H.R. , National Aeronautics and Space Administration Authorization Act for 2016 and 2017
Section-by-Section Analysis

Section 1. Short Title; Table of Contents
This Act may be cited as the "National Aeronautics and Space Administration Authorization Act of 2015".

Section 2. Definitions.
This section provides relevant definitions within the Act.

TITLE I - AUTHORIZATION OF APPROPRIATIONS

Section 101. Fiscal Year 2016.
Except as provided in section 103, this section authorizes NASA for fiscal year 2016 at $18,529,100,000 including:

(1) For Exploration, $4,953,100,000 of which--
(A) $1,700,000,000 shall be for the Space Launch System;
(B) $410,100,000 shall be for Exploration Ground Systems;
(C) $1,200,000,000 shall be for the Orion crew vehicle;
(D) $399,200,000 shall be for Exploration Research and Development; and
(E) $1,243,800,000 shall be for Commercial Crew Development activities.

(2) For Space Operations, $3,992,500,000.

(3) For Science, $4,951,700,000, of which--
(A) $1,450,00,000 shall be for Earth Science;
(B) $1,500,000,000 shall be for Planetary Science, with up to $30,000,000 for the Astrobiology Institute;
(C) $730,700,000 shall be for Astrophysics;
(D) $620,000,000 shall be for the James Webb Space Telescope;
(E) $651,000,000 shall be for Heliophysics.

(4) For Aeronautics, $571,400,000.

(5) For Space Technology, $596,000,000.

(6) For Education, $119,000,000.

(7) For Safety, Security, and Mission Services, $2,843,100,000.

(8) For Construction and Environmental Compliance and Restoration, $465,300,000.

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

Section 102. Fiscal Year 2017.
Except as provided in section 103, this section authorizes NASA for fiscal year 2017 at $18,807,000,000 including:

(1) For Exploration, $5,268,000,000 of which--

(A) $1,899,600,000 shall be for the Space Launch System;

(B) $432,300,000 shall be for Exploration Ground Systems;

(C) $1,349,600,000 shall be for the Orion crew vehicle;

(D) $401,700,000 shall be for Exploration Research and Development; and

(E) $1,184,800,000 shall be for Commercial Crew Development activities.

(2) For Space Operations, $3,992,500,000.

(3) For Science, $4,935,300,000, of which--

(A) $1,450,00,000 shall be for Earth Science;

(B) $1,500,000,000 shall be for Planetary Science, with up to $30,000,000 for the Astrobiology Institute;

(C) $730,700,000 shall be for Astrophysics;

(D) $569,400,000 shall be for the James Webb Space Telescope;

(E) $685,200,000 shall be for Heliophysics.

(4) For Aeronautics, $580,000,000.

(5) For Space Technology, $596,000,000.

(6) For Education, $119,000,000.

(7) For Safety, Security, and Mission Services, $2,843,100,000.

(8) For Construction and Environmental Compliance and Restoration, $436,100,000.

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

Section 103. Budget Control.
If the Budget Control Act of 2011 (Public Law 112-25) is not repealed, replaced, modified, or if offsets are not identified from within existing discretionary caps to account for increased allocations, there are authorized to be appropriated to the Administration for fiscal year 2016 and 2017 $18,010,200,000 as follows:

(1) For Exploration, $4,845,400,000 of which--

(A) $1,700,000,000 shall be for the Space Launch System;

(B) $410,100,000 shall be for Exploration Ground Systems;

(C) $1,200,000,000 shall be for the Orion crew vehicle;

(D) $399,200,000 shall be for Exploration Research and Development; and

(E) $1,136,100,000 shall be for Commercial Crew Development activities.

(2) For Space Operations, $3,950,400,000.

(3) For Science, $4,678,600,000, of which--

(A) $1,198,500,000 shall be for Earth Science;

(B) $1,500,000,000 shall be for Planetary Science, with up to $30,000,000 for the Astrobiology Institute;

(C) $709,100,000 shall be for Astrophysics;

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

(E) $651,000,000 shall be for Heliophysics.

(4) For Aeronautics, $571,400,000.

(5) For Space Technology, $500,000,000.

(6) For Education, $119,000,000.

(7) For Safety, Security, and Mission Services, $2,843,100,000.

(8) For Construction and Environmental Compliance and Restoration, $465,300,000.

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

TITLE II - HUMAN SPACE FLIGHT

Subtitle A – Exploration

Section 201. Space Exploration Policy.

Section 201 states that exploration deeper into the solar system shall be a core mission of NASA. It further states that it is the policy of the United States that the goal of NASA's human exploration program shall be to successfully conduct a crewed mission to the surface of Mars to begin human exploration of that planet. This section adds relevant definitions to title 51 and also adds language to title 42 regarding the acceleration of 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 title 51. This section states that non-United States human space flight capabilities should only be used as a contingency when no domestic commercial or public-private partnership provider that meets NASA's safety and affordability requirements is available.

