



Space Weather Advisory Group Update

**NASA Space Weather Council
February 22, 2024**

**Dr. Tamara Dickinson
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Chair, Space Weather Advisory Group*
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All opinions are my own and not those of SWAG

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Topics to Address

1. Update on SWAG activities
2. Membership transition issues
3. Coordination concerns or suggestions for Space Weather Council



Committee Members

SWAG Nongovernmental End-User Representatives

Tamara Dickinson, SWAG Chair
Science Matters Consulting

Rebecca Bishop
Aerospace Corp.

Craig Fugate
One Concern (former FEMA Adm)

Mark Olson
North American Electric Reliability Corporation

Michael Stills
United Airlines (retired)

SWAG Commercial Sector Representatives

Nicole Duncan
BAE Systems

Jennifer Gannon
Computational Physics, Inc.

Seth Jonas
Lockheed Martin

Conrad Lautenbacher
GeoOptics, Inc. (former NOAA Adm)

Kent Tobiska
Space Environment Technologies

SWAG Academic Community Representatives

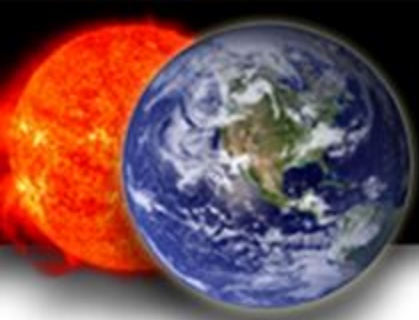
Heather Elliott
Southwest Research Institute

Tomas Gombosi
University of Michigan, Ann Arbor

George Ho
Southwest Research Institute

Delores Knipp
University of Colorado, Boulder

Scott McIntosh
National Centers for Atmospheric Research

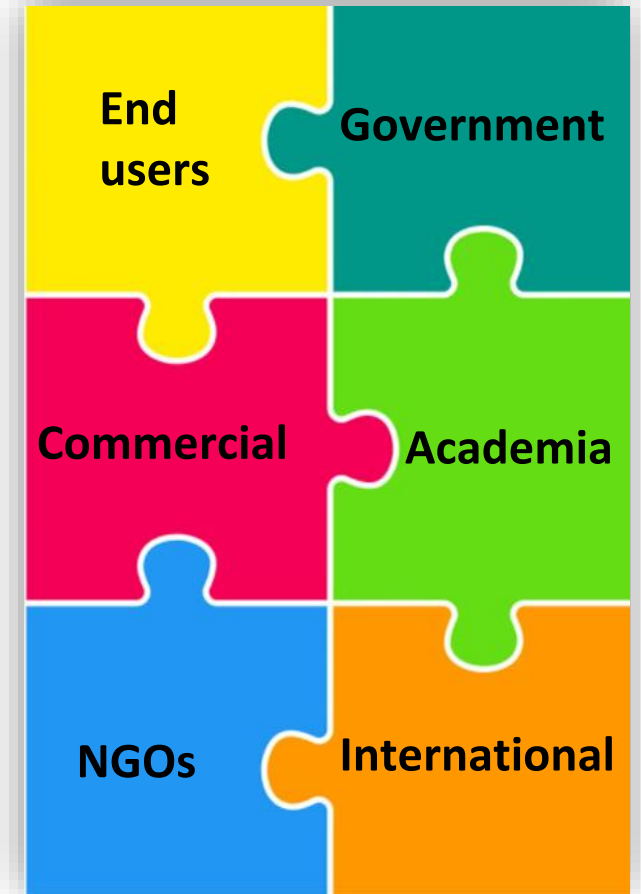


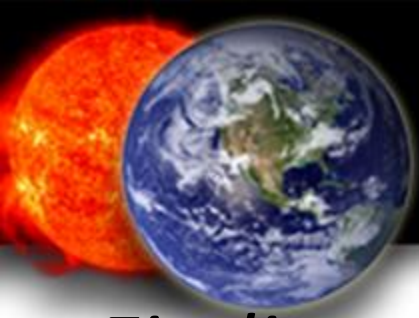
PROSWIFT Act - SWAG Duties

Advise White House SWORM Subcommittee on:

