

# **Growing the Space Weather Enterprise**

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## **Public – Private Partnering**

Space Weather Workshop

Boulder, CO

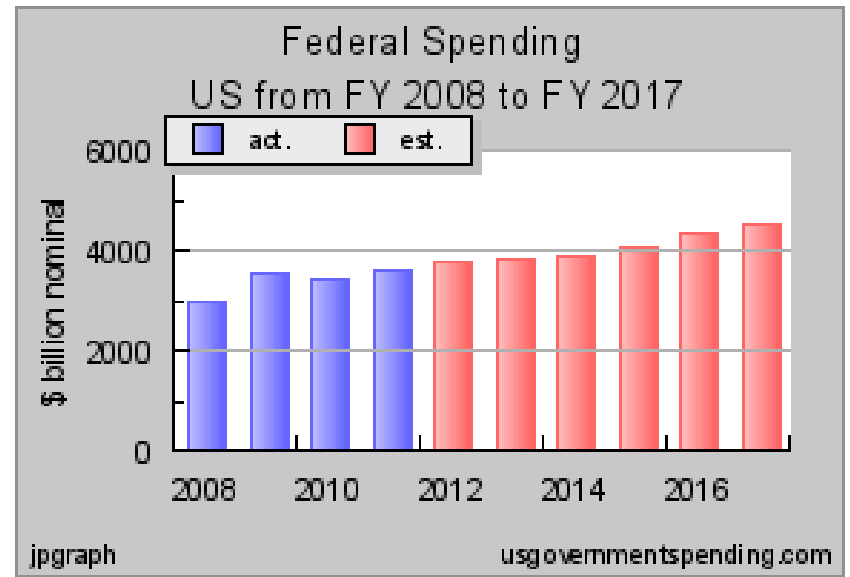
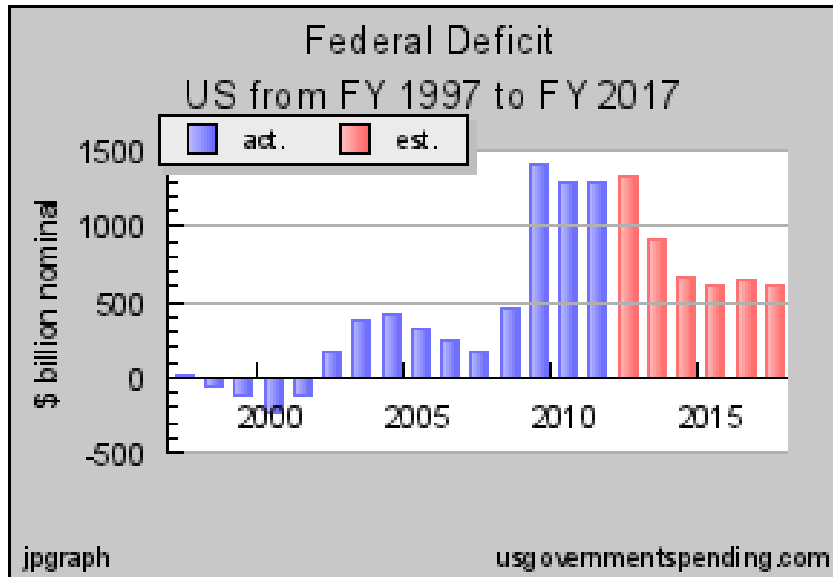
April 17, 2013

Conrad C Lautenbacher Jr  
CEO, GeoOptics, Inc

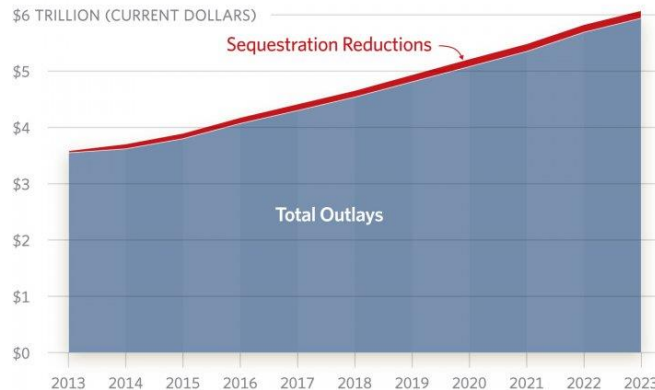
# Agenda

- The Changing Landscape
  - Federal Government Debt and Sequestration
  - NWS Budget Execution Issues
  - American Commercial Space Weather Association (ACSWA)
  - “Weather Commission” ?
  - Visibility Within the Weather and Climate Enterprise
  - Solar Maximum
  - Increasing Government Awareness of Space Weather Issues
- Opportunities
  - Enhanced Public -- Private Sector Partnerships
  - Greater Collaboration With the Weather & Climate Enterprise
  - Working Together Never More Important
- Summary

