

Space Weather Activities in the USA

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- **ISWI Instrument Programs with U.S. Leads [from last year]:**
 - African Meridian B-field Education and Research (**AMBER**); E Yizengaw and M. Moldwin
 - Atmospheric Weather Education System for Observation and Modeling of Effects (**AWESOME**) and Sudden Ionospheric Disturbance Monitor (**SID**); M. Cohen, U.S. Inan and D. Scherrer
 - Boston University All-Sky Imaging Network (**BU_ASI**); M. Mendillo and C. Martinis
 - Coherent Ionospheric Doppler Receivers (**CIDR**); A. Mahrous (Egypt) and T.W. Garner (US)
 - Low-latitude Ionosphere Sensor Network (**LISN**); C. Valladeres
 - Remote Equatorial Nighttime Observatory for Ionospheric Regions (**RENOIR**); J.J. Makela
 - Realistic Ionosphere (**RI**); B. Reinisch and I. Galkin
 - Scintillation Network Decision Aid (**SCINDA**); K. Groves

- **The U.S. national space weather activity is a coordinated effort of different federal agencies, including NASA, NSF, NOAA, USGS, AFRL, and NRL.**

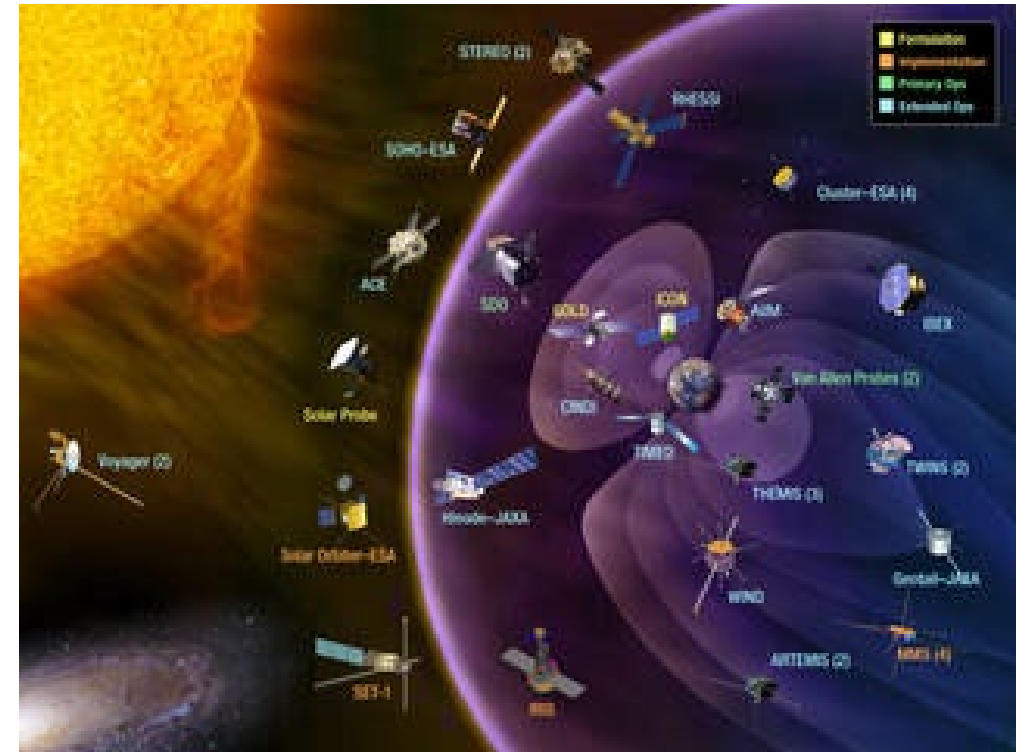
- **NASA** helps to coordinate these agencies through the **National Space Weather Strategy and Action Plan**. This is an additional program to the existing LWS program.

- **NASA Living With a Star program**. This year (released 14 Feb 2023) the LWS focused science topics were: 1) Understanding Ionospheric Conductivity and its Variability, 2) Synergistic View of the Global Magnetosphere, and 3) Evolution of Coronal Mass Ejections in the Corona and Inner Heliosphere.

