



2019 Space Weather Workshop Draft Agenda, Some Titles are Preliminary
Embassy Suites Hotel
Boulder, Colorado

Monday, April 1 – Pre-Workshop Meetings

8:00-10:00 **UN International Civil Aviation Organization (ICAO) Coordination Discussion – by invitation –**
 Brent Gordon – Foothills Meeting Room

8:30-10:00 **US Air Force and US Federal Agency Collaboration – by invitation –** Major Janelle Jenniges, Michael Starks & James McCollough – Royal Arch Meeting Room

10:00-12:00 **UN International Civil Aviation Organization (ICAO) Coordination Discussion – by invitation –**
 Brent Gordon/Bill Murtagh – Royal Arch Meeting Room

12:00-1:30 **Lunch**

1:30 – 4:30 **UN International Civil Aviation Organization (ICAO) Discussion – Open -** Brent Gordon/Bill Murtagh – Royal Arch Meeting Room

3:00 - 4:30 **Student Networking Session – by invitation –** Carina Alden – Foothills Meeting Room

5:00 - 7:00 **Networking Session for Space Weather Workshop Participants –** NCAR Mesa Lab – Busses Provided from/to Hotel

Tuesday, April 2

8:30 **Workshop Opening Remarks**
 Bill Murtagh, NOAA/SWPC

8:45 – 9:00 **Special Presentation: Update from the Executive Office of the President**
 Aaron Miles, Office of Science and Technology Policy

9:00 – 9:45 **Operational Space Weather Services – Latest Developments**
 Chair: Bill Murtagh, NOAA/SWPC

9:00 **SWPC Update to the 2019 SWW**
 Brent Gordon, NOAA/SWPC

9:15 **Current Mission and Future plans for the USAF Space Weather Operations Center**
 Major Eric Cercone, US Air Force/557th Weather Wing

9:30 **Contributions to Space Weather Services from the Commercial Sector**
 Conrad Lautenbacher, American Commercial Space Weather Association

9:45 – 10:45 **Break and Poster Session (Solar and Interplanetary Research and Applications)**

10:45 - 12:15 **Panel Session: Space Weather and ICAO: Meeting Needs for Global Aviation Services**
Chair: Brent Gordon, NOAA/SWPC

10:45 **Regulatory Group/Policy Perspective**

Bill Bauman, Federal Aviation Administration

11:00 **Space Weather: An Airline Perspective**

Mike Stills, United Airlines

11:10 **A Practitioner's Perspective on Integrating ICAO Requirements into Operations**

Rob Steenburgh, NOAA/SWPC

11:20 **Service Center – Pan-European Consortium for Aviation Space Weather User Services**

Ari-Matti Harri, Finnish Meteorological Institute

11:30 **Service Center – Australia-Canada-France Japan Consortium**

David Boteler, Natural Resources Canada

11:40 **Commercial Sector Space Weather Support for ICAO**

W. Kent Tobiska, Space Environment Technologies, LLC

11:50-12:15 **Panel/Audience Discussion**

12:15 – 1:45 **Lunch & SWPC Tour** (*Please Note: Tour participants must have signed up and will miss early afternoon session talks, Tour bus departs the Embassy Suites Lobby at 12:30 PM and returns at 3 PM*)

1:45 – 2:00 **Keynote: Satellite Anomalies and the Radiation Belts**

Daniel Baker, University of Colorado Boulder

2:00 - 3:15 **Satellite Impacts and Anomaly Support**

Chair: Janet Green, Space Hazards Applications

2:00 **The Wave of Sensitive Systems**

Jonny Dyer, Lyft

2:15 **A 60-satellite Space Weather Constellation with Real-time 24/7 Globalstar Coverage**

Hank Voss, Nearspace Launch, Inc.

