NASA Heliophysics View of the CCMC

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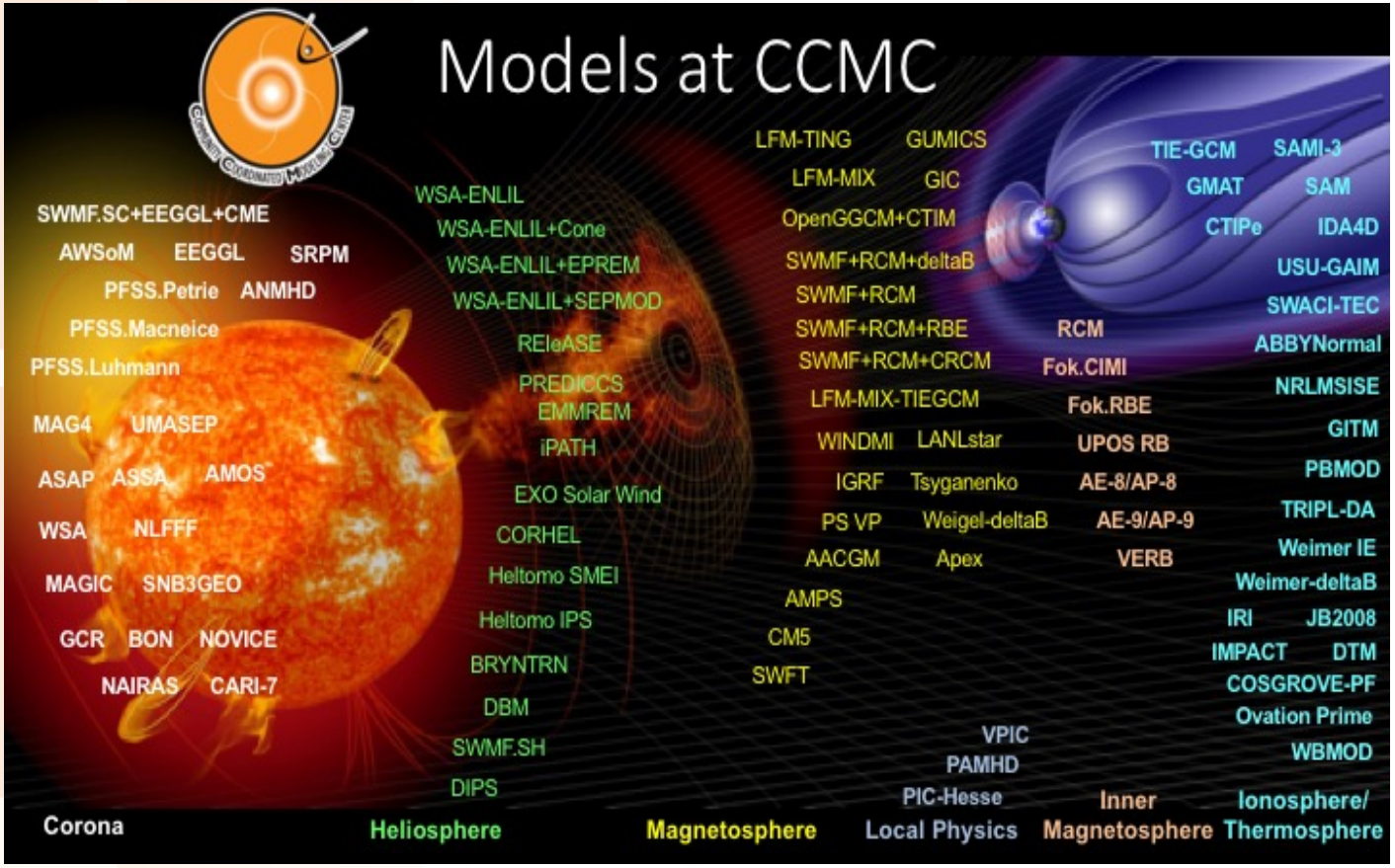


NASA Heliophysics View of the CCMC

- CCMC is an essential and an integral part of the heliophysics community
- CCMC is vibrant, ambitious, talented, responsive, entrepreneurial, resourceful, enabling, etc.
- CCMC utilizes strong and effective teamwork – internally and externally
- CCMC has dedicated and effective leadership
- CCMC has new opportunities with expanding national and international space weather efforts

CCMC Concept of Operations (2002)

- Recommended in 1997 by NASA-USAF working group, implementation plan signed by agencies in 1999
- Main criteria for success:
  - Broad use of models throughout the scientific community
  - Transition of models to operations
- CCMC Activities:
  - Runs on request
  - Model coupling
  - Space weather product metrics to measure progress
  - Model selection procedures
  - Model exit considerations (remain, improve, or remove)

CCMC Heliophysics Programmatic Review May, 2017

Instructions to the review team:

- Determine the relevance and importance of the CCMC to NASA Heliophysics Division's strategic objectives
- Recommend prioritization of CCMC activities

Selected feedback:

- CCMC is a very successful, highly utilized, and an indispensable component of the space physics and space weather enterprise
- CCMC dramatically advances space physics research by enabling the wide application of numerical models
- CCMC is stretched too thin – priorities must be established

CCMC Heliophysics Programmatic Review May, 2017

Highest priority activities:

- Host/maintain research models and provide runs on request
  - Develop criteria for model selection and continued support
  - Periodically assess demand and impact of models
- Test/validate models for transition to operational organizations

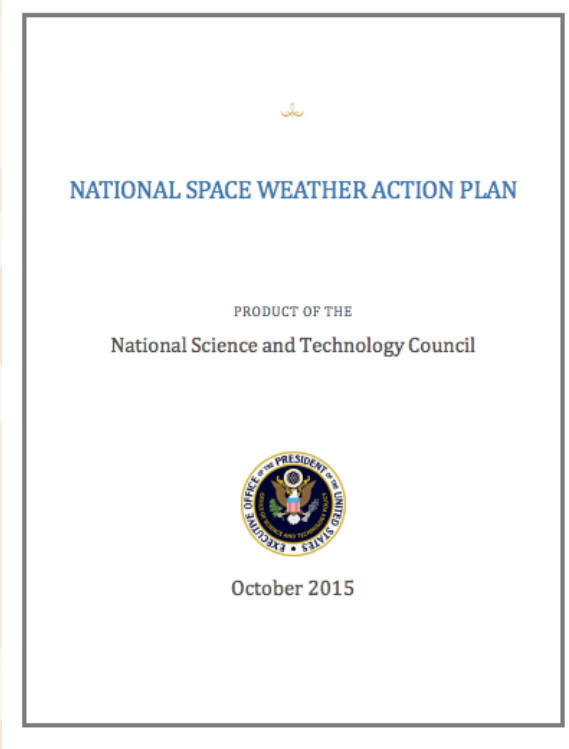
Additional high priority activities:

- Information architecture: Ingest/maintain data streams

Computation infrastructure:

- Adequate computational resources were considered a prerequisite condition that must be fulfilled

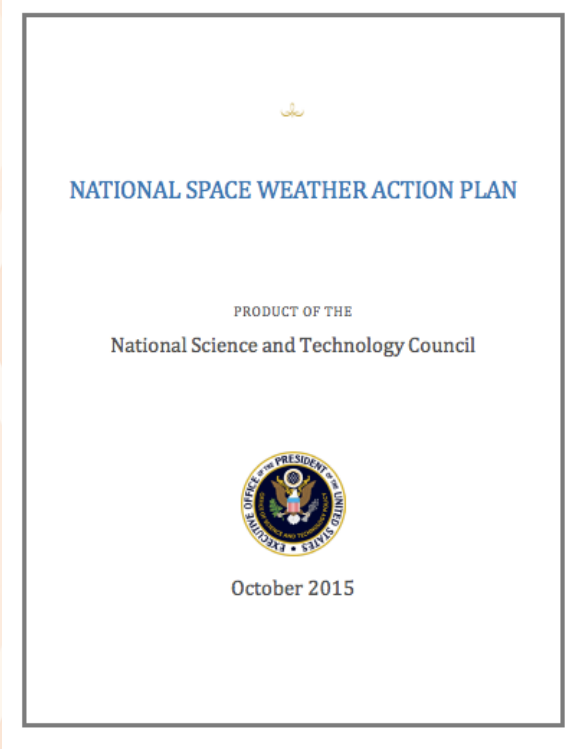
National Space Weather Strategy and Action Plan



1. Establish benchmarks for extreme events
2. Enhance response and recovery
3. Improve protection and mitigation
4. Improve modeling of impacts on critical infrastructure
5. Improve services through advancing understanding
6. Increase international cooperation

20 Government Departments, Agencies and Service Branches

Goal 1: Benchmarks



1 in 100 year event and theoretical maximum

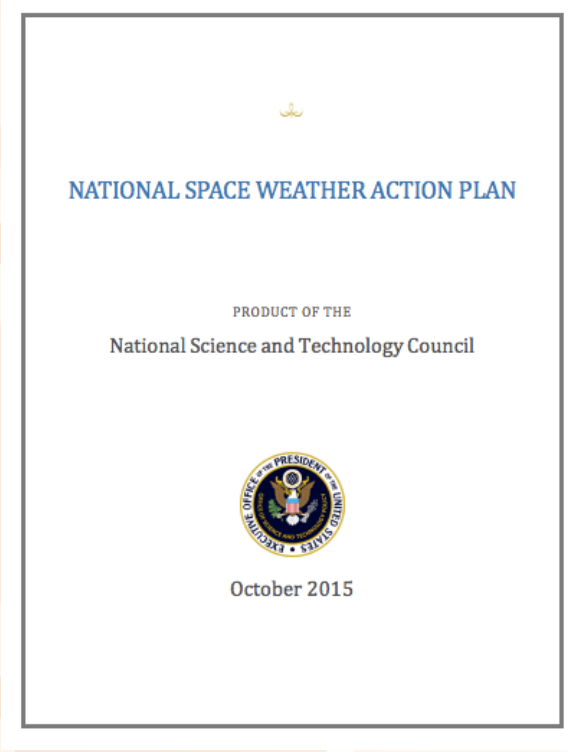
- Induced electric fields
- Ionizing radiation (NASA lead)
- Ionospheric disturbances
- Solar radio bursts
- Upper atmospheric expansion

Phase 1 document was released

Broader national and international input to be obtained through community meetings

Scientific modeling and the CCMC can have an important role in improving benchmarks

Goal 5: Improve Services Through Advancing Understanding



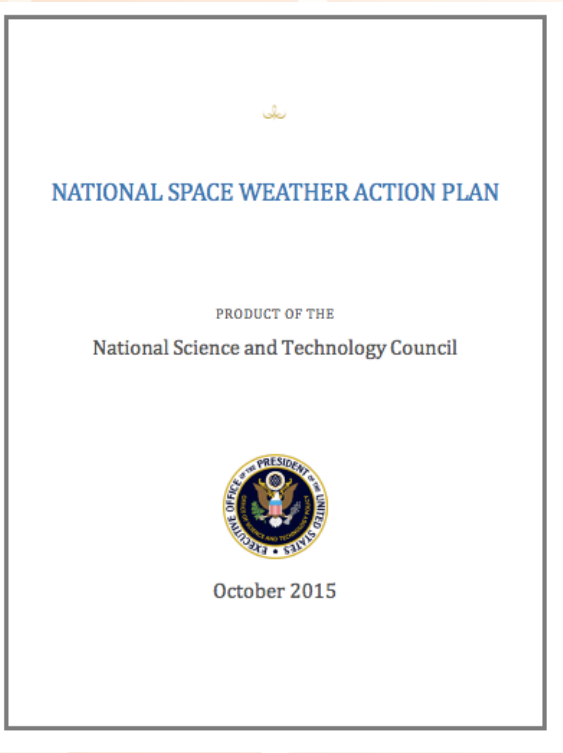
Action 5.5.1: Prioritize R&D to enhance space weather understanding

Action 5.5.2: Support basic research on solar processes and connection to Earth

Action 5.5.3: Support research targeting operational space weather needs

Goal 5: Improve Services Through Advancing Understanding

5.6 Improve Effectiveness and Timeliness of the Process that Transitions Research to Operations


NATIONAL SPACE WEATHER ACTION PLAN

PRODUCT OF THE

National Science and Technology Council

October 2015

Action 5.6.1: Enhance coordination between research modeling centers and forecasting centers for sustaining and improving models that transition into operations.

- CCMC-SWPC MOU signed

Action 5.6.2: Develop a plan for improving, testing, and maintenance of operational models, which may include a center.

- O2R plan submitted – to be released

Interagency Actions

- CCMC – SWPC activities under MOU
  - WSA-Enlil and Adapt-Enlil assessment
- 2017 Operations-to-Research opportunity
  - Announcement of opportunity released January, 2018
  - Focus on solar wind and coronal mass ejections
  - 21 proposals received March 30
- 2018 Operations-to-Research opportunity
  - New call could be released in April/May in response to FY18 funds
  - Tri-Agency MOU drafted to allow full participation (NASA, NOAA, NSF)
  - Second 2018 announcement of opportunity could be released this summer

NASA Heliophysics Plans

- Space Weather Science Applications Project (SnAP)
  - Goal: Advance and transition Heliophysics science to address space weather impacts
- Competed Elements
  - Applied research focused on R2O-O2R
  - Technology development to improve forecasts
  - Small Business Innovative Research (SBIR)
- Enhanced Capabilities
  - CCMC enhancement for model assessment and transition
  - High-end computing

International Organizations Engaged in Space Weather

UN Committee on the Peaceful Uses of Outer Space

World Meteorological Organization

International Civil Aviation Organization

Coordination Group for Meteorological Satellites

International Space Environment Service

Numerous other groups are active in space weather research (COSPAR, ISWI, ILWS, IAU, URSI, SCOSTEP, etc.)

Summary

- CCMC is an essential and an integral part of the heliophysics community
- Prioritization of CCMC activities is recommended
- New opportunities appear likely for enhanced CCMC efforts for model assessment and transition
- There is an increasing need for numerical predictions/specifications to address space weather impacts to industry and government
- How can the CCMC most effectively combine its capabilities with the growing contributions in the research community and private sector?