# Federal Government Debt and Sequestration



## Sequestration Reduces Projected Federal Spending by 2.4 Percent



Source: Congressional Budget Office, "The Budget and Economic Outlook: Fiscal Years 2013 to 2023," February 5, 2013, <http://www.cbo.gov/publication/43907> (accessed February 6, 2013).

heritage.org

## Federal Outlays

2013 -\$44B

2016 -\$110B

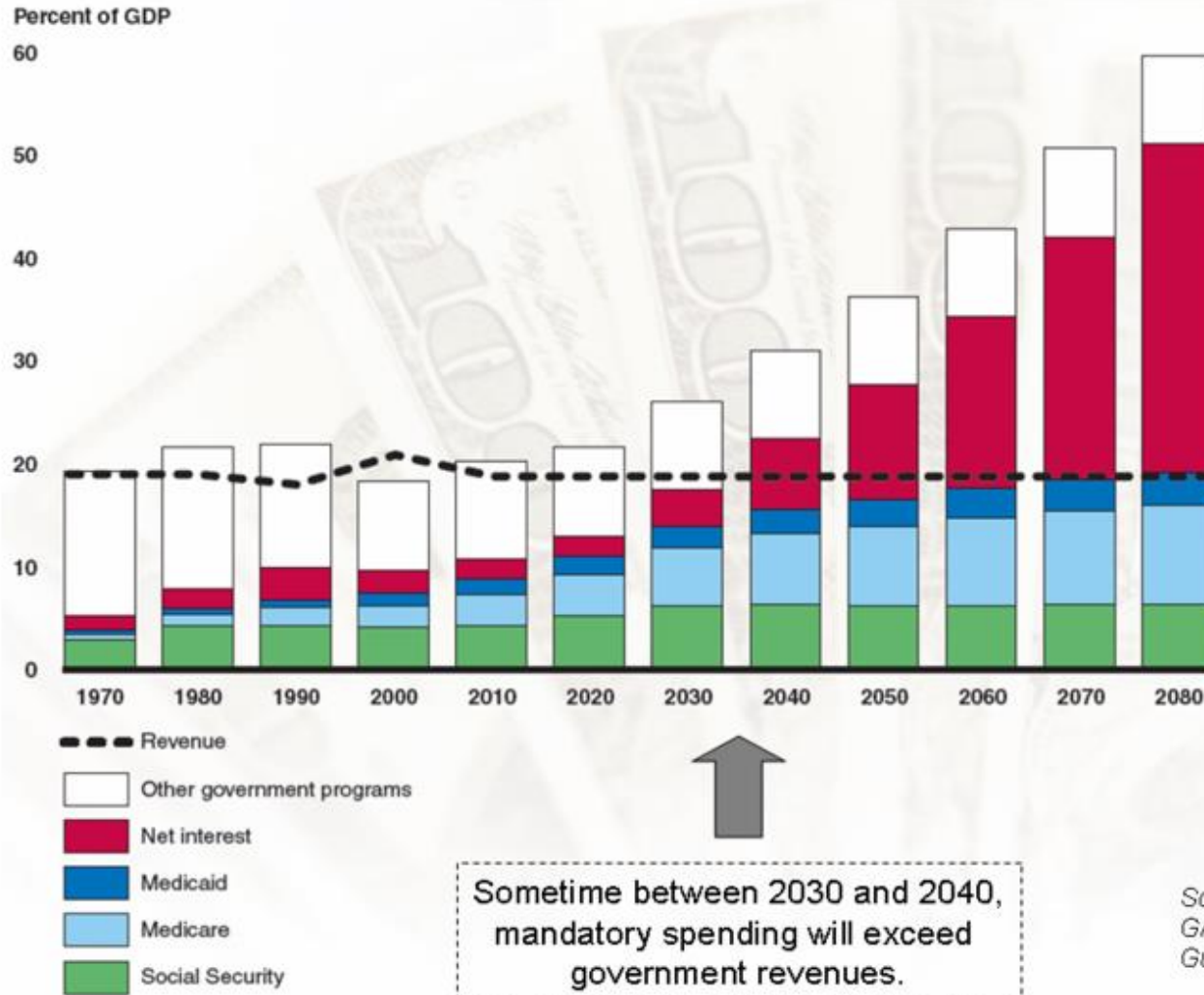
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2022 Total -\$1000B