Section 202. Stepping Stone Approach to Exploration.

This section requires the development of a Human Exploration Roadmap defining the capabilities and technologies necessary to extend human presence to the surface of Mars. This section establishes requirements for the content of the roadmap. The roadmap must be transmitted to Congress, updated no less frequently than every two years, and include addenda from the NASA Advisory Council and Aerospace Safety Advisory Panel, each with a statement of review. The roadmap must also include an examination of the benefits of utilizing current Administration launch facilities for trans-lunar missions.

Section 203. Space Launch System.
Section 203 contains findings regarding the importance of the Space Launch System (SLS) and describes its intended uses. It includes a sense of Congress stating that the President's budget requests for the SLS and Orion multipurpose crew vehicle development, test, and operational phases should strive to accurately reflect the resource requirements of each of those phases. This section requires the Administrator to make expeditious development, test, and achievement of operational readiness of the SLS and the Orion crew vehicle the highest priority of the exploration program. It requires a Government Accountability Office review of NASA's acquisition of ground systems in support of the SLS, and establishes requirements for the review. This section requires the Administrator to report on the effort and budget required to enable and utilize a cargo variant of the SLS configuration. This section further requires NASA to conduct a competition among students in elementary and secondary schools to name the elements of NASA's exploration program. Section 203 requires a report to Congress describing the estimated cost of an advanced booster for SLS, detailing changes in development costs that may result from conducting a competition for an advanced booster, and outlining potential schedule delay resulting from a competition. It directs NASA to conduct a competition for an advanced booster if the Associate Administrator reports the results would be cost reductions and no adverse schedule impact in the required report. It directs NASA to conduct a competition for an advanced booster as soon as practicable after the development of the upper stage, if the Associate Administrator reports the results would be cost reduction and no adverse schedule impact in the required report.

Section 204. Orion Crew Vehicle.
Section 204 states that Orion must meet the needs and the minimum capability requirements described in law. It requires a report to Congress detailing the components and systems of Orion that ensure it is in compliance with the law and the expected date that Orion will be available to transport crew and cargo to the ISS, as well as certification that the requirements of the law will be met in time for the first crewed test flight in the year 2021.

Section 205. Space Radiation.
This section requires the Administrator to develop a space radiation mitigation and management strategy and implementation plan. The strategy and plan must be submitted to Congress. The Administrator, in consultation with the heads of other agencies, must assess the national capabilities for carrying out critical ground-based research on space radiation biology.

Section 206. Planetary Protection for Human Exploration Missions.
This section requires the Administrator to contract with the National Academies for a study to explore the planetary protection ramifications of future missions by astronauts. The study must be submitted to Congress.

Subtitle B – Space Operations

Section 211. International Space Station.
This section contains findings regarding the importance of the International Space Station (ISS) and the need for access to the ISS. This section states that the ISS shall have two primary objectives: supporting 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, in consultation with its international partners in the ISS program, to support full and complete utilization of the ISS. Section 211 states that the ISS 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. This section requires the Administrator to take all necessary steps to support the operation and full utilization of the ISS and seek to minimize the operating costs of the ISS. It further states that reliance on foreign carriers for crew and cargo is unacceptable and the Nation's human space flight program must acquire the capability to launch American astronauts on American rockets from American soil as soon as is safe and practically possible. It reaffirms Congress' commitment to the development of a commercially developed launch and delivery system to the ISS for crew missions. This section reaffirms that NASA shall make use of the United States' commercially provided ISS crew transfer and crew rescue services to the maximum extent practicable. Section 211 reaffirms that the Orion crew vehicle shall provide an alternative means to deliver crew and cargo to the International Space Station, in the event other vehicles are unable to perform that function. It also reaffirms that NASA shall pursue means to maximize ISS logistics capabilities, reduce risks to ISS systems sustainability, and minimize United States operations costs relating to the ISS. This section amends the law to state that 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. This section requires the Administrator to submit a report to Congress on the feasibility of extending the operation of the ISS and also requires the Director of the Office of Science and Technology Policy to develop and transmit to Congress a strategic plan for conducting research in the physical and life sciences and related technologies on the ISS through at least 2020.

Section 212. Barriers Impeding Enhanced Utilization of the ISS's National Laboratory by Commercial Companies.
Section 212 includes a sense of Congress regarding the importance of enhanced utilization of the ISS National Laboratory. This section requires the Administrator to contract with the National Academies for an assessment (to be transmitted to Congress) to identify barriers impeding enhanced utilization of the ISS National Laboratory, recommend ways to encourage companies to make greater use of the ISS National Laboratory, and identify any legislative changes that may be required.

