H. R. ______

To authorize the programs of the National Aeronautics and Space Administration for fiscal years 2018 and 2019, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

Mr. Babin introduced the following bill; which was referred to the Committee on

A BILL

To authorize the programs of the National Aeronautics and Space Administration for fiscal years 2018 and 2019, and for other purposes.

1 Be it enacted by the Senate and House of Representa-
2 tives of the United States of America in Congress assembled,
3
4 SECTION 1. SHORT TITLE; TABLE OF CONTENTS.
5 (a) Short Title.—This Act may be cited as the
6 “National Aeronautics and Space Administration Author-
7 ization Act of 2018”.
8 (b) Table of Contents.—The table of contents for
9 this Act is the following:
Sec. 1. Short title; table of contents.
Sec. 2. Definitions.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

Sec. 102. Fiscal year 2019.

TITLE II—HUMAN EXPLORATION

Sec. 201. Space facilities beyond low-Earth orbit.
Sec. 202. ISS transition.
Sec. 203. Human spaceflight research.
Sec. 204. Critical path redundancy for human spaceflight.
Sec. 205. Space suits.

TITLE III—SCIENCE

Subtitle A—Earth Science
Sec. 301. Reimbursable basis for development of sensors and instruments.
Sec. 302. Earth observations study.
Sec. 303. Land imaging.
Sec. 304. Landsat data policy.
Sec. 305. Earth science missions.

Subtitle B—Astronomy and Astrophysics
Sec. 311. Search for the origin, evolution, distribution, and future of life in the universe.
Sec. 312. Wide-Field Infrared Space Telescope.

Subtitle C—Planetary Science
Sec. 322. Space nuclear power.

TITLE IV—AERONAUTICS

Sec. 401. Supersonic research.
Sec. 402. Unmanned aircraft systems research.
Sec. 403. 21st Century Aeronautics Research Capabilities Initiative.
Sec. 404. Experimental plane program.
Sec. 405. Hypersonic Technology project.

TITLE V—COMMERCIAL

Sec. 501. Commercial supply of space products.
Sec. 502. Commercial provision of services.
Sec. 503. Commercial in-space infrastructure.
Sec. 504. Preference for launch vehicles manufactured in the United States.
Sec. 505. Studies on industrial base.
Sec. 506. Spectrum coordination.
Sec. 507. Enhanced-use leasing.
Sec. 508. Satellite servicing technologies.

TITLE VI—POLICY
Sec. 601. NASA-funded institutes.
Sec. 602. Baseline and cost controls.
Sec. 603. Reports to Congress.
Sec. 604. International technical and operational standards.
Sec. 605. NASA contractor responsibility watch list.
Sec. 606. Human space exploration risk.

SEC. 2. DEFINITIONS.

In this Act:

(1) ADMINISTRATOR.—The term “Administrator” means the Administrator of NASA.

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

(3) ISS.—The term “ISS” means the International Space Station.

(4) NASA.—The term “NASA” means the National Aeronautics and Space Administration.

(5) NEAR-EARTH ASTEROID.—The term “near-Earth asteroid” means an asteroid with a perihelion distance of less than 1.3 Astronomical Units from the Sun.

(6) NEAR-EARTH OBJECT.—The term “near-Earth object” means an asteroid or comet with a perihelion distance of less than 1.3 Astronomical Units from the Sun.

(7) NONPROFIT ORGANIZATION.—The term “nonprofit organization” means an organization de-
terminated by the Secretary of the Treasury to be an organization described in section 501(e)(3) of the Internal Revenue Code of 1986 (26 U.S.C. 501(e)(3)) which is exempt from taxation under section 501(a) of such Code.

(8) ORION.—The term “Orion” means the multipurpose crew vehicle described under section 303 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18323).

(9) SPACE LAUNCH SYSTEM.—The term “Space Launch System” has the meaning given the term in section 3 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18302).

TITLE I—AUTHORIZATION OF APPROPRIATIONS

SEC. 101. FISCAL YEAR 2018.

There are authorized to be appropriated to NASA for fiscal year 2018, $20,736,140,000, as follows:

(1) For Science, $6,221,500,000, of which—

(A) $1,921,000,000 is for Earth Science;

(B) $2,227,900,000 is for Planetary Science;

(C) $850,400,000 is for Astrophysics;
(D) $533,700,000 is for the James Webb
Space Telescope; and
(E) $688,500,000 is for Heliophysics.

(2) For Aeronautics, $685,000,000.

(3) For Space Technology, $760,000,000.

(4) For Exploration, $4,790,000,000, of
which—

(A) $1,350,000,000 is for Orion and asso-
ciated program and other necessary support;

(B) $2,150,000,000 is for the Space
Launch System and associated program and
other necessary support;

(C) $895,000,000 is for Exploration
Ground Systems; and

(D) $395,000,000 is for Exploration Re-
search and Development.

(5) For Space Operations, $4,751,500,000.

(6) For Education, $100,000,000, of which—

(A) $18,000,000 is for the Experimental
Program to Stimulate Competitive Research;
and

(B) $40,000,000 is for the National Space
Grant College and Fellowship Program.

(7) For Safety, Security, and Mission Services,

$2,826,900,000.
(8) For Construction and Environmental Compliance and Restoration, $562,240,000.

(9) For Inspector General, $39,000,000.

SEC. 102. FISCAL YEAR 2019.

There are authorized to be appropriated to NASA for fiscal year 2019, $20,736,140,000, as follows:

(1) For Deep Space Exploration Systems, $4,929,000,000, of which—

(A) $4,040,000,000 is for Exploration Systems Development, of which—

(i) $2,150,000,000 is for Orion and associated program and other necessary support;

(ii) $1,350,000,000 is for the Space Launch System and associated program and other necessary support; and

(iii) $540,000,000 is for Exploration Ground Systems; and

(B) $889,000,000 is for Advanced Exploration Systems, of which—

(i) $504,300,000 is for the Lunar Orbital Platform–Gateway and associated program and other necessary support;

(ii) $116,500,000 is for Advanced Cislunar and Surface Capabilities; and
(iii) $268,200,000 is for Exploration Advanced Systems.