# Federal Government Debt and Sequestration

## The Risks of Growing Entitlement Spending



# NWS Budget Execution Issues

- Spending Law Violations
  - CFO and NWS Director departed
  - Budget Category System Ordered Modified for 2015
  - New NWS Director
  - Fixes include new budget category system
- Weather Ready Nation (WRN)
  - Invest in research and speed to operations
  - Improved high performance modeling & computing
  - More effective forecast and warning communications
  - A better prepared and responsive public
  - **Enhanced public -- private sector partnerships**
- Budget Restructuring
  - **Less Money (Reductions + Sequestration)**
  - New Categories:
    - **Observations; Central Processing; Analyze, Forecast, Assist; Disseminate; Science-Technology Integration**

# American Commercial Space Weather Association

- Formed in 2010;
- Members:  
**AER, ASTRA, CPI, CRC, EXPI, PSI,  
Q-up, SAC, SEC, SET, SSI**
- Executive Committee:  
**G. Crowley (ASTRA),  
D. Intriligator (CRC),  
R. Schunk (SEC),  
K. Tobiska (SET)**

**ACSWA**  
**[www.acswa.us](http://www.acswa.us)**



# “Weather Commission” ?

- Weather and Climate Community Growing Concerns
  - Research and Modernization Funding
  - Increasing Impact of Severe Weather and Climate Change
  - Lack of Public Awareness
- What is a “Commission”?
  - Congressional or Presidential Mandate
  - Composed of Prominent and Knowledgeable Citizens
  - Makes Recommendations for Federal Action
- Dallas Meeting
- Washington Forum
- Space Weather Participation and Role?
  - Government and Private Sectors
  - Community Position Development