Section 213. Utilization of the International Space Station for Science Missions.
This section directs the Administrator to utilize the ISS for Science Mission Directorate missions in low-Earth orbit wherever it is practical and cost effective to do so.

Section 214. International Space Station Cargo Resupply Services Lessons Learned.
This section requires the Administrator to transmit a report to Congress that identifies lessons learned from the Commercial Resupply Services contract, indicates whether changes are needed to NASA's procurement and management of similar services upon expiration of the existing contract, and identifies any lessons learned that should be applied to the procurement and management of commercial crew services.

Section 215. Commercial Crew Program.
Section 215 states it is the sense of Congress that United States commercially-provided crew transportation systems offer the potential of serving as the primary means of transporting American astronauts to and from the ISS and serving as ISS emergency crew rescue vehicles. 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. This section states that the objective of the Commercial Crew Program shall be to assist the development of at least one crew transportation system to carry NASA astronauts safely, reliably, and affordably to and from the ISS and to serve as an emergency crew rescue vehicle as soon as practicable under the funding levels authorized in this Act. This section requires NASA to ensure that, consistent with the findings and recommendations of the Columbia Accident Investigation Board, safety is the highest priority in its evaluation and selection of contracts for the development of commercial crew transportation capabilities. It requires the Administrator to strive through the competitive selection process to minimize the Program's lifecycle cost to NASA. Section 215 requires the Administrator to ensure that every crew transportation services provider has provided evidence-based support for their costs and schedule. This section requires the Administrator to arrange for the initiation of an Independent Cost and Schedule Estimate that meets specified requirements. This estimate must be provided to Congress.

Section 216. Space Communications.
This section directs the Administrator to develop a plan (to be transmitted to Congress) for updating NASA's space communications architecture for both low-Earth orbit operations and deep space exploration so that it is capable of meeting NASA's needs over the next twenty years. The plan shall include life-cycle cost estimates, milestones, estimated performance capabilities, and five-year funding profits. This section specifies additional requirements for the plan.

TITLE III – SCIENCE

Subtitle A – General

Section 301. Science Portfolio.
Section 301 amends the law to state that a balanced and adequately funded set of activities contributes to a robust and productive science program that serves as a catalyst for innovation and discovery. This section states that unless otherwise directed by Congress, NASA shall take into account the current decadal surveys from the National Academies when submitting the President's budget request to Congress.

Section 302. Radioisotope Power Systems.
This section requires the Administrator to conduct and transmit to Congress an analysis of NASA requirements for radioisotope power system material needed to carry out high priority robotic missions in the solar system and other surface exploration activities beyond low-Earth orbit, as well as the risks to NASA missions in meeting those requirements due to a lack of adequate domestic production of radioisotope power system material.

Section 303. Congressional Declaration of Policy and Purpose.
This section amends current law to add the search for life's origin, evolution, distribution, and future in the Universe to the list of objectives of NASA's activities.

Section 304. University Class Science Missions.
Section 304 includes a sense of Congress regarding the value of principal investigator-led small orbital science mission. This section directs the Administrator to conduct a review of these missions. The Administrator must transmit a report on the review to Congress.

Section 305. Assessment of Science Mission Extensions.
Section 305 amends the law to require biennial reviews within each of the Science divisions to assess the benefits of extending the date of termination of data collection for missions that exceed their planned mission lifetimes. This section requires consultation by relevant agencies for missions with an operational component. This section requires a report to Congress detailing the assessment required.

Subtitle B – Astrophysics

Section 311. Decadal Cadence.
This section states that the Administrator shall seek to ensure to the extent practicable a steady cadence of large, medium, and small missions when following the guidance provided by the decadal surveys.

Section 312. Extrasolar Planet Exploration Strategy.
Section 312 requires the Administrator to contract with the National Academies to develop a strategy for the study and exploration of extrasolar planets that would provide a foundation for NASA roadmaps, strategic plans, and activities related to exoplanet research and exploration.

Section 313. James Webb Space Telescope.
This section states that it is the sense of Congress that the James Webb Space Telescope (JWST) program will revolutionize our understanding of star and planet formation and how galaxies evolved and advance the search for the origins of the universe; the JWST program will enable American scientists to maintain their leadership in astrophysics and other disciplines; the JWST program is making steady progress towards a launch in 2018; the on-time and on-budget delivery of JWST is a high congressional priority; and 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 handle within JWST's development schedule.

Section 314. National Reconnaissance Office Telescope Donation
Section 314 requires the Administrator to report to Congress on NASA's plan for developing the Wide-Field Infrared Survey Telescope including a plan for the Wide-Field Infrared Survey Telescope 2.4, which includes the donated 2.4-meter aperture National Reconnaissance Office telescope.

