required technology development activities, the management strategy to be followed, related ISS activities, planned international collaborative activities, potential commercial contributions, and other activities relevant to the achievement of the goal established in this section.

''(3) CONSIDERATIONS.—In developing the human exploration roadmap, the Administrator shall consider—

''(A) using key exploration capabilities, namely the Space Launch System and Orion;

''(B) using existing commercially available technologies and capabilities or those technologies and capabilities being developed by industry for commercial purposes;

''(C) establishing an organizational approach to ensure collaboration and coordination among NASA's Mission Directorates under section 821 [set out as a note under section 20111 of this title], when appropriate, including to collect and return to Earth a sample from the Martian surface;

''(D) building upon the initial uncrewed mission, Artemis I, and first crewed mission, Artemis II, of the Space Launch System and Orion to establish a sustainable cadence of missions extending human exploration missions into cis-lunar space, including anticipated timelines and milestones;

''(E) developing the robotic and precursor missions and activities that will demonstrate, test, and develop key technologies and capabilities essential for achieving human missions to Mars, including long-duration human operations beyond low-Earth orbit, space suits, solar electric propulsion, deep space habitats, environmental control life support systems, Mars lander and ascent vehicle, entry, descent, landing, ascent, Mars surface systems, and in-situ resource utilization;

''(F) demonstrating and testing 1 or more habitat modules in cis-lunar space to prepare for Mars missions;

''(G) using public-private, firm fixed-price partnerships, where practicable;

''(H) collaborating with international, academic, and industry partners, when appropriate;

''(I) any risks to human health and sensitive onboard technologies, including radiation exposure;

''(J) any risks identified through research outcomes under the NASA Human Research Program's Behavioral Health Element; and

''(K) the recommendations and ideas of several independently developed reports or concepts that describe potential Mars architectures or concepts and identify Mars as the long-term goal for human space exploration, including the reports described under section 431.

''(4) CRITICAL DECISION PLAN ON HUMAN SPACE EXPLORATION.—As part of the human exploration roadmap, the Administrator shall include a critical decision plan—

''(A) identifying and defining key decisions guiding human space exploration priorities and plans that need to be made before June 30, 2020, including decisions that may guide human space exploration capability development, precursor missions, long-term missions, and activities;

''(B) defining decisions needed to maximize efficiencies and resources for reaching the near, intermediate, and long-term goals and objectives of human space exploration; and

''(C) identifying and defining timelines and milestones for a sustainable cadence of missions beginning with Artemis III for the Space Launch System and Orion to extend human exploration from cis-lunar space to the surface of Mars.

''(5) REPORTS.—

''(A) INITIAL HUMAN EXPLORATION ROADMAP.—The Administrator shall submit to the appropriate committees of Congress—

''(i) an initial human exploration roadmap, including a critical decision plan, before December 1, 2017; and

''(ii) an updated human exploration roadmap periodically as the Administrator considers necessary but not less than biennially.

''(B) CONTENTS.—Each human exploration roadmap under this paragraph shall include a description of—

''(i) the achievements and goals accomplished in the process of developing such capabilities and technologies during the 2-year period prior to the submission of the human exploration roadmap; and

''(ii) the expected goals and achievements in the following 2-year period.

''(C) SUBMISSION WITH BUDGET.—Each human exploration roadmap under this section shall be included in the budget for that fiscal year transmitted to Congress under section 1105(a) of title 31, United States Code.''

[Pub. L. 117–167, div. B, title VII, §10817(b), Aug. 9, 2022, 136 Stat. 1740, which directed amendment of section 432(b) of the National Aeronautics and Space Administration Authorization Act of 2017, was executed by amending section 432(b) of Pub. L. 115–10, set out above, which is section 432(b) of the National Aeronautics and Space Administration Transition Authorization Act of 2017, to reflect the probable intent of Congress.]

[For definitions of terms used in sections 431 and 432 of Pub. L. 115–10, set out above, see section 2 of Pub. L. 115–10, set out as a note under section 10101 of this title.]

§ 20303. Contribution to innovation

(a) PARTICIPATION IN INTERAGENCY ACTIVITIES.—The Administration shall be a full participant in any interagency effort to promote innovation and economic competitiveness through near-term and long-term basic scientific research and development and the promotion of science, technology, engineering, and mathematics education, consistent with the Administration's mission, including authorized activities.

(b) HISTORIC FOUNDATION.—In order to carry out the participation described in subsection (a), the Administrator shall build on the historic role of the Administration in stimulating excellence in the advancement of physical science and engineering disciplines and in providing opportunities and incentives for the pursuit of academic studies in science, technology, engineering, and mathematics.

(c) BALANCED SCIENCE PROGRAM AND ROBUST AUTHORIZATION LEVELS.—The balanced science program authorized by section 101(d) of the National Aeronautics and Space Administration Authorization Act of 2005 (42 U.S.C. 16611(d))[1] shall be an element of the contribution by the Administration to the interagency programs.

(d) ANNUAL REPORT.—

(1) REQUIREMENT.—The Administrator shall submit to Congress and the President an annual report describing the activities conducted pursuant to this section, including a description of the goals and the objective metrics upon which funding decisions were made.

(2) CONTENT.—Each report submitted pursuant to paragraph (1) shall include, with regard to science, technology, engineering, and mathematics education programs, at a minimum, the following:

(A) A description of each program.

[1] See References in Text note below.

(B) The amount spent on each program.

(C) The number of students or teachers served by each program.

(Pub. L. 111–314, § 3, Dec. 18, 2010, 124 Stat. 3356.)

