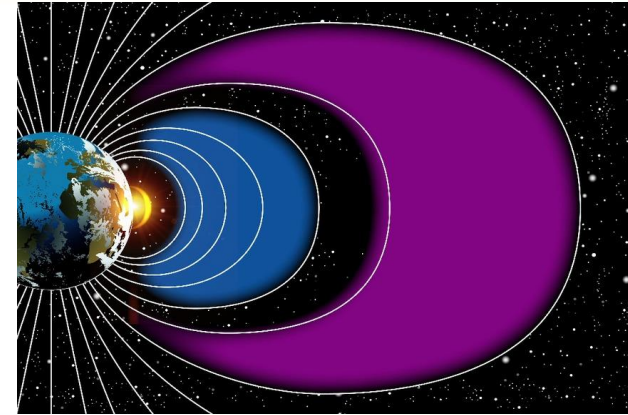
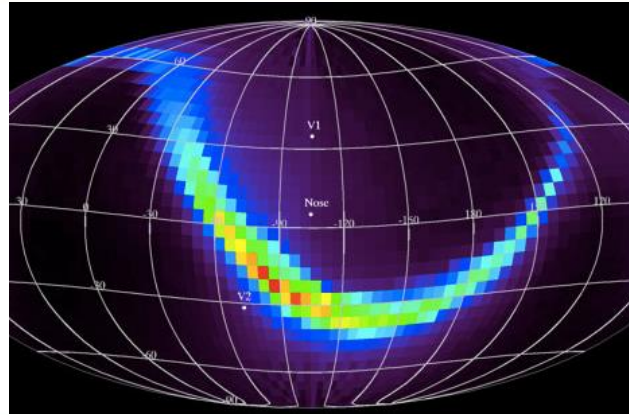




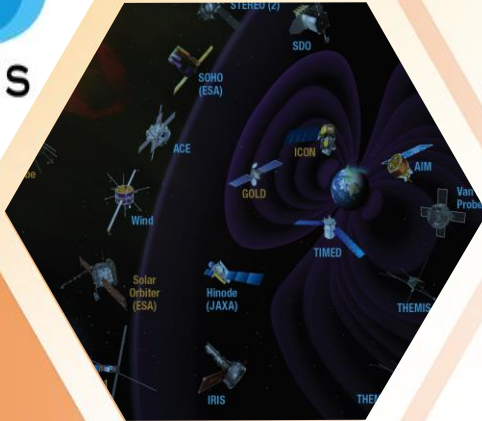
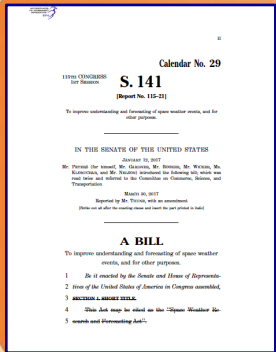
SCIENCE