(2) For Exploration and Research Technology, $1,017,700,000, of which—

(A) $108,500,000 is for Early Stage Innovation and Partnerships;

(B) $216,500,000 if for Technology Maturation, of which $75,000,000 is for nuclear fission and cryogenic fluid management development;

(C) $332,700,000 is for Technology Demonstration.

(D) $140,000,000 is for Human Research Program; and

(E) $205,000,000 is for Small Business Innovation Research and Small Business Technology Transfer.

(3) For Low-Earth Orbit and Spaceflight Operations, $4,624,600,000, of which—

(A) $1,462,200,000 is for the International Space Station;

(B) $2,108,700,000 is for Space Transportation;

(C) $903,700,000 is for Space Flight Support; and
(D) $150,000,000 is for Commercial Low-Earth Orbit Development.

(4) For Science, $6,152,600,000, of which—

(A) $1,450,000,000 is for Earth Science;

(B) $2,636,500,000 is for Planetary Science;

(C) $1,375,400,000 is for Astrophysics; and

(D) $690,700,000 is for Heliophysics.

(5) For Aeronautics, $685,000,000.

(6) For Education, $100,000,000, of which—

(A) $18,000,000 is for the Established Program to Stimulate Competitive Research; and

(B) $40,000,000 is for Space Grant.

(7) For Safety, Security, and Mission Services, $2,749,700,000.

(8) For Construction and Environmental Compliance and Restoration, $438,200,000.

(9) For Inspector General, $39,300,000.

TITLE II—HUMAN EXPLORATION

SEC. 201. SPACE FACILITIES BEYOND LOW-EARTH ORBIT.

(a) SENSE OF CONGRESS.—It is the sense of Congress that space facilities for use beyond low-Earth orbit play a significant role in NASA’s long-term pursuit of its
exploration goals under section 202(a) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18312(a)).

(b) CREWED AND CREW-TENDED SPACE FACILITIES REPORT.—

(1) IN GENERAL.—Not later than 90 days 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 potential development of space facilities for use beyond low-Earth orbit.

(2) CONTENTS.—The report required under paragraph (1) shall include a description of—

(A) how each such space facility can advance, enable, or complement human exploration of the Solar System, including of the atmosphere and the surface of celestial bodies;

(B) the role of the space facility as a staging, logistics, and operations hub in an exploration architecture;

(C) how the space facility could support the research, development, testing, validation,
operation, and launch of space exploration sys-
tems and technologies;

(D) opportunities and strategies for com-
mercial operation or public-private partnerships
that protect taxpayer interests and foster com-
petition; and

(E) the role of such a space facility in
making, developing, and refining the case for
further crewed and uncrewed exploration invest-
ments.

SEC. 202. ISS TRANSITION.

(a) FINDINGS.—Congress finds the following:

(1) The ISS is a valuable national asset that
can continue to produce worthwhile scientific re-
search and valuable technology.

(2) The ISS mission should be to carry out
microgravity research and development, research in
support of deep space human exploration, and low-
Earth orbit commercialization.

(3) The ISS is the best platform currently
available to conduct certain types of research needed
for NASA's deep space human exploration program
with such research currently scheduled to be com-
pleted by the end of fiscal year 2024.
(4) The ISS transition report, submitted pursuant to section 50111(c)(2) of title 51, United States Code, provides an explanation of NASA’s plans to foster the development of private industry capabilities and private demand with a goal of ending direct NASA support for ISS operations by the end of fiscal year 2024.

(5) The plans laid out in the ISS transition report are conditionally flexible and require feedback to inform next steps. In addition, the feasibility of ending direct NASA support for ISS operations by the end of fiscal year 2024 is dependent on many factors, some of which are indeterminate until the Administration carries out the initial phases of the ISS transition plan.

(6) The value of any in-space facility, such as the ISS, depends both on its contributions to further expansion of human presence throughout the solar system, pursuant to section 202 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18312) and to making existing presence self-sustaining.

(7) As the United States moves towards a commitment to a human presence off the surface of the Earth, other Government agencies should seek to
benefit from and capitalize upon the ongoing human presence in space.

(b) IN GENERAL.—The Administration shall support Johnson Space Center as a center of innovation and leadership in developing human operations, including surfaces of celestial bodies, beyond Earth, to the cis-lunar region, the Moon, Mars, and beyond.

(c) ISS OPERATION.—

(1) IN GENERAL.—NASA shall continue operation of the International Space Station for such time as Congress authorizes its operations.

(2) INTERNATIONAL AGREEMENTS.—NASA shall pursue international agreements to provide maximum flexibility for ISS utilization.

(3) LOW-EARTH ORBIT.—NASA shall pursue a step-wise transition of low-Earth orbit human spaceflight operations from a Government-directed activity to a model where private industry is responsible for how to meet and execute NASA’s requirements.

(4) TRANSITION REPORT.—NASA shall carry out activities in fiscal year 2019 as proposed in the ISS transition report, delivered pursuant to section 50111(c) of title 51, United States Code.
(d) REPORTING.—In addition to the biennial reporting requirement under section 50111(e) of title 51, United States Code, the Administrator shall brief the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate quarterly, beginning on the date that is 3 months after the date of enactment of this Act, on the status of, and all progress, changes, and other developments related to carrying out the plans in the ISS transition report.

(e) AUTHORIZED FUNDING.—Subject to the availability of appropriations, shall make available at least $150,000,000 for fiscal year 2019 for commercial low-Earth orbit development out of the LEO and Spaceflight Operations account.

