

115TH CONGRESS
1ST SESSION

H. R. 3086

To improve understanding and forecasting of space weather events, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JUNE 27, 2017

Mr. PERLMUTTER (for himself, Mr. BRIDENSTINE, and Ms. EDDIE BERNICE JOHNSON of Texas) introduced the following bill; which was referred to the Committee on Science, Space, and Technology, and in addition to the Committees on Armed Services, Intelligence (Permanent Select), Foreign Affairs, and Transportation and Infrastructure, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To improve understanding and forecasting of space weather events, 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.**

4 This Act may be cited as the “Space Weather Re-
5 search and Forecasting Act”.

1 **SEC. 2. SPACE WEATHER.**

2 (a) IN GENERAL.—Subtitle VI of title 51, United
3 States Code, is amended by adding after chapter 605 the
4 following:

5 **“CHAPTER 607—SPACE WEATHER**

“Sec.

“60701. Space weather.

“60702. Observations and forecasting.

“60703. Research and technology.

“60704. Space weather data.

6 **“§ 60701. Space weather**

7 “(a) FINDINGS.—Congress makes the following find-
8 ings:

9 “(1) Space weather events pose a significant
10 threat to humans working in the space environment
11 and to modern technological systems.

12 “(2) The effects of severe space weather events
13 on the electric power grid, satellites and satellite
14 communications and information, airline operations,
15 astronauts living and working in space, and space-
16 based position, navigation, and timing systems could
17 have significant societal, economic, national security,
18 and health impacts.

19 “(3) Earth and space observations provide cru-
20 cial data necessary to predict and warn about space
21 weather events.

22 “(4) Clear roles and accountability of Federal
23 departments and agencies are critical for an efficient

1 and effective response to threats posed by space
2 weather.

3 “(5) In October 2015, the National Science and
4 Technology Council published a National Space
5 Weather Strategy and a National Space Weather
6 Action Plan seeking to integrate national space
7 weather efforts and add new capabilities to meet in-
8 creasing demand for space weather information.

9 “(b) FEDERAL AGENCY ROLES.—

10 “(1) FINDINGS.—Congress finds that—

11 “(A) the National Oceanic and Atmos-
12 pheric Administration provides operational
13 space weather forecasting and monitoring for
14 civil applications, maintains ground and space-
15 based assets to provide observations needed for
16 forecasting, prediction, and warnings, provides
17 research to support operational responsibilities,
18 and develops requirements for space weather
19 forecasting technologies and science;

20 “(B) the Department of Defense provides
21 operational space weather forecasting, moni-
22 toring, and research for the department’s
23 unique missions and applications;

24 “(C) the National Aeronautics and Space
25 Administration provides increased under-

standing of the fundamental physics of the Sun-Earth system through space-based observations and modeling, develops new space-based technologies and missions, and monitors space weather for NASA's space missions;

“(D) the National Science Foundation provides increased understanding of the Sun-Earth system through ground-based measurements, technologies, and modeling;

“(E) the Department of the Interior collects, distributes, and archives operational ground-based magnetometer data in the United States and its territories, works with the international community to improve global geophysical monitoring, and develops crustal conductivity models to assess and mitigate risk from space weather-induced electric ground currents; and

“(F) the Federal Aviation Administration provides operational requirements for space weather services in support of aviation and for coordination of these requirements with the International Civil Aviation Organization, integrates space weather data and products into the Next Generation Air Transportation System,

1 and conducts real-time monitoring of the
2 charged particle radiation environment to pro-
3 tect the health and safety of crew and pas-
4 sengers during space weather events.

5 “(2) OFFICE OF SCIENCE AND TECHNOLOGY
6 POLICY.—The Director of the Office of Science and
7 Technology Policy shall—

8 “(A) coordinate the development and im-
9 plementation of Federal Government activities
10 to improve the Nation’s ability to prepare,
11 avoid, mitigate, respond to, and recover from
12 potentially devastating impacts of space weath-
13 er events; and

14 “(B) coordinate the activities of the space
15 weather interagency working group established
16 under subsection (c).

17 “(c) SPACE WEATHER INTERAGENCY WORKING
18 GROUP.—In order to continue coordination of executive
19 branch efforts to understand, prepare, coordinate, and
20 plan for space weather, the National Science and Tech-
21 nology Council shall establish an interagency working
22 group on space weather.

