American Commercial Space Weather Association

October 05, 2017

Dear House Science Committee Staff members,

On behalf of the American Commercial Space Weather Association (ACSWA), we reaffirm support for the Space Weather Research and Forecasting Act (H.R. 3086, the Space Weather Research and Forecasting Act) that was introduced for consideration in the House of Representatives on June 27, 2017. From a commercial perspective, we believe that the bill must be strengthened with additions highlighted in **blue** and changes in **red**, respectively. We provide arguments for these changes in sidebar text boxes.

This strengthening is necessary for two reasons: (1) the commercial sector represents the best chance for innovation as well as expansion of space weather risk management for our nation's security and (2) this bill will likely be the only space weather related bill to pass Congress in the next few years and we want to get it right. If this national capability is to grow, it cannot only be through agency or academic efforts. To unleash the additional economic power of business activity, the commercial sector must be given a more prominent role than it has had in the past. A majority of the commercial space weather industry is represented through small business and can cost-effectively contribute to improving space weather risk management.

New concepts for inclusion into the bill include: (1) a FACA to advise the agencies rather than creating and funding any untested, new, costly entity to advise the government; (2) testbed initiatives using industry expertise for R2O and O2R transitions; (3) NOAA and FAA initiatives parallel to NASA's Flight Opportunities program (industry matched funding for space flight) for space weather data production and airborne flight instrumentation development; and (4) specifically require use of existing operational commercial capabilities when appropriate for data and instrument needs to service space weather forecasters.

Thank you for your consideration.

Sincerely,

The ACSWA Executive Committee

Geoff Crowley (Atmospheric and Space Technology Research Associates)
Alec Engell (NextGen)
Devrie Intriligator (Carmel Research Center)
Conrad C. Lautenbacher, Jr., VADM USN (ret.) (GeoOptics)
Bob Robinson (In Space Now)
Bob Schunk (Space Environment Corporation)
W. Kent Tobiska (Space Environment Technologies)

Additions and **changes** to HR 3086 to strengthen commercial space weather contributions to the national space weather efforts

§ 60701. Space weather

(f) INTERNATIONAL, COMMERCIAL, AND ACADEMIC COLLABORATION. — Participating Federal agencies in the space weather interagency working group established under subsection (c) shall, to the extent practicable and appropriate, increase engagement and cooperation with the international, commercial, and academic communities on the observational infrastructure, data, and scientific research necessary to advance the characterization, prediction, and mitigation of space weather events. **Under the direction of the space weather interagency working group, at least one participating agency shall be designated as the host of a Federal Advisory Committee Act advisory body to coordinate the increased engagement of said communities.**

Rationale: (NEW) Add FACA sentence as the most direct way, and the least expensive, to bring all parties to the table and enable commercial sector to have a full participation in policy discussions.

§ 60702. Observations and forecasting

(b) INTEGRATED STRATEGY. —

(2) CONSIDERATIONS. — In developing the strategy under paragraph (1), the Director of the Office of Science and Technology Policy shall consider small satellite and microsatellite options, hosted payloads, commercial **ground/ocean/air/space** options, international options, and prize authority.

Rationale: Add phrase for all four domains since commercial sector has capabilities for space weather from ground/ocean-based platforms, from the air, and in space. A space only emphasis eliminates many potential contributions of facilities, including some lower cost options than purely space-based options.

§ 60702. Observations and forecasting

(e) FOLLOW-ON ~~**SPACE-BASED**~~ OBSERVATIONS.

(1) PLAN. — The Administrator of the National Oceanic and Atmospheric Administration, in coordination with the Secretary of Defense, shall develop requirements and a plan for follow-on **ground-, ocean-, air- and** space-based observations for operational purposes, in accordance with the integrated … .

(2) RESEARCH NEEDS. — In developing the requirements and plan under paragraph (1), the Administrator of the National Oceanic and Atmospheric Administration shall coordinate with the National Aeronautics and Space Administration and the National Science Foundation regarding the research necessary to improve space weather forecasting and the **ground-, ocean-, air- and** space-based observations that will advance … .

(f) REPORT. — Not later than 180 days after the date of enactment of the Space Weather Research and Forecasting Act, the Director of the Office of Science and Technology Policy shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report on the integrated strategy under subsection (b), including the Plan for follow-on **ground-, ocean-, air- and** space-based observations under subsection (e).

(h) **ADDITIONAL** GROUND-BASED OBSERVATIONS. — The National Science Foundation, the Air Force, and, where practicable in support of the Air Force, the Navy shall each—

(1) maintain and improve, as necessary and advisable, ground-based observations of the ~~**Sun**~~ **solar, near-space, and terrestrial space weather features** in order to help meet the priorities identified in section 60703(a); and

(2) provide space weather data by means of its set of ground-based facilities, including radars, lidars, magnetometers, radio **and GPS** receivers, aurora and airglow imagers, spectrometers, interferometers, **airborne radiation sensors, neutron monitors,** and solar observatories.

(3) Buy American products and services, including sensors unless a good reason can be found to do otherwise.

Rationale: Remove Space-Based since commercial sector has capabilities for space weather measurements from the ground, ocean, air, and in space. Space tends to be an expensive option versus ground-based instruments. NOAA and DoD work in all three domains and eliminating two of them puts small businesses at a disadvantage.
Rationale: Add phrase for all four domains since a space-only emphasis eliminates many potential contributions provided by small business. Ground-based examples include precision GPS stations to measure the ionosphere, magnetic and electric field instruments, and aircraft-based radiation monitoring instruments.
Rationale: Add word ADDITIONAL to complement section (e) title change.
Rationale: Add phrase for all space weather domain elements.
Rationale: Add other key technologies that have a mature capability provided by small businesses and that map into operational needs.
Rationale: Add Buy American phrase – Europe is insistent on buying European products, making it difficult to export American products in the space weather arena.

§ 60703. Research and technology

(b) RESEARCH ACTIVITIES. —

(3) MULTIDISCIPLINARY RESEARCH. —

(C) SENSE OF CONGRESS. — It is the sense of Congress that the Administrator of the National Aeronautics and Space Administration and Director of the National Science Foundation should support competitively awarded Heliophysics Science Centers and **testbed initiatives** that support research to operations and operations to research. **The Administrator of the National Oceanic and Atmospheric Administration and Administrator of the Federal Aviation Administration should support competitively awarded data production and flight opportunity initiatives that support research to operations and operations to research.**

Rationale: (NEW) Add phrases as a way to allow commercial sector to participate in multidisciplinary research. Only large research universities will be able to compete for HSCs while small business and 2nd-3rd tier universities and colleges can compete for other initiatives. HSCs alone will eliminate nearly all commercial participation.

Commercial organizations are successful at R2O, versus universities that focus on 'R' at low Technology Readiness Levels.

NOAA and FAA are included similar to the example of NASA's Flight Opportunities program. Examples might be matching funds programs for NOAA in data production (use of cost-effective commercial data, e.g., GPS scintillation or single frequency improved accuracies from data assimilation models, solar flare and CME forecasts, satellite TEC data). FAA might do a flight opportunity matching fund program (new technologies hosted on aircraft to provide operational data or research data, e.g., temperature, pressure, humidity, radiation sensors) to improve aviation operational capabilities.

§ 60703. Research and technology

(d) RESEARCH TO OPERATIONS. —

"(3) COMMERCIAL CAPABILITIES. — The Administrator of the National Oceanic and Atmospheric Administration and the Secretary of Defense, in coordination with the Administrator of the National Aeronautics and Space Administration and the Director of the National Science Foundation, shall utilize to the maximum extent possible existing operational data capabilities and instrument facilities of U.S. commercial organizations to fulfill the operational data and instrument needs of space weather forecasters.

Rationale: (NEW) Add new paragraph as a cost-savings method to the government. The commercial sector already has existing commercial space weather operational data streams and instrumentation that provide services to USG agencies at a fraction of the cost that could be duplicated by the government. An example is the commercially-provided space weather indices used by USAF Joint Space Operations Center for satellite tracking and debris-avoidance management. Another example are commercial GPS receivers in Alaska providing forewarning of ionospheric scintillation that affects navigation.

§ 60704. Space weather data

(c) SPACE WEATHER GOVERNMENT-INDUSTRY-UNIVERSITY ROUNDTABLE. —The Administrator of the National Oceanic and Atmospheric Administration, in collaboration with the Administrator of the National Aeronautics and Space Administration and the Director of the National Science Foundation, shall enter into an arrangement with the National Academies to establish a Space Weather Government-Industry-University Roundtable**, including through the use of a Federal Advisory Committee Act advisory body,** to facilitate communication and knowledge transfer among Government participants in the space weather interagency working group established under section 60701(**f**), industry, and academia to—

Rationale: Add FACA phrase as the most direct way, and the least expensive, to bring all parties to the table and enable commercial sector to have a full participation in policy discussions. There are suggestions floating in the community to set up (and fund) separate advisory bodies. However, these concepts are not well-formulated and, if funded, would represent an added layer of expense and management, potentially limiting participation by only one sector (agency, academia, industry).

SEC. 6. ENSURING THE SAFETY OF CIVIL AVIATION.

(a) IN GENERAL. —

(2) assess methods**, including commercial options,** to mitigate the safety implications and effects of space weather on aviation communication systems, aircraft navigation systems, satellite and ground-based navigation systems, and potential health effects of radiation exposure **at commercial aviation altitudes**; and

(3) assess options**, including commercial options,** for incorporating space weather into operational training for pilots, cabin crew, dispatchers, air traffic controllers, meteorologists, and engineers.

Rationale: Add phrases to explicitly encourage the FAA Administrator to consider commercial options for lowering costs and reducing time to implementation.