

Welcome to SWEF 2015!



Hon. Bill Nelson

U.S. Senator

SWEF 2015 Congressional Sponsor

Dr. Bill Leith

Senior Science Advisor, USGS

SWEF 2015 Host



USGS Geomagnetism Program



Monitor Earth's magnetic field using ground-based magnetic observatories

Collect continuous, high-temporal resolution, accurate records of magnetic field variations covering long timescales

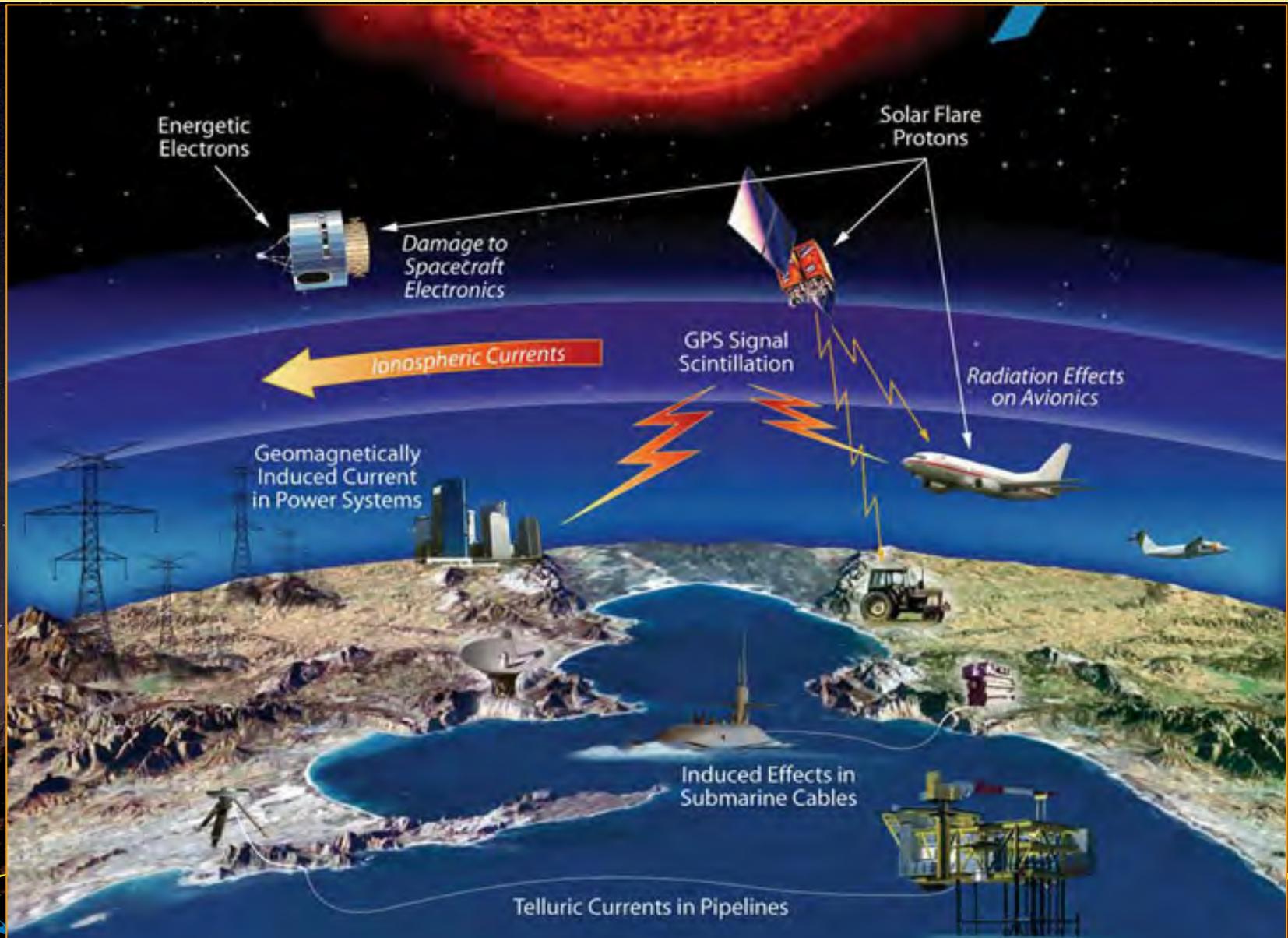
Provide magnetic data to various governmental, academic, and private institutions, including the NOAA Space Weather Prediction Center and USAF

Conduct research for scientific understanding and hazard mitigation

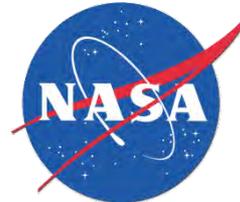
110-year history
14 observatories



Effects of Space Weather



Federal Space Weather Partners



Flaring Up | How a solar storm can knock the lights out

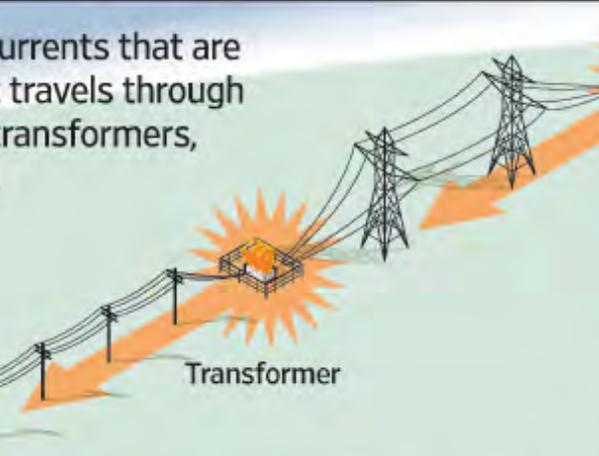
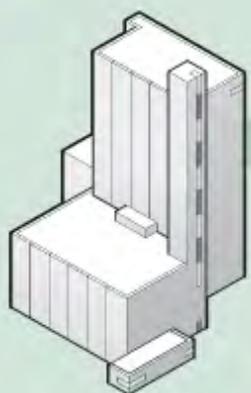
1. A solar storm occurs when a stream of electrically charged particles from a solar flare travels across space to Earth.

