Space Weather Services: The U.S. Approach

Dr. William M. Lapenta
Director, National Centers for Environmental Prediction
NOAA/National Weather Service
Space Weather as a Global Challenge
Embassy of Italy, 18 May 2017
National Space Weather Strategy and Action Plan: All of Government Approach

• Chartered under White House National Science and Technology Council
  • Chaired by Office of Science and Technology Policy (OSTP), NOAA, and Dept. of Homeland Security (DHS)
  • 20 Government Departments, Agencies, and Service Branches involved
  • OSTP: policy lead
  • NOAA: operational forecasting
  • DHS: preparedness, mitigation, response, and recovery

• Released 29-October-2015
• Outlines goals for operations, research, mitigation, and response in preparation for extreme events.
• Strategy and Action Plan are publicly available
Space Weather Prediction Center
Continuous Coordination with Multiple Customer Sectors - In Support of National Needs for Space Weather Services

Operations – Space Weather Forecast Office

Daily forecast since 1965.

Specifications: Current conditions
Forecast: Conditions tomorrow
Watches: Conditions are favorable for storm
Warnings: Storm is imminent with high probability
Alerts: observed conditions meeting or exceeding storm thresholds

R & D – Space Weather Prediction Testbed Transitioning models into operations

Research-to-Operations
- Applied Research
- Model Development
- Model Test/Evaluation
- Model Transition
- Operations Support

Operations-to-Research
- Customer Requirements
- Observation Requirements
- Research Requirements
Customer Subscriptions
(through February 2017)

Frequent Users:
- Emergency Response
- Electric Power Grid
- Drilling and Oil Exploration
- Satellite Industry
- Airlines and Transportation

- Continuous customer growth throughout the solar cycle
- Significant space weather can occur at any time
NWS Strategic Outcome:  
A Weather- and Water-Ready Nation

“Ready, Responsive, Resilient”

Executive Order – Coordinating Preparation for Space Weather Events

“...will enhance national preparedness and speed the creation of a space-weather-ready Nation.”

Involves the entire US Weather, Water and Climate Enterprise WORKING TOGETHER
Priority Activities to Support Space Weather Services

Observations
• DSCOVR went operational July 2016
• GOES-16 launched November 2016
• Ground-based Solar network operational
• Space Weather Forward Observatory (planning)

Modeling:
• Regional Geomagnetic Activity Model operational
• Solar Wind Disturbance Model upgrades
• Coupled Atmosphere-Ionosphere Model - prototype real-time capability in FY17
• Electric Field model being tested for operations

SWORM/SWAP
• Extreme Event Benchmarks
• Operations-to-Research plan
• Economic Impact study
National Strategy Goal 6 – Increased International Cooperation

• Increase international engagement:
  • Observation infrastructure
  • Data sharing
  • Numerical modeling
  • Scientific research

• Strengthen cooperation on space weather products and services

• Promote collaborative approach to preparedness for extreme events