- Facilitating advances in the space weather enterprise of the US
- Improving the ability of the US to prepare for, mitigate, respond to, and recover from space weather phenomena
- Enabling the coordination and facilitation of R2O2R
- Developing and implementing the integrated strategy for coordinated observation

Conduct a comprehensive user needs survey of space weather products





SWAG Report: Finding and Recommendations

Findings and Recommendations to Successfully Implement PROSWIFT and Transform the National Space Weather Enterprise (www.weather.gov/swag)

Structure:

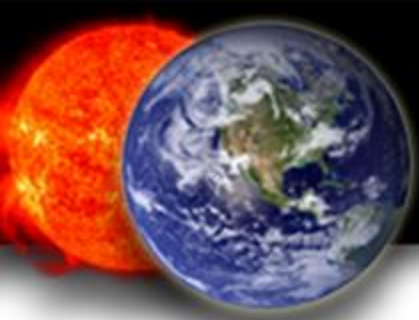
- 25 findings with 56 recommendations
- 11 priority recommendations

Audience:

- SWORM, Congress, Space Weather Enterprise

Findings and Recommendations to Successfully Implement PROSWIFT and Transform the National Space Weather Enterprise

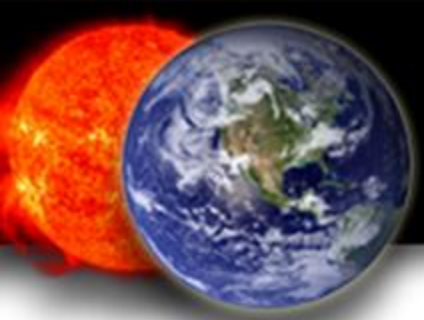
April 17, 2023



PROSWIFT Act - User Survey

User Survey Requirements:

1. Assess the **adequacy of Federal Government goals** for lead time, accuracy, coverage, timeliness, data rate, and data quality for space weather **observations and forecasting**;
2. Identify options and methods to **advance the above goals**;
3. Identify **opportunities for collection of data** to address the needs of space weather users;
4. Identify methods to **increase coordination of space weather R2O2R**;
5. Identify opportunities for **new technologies, research, and instrumentation** to aid in understanding, monitoring, modeling, prediction, and warning of space weather; and
6. Identify methods and technologies to **improve preparedness** for space weather.



Sectors for User Survey

2023-2024

- Electric Power Grid
- Space Situational Awareness/
Space Traffic Coordination
- Emergency Management
- Human space flight
- Aviation
- Research
- GNSS

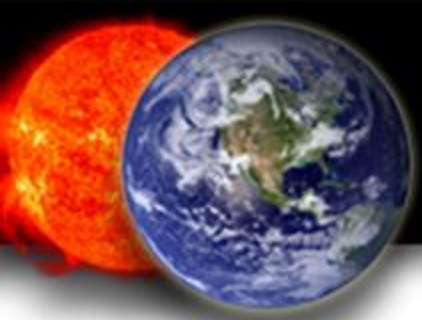
2024+

- Satellite
- National Security
- Radio Frequency Application
(comms and Radar)
- GNSS



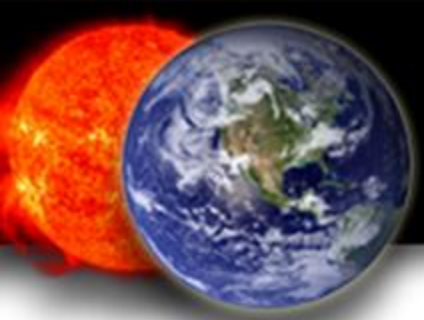
User Survey Process

- Science and Technology Policy Institute (STPI) helped conduct the survey
- Virtual and/or in-person focus groups
- Chatham House Rules
- High-level anonymized summary created by STP for the SWAG
- Results including recommendations will be compiled into a report that will be delivered to Congress and made public



