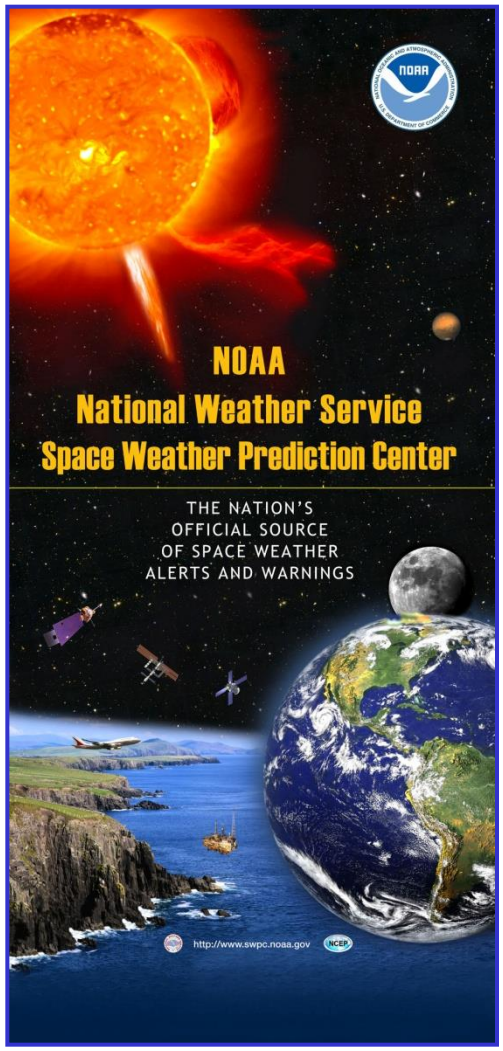
State of the Space

Weather Prediction Center 2010

Thomas J Bogdan

Space Weather Program Manager
Space Weather Prediction Center Director



Mission

To deliver space weather products and services that meet the evolving needs of the nation

Vision

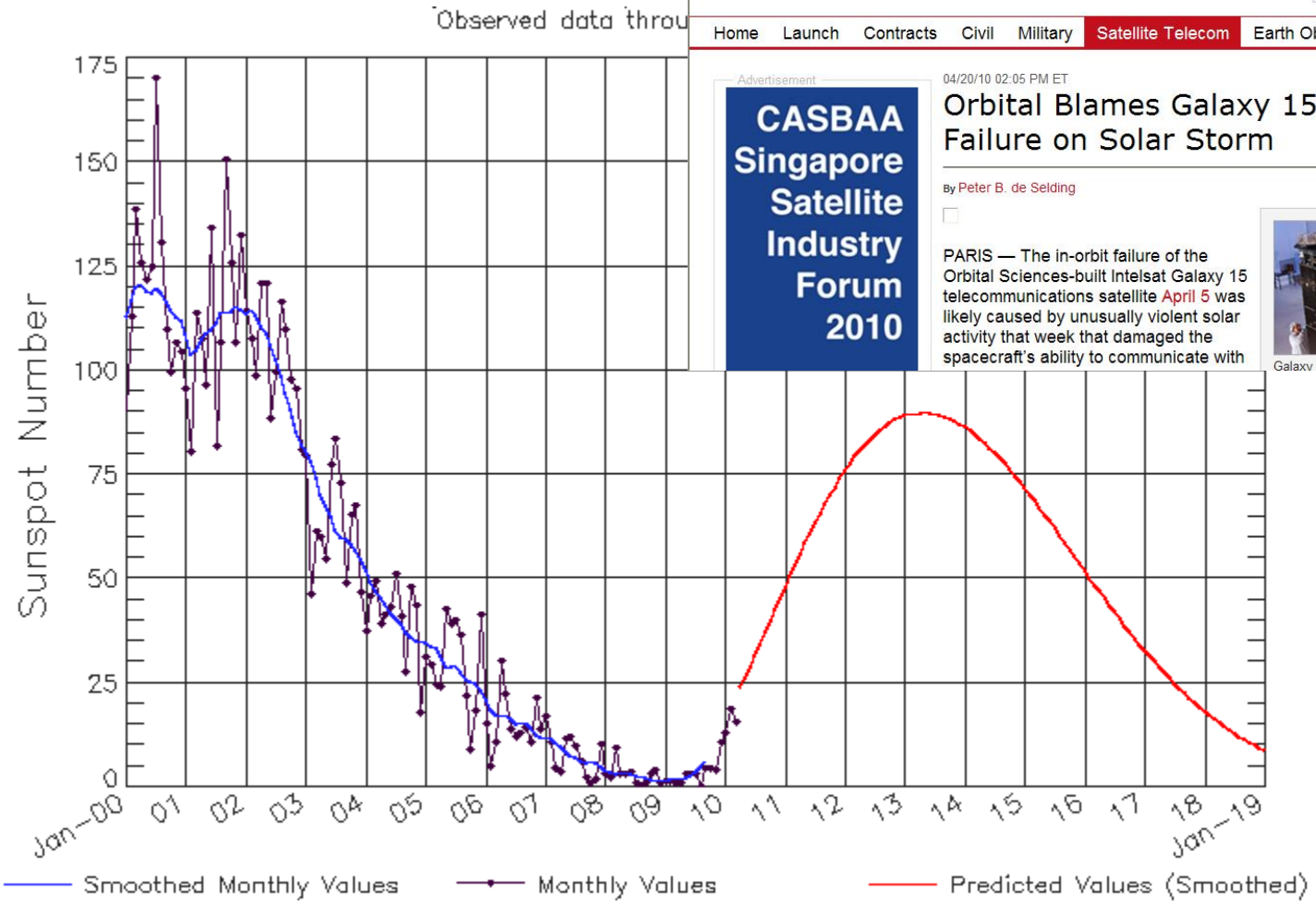
A nation prepared to mitigate the effects of space weather through the understanding and use of actionable alerts, forecasts, and data products