23 “(d) MEMBERSHIP.—In order to understand and re-
24 spond to the adverse effects of space weather, the inter-
25 agency working group established under subsection (c)

1 shall leverage capabilities across participating Federal
2 agencies, including—

3 “(1) the National Oceanic and Atmospheric Ad-
4 ministration;

5 “(2) the National Aeronautics and Space Ad-
6 ministration;

7 “(3) the National Science Foundation;

8 “(4) the Department of Defense;

9 “(5) the Department of the Interior;

10 “(6) the Department of Homeland Security;

11 “(7) the Department of Energy;

12 “(8) the Department of Transportation, includ-
13 ing the Federal Aviation Administration; and

14 “(9) the Department of State.

15 “(e) INTERAGENCY AGREEMENTS.—

16 “(1) SENSE OF CONGRESS.—It is the sense of
17 Congress that the interagency collaboration between
18 the National Aeronautics and Space Administration
19 and the National Oceanic and Atmospheric Adminis-
20 tration on terrestrial weather observations pro-
21 vides—

22 “(A) an effective mechanism for improving
23 weather and climate data collection while avoid-
24 ing unnecessary duplication of capabilities
25 across Federal agencies; and

1 “(B) an agency collaboration model that
2 could benefit space weather observations.

3 “(2) INTERAGENCY AGREEMENTS.—The Ad-
4 ministrator of the National Aeronautics and Space
5 Administration and the Administrator of the Na-
6 tional Oceanic and Atmospheric Administration shall
7 enter into one or more interagency agreements pro-
8 viding for cooperation and collaboration in the devel-
9 opment of space weather spacecraft, instruments,
10 and technologies and in the transition of research to
11 operations in accordance with this chapter.

12 “(f) INTERNATIONAL, COMMERCIAL, AND ACADEMIC
13 COLLABORATION.—Participating Federal agencies in the
14 space weather interagency working group established
15 under subsection (c) shall, to the extent practicable and
16 appropriate, increase engagement and cooperation with
17 the international, commercial, and academic communities
18 on the observational infrastructure, data, and scientific re-
19 search necessary to advance the characterization, pre-
20 diction, and mitigation of space weather events.

21 **“§ 60702. Observations and forecasting**

22 “(a) POLICY.—It is the policy of the United States
23 to establish and sustain a baseline space and ground-based
24 capability for space weather observations.

25 “(b) INTEGRATED STRATEGY.—

1 “(1) IN GENERAL.—The Director of the Office
2 of Science and Technology Policy, in coordination
3 with the Administrator of the National Oceanic and
4 Atmospheric Administration, the Administrator of
5 the National Aeronautics and Space Administration,
6 the Director of the National Science Foundation,
7 and the Secretary of Defense, and in consultation
8 with the academic and commercial communities,
9 shall develop an integrated strategy for space and
10 ground-based space weather observations, including
11 solar and solar wind observations beyond the lifetime
12 of current assets, that considers—

13 “(A) the provision of solar wind measure-
14 ments and other measurements essential to
15 space weather forecasting; and

16 “(B) the provision of solar and space
17 weather measurements important for scientific
18 purposes.

19 “(2) CONSIDERATIONS.—In developing the
20 strategy under paragraph (1), the Director of the
21 Office of Science and Technology Policy shall con-
22 sider small satellite and microsatellite options,
23 hosted payloads, commercial options, international
24 options, and prize authority.

1 “(c) CRITICAL OBSERVATIONS.—In order to sustain
2 current space-based observational capabilities, the Admin-
3 istrator of the National Aeronautics and Space Adminis-
4 tration shall—

5 “(1) as appropriate, in cooperation with the
6 European Space Agency, maintain operations of the
7 Solar and Heliospheric Observatory/Large Angle and
8 Spectrometric Coronagraph (referred to in this sec-
9 tion as ‘SOHO/LASCO’) for as long as the satellite
10 continues to deliver quality observations; and

11 “(2) prioritize the reception of LASCO data.

12 “(d) ADDITIONAL CAPABILITY FOR SOLAR IMAG-
13 ING.—

14 “(1) IN GENERAL.—The Administrator of the
15 National Oceanic and Atmospheric Administration
16 shall secure reliable secondary capability for near
17 real-time coronal mass ejection imagery.

18 “(2) OPTIONS.—The Administrator of the Na-
19 tional Oceanic and Atmospheric Administration, in
20 coordination with the Secretary of Defense and the
21 Administrator of the National Aeronautics and
22 Space Administration, shall develop options, includ-
23 ing commercial solutions, to build and deploy one or
24 more instruments for near real-time coronal mass
25 ejection imagery.