Ocean  
Commission

# Visibility Within the Weather and Climate Enterprise

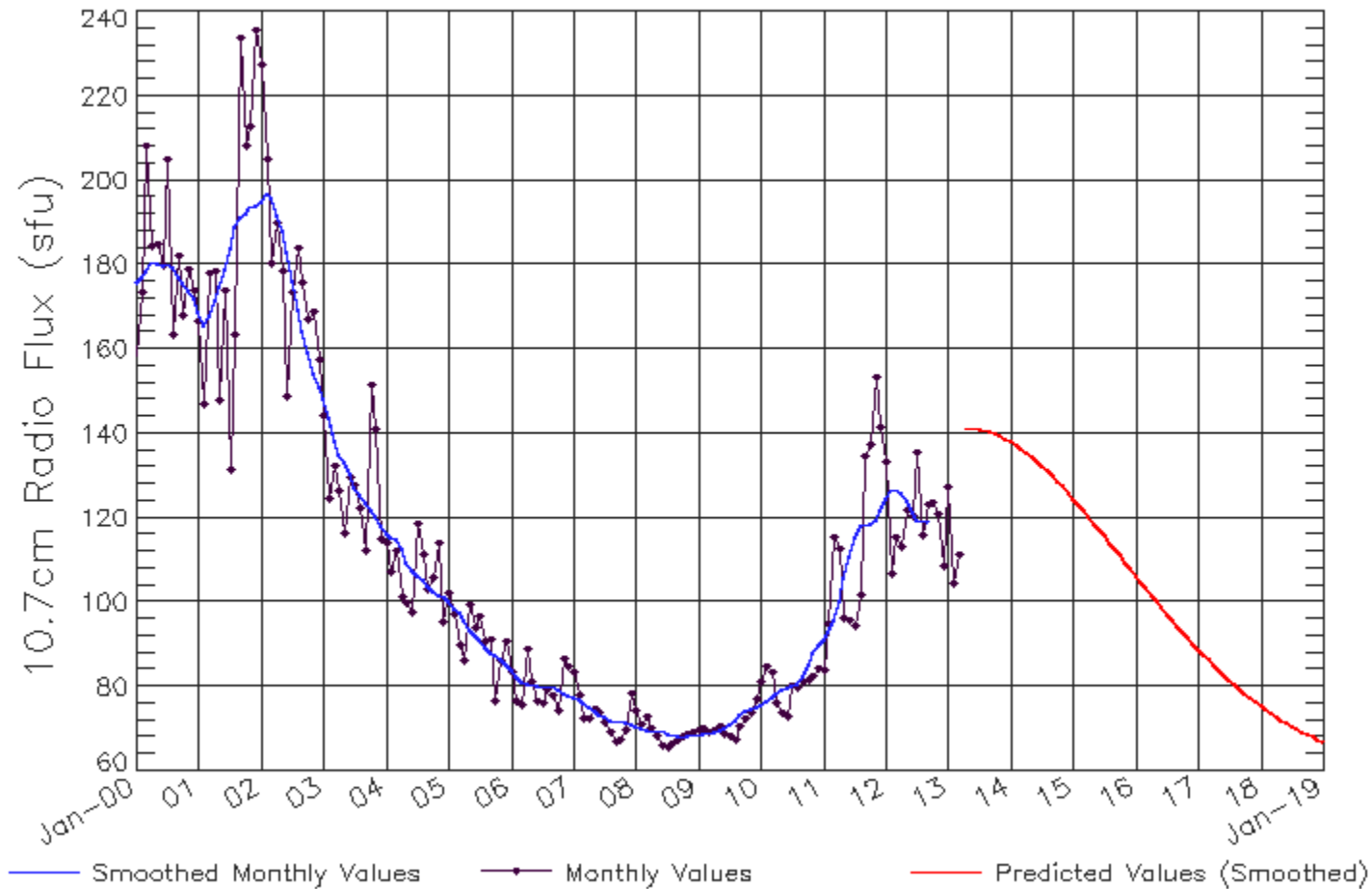
- Presence at 2013 AMS Annual Meeting
  - AMS Short Course
  - Town Hall – Our Stormy Sun
  - 10<sup>th</sup> Conference on Space Weather
  - 2 & ½ Days of Presentations
- AMS Space Weather Enterprise Session
  - Commercial Sector Issues
    - Competition or Collaboration with Government Sector
    - Government Partnership Policies Helpful
    - Role in Interagency Agreements
    - Overall Efficiency Dictates Using Private Sector Capabilities
    - Open Competition for Government Contracts
  - AMS Commission on the Weather and Climate Enterprise (CWCE)
    - Venue for government, commercial, and academic discussions
  - Strengths
    - Regular Communication Between Sectors
    - Spirit of Collaboration
    - Open Data
    - Open discussions on Division of Duties among Sectors



# Solar Maximum

ISES Solar Cycle F10.7cm Radio Flux Progression

Observed data through Mar 2013



Updated 2013 Apr 8

NOAA/SWPC Boulder, CO USA

<http://www.swpc.noaa.gov/SolarCycle/>

# Increasing Government Awareness of Space Weather Issues

## Responding to the Threat

- Federal Energy Regulatory Commission (FERC)
  - Notice of Proposed Rule Making (NOPR)
    - Reliability Standards for Bulk-Power System
- North American Electric Reliability Corp (NERC)
  - Joint Industry-Government Task Force
    - Redefine Primary Alerting Processes
- White House Geomagnetically Induced Currents Interagency Working Group
  - President directed moving forward with Space Weather mitigation
- National Exercise Program NEP
  - One of 6 scenarios for 2013-2014
- International Activities: Global threat – Global response
  - Now Included in many national risk assessments
  - Beddington-Sullivan Joint Statement -- Space Weather threats

**THE EVOLVING  
LANDSCAPE OF  
CATASTROPHIC  
MANAGEMENT**

# Opportunities

## Enhanced Public -- Private Sector Partnerships

- Fewer Government Dollars
  - Agencies looking for help to meet requirements and funding
    - Some agency budgets labor intensive (fewer employees)
  - Mutual Support
  - Demand increasing from both government and private sectors
  - NWS already including as part of future budget strategy
  - Potential New Products and Services
  - New Agency Needs could be met by contracted services
  - Data Purchases
    - Commercial Radio Occultation (RO) constellation under development
- Increased public – private dialogue needed
  - Cooperative and Mutually Supporting
  - Division of Public and Private Workload
  - Meeting Needs versus Competition

# Opportunities

## Greater Collaboration with the Weather & Climate Enterprise

What is Space Weather Position on \_\_\_\_\_???