SEC. 203. HUMAN SPACEFLIGHT RESEARCH.

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

(1) the benefits derived from the peaceful use of space depend on the extent to which ground-based space infrastructure, facilities, and research are well-integrated; and

(2) NASA Johnson Space Center (hereinafter referred to as “JSC”) has the expertise and facilities to support the development of the major techno-
logical innovations necessary to enable and support
the nation’s ongoing commitment to human
spaceflight, exploration, and continued human pres-
ence in space.

(b) JOHNSON SPACE CENTER RESEARCH OFFICE.—

(1) ESTABLISHMENT.—The Administrator shall
establish a research office at JSC to build upon the
Center’s existing expertise in human space flight
missions for future challenges.

(2) RESEARCH DIRECTOR.—The head of the re-
search office shall be the research director, who shall
report directly to the Director of JSC.

(3) DUTIES.—The research director shall have,
at a minimum, the following duties:

(A) Oversee a research portfolio focused on
human space flight.

(B) Recommend infrastructure and equip-
ment necessary to carry out a research mission.

(C) Oversee professional development and
continuing education, as necessary and appro-
priate, for the civil workforce as the research
and innovation focus of the center increases.

(4) SCOPE OF RESEARCH.—The research office
shall focus on aspects of research that are directly
relevant to the endeavor of human space flight, in-
cluding problems of human spaceflight and robotics
supporting human space exploration.

(5) SUPPORT FOR HUMAN SPACEFLIGHT ACTIVITIES.—JSC shall, consistent with its primary responsibilities to NASA and other government customers, endeavor to make the fullest possible use of its facilities and infrastructure to support all U.S. human spaceflight activities, including those of the private sector.

(c) REPORT.—Not later than 180 days after the enactment of this Act, NASA and JSC 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 NASA’s progress on, and other developments related to, carrying out the requirements of this section.

(d) AUTHORIZED FUNDING.—Subject to the availability of appropriations, the Administrator shall make available at least $15,000,000 in fiscal year 2019 out of the Exploration Research and Technology account to carry out this section.

SEC. 204. CRITICAL PATH REDUNDANCY FOR HUMAN SPACEFLIGHT.

(a) FINDINGS.—Congress finds that NASA, in cooperation with private sector and international partners,
has facilitated the development of a wide array of cargo
and crew transportation options for operations in low-
Earth orbit and beyond.

(b) SENSE OF CONGRESS.—It is the sense of Con-
gress that the availability of a multitude of launch vehicles
and crew and cargo vehicles provides critical path redun-
dancy.

(c) LOGISTICAL AND TRANSPORT REDUNDANCY.—
Not later than 3 months after the date of the enactment
of this Act, the Administrator shall submit to the Com-
mittee on Commerce, Science, and Transportation of the
Senate and the Committee on Science, Space, and Tech-
tology of the House of Representatives a report that con-
tains an evaluation of the suitability and performance, in-
cluding cost, reliability, and availability, of—

(1) all available crew and cargo vehicles for des-

tinations in low-Earth orbit, cis-lunar space, and be-
yond; and

(2) all available launch vehicles that are capable
of delivering more than 20 tons to, or beyond, low-
Earth orbit to support exploration and scientific
missions, particularly to outer planets.

SEC. 205. SPACE SUITS.

(a) FINDINGS.—Congress finds the following:
(1) Space suits and associated extravehicular activity (in this section, referred to as “EVA”) technologies are critical space exploration technologies.

(2) The NASA civil service workforce at the Johnson Space Center possesses unique capabilities to integrate, design, and validate space suits and associated EVA technologies.

(3) Maintaining a strong core competency in the design, development, manufacture, and operation of space suits and related technologies allows NASA to be an informed purchaser of competitively awarded commercial space suits and associated EVA technologies.

(4) NASA should fully utilize the International Space Station by 2025 to test future space suits and associated EVA technologies to reduce risk and improve safety.

(b) SPACE SUITS.—

(1) IN GENERAL.—NASA shall develop space suits and associated EVA technologies.

(2) MANAGEMENT.—The Johnson Space Center shall manage the space suit and EVA programs of NASA.

(3) PRIVATE SECTOR.—In carrying out this subsection, the Administrator may enter into agree-
ments with the private sector as the Administrator considers appropriate.

**TITLE III—SCIENCE**

**Subtitle A—Earth Science**

**SEC. 301. REIMBURSABLE BASIS FOR DEVELOPMENT OF SENSORS AND INSTRUMENTS.**

Chapter 605 of title 51, United States Code, is amended by adding at the end the following:

“§ 60507. Reimbursable basis for development of sensors and instruments

“Any work undertaken by the Administration for the benefit of another agency shall be conducted on a reimbursable basis that accounts for the full cost of the work, including work undertaken for the development of operational Earth science systems, including satellite, sensor, or instrument development, acquisition, and operations, as well as product development and data analysis.”.

(1) TECHNICAL AMENDMENT.—The table of sections for chapter 605 of title 51, United States Code, is amended by adding at the end the following:

“60507. Reimbursable basis for development of sensors and instruments.”.

**SEC. 302. EARTH OBSERVATIONS STUDY.**

Section 702 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18371) is amended—
(1) by striking “The Director of” and inserting the following:

“(a) IN GENERAL.—The Director of”; and

(2) by adding at the end the following:

“(b) CONSIDERATION.—In carrying out the strategic implementation plan under subsection (a), the Director shall take into account and incorporate into such plan, as appropriate, purchasing Earth observation data and services from the private sector or through public-private partnerships to meet Earth observation requirements.”.

SEC. 303. LAND IMAGING.