NASA's Role and Current Efforts for SWAP 2018 Space Weather Workshop

James Spann
Acting Chief Scientist
Heliophysics Division

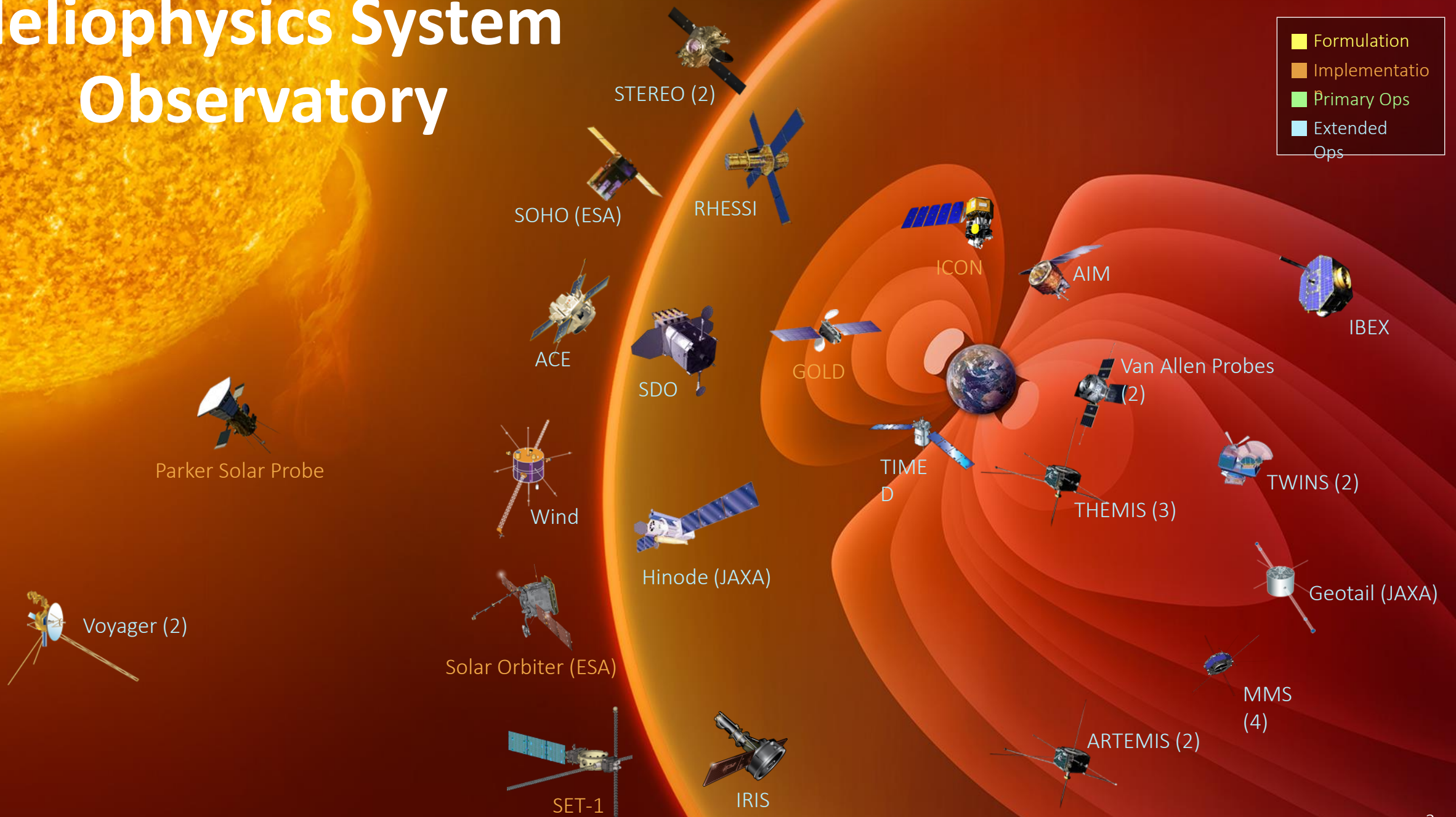
18 April 2018



Overview

- Heliophysics System Observatory
 - Status of Missions in Implementation
- Space Weather Strategy
- SWx Science Applications Project – SnAP
- International and Interagency Partnerships

Heliophysics System Observatory



Heliophysics System Observatory

Parker Solar Probe
July 2018

Parker Solar Probe

Voyager (2)

Solar Orbiter Feb 2020

Solar Orbiter (ESA)

SET-1

STEREO (2)

SOHO (ESA)

ACE

Wind

SDO

Hinode (JAXA)

GOLD
Jan 2018

GOLD

SET
2018

IRIS

ICON
NET Jun 2018

ICON

THEMIS (3)

Van Allen Probes (2)

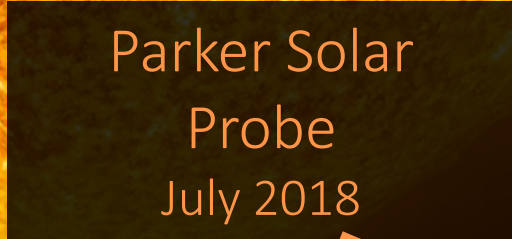
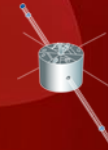
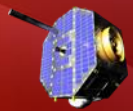
TWINS (2)

Geotail (JAXA)

MMS (4)

ARTEMIS (2)