**Legislation?**

**Weather Service  
Reauthorization?**

**Weather Commission?**

**NWS Budget  
Retooling?**

Does  
American Weather Industry (AWI)  
imply  
American Space Weather Industry (ASWI)?

**Go it Alone or Join  
with the Weather &  
Climate Enterprise?**

# Opportunities

## Working Together Never More Important!

- Battle for Resources will be Challenging!
  - Discretionary Funding Squeeze
  - No immediate funding windfall in site
  - Agreement on Priorities Critical
    - Weather and Space Weather very small players
    - Balance among Research, Operations, Warning, and Recovery
    - Balance among Sectors
- Reaction Time will be Limited
  - Authorization and Appropriation Process Irregular
  - Communication must be open and used
- Societal Priority
  - Catastrophic Events more devastating than ever
  - Government must step up to Warning, Prevention, and Recovery
- Overriding Mutual Interest !

# Summary

- The Times Are “a changing”!
- Federal Deficits and Entitlement Spending are limiting Government Support
- The Weather and Climate Enterprise is feeling the pinch and increasing efforts to gain support
- ACSWA established and growing
- A major solar event could be catastrophic, but the lack of solar max “activity” limits space weather public visibility
- Government continues to increase their interest and involvement
- It is critical that we come together in the Space Weather community, and work in harmony with ourselves and the overall Weather and Climate Enterprise.

# Back Up

# Back Up

# AMS Space Weather Enterprise Session

- Strengths of the Weather and Climate Enterprise
  - Regular communication among the sectors
  - Spirit of collaboration and cooperation with a non-adversarial approach
  - Open data: reliable, timely, consistent
  - Dividing lines among the sectors continually evolving in mutually beneficial open discussion
- Government Agency Challenges
  - Compliance with rules that require equity
  - Making decisions that impact commodity markets
  - Conducting legal interactions with advisory committees/structures
- Lessons Learned from the Meteorological Community
  - Understanding of each sector's roles vital
  - Partnership policy by government (e.g. NOAA) very helpful
  - NWS directives provide better understanding by private sector of policies and products
  - NOAA SAB EISWG includes and communicates with all sectors
  - Communication through NWS Partners, Family of Service, and other Collaborative meetings
  - The Weather Coalition, AWCIA, and NCIM advocate for federal support across sectors



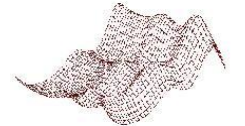
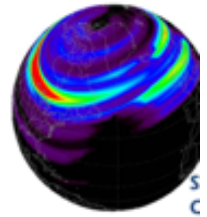
# AMS Space Weather Enterprise Session

- Issues and Opportunities
  - Private Sector Investments should not be compromised by government lab competition
  - Private sector efficiency in products and services should be considered by government
  - Tailored products should be solely within the purview of the private sector
  - Products already available in the private sector should not be duplicated by government
  - All government agencies should have partnership policies like NOAA
  - Private sector should have role in interagency agreements and the National Space weather program
  - Government should provide for open competition in space weather contracting
  - Government should not compete for non-federal funding – refer to ACSWA
  - AMS Commission on Weather and Climate Enterprise (CWCE) should continue to include Space Weather issues
  - Develop and maintain appropriate partnership in provision of products and services
  - Develop common operational practices for data exchange between sectors
  - Government should ensure procurement of commercial space weather services on a parallel with meteorological services procurement

# ACSWA Mission Summary

## Carmel Research Center, Inc.

- Provide space weather (SW) data/services;
- Provide advisory services to government;
- Provide guidance to government on tasks better provided by SW industry;
- Represent commercial providers' interests;
- Represent commercial SW capabilities  
Nationally & internationally;
- Develop operational SW best--practices.

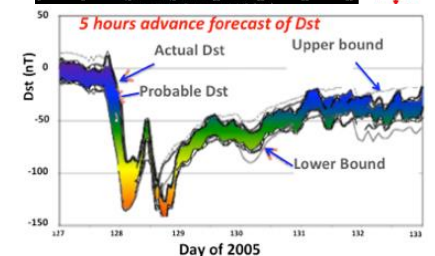
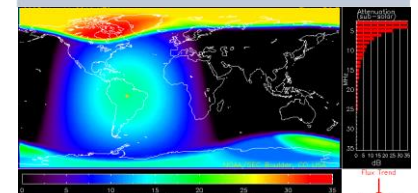


Predictive Science, Inc.