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

(1) the continuous collection and utilization of land remote sensing data from space are of major benefit in studying and understanding human impacts on the global environment, in managing the Earth’s natural resources, in carrying out national security functions, and in planning and conducting many other activities of scientific, economic, and social importance; and

(2) to the greatest extent practicable, the United States should foster the development of U.S. private sector remote sensing capabilities and analyses that can satisfy the public interest in long-term
continuous collection of medium-resolution land remote sensing data.

(b) Continuous LAND Remote Sensing DATA Collection.—

(1) In General.—Subchapter IV of chapter 601 of title 51, United States Code, is amended by adding at the end the following new section:

“§ 60135. Continuous land remote sensing data collection

“(a) Policy.—It is the policy of the United States to—

“(1) ensure, to the greatest extent practicable, the continuous collection of space-based, medium-resolution observations of the Earth’s land cover;

“(2) ensure that the collected data are made available in such ways as to facilitate the widest possible use; and

“(3) to the greatest extent practicable, foster the development of U.S. private sector remote sensing capabilities and analyses that can satisfy the public interest in long-term continuous collection of medium-resolution land remote sensing data.

“(b) Coordination.—The National Space Council, in consultation with other relevant Federal agencies, shall
coordinate United States Government activities described under paragraphs (1) through (3) of subsection (a).’’.

(2) CONFORMING AMENDMENT.—The table of sections for subchapter IV of chapter 601 of title 51, United States Code, is amended by adding at the end the following new section:

“60135. Continuous land remote sensing data collection.”.

SEC. 304. LANDSAT DATA POLICY.

(a) IN GENERAL.—

(1) LIMITATION ON USE OF FUNDS.—No funds may be obligated or expended for Landsat 11 or any other subsequent Landsat system until the Administrator has completed a study assessing which aspects of Landsat system observations and associated science requirements can be provided by purchasing data from the private sector or through public-private partnerships.

(2) REPORT.—Not later than 1 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, a report containing the results of the study required under paragraph (1).
(b) DEFINITION OF LANDSAT SYSTEM.—In this section, the term “Landsat system” has the meaning given that term in section 60101 of title 51, United States Code.

SEC. 305. EARTH SCIENCE MISSIONS.

The Administrator shall continue to restructure the Earth science portfolio of NASA to reduce overall costs, support innovative and sustainable programs and missions with commercial and international partners, and align with the recommendations of the National Academy of Sciences included in the publication published in 2018 titled “Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space” to ensure that the Earth science portfolio is focused on the highest priority missions for the science and applications communities within a balanced, comprehensive Earth science program.

SEC. 306. GODDARD INSTITUTE FOR SPACE STUDIES INSPECTOR GENERAL 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 containing the results of NASA’s implementation of the recommendations identified in the report published by the NASA Office of Inspector General on April 5, 2018, titled
Subtitle B—Astronomy and Astrophysics

SEC. 311. SEARCH FOR THE ORIGIN, EVOLUTION, DISTRIBUTION, AND FUTURE OF LIFE IN THE UNIVERSE.

(a) POLICY.—Section 20102(d)(10) of title 51, United States Code, includes the search for life’s origin, evolution, distribution, and future in the universe as an objective of U.S. aeronautical and space activities.

(b) IN GENERAL.—NASA shall partner with the private sector and philanthropic organizations to the maximum extent practicable to search for technosignatures, such as radio transmissions, in order to meet the NASA objective to search for life’s origin, evolution, distribution, and future in the universe.

(c) REPORT.—Not later than 90 days 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, produced in consultation with industry and academia, on all NASA programs, including partnerships with the private sector and philanthropic organizations, that con-
tribute to the search for life’s origin, evolution, distribution, and future in the universe.

(d) AUTHORIZED FUNDING.—Subject to the availability of appropriations, the Administrator shall make available at least $10,000,000 for each of fiscal years 2018 and 2019 for the search for technosignatures.

SEC. 312. WIDE-FIELD INFRARED SPACE TELESCOPE.

(a) FINDINGS.—Congress finds the following:

(1) Concurrent flagship programs challenge significantly NASA’s program management capacity, especially during later stages of the program management process.

(2) The Wide-Field Infrared Space Telescope (hereinafter referred to as “WFIRST”) was cancelled in the President’s fiscal year 2019 budget request.

(3) WFIRST was funded in the amount of $150,000,000 in NASA’s appropriation for fiscal year 2018.

(4) Pursuant to direction in NASA’s appropriation for fiscal year 2018, NASA is conducting a preliminary life-cycle cost estimate, including any additions needed to achieve Class A classification, along with a year-by-year breakout of development costs.
(5) Until such preliminary life-cycle cost estimate is complete, Congress has insufficient information to judge whether or not WFIRST should be authorized to proceed in fiscal year 2019.

(b) TOTAL COST.—The total formulation and development cost, as such term is defined in section 30104 of title 51, United States Code, for the Wide-Field Infrared Space Telescope shall not exceed $3,200,000,000.

(e) BUDGET.—The Administrator shall include in the budget for fiscal year 2020 a 5-year funding profile necessary to achieve the goal in subsection (b).

(d) LIMITATION.—The Administrator shall not procure a launch vehicle for the Wide-Field Infrared Space Telescope until the James Webb Space Telescope is operational in space.

Subtitle C—Planetary Science

SEC. 321. NEAR-EARTH OBJECT SURVEY.

(a) FINDINGS.—Congress finds the following:

(1) The George E. Brown, Jr. Near-Earth Object Survey Act (Public Law 109–155) established the Near-Earth Object Survey program to detect, track, and catalogue the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter in order to assess the threat of such objects to Earth.
(2) The goal of the Survey program is to achieve 90 percent completion of the near-Earth project catalogue (based on statistically predicted populations of near-Earth objects) not later than 15 years after the date of the enactment of the George E. Brown, Jr. Near-Earth Object Survey Act.