Section 315. Wide-Field Infrared Survey Telescope.
This section includes a sense of Congress stating that the Administrator should, to the extent practicable, make progress on the technologies and capabilities needed to position NASA to meet the objectives of the WFIRST mission, as outlined in the National Academies' 2010 decadal survey, in a way that maximizes the scientific productivity of meeting those objectives. This section requires the Administrator to ensure that the concept definition and pre-formulation activities for the Wide-Field Infrared Survey Telescope continue while the James Webb Space Telescope is completed.

Section 316. Stratospheric Observatory for Infrared Astronomy.
Section 316 prohibits the Administrator from using funding appropriated to NASA for FY16 for the shutdown of the Stratospheric Observatory for Infrared Astronomy or any preparation thereof.

Subtitle C –Planetary Science

Section 321. Decadal Cadence.
This section states that when following the guidance provided by the decadal surveys, the Administrator shall seek to ensure to the greatest extent practicable that NASA carries out a balanced set of programs in accordance with the priorities established in the most recent decadal survey, including: a Discovery-class mission at least once every 24 months; a New Frontiers-class mission at least once every 60 months; and a Flagship-class mission at least once per decadal survey period, including a Europa mission with a goal of launching by 2021.

Section 322. Near-Earth Objects.
Section 322 requires the Administrator to continue to discover, track, catalogue, and characterize the physical characteristic 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 Earth. It shall be the goal of the Survey to achieve 90 percent completion of its near-earth object catalogue by 2020. Section 322 reaffirms the policy in title 51 relating to detecting, tracking, cataloguing, and characterizing asteroids and comets. This section requires the Office of Science and Technology Policy to transmit to Congress an initial report that provides the following: recommendations and a proposed budget to carry out the Survey program; an analysis of possible options NASA could employ to divert an object on a likely collision course with Earth; and 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. It further requires the Administrator to transmit an annual report that provides a summary of all activities and expenditures taken with regards to the Survey since the enactment of this act. This section requires a technical and scientific assessment of the capabilities and resources to accelerate the Survey and expand NASA's Near-Earth Object program to include detection, tracking, cataloging, and characterizing potentially hazardous near-Earth objects less than 140 meters in diameter.

Section 323. Near-Earth Objects Public-Private Partnerships.
This section states it is the sense of Congress that NASA should seek to leverage the capabilities of private sector and philanthropic organizations in carrying out the Near-Earth Object Survey

program in order to meet the goal of the Survey program. It requires the Administrator to transmit a report to Congress describing how the Administration can expand collaborative partnerships to detect, catalogue, and categorize near-Earth asteroids.

Section 324. Research on Near-Earth Object Tsunami Effects.
Section 324 requires the Administrator to prepare a report (to be transmitted to Congress) 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.

Section 325. Astrobiology Strategy.
This section would require the Administrator to contract with the National Academies to develop a science strategy for astrobiology to be used in planning and funding research and other activities and initiatives in the field of astrobiology. This section would also require the Administrator to transmit a report containing the strategy to Congress.

Section 326. Astrobiology Public-Private Partnerships.
Section 326 requires a report to Congress describing how NASA can expand collaborative public-private partnerships to study life's origin, evolution, distribution, and future in the Universe.

Section 327. Assessment of Mars Architecture.
This section requires the Administrator to contract with the National Academies to assess NASA's revised post-2016 Mars exploration architecture and its responsiveness to the National Academies' planetary science decadal surveys and other relevant National Academies Mars-related reports; the long-term goals of NASA's Mars Exploration Program and the program's ability to optimize the science return; the Mars architecture's relationship to Mars-related activities to be undertaken by agencies and organizations outside of the United States; and the extent to which the Mars architecture represents a reasonably balanced mission portfolio. The results of the assessment must be transmitted to Congress.

Subtitle D –Heliophysics

Section 331. Decadal Cadence.
This section states that the Administrator shall seek to ensure to the extent practicable a steady cadence of large, medium, and small heliophysics missions when following the guidance provided by the decadal surveys.

Section 332. Review of Space Weather.
Section 332 directs the Director of the Office of Science and Technology Policy to enter into an arrangement with the National Academies to provide a comprehensive study, which will be transmitted to Congress, 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.

