

Understanding and managing risks and impacts associated with space weather – National Weather Service perspective



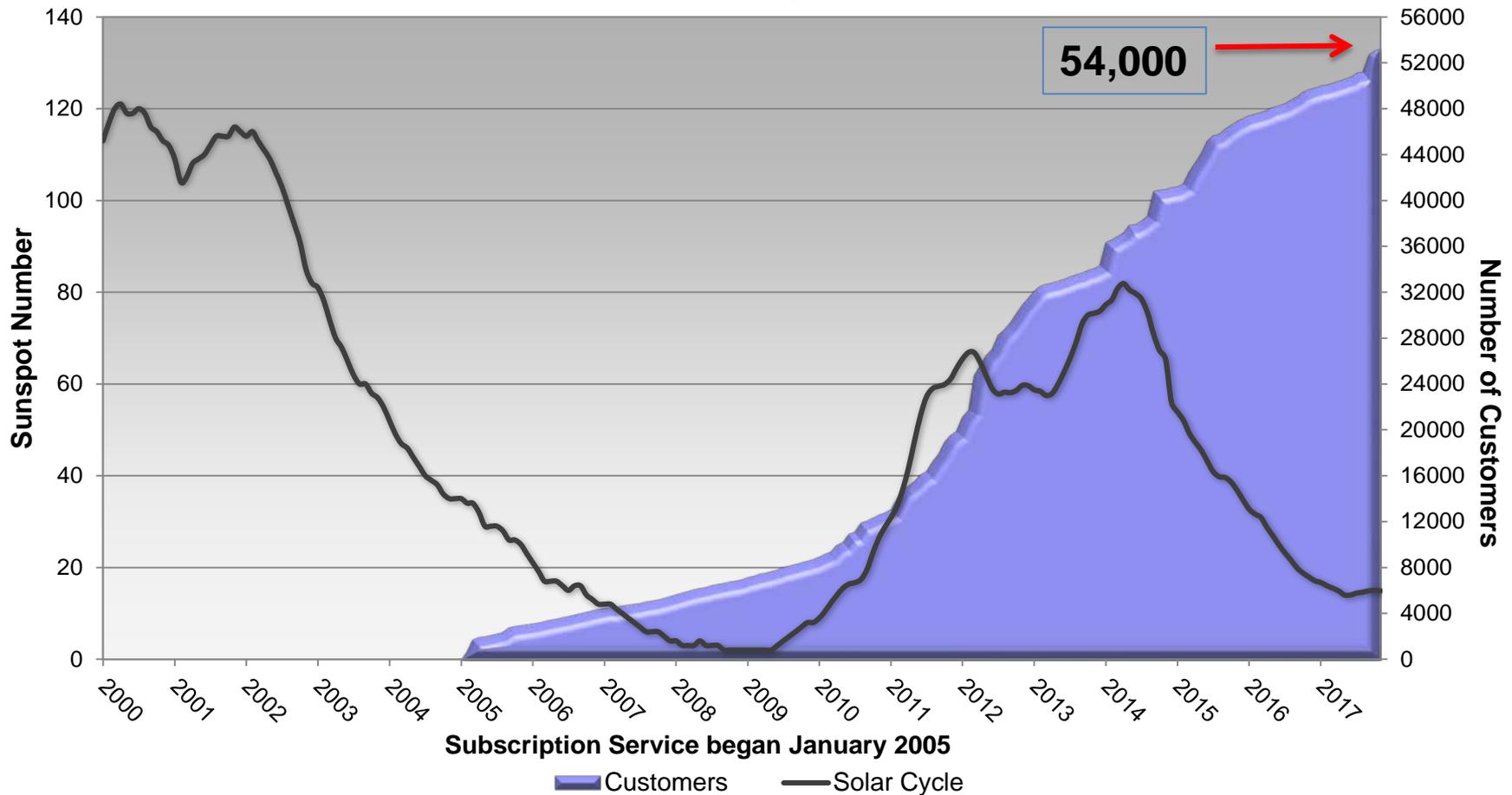
Dr. Bill Lapenta

Director, National Centers for Environmental Prediction
National Weather Service

Space Weather Enterprise Forum
Washington D.C.
25 July 2018

Customer Growth SWPC Product Subscription Service

June 2017

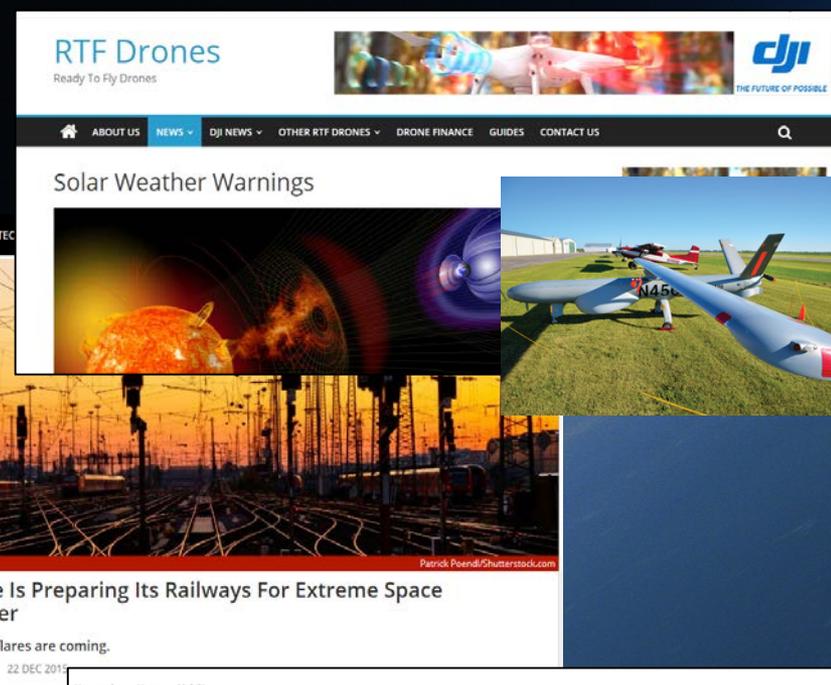


- **Averaging 200 new subscribers monthly...even through solar minimum**
 - **Increased awareness across all sectors**
 - **Hundreds of Federal, State, and local emergency responders**

Adapting To Consumers Evolving Needs

Community must anticipate and manage the needs of a rapidly evolving technological society

- Autonomous vehicles
- Advanced Rail Technologies - Positive Train Control (GPS-based safety system)
- Supersonic and Hypersonic transport
- Space Tourism
- Drone technology
- Deep space exploration



RTF Drones
Ready To Fly Drones

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Solar Weather Warnings

Europe Is Preparing Its Railways For Extreme Space Weather

The solar flares are coming.

DAVID NIELD 22 DEC 2015

Science alert

Patrick Poendl/Shutterstock.com

N456