(3) NASA has been successful finding more than 90 percent of the near-Earth asteroids larger than one kilometer but has only found about 30 percent of the near-Earth objects larger than 140 meters.

(4) The vast majority of near-Earth object discoveries have been made by NASA-supported ground-based telescopic surveys.

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

(1) in order to meet the statutory requirements of the George E Brown, Jr. Near-Earth Object Survey Act (Public Law 109–155), a space-based telescope mission should be fully funded and supported by NASA and carried out by the Planetary Defense Coordination Office; and

(2) the space-based telescope Near-Earth Object Camera mission, or a similar infrared telescope concept optimized for near-Earth object search and
characterization, could discover and characterize most of the potentially hazardous asteroids that are near the Earth.

SEC. 322. SPACE NUCLEAR POWER.

(a) FINDING.—Congress finds that in-space nuclear fission power complements the use of Plutonium-238 radioisotope thermoelectric generators (in this section referred to as “RTG”) for spacecraft power needs.

(b) POLICY.—It is the policy of the United States—

(1) to continue the development of in-space nuclear fission technology, as necessary, for purposes including—

(A) in-space power generation for advanced in-space propulsion;

(B) onboard power generation to replace or supplement RTG systems;

(C) power generation on the surface of celestial bodies;

(D) extraction and processing of in situ resources; and

(E) nuclear thermal and nuclear electric propulsion able to transport crew or cargo among Earth and other celestial bodies much more rapidly than is practical with non-nuclear systems;
(2) that research and development of in-space nuclear fission power should be carried out as part of a portfolio that appropriately balances development of power systems at different sizes and maturities, with an emphasis on early development of mature, operational systems; and

(3) that NASA should continually seek to streamline the process for space launch approval of nuclear materials, eliminate redundant and unneeded processes, and regularize the process for efficient, regular functioning, and toward that end, the Administrator should update the launch approval process and seek to establish a licensing process for private nuclear power sources in space.

(c) SPACE NUCLEAR POWER REPORT.—

(1) IN GENERAL.—Not later than 180 days 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, produced in consultation with industry and academia, on the use and role of nuclear fission power in space.

(2) CONTENTS.—The report required under paragraph (1) shall include—
(A) an assessment of the prospects for in-space nuclear fission reactors, describing particular roles and missions for which nuclear power is uniquely well-suited;

(B) a description of the convergence between NASA’s existing Plutonium-238 RTG programs and ongoing nuclear thermal propulsion and nuclear power generation development programs;

(C) a detailed plan for encouraging convergence between NASA’s various nuclear power and propulsion efforts;

(D) an identification of key infrastructure and facilities needed for the development of in-space nuclear fission power reactors;

(E) an identification of particular legal issues, including regulatory challenges, that must be addressed for the use of nuclear fission power systems;

(F) how small in-space nuclear fission reactors can complement or replace existing and planned radioisotope thermal generator capabilities; and
(G) information on very low cost, high reliability designs that can be made operational quickly.

(d) DEMONSTRATION.—NASA should demonstrate a nuclear electric power reactor for use in space using existing authorized funding levels and within a schedule made possible by appropriated funding.

TITLE IV—AERONAUTICS

SEC. 401. SUPersonic RESEARCH.

(a) POLICY.—It is the policy of the United States to reduce Government barriers to the development of civil supersonic transportation.

(b) RESEARCH.—Section 40112(a) of title 51, United States Code, is amended—

(1) by striking “The Administrator” and inserting the following:

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

(2) by adding at the end the following:

“(2) RESEARCH.—The Administrator, in consultation with the Administrator of the Federal Aviation Administration, shall undertake research on supersonic transport to inform and accelerate the promulgation of domestic regulations and international standards and recommended practices that
will open up the U.S. civil airspace to civil supersonic transport.”

SEC. 402. UNMANNED AIRCRAFT SYSTEMS RESEARCH.

(a) IN GENERAL.—

(1) Title 51.—Chapter 315 of title 51, United States Code, is amended by adding at the end the following:

“§ 31506. Unmanned aircraft systems research

“The Administrator, in consultation with the Administrator of the Federal Aviation Administration and other Federal agencies, shall conduct research on facilitating the safe integration of unmanned aircraft 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.”.

(2) CONFORMING AMENDMENT.—The table of sections for chapter 315 of title 51, United States Code, is amended by adding at the end the following new item:

“31506. Unmanned aircraft systems research.”.

(b) COOPERATIVE UNMANNED AERIAL VEHICLE ACTIVITIES.—Section 31504 of title 51, United States Code, is amended by adding at the end the following: “Oper-
ational flight data derived from such cooperative agree-
ments shall be made available, in appropriate and usable
formats, to the Administration and the Federal Aviation
Administration for the development of regulatory stand-
ards.”.

SEC. 403. 21ST CENTURY AERONAUTICS RESEARCH CAPA-
BILITIES INITIATIVE.

(a) ESTABLISHMENT.—The Administrator shall es-

tablish an initiative to be known as the 21st Century Aero-

nautics Research Capabilities Initiative, funded through
the Construction of Facilities account, to ensure that
NASA possesses the infrastructure capabilities and com-
putational tools necessary to conduct flight demonstration
projects across the range of NASA aeronautics interests.

(b) ACTIVITIES.—In carrying out the 21st Century
Aeronautics Research Capabilities Initiative, the Adminis-
trator shall—

(1) upgrade and create facilities for civil and
national security aeronautics research; and

(2) support flight testing activities.

(c) OPERATING MODEL.—In carrying out the 21st
Century Aeronautics Research Capabilities Initiative, the
Administrator shall, to the greatest extent practicable,
build on NASA’s work on developing its Operating Model
and the results of the Technical Capabilities Assessment Team.

(d) REPORT.—

(1) REPORT REQUIRED.—Not later than 120 days 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 containing a 5-year plan for the implementation of the 21st Century Aeronautics Research Capabilities Initiative.