Subtitle E – Earth Science

Section 341. Goal.
Section 341 states it is the sense of Congress that NASA is being asked to undertake important Earth science activities in an environment of increasingly constrained fiscal resources, and that any transfer of additional responsibilities to NASA should be accompanied by the provision of additional resources to allow NASA to carry out the increased responsibilities without adversely impacting its implementation of its existing Earth science programs and priorities. This section directs the Administrator to continue to carry out a balanced Earth science program consistent with the recommendations and priorities established in the National Academies' Earth Science Decadal Survey. It instructs the Administrator to collaborate with other Federal agencies, non-government entities, and international partners, as appropriate, in carrying out NASA's Earth science program. This section directs NASA to continue to develop first-of-a-kind instruments that, once proved, can be transitioned to other agencies for operations. Finally, this section states that whenever responsibilities for the development of sensors or for measurements are transferred to NASA from another agency, the Administrator shall seek, to the extent possible, to be reimbursed for the assumption of such responsibilities.

Section 342. Decadal Cadence.
This section directs the Administrator to seek to ensure to the extent practical a steady cadence of large, medium, and small Earth science missions.

Section 343. Venture Class Missions.
Section 343states 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 further states it is the sense of Congress that NASA should seek to increase the number of Venture class projects as part of a balanced Earth science program.

Section 343. Assessment.
This section directs the Administrator to carry out a scientific assessment of NASA's Earth science global datasets to identify those datasets that are useful for understanding regional changes and variability, and for informing applied science research. The assessment must be transmitted to Congress.

TITLE IV- AERONAUTICS

Section 401. Sense of Congress.
Section 401 states that it is the sense of Congress that 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. It further states that aeronautics research is essential to NASA's mission and should be supported and that the Administrator should coordinate with other stakeholders to minimize duplication and leverage resources. This section states that carrying aeronautics research to a level of maturity

that allows NASA's research results to be transitioned to the users is critical to their eventual adoption.

Section 402. Aeronautics Research Goals.
This section instructs the Administrator to ensure that NASA maintains a strong aeronautics research portfolio, ranging from fundamental research through integrated systems research, with specific research goals including: enhance airspace operations and safety; improve air vehicle performance; strengthen aviation safety; and demonstrate concepts at the system level.

Section 403. Unmanned Aerial Systems Research and Development.
Section 403 requires the Administrator to direct research and technological development to facilitate the safe integration of unmanned aerial systems into the National Airspace System. It requires the Administrator to update and transmit to Congress a roadmap for unmanned aerial systems research and development. This section requires that operational flight data from specified cooperative agreements be made available to NASA and the FAA for the development of regulatory standards.

Section 404. Research Program On Composite Materials Used In Aeronautics.
Section 404 requires the Administrator to continue NASA's cooperative research program with industry to identify and demonstrate more effective and safe ways of developing, manufacturing, and maintaining composite materials. This section states that, to the extent practicable, the Administration's cooperative research program on composite materials shall provide timely access to that research to the next generation of engineers and technicians, thereby helping to develop a workforce ready to take on the development, manufacture, and maintenance of components reliant on advanced composite materials. This section states that the Administrator, in overseeing NASA'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. It requires the Administrator to transmit to Congress a report detailing the work of NASA on new composite materials and the coordination efforts among agencies.

Section 405. Hypersonic Research.
This section requires the Administrator to develop and transmit to Congress a roadmap for hypersonic aircraft research.

Section 406. Supersonic Research.
Section 406 includes findings regarding the importance of supersonic overland flight and continuing NASA's research program in supersonic flight. It requires the Administrator to develop and transmit to Congress a roadmap for supersonic aeronautics research and development with the goal of developing and demonstrating, in a relevant environment, airframe and propulsion technologies to minimize the environmental impact of supersonic overland flight in an efficient and economical manner.

Section 407. Research On NextGen Airspace Management Concepts And Tools.
This section requires the Administrator, in consultation with the relevant federal agencies, to review NASA's research and development activities in support of NextGen and make any

necessary adjustments to NASA's research and development activities in support of NextGen. It also requires the Administrator to report to Congress regarding the progress of NASA's research and development activities in support of the NextGen airspace management modernization initiative, including details of technology transfer to other agencies, consultation with other agencies, and any adjustments made to research activities.

Section 408. Rotorcraft Research.
Section 408 requires the Administrator to prepare and transmit to Congress a plan for research relating to rotorcraft and other runway-independent air vehicles. The plan must 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.

Section 409. Transformative Aeronautics Research.
This section states that it is the sense of Congress that the Administrator should encourage investigations into the early-stage advance of new processes, novel concepts, and innovative technology that have the potential to meet national aeronautics needs.

Section 410. Study of United States Leadership in Aeronautics Research.
Section 410 requires the Administrator to enter into an arrangement with the National Academies for a study to assess the position of the United States in civil aeronautics research compared to the rest of the world. This section establishes requirements for the study. The study must be transmitted to Congress.

