

110TH CONGRESS
1ST SESSION

S. 931

To establish the National Hurricane Research Initiative to improve hurricane preparedness, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MARCH 20, 2007

Mr. MARTINEZ (for himself, Mr. NELSON of Florida, Mrs. DOLE, and Ms. LANDRIEU) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To establish the National Hurricane Research Initiative to improve hurricane preparedness, 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 “National Hurricane
5 Research Initiative Act of 2007”.

6 **SEC. 2. DEFINITIONS.**

7 In this Act:

8 (1) **DIRECTOR.**—The term “Director” means
9 the Director of the National Science Foundation.

1 (2) UNDER SECRETARY.—The term “Under
2 Secretary” means the Under Secretary for Oceans
3 and Atmosphere of the Department of Commerce.

4 **SEC. 3. NATIONAL HURRICANE RESEARCH INITIATIVE.**

5 (a) REQUIREMENT TO ESTABLISH.—The Under Sec-
6 retary and the Director shall establish an initiative known
7 as the National Hurricane Research Initiative for the pur-
8 poses described in subsection (b).

9 (b) PURPOSES.—The purposes of the National Hurri-
10 cane Research Initiative shall be to set research objectives
11 based on the findings of the January 12, 2007, National
12 Science Board report entitled “Hurricane Warning: The
13 Critical Need for National Hurricane Initiative”—

14 (1) to make recommendations to the National
15 Science Board based on such research;

16 (2) to assemble the expertise of the science and
17 engineering capabilities of the United States through
18 a multi-agency effort that is focused on—

19 (A) improving a better understanding of
20 hurricane prediction, intensity, and mitigation
21 on coastal populations;

22 (B) infrastructure; and

23 (C) the natural environment; and

24 (3) to make grants to eligible entities to carry
25 out research in the following areas:

1 (A) PREDICTING HURRICANE INTENSIFICA-
2 TION.—Research to improve understanding
3 of—

4 (i) rapid intensity change in storms,
5 relationships among storm size, motion,
6 and intensity;

7 (ii) the internal dynamics of hurri-
8 canes; and

9 (iii) the manner in which hurricanes
10 interact with the environment.

11 (B) UNDERSTANDING AIR-SEA INTER-
12 ACTIONS.—Research to improve understanding
13 of theories of air-sea interaction that are com-
14 mon to the strong wind and high wave condi-
15 tions associated with hurricanes, and cases in
16 which the air-sea interface beneath hurricanes
17 vanishes and is replaced by an emulsion, includ-
18 ing theoretical theories, observational theories,
19 and modeling.

20 (C) PREDICTING STORM SURGE, RAINFALL,
21 AND INLAND FLOODING FROM HURRICANES
22 AND TROPICAL STORMS.—Research to under-
23 stand and model rainfall and flooding from hur-
24 ricanes, including probabilistic modeling and
25 mapping of storm surge risk.

1 (D) HURRICANE MODIFICATION.—Basic
2 research for modifying hurricanes to reduce the
3 intensity or alter the movement of hurricanes
4 by human intervention, including research to
5 improve understanding of the potential effects
6 of hurricane modification on precipitation and
7 fresh water supply, as well as on climate.

8 (E) IMPROVED OBSERVATION OF HURRI-
9 CANES AND TROPICAL STORMS.—Research to
10 improve hurricane and tropical storm observa-
11 tion through mobile radars, Global Positioning
12 System technology, unmanned aerial vehicles,
13 and ground-based and aerial wireless sensors to
14 improve understanding of the complex nature of
15 storms.

16 (F) ASSESSING VULNERABLE INFRASTRUC-
17 TURE.—Research to develop a national engi-
18 neering assessment of coastal infrastructure, in-
19 cluding infrastructure related to levees, sea-
20 walls, drainage systems, bridges, water and
21 sewage utilities, power, and communications, to
22 determine the level of vulnerability of such in-
23 frastructure to damage from a hurricane.

24 (G) INTERACTION OF HURRICANES WITH
25 ENGINEERED STRUCTURES.—Research to im-

1 prove understanding of the impacts of hurri-
2 canes and tropical storms on buildings, struc-
3 tures, and housing combined with modeling es-
4 sential for guiding the creation of improved
5 building designs and construction codes in loca-
6 tions particularly vulnerable to hurricanes.

7 (H) RELATIONSHIP BETWEEN HURRI-
8 CANES, CLIMATE, AND NATURAL ECO-
9 SYSTEMS.—Research to improve the under-
10 standing of the complex relationships between
11 hurricanes and climate, including research to
12 determine the most effective methods to use ob-
13 servational information to examine the impacts
14 on ecosystems over long- and short-periods of
15 time.

16 (I) TECHNOLOGIES FOR DISASTER RE-
17 SPONSE AND RECOVERY.—Research to improve
18 emergency communication networks for govern-
19 ment agencies and non-government entities and
20 to improve communications between such net-
21 works during disaster response and recovery,
22 including cyber-security during disaster situa-
23 tions and the ability to improve damage assess-
24 ments during storms.

1 (J) EVACUATION PLANNING.—Research to
2 improve the manner in which hurricane-related
3 information is provided to, and utilized by, the
4 public and government officials, including re-
5 search to assist officials of State or local gov-
6 ernment in determining the circumstances in
7 which evacuations are required and in carrying
8 out such evacuations.

9 (K) COMPUTATIONAL CAPABILITY.—Re-
10 search to improve understanding of the efficient
11 utility of multiple models requiring sharing and
12 inter-operability of databases, computing envi-
13 ronments, networks, visualization tools, and
14 analytic systems beyond what is currently avail-
15 able for transitioning hurricane research assets
16 into operational practice and to provide access
17 to robust computational facilities beyond the fa-
18 cilities normally accessible by the civilian re-
19 search community for the hurricane research
20 enterprise, including data acquisition and mod-
21 eling capability during hurricane events.

22 (c) COOPERATION WITH OTHER AGENCIES.—The
23 Under Secretary and the Director shall cooperate with the
24 head of each appropriate Federal agency or department,
25 research institute, university, and disaster-response or

1 nongovernmental organization to utilize the expertise and
2 capabilities of such entity to carry out the purposes of the
3 National Hurricane Research Initiative, including co-
4 operation with the heads of the following entities:

5 (1) The National Aeronautics and Space Ad-
6 ministration.

7 (2) The National Institute of Standards and
8 Technology.

9 (3) The Department of Homeland Security, in-
10 cluding the Federal Emergency Management Agen-
11 cy.

12 (4) The Department of Energy.

13 (5) The Defense Advanced Research Project
14 Agency.

15 (6) The Environmental Protection Agency.

16 (7) The United States Geological Survey.

17 (8) The Army Corps of Engineers.

18 (d) COORDINATION.—The White House Office of
19 Science and Technology Policy, through the National
20 Science and Technology Council, shall coordinate the ac-
21 tivities carried out by the United States related to the Na-
22 tional Hurricane Research Initiative as a formal program
23 with a well defined organizational structure and execution
24 plan.

25 (e) GRANTS.—

1 (1) **AUTHORITY.**—The Under Secretary and the
2 Director may award grants to appropriate govern-
3 ment agencies or departments or nongovernmental
4 entities to carry out the purposes described in sub-
5 section (b).

6 (2) **BEST PRACTICES.**—The Under Secretary
7 and the Director shall develop and make available to
8 the public a description of best practices to be used
9 to carry out a project with a grant awarded under
10 this subsection.

11 (f) **RESEARCH SEMINARS AND FORUMS.**—The Under
12 Secretary and the Director shall carry out a series of na-
13 tional seminars and forums that assemble a broad collec-
14 tion of scientific disciplines to direct researchers to work
15 collaboratively to carry out the purposes described in sub-
16 section (b).

17 (g) **AUTHORIZATION OF APPROPRIATIONS.**—There is
18 authorized to be appropriated \$285,000,000 for each of
19 the fiscal years 2008 through 2018 to carry out this sec-
20 tion.

21 **SEC. 4. NATIONAL INFRASTRUCTURE DATABASE.**

22 (a) **REQUIREMENT TO ESTABLISH.**—The Under Sec-
23 retary and the Director shall establish a National Infra-
24 structure Database for the purposes of—

1 (1) cataloging and characterizing the physical,
2 social, and natural infrastructure in order to provide
3 a baseline for developing standards, measuring modi-
4 fication, and determining loss;

5 (2) providing information to Federal, State, and
6 local government officials to improve information
7 public policy related to hurricanes and tropical
8 storms; and

9 (3) providing data to researchers to improve
10 their ability to measure hurricane impacts, separate
11 such impacts from other effects, both natural and
12 anthropogenic, make effective recommendations for
13 improved building codes and urban planning prac-
14 tices, and develop effective procedures for respond-
15 ing to infrastructure disruption.

16 (b) DATABASE REQUIREMENTS.—The National In-
17 frastructure Database shall be a virtual, cyber environ-
18 ment that uses existing capabilities and facilities, and es-
19 tablishes new capabilities and facilities, as appropriate, to
20 provide an interoperable environment and the necessary
21 metadata and other resources needed by users of that
22 Database.

23 (c) AUTHORIZATION OF APPROPRIATIONS.—There is
24 authorized to be appropriated \$20,000,000 for each of the
25 fiscal years 2008 through 2018 to carry out this section.

1 **SEC. 5. NATIONAL HURRICANE RESEARCH MODEL.**

2 (a) REQUIREMENT TO ESTABLISH.—The Under Sec-
3 retary and the Director shall develop a National Hurri-
4 cane Research Model to conduct integrative research and
5 to facilitate the transfer of research knowledge to oper-
6 ational applications, including linking relevant theoretical,
7 physical, and computational models from atmospheric,
8 oceanic, economic, sociological, engineered infrastructure,
9 and ecologic fields, conducting experimental research to
10 understand the extensive complexities of hurricanes, and
11 obtaining measurable results in a comprehensive frame-
12 work suitable for testing end-to-end integrative systems.

13 (b) SYSTEM REQUIREMENTS.—The National Hurri-
14 cane Research Model shall be a physically distributed and
15 highly coordinated working environment in which research
16 from the National Hurricane Research can be experi-
17 mentally substantiated using suitable quantitative metrics,
18 and where a culture of interaction and collaboration can
19 further be promoted, including in the areas of—

- 20 (1) facilities and cyberinfrastructure;
21 (2) software integration; and
22 (3) fixed mobile data collection platforms and
23 data provisioning systems.

24 (c) AUTHORIZATION OF APPROPRIATIONS.—There is
25 authorized to be appropriated \$130,000,000 for each of

1 the fiscal years 2008 through 2018 to carry out this sec-
2 tion.

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