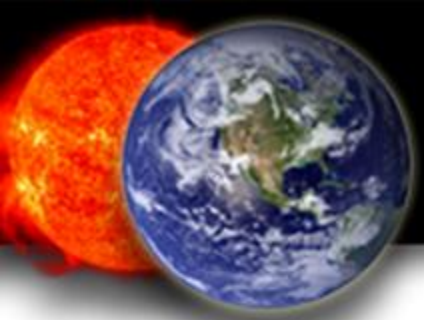
User Survey Questions

1. Current use of space weather observations, information, and forecasts
2. Current technological systems, components or elements affected by space weather
3. Current risk reduction and resilience activities
4. Future needs of space weather observations, information and forecasts
5. Future risk reduction and resilience activities
6. New or non-traditional sources of Space Weather Data
7. Next generation technologies, research, instrument, and models to address Space Weather



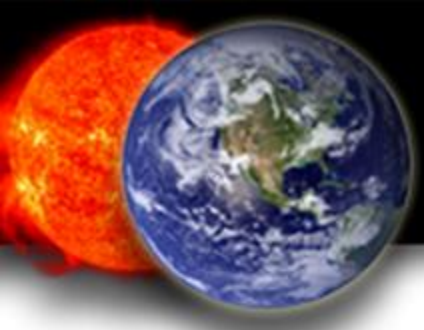
Sector Co-Chairs

- Electric Power Grid - Mark Olson and Jenn Gannon
- Aviation - Mike Stills and Kent Tobiska
- Human Space Flight - Kent Tobiska, George Ho, and Jenn Gannon
- Space Traffic Management/Coordination - Delores Knipp and George Ho
- Research - Scott McIntosh and Heather Elliott
- GNSS - Rebecca Bishop and George Ho



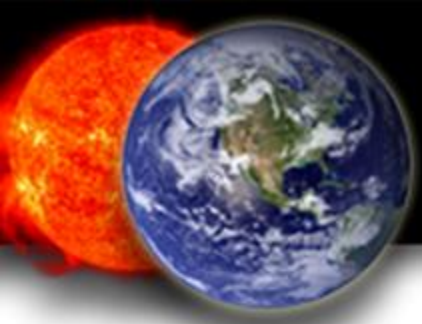
Status of User Survey

- GNSS sector continuing online survey and then will conduct focus groups. This sector is expected to run over 2 years.
- Completed the other in-person and virtual focus groups
- Townhall at AGU to discuss first impressions/common themes
- Session at AMS to discuss first impressions/common themes
- Started drafting the report
- Public meeting to discuss the report March 26
- Roll out *scheduled* for April 16 at Space Weather Workshop



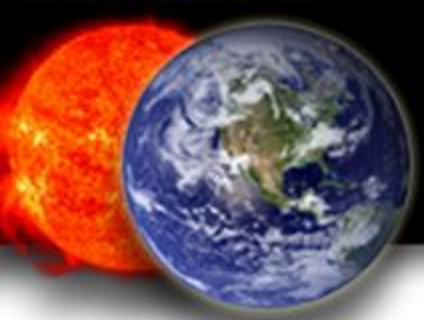
What is Next for SWAG?

- What issue/activity will SWAG undertake next?
 - SWORM/STPI Scales initiative
 - Request from SWORM
 - Initiated by SWAG
- In person meeting (likely in DC) later this year



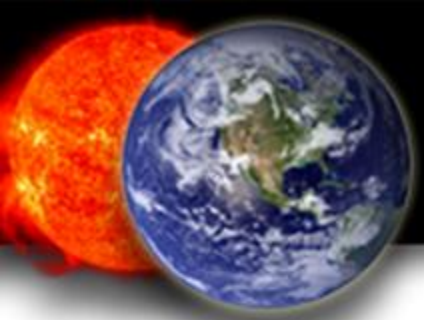
Membership Transition Issues

- PROSWIFT Act guidance on membership
 - Composed of not more than 15 members appointed by SWORM
 - 5 representatives each from academia, commercial space sector, and end user community
 - Chair appointed by NOAA Administrator
 - 3 year terms beginning when appointed
 - Members may not serve more than 2 consecutive terms
 - Chair may not serve as chair for more than 2 terms regardless of whether they are consecutive



