NOAA Space Weather Prediction Center Update

2019 Space Weather Workshop

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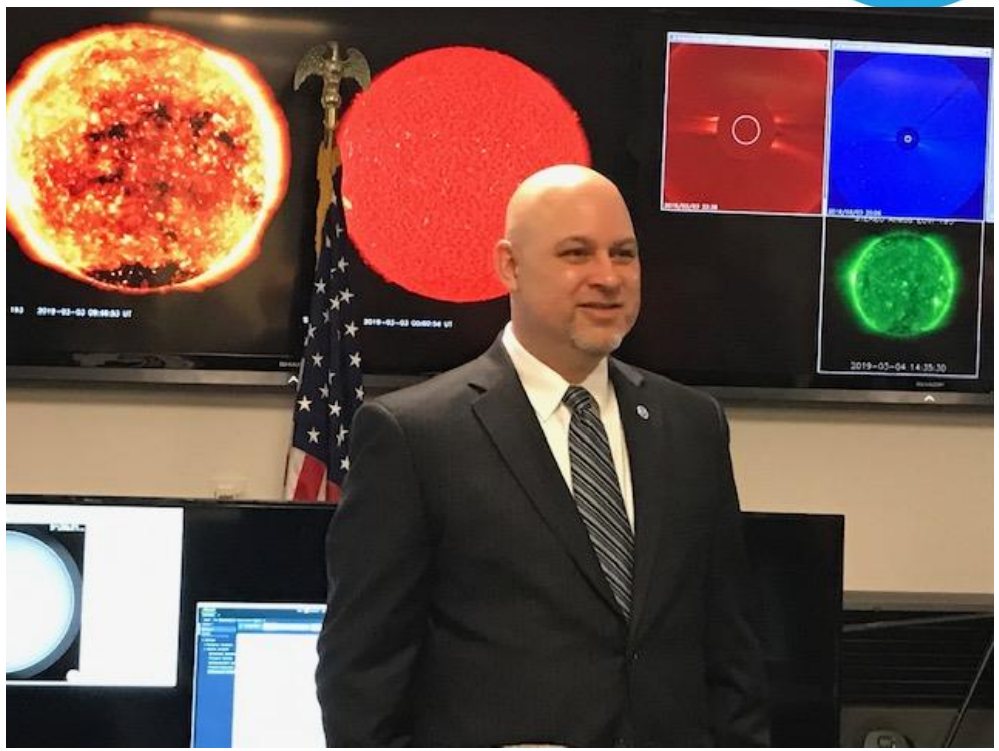
NOAA
National Weather Service

