# AMENDMENT IN THE NATURE OF A SUBSTITUTE TO H.R. _____

## OFFERED BY MR. LUCAS OF OKLAHOMA

Strike all after the enacting clause and insert the following:

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

(a) SHORT TITLE.—This Act may be cited as the ''NASA Reauthorization Act of 2024''.

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

TITLE V—AERONAUTICS



TITLE VI—SCIENCE



TITLE VII—STEM EDUCATION



TITLE VIII—POLICY/NASA

**SEC. 2. DEFINITIONS.**

In this Act:

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

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

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

(B) the Committee on Science, Space, and Technology of the House of Representatives.

(3) CISLUNAR SPACE.—The term ''cislunar space'' means the region of space beyond low-Earth orbit out to and including the region around the surface of the Moon.

(4) COMMERCIAL PROVIDER.—The term ''commercial provider'' means any person providing space services or space-related capabilities, primary control of which is held by persons other than the Federal Government, a State or local government, or a foreign government.

(5) DEEP SPACE.—The term ''deep space'' means the region of space beyond low-Earth orbit, which includes cislunar space.

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

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

(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'' means the Space Launch System authorized under section 302 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322).

# TITLE I—AUTHORIZATION OF APPROPRIATIONS

**SEC. 101. FISCAL YEAR 2025.**

For fiscal year 2025, there are authorized to be appropriated to NASA $25,224,640,000 as follows:

(1) For the Exploration Systems Development Mission Directorate, $7,618,200,000.

(2) For the Space Operations Mission Directorate, $4,473,500,000.

(3) For the Space Technology Mission Directorate, $1,181,800,000.

(4) For the Science Mission Directorate, $7,334,200,000.

(5) For the Aeronautics Research Mission Directorate, $965,800,000.

(6) For the Office of STEM Engagement, $135,000,000.

(7) For Safety, Security, and Mission Services, $3,044,440,000.

(8) For Construction and Environmental Compliance and Restoration, $424,100,000.

(9) For Inspector General, $47,600,000.

# TITLE II—EXPLORATION

**SEC. 201. CONTINUITY OF PURPOSE FOR SPACE EXPLORATION.**

(a) FINDINGS.—Congress finds the following:

(1) NASA continues to make progress in developing and testing the Space Launch System, *Orion*, and associated ground systems, including through the successful completion of the *Artemis I* mission in November 2022 and through continued preparations for the *Artemis II* crewed flight demonstration mission.

(2) The number of spacefaring countries is increasing, and foreign countries have expanded activities for space exploration efforts, including efforts to

explore and utilize the Moon through human and robotic missions.

(3) A strong and ambitious space exploration program conducted with international and commercial partners is important to maintaining United States leadership in space and enhancing United States international competitiveness.

(4) Clear mission objectives that tie to concrete, long-term programmatic goals provide a measure to ensure accountability, enhance public support for exploration missions, and provide a clear signal of commitment to both international and domestic partners.

(b) CONTINUITY OF EXISTING CAPABILITIES AND PROGRAMS.—

(1) As part of the human exploration activities of the Administration, including progress on *Artemis* missions and activities, the Administrator shall continue development of space exploration elements pursuant to section 10811 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167; 51 U.S.C. 20302).

(2) The Administrator shall leverage the private sector for logistical services to the extent practical, consistent with the Moon to Mars architecture re-

quirements and in accordance with section 50131 of title 51, United States Code.

(3) Congress reaffirms the sense of Congress to maintain continuity of purpose as described in section 201 of the 2017 NASA Transition Authorization Act (Public Law 115–10; 131 Stat. 21).

**SEC. 202. *ARTEMIS* PROGRAM.**

(a) SENSE OF CONGRESS.—The following is the sense of Congress:

(1) Exploration of outer space, including exploration of the lunar surface and cislunar space, provides benefits and economic opportunity, including by inspiring future generations and expanding the science, technology, engineering, and mathematics workforce needed to sustain United States leadership in science, space, and technology.

(2) The lunar south pole is home to shadowed craters that may contain water ice and other volatiles. Understanding the nature of lunar polar volatiles, such as water ice, would advance science related to the origin and evolution of volatiles in the inner solar system and could facilitate the long-term future of space exploration. Water ice lunar resources have the potential to become an enabling component of future space exploration missions

throughout the solar system, including crewed missions to Mars.

(3) Other countries have demonstrated technological advances and successful robotic missions for lunar exploration and have announced credible plans for long-term human exploration of the Moon that include the intent to establish lunar bases.

(4) United States leadership of and measurable progress on the exploration of deep space is essential for guiding development of norms related to operations on and around the Moon and for other space destinations.

(5) It is in the national interest of the United States to hold a leadership role in discussions of future norms governing activities in space, including those on the lunar surface and in cislunar space.

(b) IN GENERAL.—In carrying out activities to enable *Artemis* missions under the Moon to Mars Program set forth in section 10811 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167), the Administrator shall—

(1) use relevant elements set forth in section 10811(b)(2)(B) of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167);

(2) continue to ensure that the elements under paragraph (1) enable the human exploration of Mars, consistent with section 10811(b)(2)(C)(i) of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167);

(3) engage with international partners, as appropriate, in a manner that is consistent with section 10811(b)(2)(C) the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167), and that increases redundancy, efficiency, and cost savings; and

(4) leverage capabilities provided by United States commercial providers, as appropriate and practicable.

(c) UNITED STATES COMMERCIAL PROVIDER CAPABILITIES IN SUPPORT OF LUNAR EXPLORATION EFFORTS.—The Administrator may enter into agreements with United States commercial providers or engage in public-private partnerships to procure capabilities and services to support the human exploration of the Moon or cislunar space.

**SEC. 203. REAFFIRMATION OF THE SPACE LAUNCH SYSTEM.**

(a) SPACE LAUNCH SYSTEM.—

(1) DEVELOPMENT AND CADENCE OBJECTIVES.—Congress reaffirms—

(A) support for the full development of capabilities of the Space Launch System as set forth in section 302(c) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322(c)).

(B) its commitment to the flight rate of the integrated Space Launch System and Orion crew vehicle missions set forth in section 10812(b) of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167; 51 U.S.C. 20301 note).

(2) OTHER USES.—The Administrator shall assess the demand for the Space Launch System by entities other than NASA and shall break out such demand according to the relevant Federal agency or nongovernment sector. This assessment may—

(A) estimate cost and schedule savings from reduced transit times and the potential for increased returns enabled by the unique capabilities of the Space Launch System;

(B) describe any barriers or challenges that could impede use of the Space Launch System by entities other than NASA; and

(C) identify potential actions and costs associated with overcoming barriers and challenges described in subparagraph (B).

(b) REPORT.—Not later than 180 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report describing the following:

(1) NASA's progress towards achieving the flight rate referred to in subsection (a)(1)(B) and the expected launch of the integrated Space Launch System and *Orion* crew vehicle missions after which such cadence shall be achieved.

(2) The results of the assessment conducted pursuant to subsection (a)(2).

**SEC. 204. HUMAN LUNAR LANDING CAPABILITIES.**

(a) REAFFIRMATION.—Congress reaffirms that the Moon to Mars program set forth in section 10811 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167; 51 U.S.C. 20302 note.; 136 Stat. 1732) shall include human-rated lunar landing systems.

(b) HUMAN LANDING CAPABILITIES.—

(1) The Administrator shall support the development and demonstration of, and shall obtain, human-rated lunar landing capabilities to further the goals of the human exploration roadmap under section 432 of the National Aeronautics and Space Administration Transition Authorization Act of 2017 (Public Law 115–10; 51 U.S.C. 20302 note) and the Moon to Mars Program set forth in section 10811 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167).

(2) The Administrator shall ensure that such human-rated lunar landing capabilities meet all relevant requirements, including requirements of the Moon to Mars program, and for human-rating and certification.

(3) Any commercial provider from which the Administrator obtains human-rated lunar landing capabilities must be a United States commercial provider.

(c) REPORT.—The Administrator shall submit to the appropriate committees of Congress the following:

(1) Not later than 60 days after the date of the enactment of this Act, a report—

(A) identifying the contribution over the past five years, and the planned contribution for 2024–2029, of government personnel, expertise, technologies and infrastructure utilized and to be utilized in support of design, development, or operation of human lunar landing capabilities under this section; and

(B) setting forth details and the associated costs of such government support, broken out according to the areas of contribution specified in subparagraph (A), as part of any development initiative for obtaining human lunar landing capabilities.

(2) Not later than 90 days after the date of the enactment of this Act, a report that sets forth, for any agreement with a United States commercial provider for human lunar landing capabilities, the following:

(A) The total value of the agreement when awarded.

(B) If different from the amount in subparagraph (A), the total value of the agreement as of the date of the enactment of this Act, and an explanation for any change in value, as well as an identification of whether NASA or the

commercial partner is responsible for meeting the change in value.

(C) The dollar amount invested and to be invested by the Administration, and the dollar amount invested and to be invested by the commercial partner.

(D) The full requirements, including human-rating and safety requirements, for human lunar landing capabilities under the agreement when awarded.

(E) If different from the amount specified in subparagraph (C), the full requirements, including human-rating and certification requirements, for the human lunar landing capabilities under the agreement as of the date of the enactment of this Act and an explanation for any changes in requirements.

(F) A description of milestone and associated payments provided for in the agreement, including the following:

(i) An identification of all milestones under the agreement.

(ii) The value of the associated payment for each milestone identified under clause (i).

(iii) An identification of completed milestones and the date of completion.

(iv) An identification of milestones which have not yet been completed and an estimated schedule for completion.

(v) The value of all NASA payments under the agreement, outlays as of the date of the enactment of this Act, and the amount which as of the date of the enactment of this Act has not yet been paid.

(vi) a description of any changes in milestones and associated payments between the date of contract award and the date of the enactment of this Act.

(G) Any cost, schedule, and performance challenges as of the date of the enactment of this Act in provider performance of the agreement.

(H) A detailed justification of compliance with section 30301 of title 51, United States Code.

(I) A detailed certification and justification of compliance with section 50503 of title 51, United States Code.

(3) Not later than 180 days after the date of the enactment of this Act, in consultation with any United States commercial provider that is party to an agreement with NASA for human lunar landing capabilities under this section, a report on any steps the Administrator and such providers are taking to carry out the following:

(A) Address cost, schedule, and performance challenges faced by each commercial provider in development and performance of human lunar landing capabilities described in paragraph (2)(G).

(B) Facilitate the timely availability of human lunar landing capabilities of each provider to support the schedule of *Artemis* missions in effect as of the date of the enactment of this Act, as applicable to each provider.