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

(A) a description of proposed projects;

(B) a description of how the projects align with the Aeronautics Strategic Implementation Plan; and

(C) a timetable for carrying out activities and initiatives authorized under this section.

(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated $50,000,000, funded through the Construction of Facilities account, for fiscal year 2019 to carry out this section.
SEC. 404. EXPERIMENTAL PLANE PROGRAM.

(a) POLICY.—It is the policy of the United States to maintain the role of the United States as a world leader in aeronautical science and technology.

(b) OBJECTIVE.—A fundamental objective of NASA aeronautics research is the steady progression and expansion of high-speed flight research and capabilities, including the science and technology of critical underlying disciplines and competencies, the most important of which are computational-based analytical and predictive tools and methodologies, aero thermodynamics, high-speed flight propulsion, high-temperature structures and materials, and flight controls.

SEC. 405. HYPERSONIC TECHNOLOGY PROJECT.

(a) FINDINGS.—Congress finds that—

(1) the development of new hypersonic flight technologies is important to the United States;

(2) though hypersonic flight technologies are likely to be applied to enhance defense systems in the near-term, in the long-term, application of such technologies may expand to include improved access-to-space capabilities that benefit NASA; and

(3) NASA maintains specialized facilities and experts who will focus on research areas that explore challenges in hypersonic flight.
(b) POLICY.—In carrying out the Hypersonic Technology project, NASA should focus research and development efforts on high-speed propulsion systems, reusable vehicle technologies, high-temperature materials, and systems analysis.

(e) AUTHORIZED FUNDING.—Subject to the availability of appropriations, the Administrator shall make available at least $30,000,000 for fiscal year 2019 for the Hypersonic Technology project.

TITLE V—COMMERCIAL

SEC. 501. COMMERCIAL SUPPLY OF SPACE PRODUCTS.

(a) IN GENERAL.—Subchapter II of chapter 501 of title 51, United States Code, is amended by adding at the end the following:

“§ 50117. Commercial supply of space products

“(a) IN GENERAL.—In planning and carrying out space exploration missions, the Administrator shall, to the greatest extent practicable, prioritize the acquisition and use of space products provided by a United States commercial provider or through a public-private partnership with a United States commercial provider.

“(b) SPACE PRODUCT DEFINED.—In this section, the term ‘space product’ means a tangible good, including a finished good, or commodity, including a propellant, water, oxygen, or gas, that—
“(1) is required for space exploration activities;

and

“(2) originates in outer space.

“(c) COMMODITIES USED IN SPACE.—

“(1) LIST OF COMMODITIES.—In planning a
space exploration mission, the Administrator shall
create a list of commodities to be used during such
mission. The list shall include specification of each
commodity, anticipated quantity, and the location
and the timeframe of need.

“(2) COMMODITY COST BASIS.—For each com-
modity listed pursuant paragraph (1), NASA shall
establish a commodity cost basis that shall represent
the lesser of—

“(A) the estimated cost to procure the
commodity on Earth and deliver the commodity
to the location of use; and

“(B) the estimated cost for the Govern-
ment to procure the equivalent commodity that
is a space product.

“(3) PUBLICATION.—The Administrator shall
annually publish the information compiled under
paragraphs (1) and (2) during the previous calendar
year.
“(d) EXCEPTIONS.—The Administrator shall not be required to prioritize the acquisition of space products for the purposes described in subsection (a) if, on a case-by-case basis—

“(1) the Administrator determines that—

“(A) cost-effective space products that meet specific mission requirements would not be reasonably available from United States commercial providers when required;

“(B) the use of space products from United States commercial providers poses an unacceptable mission risk; or

“(C) the use of space products is inconsistent with international agreements for international collaborative efforts relating to science and technology; or

“(2) the Secretary of the Air Force determines that the use of space commodities from United States commercial providers is inconsistent with national security objectives.

“(e) AGREEMENTS WITH FOREIGN ENTITIES.—Nothing in this section shall prevent the Administrator from planning or negotiating agreements with foreign governmental entities for the provision of space products.”.
(b) **CONFORMING AMENDMENT.**—Subchapter II of chapter 501 of title 51, United States Code, is amended by adding at the end the following:

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“50117. Commercial supply of space products.”.
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## SEC. 502. COMMERCIAL PROVISION OF SERVICES.

(a) **IN GENERAL.**—Subchapter II of chapter 501 of title 51, United States Code, is further amended by adding at the end the following:

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“§ 50118. Commercial provision of services

“(a) **IN GENERAL.**—In planning and carrying out space exploration missions, the Administrator shall, to the greatest extent practicable, acquire services to be carried out in outer space by a United States commercial provider or through a public-private partnership with a United States commercial provider to support such missions.

“(b) **EXCEPTIONS.**—The Administrator shall not be required to acquire services under subsection (a) from a United States commercial provider or through a public-private partnership with a United States commercial provider if, on a case-by-case basis—

“(1) the Administrator determines that—

“(A) cost-effective services that meet specific mission requirements would not be reasonably available from United States commercial providers when required;
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“(B) the use of such services from United States commercial providers poses an unacceptable mission risk; or

“(C) the use of such services is inconsistent with international agreements for international collaborative efforts relating to science and technology; or

“(2) the Secretary of the Air Force determines that the use of services from United States commercial providers is inconsistent with national security objectives.

“(c) AGREEMENTS WITH FOREIGN ENTITIES.—Nothing in this section shall prevent the Administrator from planning or negotiating agreements with foreign governmental entities for the provision of support services to be carried out in outer space.”.

(b) CONFORMING AMENDMENT.—Subchapter II of chapter 501 of title 51, United States Code, is further amended by adding at the end the following:

“50118. Commercial provision of services.”.