2. When the particles collide with the magnetic field that surrounds Earth, they cause brilliant light displays in the sky. But they can also wreak havoc on the electrical grid.

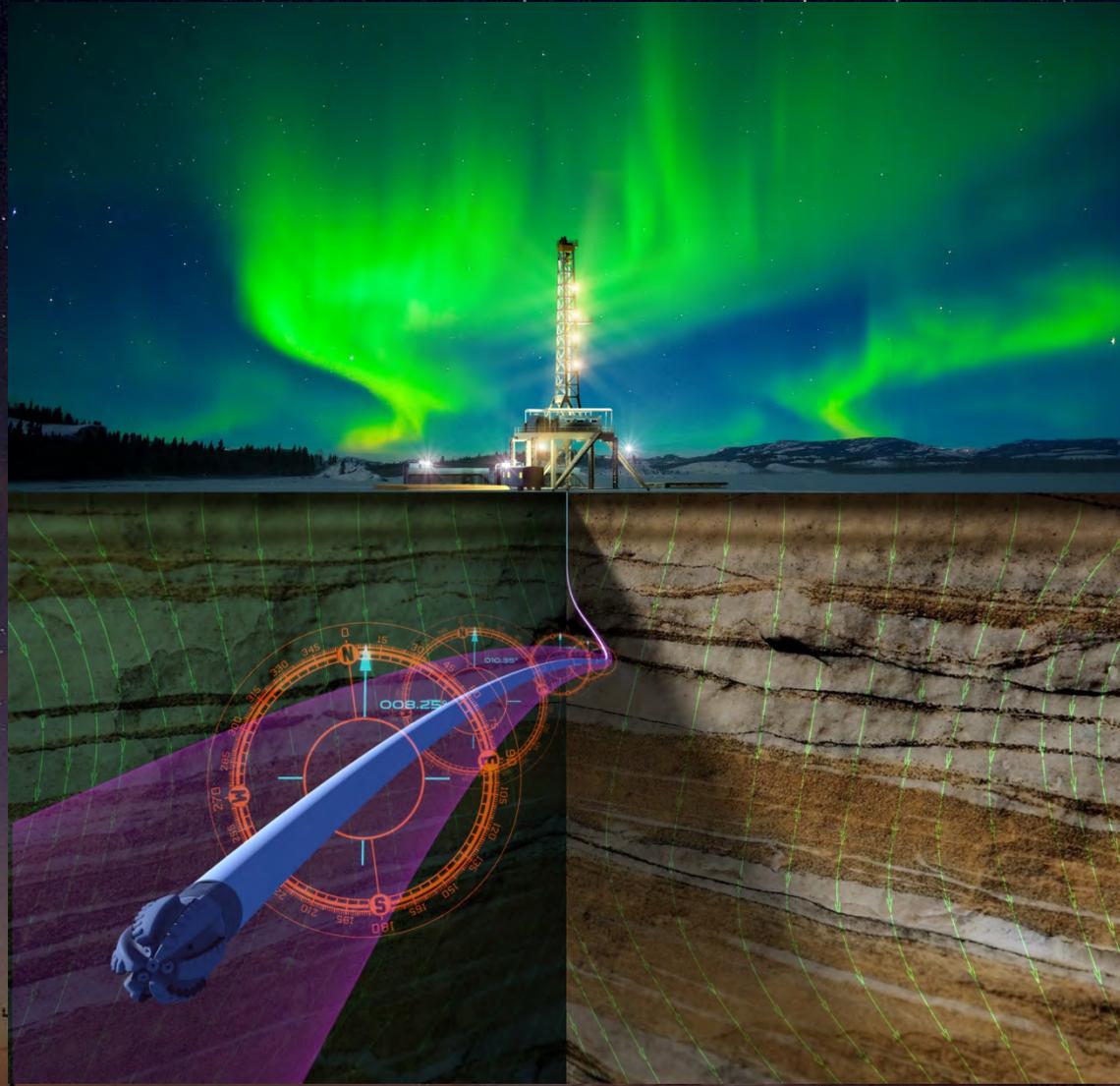
3. Changes to the magnetic field cause currents that are picked up by Earth's surface. The current travels through the ground and enters the grid through transformers, which have wires reaching underground.

4. The current flows into the transformer and across transmission lines, causing dangerous volatility. If the solar storm is strong enough, it could cause a blackout or knock out the transformer permanently.

Magnetosphere (magnetic field)



Industrial Applications



Quantifying Hazard, Modeling, Forecasting, and Mitigating Risk

Large-scale geomagnetic storms are well-recognized as “low-probability, high-consequence” events.

However, neither modern observations nor the historical record are sufficient to confidently:

1. Determine probabilities
2. Forecast severity and duration
3. Model effects on systems and infrastructure
4. Calculate cost-benefit for mitigation solutions
5. Establish insurance parameters



Overview of Technical Sessions

Tuesday:

Session 2: National Space Weather Strategy

Session 3: Future Directions of Industry

Wednesday:

Session 5: Understanding the Impacts of Space Weather

Session 6: Space Weather Observing Systems