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Solar storms could wreak havoc on driverless cars

March 16, 2018 @ 12:47 pm
Kyle Stock and Brian Sullivan
Bloomberg

0 Shares

Self-driving cars are still working to master the snow. It turns out that excessive sun can also pose a problem for the coming waves of robot drivers.



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How much are you willing to pay to become an astronaut?

By Stefania Mudda April 20, 2018



WIRED

BOEING'S PROPOSED HYPERSONIC PLANE IS REALLY, REALLY FAST

Altitude: 96k ft

It would cruise at 95,000 feet, at 3,800 miles per hour. The G-force feeling upon takeoff would last a full 12 minutes. @ aerevs

NOAA Response – Meeting commitments to improve space weather services through critical observations

NSWS - Establish and sustain a baseline observational capability

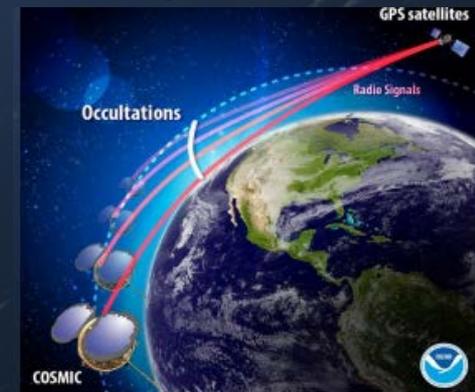
- **GONG** – NOAA now supporting the Operations and Maintenance of the Observatories
 - SWPC working with NSF/NSO and NOAA/IDP program to operationalize the processing of the GONG data
- **GOES** – Currently Operational with GOES 14&15
 - GOES-16 operational FY19/Q2
 - GOES-17 operational ~FY20
- **DSCOVR** – Supporting SWPC operations and models since 2016

