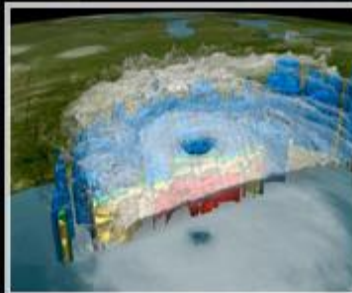
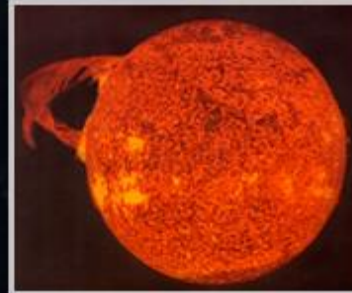
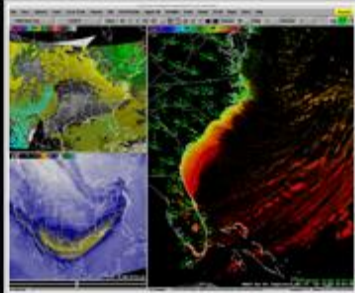


# Space Weather Services: The U.S. Approach



**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

NATIONAL SPACE WEATHER STRATEGY

National

NATIONAL SPACE WEATHER ACTION PLAN

PRODUCT OF THE  
National Science and Technology Council



October 2015

- 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

**R2O**

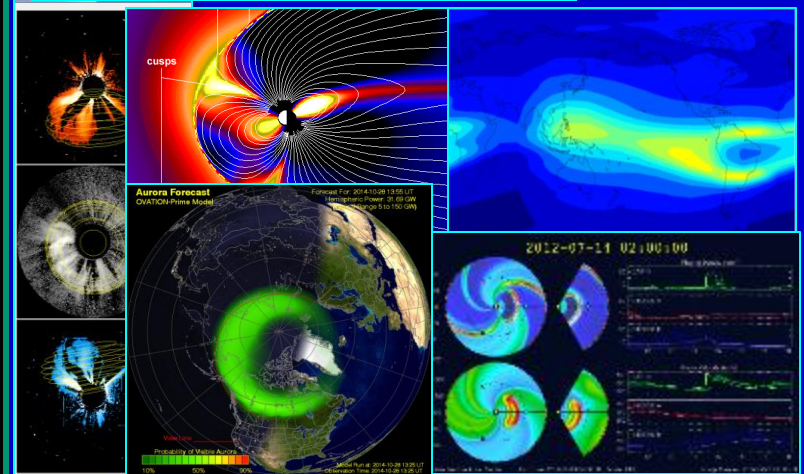
### Research-to-Operations

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

### Operations-to-Research

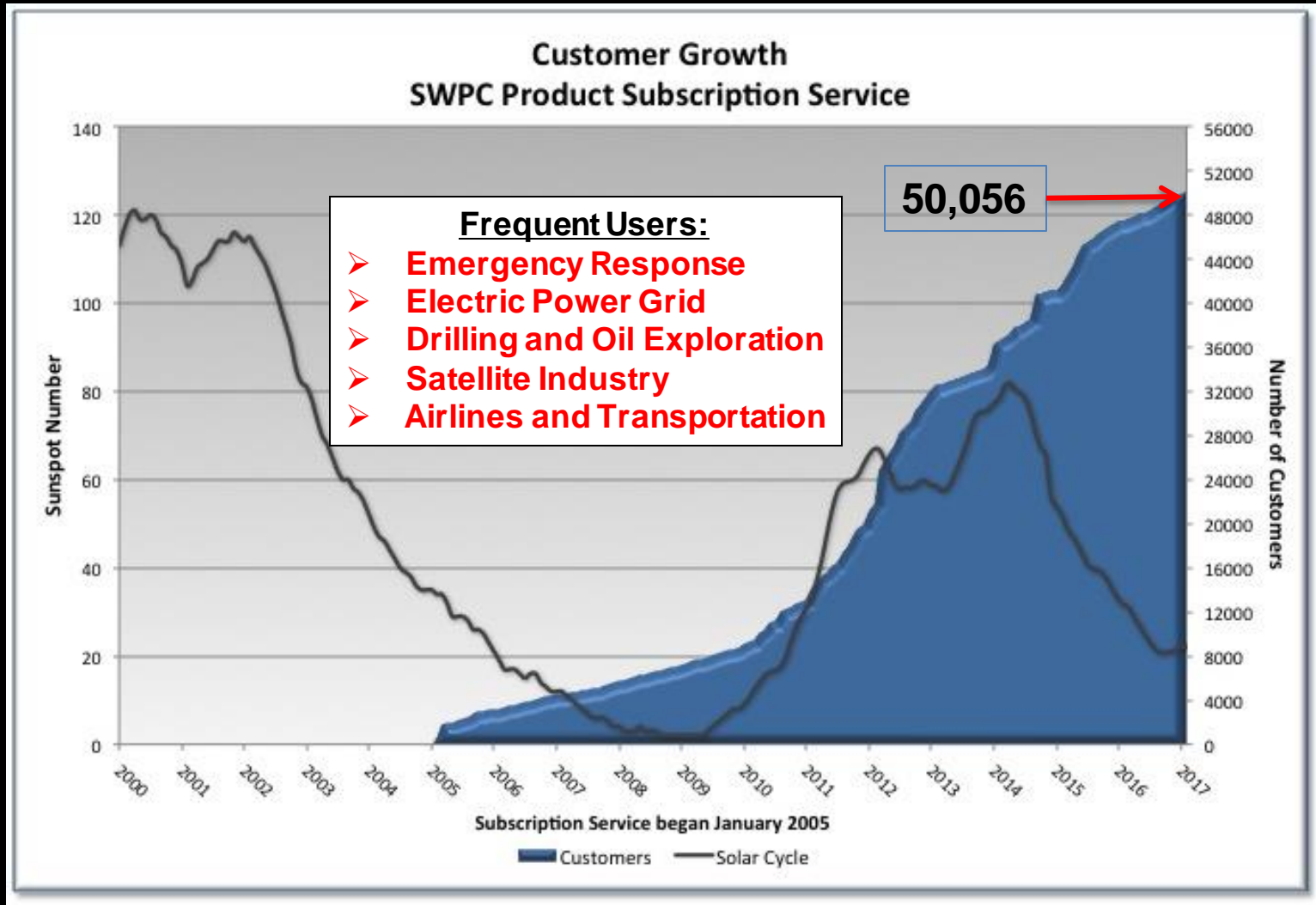
- Customer Requirements
- Observation Requirements
- Research Requirements

**O2R**





# Customer Subscriptions (through February 2017)



- Continuous customer growth throughout the solar cycle
- Significant space weather can occur at any time



# NWS Strategic Outcome: A Weather- and Water-Ready Nation



# WRN

**“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*

**We have 5000+ WRN Ambassadors**



# Priority Activities to Support Space Weather Services

## Observations

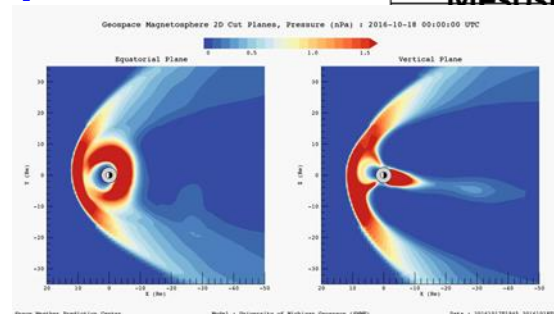
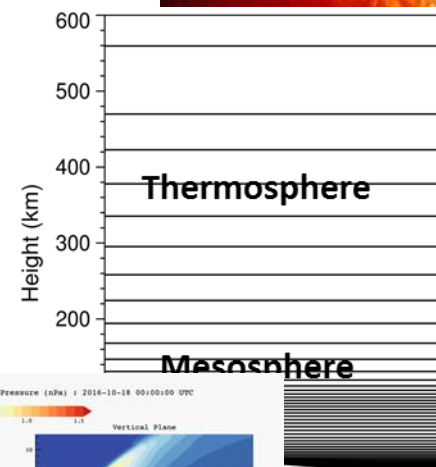
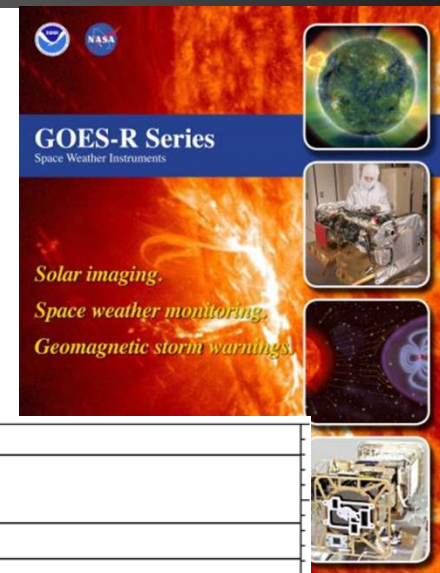
- DSCOVR went operational July 2016
- GOES-16 launched November 2016
- Ground-based Solar network operational
- Space Weather Forward Observatory (planning)

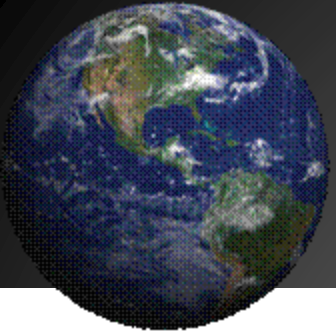
## Modeling:

- 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 Space Weather Strategy and Action Plan

## 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**