TITLE V - SPACE TECHNOLOGY

Section 501. Sense of Congress.
This section contains a sense of Congress regarding the importance of space technology development**.**

Section 502. Space Technology Program.
Section 502 authorizes a Space Technology Program to pursue the development of technologies that enable exploration of the solar system or advanced space science through various elements of NASA. This section also states that the Administrator shall organize and manage NASA's Small Business Innovation Research program and Small Business Technology Transfer program within the Space Technology Program. Additionally, this section requires the Administrator to certify that no project within the Space Technology Program is also under development in any established mission directorate. It requires the Administrator to ensure that NASA's work in space technology is fully coordinated and aligned and results from such work are shared and leveraged within NASA. Work being conducted by the Human Exploration and Operations Mission Directorate in support of advanced space technologies and systems focusing on human space exploration should continue. This section requires a report to Congress comparing NASA's space technology investments with the high-priority technology areas identified by the National Academies in the National Research Council's report on NASA's Space Technology Roadmaps. It requires an annual submission with the budget for each fiscal year describing 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.

Section 503. Utilization of the International Space Station for Technology Demonstrations. This section requires the Administrator to utilize the ISS and commercial services for Space Technology Demonstration missions in low-Earth orbit wherever it is practical and cost effective to do so.

TITLE VI - Education

Section 601. Education.
Section 601 states it is the sense of Congress that NASA's missions are an inspiration for Americans and that this inspiration has a powerful effect in stimulating interest in science, technology, engineering, and mathematics (STEM) education and careers. This section further states it is the sense of Congress that NASA's Office of Education and mission directorates have been effective in delivering NASA's educational content because of the strong engagement of NASA scientists and engineers in NASA's education and outreach activities. It includes a sense of Congress that NASA 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. Section 601 directs NASA to continue its education and outreach efforts to: increase student interest and participation in STEM education; improve public literacy in STEM; employ proven strategies for improving student learning and teaching; provide curriculum support materials; and create and support opportunities for professional development for STEM teachers. It states that in order to ensure the inspiration and engagement of children and the general public, the Administrator should continue to carry out education and outreach programs and activities through the Office of Education and NASA's mission directorates and to continue to engage, to the maximum extent practicable, NASA and NASA-supported researchers and engineers in carrying out those programs and activities. This section requires the Administrator to continue to operate the National Space Grant College and Fellowship program through a national network consisting of a State-based consortium in each state. It reaffirms Congress' commitment to informal science education and science centers and planetariums as set forth in the NASA Authorization Act of 2005.

Section 602. Independent Review of the National Space Grant College and Fellowship Program.
Section 602 includes a sense of Congress regarding the importance of the Space Grant Program. This section directs the Administrator to arrange for a review of the Space Grant Program by the National Academies. It expands the Space Grant Program to 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. This section would also permit a space grant regional consortium to include one or more 2-year institutions of higher education.

Section 603. Sense of Congress.
This section states it is the sense of Congress that the Administrator should make the continuation of NASA's Minority University Research and Education Program a priority in order to further STEM education for underrepresented students.

Title VII - Policy Provisions

Section 701. Asteroid Retrieval Mission.
Section 701 requires the Administrator to report to Congress on the proposed Asteroid Retrieval Mission including a detailed budget profile; a detailed technical plan; a description of the technologies and capabilities anticipated to be gained that will enable future missions to Mars that could not be gained by lunar missions; a description of the technologies and capabilities anticipated to be gained from the proposed mission that will enable future planetary defense missions; and a review by the Small Bodies Assessment Group and the NASA Advisory Council of how the proposed mission is or is not in the strategic interest of the U.S. in space exploration. This section requires a report conducted by an independent, private systems engineering and technical assistance organization analyzing the proposal for a Mars Flyby human spaceflight mission to be launched in 2021. The report must be transmitted to Congress.

Section 702 . Termination Liability Sense of Congress.
This section contains findings regarding how holding funds for termination liability affects large NASA programs.

Section 703. Baseline and Cost Controls.
Section 703 amends requirements associated with Baseline and Cost Controls to make the reporting more timely.

Section 704. Project and Program Reserves.
This section states that it is the sense of Congress that the judicious use of program and project reserves provides NASA managers with the flexibility needed to manage projects and programs to ensure that the impacts of contingencies can be mitigated. It requires the Administrator to report to Congress on NASA's criteria for establishing the amount of reserves at the project and program levels; how such criteria relate to NASA's policy of budgeting at a 70 percent confidence level; NASA's criteria for waiving the policy of budgeting at a 70 percent confidence level, and strategies for controlling costs when a waiver is granted.

Section 705. Independent Reviews.
Section 705 requires the Administrator to report to Congress on NASA's procedure for independent reviews of projects and programs at lifecycle milestones and how NASA ensures the independence of the individuals conducting those reviews as well as the independence of internal and external entities that review projects and programs at lifecycle milestones.