(4) Not later than 180 days after the date of the enactment of this Act, a report on alternative approaches, and implementation plans for such approaches, including an estimate of needed budgetary resources, for a human lunar landing capability that meets NASA human-rating and certification requirements in the event challenges referred to in para-

graph (3)(A) cannot be overcome or the timeline specified in paragraph (3)(B) cannot be met.

**SEC. 205. ADVANCED SPACESUIT CAPABILITIES.**

(a) FINDINGS.—Congress finds the following:

(1) Space suits and associated extravehicular activity (EVA) technologies are critical exploration technologies that are necessary for future human deep space exploration efforts, including crewed missions to the Moon.

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

(3) Maintaining a strong NASA 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 subcomponents.

(4) According to a 2018 NASA Office of Inspector General (OIG) report, current EVAs space suits, the Extravehicular Mobility Units (EMUs), were developed in the late 1970s, are reaching the end of their useful life, have experienced multiple maintenance issues that threaten astronaut lives,

and no longer accommodate the varying sizes of a diverse astronaut corps.

(5) The same NASA OIG report found that ". . . manufacturers of several critical suit components, including the very fibers of the suits, have now gone out of business. . . ," which further reinforces the importance of NASA's role in maintaining a space suit core competency and limiting the risk posed by outsourcing key national capabilities.

(6) The private sector currently is developing space suit capabilities.

(7) Testing space suits and related technologies on the International Space Station could reduce risk and improve safety of such suits and technologies.

(b) IN GENERAL.—The Administrator shall obtain advanced spacesuit capabilities necessary to achieve the goals of NASA's human spaceflight exploration programs.

(c) ELIGIBILITY.—Any commercial provider from which the Administrator obtains advanced spaceflight capabilities must be a United States commercial provider, as set forth in section 203(c) of this Act.

(d) PRESERVING SPACESUIT EXPERTISE.—

(1) In carrying out subsection (b), NASA shall maintain the internal expertise necessary to develop space suits for both extravehicular activity and sur-

face operations, including through partnerships with the private sector.

(2) The Johnson Space Center shall continue to manage NASA's spacesuit and extravehicular activity programs.

(e) REPORT.—Not later than 180 days from the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report —

(1) describing NASA's plans for—

(A) in-space testing of advanced spacesuit capabilities, including—

(i) space suit tests which must be conducted in microgravity in low-Earth orbit; and

(ii) space suit tests that must be conducted on the International Space Station before decommissioning of the International Space Station;

(B) transitioning from existing spacesuits in use on the International Space Station to use of advanced spacesuit capabilities;

(C) future use of advanced spacesuit capabilities by government astronauts with any non-governmental platform in low-Earth orbit that

is certified for use by the Administration for government astronauts (as such term is defined in section 50902(4) of title 51, United States Code); and

(D) disposition of retired spacesuits used on the Space Shuttle or the International Space Station; and

(2) including—

(A) a detailed justification of compliance with section 30301 of title 51, United States Code; and

(B) a detailed certification and justification of compliance with section 50503 of title 51, United States Code.

(f) ASSESSMENT OF EXTRAVEHICULAR MOBILITY UNITES USED ON THE ISS.—

(1) No later than 45 days after the date of enactment of this Act, the Administrator shall enter into an arrangement with an independent science and technical engineering organization to review the technical status and performance of the Administration's existing extravehicular mobility units (''EMUs''), to analyze the data associated with all mishaps, anomalies, and off-nominal events related to the EMUs used by government astronauts on the

International Space Station over the last 10 years, and to make recommendations to the Administrator, as a result of such assessment.

(2) The Administrator shall ensure that the entity carrying out the assessment in paragraph (1) consults with relevant industry contractors regarding the Administration's EMUs and EMU capabilities, and coordinates with the NASA Astronaut Office in carrying out such assessment.

(3) The Administrator shall transmit the results of the assessment in paragraph (1) to the appropriate committees of Congress as soon as practicable and no later than 270 days after the date of enactment of this Act.

# TITLE III—SPACE OPERATIONS

### SEC. 301. REPORT ON CONTINUED UNITED STATES PRESENCE IN LOW EARTH ORBIT.

Not later than 270 days after the date of the enactment of this Act, the Comptroller General shall transmit to the appropriate committees of Congress a report containing information on the following:

(1) The United States Government description of and plans for implementation of the policy on an uninterrupted capability for human space flight and operations in accordance with section 70501(a) of

title 51, United States Code, and section 201(b) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18311(b)) regarding United States human space flight capabilities.

(2) The preparedness of the Administration to continue to meet statutory direction referenced in paragraph (1) under the planned approach to deorbit the International Space Station by not later than the end of calendar year 2031.

**SEC. 302. INTERNATIONAL SPACE STATION.**

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

(1) ISS is a unique facility that provides the United States with capabilities in space that are currently unmatched; NASA continues to make productive use of the ISS;

(2) the ISS serves several functions, including establishing the United States as a leader in space activities, acting as a beacon of international cooperation, and conducting cutting-edge microgravity and observational research in low-Earth orbit;

(3) NASA must complete certain objectives on the ISS to facilitate deep space exploration efforts,

including carrying out human research and demonstrating exploration-related technologies; and

(4) reducing crew size or cargo deliveries, or reducing sustaining engineering capabilities, would reduce the scientific output of the ISS and potentially increase the risk to the ISS and its crew.

(b) FULL UTILIZATION.—

(1) SENSE OF CONGRESS.—It is the sense of Congress that, to ensure the greatest return on investments made by the United States and the International Space Station partners in the development, assembly, and operations of the International Space Station, the Administrator should maximize the utilization and productivity of the International Space Station with respect to the priorities set forth in section 10816 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167; 51 U.S.C. 70901 note), which include research of the human research program, risk reduction activities relevant to exploration technologies, the advancement of United States leadership of basic and applied space life and physical sciences, and other research and development essential to Moon to Mars program activities.

(2) AMENDMENT.—Section 502(a) of the National Aeronautics and Space Administration Authorization Act of 2010 (Public Law 111–267; 42 U.S.C. 18352(a)), is amended by striking ''take steps to''.

**SEC. 303. NONGOVERNMENTAL MISSIONS ON THE INTERNATIONAL SPACE STATION.**

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

(1) nongovernmental missions involving crew or spaceflight participants on the International Space Station carried out, as appropriate, pursuant to NASA policies and procedures, and Federal Government laws and regulations, can provide lessons and learning experiences for both government and nongovernment entities to inform the development of future commercial low-Earth orbit platforms and a low-Earth orbit economy; and

(2) the Administrator should share lessons learned from nongovernmental missions on the International Space Station to advance the commercial human spaceflight industry, to promote the safety of future commercial low-Earth orbit platforms, and to inform the evolution of policies guiding such activities in low-Earth orbit.

(b) NONGOVERNMENTAL MISSIONS ON THE ISS.—The Administrator may enter into one or more agreements to enable one or more United States commercial providers to conduct nongovernmental missions on the International Space Station pursuant to NASA policies and procedures, and Federal government laws and regulations.

(c) REPORT.—Not later than 18 months after the date of the enactment of this Act, the Comptroller General of the United States shall submit to the appropriate committees of Congress a report containing information relating to the following:

(1) The number of nongovernmental missions on the ISS planned.

(2) The number of nongovernmental missions on the ISS completed.

(3) The extent to which commercial entities carrying out nongovernmental missions on the ISS fully reimburse costs incurred by NASA in association with any nongovernmental missions carried out on the International Space Station.

(4) The extent to which nongovernmental missions on the International Space Station impact the priorities specified in section 10816 of the National Aeronautics and Space Administration Authorization

Act of 2022 (Public Law 117–167; 51 U.S.C. 70901 note).

(5) The impact, if any, to operations of or activities on the International Space Station that are not related to nongovernmental missions on the International Space Station.

(6) The extent to which any nongovernmental mission on the ISS—

(A) conforms with section 20102 of title 51, United States Code;

(B) adheres to the requirements of section 50131 of title 51, United States Code; and

(C) is consistent with the national security or foreign policy interests of the United States.

(7) Any other issues related to nongovernmental missions on the International Space Station that the Comptroller General determines are appropriate for review as part of undertaking the report in subsection (c).

(d) DEFINITIONS.—In this section, the terms ''crew'' and ''spaceflight participant'' have the meanings given such terms in section 50902 of title 51, United States Code.

**SEC. 304. REPORT ON SUBORBITAL CREW MISSIONS.**

Not later than 180 days after the date of the enactment of this Act, the Administrator shall deliver to the appropriate committees of Congress a report on the costs, benefits, risks, training requirements, and policy or legal implications, including liability matters, of launching United States Government personnel on commercial suborbital vehicles.

**SEC. 305. UNITED STATES DEORBIT CAPABILITIES.**

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

(1) the International Space Station is aging and eventually will need to be deorbited safely and disposed of in a controlled manner; and

(2) to protect the safety of the public, and to avoid interfering with other space operators or objects, NASA plans to deorbit and disposition the International Space Station through a controlled atmospheric reentry over an uninhabited region.

(b) AUTHORIZATION.—

(1) The Administrator shall acquire ISS deorbit capabilities from one or more United States commercial providers.

(2) In carrying out paragraph (1), the Administrator shall, to the greatest extent practicable, not reduce or deprioritize NASA activities conducted on

and in support of the ISS to support the acquisition of United States deorbit capabilities.

(c) COSTS.—

(1) INDEPENDENT COST ESTIMATE.—Before entering into an agreement for the capabilities described in subsection (b), the Administrator shall obtain an independent life-cycle cost estimate for the deorbit capability and shall report the results of such estimate and a five-year budget profile to the appropriate committees of Congress.

(2) REPORT.—

(A) Not later than one year after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report detailing the Administration's plan for the financial, logistical, and operational responsibilities associated with the deorbit capability.

(B) Annually, the Administrator shall submit to the appropriate committees of Congress a report, to accompany the President's budget request, containing a description of the annual and lifecycle costs for activities related to the deorbit of the International Space Station and

how such costs are shared among the ISS partners.

**SEC. 306. COMMERCIAL LOW-EARTH ORBIT DEVELOPMENT.**

(a) STRATEGY.—Not later than 180 days after the date of the enactment of this Act, the Administrator, in consultation with the National Space Council, shall transmit to the appropriate committees of Congress a strategy for a robust and resilient architecture to advance NASA and other relevant Federal government civil research, development, and operational requirements in low-Earth orbit. The architecture should—

(1) include a mix of crewed and uncrewed platforms;

(2) consider an incremental approach to achieving the full suite of capabilities necessary to meet NASA research, development, and operational requirements in low-Earth orbit;

(3) consider the requirements described in subsection (b); and

(4) sustain and promote United States leadership and international partnerships in carrying out low-Earth orbit activities.

