

# Space Weather Seminar

- What is space weather?
- What causes it?
- Does it have an effect on us, on GNSS?
- Is anyone doing anything about it?

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**Boston College**

**December 13, 2016 Kathmandu, Nepal**

*LaOtto, IN Oct 29, 2003*

*Photo by R. Slobins*

# U.S. National Space Weather Strategy

Presentation by Jeffrey Auerbach, US Department of State

## Motivation

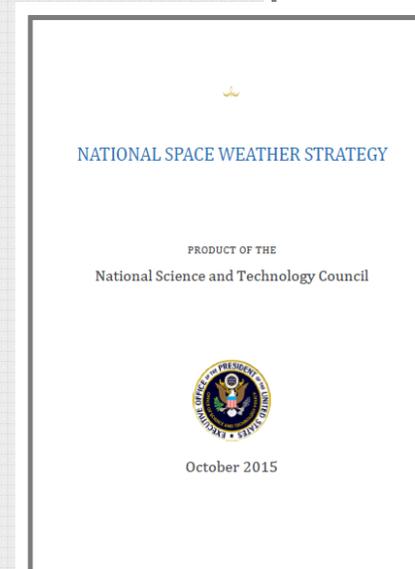
- *Reliance on advanced technology vulnerable to space weather*
- *New awareness of extreme space weather and its potential effects*

**Nov 2014** – *White House charters multi-agency Space Weather Task Force*

**Oct 2015** – *A cohesive all-of-government Strategy and Action Plan delivered to mitigate, respond to and recover from a major space weather storm*

*Strategy articulates six high-level goals*

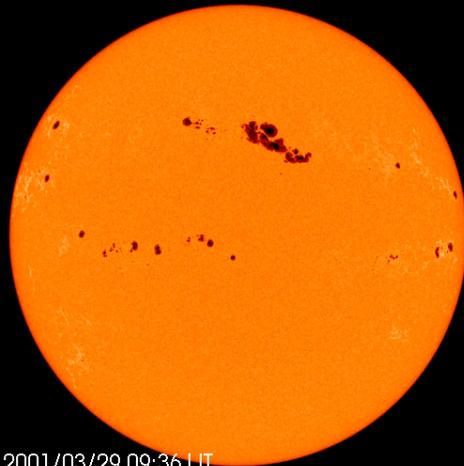
- *Goal 6: Increase International Cooperation*



*Released on 29 October 2015*

# Origins of Space Weather

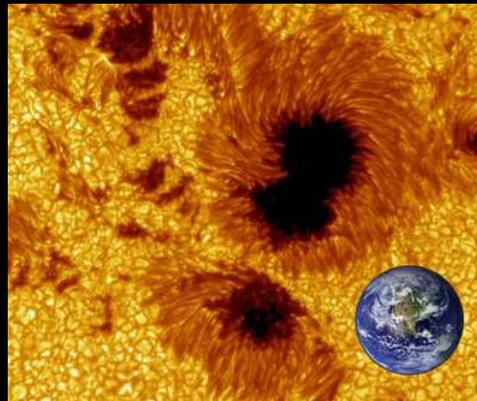
Presentation by Christine Amory, LLP, France