Section 706. Commercial Technology Transfer Program.
This section adds "protecting national security" to the considerations used to evaluate when to transfer technology.

Section 707. National Aeronautics and Space Administration Advisory Council.
Section 707 requires the Administrator to contract with the National Academy of Public Administrator for an assessment of the effectiveness of the NASA Advisory Council. The assessment must make recommendations for Congress for any changes to: the functions of the Council; the appointment of members to the Council; qualifications for members of the Council; duration of terms of office for members of the Council; frequency of meetings of the Council; the structure of leadership and Committees of the Council; and levels of professional staffing for the Council. The Academy must also assess the impacts of broadening the Council's role to advising Congress, and any other issues that that the Academy determines could potentially impact the effectiveness of the Council. The assessment must be transmitted to Congress. It amends current law to state that in the performance of its functions, the Administrator is authorized to appoint such advisory committees as may be appropriate for purposes of consultation and advice to the Administration and Congress. The inclusion of "Congress" will sunset on September 30, 2016.

Section 708. Cost Estimation.
This section states that it is the sense of Congress that realistic cost estimating is important to the success of major development projects, and that it is important that NASA continue its efforts to develop and implement guidance in establishing realistic cost estimates. It requires the Administrator to provide guidance on when an Independent Cost Estimate and Independent Cost Assessment should be used and the criteria to be used to make such a determination to program and projects. Section 708 requires a report to Congress on the implementation of more effective cost estimation practices.

Section 709. Avoiding Organizational Conflicts of Interest in Major NASA Acquisition Programs.
This section requires the Administrator to revise the NASA 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 specified concerns.

Section 710. Facilities and Infrastructure.
Section 710 states that it is the sense of Congress that NASA must reverse the deteriorating condition of its facilities and infrastructure; NASA has a role in providing laboratory capabilities that are not available elsewhere to industry participants that are economically viable as commercial entities; NASA should seek to establish strategic partnerships with other Federal agencies, academic institutions, and industry, as appropriate; and decisions on whether to dispose of, maintain, or modernize existing facilities must be made in the context of meeting future NASA and other Federal agencies' laboratory needs, including those required to meet the activities supporting the Roadmap required by Sec 202. It further states that it is the policy of the United States that NASA 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 NASA needs. This section requires the Administrator to develop a plan that has the goal of positioning NASA to have the facilities, laboratories, tools, and approaches necessary to address future NASA requirements. It requires the Administrator to establish and make publically available a policy that guides the agency'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.

Section 711. Detection and Avoidance of Counterfeit Electronic Parts.
Section 711 requires NASA to revise the NASA Supplement for the Federal Acquisition Regulation to address the detection and avoidance of counterfeit electronic parts. The revised regulations must provide that contractors who supply electronic parts or products including electronic parts are responsible for detecting and avoiding the use or inclusion of counterfeit electronic parts or suspect counterfeit parts in such products, and for any corrective actions that may be required to remedy the use of such parts. The costs of counterfeit electronic parts and the cost of corrective action are not allowable costs under Agency contracts except under specified exemptions. It sets requirements for acquisition of electronic parts by NASA contractors and subcontractors to ensure authenticity. It requires that any contractor or subcontractor who becomes aware of a possible counterfeit part must notify NASA within 30 calendar days. This section requires the Administrator to submit a report to Congress updating NASA's actions to prevent counterfeit electronic parts from entering the supply chain.

Section 712. Space Act Agreements.
Section 712 sets the following conditions for Space Act Agreements: funds provided by the government under a funded Space Act Agreement should not exceed the total amount provided by other parties to the agreement or other transaction; a Space Act Agreement may be used only when the use of a standard contract, grant, or cooperative agreement is not feasible or appropriate; Space Act Agreements must be available for public notice and comment prior to agreement; the Administrator shall publically disclose on NASA's website and make available in a searchable format all Space Act Agreements with appropriate redactions for proprietary information in a timely manner; and the Administrator must submit to Congress an annual report on the use of Space Act Agreement authority by NASA during the previous fiscal year. The report must include a list of anticipated agreements for the upcoming fiscal year. The report must also include a discussion of the benefits NASA has accumulated by using Space Act Agreements.

Section 713. Human Spaceflight Accident Investigations.
This section amends current law such that any accident of a suborbital or orbital space vehicle carrying a human that is being operated at the behest of the Federal government shall be included in the presidential accident investigation statute.

Section 714. Fullest Commercial Use of Space.
Section 714 requires the Administrator to transmit a report to Congress on current and continuing efforts by NASA to "seek and encourage, to the maximum extent possible, the fullest commercial use of space." This section also requires a report to Congress on current and continuing efforts by NASA to reduce impediments, bureaucracy, redundancy, and burdens to ensure the fullest commercial use of space.