(b) REQUIREMENTS.—Not later than 90 days after the date of the enactment of this Act, the Administrator shall transmit to the appropriate committees of Congress

and make available to relevant United States commercial industry entities, a detailed account of the research, development, and operational requirements for NASA activities in low-Earth orbit, including any requirements that could affect the design, development, instrumentation, and long-term operations of future United States commercial low-Earth orbit platforms and supporting capabilities. In preparing the detailed account of research, development, and operational requirements, the Administrator may consider the requirements of other relevant Federal agencies.

(c) AUTHORIZATION.—The Administrator is authorized to enter into agreements with one or more United States commercial providers to enable the development and certification of, and procure capabilities related to, a United States private, low-Earth orbit platform or platforms, and to use such platforms or platforms and related capabilities to achieve the goals set forth in the strategy under subsection (a), to sustain the priorities described in section 10816 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167; 51 U.S.C. 70901 note) and the activities under the Human Exploration Roadmap pursuant to section 432(b)(2)(J) of the National Aeronautics and Space Administration Transition Authorization Act of 2017 (Public

Law 115–10), and to meet the requirements described in subsection (b).

(d) ANCHOR TENANCY.—No later than November 15, 2025, the Administrator shall provide to the appropriate committees of Congress the following:

(1) The results of a survey and assessment of the market for capabilities and services that may be provided through future United States commercial low-Earth orbit platforms that shall be prepared by an independent entity with appropriate expertise;

(2) A detailed justification of compliance with section 30301 of title 51, United States Code.

(3) A detailed certification and justification of compliance with section 50503 of title 51, United States Code.

(e) USE OF UNITED STATES LAUNCH AND REENTRY SERVICES.—As a term of an agreement entered into under to subsection (c), the Administrator shall include a requirement for the use of United States commercially-provided launch and reentry services to support all Administration activities under the agreement, in accordance with section 50131 of title 51, United States Code, as applicable.

(f) SAFETY.—When an agreement under subsection (c) involves a government astronauts (as such term is de-

fined in section 50902(4) of title 51, United States Code), the Administrator shall protect the safety of the government astronaut by ensuring that each platform under the agreement meets all applicable human rating processes, certification, and safety requirements.

# TITLE IV—SPACE TECHNOLOGY

**SEC. 401. SBIR PHASE II FLEXIBILITY.**

Section 9 of the Small Business Act (15 U.S.C. 638) is amended in subsection (cc) by striking ''and the Department of Education'' and inserting ''the Department of Education, and the National Aeronautics and Space Administration''.

**SEC. 402. LUNAR POWER PURCHASE AGREEMENT PROGRAM.**

(a) STUDY.—The Administrator may enter into an arrangement with an independent entity with appropriate expertise to conduct a study evaluating the feasibility of using power purchase agreements to facilitate the development and deployment of lunar surface power.

(b) CONTENTS.—The study conducted under subsection (a) may include the following:

(1) An identification of facilities and technical capabilities needed to support lunar surface power production.

(2) A demand forecast for lunar surface power, including the following:

(A) Forecasted demand of both governmental and nongovernmental users.

(B) To support the following:

(i) Near-term exploration activities.

(ii) Long-duration activities.

(3) Potential policy and legal issues associated with lunar power purchase agreements between providers and the United States Government, international partners, and other private sector entities.

(c) COORDINATION.—In conducting the study under this section, the Administrator may consult with the following:

(1) The Lunar Surface Innovation Consortium.

(2) The Department of Energy, the Department of Commerce, and other Federal agencies, as determined appropriate by the Administrator.

(3) International partners.

(4) Relevant private sector entities.

(d) REPORT.—Not later than 24 months after the date of the enactment of this Act, the Administrator may submit to the appropriate committees of Congress a report that describes the results of the study conducted pursuant to subsection (a).

**SEC. 403. CRYOGENIC FLUID VALVE TECHNOLOGY REVIEW.**

(a) SENSE OF CONGRESS.—It is the sense of Congress that advancing cryogenic fluid valve technology would support the Administration's efforts to improve cryogenic fluid management and improve space vehicle reliability and efficiency.

(b) TECHNOLOGY AND RESEARCH REVIEW.—Not later than 90 days after the date of the enactment of this Act, subject to the availability of appropriations, the Administrator shall enter into an agreement with an independent research and development center or other independent nonprofit organization, as determined appropriate by the Administrator, to conduct a review of cryogenic fluid valve technology in accordance with this section. The organization shall review recent advances in technologies related to cryogenic fluid valve use in space applications and assess opportunities to improve cryogenic fluid valve technologies, including support for research and development activities to advance materials engineering for cryogenic fluid valves.

(c) REPORT.—Not later than 18 months after the date of the enactment of this Act, the organization conducting the review shall submit to the Administrator and the appropriate committees of Congress a report detailing the results of the review conducted under this section.

**SEC. 404. LUNAR COMMUNICATIONS.**

(a) FINDINGS.—Congress finds the following:

(1) Reliable communication and navigation capabilities are essential for sustainable human and robotic exploration of the Moon.

(2) Fostering the development of commercial capabilities can accelerate the deployment of lunar communication and navigation services.

(b) IN GENERAL.—The Administrator is authorized to develop a robust and resilient architecture for lunar communications and navigation to support the Administration's human and robotic lunar exploration activities.

(c) STUDY AND PLAN.—To inform the development in subsection (a), the Administrator shall develop a study and prepare a plan to—

(1) enable interoperable communications and navigation services for cislunar missions;

(2) work with the private sector, other Federal agencies, and, as appropriate, international partners to establish technical standards, consistent with section 12(d) of the National Technology Transfer and Advancement Act of 1995 (Public Law 104–113), protocols, and interface requirements for cislunar communications and navigation services and systems;

(3) support NASA lunar activities;

(4) leverage NASA's space technology research, development, and demonstration activities related to space communications and navigation; and

(5) evaluate the opportunities, benefits, feasibility, and challenges of potentially using commercial cislunar communication and navigation services, as appropriate, by United States commercial providers.

# TITLE V—AERONAUTICS

**SEC. 501. DEFINITIONS.**

In this title:

(1) ADVANCED AIR MOBILITY; AAM.—The terms ''advanced air mobility'' and ''AAM'' mean a transportation system that is comprised of urban air mobility and regional air mobility using manned or unmanned aircraft.

(2) REGIONAL AIR MOBILITY.—The term ''regional air mobility'' means the movement of passengers or property by air between 2 points using an airworthy aircraft that—

(A) has advanced technologies, such as distributed propulsion, vertical takeoff and landing, powered lift, nontraditional power systems, or autonomous technologies;

(B) has a maximum takeoff weight of greater than 1,320 pounds; and

(C) is not urban air mobility.

(3) UNMANNED AIRCRAFT SYSTEM.—The term ''unmanned aircraft system'' has the meanings given such term in section 44801 of title 49, United States Code.

(4) URBAN AIR MOBILITY.—The term ''urban air mobility'' means the movement of passengers or property by air between 2 points in different cities or 2 points within the same city using an airworthy aircraft that—

(A) has advanced technologies, such as distributed propulsion, vertical takeoff and landing, powered lift, nontraditional power systems, or autonomous technologies; and

(B) has a maximum takeoff weight of greater than 1,320 pounds.

(5) UTM.—The term ''UTM'' means an unmanned aircraft system traffic management system or service.

**SEC. 502. EXPERIMENTAL AIRCRAFT DEMONSTRATIONS.**

(b) STUDY.—Not later than 1 year after the date of the enactment of this Act, the Administrator, in consultation with industry and academia, shall conduct a study of past and future administration of the experimental aircraft demonstrator projects.

(c) FUTURE DEMONSTRATIONS.—The study under subsection (a) shall identify systems, capabilities, and technologies that could be viable candidates for maturation and demonstration through the development of an experimental aircraft demonstrator. Such systems, capabilities, and technologies may include technological advancements related to structures, aerodynamics, propulsion, controls, and autonomous capabilities. The study shall include a description of criteria and performance metrics used to determine the readiness of a system, capability, or technology to be demonstrated on a future experimental aircraft demonstrator.

(d) LESSONS LEARNED.—The study under subsection (a) also shall include an assessment of lessons learned from the Administration's previous experimental aircraft demonstration projects over the last decade, including the projects set forth under section 10831 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167). This assessment shall include—

(1) a quantitative assessment of each experimental aircraft demonstration project's ability to meet cost, schedule and performance goals, as defined at the time of project confirmation;

(2) the extent to which the project's objectives or performance goals were changed or descoped;

(3) the extent to which the system, capability, or technology that was the subject of the project was matured as a result of its demonstration on an experimental aircraft demonstrator; and

(4) the extent to which the project has contributed to advancing the capabilities of and innovation in the United States aircraft and aviation industries.

**SEC. 503. HYPERSONIC RESEARCH.**

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

(1) basic and applied hypersonic research—

(A) is critical for enabling the development of advanced high-speed aeronautical and space systems; and

(B) can improve understanding of technical challenges related to high-speed and reusable vehicle technologies, including those related to propulsion, noise, advanced materials, and entry, descent, and landing operations;

(2) investments in hypersonic research are critical to sustaining United States global leadership in space and aeronautics; and

(3) NASA efforts to study hypersonic research should complement research supported by the Department of Defense and, when appropriate, be conducted in partnership with universities and industry.

(b) HYPERSONIC RESEARCH.—The Administrator, in coordination with the Administrator of the Federal Aviation Administration and the Secretary of the Department of Defense, and in consultation with industry and academia, shall continue to carry out basic and applied hypersonic research.

(c) HYPERSONIC RESEARCH ROADMAP.—Not later than 180 days after the date of the enactment of this Act, the Administrator, in consultation with the Administrator of the Federal Aviation Administration and the Secretary of the Department of Defense, and with industry and academic institutions, shall update the hypersonic research roadmap required under section 603 of the National Aeronautics and Space Administration Transition Authorization Act of 2017 (Public Law 115–10; 51 U.S.C. 20302 note). In updating the research roadmap, the Administrator may consider advancements in—

(1) system level design, analysis, and validation of hypersonic aircraft technologies;

(2) propulsion capabilities and technologies;

(3) vehicle technologies to include vehicle flow physics and vehicle thermal management associated with aerodynamic heating;

(4) advanced materials, including materials capable of withstanding high temperatures and demonstrating durable materials, and efforts to create models and simulate use of such materials; and

(5) other areas of hypersonic research as determined appropriate by the Administrator.