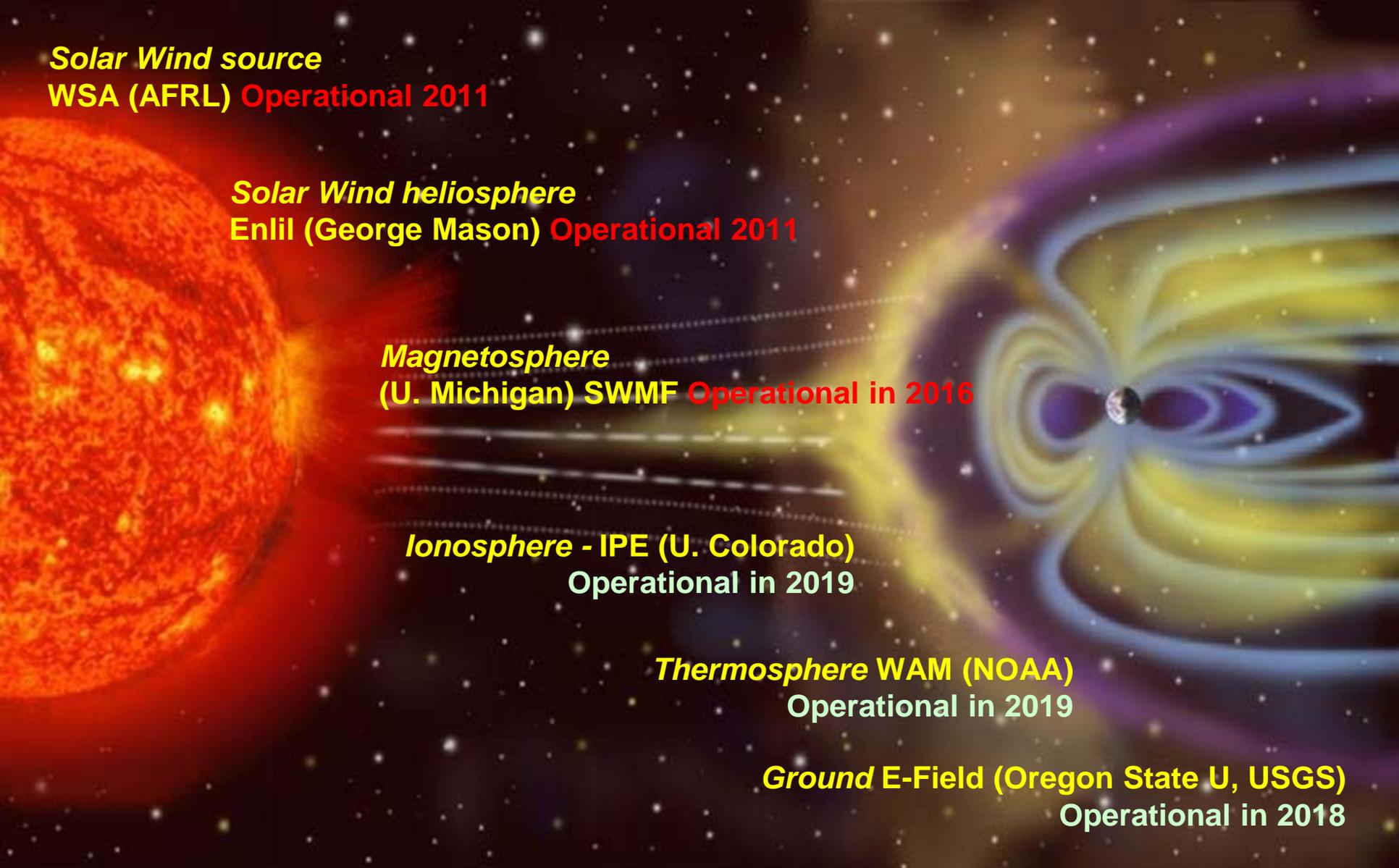


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- **Space Weather Follow On + Operational Coronagraph**
 - Host coronagraph on GOES-U, launch in 2024
 - Rideshare to L1 with NASA's Interstellar Mapping and Acceleration Probe (IMAP) late 2024 to include solar wind instruments and coronagraph
- **NOAA Commercial Weather Data Buy Program (radio occultation data for operational use)**
 - Showing promise as replacement to the now canceled COSMIC-2B program





Solar Wind source
WSA (AFRL) Operational 2011

Solar Wind heliosphere
Enlil (George Mason) Operational 2011

Magnetosphere
(U. Michigan) SWMF Operational in 2016

Ionosphere - IPE (U. Colorado)
Operational in 2019

Thermosphere WAM (NOAA)
Operational in 2019

Ground E-Field (Oregon State U, USGS)
Operational in 2018

Building a Sun-to-Earth modeling capability



Partnerships & Building Relationships “Can’t Do It Alone”



Achieving our goals will require the Federal Government to work across agencies and to develop enhanced and innovative partnerships with State, tribal, and local governments; academia; non-profits; the private sector; and international partners. These efforts will enhance national preparedness and speed the creation of a space-weather-ready Nation