Section 715. Orbital Debris.
Section 715 includes findings regarding the dangers of orbital debris. This section requires the Administrator to report to Congress 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. It requires the Director of the Office of Science and Technology Policy to report to Congress on the status of the orbital debris mitigation strategy required by law.

Section 716. Review of Orbital Debris Removal Concepts.
This section states 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. It requires the Administrator to 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. The review must be transmitted to Congress.

Section 717. Use of Operational Commercial Suborbital Vehicles for Research, Development, and Education.
Section 717 requires the Administrator to develop a policy on the use of operational commercial reusable suborbital flight vehicles for carrying out scientific and engineering investigations and educational activities. This section requires the Administrator to prepare a plan on NASA's use of operational commercial reusable suborbital flight vehicles for carrying out scientific and engineering investigations and educational activities. The Administrator must also assess and characterize the potential capabilities and performance of commercial reusable suborbital vehicles for addressing scientific research. The plan and assessment must be transmitted to Congress. The Administrator must report to Congress annually describing progress in carrying out the Commercial Reusable Suborbital Research Program, including the number and type of suborbital missions planned in each fiscal year. This section prohibits the Administrator from proceeding with requests for proposals or contracts until the liability issues in the plan have been addressed.

Section 718. Fundamental Space Life and Physical Sciences Research.
Section 718 states it is 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. It directs the Administrator to include a budget line for such research in the annual budget request. This section directs the Administrator to develop and transmit to Congress a strategic plan for competitive, peer reviewed fundamental space life science and physical sciences and related technology research.

Section 719. Restoring Commitment to Engineering Research.
This section states it is the sense of Congress that engineering excellence has long been a hallmark of NASA's ability to make significant advances in aeronautics and space exploration. The sense of Congress expresses concern that constrained funding and competing priorities have led to an erosion of NASA's commitment to basic engineering research, and that this trend could have negative effects on the engineering workforce. This section directs the Administrator to develop a plan for restoring a meaningful basic engineering research program to NASA's Centers. The plan must be transmitted to Congress.

Section 720. Liquid Rocket Engine Development Program.
Section 720 directs the Administrator to consult with the Secretary of Defense to ensure that any next generation liquid rocket engine made in the U.S. for national security space launch objectives can contribute, to the extent practicable, to the space programs and missions carried out by NASA.

Section 721. Remote Satellite Servicing Demonstrations.
This section states it is the sense of Congress that NASA plays a key role in demonstrating the feasibility of using robotic technologies for a spacecraft that could autonomously service satellites, that demonstrating this feasibility would both assist the NASA in its future missions and provide other agencies and the private sector with enhanced confidence in the feasibility to robotically service satellites, and the capability to service satellites robotically could add years of functional life to satellites. It requires the Administrator to report to Congress regarding specified aspects of robotic satellite servicing technology and technology development.

Section 722. Information Technology Governance.
Section 722 includes a sense of Congress stating that information security is central to NASA's ability to protect information and information systems vital to its mission. This section requires an assessment of NASA's Information Technology Governance by the Comptroller General. The results of the assessment must be transmitted to Congress.

Section 723. Strengthening Administration Security.
Section 723 includes findings regarding the need to strengthen NASA's security, particularly with regard to Foreign National Access Management. This section requires a report to Congress on how NASA plans to address each of the recommendations made in the National Academy of Public Administration's (NAPA) review of NASA security and recommendations made by the Government Accountability Office and the Office of Inspector General. This section requires the Comptroller General to report to Congress on its assessment of how NASA has complied with the recommendations.

Section 724. Prohibition on Use of Funds for Contractors that Have Committed Fraud or Other Crimes.
This section prohibits any funds authorized or appropriated for NASA from being used to enter into a contract with an offeror or any of its principals if the offeror or any of its principals has been convicted within a three-year period preceding the offer of: fraud related to Federal contracts; violation Federal or State antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating Federal tax laws, or receiving stolen property. It also forbids contracts with offerors if the offeror or principal is presently indicted for any of those crimes, or has been notified of delinquent Federal taxes in an amount that exceeds $3,000 for which the liability remains unsatisfied.

Section 725. Protection of Apollo Landing Sites.
Section 725 instructs the Director of Office of Science and Technology Policy to 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. This section requires the Director to transmit the results of the assessment to Congress.

Section 726. Astronaut Occupational Healthcare.
This section directs the Administrator to prepare a response to the National Academies report recommendations on health standards for long duration and exploration spaceflight and transmit the response to Congress.

Section 727. Sense of Congress on Access to Observational Data Sets.
This section states it is the sense of Congress that the Administration should prioritize the development of tools and interfaces that make publicly available observational data sets easier for the American public to use, with a focus on STEM education.