(d) REPORT AND BRIEFING.—Not later than 1 year after the date of the enactment of this Act, the Administrator shall—

(1) transmit the updated research roadmap under subsection (c) to the appropriate committees of Congress; and

(2) provide a briefing on the research conducted under subsection (b), including how such research aligns with the updated research roadmap under subsection (c).

**SEC. 504. ADVANCED MATERIALS AND MANUFACTURING TECHNOLOGY.**

Not later than 1 year after the date of the enactment of this Act, the Administrator shall transmit a report to the appropriate committees of Congress on the status of NASA activities relating to section 10831(e), the Ad-

vanced Materials and Manufacturing Technology Program, and section 10831(f), regarding relevant Research Partnerships, as set forth in the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167).

**SEC. 505. UNMANNED AIRCRAFT SYSTEM AND ADVANCED AIR MOBILITY.**

(a) FINDING.—Congress finds that research and development related to autonomous aviation is vital to ensure United States competitiveness as the National Airspace System evolves from trajectory-based operations to collaborative and highly automated operations.

(b) COLLABORATION.—The Administrator shall, in collaboration with the Administrator of Federal Aviation Administration, the heads of other relevant Federal agencies, and appropriate representatives of academia and industry, continue its research on unmanned aircraft systems and advanced air mobility, including research related to USM and autonomous capabilities, as practicable.

(c) BRIEF.—Not later than 18 months after the date of the enactment of this Act, the Administrator shall brief the appropriate committees of Congress on the progress of the research under subsection (b).

**SEC. 506. ADVANCED CAPABILITIES FOR EMERGENCY RESPONSE OPERATIONS.**

(a) IN GENERAL.—The Administrator shall leverage NASA-developed tools and technologies to conduct research and development activities under the Advanced Capabilities for Emergency Response Operations (ACERO) project, or appropriate successor project or projects, to improve aerial responses to wildfires.

(b) GOALS.—The research and development activities conducted under subsection (a) may include the following:

(1) Advanced aircraft technologies and airspace management efforts to assist in the management, deconfliction, and coordination of aerial assets during wildfire response efforts.

(2) Information sharing and real-time data exchange for wildfire response teams.

(3) Development of an interoperable platform to provide situational awareness of aerial assets during wildfire response.

(4) Establishment of a multi-agency concept of operations, which may involve Federal, State, and local government agencies, to enable coordination of aerial activities for wildfire response.

(c) COLLABORATION.—In carrying out this section, the Administrator—

(1) may coordinate and collaborate with other Federal, State, and local government agencies, regional organizations, and commercial partners and academic institutions involved in wildfire management; and

(2) shall, to the maximum extent practicable, consult with the heads of other Federal departments and agencies to avoid duplication of activities.

(d) PROHIBITION.—

(1) IN GENERAL.—Except as provided in this subsection, the Administrator may not procure an unmanned aircraft system to conduct activities described in this section if such unmanned aircraft system is manufactured or assembled by a covered foreign entity.

(2) EXEMPTION.—The Administrator may waive the prohibition under paragraph (1) on a case-by-case basis if the Administrator—

(A) determines that the procurement of an unmanned aircraft system is—

(i) in the national interest of the United States; and

(ii) necessary for the sole purpose of improving aerial responses to wildfires; and

(B) notifies the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 30 days after a determination in the affirmative under subparagraph (A).

(e) ANNUAL REPORTS.—Not later than one year after the date of the enactment of this Act and annually thereafter until December 31, 2029, 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 describing the activities, including results, carried out pursuant to this section 2. Each such report, at minimum, shall contain the following:

(1) A description of any research and development activities.

(2) A description of the Administrator's activities pursuant to subsection (c).

(3) An identification of any topics related to improvement of aerial responses to wildfires that could benefit from further research.

(4) A description of any continuing efforts under this section.

(5) Any other information determined appropriate by the Administrator.

(f) DEFINITION.—In this section:

(1) COVERED FOREIGN ENTITY.—The term ''covered foreign entity'' has the meaning given such term in section 1832 of the National Defense Authorization Act for Fiscal Year 2024 (Public Law 118–31).

(2) UNMANNED AIRCRAFT SYSTEM.—The term ''unmanned aircraft system'' has the meaning given such term in section 44801 of title 49, United States Code.

**SEC. 507. HYDROGEN AVIATION.**

(a) IN GENERAL.—Subject to the availability of appropriations for such purpose, and taking into consideration the strategy developed under and research conducted pursuant to section 1019 of the FAA Reauthorization Act of 2024 (Public Law 118–63), the Administrator may carry out research on emerging technologies related to hydrogen aviation.

(b) REPORT.—Not later than 18 months after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on the findings of the research under subsection (a).

**SEC. 508. HIGH-PERFORMANCE CHASE AIRCRAFT.**

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

(1) NASA programs benefit from and rely upon high-performance chase aircraft for providing research and mission support; and

(2) NASA currently faces maintenance challenges related to its aging high-performance aircraft fleet, which is resulting in increased program costs.

(b) BRIEFING.—Not later than 60 days after the date of the enactment of this Act and biannually thereafter, the Administrator shall provide to the appropriate committees of Congress a briefing on the strategy of NASA relating to the following:

(1) Collaboration with the Department of Defense on efforts for research and flight asset sharing to support NASA's research mission support and pilot training requirements.

(2) Efforts to seek aircraft parts and engines to keep NASA's current fleet of chase aircraft operational, including potential use of 3D additive manufactured parts.

(3) Strategies for acquiring or using through loan, sharing, or other agreements, as appropriate, Department of Defense aircraft to support NASA's research and mission support activities, as required.

**SEC. 509. COLLABORATION WITH ACADEMIA.**

It is the sense of Congress that—

(1) colleges and universities are hubs of research and innovation, with expertise in various fields of science and aeronautics;

(2) collaborating with academia allows NASA to access cutting-edge research and expertise that can further enable advancements in aeronautics research and technology and address complex aeronautical challenges;

(3) a cutting-edge civil aeronautics research and development program can inspire the next generation to pursue education and careers in science, technology, engineering, and mathematics, including aeronautics; and

(4) opportunities for students to participate in NASA-supported academic research and development projects, such as the University Leadership Initiative, the University Students Research Challenge, and related aeronautic projects and competitions, contributes to training the next generation and developing the aeronautics workforce to support continued United States leadership and economic growth in civil aeronautics and aviation.

**SEC. 510. NATIONAL STUDENT UNMANNED AIRCRAFT SYSTEMS COMPETITION PROGRAM.**

(a) IN GENERAL.—The Administrator shall lead a national pilot program to carry out unmanned aircraft systems technology competitions for students at the high school and undergraduate level (in this section referred to as ''competitions'') in which students shall compete to design, create, and demonstrate an unmanned aircraft system.

(b) COMPETITION ADMINISTRATION.—The Administrator shall award, on a merit-reviewed, competitive basis, a grant to a nonprofit organization, an institution of higher education, or a consortium thereof, to administer the pilot program under subsection (a) (in this section referred to as the ''competition administrator'').

(c) AWARD CRITERIA.—The Administrator shall ensure that the award decision made under subsection (b) take into account the extent to which the eligible entity—

(1) identifies a plan for engaging eligible institutions from diverse geographic areas, including poor, rural, and Tribal communities; and

(2) identifies a plan for connecting science, technology, engineering, and medicine (STEM) activities to Administration missions and centers.

(d) COMPETITION ADMINISTRATOR RESPONSIBILITIES.—In carrying out the pilot program, the competition administrator shall be responsible for the following:

(1) Awarding grants to institutions of higher education or nonprofit organizations (or a consortium thereof) on a merit-reviewed, competitive basis to host individual competitions.

(2) Developing STEM curriculum to be utilized by the competition awardees to help students make the connection to the design, construction, and demonstration of unmanned aircraft systems.

(3) Developing curriculum to assist students in making real-world connections to STEM content and educate students on the relevance and significance of STEM careers.

(4) Ensuring competition awardees are supporting the activities specified in subsection (f).

(5) Conducting performance evaluations of competitions, including data collection, on the following:

(A) The number of students engaged.

(B) Geographic and institutional diversity of participating schools and institutions of higher education.

(6) Any other activities the Administrator finds necessary to ensure the competitions are successful.

(e) ADDITIONAL CONSIDERATIONS.—In awarding grants in subsection (d), the competition administrator shall consider applications that include a partnership with that State's space grant program under chapter 403 of title 51, United States Code.

(f) PERMITTED ACTIVITIES.—In carrying out the pilot program under subsection (a), the competition administrator shall ensure competitions occurring at both the high school and undergraduate levels—

(1) allow students to design, construct, and demonstrate an unmanned aircraft system;

(2) allow students to compete with other teams in the performance of the constructed unmanned aircraft system;

(3) connect to relevant missions and NASA Center activities of the Administration;

(4) connect relevant STEM curriculum to the design, construction, and demonstration of unmanned aircraft systems;

(5) support activities designed to help students make real-world connections to STEM content and educate students on the relevance and significance of STEM careers;

(6) are geographically dispersed in order to serve a broad student population, including those in rural and underserved communities; and

(7) encourage, to the greatest extent practicable, the participation of students from groups historically underrepresented in STEM.

(g) REPORT TO CONGRESS.—Not later than six months after the end of the pilot program under subsection (a), the Administrator shall submit to the appropriate committees of Congress a report describing the accomplishments, lessons learned, any challenges in the implementation of the pilot program, and recommendations for whether to continue the pilot program.

(h) DEFINITION.—In this section, the term ''eligible institution'' means—

(1) an institution of higher education;

(2) a nonprofit research institution;

(3) a high school; or

(4) a consortium of 2 or more entities described in any of paragraphs (1) through (3).

**SEC. 511. DECADAL SURVEY FOR NATIONAL AERONAUTICS RESEARCH AND PRIORITIES REVIEW.**

(a) FINDING.—Congress finds the following:

(1) Engaging the science and engineering communities, along with industry, through the develop-

ment of a National Academies of Science, Engineering, and Medicine decadal survey in aeronautics research and development can provide a science and engineering community consensus on key research and development priorities in national civil aeronautics programs.

(2) A decadal survey entails a comprehensive review of and strategy and priorities for civil national aeronautics research and development and prioritizes for the next decade.

(3) A decadal survey for civil aeronautics research and development can serve as a guiding framework for strategic planning and resource allocation in the field of civil aeronautics for the coming decade.