2:30 **SpaceWx and UK SKYNET Operations and Exercises**

Ewan Haggerty, Airbus Defense and Space

2:45 **Spwx Correlations to Abnormal Satellite State of Health**

Chris Bowman, Data Fusion and Neural Networks

3:00 **Roadmaps from the Space Environment Engineering and Science Applications Workshop**

Paul O'Brien, The Aerospace Corporation

3:15 - 4:15 **Break and Poster Session (Solar and Interplanetary Research and Applications)**

4:15 - 5:30 **Space Weather Support for the Arctic Region**

Chair: Rodney Viereck, NOAA/SWPC

4:15 **Policy Perspective**

4:30 **Arctic Marine Navigation and Communication Support**
Captain David Zezula, NOAA

4:45 **Arctic Research at the Geophysical Institute**
Bob McCoy, University of Alaska Geophysical Institute

5:00 **Analytic and Experimentation Capabilities for Arctic Communications and Operations**
Jennifer Forsyth, The MITRE Corporation

5:15 **Space Weather in the NWS Alaska Region**
David Kochevar, NOAA/NWS Alaska Region

5:45 - 8:00 **13th Annual NOAA - Commercial Space Weather Interest Group (CSWIG)/American Commercial Space Weather Association (ACSWA) Summit Meeting – by invitation**

Wednesday, April 3

8:30 - 8:45 **Keynote: Overview of NASA's Exploration Campaign**
Steve Clarke, National Aeronautics and Space Administration

8:45 – 10:00 **Panel Session: Space Weather Support for Human Expansion Across the Universe**
Chair: Linda Parker, Universities Space Research Association

8:45 **Operational Space Weather Forecasting Needs for Manned Exo-LEO Missions**
Eddie Semones, NASA Johnson Space Center

8:55 **Air Force Research Laboratory's Solar Energetic Particle Forecasting Needs**
Rachel Hock-Mysliwiec, Air Force Research Laboratory

9:05 **ESA Space Weather Activities in Space Safety Programme**
Juha-Pekka Luntama, European Space Agency

9:15 **Solar Energetic Particle Forecasting: Current Capabilities and Future Directions**
Hazel Bain, NOAA/SWPC

9:25 **Active Dosimeter-Based Estimate of Astronaut Acute Radiation Risk from Solar Energetic Protons**
Chris Mertens, National Aeronautics and Space Administration at Langley

9:35-10:00 **Panel/Audience Discussion**

10:00 - 11:00 **Break and Poster Session (Ionosphere and Thermosphere Research and Applications and General Space Weather Services)**

11:00 - 12:00 **Agency Vision on Implementation of Space Weather O2R2O**
Chair: Tamara Dickinson, Office of Science and Technology Policy

11:00 **NOAA O2R2O**
Mary Erickson, Deputy Director of the National Weather Service

11:15 **Heliophysics at NASA and the Science of Space Weather**
Nicola Fox, National Aeronautics and Space Administration

11:30 **NSF Space Weather Activities**
Michael Wiltberger, National Science Foundation

11:45 **USAF Space Weather O2R2O Efforts**
Michael Farrar, US Air Force Directorate of Weather

12:00 **UK R2O Activities**
Mark Gibbs, United Kingdom Met Office

12:15 - 1:35 **Lunch**

1:35 - 2:50 **Extreme Space Weather Benchmarks**
Chair: Geoffrey Reeves, Los Alamos National Laboratory

1:35 **Benchmarks for Induced Geo-Electric Fields**
Pete Riley, Predictive Sciences, Inc.

1:50 **Space Weather Impacts of Solar Radio Bursts**
Dale Gary, New Jersey Institute of Technology

2:05 **Next Steps in Determining Space Weather Benchmarks for Ionizing Radiation Hazards**
Christina Cohen, California Institute of Technology

2:20 **National Benchmarks for Ionospheric Disturbances**
Susan Skone, University of Calgary

2:35 **Upper Atmosphere Expansion**
Eric Sutton, University of Colorado, Boulder

2:50 - 3:45 **Break and Poster Session (Ionosphere and Thermosphere Research and Applications and General Space Weather Services)**

3:45 – 4:00 **Modernizing the Power Grids and Understanding Potential Impacts from Solar Weather**
Ben Kroposki, National Renewable Energy Laboratory

4:00 – 5:15 **Panel Session: Space Weather Services for the Electric Power Grid**
Chair: Seth Jonas, Science and Technology Policy Institute

4:00 **Integrating Space Weather and Ground-based Magnetotelluric Data with Powerflow Solutions for Real-time Assessment of Risk to the Power Grid**
Adam Schultz, Oregon State University

4:15 **NOAA's Development of Regional Geoelectric Field Modeling Capability: New Nowcast and Forecast Products to Improve Operational Decision Making of the U.S. Electrical Power Grid in Response to Geomagnetic Storms**
Christopher Balch, NOAA/SWPC

4:30 **Magnetic-storm Geoelectric Hazard Maps and the Induction of Voltages on Power-grids**
Jeffrey Love, US Geological Survey

4:45 **Using MT Data to Improve Regional Ground Response Models**
Jennifer Gannon, CPI Computational Physics, Inc.