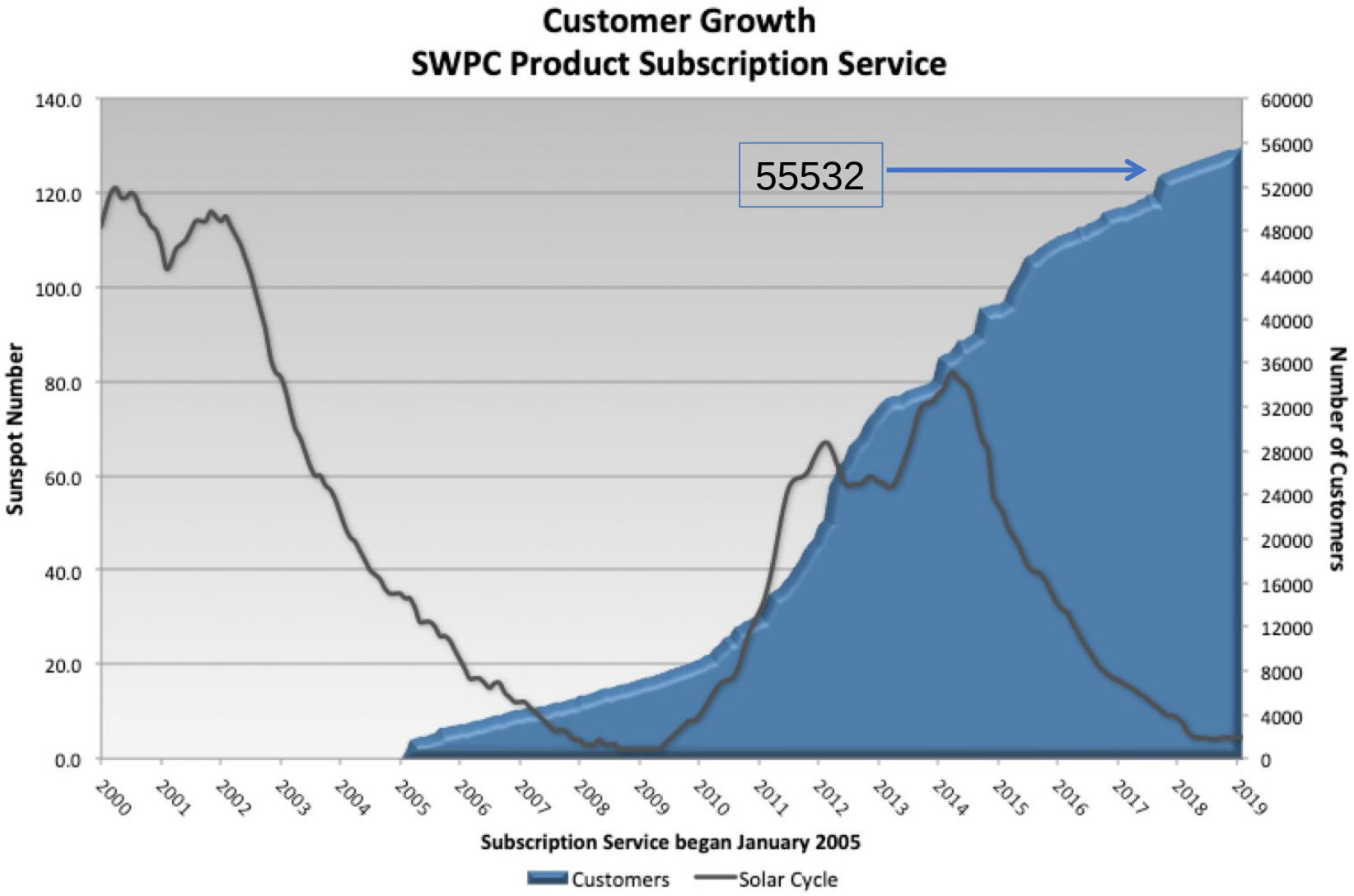
02 April 2019

New Faces at SWPC, Still More to Come



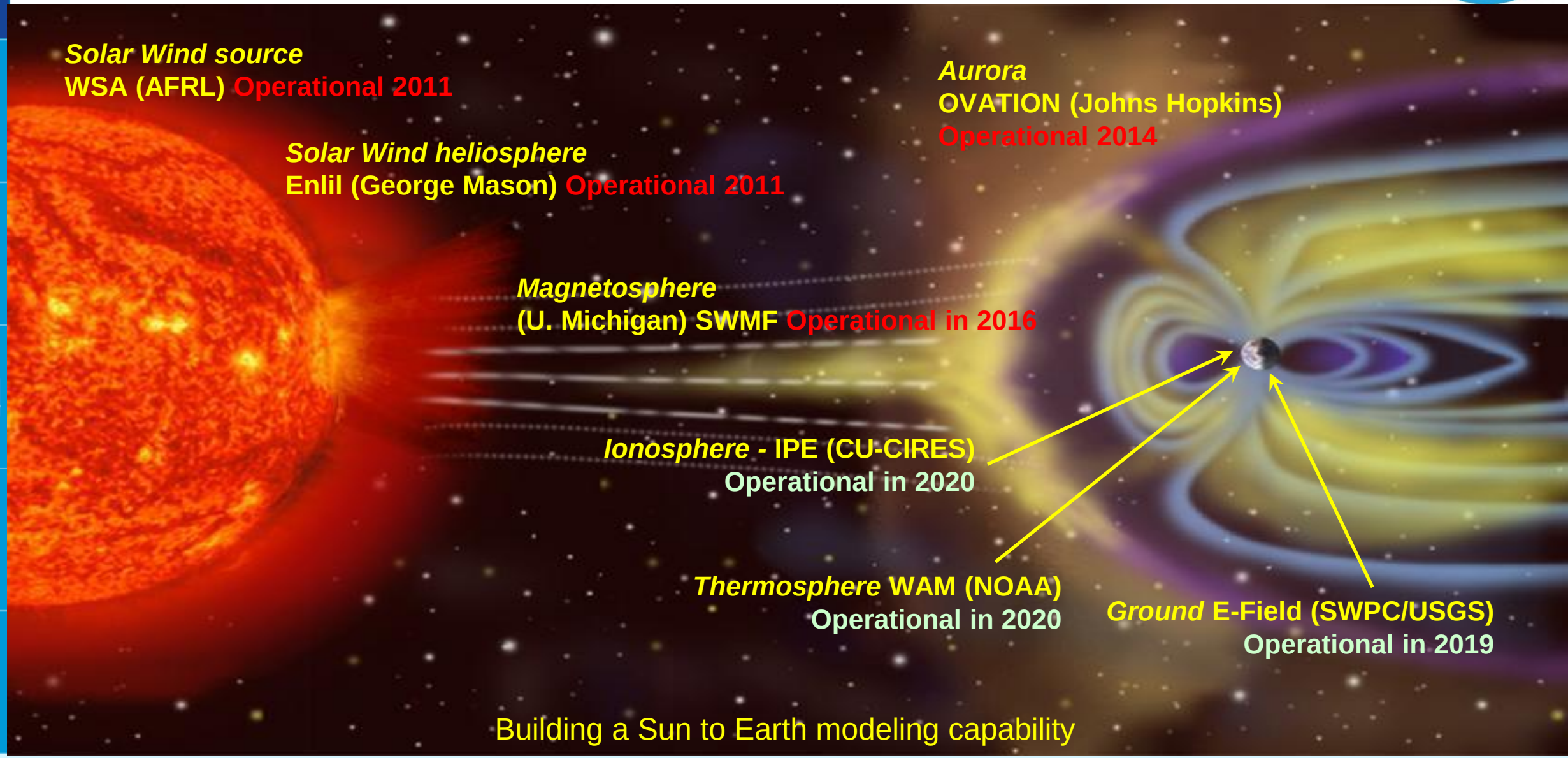
- Clinton Wallace selected as SWPC Director
- Chris Bidwell, Cheryl Dann, & Jason Livingston selected to IT positions
- Jun Wang Selected to lead our Commercial Weather Data Pilot evaluation effort
- Enrico Camporeale selected to help with our Geospace model project
- We are still working to fill the following:
- Rodney Viereck retired as the Research Section lead
  - Thanks to Terry Onsager for filling in!
- Tim Feickert departed from our IT Branch Chief position
- Bob Rutledge is in Geneva working on a temporary detail to the WMO
  - Thanks to Rob Steenburgh for filling in!

SWPC Customer Base Continues to Rise



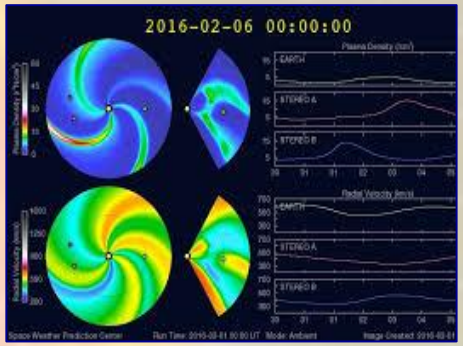
- Number of customers continues to rise – Even as we approach solar minimum
- ~200 new customers per month
- Adding in many major industries
  - Major airlines
  - Drilling and oil exploration
  - Satellite companies
  - Transportation sector
  - Power grid operators
  - Agriculture
  - Emergency Responders