(b) STUDY.—The Administrator in consultation with the heads of other relevant Federal Government agencies and in accordance with section 20305 of title 51. United States Code, shall seek to enter into an arrangement with the National Academies of Sciences, Engineering, and Medicine (in this section referred to as the ''National Academies'') to conduct a decadal survey of civil aeronautics research and development for the 2025—2035 decade. The survey shall recommend research priorities to sustain United States leadership in civil aeronautics re-

search and development and support a safe and sustainable future for aviation. The survey may also include recommendations related to the dissemination and transition of such research and development to the United States commercial aviation and aircraft industries, to enabling innovation, and to ensuring a world-class workforce for aeronautics research and development and related United States commercial industries and activities.

(c) TRANSMITTAL.—Not later than 2 years 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 the results of such survey, including any recommendations.

# TITLE VI—SCIENCE

**SEC. 601. MAINTAINING A BALANCED SCIENCE PORTFOLIO.**

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

(1) a balanced and adequately funded set of activities consisting of research and analysis grant programs, technology development, suborbital research activities, and small, medium, and large space missions, contributes to a robust and productive science program and serves as a catalyst for innovation and discovery; and

(2) the Administrator should set science priorities by following the recommendations and guidance provided by the scientific community through the National Academies of Sciences, Engineering, and Medicine decadal surveys.

(b) POLICY REAFFIRMATION.—Congress reaffirms the policy of the United States set forth in section 501(c) of the National Aeronautics and Space Administration Transition Authorization Act of 2017 (Public Law 115–10; 51 U.S.C. 20302 note), which states, ''It is the policy of the United States to ensure, to the extent practicable, a steady cadence of large, medium, and small science missions''.

**SEC. 602. IMPLEMENTATION OF SCIENCE MISSION COST-CAPS.**

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

(1) NASA science missions address compelling scientific questions prioritized by the National Academies decadal surveys, and often such missions exceed expectations in terms of performance, longevity, and scientific impact;

(2) the Administrator should continue to pursue an ambitious science program while also seeking to avoid excessive cost growth that has the potential to

affect the balance across the Science portfolio and within the Science Divisions;

(3) audits by the NASA Inspector General and the Government Accountability Office have reported that early cost estimates for missions in the preliminary phases of conception and development are immature and unreliable, and the cost of a mission typically is not well-understood until the project is further along in the development process;

(4) cost growth of a mission beyond its early cost estimates is a challenge for budget planning and has the potential to affect other missions in the Science Mission Directorate portfolio, including through delays to future mission solicitations; and

(5) relying on early cost estimates made prior to preliminary design review for science missions which then experience such cost growth may disincentivize program and cost discipline moving forward.

(b) REPORT.—Not later than 12 months after the date of the enactment of this Act, the Comptroller General shall transmit to the appropriate committees of Congress a review of NASA practices related to establishment of and compliance with cost caps of competitively-selected,

principal investigator-led science missions. The review shall—

(1) assess current cost cap values and determine whether existing cost-cap amounts are appropriate for different classes of missions;

(2) consider the effectiveness of cost caps in maintaining a varied and balanced portfolio of mission types within the Science Mission Directorate;

(3) describe the information NASA requires as part of a proposal submission related to project cost estimates and proposal compliance with cost caps, and assess whether such required information provides sufficient insight or confidence in the estimates;

(4) consider NASA processes for assessing proposed cost estimates and the accuracy of such assessments for past competitively-selected, principal investigator-led science missions; and

(5) for the period starting on January 1, 2000 and ending on the date of the enactment of this Act—

(A) a list of—

(i) competitively-selected, principal investigator-led science missions for which

costs have exceeded the associated cost cap; and

(ii) reason the mission costs exceeded the cost-cap;

(B) an assessment of NASA's role in predicting, preventing, or managing competitively-selected, principal investigator-led science mission cost increases; and

(C) a description of the impact of increased competitively-selected, principal investigator-led science mission costs beyond the cost caps on—

(i) the missions for which the cost cap has been breached; and

(ii) other missions within the applicable division and within the Science Mission Directorate.

**SEC. 603. REEXAMINATION OF DECADAL SURVEYS.**

Title 51, United States Code, is amended in section 20305(c) by inserting ", significant changes to the NASA budget" after "growth".

**SEC. 604. LANDSAT.**

Not later than 180 days after the date of enactment of this Act, the Administrator shall transmit a report to the appropriate committees of Congress describing—

(1) the Administrator's efforts to comply with section 60134 of title 51, United States Code;

(2) aspects of Landsat NEXT or any other Landsat observations that—

(A) could be provided by private sector data-buys or service procurements; and

(B) could—

(i) meet associated science requirements while maintaining or exceeding the quality, integrity, and continuity of the Landsat observational capabilities and performance, including requirements necessary to ensure high-quality calibrated data continuity and traceability with the 50-year Landsat data record; and

(ii) comply with nondiscriminatory availability of unenhanced data and public archiving of data pursuant to section 60141 and 60142 of title 51, United States Code, and all other relevant federal laws, regulations, and policies related to open science and data accessibility;

(3) any potential tradeoffs or other impacts of subparagraphs (A) or (B) that could reduce the benefit of Landsat data for scientific and applied uses

or reduce the Federal Government's ability to make such data available for the widest possible use; and

(4) recommendations and opportunities for the Federal Government to mitigate potential tradeoffs or impacts identified under paragraph (3) or to otherwise facilitate private sector data-buys or service procurements.

**SEC. 605. PRIVATE EARTH OBSERVATION DATA.**

(a) AMENDMENTS.—Section 18371 of title 42, United States Code, is amended—

(1) by redesignating the contents of section 18371 as subsection (a);

(2) by inserting after subsection (a), as redesignated, the following:

''(b) In updating the civil Earth observation strategic implementation plan pursuant to subsection (a), the Director of the Office of Science and Technology Policy shall consider commercial Earth observation data, as appropriate, that can be purchased or accessed by the Federal Government to meet Earth observation requirements.''.

(b) GOVERNMENT ACCOUNTABILITY OFFICE REPORT.—Not later than 12 months after the release of the next civil Earth observation strategic implementation plan update under section 18371(a) of title 42, United States Code, the Comptroller General shall report to the appro-

priate committees of Congress an assessment of the Director of the Office of Science and Technology Policy's implementation of 18371(b) of title 42, United States Code, as amended.

**SEC. 606. COMMERCIAL SATELLITE DATA.**

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

(1) Section 60501 of title 51, United States Code, states that the goal for the Earth Science program of NASA shall be to pursue a program of Earth observations, research, and applications activities to better understand the Earth, how it supports life, and how human activities affect its ability to do so in the future.

(2) Section 50115 of title 51, United States Code, states that the Administrator of NASA shall, to the extent possible and while satisfying the scientific or educational requirements of NASA, and where appropriate, of other Federal agencies and scientific researchers, acquire, where cost effective, space-based and airborne commercial Earth remote sensing data, services, distribution, and applications from a commercial provider.

(3) The Administrator of NASA established the Commercial SmallSat Data Acquisition Pilot Pro-

gram in 2019 to identify, validate, and acquire from commercial sources data that support the Earth science research and application goals.

(4) The Administrator of NASA has—

(A) determined that the pilot program described in paragraph (3) has been a success, as described in the final evaluation entitled ''Commercial SmallSat Data Acquisition Program Pilot Evaluation Report'' issued in 2020;

(B) established a formal process for evaluating and onboarding new commercial vendors in such pilot program;

(C) increased the number of commercial vendors and commercial data products available through such pilot program; and

(D) expanded procurement arrangements with commercial vendors to broaden user access to provide commercial Earth remote sensing data and imagery to federally funded researchers.

(b) COMMERCIAL SATELLITE DATA ACQUISITION PROGRAM.—

(1) IN GENERAL.—Chapter 603 of title 51, United States Code, is amended by adding at the end the following:

**"§ 60307. Commercial satellite data acquisition program**

''(a) IN GENERAL.—The Administrator shall establish within the Earth Science Division of the Science Mission Directorate a program to acquire and disseminate cost-effective and appropriate commercial Earth remote sensing data and imagery in order to satisfy the scientific, operational, and educational requirements of the Administration, and where appropriate, of other Federal agencies and scientific researchers to augment or complement the suite of Earth observations acquired by the Administration, other United States Government agencies, and international partners.

''(b) DATA PUBLICATION AND TRANSPARENCY.—The terms and conditions of commercial Earth remote sensing data and imagery acquisitions under the program described in subsection (a) shall not prevent—

''(1) the publication of commercial data or imagery for scientific purposes; or

''(2) the publication of information that is derived from, incorporates, or enhances the original commercial data or imagery of a vendor.

''(c) AUTHORIZATION.—In carrying out the program under this section, the Administrator may—

''(1) procure the commercial Earth remote sensing data and imagery from commercial vendors

to advance scientific research and applications in accordance with subsection (a); and

''(2) establish or modify end-use license terms and conditions to allow for the widest-possible use of procured commercial Earth remote sensing data and imagery by individuals other than NASA-funded users, consistent with the goals of the program.

''(d) UNITED STATES VENDORS.—Commercial Earth remote sensing data and imagery referred to in subsections (a) and (c) shall, to the maximum extent practicable, be procured from United States vendors.

''(e) REPORT.—Not later than 180 days after the date of the enactment of this section and annually thereafter, the Administrator shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report that includes the following information regarding the agreements, vendors, license terms, and uses of commercial Earth remote sensing data and imagery under this section:

''(1)(A) In the case of the initial report, a list of all agreements that are providing commercial Earth remote sensing data and imagery to NASA as of the date of the report.

''(B) For each subsequent report, a list of all agreements that have provided commercial Earth remote sensing data and imagery to NASA during the reporting period.

''(2) A description of the end-use license terms and conditions for each such vendor.

''(3) A description of the manner in which each such agreement is advancing scientific research and applications, including priorities recommended by the National Academies of Sciences, Engineering, and Medicine decadal surveys.

''(4) Information specifying whether the Administrator has entered into an agreement with a commercial vendor or a Federal agency that permits the use of data and imagery by Federal Government employees, contractors, or non-Federal users.''.

(2) CLERICAL AMENDMENT.—The table of contents for chapter 603 of title 51, United States Code, is amended by adding at the end the following new item:

''60307. Commercial Satellite Data Acquisition Program.''.