SEC. 503. COMMERCIAL IN-SPACE INFRASTRUCTURE.

(a) IN GENERAL.—Subchapter II of chapter 501 of title 51, United States Code, is further amended by adding at the end the following:
§ 50119. Commercial in-space infrastructure

(a) In general.—In planning and carrying out space exploration missions, the Administrator shall, to the greatest extent practicable, make use of commercial in-space infrastructure to support such missions.

(b) Commercial in-space infrastructure.—In this section, the term ‘commercial in-space infrastructure’ means infrastructure that is—

(1) owned, managed, or built by a United States commercial provider or through a public-private partnership with a United States commercial provider; and

(2) located more than 320,000 kilometers from the Earth’s surface.

(c) Exceptions.—The Administrator shall not be required to use commercial in-space infrastructure if, on a case-by-case basis—

(1) the Administrator determines that—

(A) cost-effective infrastructure that meets specific mission requirements would not be reasonably available from United States commercial providers when required;

(B) the use of commercial in-space infrastructure poses an unacceptable mission risk; or

(C) the use of commercial in-space infrastructure is inconsistent with international
agreements for international collaborative efforts relating to science and technology; or

“(2) the Secretary of the Air Force determines that the use of commercial in-space infrastructure is inconsistent with national security objectives.

“(d) AGREEMENTS WITH FOREIGN ENTITIES.—Nothing in this section shall prevent the Administrator from planning or negotiating agreements with foreign governmental entities for the use infrastructure in support of United States civil government activities in outer space.”.

(b) CONFORMING AMENDMENT.—Subchapter II of chapter 501 of title 51, United States Code, is further amended by adding at the end the following:

“50119. Commercial in-space infrastructure.”.

SEC. 504. PREFERENCE FOR LAUNCH VEHICLES MANUFACTURED IN THE UNITED STATES.

It is the sense of Congress that the Administrator should, to the greatest extent possible, with respect to entering into contracts for commercial space data and services, provide weighed preference, selection points, and other incentives for the use of launch vehicles that are manufactured in the United States.

SEC. 505. STUDIES ON INDUSTRIAL BASE.

No funds may be obligated or expended by the Administrator for purposes of carrying out a Bureau of In-
dustry and Security survey of the United States aerospace industrial base until the date that is 30 days after the date on which the Administrator submits 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 written notification that includes—

(1) the proposed subject matter of such survey;
(2) a description of the information to be required of survey respondents; and
(3) any penalties proposed to be assessed by the Federal Government against respondents for non-compliance with survey requirements.

SEC. 506. SPECTRUM COORDINATION.

(a) IN GENERAL.—The Administrator shall develop and implement a plan to more effectively and efficiently, taking into account NASA’s spectrum requirements, share electromagnetic spectrum assigned to NASA with United States nongovernmental entities operating or proposing to operate space objects.

(b) REPORT.—Not later than 180 days 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 Com-
merce, Science, and Transportation of the Senate a report
on the plan developed under subsection (a).

SEC. 507. ENHANCED-USE LEASING.

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

(1) NASA possesses a variety of unique and
world-class facilities;

(2) NASA is developing and using many dif-
ferent methods to offset the cost of maintaining and
operating such facilities;

(3) nongovernmental entities may be able to use
such facilities in a manner that is cost-effective; and

(4) agreements between NASA and nongovern-
mental entities regarding the use of such facilities
may offset a portion of the spending of NASA.

(b) EXTENSION OF AUTHORITY TO LEASE NON-EX-
CESS PROPERTY.—Section 20145(g) of title 51, United
States Code, is amended by striking “December 31, 2018”
and inserting “December 31, 2020”.

(c) CONDITION ON USE OF FUNDS.—For any year
for which funds are made available under section 20145
of title 51, United States Code, (as amended by subsection
(b)), no funds may be expended by the Administrator
under such section after January 31 unless Administrator
submits, before such date, 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 annual report required under such section for the prior year.

SEC. 508. SATELLITE SERVICING TECHNOLOGIES.

The Administrator shall continue to restructure NASA investments in the development of satellite servicing technologies to reduce the overall cost to NASA and align with NASA needs for exploration.

TITLE VI—POLICY

SEC. 601. NASA-FUNDED INSTITUTES.

(a) FINDINGS.—Congress finds that on June 9, 2016, the Office of Inspector General of NASA reported that—

(1) NASA does not aggregate information on the universe, status, or funding levels for the many institutes it supports;

(2) the absence of this information makes it difficult for NASA leaders to strategically evaluate the scope or purpose of its institute investments and for Congress and other stakeholders to understand how NASA is spending more than three-quarters of a billion dollars of its budget annually;
(3) absent comprehensive, centralized information about these investments, it may be difficult for NASA to avoid duplication among its efforts;

(4) NASA has not defined what constitutes an institute or established guidance and metrics on the management, use, or expectations for return on investment;

(5) such guidance may enable NASA to gain a better understanding of how funds directed to NASA-funded institutes are utilized to accomplish the mission and goals of NASA, increase its return on investment, and evaluate the performance of such institutes; and

(6) NASA lacks a standard process to assess a potential grantee’s financial condition prior to grant award or to impose additional reporting or oversight requirements that such a condition may warrant, and without such a mechanism, NASA risks making uninformed investment decisions.

(b) INSTITUTE BUDGETS.—Section 30103(a) of title 51, United States Code, is amended—

(1) in paragraph (5), by striking “and” at the end;

(2) by redesignating paragraph (6) as paragraph (7); and
(3) by inserting after paragraph (5) the follow-
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(6) the budget for each NASA-funded insti-
tute; and”.
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(c) REPORT.—Not later than 90 days 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 Com-
merce, Science, and Transportation of the Senate a report
that recommends guidance and metrics for the manage-
ment, utilization, expectations for return on investment,
and financial condition of NASA-funded institutes.