NOAA Space Weather Modeling



Building a Sun to Earth modeling capability

SWPC Operational Model Suite



GMU/AFRL WSA-Enlil

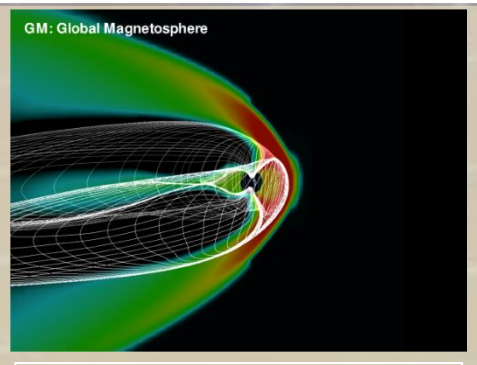
Operational since 2011

Major upgrade Summer 2019

1. Latest version of models
2. Zero-point corrected GONG maps
3. WSA output files
4. WSA readied for ADAPT

Future Work

1. Changing CONOPS for on-demand runs vs runs ever two hours



U. Michigan Geospace

Operational since 2016

V1.5 Implemented Fall 2017

1. New auroral zone forecast
2. Improved grid over N. Am.
3. Improved Code robustness

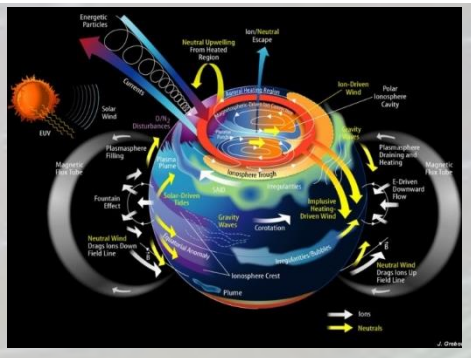
2018 Implementation

1. Verification & Validation

V2.0 coming in 2020

1. Improved Resolution

spaceweather.gov/models



NOAA/U. CO WAM-IPE

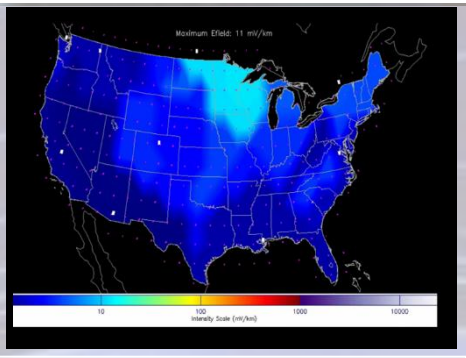
Operational 2020

4 runs per day on development NOAA supercomputer

1. One way coupled system WAM->IPE
2. Experimental products available on our website

Future Work

1. Two-way coupled
2. Use new NWS Global model
3. Increase resolution



NOAA/NASA/USGS/NSF E-field

Operational Fall 2019

Real time runs every minute

1. USGS 1D ground conductivity model
2. Working with industry on output format

Future work

1. USGS/NSF 3D ground conductivity model
2. Higher resolution
3. Couple to Geospace

spaceweather.gov/experimental

Note: all models developed with NASA and/or NSF funding at some level.

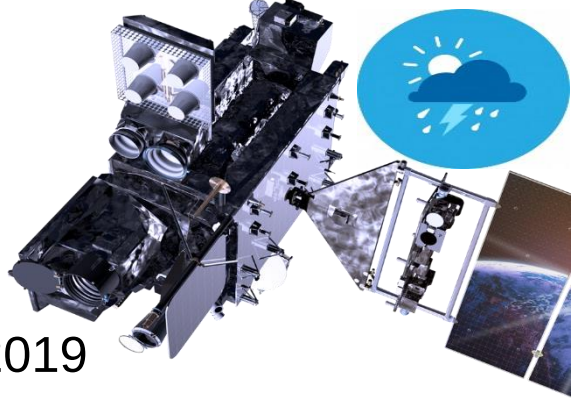
NOAA-NASA-NSF – Continued Strong Partnership

- Tri-Agency Memorandum of Understanding signed between NOAA-NASA-NSF in 2018
  - Allows for the interagency coordination of funding for applied space weather research
- The space weather research community is already seeing the benefits of this partnership with several Announcements of Opportunities (AO)
  - Jan 2018 – Solar wind, solar wind structures, and CMEs (12 reported on this Friday)
  - May 2018 – Energetic particles and plasma at spacecraft (9 reported on this Friday)
  - Nov 2018 – Solar energetic particles and heavy ions
  - April 2019 – To be announced
- SWPC continues its detail assignments to NASA HQ
  - Working on clearance process for the next person to replace Terry Onsager (2018)
- The “Conveyor Belt” of new space weather science has been created!
  - Operational space weather centers must shift gears and be ready to “off-load” new science and technology
  - The next great R2O challenge is in effectively and efficiently evaluating the results of these AO’s and plugging them into operations