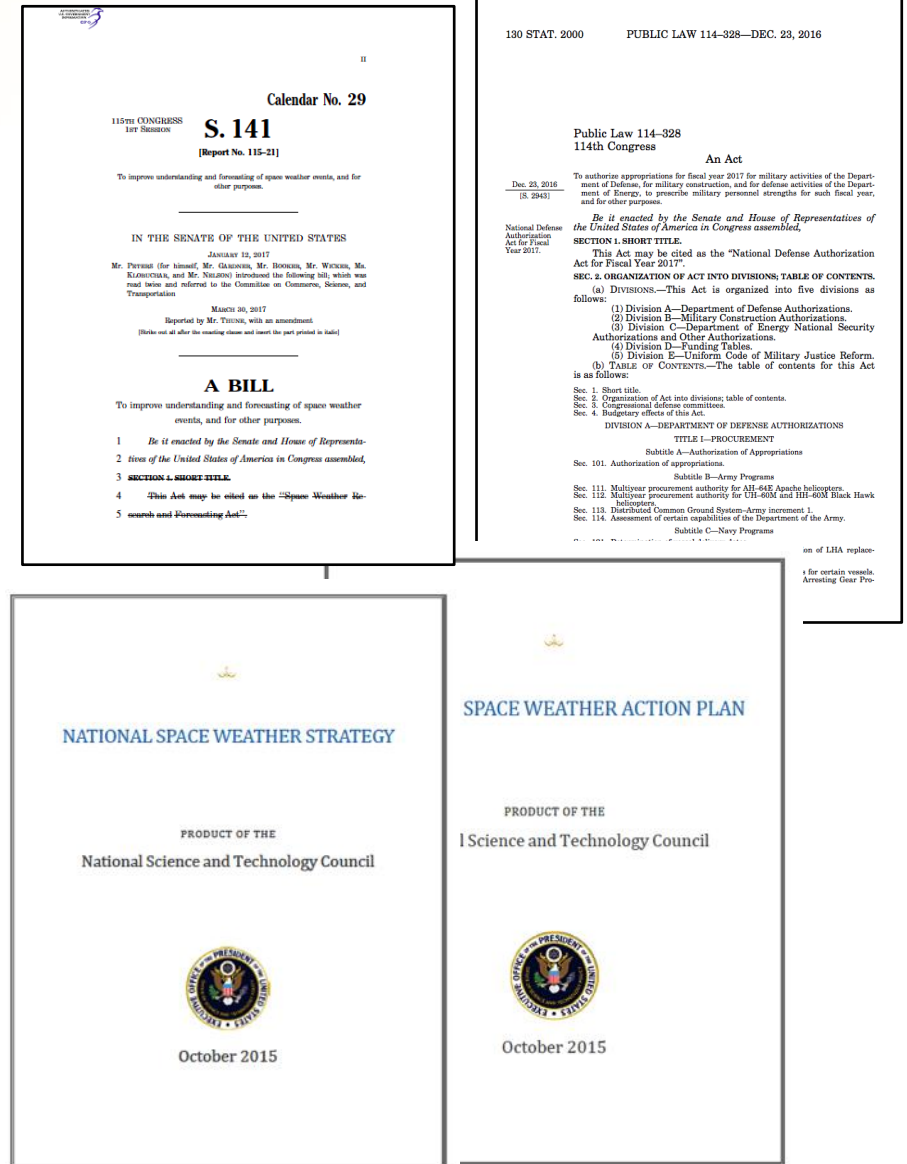
IBEX



- Formulation
- Implementatio
- Primary Ops
- Extended Ops

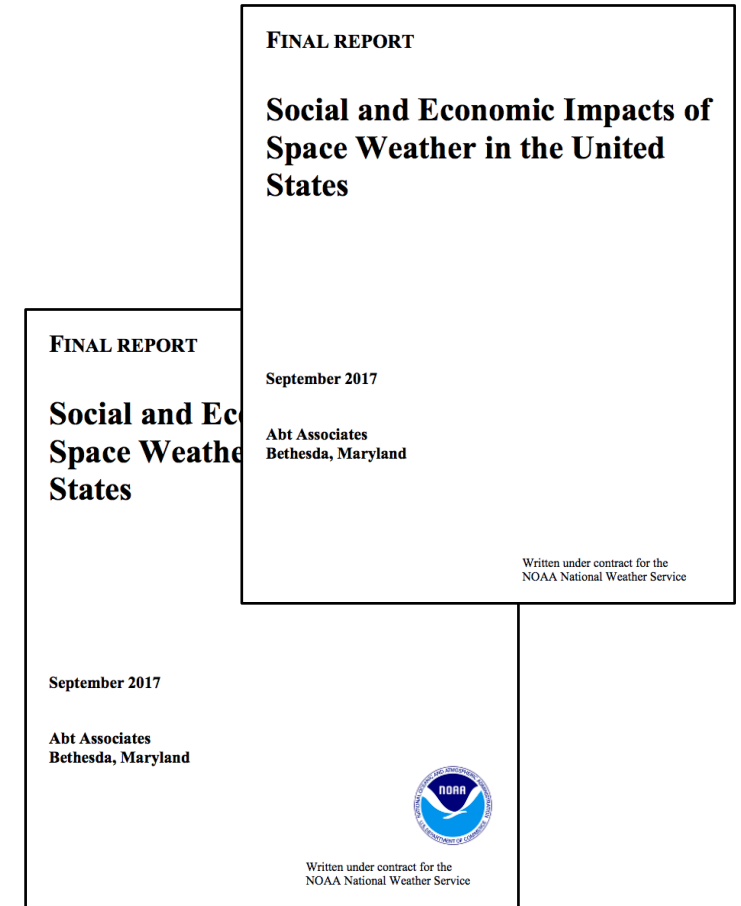
Recent National Space Weather Strategy

- Space Weather Research and Forecasting Act (S.141), amended May 2017
 - Currently being reviewed by House of Representatives Subcommittee on Strategic Forces
- National Defense Authorization Act, 2017
 - Strategy to prepare for natural and adversarial electromagnetic pulses
- National Space Weather Strategy and Space Weather Action Plan, released October 2015
 - Details the activities, outcomes and timelines that will be undertaken by U.S. federal departments and agencies for the Nation to make progress toward the strategic goals
- Space Weather Operations, Research, and Mitigation (SWORM) Task Force, established by OSTP National Science and Technology Council - 2014



SWORM Goal 1, 4, and 5 Summary

- Goal 1: Benchmarks
 - Provide a clear description of space weather events based on scientific and historical knowledge; Phase 1 document released
 - Next Step: Broader national and international input will be obtained through upcoming community meetings
- Goal 4: Impacts on critical infrastructure - Economic Impact Study
 - Final Report released in September 2017
- Goal 5: Improve services through advancing understanding
 - Coordinated interagency space weather research funding
 - Tri-agency MOU released between NASA, NOAA, and NSF
 - Joint NASA/NOAA Operations-to-Research solicitations



SWx Science Applications Project – SnAP

Focus and Objectives

Goal