SEC. 602. BASELINE AND COST CONTROLS.

Section 30104(e)(1)(A) of title 51, United States
Code, is amended—

(1) in clause (ii) by striking “and” at the end;
(2) in clause (iii) by striking “and” at the end;

and

(3) by adding at the end the following:
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(iv) any changes made in the per-
formance or schedule milestones and the
degree to which such changes have contrib-
uted to the increase in total cost;
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(v) new estimates of the specific
project or specific program cost; and
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“(vi) a statement validating that the management structure of the project or program is adequate to control cost; and’’.

SEC. 603. REPORTS TO CONGRESS.

(a) IN GENERAL.—Chapter 301 of title 51, United States Code, is amended by adding at the end the following:

“§ 30105. Concurrent reports

“For any report that the Administration submits to the Committee on Appropriations of the House of Representatives or the Committee on Appropriations of the Senate, the Administrator shall concurrently submit such report to the Committee on Science, Space, and Technology of the House of Representatives and the Commerce, Science, and Transportation Committee of the Senate.’’.

(b) CONFORMING AMENDMENT.—The table of sections for chapter 301 of title 51, United States Code, is amended by adding at the end the following:

“30105. Concurrent reports.”.

SEC. 604. INTERNATIONAL TECHNICAL AND OPERATIONAL STANDARDS.

(a) FINDINGS.—Congress finds that—

(1) section 71301 of title 51, United States Code, directs the Administrator to “enter into discussions with the appropriate representatives of
spacefaring nations who have or plan to have crew transportation systems capable of orbital flight or flight beyond low Earth orbit for the purpose of agreeing on a common docking system standard’’;

(2) the development of an international docking standard has been beneficial in promoting Government and private sector space exploration, interoperability, and United States international leadership;

(3) NASA continues the development described in paragraph (2) by coordinating the development of joint international deep space interoperability standards; and

(4) the long-term goals of NASA, as described in section 202(a) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18312(a)), include expanding permanent human presence beyond low-Earth orbit.

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

(1) the plans of NASA for crewed exploration beyond low-Earth orbit should involve a wide array of partners to address the technological challenges of deep space exploration;

(2) the development of common terminology and concepts for spacecraft design and safety will
help promote NASA leadership in space and spacecraft design;

(3) the adoption of common design and safety terminology and concepts across NASA would enable NASA to pursue the long-term goals of NASA, described in section 202(a) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18312(a)), in a manner that is effective and efficient; and

(4) NASA should continue to develop and promote common terminology and concepts for spacecraft design and safety.

SEC. 605. NASA CONTRACTOR RESPONSIBILITY WATCH LIST.

(a) IN GENERAL.—The Administrator shall establish and maintain a watch list of contractors with a history of poor performance on space procurement contracts or research, development, test, and evaluation space program contracts.

(b) BASIS FOR INCLUSION ON LIST.—

(1) DETERMINATION.—The Administrator may place a contractor, including parties contracting under other transaction authorities, on the watch list established under subsection (a) upon determining that the ability of the contractor to perform a con-
tract specified in such subsection is uncertain because of any of the following:

(A) Poor performance or award fee scores below 50 percent.

(B) Financial concerns.

(C) Felony convictions or civil judgements.

(D) Security or foreign ownership and control issues.

(2) DISCRETION OF THE ADMINISTRATOR.—The Administrator shall be responsible for determining which contractors to place on the watch list, whether an entire company or a specific division should be included, and when to remove a contractor from the list.

(c) EFFECT OF LISTING.—

(1) PRIME CONTRACTS.—NASA may not solicit an offer from, award a contract to, execute an engineering change proposal with, or exercise an option on any program of NASA with a contractor included on the list established under subsection (a) without the prior direct approval of the Administrator.

(2) SUBCONTRACTS.—A prime contractor on a contract entered into with NASA may not enter into a subcontract valued in excess of $3,000,000 or five percent of the prime contract value, whichever is
lesser, with a contractor included on the watch list established under subsection (a) without the prior approval of the Administrator.

(d) Request for Removal from List.—A contractor may submit to the Administrator a written request for removal from the watch list, including evidence that the contractor has resolved the issue that was the basis for inclusion on the list.

(e) Rule of Construction.—Nothing in this section shall be construed as preventing the suspension or debarment of a contractor, but inclusion on the watch list shall not be construed as a punitive measure or de facto suspension or debarment of a contractor.

SEC. 606. HUMAN SPACE EXPLORATION RISK.

(a) Findings.—Congress finds the following:

(1) American leadership in the peaceful exploration and use of outer space has been a long-standing priority for the United States.

(2) The reestablishment of the National Space Council by President Trump demonstrates the strategic importance of outer space to the Nation.

(3) The December 2017 National Security Strategy of the United States establishes the broad strategic importance of outer space exploration and use for the United States.
(b) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) exploration and use of outer space is a matter of broad, national strategic importance; and

(2) space exploration decision-making and requirement-setting in such a strategic context is complex, especially with respect to setting appropriate priorities and levels of risk tolerance.

(e) REPORT ON INHERENT JUSTIFIABLE RISK.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the National Space Council, or its designee, shall submit to Congress and make available to the public a report relating the broad strategic national importance of space to the inherent, justifiable risk of the exploration and use of space.

(2) POLICY AND STRATEGY.—The Administrator shall engage with appropriate members of the private sector, academia, and nonprofit organizations on a policy and strategy of enterprise-level engineering and operational risk management to present in the report that addresses inherent, justifiable risks of loss of life that may occur in space exploration and use.
(3) CONTENTS.—The report required under paragraph (1) shall—

(A) clarify the broad strategic case and value of space;

(B) address inherent, justifiable risks of loss of life that may occur in space exploration and use; and

(C) discuss enterprise- and architecture-level approaches for exploration risk management.