



NOAA Space Weather (SWX) Program: User Engagement

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NWS Space Weather Prediction Center

Community Meeting on NOAA Satellites

Informing the Future of NOAA Satellite Observations

September 30, 2020



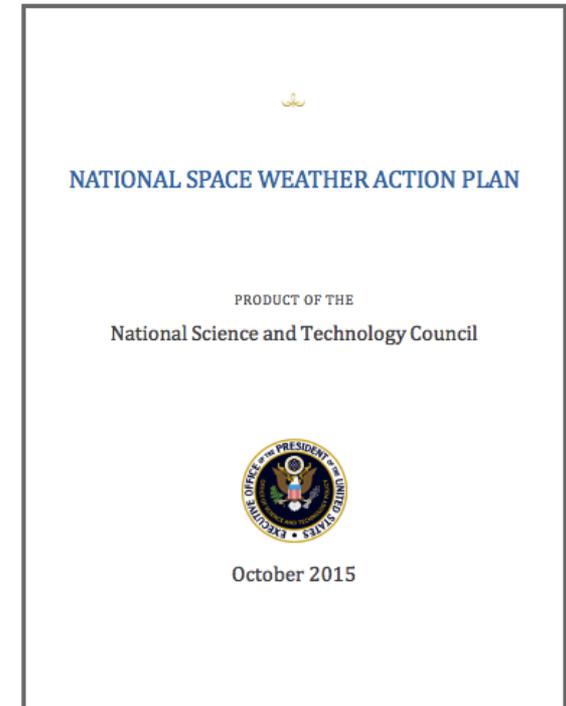
National Space Weather Strategy and Action Plan - 2015



Customer Focused Actions:

Action 4.5.2: DOC, in coordination with DHS, will support research into the social and economic impacts of space-weather effects ...

Action 5.1.1: DOC will conduct a comprehensive survey of space-weather data and product requirements needed by user communities to help improve services.



20 Government Departments,
Agencies and Service Branches

Social and Economic Impacts of Space Weather



FINAL REPORT

Social and Economic Impacts of Space Weather in the United States

September 2017

Abt Associates
Bethesda, Maryland

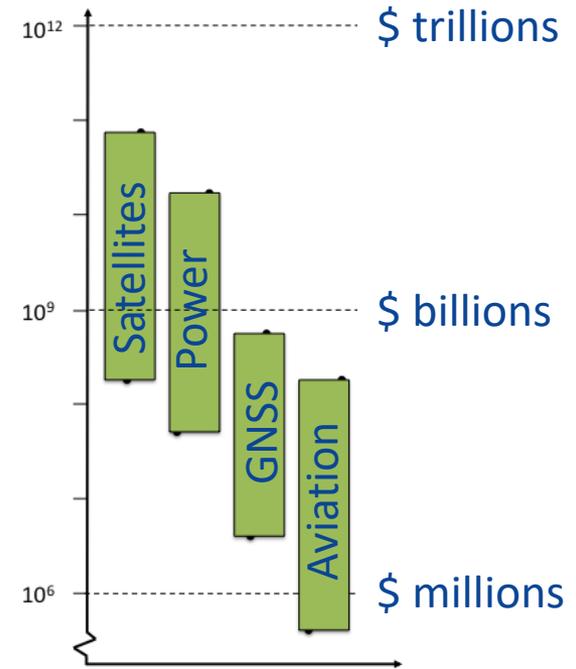


Written under contract for the
NOAA National Weather Service
www.nws.noaa.gov

Key Findings

- Impacts are a real concern
- Stakeholders are interested
- Topic is complex
- Mitigation may be inexpensive
- Results help value NOAA investments

Estimated cost of moderate/extreme event



Note: Costs represent first pass estimates not to be taken out of context or quoted without appropriate caveats. Qualitative information and quantitative framework are the more important contributions of this effort.

Customer Needs and Requirements Survey



Key Customer Needs and Requirements:

- Higher accuracy of long lead-time forecast
- Satellite information in MEO, LEO, and GEO
- Improved ionospheric products: TEC and scintillation
- Improved localization of geomagnetic disturbances
- Note: Satellite orbit determination and collision avoidance customers were not included

Abt Associates, 2019



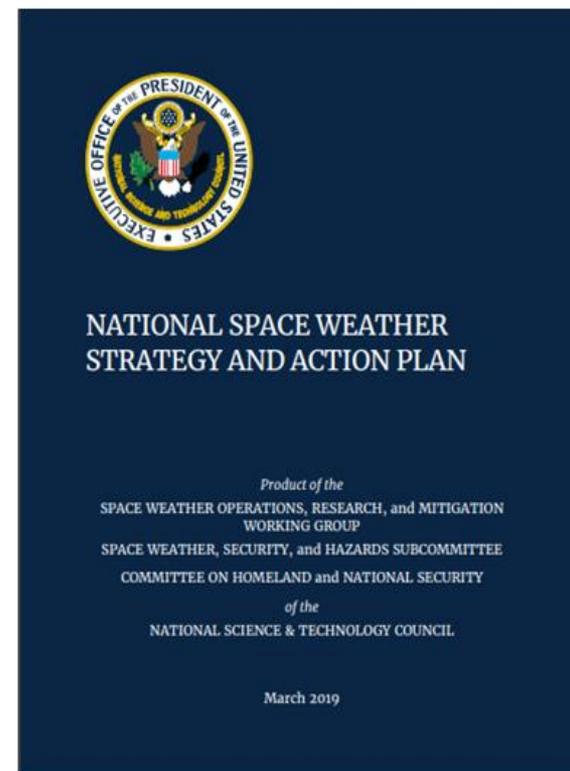
National Space Weather Strategy and Action Plan - 2019



Action 1.3.1: In coordination with SSAs and the private sector infrastructure operators, define and develop minimum and desired information requirements for space weather forecasting products usable for the operational response of critical infrastructures.

Lead agency: Department of Homeland Security

Progress: A Request for Information (RFI) has been developed and will be distributed soon.



Key Space Weather Observations (SPRWG)



Program of Record
2025

Coronagraph (L1 or GEO)
Solar X-ray Irradiance
Solar EUV Imaging
Solar EUV Irradiance
Solar Wind Plasma and Magnetic Field (L1)
Solar Wind Suprathermal Particles (L1)
Magnetospheric Energetic Particles (GEO)
Magnetospheric Magnetic Field (GEO)
Ionospheric Radio Occultation and Ion Drift (COSMIC-2 A and B)

Additional
observations for
consideration in
future architecture

Coronagraph (Off Sun-Earth Line)
Heliospheric Imager
Upper Thermospheric Mass Density
Magnetospheric Energetic Particles (non-GEO orbits)
Solar Photospheric Magnetograph (Off Sun-Earth Line)
Auroral Imaging
Neutral Composition - O/N₂ Ratio
Magnetospheric Magnetic Field (non-GEO orbits)
Solar Photospheric Magnetograph (Sun-Earth Line)
Solar Wind Plasma (Off Sun-Earth Line)
Solar Wind Energetic Particles (L1)



Prioritization of Observations

Considerations:

- Economic impact study
- Customer needs and requirements study
- SPRWG documentation of use and value
- Contribution to improving numerical prediction models
- Contribution to improvement of forecast/nowcast products
- Anticipated improvement in customer action



Prioritization of Observations

Higher Priority:

- Coronagraph (Off Sun-Earth Line)
- Heliospheric Imager
- Upper Thermospheric Mass Density
- Magnetospheric Energetic Particles (non-GEO orbits)

Medium Priority:

- Solar Photospheric Magnetograph (Off Sun-Earth Line)
- Auroral Imaging
- Neutral Composition - O/N₂ Ratio
- Magnetospheric Magnetic Field (non-GEO orbits)

Lower Priority:

- Solar Photospheric Magnetograph (Sun-Earth Line)
- Solar Wind Plasma (Off Sun-Earth Line)
- Solar Wind Energetic Particles (L1)



Summary

- Recent national efforts have resulted in improved understanding of user needs for space weather services
 - Social and Economic Impacts of Space Weather (2017)
 - Customer Needs and Requirements Survey (2019)
 - Critical Infrastructure Information Requirements (in progress)
- Space Platform Requirements Working Group (SPRWG) established key observations – many are in POR 2025
- Prioritization of observations for future architecture is ongoing based on evolving customer requirements
- NOAA's observing architecture is being designed to address space weather's emerging and expanding needs