1 “(3) CONSIDERATIONS.—In developing options
2 under paragraph (2), the Administrator of the Na-
3 tional Oceanic and Atmospheric Administration shall
4 consider commercial solutions, prize authority, aca-
5 demic and international partnerships, small satellites
6 and microsatellites, ground-based instruments, and
7 opportunities to deploy the instrument or instru-
8 ments as a secondary payload on an upcoming
9 planned launch.

10 “(4) COSTS.—In implementing paragraph (1),
11 the Administrator of the National Oceanic and At-
12 mospheric Administration shall consider a cost-effec-
13 tive and reliable solution.

14 “(5) OPERATIONAL PLANNING.—The Adminis-
15 trator of the National Oceanic and Atmospheric Ad-
16 ministration shall develop an operational contingency
17 plan to provide continuous space weather forecasting
18 in the event of a SOHO/LASCO failure.

19 “(6) BRIEFING.—Not later than 120 days after
20 the date of enactment of the Space Weather Re-
21 search and Forecasting Act, the Administrator of
22 the National Oceanic and Atmospheric Administra-
23 tion shall provide a briefing to the Committee on
24 Commerce, Science, and Transportation of the Sen-
25 ate and the Committee on Science, Space, and Tech-

1 nology of the House of Representatives on the op-
2 tions for building and deploying the instrument or
3 instruments described in paragraph (2) and the
4 operational contingency plan developed under para-
5 graph (5).

6 “(e) FOLLOW-ON SPACE-BASED OBSERVATIONS.—

7 “(1) PLAN.—The Administrator of the National
8 Oceanic and Atmospheric Administration, in coordi-
9 nation with the Secretary of Defense, shall develop
10 requirements and a plan for follow-on space-based
11 observations for operational purposes, in accordance
12 with the integrated strategy developed under sub-
13 section (b).

14 “(2) RESEARCH NEEDS.—In developing the re-
15 quirements and plan under paragraph (1), the Ad-
16 ministrator of the National Oceanic and Atmos-
17 pheric Administration shall coordinate with the Na-
18 tional Aeronautics and Space Administration and
19 the National Science Foundation regarding the re-
20 search necessary to improve space weather fore-
21 casting and the space-based observations that will
22 advance research and development.

23 “(f) REPORT.—Not later than 180 days after the
24 date of enactment of the Space Weather Research and
25 Forecasting Act, the Director of the Office of Science and

1 Technology Policy shall submit to the Committee on Com-
2 merce, Science, and Transportation of the Senate and the
3 Committee on Science, Space, and Technology of the
4 House of Representatives a report on the integrated strat-
5 egy under subsection (b), including the Plan for follow-
6 on space-based observations under subsection (e).

7 “(g) REVIEW OF INTEGRATED STRATEGY.—

8 “(1) REVIEW.—The Director of the National
9 Science Foundation, in conjunction with Federal
10 agencies participating in the space weather inter-
11 agency working group established under section
12 60701(c), shall enter into an agreement with the
13 National Academies to review the integrated strat-
14 egy developed under subsection (b).

15 “(2) TRANSMITTAL.—The Director of the Na-
16 tional Science Foundation shall transmit the results
17 of the review required under paragraph (1) to the
18 Committee on Science, Space, and Technology of the
19 House of Representatives and the Committee on
20 Commerce, Science, and Transportation of the Sen-
21 ate not later than 18 months after the enactment of
22 the Space Weather Research and Forecasting Act.

23 “(h) GROUND-BASED OBSERVATIONS.—The Na-
24 tional Science Foundation, the Air Force, and, where

1 practicable in support of the Air Force, the Navy shall
2 each—

3 “(1) maintain and improve, as necessary and
4 advisable, ground-based observations of the Sun in
5 order to help meet the priorities identified in section
6 60703(a); and

7 “(2) provide space weather data by means of its
8 set of ground-based facilities, including radars,
9 lidars, magnetometers, radio receivers, aurora and
10 airglow imagers, spectrometers, interferometers, and
11 solar observatories.

12 “(i) GROUND-BASED OBSERVATIONS DATA.—The
13 National Science Foundation shall—

14 “(1) provide key data streams from the plat-
15 forms described in subsection (h) for research and to
16 support space weather model development;

17 “(2) develop experimental models for scientific
18 purposes; and

19 “(3) support the transition of the experimental
20 models to operations where appropriate.