**SEC. 607. GREENHOUSE GAS EMISSION MEASUREMENTS.**

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

(1) observation and measurement of greenhouse gases such as carbon dioxide and methane are of

critical importance to understand the sources of these emissions;

(2) additional tools can improve the precise detection of methane leaks from natural gas lines and production facilities to reduce economic losses and to reduce unintentional release of this potent greenhouse gas;

(3) observation of such gases can be conducted with a combination of space-based, airborne, and ground-based instruments;

(4) in 2022, NASA cancelled the Geostationary Carbon Cycle Observatory, a competitively-selected, Principal Investigator-led instrument under development that is designed to make space-based observations of greenhouse gases, including carbon dioxide, carbon monoxide, and methane, as well as vegetation health over the western hemisphere from geosynchronous orbit; and

(5) in 2023, the Geostationary Carbon Cycle Observatory PI-led project team delivered an unvalidated instrument assembly and flight spares to NASA as part of the project closeout activities.

(b) HARDWARE.—

(1) The Administrator shall assess the hardware and, to the maximum extent practicable, seek

to validate the instrument assembly delivered to the Administration under the contract for the development of GeoCarb, which shall include an assessment of scientific capabilities of the delivered hardware, including potential repurposed uses or science contributions.

(2) The Administrator, within 6 months of the date of the enactment of this Act, shall provide a report to the appropriate committees of Congress regarding the results of the assessment conducted pursuant to paragraph (1) and if appropriate based on the assessment, a list of potential launch opportunities, including cost and schedule associated with such opportunities.

(c) STRATEGY.—

(1) IN GENERAL.—Not later than 90 days after the date of the enactment of this Act, the Administrator, in consultation with the National Oceanic and Atmospheric Administration, the National Institute of Standards and Technology, and other relevant agencies, shall enter into an agreement with the National Academies of Sciences, Engineering, and Medicine to develop a science-based strategy to assess and evaluate the use of present and future greenhouse gas monitoring and detection capabili-

ties, including ground-based, airborne, and space-based sensors and integration of data relating to such monitoring and detection from other indicators, to detect large methane emission events (commonly referred to as ''methane super-emitters'').

(2) REQUIREMENTS.—The strategy described in subsection (a) shall include the following elements:

(A) Development of a proposed definition for the term ''methane super-emitter''.

(B) Examination of whether and how current and planned Federal greenhouse gas monitoring and detection capabilities may be leveraged to monitor and detect methane super-emitters, and identify key gaps in such capabilities.

(C) Examination of the effectiveness of the U.S. Greenhouse Gas Center and Greenhouse Gas Monitoring and Measurement Interagency Working Group in facilitating interagency collaboration for greenhouse gas monitoring and detection, data standards, stewardship, and data integration, including activities related to monitoring and detecting methane super-emitters.

(D) Examination of actions taken by Federal agencies and departments in response to the National Strategy to Advance an Integrated U.S. Greenhouse Gas Measurement, Monitoring, and Information System, including progress towards pathways to enhance the scientific and operational value of information regarding methane super-emitters.

(E) Consideration of options for the Federal Government to partner with nongovernmental entities, including State and local governments, academia, nonprofit organizations, commercial industry, and international organizations, to effectively leverage greenhouse gas monitoring and detection capabilities to monitor and detect methane super-emitters.

(F) Consideration of options for the Federal Government to validate and verify technologies and data developed or collects by nongovernmental entities, academia, nonprofit organizations, commercial industry, and international organizations related to monitoring and detecting methane super-emitters.

(G) Recommendations regarding the activities under subparagraphs (A) through (F), as appropriate.

(d) USE OF STRATEGY.—The Administrator may use the strategy described in subsection (a) to inform the planning of research and development activities regarding greenhouse gas monitoring and detection, including methane super-emitters.

(e) REPORT.—Not later than 18 months after the date of the execution of the agreement between the Administrator and the National Academies of Sciences, Engineering, and Medicine under subsection (a), the National Academies shall submit to the Administrator, the Committee on Science, Space, and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation of the Senate a report on the strategy described in subsection (a).

(f) DEFINITIONS.—In this section:

(1) GREENHOUSE GAS MONITORING AND DETECTION.—The term ''greenhouse gas monitoring and detection'' means the direct observation, from space or in-situ, or collection of measurement data pertaining to, greenhouse gas emissions and levels.

(2) GEOCARB.—The term ''GeoCarb'' shall mean the Geostationary Carbon Cycle Observatory.

**SEC. 608. NASA DATA FOR AGRICULTURAL APPLICATIONS.**

(a) FINDINGS.—Congress finds the following:

(1) NASA has decades of experience in space-based scientific Earth observations and measurements, including data, trends and modeling.

(2) NASA Earth science data, which includes data on precipitation, temperature, evapotranspiration, soil moisture, and vegetation health, has been used to inform the decisionmaking of agricultural producers.

(3) NASA applies its scientific data and models to inform and support the agricultural community and engages in innovative collaborations such as the NASA Acres and NASA Harvest agricultural consortia.

(4) NASA uses space-based Earth observations and science and applications to support farmers in efforts to conserve water and other resources, improve farm management and crop yield, and facilitate the stability of the national food supply.

(5) NASA's upcoming Earth System Observatory will benefit the agricultural community by improving observations critical for measuring and understanding cropland conditions, water availability, early onset crop disease, soil moisture, and other crop and rangeland management indicators.

(6) Increased engagement between NASA and the agricultural community can support agricultural producers, bolster the national food supply, and improve agricultural research, science, and technology.

(b) DATA DISSEMINATION.—NASA shall continue to partner with other relevant Federal agencies, as practicable, to disseminate water, soil, vegetation, land-use, and other relevant NASA Earth observation and science data, information and tools to support American agricultural producers. Such partnerships may include activities such as—

(1) continuing the leverage NASA Earth science water data and information to enable efficient use of resources, inform irrigation decisions, and support local innovation and control of water management;

(2) supporting agriculture decisionmaking by increasing the accessibility and useability of NASA Earth science data, information, and tools relevant to the impact of disease, weather, precipitation, and other environmental factors on agricultural production; or

(3) making available, to the greatest extent practicable, NASA earth science measurements and data to advance precision agricultural capabilities

relevant to the needs and requirements of agricultural producers.

(c) APPLICATION OF SPACE-BASED DATA.—The Administrator shall, in furtherance of the goal for the NASA's Earth science and applications program of securing practical benefits for society, as set forth in section 60501 of title 51, United States Code, continue to collaborate with relevant Federal agencies to develop mechanisms to transition, as appropriate, relevant NASA Earth science research findings, data, information, models, and capabilities to operational governmental and private sector entities focused on addressing the needs of the agricultural user community.

(d) PARTNERING.—In carrying out subsections (b) and (d), NASA shall, to the extent practicable and in collaboration with other relevant Federal agencies, where appropriate, continue to engage State and local government agencies, institutions of higher education, agriculture producer organizations, and other relevant stakeholder and user communities from the public and private sectors to improve dissemination of NASA Earth science data, information, and tools relevant to the needs of agricultural producers and the agriculture industry, in accordance with the goal for the Administration's Earth science and applications program set forth in section 60501 of title 51,

United States Code, and relevant recommendations of the most recent decadal survey on Earth science and applications from space.

**SEC. 609. PLANETARY SCIENCE PORTFOLIO.**

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

(1) planetary science missions advance the scientific understanding of the solar system and the place of humans in it while also advancing the design and operations of spacecraft and robotic engineering; and

(2) Discovery, New Frontiers, and Flagship programs allow NASA to fund a range of missions that vary in size, cost, and complexity; maintaining balance across these mission classes allows for a broad scope of discoveries and scientific advances.

(b) MISSION PRIORITIES REAFFIRMATION.—Congress reaffirms the direction in section 502(b)(1) of the National Aeronautics and Space Administration Transition Authorization Act of 2017 (Public Law 115–10; 51 U.S.C. 20302 note) that—

(1) in accordance with the priorities established in the most recent Planetary Science Decadal Survey, The Administrator shall ensure, to the greatest extent practicable, the completion of a balanced set

of Discovery, New Frontiers, and Flagship missions at the cadence recommended by the most recent Planetary Science Decadal Survey; and

(2) consistent with the set of missions described in paragraph (1), and while maintaining the continuity of scientific data and steady development of capabilities and technologies, the Administrator may seek, if necessary, adjustments to mission priorities, schedule, and scope in light of changing budget projections.

**SEC. 610. PLANETARY DEFENSE.**

(a) Section 18387 of title 42, United States Code, is amended in subsection (b) by striking ''implement before September 30, 2012,'' and inserting '', in coordination with the NASA Administrator, maintain and regularly update''.

(b) Title 51, United States Code, is amended—

(1) in section 71103—

(A) in the section heading, by striking ''**Developing policy and recommending**'' and inserting ''**Policy on near-Earth objects and**''

(B) by striking ''Within 2 years after October 15, 2008, the'' and inserting ''The'';

(C) after ''Policy shall'', by inserting '', in coordination with the Administrator, maintain and regularly update'';

(D) by striking ''(1) develop''; and

(E) in paragraph (2), by striking ''recommend'' and inserting ''recommendations for''; and

(2) in chapter 711—

(A) by adding the following:

**''SEC. 71105. PLANETARY DEFENSE COORDINATION OFFICE.**

''(a) OFFICE.—As directed in section 10825 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167), the Administrator shall maintain an office within the Planetary Science Division of the Science Mission Directorate to be known as the 'Planetary Defense Coordination Office'.

''(b) RESPONSIBILITIES.—Consistent with the direction in section 10825 of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167) the Planetary Defense Coordination Office under subsection (a) shall—

''(1) plan, develop, and implement a program to survey threats posed by near-Earth objects equal to or grater than 140 meters in diameter, as required by section 321(d)(1) of the National Aeronautics

and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.);

''(2) identify, track, and characterize potentially hazardous near-Earth objects, issue warnings of the effects of potential impacts of such objects, and investigate strategies and technologies for mitigating the potential impacts of such objects; and

''(3) assist in coordinating government planning for a response to a potential impact of a near-Earth objects.''.

(B) CLERICAL AMENDMENT.—The table of contents for chapter 711 of title 51, United States Code, is amended by adding at the end the following new item:

''71105. Planetary Defense Coordination Office.''.

**SEC. 611. LUNAR DISCOVERY AND EXPLORATION.**

(a) IN GENERAL.—The Administrator may carry out, within the Science Mission Directorate, a program to accomplish science objectives for the Moon, with an organizational structure that aligns responsibility, authority, and accountability, as recommended by the most recent decadal survey for planetary science and astrobiology.

(b) OBJECTIVES AND REQUIREMENTS.—In carrying out the program in subsection (a), the Administrator shall direct the Science Mission Directorate, in consultation

with the Exploration Systems Development Mission Directorate and the Space Technology Mission Directorate, to define high-priority lunar science objectives informed by decadal and other scientific consensus recommendations, and related requirements of an integrated Artemis science strategy for human and robotic missions to the Moon.