➤ **Space weather schools in the U.S.** (E.G.) The 2023 *Heliophysics Summer School* was held remotely in July and in-person in August, operating from UCAR, Boulder, CO. *The International Space Weather Camp 2023*, was in June and July 2023 and was jointly ran by U of Alabama Huntsville, South African National Space Agency, and the German Aerospace Center.

➤ The **Heliophysics Systems Observatory** is a fleet of many space missions that act as a single “observatory” to observe Sun and measure its space weather.

- Still-operating imaging spacecraft include: SOHO, Hinode, STEREO-A, SDO, IRIS, and GOES-16; In-situ measurements made by ACE, WIND and DSCOVR, all at L1.
- Parker Solar Probe (2018) measures solar wind near Sun ($\leq 10 R_s$).
- Solar Orbiter (2020) has suite of in-situ and imaging instruments to observe Sun ≤ 0.28 AU and eventually out-of-the-ecliptic. SoLO is ESA mission with NASA support; PSP is NASA mission with ESA support.
- Several planetary missions that make SW measurements.
- Upcoming mission: PUNCH (Polarimeter to UNify the Corona and Heliosphere). Led by Southwest Research Institute (SWI). Launch: April 2025; 2-year mission. It will have a continuous view of a large portion of the heliosphere for four satellites. This will aid in understanding connections between solar activity and transients in the SW that can contribute to Space Weather.



- **Community Coordinated Modeling Center (CCMC)** is a multi-agency partnership performing research and development for next-generation space science and space weather models. CCMC held its 10th Community Workshop at U. Maryland, College Park, MD in June. Topics included community and agencies support and strategic planning, model on-boarding, heliophysics models beyond Earth and the Solar System, and support for open science and education.

- **National Science Foundation (NSF)** has a continuing SWx program that funds research activities that are focused on SWx impacts and support the National SWx Program.
 - NSF also supports the Solar, Heliospheric, and INterplanetary Environment (**SHINE**) group activities. SHINE held its 2023 Workshop in Stowe, VT in August. In 2024 August it will be in Juneau, AK.

- **National Academy of Science (NAS):** In 2022-2023, for the first time included “Space Weather Science and Applications” as a separate panel in the ongoing [2024-2033 Decadal Survey for Solar and Space Physics](#) study.
 - The NAS established “[The Space Weather Roundtable](#)” committee, which includes senior managers, decision makers, and scientists, to discuss activities that will facilitate advances in the scientific understanding of space weather phenomena and its impact.

- **National Oceanic & Atmospheric Admin. (NOAA)** established the [Space Weather Advisory Group](#) to (SWAG). (More below.)
 - NOAA’s SWx activities are centered at the **SWx Prediction Center (SWPC)** in Boulder, CO.
 - SWPC hosts an annual SWx Workshop, in 2023 held in April in Boulder, CO.

- **U.S. Air Force space weather program** operates through its Research Lab (**AFRL**). Basic research funding is via its Office of Scientific Research (**AFOSR**).
 - AFOSR basic research on the solar-terrestrial environment supported under Space Science program and covers activity from the Sun through Earth's magnetosphere and radiation belts to the mesosphere and lower thermosphere region.
 - In Dec. 2022 AFRL & NASA launched a cube satellite named petitSat from the ISS. The mission is to study the ionosphere to provide insight into SWx disturbances and their impact on navigation and communication systems.

- **Space Weather Activities at the Dec. 2023 AGU Meeting:**
 - Many Space Weather sessions. One of them: SH12A: “Small-Scale Solar Activity: Manifestation and Consequences for Coronal and Solar Wind Plasmas,” presented new(-ish) ideas for the origin of the solar wind.
 - The **Space Weather Advisory Group** held a Town Hall meeting on Monday evening (**TH15J: Space Weather Advisory Group (SWAG) Activities**). SWAG was established under the PROSWIFT Act (Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow). It, along with other federal agencies, advises a White House subcommittee (SWORM: The Space Weather Operations, Research, and Mitigation) on national Space Weather activities, essentially acting as a bridge between the community (commercial, electric/power, space) and the federal level. Reports are available online.