HISTORICAL AND REVISION NOTES

Revised Section	*Source (U.S. Code)*	*Source (Statutes at Large)*
20303(a)	42 U.S.C. 16611a(a).	Pub. L. 110–69, title II, § 2001(a), (b), (c), (e), Aug. 9, 2007, 121 Stat. 582.
20303(b)	42 U.S.C. 16611a(b).	
20303(c)	42 U.S.C. 16611a(c).	
20303(d)	42 U.S.C. 16611a(e).	

Editorial Notes

REFERENCES IN TEXT

Section 101(d) of the National Aeronautics and Space Administration Authorization Act of 2005 (42 U.S.C. 16611(d)), referred to in subsec. (c), is section 101(d) of Pub. L. 109–155, title I, Dec. 30, 2005, 119 Stat. 2897, which was omitted from the Code following the enactment of this title by Pub. L. 111–314.

Statutory Notes and Related Subsidiaries

INTERNATIONAL SPACE STATION'S CONTRIBUTION TO NATIONAL COMPETITIVENESS ENHANCEMENT

Pub. L. 111–358, title II, § 204, Jan. 4, 2011, 124 Stat. 3994, provided that:

''(a) SENSE OF CONGRESS.—It is the sense of the Congress that the International Space Station represents a valuable and unique national asset which can be utilized to increase educational opportunities and scientific and technological innovation which will enhance the Nation's economic security and competitiveness in the global technology fields of endeavor. If the period for active utilization of the International Space Station is extended to at least the year 2020, the potential for such opportunities and innovation would be increased. Efforts should be made to fully realize that potential.

''(b) EVALUATION AND ASSESSMENT OF NASA'S INTERAGENCY CONTRIBUTION.—Pursuant to the authority provided in title II of the America COMPETES Act (Public Law 110–69 [see Tables for classification]), the Administrator [of NASA] shall evaluate and, where possible, expand efforts to maximize NASA's [National Aeronautics and Space Administration's] contribution to interagency efforts to enhance science, technology, engineering, and mathematics education capabilities, and to enhance the Nation's technological excellence and global competitiveness. The Administrator shall identify these enhancements in the annual reports required by section 2001(e) of that Act ([former] 42 U.S.C. 16611a(e)) [now 51 U.S.C. 20303(d)].

''(c) REPORT TO THE CONGRESS.—Within 120 days after the date of enactment of this Act [Jan. 4, 2011], the Administrator shall provide to the House of Representatives Committee on Science and Technology [now Committee on Science, Space, and Technology] and the Senate Committee on Commerce, Science, and Transportation a report on the assessment made pursuant to subsection (a). The report shall include—

''(1) a description of current and potential activities associated with utilization of the International Space Station which are supportive of the goals of educational excellence and innovation and competitive enhancement established or reaffirmed by this Act [see Short Title of 2011 Amendment note set out under section 1861 of Title 42, The Public Health and Welfare], including a summary of the goals supported, the number of individuals or organizations participating in or benefiting from such activities, and a summary of how such activities might be expanded or improved upon;

''(2) a description of government and private partnerships which are, or may be, established to effectively utilize the capabilities represented by the International Space Station to enhance United States competitiveness, innovation and science, technology, engineering, and mathematics education; and

''(3) a summary of proposed actions or activities to be undertaken to ensure the maximum utilization of the International Space Station to contribute to fulfillment of the goals and objectives of this Act, and the identification of any additional authority, assets, or funding that would be required to support such activities.''

§ 20304. Basic research enhancement

(a) DEFINITION OF BASIC RESEARCH.—In this section, the term ''basic research'' has the meaning given the term in Office of Management and Budget Circular No. A–11.

(b) COORDINATION.—The Administrator, the Director of the National Science Foundation, the Secretary of Energy, the Secretary of Defense, and the Secretary of Commerce shall, to the extent practicable, coordinate basic research activities related to physical sciences, technology, engineering, and mathematics.

(Pub. L. 111–314, § 3, Dec. 18, 2010, 124 Stat. 3357.)

HISTORICAL AND REVISION NOTES

Revised Section	*Source (U.S. Code)*	*Source (Statutes at Large)*
20304	42 U.S.C. 16658.	Pub. L. 110–69, title II, § 2003, Aug. 9, 2007, 121 Stat. 583.

§ 20305. National Academies decadal surveys

(a) IN GENERAL.—The Administrator shall enter into agreements on a periodic basis with the National Academies for independent assessments, also known as decadal surveys, to take stock of the status and opportunities for Earth and space science discipline fields and Aeronautics research and to recommend priorities for research and programmatic areas over the next decade.

(b) INDEPENDENT COST ESTIMATES.—The agreements described in subsection (a) shall include independent estimates of the life cycle costs and technical readiness of missions assessed in the decadal surveys whenever possible.

(c) REEXAMINATION.—The Administrator shall request that each National Academies decadal survey committee identify any conditions or events, such as significant cost growth or scientific or technological advances, that would warrant the Administration asking the National Academies to reexamine the priorities that the decadal survey had established.

(Pub. L. 111–314, § 3, Dec. 18, 2010, 124 Stat. 3357.)

HISTORICAL AND REVISION NOTES

Revised Section	*Source (U.S. Code)*	*Source (Statutes at Large)*
20305	42 U.S.C. 17823.	Pub. L. 110–422, title XI, § 1104, Oct. 15, 2008, 122 Stat. 4809.

Statutory Notes and Related Subsidiaries

IMPLEMENTATION OF DECADAL SURVEY'S RECOMMENDED DECISION RULES

Pub. L. 112–55, div. B, title III, Nov. 18, 2011, 125 Stat. 622, provided in part: ''That NASA shall implement the recommendations of the most recent National Research