(c) INSTRUMENTATION.—The program in subsection (a) should assess the need for and facilitate the development of instrumentation to support the scientific exploration of the Moon.

**SEC. 612. COMMERCIAL LUNAR PAYLOAD SERVICES.**

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

(1) the Administrator's encouragement and support for commercial services for lunar surface delivery capabilities and other related services serves the national interest; and

(2) commercial providers benefit from an approach that places low-cost, noncritical instruments on initial deliveries using small- and medium-size landers before proceeding to larger landers for more complex payloads.

(b) COMMERCIAL LUNAR PAYLOAD SERVICES.—The Administrator is authorized to establish a Commercial Lunar Payload Services program for the purposes of pro-

curing, from one or more United States commercial providers, services for delivery of NASA science payloads, and the payloads of other NASA mission directorates, as appropriate and practicable, to the lunar surface.

(c) RELATIONSHIP TO OTHER MISSION DIRECTORATES.—A Mission Directorate that seeks to obtain commercial lunar payload services under the program established in subsection (b) shall provide funding for—

(1) any payload, instrument or other item sponsored by the Mission Directorate for delivery through the program; and

(2) the cost of the commercial lunar payload services obtained on behalf of the Mission Directorate.

(d) IMPLEMENTATION.—In implementing any such activities pursuant to subsection (b), the Administrator shall—

(1) conduct updated market research on the commercial lunar economy and identify any changes since the last market analysis;

(2) assess NASA's needs from and role in and contribution to the commercial lunar delivery market;

(3) based on such needs identified in paragraph (2), assess the effectiveness of the task order ap-

proach in advancing commercial development of lunar delivery services, including an assessment of the appropriate number of providers necessary to support NASA commercial lunar delivery needs, and identify any challenges and recommendations for improvement; and

(4) strengthen procedures related to the selection, manifesting, interfaces, and requirements of payloads and other relevant factors that could contribute to minimizing future NASA-directed changes to projects following commercial lunar payload service contract awards.

(e) MANAGEMENT PLAN.—Not later than 90 days from the date of the enactment of this Act, the Administrator shall, informed by the activities conducted under subsection (c), prepare and implement a management plan with clear leadership authority and responsibility for the program authorized in subsection (b).

(f) BRIEFINGS.—Not later than 180 days from the date of the enactment of this Act, the Administrator shall brief the appropriate committees of Congress on the implementation of the management plan in subsection (d).

(g) COORDINATION.—The Administrator shall ensure coordination between Mission Directorates and the Moon to Mars Program on the administration of the program

in subsection (b) to ensure alignment of goals for lunar delivery services.

**SEC. 613. PLANETARY AND LUNAR OPERATIONS.**

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

(1) existing NASA lunar and Martian orbital missions are operating well beyond their planned mission lifespans;

(2) NASA relies on this aging infrastructure for observations, communications relay, and other operations to support critical NASA missions; and

(3) the United States plans to increase its activities on and around both the Moon and Mars in coming years.

(b) PLAN.—The Administrator shall develop a plan to ensure continuity of operations and sufficient observational and operational capabilities on and around the Moon and Mars necessary to continue to enable a robust science program and human exploration program for the Moon and Mars well into the future. Such plan shall consider opportunities to engage both private and international partners in future operations.

**SEC. 614. MARS SAMPLE RETURN.**

(a) IN GENERAL.—The Administrator shall, subject to the availability of appropriations, lead a Mars Sample

Return program to enable the return to Earth of scientifically-selected samples from the surface of Mars for study in terrestrial laboratories, consistent with the recommendations of the National Academies decadal surveys for planetary science.

(b) APPROACH.—The Administrator shall pursue the program in subsection (a) on a timeline and in a manner necessary to—

(1) Sustain United States leadership in the scientific exploration of Mars;

(2) maintain NASA capabilities to land and operate robotic spacecraft on the surface of Mars;

(3) preserve the relevant unique and long-term institutional expertise; and

(4) maintain a balanced and robust planetary science division portfolio without requiring significant increases to the NASA budget.

(c) IMPLEMENTATION PLAN.—The Administrator shall, as soon as practicable and no later than 180 days after the date of enactment of this Act, transmit to the appropriate committees of Congress a plan and timeline for the implementation of a Mars Sample Return program pursuant to this section with the goal of enabling the highest scientific return for the resources invested. Such plan shall include a design and mission architecture and estab-

lish realistic cost and schedule estimates to enable such goal.

**SEC. 615. HUBBLE SPACE TELESCOPE SERVICING.**

Not later than 90 days from the date of the enactment of this Act, the Administrator shall submit a report to the appropriate committees of Congress that includes the results of any study or studies conducted in the last five years regarding the technical feasibility of safely reboosting the Hubble Space Telescope, including any such studies regarding the technical feasibility of using private sector capabilities.

**SEC. 616. GREAT OBSERVATORIES MISSION AND TECHNOLOGY MATURATION.**

(a) ESTABLISHMENT.—The Administrator may establish a Great Observatories Mission and Technology Maturation project (referred to in this section as a ''Project'') to mature the large-scale space-based mission concepts and technologies needed for a future astrophysics mission, as informed by the recommendations of the most recent decadal survey in astronomy and astrophysics.

(b) ACTIVITIES.—A project established under subsection (b) shall inform the design and development of future large-scale space-based Astrophysics missions by conducting activities which may include—

(1) assessing the appropriate scope for any future mission;

(2) determining the range of capabilities and technology readiness of such capabilities needed for a mission; and

(3) informing the development and maturation of science and technologies needed for such mission.

(c) COSTS.—The independent life-cycle cost estimate conducted under section 30307 of title 51, United States Code, as amended by this Act, for a large-scale space-based mission resulting from successful completion of a Project established under subsection (b) shall include an accounting of all costs spent on maturation of the mission through such Project.

(d) REPORT.—Starting on February 1, 2025, and continuing annually thereafter, the Administrator shall submit to the appropriate committees of Congress a report on the progress and impacts of any Projects established under subsection (b) within Astrophysics programs.

**SEC. 617. NANCY GRACE ROMAN TELESCOPE.**

The Administrator shall continue development of the Nancy Grace Roman Space Telescope as directed in subsection 10823(b) of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167).

**SEC. 618. CHANDRA X-RAY OBSERVATORY.**

The Administrator shall, to the greatest extent practicable, take no action to reduce or otherwise preclude continuation of the science operations of the Chandra X-Ray Telescope prior to the completion and consideration of the next triennial review of mission extensions for the Astrophysics division conducted pursuant to section 30504 of title 51, United States Code and NASA's ongoing operations paradigm change review.

**SEC. 619. HELIOPHYSICS RESEARCH.**

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

(1) NASA heliophysics research advances the scientific understanding of the Sun, its impact on the Earth and near-Earth environment, and the Sun's interactions with other bodies in the solar system, the interplanetary medium, and the interstellar medium;

(2) fundamental science supported by the Heliophysics division is critical to improving space weather observations forecasting capabilities, which contribute to—

(A) fortifying national security and other critically important space-based and ground-based assets;

(B) improving the resilience of the Nation's energy infrastructure; and

(C) protecting human health in space; and

(3) the Heliophysics Division should continue to maximize the scientific return on investment of its portfolio through maintaining a balanced portfolio that includes research and analysis, including multidisciplinary research initiatives, technology development, space-based missions and suborbital flight projects that include both directed and strategic missions and principal investigator-led, competitively solicited missions, informed by the science priorities and guidance of the most recent decadal survey in solar and space physics.

(b) PROGRAM MANAGEMENT.—The Administrator shall seek to—

(1) maintain a regular Explorer Announcement of Opportunity cadence and alternate between small and mid-sized missions; and

(2) enable a regular selection of Missions of Opportunity.

**SEC. 620. STUDY ON COMMERCIAL SPACE WEATHER DATA.**

(a) STUDY.—The Administrator, in consultation with the Administrator of the National Oceanic and Atmospheric Administration, shall conduct a study of the extent

to which commercially-available data could advance space weather research, including the relevant space weather research priorities of the most recent decadal survey on solar and space physics.

(b) CONTENTS.—The study shall include—

(1) an assessment of commercial capabilities and commercial data that meets or exceeds the science and technical standards and requirements of the Administration, which may include—

(A) data that is generated or able to be generated by commercial providers;

(B) commercially-available small spacecraft; and

(C) opportunities for hosted NASA payloads on commercial spacecraft; and

(D) commercial solutions for data processing applicable to space weather science;

(2) recommendations and opportunities for the Federal Government to facilitate the use of commercially available options for space weather data relevant to advancing the Administration's space weather research and development activities consistent with the most recent National Academies decadal survey, without reducing quality of data; and

(3) options, where appropriate, for potential partnerships or use of NASA prize authority and competitions, as appropriate and practicable, to obtain access to such data identified in paragraph (1) that—

(A) meets or exceeds the science and technical standards and requirements of the Administration; and

(B) are not duplicative of activities conducted pursuant to chapter 606 of title 51, United States Code.

(c) REPORT.—Not later than 270 days after the date of enactment of this Act, the Administrator shall transmit a report to the appropriate committees of Congress containing the results of the study provided under subsection (a).

**SEC. 621. GEOSPACE DYNAMICS CONSTELLATION.**

(a) SENSE OF CONGRESS.—It is the sense of Congress that the Geospace Dynamics Constellation mission could enable scientific discoveries that will transform understanding of the processes that govern the dynamics of the Earth's upper atmospheric envelope that surrounds and protects the planet.

(b) ASSESSMENT.—Not later than September 5, 2024, The Administrator shall transmit to the appropriate

committees of Congress a report regarding the schedule and budget profile to launch the Geospace Dynamics Constellation mission by the end of the decade to fulfill the recommendations of the heliophysics decadal survey.

# TITLE VII—STEM EDUCATION

## SEC. 701. NATIONAL SPACE GRANT COLLEGE AND FELLOWSHIP PROGRAM.

(a) AMENDMENTS.—Title 51, United States Code, is amended—

(1) in section 40303, by striking subsections (d) and (e);

(2) in section 40304—

(A) by striking subsection (c) and inserting the following:

''(c) SOLICITATIONS.—

''(1) IN GENERAL.—The Administrator shall issue a solicitation from space grant consortia for the award of grants or contracts under this section at the conclusion of the award cycle for fiscal Year 2020 to 2024. The Administrator shall implement the allocation guidance from section 40304(e) during each fiscal year covered by the award cycle.