21 **“§ 60703. Research and technology**

22 “(a) USER NEEDS.—

23 “(1) IN GENERAL.—The Administrator of the
24 National Oceanic and Atmospheric Administration,
25 the Secretary of the Air Force, and where prac-

1 ticable in support of the Air Force, the Secretary of
2 the Navy, in conjunction with the Administrator of
3 the National Aeronautics and Space Administration
4 and the heads of other relevant Federal agencies,
5 shall conduct a comprehensive survey to identify and
6 prioritize the needs of space weather forecast users,
7 including space weather data and space weather
8 forecast data needed to improve services and inform
9 research priorities and technology needs.

10 “(2) CONTENTS.—In conducting the com-
11 prehensive survey under paragraph (1), the Adminis-
12 trator of the National Oceanic and Atmospheric Ad-
13 ministration, the Secretary of the Air Force, and
14 where practicable in support of the Air Force, the
15 Secretary of the Navy, at a minimum, shall—

16 “(A) consider the goals for forecast lead
17 time, accuracy, coverage, timeliness, data rate,
18 and data quality for space weather observa-
19 tions;

20 “(B) identify opportunities to address the
21 needs identified under paragraph (1) through
22 collaborations with academia, the commercial
23 sector, and the international community;

24 “(C) identify opportunities for new tech-
25 nologies, research, and instrumentation to ad-

1 dress the needs identified under paragraph (1);
2 and

3 “(D) publish a report on the findings
4 under subparagraphs (A) through (C).

5 “(3) PUBLICATION.—Not later than 1 year
6 after the date of enactment of the Space Weather
7 Research and Forecasting Act, the Administrator of
8 the National Oceanic and Atmospheric Administra-
9 tion, the Secretary of the Air Force, and where prac-
10 ticable in support of the Air Force, the Secretary of
11 the Navy, shall—

12 “(A) make the results of the comprehen-
13 sive survey publicly available; and

14 “(B) notify the Committee on Commerce,
15 Science, and Transportation of the Senate and
16 the Committee on Science, Space, and Tech-
17 nology of the House of Representatives of the
18 publication under subparagraph (A).

19 “(b) RESEARCH ACTIVITIES.—

20 “(1) BASIC RESEARCH.—The Director of the
21 National Science Foundation, Administrator of the
22 National Aeronautics and Space Administration, and
23 the Secretary of Defense shall continue to carry out
24 basic research activities on heliophysics, geospace
25 science, and space weather and support competitive,

1 merit-based, peer-reviewed proposals for research,
2 modeling, and monitoring of space weather and its
3 impacts, including science goals outlined in Solar
4 and Space Physics Decadal surveys conducted by the
5 National Academy of Sciences.

6 “(2) OTHER RESEARCH ACTIVITIES.—The Di-
7 rector of the National Science Foundation and the
8 Administrator of the National Oceanic and Atmos-
9 pheric Administration shall support basic research
10 activities in the social, behavioral, and economic
11 sciences that will lead to improved national pre-
12 paredness and encourage mitigation and protection
13 measures before a space weather event.

14 “(3) MULTIDISCIPLINARY RESEARCH.—

15 “(A) FINDINGS.—Congress finds that the
16 multidisciplinary nature of solar and space
17 physics creates funding challenges that require
18 coordination across scientific disciplines and
19 Federal agencies.

20 “(B) MULTIDISCIPLINARY RESEARCH.—

21 The Director of the National Science Founda-
22 tion, the Administrator of the National Oceanic
23 and Atmospheric Administration, and the Ad-
24 ministrator of the National Aeronautics and
25 Space Administration shall pursue multidisci-

1 plinary, coordinated research in subjects that
2 further our understanding of solar physics,
3 space physics, and space weather.

4 “(C) SENSE OF CONGRESS.—It is the
5 sense of Congress that the Administrator of the
6 National Aeronautics and Space Administration
7 and Director of the National Science Founda-
8 tion should support competitively awarded
9 Heliophysics Science Centers that support re-
10 search to operations and operations to research.

11 “(c) SCIENCE MISSIONS.—The Administrator of the
12 National Aeronautics and Space Administration shall seek
13 to implement missions that meet the science objectives
14 identified in Solar and Space Physics Decadal surveys con-
15 ducted by the National Academy of Sciences.

16 “(d) RESEARCH TO OPERATIONS.—

17 “(1) IN GENERAL.—The Administrator of the
18 National Aeronautics and Space Administration, the
19 Director of the National Science Foundation, the
20 Administrator of the National Oceanic and Atmos-
21 pheric Administration, the Secretary of the Air
22 Force, and where practicable in support of the Air
23 Force, the Secretary of the Navy, shall—

24 “(A) develop a formal mechanism to tran-
25 sition National Aeronautics and Space Adminis-

1 tration, National Science Foundation, Air
2 Force, and Navy research findings, research
3 needs, models, and capabilities, as appropriate,
4 to National Oceanic and Atmospheric Adminis-
5 tration and Department of Defense space
6 weather operational forecasting centers; and

7 “(B) enhance coordination between re-
8 search modeling centers and forecasting cen-
9 ters.

10 “(2) OPERATIONAL NEEDS.—The Adminis-
11 trator of the National Oceanic and Atmospheric Ad-
12 ministration and the Secretary of Defense, in coordi-
13 nation with the Administrator of the National Aero-
14 nautics and Space Administration and the Director
15 of the National Science Foundation, shall develop a
16 formal mechanism to communicate the operational
17 needs of space weather forecasters to the research
18 community.

19 “(e) TECHNOLOGY DEVELOPMENT.—

20 “(1) FINDINGS.—Congress finds that observa-
21 tions and measurements closer to the Sun and ad-
22 vanced instrumentation would provide for more ad-
23 vanced warning of space weather disturbances (as
24 defined in section 3 of the Space Weather Research
25 and Forecasting Act).

1 “(2) TECHNOLOGY AND INSTRUMENTATION DE-
2 VELOPMENT.—The Administrator of the National
3 Aeronautics and Space Administration and the Di-
4 rector of the National Science Foundation shall sup-
5 port the development of technologies and instrumen-
6 tation that address research priorities and improve
7 space weather forecasting lead-time and accuracy to
8 meet the needs identified by the Administrator of
9 the National Oceanic and Atmospheric Administra-
10 tion.

11 **“§ 60704. Space weather data**

12 “(a) IN GENERAL.—The Administrator of the Na-
13 tional Aeronautics and Space Administration and the Di-
14 rector of the National Science Foundation shall—

15 “(1) make space weather related data obtained
16 for scientific research purposes available to space
17 weather forecasters and operations centers; and

18 “(2) support model development and model ap-
19 plications to space weather forecasting.

20 “(b) RESEARCH.—The Administrator of the National
21 Oceanic and Atmospheric Administration shall make space
22 weather related data obtained from operational forecasting
23 available for scientific research.

24 “(c) SPACE WEATHER GOVERNMENT-INDUSTRY-
25 UNIVERSITY ROUNDTABLE.—The Administrator of the

1 National Oceanic and Atmospheric Administration, in col-
2 laboration with the Administrator of the National Aero-
3 nautics and Space Administration and the Director of the
4 National Science Foundation, shall enter into an arrange-
5 ment with the National Academies to establish a Space
6 Weather Government-Industry-University Roundtable to
7 facilitate communication and knowledge transfer among
8 Government participants in the space weather interagency
9 working group established under section 60701(c), indus-
10 try, and academia to—

11 “(1) facilitate advances in space weather pre-
12 diction and forecasting;

13 “(2) help enable the 2-way coordination of re-
14 search and operations; and

15 “(3) improve preparedness for potential space
16 weather events.”.

17 (b) TECHNICAL AND CONFORMING AMENDMENTS.—

18 (1) REPEAL OF SECTION 809.—Section 809 of
19 the National Aeronautics and Space Administration
20 Authorization Act of 2010 (42 U.S.C. 18388) and
21 the item relating to that section in the table of con-
22 tents under section 1(b) of that Act (124 Stat.
23 2806) are repealed.

24 (2) TABLE OF CHAPTERS.—The table of chap-
25 ters of title 51, United States Code, is amended by

1 adding after the item relating to chapter 605 the fol-
 2 lowing:

“607. Space weather 60701”.

3 **SEC. 3. SPACE WEATHER METRICS.**

4 (a) DEFINITIONS.—In this section:

5 (1) SPACE WEATHER DISTURBANCE.—The term
 6 “space weather disturbance” includes geo-electric
 7 fields, ionizing radiation, ionospheric disturbances,
 8 solar radio bursts, and upper atmospheric expansion.

9 (2) SPACE WEATHER BENCHMARK.—The term
 10 “space weather benchmark” means the physical
 11 characteristics and conditions describing the nature,
 12 frequency, and intensity of space weather disturb-
 13 ances.

14 (b) BENCHMARKS.—

15 (1) PRELIMINARY.—Not later than 90 days
 16 after the date of enactment of this Act, the space
 17 weather interagency working group established
 18 under section 60701(c) of title 51, United States
 19 Code, in consultation with academic and commercial
 20 experts, shall—

21 (A) assess existing data, the historical
 22 record, models, and peer-reviewed studies on
 23 space weather; and

1 (B) develop preliminary benchmarks, based
2 on current scientific understanding and the his-
3 torical record, for measuring solar disturbances.

4 (2) FINAL.—Not later than 18 months after
5 the date the preliminary benchmarks are developed
6 under paragraph (1), the space weather interagency
7 working group shall publish final benchmarks.

8 (3) REVIEW.—The Administrator of the Na-
9 tional Aeronautics and Space Administration shall
10 contract with the National Academy of Sciences to
11 review the benchmarks established under paragraph
12 (2).

13 (4) REVISIONS.—The space weather inter-
14 agency working group shall update and revise the
15 final benchmarks under paragraph (2), as necessary,
16 based on—

17 (A) the results of the review under para-
18 graph (3);

19 (B) any significant new data or advances
20 in scientific understanding that become avail-
21 able; or

22 (C) the evolving needs of entities impacted
23 by solar disturbances.

1 **SEC. 4. PROTECTION OF CRITICAL INFRASTRUCTURE.**

2 (a) IN GENERAL.—The Administrator of the Na-
3 tional Oceanic and Atmospheric Administration, in con-
4 sultation with the heads of other relevant Federal agen-
5 cies, shall provide information about space weather haz-
6 ards to the Secretary of Homeland Security for purposes
7 of this section.

8 (b) CRITICAL INFRASTRUCTURE.—The Secretary of
9 Homeland Security, in consultation with sector-specific
10 agencies, the Administrator of the National Oceanic and
11 Atmospheric Administration, and the heads of other rel-
12 evant agencies, shall—

13 (1) include, in meeting national critical infra-
14 structure reporting requirements, an assessment of
15 the vulnerability of critical infrastructure to space
16 weather events, as described by the space weather
17 benchmarks under section 3; and

18 (2) support critical infrastructure providers in
19 managing the risks and impacts associated with
20 space weather.

21 (c) PROHIBITION ON NEW REGULATORY AUTHOR-
22 ITY.—Nothing in subsection (b) may be construed to grant
23 the Secretary of Homeland Security any authority to pro-
24 mulgate regulations that was not in effect on the day be-
25 fore the date of enactment of this Act.

1 (d) DEFINITION OF SECTOR-SPECIFIC AGENCY.—In
2 this section, the term “sector-specific agency” has the
3 meaning given the term in Presidential Policy Directive—
4 21 of February 12, 2013 (Critical Infrastructure Security
5 and Resilience), or any successor.

6 **SEC. 5. PROTECTION OF NATIONAL SECURITY ASSETS.**

7 (a) IN GENERAL.—The National Security Council, in
8 consultation with the Office of the Director of National
9 Intelligence, the Secretary of Defense, and the heads of
10 other relevant Federal agencies, shall—

11 (1) assess the vulnerability of the national secu-
12 rity community to space weather events, as described
13 by the space weather benchmarks under section 3;
14 and

15 (2) develop national security mechanisms to
16 protect national security assets from space weather
17 threats.

18 (b) COOPERATION.—The Secretary of Defense, in
19 consultation with the heads of other relevant Federal
20 agencies, shall provide information about space weather
21 hazards to the National Security Council, Director of Na-
22 tional Intelligence, and heads of Defense Agencies for pur-
23 poses of this section.

1 **SEC. 6. ENSURING THE SAFETY OF CIVIL AVIATION.**

2 (a) IN GENERAL.—The Administrator of the Federal
3 Aviation Administration, in consultation with the heads of
4 other relevant Federal agencies, shall—

5 (1) assess the safety implications and vulner-
6 ability of the national airspace system by space
7 weather events, as described by the space weather
8 benchmarks under section 3;

9 (2) assess methods to mitigate the safety impli-
10 cations and effects of space weather on aviation
11 communication systems, aircraft navigation systems,
12 satellite and ground-based navigation systems, and
13 potential health effects of radiation exposure; and

14 (3) assess options for incorporating space
15 weather into operational training for pilots, cabin
16 crew, dispatchers, air traffic controllers, meteorolo-
17 gists, and engineers.

18 (b) SPACE WEATHER COMMUNICATION.—The Ad-
19 ministrator of the Federal Aviation Administration, in
20 consultation with the heads of other relevant Federal
21 agencies, shall develop methods to increase the interaction
22 between the aviation community and the space weather re-
23 search and service provider community.

○