# Government and Industry

## Learning from the Weather & Climate Enterprise

- **Products:** Tailored, “smart”.
- **Partnerships:** Successes.
- **Lines-in-sand:** Products, services.
- **Roles & missions:** Common goals.
- **Inter-agency:** Support, agreements.
- **Public Policy:** National programs.
- **Mutual support:** Congress, funding.
- **Communication:** Plans, execution.



Carmel Research Center, Inc.

# SPACE WEATHER RESPONSIBILITIES



- OPERATIONS
- NOAA
- DoD
- RESEARCH/OBSERVATIONS
- NASA
- NSF



ACE



GOES-R

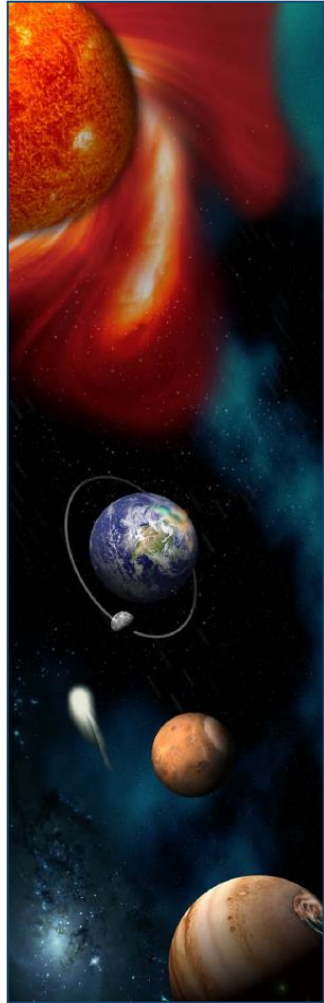


DSCOVR

THE EVOLVING LANDSCAPE OF  
CATASTROPHIC MANAGEMENT

# SPACE WEATHER IMPACTS

- *Electric Power*
- *Aviation*
- *GPS Applications*
- *Satellite Operations*
- *Deep Space Missions*
- *Manned Space Flight*



THE EVOLVING LANDSCAPE OF CATASTROPHIC MANAGEMENT



# OTHER RECENT SIGNIFICANT EVENTS

- Oct 2003 – Loss of \$600 million ADEOS II satellite
- Apr 2010 – Galaxy-15 satellite failure  
—Recovered 8 months later
- Mar 2012 – Skyterra-1 satellite knocked out for 3 weeks
- July 2012 – “What could have been”

***AN HOUR OF OUTAGE FOR A SATELLITE CAN  
COST AS MUCH AS \$150,000***

**THE EVOLVING LANDSCAPE OF  
CATASTROPHIC MANAGEMENT**



**Galaxy-15**



**Skyterra 1**

# ASSESSING THE RISKS



**U.S. Department of Homeland Security**

Home Topics How Do I? Get Involved News About DHS

Home > About DHS > Organization > The Strategic National Risk Assessment (SNRA)