''(2) PROPOSALS.—A lead institution of a space grant consortium that seeks a grant or contract under this section shall submit, on behalf of such

space grant consortium, an application to the Administrator at such time and in such manner and accompanied by such information as the Administrator may require.

''(3) AWARDS.—The Administrator shall award 1 or more multi-year grants or contracts, disbursed in annual installments, to the lead institution of an eligible space grant consortium of—

''(A) each of the 50 States of the United States;

''(B) the District of Columbia; and

''(C) the Commonwealth of Puerto Rico.''; and

(B) by inserting after subsection (d) the following:

''(e) ALLOCATION OF FUNDING.—

''(1) PROGRAM IMPLEMENTATION.—

''(A) IN GENERAL.—To carry out the purposes set forth in section 40301 of this title, each fiscal year, of the funds appropriated for this program of that fiscal year, the Administrator shall allocate not less than 85 percent among eligible space grant consortia as follows:

''(i) The space grant consortia identified in paragraph 40304(c)(3) shall each receive an equal share.

''(ii) The territories of Guam and the U.S. Virgin Islands shall each receive funds equal to one-fifth of the share for each space grant consortium.

''(2) PROGRAM ADMINISTRATION.—

''(A) IN GENERAL.—Each fiscal year, of the funds made available for the National Space Grant College and Fellowship Program, the Administrator shall allocate not more than 10 percent for the administration of the program.

''(B) COSTS COVERED.—The funds allocated under paragraph (1)(A) of this section shall cover all costs of the Administration associated with the administration of the National Space Grant College and Fellowship Program, including—

''(i) direct costs to the program, including costs relating to support services and civil service salaries and benefits;

''(ii) indirect general and administrative costs of centers and facilities of the Administration; and

''(iii) indirect general and administrative costs of the Administration headquarters.

''(3) SPECIAL OPPORTUNITIES.—Each fiscal year, of the funds made available for the National Space Grant College and Fellowship program, the Administrator shall allocate not more than 5 percent to lead institutions of Space Grant Consortia for grants to carry out innovative approaches and programs to further science and education relating to the missions of the Administration pursuant to subsection (b).''.

(b) REVIEW.—The Administrator shall make arrangements for an independent external review of the National Space Grant College and Fellowship Program to—

(1) evaluate its management, accomplishments, approach to funding allocation as described in section 40303(e) of title 51, United States Code, and responsiveness to the purposes and goals defined in chapter 403 of title 51, United States Code; and

(2) propose any statutory updates that may be needed to implement recommendations of the review.

(c) REPORT.—Not later than nine months after the date of enactment of this Act, the Administrator shall transmit a report on the independent external review of

the National Space Grant College and Fellowship Program described in subsection (a) to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate.

# TITLE VIII—POLICY/NASA

**SEC. 801. MAJOR PROGRAMS.**

Section 30104 of title 51, United States Code, is amended in subsection (a)(1) by striking ''7120.5E, dated August 14, 2012'' and inserting ''7120.5F, dated August 3, 2021''.

**SEC. 802. NASA ADVISORY COUNCIL.**

(a) CONSULTATION AND ADVICE.—Section 20113(g) of title 51, United States Code, is amended by adding ''and Congress'' after ''advice to the Administration''.

(b) SUNSET.—Effective September 30, 2028, section 20113(g) of title 51, United States Code, is amended by striking ''and Congress''.

**SEC. 803. NASA ASSESSMENT OF EARLY COST ESTIMATES.**

Not later than 12 months after the date of the enactment of this Act, the Comptroller General shall transmit to the appropriate committees of Congress a review of the development, application, and assessment of early cost estimates made prior to preliminary design review for NASA missions. The review may include—

(1) an assessment of NASA processes related to the formation and evaluation of proposed and early-stage cost estimates;

(2) an evaluation of NASA's monitoring and management of cost estimates throughout mission development, in accordance with section 10861(b)(4) of the National Aeronautics and Space Administration Authorization Act of 2022 (Public Law 117–167); and

(3) any such recommendations as the Comptroller General determines appropriate.

**SEC. 804. INDEPENDENT COST ESTIMATE.**

Section 30307 of title 51, United States Code, is amended—

(1) in the section heading, by striking ''**analysis**'' and inserting ''**estimate**''; and

(2) in subsection (b)—

(A) by striking ''Before any funds may be obligated for implementation'' and inserting ''After the Administrator completes the preliminary design review'';

(B) by striking ''analysis'' and inserting ''estimate''; and

(C) by inserting after the first sentence, ''No funds may be obligated for implementation

of the project before the Administrator reports the results of the life-cycle cost estimate to Congress.''.

**SEC. 805. OFFICE OF TECHNOLOGY, POLICY, AND STRATEGY REPORT.**

Not later than January 1, 2025, and annually thereafter, the Office of Technology, Policy, and Strategy shall prepare and submit to the appropriate committees of Congress a report describing the efforts of the Office during the previous calendar year and priorities of the Office for the upcoming calendar year, as practicable.

**SEC. 806. AUTHORIZATION FOR THE TRANSFER TO NASA OF FUNDS FROM OTHER AGENCIES FOR SCIENTIFIC OR ENGINEERING RESEARCH OR EDUCATION.**

(a) IN GENERAL.—Subsection (f) of section 20113 of title 51, United States Code, is amended—

(1) by striking ''In the performance of its functions'' and inserting the following:

''(1) IN GENERAL.—In the performance of its functions''; and

(2) by adding at the end the following new paragraph:

''(2) TREATMENT.—Funds available to any department or agency of the Federal Government for

scientific or engineering research or education, or the provision of facilities therefor, shall, subject to the approval of the head of such department or agency or as delegated pursuant to such department's or agency's regulation, be available for transfer, in whole or in part, to the Administration for such use as is consistent with the purposes for which such funds were appropriated. Funds so transferred shall be merged with the appropriation to which transferred, except that such transferred funds shall be limited to the awarding of grants or cooperative agreements for scientific or engineering research or education.''.

(b) ANNUAL INFORMATION ON FUNDS TRANSFERRED.—

(1) IN GENERAL.—Not later than two years after the date of the enactment of this section, the Administrator shall include in the annual budget justification materials of the Administration, as submitted to Congress with the President's budget request under section 1105 of title 31, United States Code, information describing the activities conducted under subsection (f) of section 20113 of title 51, United States Code (as amended by subsection (a)), during the immediately preceding fiscal year.

(2) CONTENTS.—The information referred to in paragraph (1) shall contain a description of each transfer of funds under the authority provided for in paragraph (2) of subsection (f) of section 20113 of title 51, United States Code (as added and amended, respectively, by this section), during the immediately preceding fiscal year, including the following:

(A) An identification of the department or agency of the Federal Government from which such funds were transferred.

(B) The total amount of funds so transferred, disaggregated by each such department or agency.

(C) The purposes for which such funds were appropriated to each agency or department.

(D) The program or activity of the Administration to which such funds were made available by each such transfer.

(E) The purposes of each such administration program or activity, and the amount of funding appropriated to the Administration for such purposes.

(c) REPORT.—Not later than three years after the date of enactment of the section, the Administrator of the

Administration 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 that includes the following:

(1) A summary of the value of the authority provided for in paragraph (2) of subsection (f) of section 209113 of title 51, United States Code (as added and amended, respectively, by this section), including the extent to which such authority has benefited the Administration and its ability to meet its needs, achieve its mission, or more effectively conduct interagency collaborations.

(2) An identification of any barriers or challenges to implementing such authority, or otherwise to managing funding required to conduct joint programs and award jointly funded grants and cooperative agreements by the administration with other Federal departments and agencies to advance the missions of each such department and agency.

**SEC. 807. PROCEDURE FOR LAUNCH SERVICES RISK MITIGATION.**

(a) ASSESSMENT.—The Administrator shall enter into an arrangement for an independent external assessment of the effectiveness and efficiency of NASA's ap-

proach towards launch services risk mitigation in the Administration's Procedural Requirements 8610.7D.

(b) REPORT.—Not later than 180 days from the date of enactment of this Act, the Administrator shall submit to the appropriate committees of Congress the following:

(1) The report of the assessment conducted under subsection (a).

(2) NASA response to the findings of the report, if any.

**SEC. 808. REPORT ON MERITS AND OPTIONS FOR ESTABLISHING AN INSTITUTE RELATING TO SPACE RESOURCES.**

(a) REPORT.—Not later than 180 days after the date of the enactment of this Act, the Administrator and Secretary shall jointly submit to the appropriate congressional committees a report on the merits of, and options for, establishing an institute relating to space resources to advance the objectives of NASA and the Department in maintaining United States preeminence in space. Such objectives shall include the following:

(1) Identifying, developing, and distributing space resources, including by encouraging the development of foundational science and technology.

(2) Reducing the technological risks associated with identifying, developing, and distributing space resources.

(3) Research to maximize the responsible use of space resources.

(4) Developing options for using space resources to—

(A) support current and future space architectures, programs, and missions; and

(B) enable such architectures, programs, and missions that would not otherwise be possible.

(b) ADDITIONAL MATTERS.—The report required under subsection (a) shall also include the following assessments of the Administrator and the Secretary:

(1) Whether a virtual or physical institute relating to space resources is most cost effective and appropriate.

(2) Whether partnering with institutions of higher education and the aerospace industry, and the extractive industry as appropriate, would be effective in increasing information available to the institute with respect to advancing the objectives described in subsection (a).

(c) DEFINITIONS.—In this section:

(1) DEPARTMENT.—The term ''Department'' means the Department of Commerce.

(2) EXTRACTIVE INDUSTRY.—The term ''extractive industry'' means companies and individuals involved in the processes of extracting, including mining, quarrying, drilling, and dredging, raw, natural materials or energy sources.

(3) INSTITUTE OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given such term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).

(4) SECRETARY.—The term ''Secretary'' means the Secretary of Commerce.

(5) SPACE RESOURCE.—

(A) IN GENERAL.—The term ''space resource'' means an abiotic resource in situ in outer space.

(B) INCLUSIONS.—The term ''space resource'' includes a raw, natural material or energy source.

**SEC. 809. REPORTS TO CONGRESS.**

(a) CONGRESSIONAL REPORTS AND NOTICES.—Any report or notice provided to Congress by NASA shall be provided to the Committee on Science, Space, and Technology of the House of Representatives and the Committee

on Commerce, Science, and Transportation of the Senate, concurrently with its delivery to any other Committee or office.

(b) REPORTS ON INTERNATIONAL AGREEMENTS.—If the United States becomes a signatory to an international agreement concerning outer space activities, the Administrator shall provide to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report containing a copy of such agreement.

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