5:00-5:15 **Panel/Audience Discussion**

6:30 - 9:00 **Banquet Dinner at Pearl Street Ballroom**
Special Guest Speaker: Nicola Fox, Heliophysics Division Director, NASA

Thursday, April 4

8:30 - 10:00 **International Coordination on Space Weather Research**
Chris Cannizarro, US Department of State

8:30 **International Coordination**
Jean-Luc Bald, European Commission Delegation to the US

8:45 **Ensemble Flare Forecasting: Using Terrestrial Weather Prediction Techniques to Improve Space Weather Operations**
Sophie Murray, Trinity College of Dublin

9:00 **UN COPUOS – Long Term Sustainability Guidelines**
Peter Martinez, Secure World Foundation

9:15 **Space Weather initiatives in Latin America**
Joaquim E.R. Costa, National Institute for Space Research

9:30 **Modelling GICs in Australian Power and Pipeline Networks**
Jeanne Young, Australia Bureau of Meteorology

9:45 **ESA Space Weather Activities in Space Safety Programme**
Juha-Pekka Luntama

10:00 - 11:00 **Break and Poster Session (Geospace/Magnetosphere Research and Applications)**

11:00 - 12:00 **Advances in Ground and Space-based Observations**
Chair: Douglas Biesecker, NOAA/SWPC

11:00 **Commercial Weather Data Pilot: Update from Spire Global, GeoOptics and PlanetIQ**
Duly, Spire Global, Inc.
Conrad Lautenbacher Jr., GeoOptics, Inc.
Rob Kursinski, PlanetIQ

11:15 **Polarized Imaging for CME Tracking and 3D Structure**
Craig Deforest, Southwest Research Institute

11:30 **NOAA's Current and Future Space Weather Architecture**
Elsayed Taalat, NOAA/NESDIS

11:45 **Space Weather Monitoring with the NOAA GOES-R Series Spacecraft: Instruments, Observations and Products**
Rob Redmon, NOAA/NCEI

12:00 - 2:00 **Lunch & SWPC Tour (Please Note: Tour participants must have signed up and will miss early afternoon session talks, Tour bus departs the Embassy Suites Lobby at 12:30 PM and returns at 3 PM)**

2:00 – 2:15 **Keynote: NASA's Parker Solar Probe – First Results**
Stuart Bale, University of California, Berkeley

2:15 - 3:30 **Research – Advances in Ground and Space-based Observations**
Chair: Tim Fuller-Rowell, University of Colorado Boulder

2:15 **New Observations from NASA's Global-scale Observations of the Limb and Disk (GOLD) Mission**
Richard Eastes, University of Colorado Boulder

2:30 **Space Weather Measurements from MACAWS: Monitors for Alaskan and Canadian Auroral Weather in Space (MACAWS)**
Anthea Coster, Massachusetts Institute of Technology

2:45 **GTOSat: A Pathfinder for a SmallSat-based Operational Space Weather Program**
Larry Kepko, National Aeronautics and Space Administration

3:00 **GOES-R Solar UltraViolet Imager Extended Coronal Imaging**
Gustave Comeyne, NOAA/NESDIS

3:15 **Seismic Monitoring of the Sun's Far Hemisphere**
Joe Werne, NorthWest Research Associates

3:30 - 4:30 **Break and Poster Session (Geospace/Magnetosphere Research and Applications)**

4:30 - 5:40 **Advances in Space Weather Research and Modeling**
Chair: Michele Cash, NOAA/SWPC

4:30 **Research and Modeling at the Air Force Research Laboratory**
James McCollough, Air Force Research Laboratory

4:45 **CCMC-SWPC Partnership Aiming to Improve Operational Space Weather Products and Services**
Maria Kuznetsova, National Aeronautics and Space Administration