- The goal of SnAP is to effectively transition heliophysics science investigations' output to products that enhance the user communities' ability to address impacts caused by the dynamic space environment.

Description

- SnAP is a Heliophysics Division managed project that enables transition of heliophysics science results to application products. The drivers for SnAP are the expressed needs of user communities such as engineering, industry, service providers, and operational agencies, that are impacted by the dynamic space environment. SnAP competes ideas and products, leverages existing Agency capabilities, collaborates with other agencies, and partners with the user communities.

SnAP Consistent with National Space Weather Policy

- Presidential Priorities
 - enhance the Nation's resilience to the threat of electromagnetic pulse (EMP);
 - maintain American dominance in space situational awareness;
 - mitigate the threat of space weather to our national security assets;
 - reduce unnecessary regulatory and reporting burdens;
 - improve the safety and longevity of human and robotic space activities, and
 - foster private sector investment to spur innovation in space weather forecasting and observations to ensure continued America leadership in and viability of space endeavors.
- SWAP Goal 5
- NASA Strategic Plan – Safeguarding and Improving Life on Earth
- 2012 Decadal Survey “Solar and Space Physics: A Science for a Technological Society” Action 4.3

SnAP General Construct and Content

SMD Heliophysics Division managed

- Light touch independent project management
- Draws on expertise across the agency
- + - Multiagency Collaborations – NSF, NOAA, DoD

+ 1. Competed elements

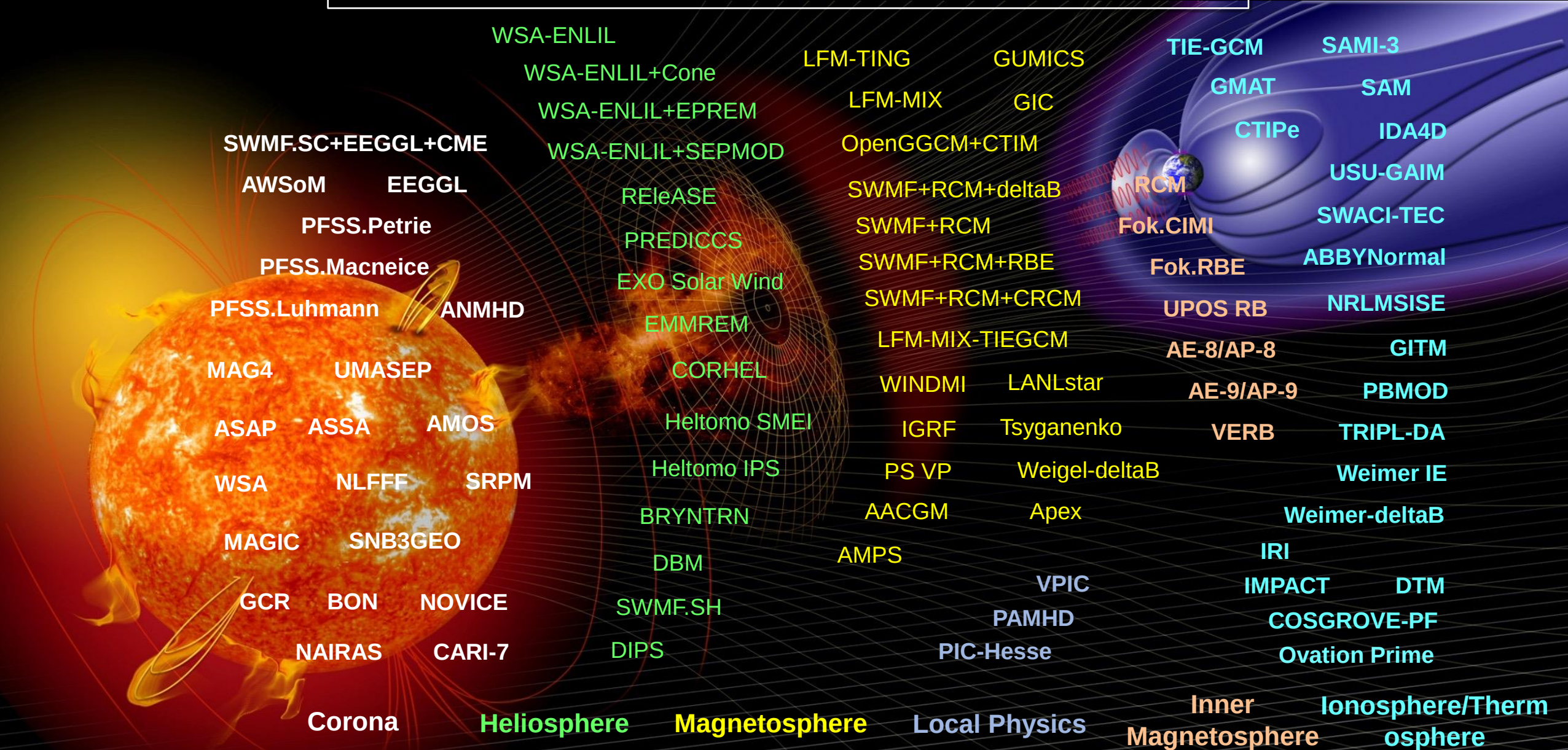
- Applied Research focused on transitioning science to applications
- Technology development for observations and informatics required to improve space weather prediction
- Small Business Innovation Research (SBIR)

2. Enhanced capabilities

- CCMC enhancement for model assessment and transition
- High-End Computing capability to enable large scale predictive modeling development

3. Generates responses to National Space Weather actions (e.g. SWORM/SWAP)

Expanding Collection Of Models at Community Coordinated Modeling Center > 80



Intra- and Interagency Partners

Planetary:

- Co-selected LWS grants; joint ROSES Juno Participating Scientist Program

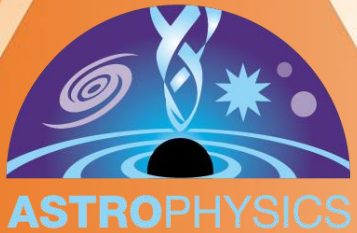
Astrophysics:

- Joint “Impact of Stellar Properties on the Habitability of Exoplanets” research opportunity

NASA-NSF:

- Coordinating ICON & GOLD opportunities (joint NASA mission GI and NSF CEDAR solicitations)
- Heliophysics Science Centers

Additional NSF/NOAA/NASA collaboration previously described with space weather



International Partners

ESA:

- Solar Orbiter
- THOR-US was contingent on selection of ESA M4 mission

KASI:

- Development towards prototype coronagraph for balloon flight, BITSE, in 2019; agreement signed October 2017

ISRO:

- Three sub-working groups established
 - 1) Aditya-1 mission collaboration
 - 2) space weather modeling
 - 3) long-term strategic collaboration focus areas

JAXA:

- Working with JAXA on approach for Next Generation Solar Physics Mission (NGSPM)



Summary

- Heliophysics Division continues execution of space weather objectives by
 - aligning with US National space weather policy and decadal recommendations
 - implementing SnAP program
 - incorporating international and interagency partnerships

