoing evaluation of health standards, improve mission safety, and reduce risks for current and future astronauts".*

*(b) RESPONSE.—The Administration shall prepare a response to the National Academies report recommendation described in subsection (a). The response shall include the estimated budgetary resources required for the implementa-*

*tion of those recommendations, and any options that might be considered as part of the response.*

*(c) TRANSMITTAL.—The response required under subsection (b) shall be transmitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 6 months after the date of enactment of this Act.*

**Union Calendar No. 349**

113TH CONGRESS
2D SESSION

# H. R. 4412

**[Report No. 113–470]**

# A BILL

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

JUNE 5, 2014

Reported with an amendment, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed