

Union Calendar No. 853

115TH CONGRESS
2^D SESSION

H. R. 5503

[Report No. 115–1102]

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

IN THE HOUSE OF REPRESENTATIVES

APRIL 13, 2018

Mr. BABIN (for himself, Mr. SMITH of Texas, Mr. BROOKS of Alabama, Mr. ROHRABACHER, Mr. KNIGHT, Mr. HIGGINS of Louisiana, and Mr. NORMAN) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

DECEMBER 21, 2018

Additional sponsors: Mr. LUCAS, Mr. POSEY, Mrs. COMSTOCK, Mr. ABRAHAM, Mr. BANKS of Indiana, Mr. BIGGS, Mr. DUNN, Mr. WEBER of Texas, Mr. HULTGREN, Mr. MARSHALL, Mr. WEBSTER of Florida, and Mr. LOUDERMILK

DECEMBER 21, 2018

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

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

[For text of introduced bill, see copy of bill as introduced on April 13, 2018]

A BILL

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

1 *Be it enacted by the Senate and House of Representa-*
 2 *tives of the United States of America in Congress assembled,*

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

4 (a) *SHORT TITLE.*—*This Act may be cited as the “Na-*
 5 *tional Aeronautics and Space Administration Authoriza-*
 6 *tion Act of 2018”.*

7 (b) *TABLE OF CONTENTS.*—*The table of contents for*
 8 *this Act is the following:*

Sec. 1. Short title; table of contents.

Sec. 2. Definitions.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

Sec. 101. Fiscal year 2018.

Sec. 102. Fiscal year 2019.

TITLE II—HUMAN EXPLORATION

Sec. 201. Space facilities beyond low-Earth orbit.

Sec. 202. ISS transition.

Sec. 203. Human spaceflight research.

Sec. 204. Critical path redundancy for human spaceflight.

Sec. 205. Space suits.

Sec. 206. Mobile launch platform and interim cryogenic propulsion stage.

Sec. 207. Mars 2033.

TITLE III—SCIENCE

Subtitle A—Earth Science

Sec. 301. Reimbursable basis for development of sensors and instruments.

Sec. 302. Earth observations study.

Sec. 303. Land imaging.

Sec. 304. Landsat data policy.

Sec. 305. Earth science missions.

Sec. 306. Goddard Institute for Space Studies Inspector General report.

Subtitle B—Astronomy and Astrophysics

Sec. 311. Search for the origin, evolution, distribution, and future of life in the
universe.

Sec. 312. Wide-Field Infrared Space Telescope.

Subtitle C—Planetary Science

Sec. 321. Near-Earth Object Survey.

Sec. 322. Space nuclear power.

TITLE IV—AERONAUTICS

- Sec. 401. *Supersonic research.*
 Sec. 402. *Unmanned aircraft systems research.*
 Sec. 403. *21st Century Aeronautics Research Capabilities Initiative.*
 Sec. 404. *Experimental plane program.*
 Sec. 405. *Hypersonic Technology project.*
 Sec. 406. *Report.*

TITLE V—COMMERCIAL

- Sec. 501. *Commercial supply of space products.*
 Sec. 502. *Space services and in-space infrastructure.*
 Sec. 503. *Preference for launch vehicles manufactured in the United States.*
 Sec. 504. *Studies on industrial base.*
 Sec. 505. *Enhanced-use leasing.*
 Sec. 506. *Satellite servicing.*

TITLE VI—POLICY

- Sec. 601. *NASA-funded institutes.*
 Sec. 602. *Baseline and cost controls.*
 Sec. 603. *Reports to Congress.*
 Sec. 604. *International technical and operational standards.*
 Sec. 605. *NASA contractor responsibility watch list.*
 Sec. 606. *Human space exploration risk.*
 Sec. 607. *NASA launch support and infrastructure modernization program.*
 Sec. 608. *Reaffirmations on orbital debris.*
 Sec. 609. *Federal-State partnerships.*
 Sec. 610. *Security management of foreign national access.*

1 **SEC. 2. DEFINITIONS.**

2 *In this Act:*

3 (1) *ADMINISTRATOR.*—*The term “Adminis-*
 4 *trator” means the Administrator of NASA.*

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

9 (3) *ISS.*—*The term “ISS” means the Inter-*
 10 *national Space Station.*

11 (4) *NASA.*—*The term “NASA” means the Na-*
 12 *tional Aeronautics and Space Administration.*

1 (5) *NEAR-EARTH OBJECT.*—*The term “near-*
2 *Earth object” means an asteroid or comet with a per-*
3 *ihelion distance of less than 1.3 Astronomical Units*
4 *from the Sun.*

5 (6) *NONPROFIT ORGANIZATION.*—*The term “non-*
6 *profit organization” means an organization deter-*
7 *mined by the Secretary of the Treasury to be an orga-*
8 *nization described in section 501(c)(3) of the Internal*
9 *Revenue Code of 1986 (26 U.S.C. 501(c)(3)) which is*
10 *exempt from taxation under section 501(a) of such*
11 *Code.*

12 (7) *ORION.*—*The term “Orion” means the multi-*
13 *purpose crew vehicle described under section 303 of*
14 *the National Aeronautics and Space Administration*
15 *Authorization Act of 2010 (42 U.S.C. 18323).*

16 (8) *SPACE LAUNCH SYSTEM.*—*The term “Space*
17 *Launch System” has the meaning given the term in*
18 *section 3 of the National Aeronautics and Space Ad-*
19 *ministration Authorization Act of 2010 (42 U.S.C.*
20 *18302).*

21 **TITLE I—AUTHORIZATION OF**
22 **APPROPRIATIONS**

23 **SEC. 101. FISCAL YEAR 2018.**

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

- 1 (1) *For Science, \$6,221,500,000, of which—*
- 2 (A) *\$1,921,000,000 is for Earth Science;*
- 3 (B) *\$2,227,900,000 is for Planetary Science;*
- 4 (C) *\$850,400,000 is for Astrophysics;*
- 5 (D) *\$533,700,000 is for the James Webb*
- 6 *Space Telescope; and*
- 7 (E) *\$688,500,000 is for Heliophysics.*
- 8 (2) *For Aeronautics, \$685,000,000.*
- 9 (3) *For Space Technology, \$760,000,000.*
- 10 (4) *For Exploration, \$4,790,000,000, of which—*
- 11 (A) *\$1,350,000,000 is for Orion and associ-*
- 12 *ated program and other necessary support;*
- 13 (B) *\$2,150,000,000 is for the Space Launch*
- 14 *System and associated program and other nec-*
- 15 *essary support;*
- 16 (C) *\$895,000,000 is for Exploration Ground*
- 17 *Systems, including \$350,000,000 for a second*
- 18 *mobile launch platform and associated Space*
- 19 *Launch System activities; and*
- 20 (D) *\$395,000,000 is for Exploration Re-*
- 21 *search and Development.*
- 22 (5) *For Space Operations, \$4,751,500,000.*
- 23 (6) *For Education, \$100,000,000, of which—*
- 24 (A) *\$18,000,000 is for the Established Pro-*
- 25 *gram to Stimulate Competitive Research; and*

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

3 (7) For Safety, Security, and Mission Services,
4 \$2,826,900,000.

5 (8) For Construction and Environmental Com-
6 pliance and Restoration, \$562,240,000.

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

8 **SEC. 102. FISCAL YEAR 2019.**

9 There are authorized to be appropriated to NASA for
10 fiscal year 2019, \$21,207,140,000, as follows:

11 (1) For Deep Space Exploration Systems,
12 \$4,929,000,000, of which—

13 (A) \$4,040,000,000 is for Exploration Sys-
14 tems Development, of which—

15 (i) \$1,350,000,000 is for Orion and as-
16 sociated program and other necessary sup-
17 port;

18 (ii) \$2,150,000,000 is for the Space
19 Launch System and associated program
20 and other necessary support; and

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

23 (B) \$889,000,000 is for Advanced Explo-
24 ration Systems, of which—

1 (i) \$504,300,000 is for the Lunar Or-
2 bital Platform–Gateway and associated pro-
3 gram and other necessary support;

4 (ii) \$116,500,000 is for Advanced
5 Cislunar and Surface Capabilities; and

6 (iii) \$268,200,000 is for Exploration
7 Advanced Systems.

8 (2) For Exploration and Research Technology,
9 \$1,017,700,000, of which—

10 (A) \$108,500,000 is for Early Stage Inno-
11 vation and Partnerships;

12 (B) \$216,500,000 if for Technology Matura-
13 tion, of which \$75,000,000 is for nuclear fission
14 and cryogenic fluid management development;

15 (C) \$332,700,000 is for Technology Dem-
16 onstration.

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

19 (E) \$205,000,000 is for Small Business In-
20 novation Research and Small Business Tech-
21 nology Transfer.

22 (3) For Low-Earth Orbit and Spaceflight Oper-
23 ations, \$4,624,600,000, of which—

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

1 (B) \$2,108,700,000 is for Space Transpor-
2 tation;

3 (C) \$903,700,000 is for Space Flight Sup-
4 port; and

5 (D) \$150,000,000 is for Commercial Low-
6 Earth Orbit Development.

7 (4) For Science, \$6,623,600,000, of which—

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

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

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

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

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

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

14 (A) \$18,000,000 is for the Established Pro-
15 gram to Stimulate Competitive Research; and

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

18 (7) For Safety, Security, and Mission Services,
19 \$2,749,700,000.

20 (8) For Construction and Environmental Com-
21 pliance and Restoration, \$438,200,000.

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

1 **TITLE II—HUMAN EXPLORATION**

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

3 (a) *SENSE OF CONGRESS.*—*It is the sense of Congress*
4 *that space facilities for use beyond low-Earth orbit play a*
5 *significant role in NASA’s long-term pursuit of its explo-*
6 *ration goals under section 202(a) of the National Aero-*
7 *nautics and Space Administration Authorization Act of*
8 *2010 (42 U.S.C. 18312(a)).*

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

11 (1) *IN GENERAL.*—*Not later than 90 days after*
12 *the date of enactment of this Act, the Administrator*
13 *shall submit to the Committee on Science, Space, and*
14 *Technology of the House of Representatives and the*
15 *Committee on Commerce, Science, and Transpor-*
16 *tation of the Senate a report on the potential develop-*
17 *ment of space facilities for use beyond low-Earth*
18 *orbit.*

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

21 (A) *how each such space facility can ad-*
22 *vance, enable, or complement human exploration*
23 *of the Solar System, including of the atmosphere*
24 *and the surface of celestial bodies;*

1 (B) the role of the space facility as a stag-
2 ing, logistics, and operations hub in exploration
3 architecture;

4 (C) how the space facility can support the
5 research, development, testing, validation, oper-
6 ation, and launch of space exploration systems
7 and technologies;

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

12 (E) the role of such a space facility in mak-
13 ing, developing, and refining the case for further
14 crewed and uncrewed exploration investments.

15 **SEC. 202. ISS TRANSITION.**

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

17 (1) *The ISS is a valuable national asset that can*
18 *continue to produce worthwhile scientific research and*
19 *technology.*

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

1 (3) *In addition to the priorities under para-*
2 *graph (2), the United States has a larger and broader*
3 *need and use for further microgravity research.*

4 (4) *The ISS is the best platform currently avail-*
5 *able to conduct certain types of research needed for*
6 *NASA's deep space human exploration program with*
7 *such research currently scheduled to be completed by*
8 *the end of fiscal year 2024.*

9 (5) *The ISS transition report, submitted pursu-*
10 *ant to section 50111(c)(2) of title 51, United States*
11 *Code, provides an explanation of NASA's plans to fos-*
12 *ter the development of private industry capabilities*
13 *and private demand with a goal of ending direct*
14 *NASA support for ISS operations by the end of fiscal*
15 *year 2024.*

16 (6) *The plans laid out in the ISS transition re-*
17 *port are conditionally flexible and require feedback to*
18 *inform next steps. In addition, the feasibility of end-*
19 *ing direct NASA support for ISS operations by the*
20 *end of fiscal year 2024 is dependent on many factors,*
21 *some of which are indeterminate until the Adminis-*
22 *tration carries out the initial phases of the ISS tran-*
23 *sition plan.*

24 (7) *The value of any in-space facility, such as*
25 *the ISS, depends both on its contributions to further*

1 *expansion of human presence throughout the solar*
2 *system, pursuant to section 202 of the National Aero-*
3 *navitics and Space Administration Authorization Act*
4 *of 2010 (42 U.S.C. 18312) and to making existing*
5 *presence self-sustaining.*

6 *(8) As the United States moves towards a com-*
7 *mitment to a human presence off the surface of the*
8 *Earth, other Government agencies should seek to ben-*
9 *efit from and capitalize upon the ongoing human*
10 *presence in space.*

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

16 *(c) ISS OPERATION.—*

17 *(1) IN GENERAL.—NASA shall continue oper-*
18 *ation of the ISS for such time as Congress authorizes*
19 *its operations.*

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

23 *(3) LOW-EARTH ORBIT.—NASA shall pursue a*
24 *step-wise transition of low-Earth orbit human*
25 *spaceflight operations from a Government-directed ac-*

1 *tivity to a model where private industry is respon-*
2 *sible for how to meet and execute NASA's require-*
3 *ments.*

4 (4) *TRANSITION REPORT.*—*NASA shall carry out*
5 *activities in fiscal year 2019 as proposed in the ISS*
6 *transition report, delivered pursuant to section*
7 *50111(c) of title 51, United States Code.*

8 (d) *REPORTING.*—*In addition to the biennial report-*
9 *ing requirement under section 50111(c) of title 51, United*
10 *States Code, the Administrator shall brief the Committee*
11 *on Science, Space, and Technology of the House of Rep-*
12 *resentatives and the Committee on Commerce, Science, and*
13 *Transportation of the Senate quarterly, beginning on the*
14 *date that is 90 days after the date of enactment of this Act,*
15 *on the status of, and all progress, changes, and other devel-*
16 *opments related to carrying out the plans in the ISS transi-*
17 *tion report.*

18 (e) *AUTHORIZED FUNDING.*—*Subject to the avail-*
19 *ability of appropriations, the Administrator shall make*
20 *available at least \$150,000,000 for fiscal year 2019 for com-*
21 *mercial low-Earth orbit development out of the Low Earth*
22 *Orbit and Spaceflight Operations account.*

23 **SEC. 203. HUMAN SPACEFLIGHT RESEARCH.**

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

1 (1) *in line with the National Space Council Pol-*
2 *icy Directive 1, as implemented by the President’s*
3 *memo of December 11, 2017, the United States should*
4 *lead the return of humans to the Moon for long-term*
5 *exploration and utilization, followed by human mis-*
6 *sions to Mars and other destinations;*

7 (2) *the benefits derived from the peaceful use of*
8 *space depend on the extent to which ground-based*
9 *space infrastructure, facilities, and research are well-*
10 *integrated; and*

11 (3) *NASA Johnson Space Center has the exper-*
12 *tise and facilities to support the development of the*
13 *major technological innovations necessary to enable*
14 *and support the nation’s ongoing commitment to*
15 *human spaceflight, exploration, and continued human*
16 *presence in space.*

17 **(b) JOHNSON SPACE CENTER RESEARCH OFFICE.—**

18 (1) *ESTABLISHMENT.—The Administrator shall*
19 *establish a research office at Johnson Space Center to*
20 *build upon the Center’s existing expertise in human*
21 *space flight missions for future challenges.*

22 (2) *RESEARCH DIRECTOR.—The head of the re-*
23 *search office shall be the research director, who shall*
24 *report directly to the Director of Johnson Space Cen-*
25 *ter.*

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

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

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

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

11 (4) *SCOPE OF RESEARCH.*—*The research office*
12 *shall focus on aspects of research that are directly rel-*
13 *evant to the endeavor of human space flight, includ-*
14 *ing problems of human spaceflight and robotics sup-*
15 *porting human space exploration.*

16 (5) *SUPPORT FOR HUMAN SPACEFLIGHT ACTIVI-*
17 *TIES.*—*Johnson Space Center shall, consistent with*
18 *its primary responsibilities to NASA and other gov-*
19 *ernment customers, endeavor to make the fullest pos-*
20 *sible use of its facilities and infrastructure to support*
21 *all U.S. human spaceflight activities, including those*
22 *of the private sector.*

23 (c) *REPORT.*—*Not later than 180 days after the enact-*
24 *ment of this Act, NASA and Johnson Space Center shall*
25 *submit to the Committee on Science, Space, and Technology*

1 *of the House of Representatives and the Committee on Com-*
2 *merce, Science, and Transportation of the Senate a report*
3 *on NASA's progress on, and other developments related to,*
4 *carrying out the requirements of this section.*

5 (d) *AUTHORIZED FUNDING.*—*Subject to the avail-*
6 *ability of appropriations, the Administrator shall make*
7 *available at least \$15,000,000 in fiscal year 2019 out of*
8 *the Exploration Research and Technology account to carry*
9 *out this section.*

10 **SEC. 204. CRITICAL PATH REDUNDANCY FOR HUMAN**
11 **SPACEFLIGHT.**

12 (a) *FINDINGS.*—*Congress finds that NASA, in coopera-*
13 *tion with private sector and international partners, has fa-*
14 *cilitated the development of a wide array of cargo and crew*
15 *transportation options for operations in low-Earth orbit*
16 *and beyond.*

17 (b) *SENSE OF CONGRESS.*—*It is the sense of Congress*
18 *that the availability of a multitude of launch vehicles and*
19 *crew and cargo vehicles provides critical path redundancy.*

20 (c) *GAO REPORT ON METRICS FOR LOGISTICAL AND*
21 *TRANSPORT REDUNDANCY.*—

22 (1) *IN GENERAL.*—*Not later than 180 days after*
23 *the date of enactment of this Act, the Comptroller*
24 *General of the United States shall submit to the Com-*
25 *mittee on Science, Space, and Technology of the*

1 *House of Representatives and the Committee on Com-*
2 *merce, Science, and Transportation of the Senate a*
3 *report that contains an evaluation of appropriate*
4 *technical benchmarks and metrics on the suitability*
5 *and performance, including cost, reliability, and*
6 *availability of—*

7 *(A) all available crew and cargo vehicles for*
8 *destinations in low-Earth orbit, cis-lunar space,*
9 *and beyond; and*

10 *(B) all available launch vehicles that are*
11 *capable of deploying more than 20 tons to low-*
12 *Earth orbit and beyond, to support exploration*
13 *and scientific missions, particularly to outer*
14 *planets.*

15 *(2) INCLUSION IN NASA ANALYSIS.—The Admin-*
16 *istrator shall consider the Comptroller General’s re-*
17 *port findings on benchmarks and metrics as part of*
18 *NASA’s analysis of logistical and transport redun-*
19 *dancy.*

20 **SEC. 205. SPACE SUITS.**

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

22 *(1) Space suits and associated extravehicular ac-*
23 *tivity (in this section, referred to as “EVA”) tech-*
24 *nologies are critical space exploration technologies.*

1 (2) *The NASA civil service workforce at the*
2 *Johnson Space Center possesses unique capabilities to*
3 *integrate, design, and validate space suits and associ-*
4 *ated EVA technologies.*

5 (3) *Maintaining a strong core competency in the*
6 *design, development, manufacture, and operation of*
7 *space suits and related technologies allows NASA to*
8 *be an informed purchaser of competitively awarded*
9 *commercial space suits and associated EVA tech-*
10 *nologies.*

11 (4) *NASA should fully utilize the International*
12 *Space Station by 2025 to test future space suits and*
13 *associated EVA technologies to reduce risk and im-*
14 *prove safety.*

15 (b) *SPACE SUITS.—*

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

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

21 (3) *PRIVATE SECTOR.—In carrying out this sub-*
22 *section, the Administrator may enter into agreements*
23 *with the private sector as the Administrator considers*
24 *appropriate.*

1 **SEC. 206. MOBILE LAUNCH PLATFORM AND INTERIM CRYO-**
2 **GENIC PROPULSION STAGE.**

3 *Consistent with NASA’s appropriation for fiscal year*
4 *2018, the Administrator shall pursue the following:*

5 *(1) The expeditious development of a new-build,*
6 *second Mobile Launch Platform specifically designed*
7 *to support the launch of Space Launch System con-*
8 *figurations that use the Exploration Upper Stage.*

9 *(2) The procurement of a second Interim Cryo-*
10 *genic Propulsion Stage.*

11 **SEC. 207. MARS 2033.**

12 *(a) FINDING.—Congress finds that human exploration*
13 *of Mars is an important objective in NASA’s human explo-*
14 *ration agenda.*

15 *(b) PRIORITIZATION.—The Administrator shall*
16 *prioritize timelines for fulfillment of the engineering,*
17 *science, and safety requirements to reduce mission risk and*
18 *ensure mission completion when evaluating human explo-*
19 *ration of Mars by 2033, if not sooner.*

20 **TITLE III—SCIENCE**

21 **Subtitle A—Earth Science**

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

24 *Chapter 605 of title 51, United States Code, is amend-*
25 *ed by adding at the end the following:*

1 **“§ 60507. Reimbursable basis for development of sen-**
2 **sors and instruments**

3 *“Any work undertaken by the Administration for the*
4 *benefit of another agency shall be conducted on a reimburs-*
5 *able basis that accounts for the full cost of the work, includ-*
6 *ing work undertaken for the development of operational*
7 *Earth science systems, including satellite, sensor, or instru-*
8 *ment development, acquisition, and operations, as well as*
9 *product development and data analysis.”.*

10 (1) *TECHNICAL AMENDMENT.—The table of sec-*
11 *tions for chapter 605 of title 51, United States Code,*
12 *is amended by adding at the end the following:*

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

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

14 *Section 702 of the National Aeronautics and Space*
15 *Administration Authorization Act of 2010 (42 U.S.C.*
16 *18371) is amended—*

17 (1) *by striking “The Director of” and inserting*
18 *the following:*

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

20 (2) *by adding at the end the following:*

21 *“(b) CONSIDERATION.—In carrying out the strategic*
22 *implementation plan under subsection (a), the Director*
23 *shall take into account and incorporate into such plan, as*
24 *appropriate, purchasing Earth observation data and serv-*

1 ices from the private sector or through public-private part-
2 nerships to meet Earth observation requirements.”.

3 **SEC. 303. LAND IMAGING.**

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

6 (1) the continuous collection and utilization of
7 land remote sensing data from space are of major
8 benefit in studying and understanding human im-
9 pacts on the global environment, in managing the
10 Earth’s natural resources, in carrying out national
11 security functions, and in planning and conducting
12 many other activities of scientific, economic, and so-
13 cial importance; and

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

20 (b) *CONTINUOUS LAND REMOTE SENSING DATA COL-*
21 *LECTION.*—

22 (1) *IN GENERAL.*—Subchapter IV of chapter 601
23 of title 51, United States Code, is amended by adding
24 at the end the following new section:

1 **“§ 60135. Continuous land remote sensing data collec-**
 2 **tion**

3 *“(a) POLICY.—It is the policy of the United States*
 4 *to—*

5 *“(1) ensure, to the greatest extent practicable, the*
 6 *continuous collection of space-based, medium-resolu-*
 7 *tion observations of the Earth’s land cover;*

8 *“(2) ensure that the collected data are made*
 9 *available in such ways as to facilitate the widest pos-*
 10 *sible use; and*

11 *“(3) foster, to the greatest extent practicable the*
 12 *development of U.S. private sector remote sensing ca-*
 13 *pabilities and analyses that can satisfy the public in-*
 14 *terest in long-term continuous collection of medium-*
 15 *resolution land remote sensing data.*

16 *“(b) COORDINATION.—The National Space Council, in*
 17 *consultation with other relevant Federal agencies, shall co-*
 18 *ordinate United States Government activities described*
 19 *under paragraphs (1) through (3) of subsection (a).”.*

20 *(2) CONFORMING AMENDMENT.—The table of sec-*
 21 *tions for subchapter IV of chapter 601 of title 51,*
 22 *United States Code, is amended by adding at the end*
 23 *the following new section:*

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

24 **SEC. 304. LANDSAT DATA POLICY.**

25 *(a) IN GENERAL.—*

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

9 (2) *REPORT.*—Not later than 1 year after the
10 date of enactment of this Act, the Administrator shall
11 transmit to the Committee on Science, Space, and
12 Technology of the House of Representatives and the
13 Committee on Commerce, Science, and Transpor-
14 tation of the Senate, a report containing the results
15 of the study required under paragraph (1).

16 (b) *DEFINITION OF LANDSAT SYSTEM.*—In this sec-
17 tion, the term “Landsat system” has the meaning given that
18 term in section 60101 of title 51, United States Code.

19 **SEC. 305. EARTH SCIENCE MISSIONS.**

20 *The Administrator shall continue to restructure the*
21 *Earth science portfolio of NASA to reduce overall costs, sup-*
22 *port innovative and sustainable programs and missions*
23 *with commercial and international partners, and align*
24 *with the recommendations of the National Academy of*
25 *Sciences included in the publication published in 2018 ti-*

1 tled “*Thriving on Our Changing Planet: A Decadal Strat-*
 2 *egy for Earth Observation from Space*” to ensure that the
 3 *Earth science portfolio is focused on the highest priority*
 4 *missions for the science and applications communities*
 5 *within a balanced, comprehensive Earth science program.*

6 **SEC. 306. GODDARD INSTITUTE FOR SPACE STUDIES IN-**
 7 **SPECTOR GENERAL REPORT.**

8 *Not later than 180 days after the date of enactment*
 9 *of this Act, the Administrator shall transmit to the Com-*
 10 *mittee on Science, Space, and Technology of the House of*
 11 *Representatives and the Committee on Commerce, Science,*
 12 *and Transportation of the Senate, a report containing the*
 13 *results of NASA’s implementation of the recommendations*
 14 *identified in the report published by the NASA Office of*
 15 *Inspector General on April 5, 2018, titled “NASA’s Man-*
 16 *agement of GISS: The Goddard Institute for Space Stud-*
 17 *ies”.*

18 ***Subtitle B—Astronomy and***
 19 ***Astrophysics***

20 **SEC. 311. SEARCH FOR THE ORIGIN, EVOLUTION, DISTRIBU-**
 21 **TION, AND FUTURE OF LIFE IN THE UNI-**
 22 **VERSE.**

23 *(a) POLICY.—Section 20102(d)(10) of title 51, United*
 24 *States Code, includes the search for life’s origin, evolution,*

1 *distribution, and future in the universe as an objective of*
2 *U.S. aeronautical and space activities.*

3 (b) *IN GENERAL.*—NASA shall partner with the pri-
4 *vate sector and philanthropic organizations to the max-*
5 *imum extent practicable to search for technosignatures, such*
6 *as radio transmissions, in order to meet the NASA objective*
7 *to search for life’s origin, evolution, distribution, and future*
8 *in the universe.*

9 (c) *REPORT.*—Not later than 90 days after the date
10 *of enactment of this Act, the Administrator shall submit*
11 *to the Committee on Science, Space, and Technology of the*
12 *House of Representatives and the Committee on Commerce,*
13 *Science, and Transportation of the Senate a report, pro-*
14 *duced in consultation with industry and academia, on all*
15 *NASA programs, including partnerships with the private*
16 *sector and philanthropic organizations, that contribute to*
17 *the search for life’s origin, evolution, distribution, and fu-*
18 *ture in the universe.*

19 (d) *AUTHORIZED FUNDING.*—Subject to the avail-
20 *ability of appropriations, the Administrator shall make*
21 *available at least \$10,000,000 for each of fiscal years 2018*
22 *and 2019 for the search for technosignatures.*

23 **SEC. 312. WIDE-FIELD INFRARED SPACE TELESCOPE.**

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

1 (1) *Concurrent flagship programs challenge sig-*
2 *nificantly NASA’s program management capacity, es-*
3 *pecially during later stages of the program manage-*
4 *ment process.*

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

8 (3) *WFIRST was funded in the amount of*
9 *\$150,000,000 in NASA’s appropriation for fiscal year*
10 *2018.*

11 (4) *Pursuant to direction in NASA’s appropria-*
12 *tion for fiscal year 2018, NASA is conducting a pre-*
13 *liminary life-cycle cost estimate, including any addi-*
14 *tions needed to achieve Class A classification, along*
15 *with a year-by-year breakout of development costs.*

16 (5) *Until such preliminary life-cycle cost esti-*
17 *mate is complete, Congress has insufficient informa-*
18 *tion to judge whether or not WFIRST should be au-*
19 *thorized to proceed in fiscal year 2019.*

20 (b) *TOTAL COST.—The total formulation and develop-*
21 *ment cost, as such term is defined in section 30104 of title*
22 *51, United States Code, for the Wide-Field Infrared Space*
23 *Telescope shall not exceed \$3,200,000,000.*

1 (c) *BUDGET.*—*The Administrator shall include in the*
2 *budget for fiscal year 2020 a 5-year funding profile nec-*
3 *essary to achieve the goal in subsection (b).*

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

8 ***Subtitle C—Planetary Science***

9 ***SEC. 321. NEAR-EARTH OBJECT SURVEY.***

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

11 (1) *The George E. Brown, Jr. Near-Earth Object*
12 *Survey Act (Public Law 109–155) established the*
13 *Near-Earth Object Survey program to detect, track,*
14 *and catalogue the physical characteristics of near-*
15 *Earth objects equal to or greater than 140 meters in*
16 *diameter in order to assess the threat of such objects*
17 *to Earth.*

18 (2) *The goal of the Survey program is to achieve*
19 *90 percent completion of the near-Earth project cata-*
20 *logue (based on statistically predicted populations of*
21 *near-Earth objects) not later than 15 years after the*
22 *date of the enactment of the George E. Brown, Jr.*
23 *Near-Earth Object Survey Act.*

24 (3) *NASA has been successful finding more than*
25 *90 percent of the near-Earth asteroids larger than one*

1 kilometer but has only found about 30 percent of the
2 near-Earth objects larger than 140 meters.

3 (4) *The vast majority of near-Earth object dis-*
4 *coveries have been made by NASA-supported ground-*
5 *based telescopic surveys.*

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

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

14 (2) *the space-based telescope Near-Earth Object*
15 *Camera mission, or a similar infrared telescope con-*
16 *cept optimized for near-Earth object search and char-*
17 *acterization, could discover and characterize most of*
18 *the potentially hazardous asteroids that are near the*
19 *Earth.*

20 **SEC. 322. SPACE NUCLEAR POWER.**

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

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

1 (1) *to continue the development of in-space nu-*
2 *clear fission technology, as necessary, for purposes in-*
3 *cluding—*

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

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

8 (C) *power generation on the surface of celes-*
9 *tial bodies;*

10 (D) *extraction and processing of in situ re-*
11 *sources; and*

12 (E) *nuclear thermal and nuclear electric*
13 *propulsion able to transport crew or cargo*
14 *among Earth and other celestial bodies much*
15 *more rapidly than is practical with non-nuclear*
16 *systems;*

17 (2) *that research and development of in-space*
18 *nuclear fission power should be carried out as part of*
19 *a portfolio that appropriately balances development of*
20 *power systems at different sizes and maturities, with*
21 *an emphasis on early development of mature, oper-*
22 *ational systems; and*

23 (3) *that NASA should continually seek to*
24 *streamline the process for space launch approval of*
25 *nuclear materials, eliminate redundant and unneeded*

1 *processes, and regularize the process for efficient, reg-*
2 *ular functioning, and toward that end, the Adminis-*
3 *trator should update the launch approval process and*
4 *seek to establish a licensing process for private nu-*
5 *clear power sources in space.*

6 *(c) SPACE NUCLEAR POWER REPORT.—*

7 *(1) IN GENERAL.—Not later than 180 days after*
8 *the date of enactment of this Act, the Administrator*
9 *shall submit to the Committee on Science, Space, and*
10 *Technology of the House of Representatives and the*
11 *Committee on Commerce, Science, and Transpor-*
12 *tation of the Senate a report, produced in consulta-*
13 *tion with industry and academia, on the use and role*
14 *of nuclear fission power in space.*

15 *(2) CONTENTS.—The report required under*
16 *paragraph (1) shall include—*

17 *(A) an assessment of the prospects for in-*
18 *space nuclear fission reactors, describing par-*
19 *ticular roles and missions for which nuclear*
20 *power is uniquely well-suited;*

21 *(B) a description of the convergence between*
22 *NASA's existing Plutonium-238 RTG programs*
23 *and ongoing nuclear thermal propulsion and nu-*
24 *clear power generation development programs;*

1 (C) a detailed plan for encouraging conver-
2 gence between NASA's various nuclear power
3 and propulsion efforts;

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

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

11 (F) how small in-space nuclear fission reac-
12 tors can complement or replace existing and
13 planned radioisotope thermal generator capabili-
14 ties;

15 (G) information on very low cost, high reli-
16 ability designs that can be made operational
17 quickly; and

18 (H) a cost analysis, including long-term
19 and security costs, of the use of highly enriched
20 uranium versus low-enriched uranium in power
21 generation in space applications, including sur-
22 face power and in-space propulsion.

23 (d) *DEMONSTRATION.*—NASA should demonstrate a
24 nuclear power reactor for use in space using existing au-

1 *thorized funding levels and within a schedule made possible*
 2 *by appropriated funding.*

3 **TITLE IV—AERONAUTICS**

4 **SEC. 401. SUPERSONIC RESEARCH.**

5 *(a) POLICY.—It is the policy of the United States to*
 6 *reduce Government barriers to the development of civil su-*
 7 *personic transportation.*

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

10 *(1) by striking “The Administrator” and insert-*
 11 *ing the following:*

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

13 *(2) by adding at the end the following:*

14 *“(2) RESEARCH.—The Administrator, in con-*
 15 *sultation with the Administrator of the Federal Avia-*
 16 *tion Administration, shall undertake research on su-*
 17 *personic transport to inform and accelerate the pro-*
 18 *mulgation of domestic regulations and international*
 19 *standards and recommended practices that will open*
 20 *up the U.S. civil airspace to civil supersonic trans-*
 21 *port.”.*

22 **SEC. 402. UNMANNED AIRCRAFT SYSTEMS RESEARCH.**

23 *(a) IN GENERAL.—*

1 (1) *TITLE 51.—Chapter 315 of title 51, United*
2 *States Code, is amended by adding at the end the fol-*
3 *lowing:*

4 **“§31506. Unmanned aircraft systems research**

5 *“The Administrator, in consultation with the Admin-*
6 *istrator of the Federal Aviation Administration and other*
7 *Federal agencies, shall conduct research on facilitating the*
8 *safe integration of unmanned aircraft systems into the na-*
9 *tional airspace system, including—*

10 *“(1) positioning and navigation systems;*

11 *“(2) sense-and-avoid capabilities;*

12 *“(3) secure data and communication links;*

13 *“(4) flight recovery systems; and*

14 *“(5) human systems integration.”.*

15 (2) *CONFORMING AMENDMENT.—The table of sec-*
16 *tions for chapter 315 of title 51, United States Code,*
17 *is amended by adding at the end the following new*
18 *item:*

“31506. Unmanned aircraft systems research.”.

19 (b) *COOPERATIVE UNMANNED AERIAL VEHICLE AC-*
20 *TIVITIES.—Section 31504 of title 51, United States Code,*
21 *is amended by adding at the end the following: “Oper-*
22 *ational flight data derived from such cooperative agree-*
23 *ments shall be made available, in appropriate and usable*
24 *formats, to the Administration and the Federal Aviation*

1 *Administration for the development of regulatory stand-*
2 *ards.”.*

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

5 (a) *ESTABLISHMENT.*—*The Administrator shall estab-*
6 *lish an initiative to be known as the 21st Century Aero-*
7 *navitics Research Capabilities Initiative, funded through the*
8 *Construction of Facilities account, to ensure that NASA*
9 *possesses the infrastructure capabilities and computational*
10 *tools necessary to conduct flight demonstration projects*
11 *across the range of NASA aeronautics interests.*

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

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

17 (2) *support flight testing activities.*

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

23 (d) *REPORT.*—

24 (1) *REPORT REQUIRED.*—*Not later than 120*
25 *days after the date of enactment of this Act, the Ad-*

1 *administrator shall submit to the Committee on Science,*
2 *Space, and Technology of the House of Representa-*
3 *tives and the Committee on Commerce, Science, and*
4 *Transportation of the Senate a report containing a 5-*
5 *year plan for the implementation of the 21st Century*
6 *Aeronautics Research Capabilities Initiative.*

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

9 (A) *a description of proposed projects;*

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

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

15 (e) *AUTHORIZATION OF APPROPRIATIONS.—There are*
16 *authorized to be appropriated \$50,000,000, funded through*
17 *the Construction of Facilities account, for fiscal year 2019*
18 *to carry out this section.*

19 **SEC. 404. EXPERIMENTAL PLANE PROGRAM.**

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

23 (b) *OBJECTIVE.—One of the fundamental objectives of*
24 *NASA aeronautics research is the steady progression and*
25 *expansion of high-speed flight research and capabilities, in-*

1 *cluding the science and technology of critical underlying*
2 *disciplines and competencies, the most important of which*
3 *are computational-based analytical and predictive tools*
4 *and methodologies, aero thermodynamics, high-speed flight*
5 *propulsion, high-temperature structures and materials, and*
6 *flight controls.*

7 **SEC. 405. HYPERSONIC TECHNOLOGY PROJECT.**

8 (a) *FINDINGS.—Congress finds that—*

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

11 (2) *though hypersonic flight technologies are like-*
12 *ly to be applied to enhance defense systems in the*
13 *near-term, in the long-term, application of such tech-*
14 *nologies may expand to include improved access-to-*
15 *space capabilities that benefit NASA; and*

16 (3) *NASA maintains specialized facilities and*
17 *experts who will focus on research areas that explore*
18 *challenges in hypersonic flight.*

19 (b) *POLICY.—In carrying out the Hypersonic Tech-*
20 *nology Project, NASA should focus research and develop-*
21 *ment efforts on high-speed propulsion systems, reusable ve-*
22 *hicle technologies, high-temperature materials, and systems*
23 *analysis.*

24 (c) *AUTHORIZED FUNDING.—Subject to the avail-*
25 *ability of appropriations, the Administrator shall make*

1 *available at least \$30,000,000 for fiscal year 2019 for the*
2 *Hypersonic Technology Project from the Aeronautics ac-*
3 *count.*

4 **SEC. 406. REPORT.**

5 *The Administrator shall submit to the Committee a re-*
6 *port on the development of the Low-Boom Flight Dem-*
7 *onstration aircraft, including the following:*

8 *(1) NASA’s planned coordination with other ex-*
9 *ecutive agencies to ensure developmental and oper-*
10 *ational testing infrastructure availability during*
11 *flight demonstration.*

12 *(2) NASA’s acquisition strategy to ensure avail-*
13 *ability of chase aircraft for flight demonstration.*

14 **TITLE V—COMMERCIAL**

15 **SEC. 501. COMMERCIAL SUPPLY OF SPACE PRODUCTS.**

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

19 **“§ 50117. Commercial supply of space products**

20 *“(a) IN GENERAL.—In planning and carrying out*
21 *space exploration missions, the Administrator shall, to the*
22 *greatest extent practicable, prioritize the acquisition and*
23 *use of space products provided by a United States commer-*
24 *cial provide.*

1 “(b) *SPACE PRODUCT DEFINED.*—*In this section, the*
2 *term ‘space product’ means a tangible good, including a*
3 *finished good, or commodity, including a propellant, water,*
4 *oxygen, or gas, that—*

5 “(1) *is required for space exploration activities;*
6 *and*

7 “(2) *originates in outer space.*

8 “(c) *COMMODITIES USED IN SPACE.*—

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

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

19 “(A) *the estimated cost to procure the com-*
20 *modity on Earth and deliver the commodity to*
21 *the location of use; and*

22 “(B) *the estimated cost for the Government*
23 *to procure the equivalent commodity that is a*
24 *space product.*

1 “(3) *PUBLICATION.*—*The Administrator shall*
2 *annually publish the information compiled under*
3 *paragraphs (1) and (2) during the previous calendar*
4 *year.*

5 “(d) *EXCEPTIONS.*—*The Administrator shall not be re-*
6 *quired to prioritize the acquisition of space products for the*
7 *purposes described in subsection (a) if, on a case-by-case*
8 *basis—*

9 “(1) *the Administrator determines that—*

10 “(A) *cost-effective space products that meet*
11 *specific mission requirements would not be rea-*
12 *sonably available from United States commercial*
13 *providers when required;*

14 “(B) *the use of space products from United*
15 *States commercial providers poses an unaccept-*
16 *able mission risk; or*

17 “(C) *the use of space products is incon-*
18 *sistent with international agreements for inter-*
19 *national collaborative efforts relating to science*
20 *and technology; or*

21 “(2) *the Secretary of the Air Force determines*
22 *that the use of space commodities from United States*
23 *commercial providers is inconsistent with national se-*
24 *curity objectives.*

1 “(e) *AGREEMENTS WITH FOREIGN ENTITIES.*—Nothing
2 *in this section shall prevent the Administrator from*
3 *planning or negotiating agreements with foreign govern-*
4 *mental entities for the provision of space products.”.*

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

“50117. Commercial supply of space products.”.

8 ***SEC. 502. SPACE SERVICES AND IN-SPACE INFRASTRUC-***
9 ***TURE.***

10 (a) *SENSE OF CONGRESS.*—*It is the sense of Congress*
11 *that there exist many commercial opportunities with a wide*
12 *array of providers and partners that will allow for more*
13 *effective use of taxpayer investments in the pursuit of the*
14 *long-term goals of NASA, as described in section 202(a) of*
15 *the National Aeronautics and Space Administration Au-*
16 *thorization Act of 2010 (42 U.S.C. 18312(a)), including ex-*
17 *panding permanent human presence beyond low-Earth*
18 *orbit.*

19 (b) *REPORT.*—*Not later than 120 days after the date*
20 *of enactment of this Act, the Administrator shall submit*
21 *to the Committee on Science, Space, and Technology of the*
22 *House of Representatives and the Committee on Commerce,*
23 *Science, and Transportation of the Senate a report describ-*
24 *ing the various commercial opportunities and options for*

1 *the procurement of in-space services or use of in-space in-*
2 *frastructure for exploration and other NASA missions.*

3 **SEC. 503. PREFERENCE FOR LAUNCH VEHICLES MANUFAC-**
4 **TURED IN THE UNITED STATES.**

5 *It is the sense of Congress that the Administrator*
6 *should, to the greatest extent possible, with respect to enter-*
7 *ing into contracts for commercial space data and services,*
8 *provide weighed preference, selection points, and other in-*
9 *centives for the use of launch vehicles that are manufactured*
10 *in the United States.*

11 **SEC. 504. STUDIES ON INDUSTRIAL BASE.**

12 *No funds may be obligated or expended by the Admin-*
13 *istrator for purposes of carrying out a Bureau of Industry*
14 *and Security survey of the United States aerospace indus-*
15 *trial base until the date that is 30 days after the date on*
16 *which the Administrator submits to the Committee on*
17 *Science, Space, and Technology of the House of Representa-*
18 *tives and the Committee on Commerce, Science, and Trans-*
19 *portation of the Senate a written notification that in-*
20 *cludes—*

21 *(1) the proposed subject matter of such survey;*

22 *(2) a description of the information to be re-*
23 *quired of survey respondents; and*

1 (3) any penalties proposed to be assessed by the
2 *Federal Government against respondents for non-*
3 *compliance with survey requirements.*

4 **SEC. 505. ENHANCED-USE LEASING.**

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

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

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

12 (3) *nongovernmental entities, States, and local*
13 *governments may be able to use such facilities in a*
14 *manner that is cost-effective; and*

15 (4) *agreements between NASA and nongovern-*
16 *mental entities, States, and local governments regard-*
17 *ing the use of such facilities may offset a portion of*
18 *the spending of NASA.*

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

23 (c) *CONDITION ON USE OF FUNDS.—For any year for*
24 *which funds are made available under section 20145 of title*
25 *51, United States Code, (as amended by subsection (b)), no*

1 *funds may be expended by the Administrator under such*
2 *section after January 31 unless the Administrator submits,*
3 *before such date, to the Committee on Science, Space, and*
4 *Technology of the House of Representatives and the Com-*
5 *mittee on Commerce, Science, and Transportation of the*
6 *Senate the annual report required under such section for*
7 *the prior year.*

8 **SEC. 506. SATELLITE SERVICING.**

9 *The Administrator shall continue to restructure NASA*
10 *investments in the development of satellite servicing tech-*
11 *nologies to reduce the overall cost to NASA and align with*
12 *NASA needs for exploration.*

13 **TITLE VI—POLICY**

14 **SEC. 601. NASA-FUNDED INSTITUTES.**

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

17 *(1) NASA does not aggregate information on the*
18 *universe, status, or funding levels for the many insti-*
19 *tutes it supports;*

20 *(2) the absence of this information makes it dif-*
21 *ficult for NASA leaders to strategically evaluate the*
22 *scope or purpose of its institute investments and for*
23 *Congress and other stakeholders to understand how*
24 *NASA is spending more than three-quarters of a bil-*
25 *lion dollars of its budget annually;*

1 (3) *absent comprehensive, centralized informa-*
2 *tion about these investments, it may be difficult for*
3 *NASA to avoid duplication among its efforts;*

4 (4) *NASA has not defined what constitutes an*
5 *institute or established guidance and metrics on the*
6 *management, use, or expectations for return on in-*
7 *vestment;*

8 (5) *such guidance may enable NASA to gain a*
9 *better understanding of how funds directed to NASA-*
10 *funded institutes are utilized to accomplish the mis-*
11 *sion and goals of NASA, increase its return on invest-*
12 *ment, and evaluate the performance of such institutes;*
13 *and*

14 (6) *NASA lacks a standard process to assess a*
15 *potential grantee’s financial condition prior to grant*
16 *award or to impose additional reporting or oversight*
17 *requirements that such a condition may warrant, and*
18 *without such a mechanism, NASA risks making unin-*
19 *formed investment decisions.*

20 (b) *INSTITUTE BUDGETS.*—*Section 30103(a) of title*
21 *51, United States Code, is amended—*

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

24 (2) *by redesignating paragraph (6) as para-*
25 *graph (7); and*

1 (3) by inserting after paragraph (5) the fol-
2 lowing:

3 “(6) the budget for each NASA-funded institute;
4 and”.

5 (c) *REPORT*.—Not later than 90 days after the date
6 of enactment of this Act, the Administrator shall submit
7 to the Committee on Science, Space, and Technology of the
8 House of Representatives and the Committee on Commerce,
9 Science, and Transportation of the Senate a report that rec-
10 ommends guidance and metrics for the management, utili-
11 zation, expectations for return on investment, and financial
12 condition of NASA-funded institutes.

13 **SEC. 602. BASELINE AND COST CONTROLS.**

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

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

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

18 and

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

20 “(iv) any changes made in the per-
21 formance or schedule milestones and the de-
22 gree to which such changes have contributed
23 to the increase in total cost;

24 “(v) new estimates of the specific
25 project or specific program cost; and

1 “(vi) a statement validating that the
2 management structure of the project or pro-
3 gram is adequate to control cost; and”.

4 **SEC. 603. REPORTS TO CONGRESS.**

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

7 **“§ 30105. Concurrent reports**

8 “*For any report that the Administration submits to*
9 *the Committee on Appropriations of the House of Rep-*
10 *resentatives or the Committee on Appropriations of the Sen-*
11 *ate, the Administrator shall concurrently submit such re-*
12 *port to the Committee on Science, Space, and Technology*
13 *of the House of Representatives and the Committee on Com-*
14 *merce, Science, and Transportation of the Senate.”.*

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

 “30105. Concurrent reports.”.

18 **SEC. 604. INTERNATIONAL TECHNICAL AND OPERATIONAL**
19 **STANDARDS.**

20 (a) *FINDINGS.*—Congress finds that—

21 (1) section 71301 of title 51, United States Code,
22 directs the Administrator to “enter into discussions
23 with the appropriate representatives of spacefaring
24 nations who have or plan to have crew transportation
25 systems capable of orbital flight or flight beyond low

1 *Earth orbit for the purpose of agreeing on a common*
2 *docking system standard”;*

3 *(2) the development of an international docking*
4 *standard has been beneficial in promoting Govern-*
5 *ment and private sector space exploration, interoper-*
6 *ability, and United States international leadership;*

7 *(3) NASA continues the development described in*
8 *paragraph (2) by coordinating the development of*
9 *joint international deep space interoperability stand-*
10 *ards; and*

11 *(4) the long-term goals of NASA, as described in*
12 *section 202(a) of the National Aeronautics and Space*
13 *Administration Authorization Act of 2010 (42 U.S.C.*
14 *18312(a)), include expanding permanent human pres-*
15 *ence beyond low-Earth orbit.*

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

18 *(1) the plans of NASA for crewed exploration be-*
19 *yond low-Earth orbit should involve a wide array of*
20 *partners to address the technological challenges of*
21 *deep space exploration;*

22 *(2) the development of common terminology and*
23 *concepts for spacecraft design and safety will help*
24 *promote NASA leadership in space and spacecraft de-*
25 *sign;*

1 (3) *the adoption of common design and safety*
2 *terminology and concepts across NASA would enable*
3 *NASA to pursue the long-term goals of NASA, de-*
4 *scribed in section 202(a) of the National Aeronautics*
5 *and Space Administration Authorization Act of 2010*
6 *(42 U.S.C. 18312(a)), in a manner that is effective*
7 *and efficient; and*

8 (4) *NASA should continue to develop and pro-*
9 *mote common terminology and concepts for spacecraft*
10 *design and safety.*

11 **SEC. 605. NASA CONTRACTOR RESPONSIBILITY WATCH**

12 **LIST.**

13 (a) *IN GENERAL.—The Administrator shall establish*
14 *and maintain a watch list of contractors with a history*
15 *of poor performance on space procurement contracts or re-*
16 *search, development, test, and evaluation space program*
17 *contracts.*

18 (b) *BASIS FOR INCLUSION ON LIST.—*

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

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

3 (B) *Financial concerns.*

4 (C) *Felony convictions or civil judgements.*

5 (D) *Security or foreign ownership and con-*
6 *trol issues.*

7 (2) *DISCRETION OF THE ADMINISTRATOR.—The*
8 *Administrator shall be responsible for determining*
9 *which contractors to place on the watch list, whether*
10 *an entire company or a specific division should be in-*
11 *cluded, and when to remove a contractor from the list.*

12 (c) *EFFECT OF LISTING.—*

13 (1) *PRIME CONTRACTS.—NASA may not solicit*
14 *an offer from, award a contract to, execute an engi-*
15 *neering change proposal with, or exercise an option*
16 *on any program of NASA with a contractor included*
17 *on the list established under subsection (a) without*
18 *the prior direct approval of the Administrator.*

19 (2) *SUBCONTRACTS.—A prime contractor on a*
20 *contract entered into with NASA may not enter into*
21 *a subcontract valued in excess of \$3,000,000 or five*
22 *percent of the prime contract value, whichever is less-*
23 *er, with a contractor included on the watch list estab-*
24 *lished under subsection (a) without the prior approval*
25 *of the Administrator.*

1 (d) *REQUEST FOR REMOVAL FROM LIST.*—A con-
2 tractor may submit to the Administrator a written request
3 for removal from the watch list, including evidence that the
4 contractor has resolved the issue that was the basis for in-
5 clusion on the list.

6 (e) *RULE OF CONSTRUCTION.*—Nothing in this section
7 shall be construed as preventing the suspension or debar-
8 ment of a contractor, but inclusion on the watch list shall
9 not be construed as a punitive measure or de facto suspen-
10 sion or debarment of a contractor.

11 **SEC. 606. HUMAN SPACE EXPLORATION RISK.**

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

13 (1) *American leadership in the peaceful explo-*
14 *ration and use of outer space has been a long-stand-*
15 *ing priority for the United States.*

16 (2) *The reestablishment of the National Space*
17 *Council in 2017 by the President demonstrates the*
18 *strategic importance of outer space to the Nation.*

19 (3) *The December 2017 National Security Strat-*
20 *egy of the United States establishes the broad strategic*
21 *importance of outer space exploration and use for the*
22 *United States.*

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

1 (1) *exploration and use of outer space is a mat-*
2 *ter of broad, national strategic importance; and*

3 (2) *space exploration decision-making and re-*
4 *quirement-setting in such a strategic context is com-*
5 *plex, especially with respect to setting appropriate*
6 *priorities and levels of risk tolerance.*

7 (c) *REPORT ON INHERENT JUSTIFIABLE RISK.—*

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

15 (2) *POLICY AND STRATEGY.—The Administrator*
16 *shall engage with appropriate members of the private*
17 *sector, academia, and nonprofit organizations on a*
18 *policy and strategy of enterprise-level engineering and*
19 *operational risk management to present in the report*
20 *that addresses inherent, justifiable risks of loss of life*
21 *that may occur in space exploration and use.*

22 (3) *CONTENTS.—The report required under*
23 *paragraph (1) shall—*

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

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

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

6 **SEC. 607. NASA LAUNCH SUPPORT AND INFRASTRUCTURE**
7 **MODERNIZATION PROGRAM.**

8 (a) *LAUNCH SUPPORT AND INFRASTRUCTURE MOD-*
9 *ERNIZATION.*—*The Administrator shall continue the pro-*
10 *gram established under section 305 of the National Aero-*
11 *navitics and Space Administration Authorization Act of*
12 *2010 (42 U.S.C. 18325) for launch support and infrastruc-*
13 *ture modernization for launch sites and ranges at NASA*
14 *facilities that support the International Space Station mis-*
15 *sion.*

16 (b) *LEVERAGE OF INFRASTRUCTURE INVESTMENTS.*—
17 *Such program should, to the greatest extent practicable, le-*
18 *verage current and planned State government infrastruc-*
19 *ture investments at NASA facilities to support these and*
20 *other missions and use funding available under this pro-*
21 *gram to collaborate on relevant infrastructure projects.*

22 **SEC. 608. REAFFIRMATIONS ON ORBITAL DEBRIS.**

23 (a) *REAFFIRMATION OF FINDINGS.*—*Congress reaf-*
24 *firms the findings under section 839(a) of the National Aer-*

1 *onautics and Space Administration Transition Authoriza-*
2 *tion Act of 2017 (Public Law 115–10) that—*

3 *(1) orbital debris poses serious risks to the oper-*
4 *ational space capabilities of the United States;*

5 *(2) an international commitment and integrated*
6 *strategic plan are needed to mitigate the growth of or-*
7 *bital debris wherever possible; and*

8 *(3) the delay in the Office of Science and Tech-*
9 *nology Policy’s submission of a report on the status*
10 *of international coordination and development of or-*
11 *bital debris mitigation strategies is inconsistent with*
12 *such risks.*

13 *(b) REAFFIRMATION OF SENSE OF CONGRESS.—Con-*
14 *gress reaffirms the sense of Congress under section 840(a)*
15 *of the National Aeronautics and Space Administration*
16 *Transition Authorization Act of 2017 (Public Law 115–10)*
17 *that—*

18 *(1) orbital debris in low-Earth orbit poses sig-*
19 *nificant risks to spacecraft;*

20 *(2) such orbital debris may increase due to colli-*
21 *sions between existing debris objects; and*

22 *(3) understanding options to address and remove*
23 *orbital debris is important for ensuring safe and ef-*
24 *fective spacecraft operations in low-Earth orbit.*

1 **SEC. 609. FEDERAL-STATE PARTNERSHIPS.**

2 (a) *SENSE OF CONGRESS.*—*It is the sense of Congress*
3 *that, as State and local governments have invested hundreds*
4 *of millions of dollars in new infrastructure and operations*
5 *at Administration space facilities to meet the needs of civil,*
6 *national security, and commercial space activities, the Ad-*
7 *ministration should seek to leverage such investments and*
8 *the resources and capabilities of State and local govern-*
9 *ments.*

10 (b) *REPORT.*—*Not later than 120 days after the date*
11 *of enactment of this Act, the Administrator shall submit*
12 *to Congress a report describing—*

13 (1) *existing partnerships with State and local*
14 *governments at Administration facilities;*

15 (2) *past and current investments and partner-*
16 *ships in facility infrastructure and operations with*
17 *State and local government that benefitted Federal,*
18 *State, and commercial users;*

19 (3) *the contracting mechanisms used and the av-*
20 *erage response time from a facility infrastructure*
21 *partnership proposal to approval by the Administra-*
22 *tion;*

23 (4) *current or prospective opportunities for Fed-*
24 *eral-State matching grant funding to support shared*
25 *infrastructure;*

1 (5) *the benefits and challenges associated with*
2 *Federal-State infrastructure partnerships; and*

3 (6) *how, if at all, the Administration should ex-*
4 *pend Federal-State partnerships to better meet the*
5 *needs of civil, national security, and commercial*
6 *space activities.*

7 **SEC. 610. SECURITY MANAGEMENT OF FOREIGN NATIONAL**
8 **ACCESS.**

9 *The Administrator shall notify the Committee on*
10 *Science, Space, and Technology of the House of Representa-*
11 *tives and the Committee on Commerce, Science, and Trans-*
12 *portation of the Senate when the agency has implemented*
13 *the information technology security recommendations from*
14 *the National Academy of Public Administration on foreign*
15 *national access management.*

Union Calendar No. 853

115TH CONGRESS
2^D Session

H. R. 5503

[Report No. 115-1102]

A BILL

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

DECEMBER 21, 2018

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