2001/03/29 09:36 UT

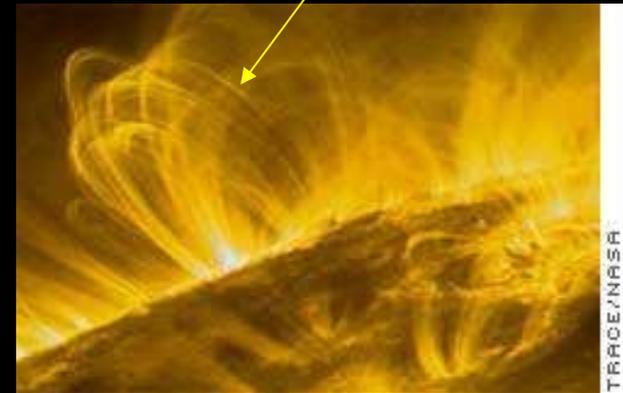
Sunspots

Cooler regions containing intense magnetic fields



Sunspot Close-up

clusters of solar magnetic fields

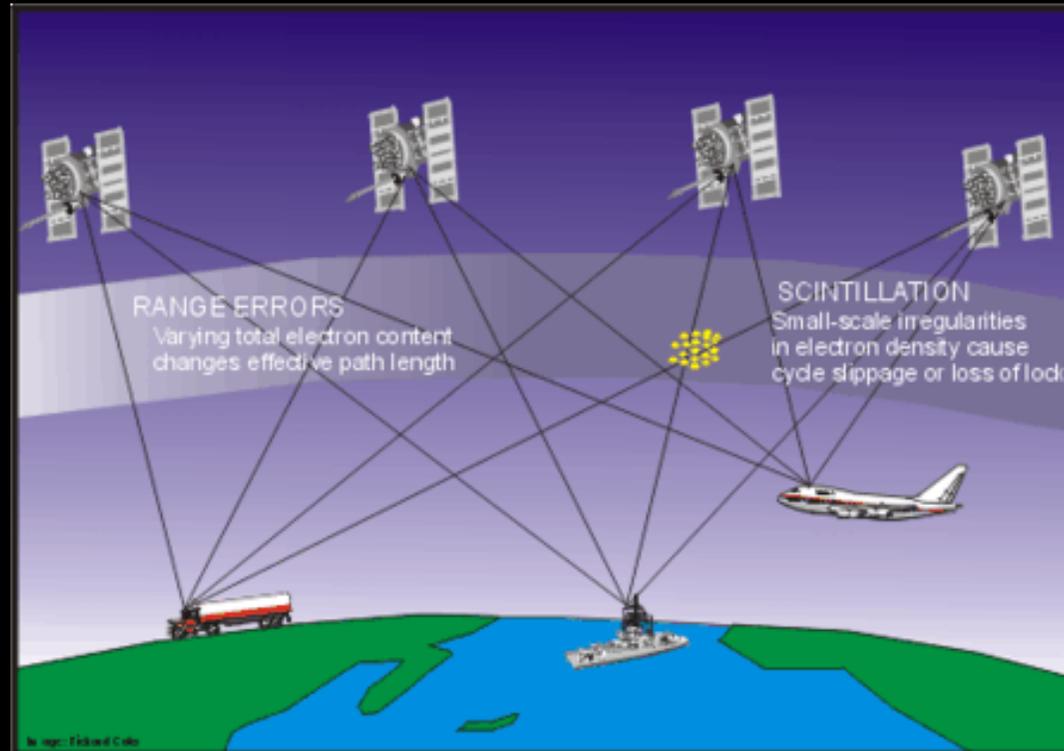


Active Regions

*Source of solar flares and CMEs*

# Space Weather Effects on GNSS Signals

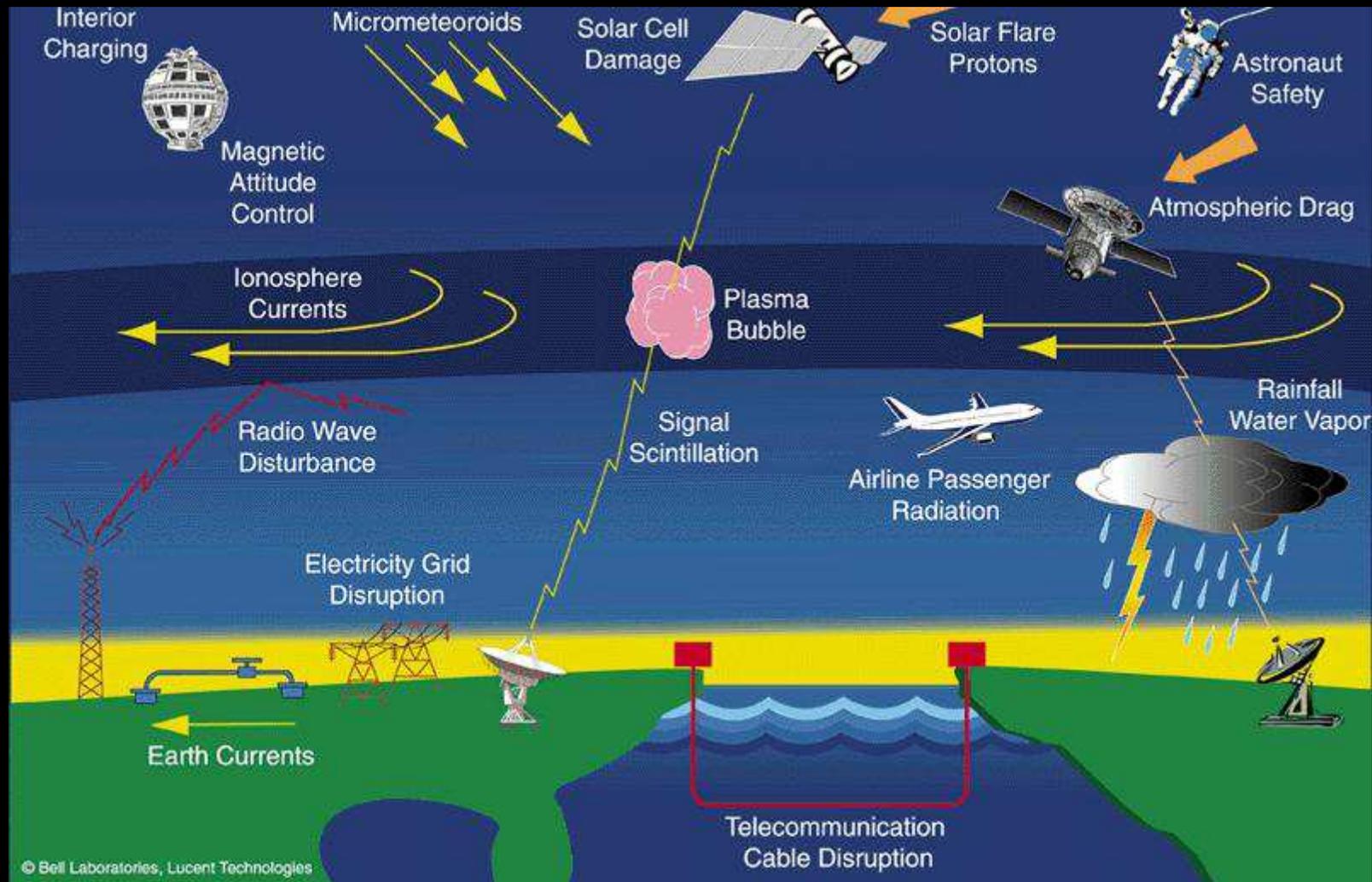
Presentation by Keith Groves, Boston College



- **Disturbed solar events can increase variations in ionospheric TEC**
  - **Change the speed of the signal - increased range errors**
  - **Introduce scintillation - loss of tracking**

# Space Weather Effects on GNSS Applications

Presentation by Patricia Doherty, Boston College



Welcome to the science of  
Space Weather!!!