SWPC selected as ICAO Global Space Weather Center

- In November 2018, the International Civil Aviation Organization (ICAO) selected three centers to provide Global Space Weather Services to aviation industry
  - SWPC (United States)
  - PECASUS Consortium (Finland, UK, Germany, Poland, Austria, Italy, Netherlands, Belgium, Cyprus)
  - ACFJ Consortium (Australia, Canada, France, & Japan)
- ICAO also identified two centers to provide Regional Space Weather Services beginning in November 2022
  - South Africa
  - China-Russia Consortium
- Global centers now working very hard to stand up Initial Operating Capability by 07 November 2019
- Much more on this topic in the very next Panel Session!

Observations Update



- GOES – Currently Operational with GOES 14&15
  - GOES-16 space weather observations expected in operations by Fall 2019
  - GOES-17 in 2020
- GONG – NOAA continuing to support the Operations and Maintenance of the Observatories
  - SWPC working with NSF/NSO and NOAA/IDP program to operationalize the processing of the GONG data
- DSCOVR – Supporting SWPC operations and models since 2016
  - Software modifications improve data quality
  - Spurious reboots continue – 25 since 2015 – 7 Since last SWW!
- Space Weather Follow On + Operational Coronagraph on GOES-U
  - Working with NESDIS and NASA on a 2024 launch for both
  - Exciting update from NESDIS coming on Thursday!!!
- NOAA Commercial Weather Data Buy Program
  - SWPC now staffed to evaluate the Radio Occultation data from this pilot program
  - NOAA has awarded Contracts to Spire, PlanetIQ and GeoOptics

National Space Weather Strategy and Action Plan

- SWPC continues its work on the 2015 Space Weather Strategy and Action Plan
  - O2R work and Economic Impact Study are some examples of these efforts
  - We anticipate the release of a brand new customer survey this month that focused on power grid, airline, and satellite industry needs
    - Release announcement will be made on SWPC website (spaceweather.gov)
- SWPC also working with priorities established by the current Administration
  - Presidential Space Policy #1 (manned space flight) & #3 (Space Traffic Management)
  - Presidential Executive Order on Coordinating Resilience to Electromagnetic Pulses
    - Released 26 March 2019
    - Includes Natural EMPs – i.e. Geomagnetic Storms
    - Directs support for USGS geomagnetism program and Magnetotelluric survey (critical for SWPC)
  - 2019 National Space Weather Strategy and Action Plan
    - Also released 26 March 2019
    - Updates 2015 plan and aligns with Administration priorities

Executive Order 13744 – Coordinating Efforts to Prepare the Nation for Space Weather (Oct 2016)

5(f) DHS develop a coordinated Federal operating concept and associated checklist to coordinate Federal assets and activities to respond to notification of impending space weather events.

Following publication of the operating concept, agencies shall develop operational plans documenting their procedures

Coordinating with NSC and FEMA on finalizing the Federal operating concept and associated checklist

Progress and Partnerships

- Just like the vast area of space we try to predict, the number of items on our to-do list are equally vast – We can not do it alone!
- We can not claim sole ownership for the progress we have made over the past years.
- Many have helped us this year, and many more have helped us long before this year!
- ICAO has created new opportunities for international partnership and collaboration

Conclusion

- SWPC Research continue to focus on the growth of its modeling capability
  - Whole community effort that capitalizes on great partnership with NASA and NSF and many others!
  - The R2O/O2R challenge must continue to be an important focus of ours
  - We fully recognize the contribution from outside the walls of SWPC
- We are working closely with NESDIS as the spin up on the observations mission traditionally performed by SWPC
- ICAO requirements present an excellent opportunity for the entire community to address aviation sectors needs