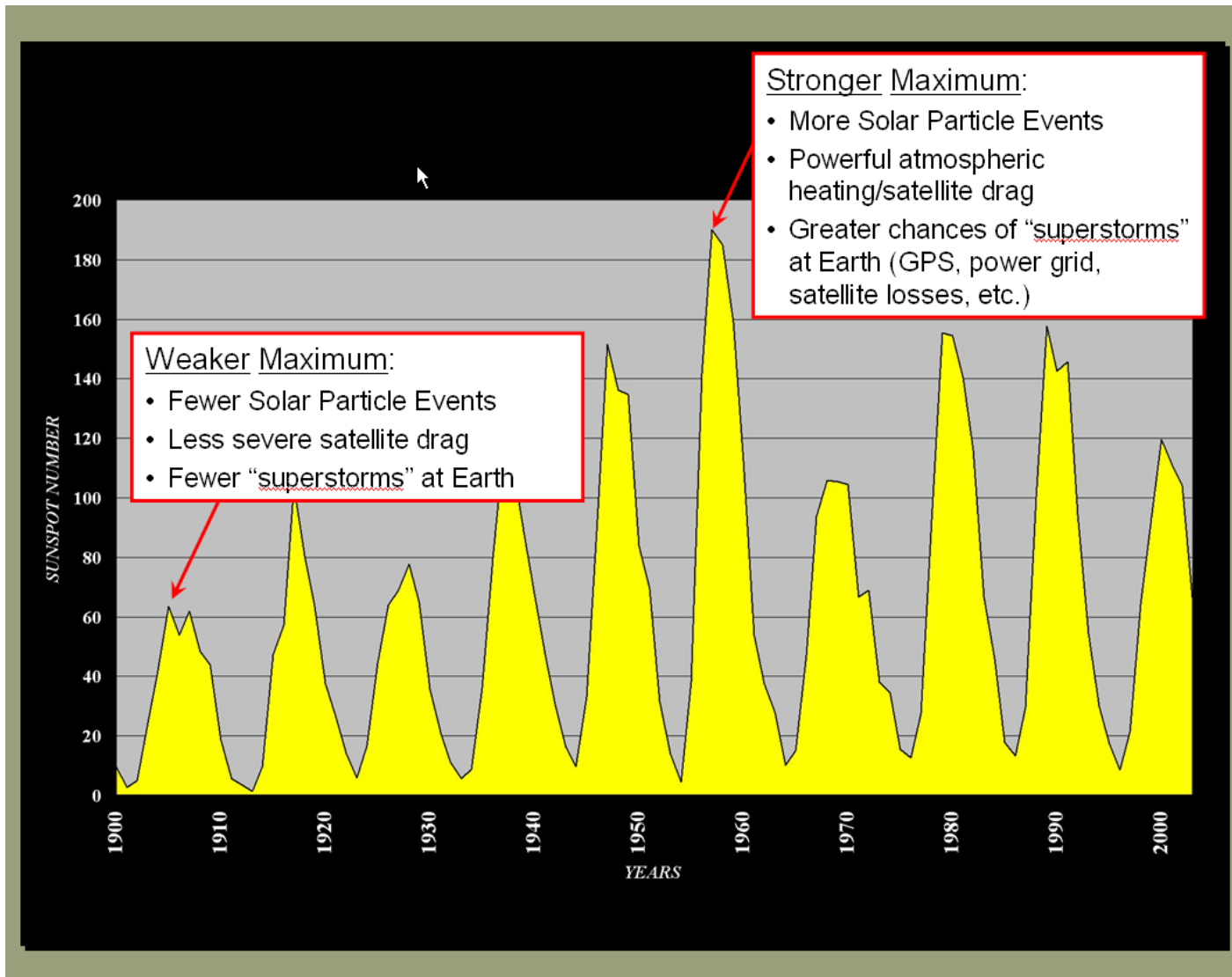
About DHS  
The Secretary  
Budget & Finance

## The Strategic National Risk Assessment (SNRA)

Threat/Hazard Group	Threat/Hazard Type	National-level Event Description
Natural	Animal Disease Outbreak	An unintentional introduction of the foot-and-mouth disease virus into the domestic livestock population in a U.S. state
	Earthquake	An earthquake occurs within the U.S. resulting in direct economic losses greater than \$100 Million
	Flood	A flood occurs within the U.S. resulting in direct economic losses greater than \$100 Million
	Human Pandemic Outbreak	A severe outbreak of pandemic influenza with a 25% gross clinical attack rate spreads across the U.S. populace
	Hurricane	A tropical storm or hurricane impacts the U.S. resulting in direct economic losses of greater than \$100 Million
	Space Weather	The sun emits bursts of electromagnetic radiation and energetic particles causing utility outages and damage to infrastructure
	Tsunami	A tsunami with a wave of approximately 50 feet impacts the Pacific Coast of the U.S.
	Volcanic Eruption	A volcano in the Pacific Northwest erupts impacting the surrounding areas with lava flows and ash and areas east with smoke and ash
Wildfire	A wildfire occurs within the U.S. resulting in direct economic losses greater than \$100 Million	

- 2008 National Research Council study
  - Potential loss due to widespread blackout following severe geomagnetic storm - \$1-2 trillion
- 2012 North American Electric Reliability Corp.
  - Geomagnetic storms could lead to voltage instability and power system collapse
- Probability of occurrence of extreme space weather event in next 10 years = 6 – 12%
- Space weather now included in the Strategic National Risk Assessment

# Solar Cycle History



[http://www.swpc.noaa.gov/SolarCycle/SC24/Baker\\_slide2.png](http://www.swpc.noaa.gov/SolarCycle/SC24/Baker_slide2.png)



# Federal Government Debt and Sequestration