Membership Transition Issues

- Current members were selected in September 2021
- New members will be selected by SWORM
- **My assumptions:**
 - Process will be similar to that used in 2021
 - Some members may be asked to remain on SWAG
 - Some new members may be added
 - Nomination announced in Federal Register
 - Community can apply if you fall into one of the three categories of members



Coordination/Collaboration

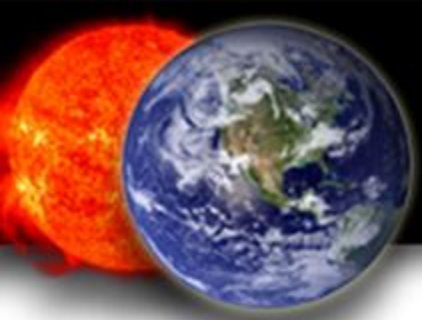
- Overlapping membership
 - Personal view is this is working
 - Official updates though should be done by Chair or their delegate
- Invite Roundtable and Council to give updates at SWAG public meetings
- Coordination calls with chairs/handlers of SWAG, Roundtable, Council
- Sessions at meetings/workshops (e.g. SWW 2023, AMS 2024)
- Still confusion in community about roles of SWAG, SWORM, Roundtable, and Council
- Still confusion on role of federal agencies even though this has been spelled out in Executive Orders and PROSWIFT Act



THANKS!

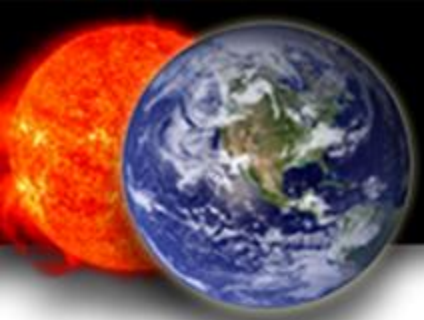
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www.weather.gov/SWAG



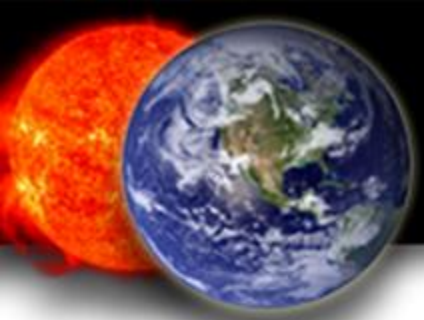
Broad Set of Space Weather Topics Covered

- Overarching Recommendations
- Ground-Based and Airborne Sensors and Networks
- In-Space Architectures and Space-Based Observations
- Data and Computing Infrastructure for Space Weather Operations
- Improving Benchmarks, Metrics, and Scales for Space Weather End-Users
- Space Weather Risk to Evolving Infrastructure Systems and Services
- Economic Assessments on The Costs of Space Weather and the Value Of Forecasting and Mitigation
- Promote Focused and Continued Engagement Across Industry and Government Space Weather Stakeholders
- Additional Findings and Recommendations
- Next Steps



Priority Recommendations

1. Fund the Federal Space Weather Enterprise. (R.1.1)
2. Create and fund an applied research program office for space weather within NOAA to coordinate, facilitate, promote, and transition applied research across the national space weather enterprise. (R.2.1)
3. Ensure OSTP staffing and White House led prioritization and coordination across the national space weather enterprise. (R.3.1 and more)
4. Protect space weather sensors from spectrum interference. (R.5.1)
5. Provide long-term support for operational ground-based and airborne sensors and networks. (R.6.2)
6. Provide and fund critical operational space weather services beyond near-Earth. (R9.2)



Priority Recommendations

7. Fund NASA missions that advance fundamental science to support space weather research. (R.10.1)
8. Coordinate benchmark development or improvement with industry. (R.14.1)
9. Quantify the societal benefits for addressing risk from space weather by performing national-level and industry-wide economic assessments and consider space weather in the context of broader national risk. (R.18.1. and R.4.1)
10. Support coordinated applied research within the thermosphere (above 100 km altitude) which is critical for space traffic coordination. (R.24.1-3)
11. Foster and lead a global space weather enterprise. (R. 25.1-4)