5:00 **Machine Learning in Space Weather**
Enrico Camporeale, NOAA/SWPC

5:10 **The Performance Characteristics of Operational Flare Forecasting Systems**
KD Leka, NorthWest Research Associates

5:20 **NASA's SPoRT Center: Progress in Extending Terrestrial Weather R2O/O2R to Space Weather**
Ghee Fry, National Aeronautics and Space Administration

5:30 **Applied Artificial Intelligence for Science and Exploration**
Madhulika Guhathakurta, National Aeronautics and Space Administration

Friday, April 5

8:30 – 10:00 **Advances in Space Weather Research and Modeling: Solar Wind and CMEs**
Chair: James Spann, National Aeronautics and Space Administration

8:30 **Session Introduction**
James Spann, National Aeronautics and Space Administration

8:35 **Global Boundary Magnetic Field Optimization for Coronal and Solar Wind Models**
Graham Barnes, NorthWest Research Associates

8:41 **Improving Magnetic Field Boundary Conditions for Solar Wind Models**
Thomas Berger, University of Colorado, Boulder

8:47 **A Higher-Accuracy Model of the Heliosphere with Improved Background Solar Wind and Coronal Mass Ejections**
Tae Kim, University of Alabama, Huntsville

8:53 **Using Machine Learning to Validate Heliophysical Models**
Michael Kirk, Catholic University of America

8:59 **Inner Heliosphere Modeling With the GAMERA MHD Model**
Sasha Ukhorskiy, Johns Hopkins University

9:05 **Improving the Prediction Accuracy of CME Arrivals in the WSA-ENLIL-Cone Model**
Dusan Odstrcil, George Mason University

9:11 **Using Magnetograms and Coronal Imaging to Improve Solar Wind Predictions**
Yi-Ming Wang, Naval Research Laboratory

9:17 **Reliably Inferring the Sun's Far-Side Magnetic Flux for Operations Using Time-Distance Helioseismic Imaging**
Shea Hess Webber, Stanford University

9:23 **Metric-Based Assessment of New Solar Wind Forecast Models incorporating Data Assimilation**
Pete Riley, Predictive Sciences, Inc.

9:29 **Space Weather O2R: Physics-Based Extension of the WSA Model Capabilities**
Igor Sokolov, University of Michigan

9:35 **Interactive Tool for Modeling Multiple Solar Eruptions**
Jon Linker, Predictive Sciences, Inc.

9:41 – 10:00 Discussion

10:00 - 10:30 Break

10:30 – 11:45 Advances in Space Weather Research and Modeling: Magnetospheric Energetic Particles and Plasma
Chair: Howard Singer, NOAA/SWPC

10:30 **Quantitative Forecasts and Specifications of Outer Radiation Belt Electrons Based on Solar Wind Conditions**
Xinlin Li, University of Colorado Boulder

10:36 **Specifying High-altitude Electrons using Low-altitude LEO Systems (SHELLS)**
Janet Green, Space Hazards Applications, LLC

10:42 **PreMevE: A Neural Network Based Predictive Model for MeV Electrons inside Earth's Outer Radiation Belt**
Yue Chen, Los Alamos National Security, LLC

10:48 **A Machine Learning Based Specification and Forecast Model of the Inner Magnetospheric Radiation Environment**
Jacob Bortnik, University of California Los Angeles

10:54 **An ARIMAX Model of ULF Wave Power and Radial Diffusion for Space Weather Forecasting**
Kyle Murphy, University of Maryland, College Park

11:00 **Data-Augmented Forecasting Model for near-Earth Relativistic Electron Intensities**
Sasha Ukhorskiy, Johns Hopkins University

11:06 **Advanced Particle and Plasma Environment Specification Model for Spacecraft Impacts**
Mei-Ching Fok, National Aeronautics and Space Administration

11:12 **Development of a Predictive Inner Magnetosphere Model for Space Weather**
Stanislav Sazykin, William Marsh Rice University

11:18 **ARMAS Dual Monitor: Demonstrating an Operational Aviation Radiation Monitoring System**
W. Kent Tobiska, Space Environment Technologies, LLC

11:24 – 11:45 **Discussion**

11:45 – 12:00 **Solar Cycle 25 Predications**
Lisa Upton, High Altitude Observatory

12:00 **Workshop Closing Remarks**
Howard Singer, NOAA/SWPC