Safeguarding Our Nation's Advanced Technologies

Outline/Headlines

- Solar Activity is Back
- Customers Continue To Multiply
- SWPC Base Budget is Going Up
- ACE and COSMIC Follow-ons are in NOAA's FY11 Budget Request
- WSA-Enlil in Production Mode at NCEP
- GOES 14/15 Launched; XRS Gap Avoided
- ACE RTSW Network Secured Over European Sector
- Legacy DEC and HP Computers Retired

New Solar Cycle! (…Is Finally Here)



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CASBAA Singapore Satellite Industry Forum 2010

04/20/10 02:05 PM ET

Orbital Blames Galaxy 15 Failure on Solar Storm

By Peter B. de Selding

PARIS — The in-orbit failure of the Orbital Sciences-built Intelsat Galaxy 15 telecommunications satellite April 5 was likely caused by unusually violent solar activity that week that damaged the spacecraft's ability to communicate with

Galaxy 15 satellite. Credit: Orbital

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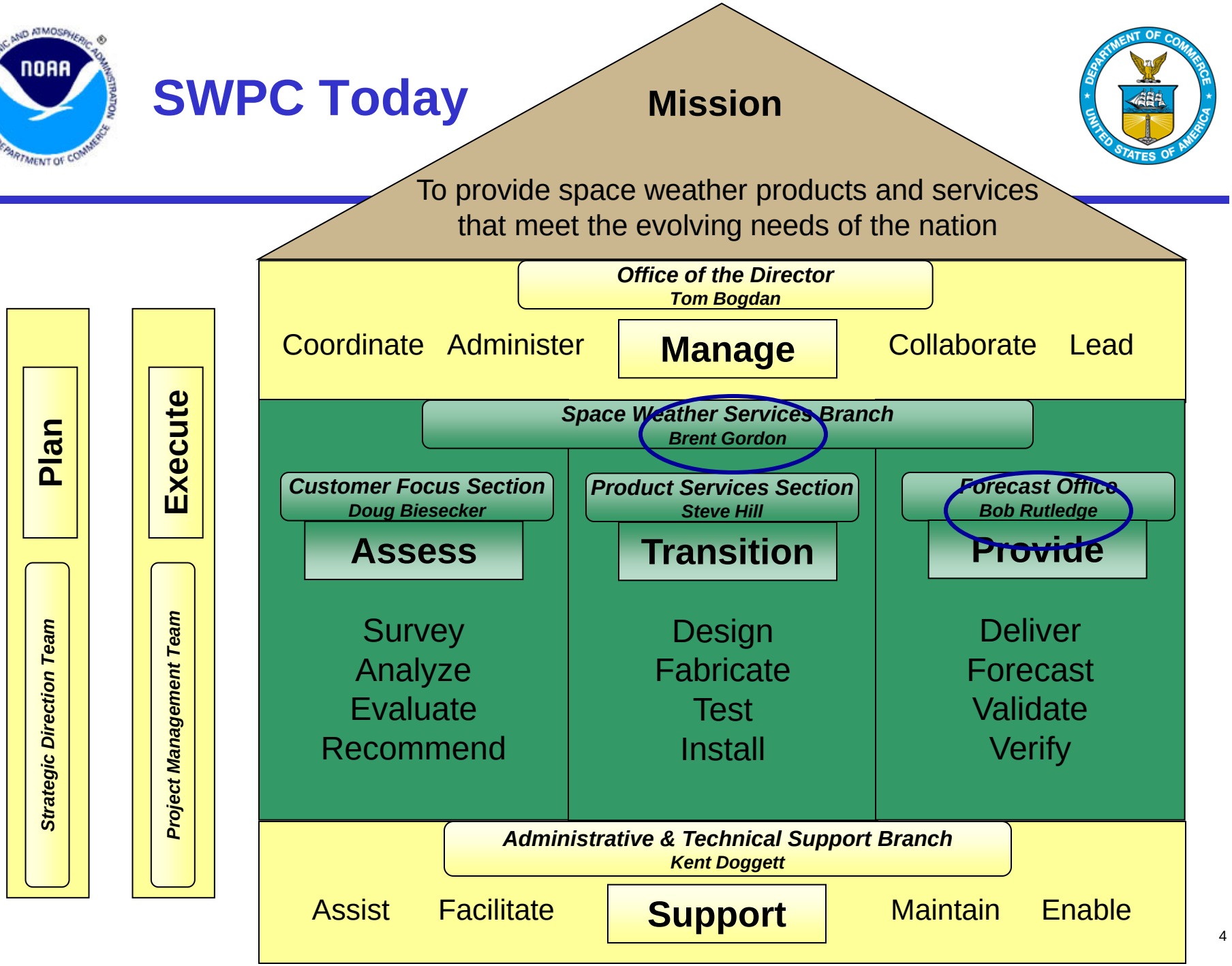
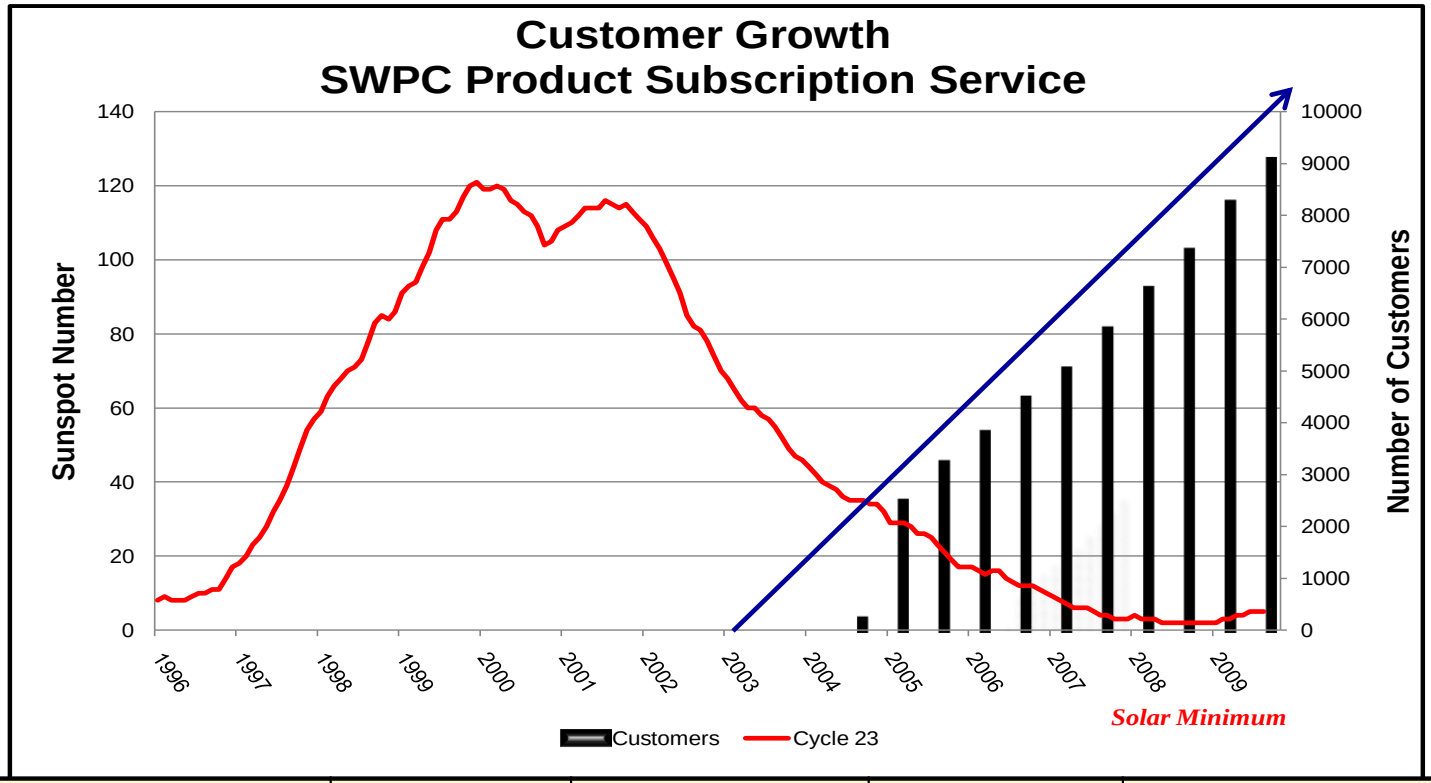
NOAA/SWPC Boulder,CO USA

SWPC Today


Mission
To provide space weather products and services that meet the evolving needs of the nation
Office of the Director
Tom Bogdan
Coordinate
Administer
Manage
Collaborate
Lead
Space Weather Services Branch
Brent Gordon
Customer Focus Section
Doug Biesecker
Assess
Survey
Analyze
Evaluate
Recommend
Product Services Section
Steve Hill
Transition
Design
Fabricate
Test
Install
Forecast Office
Bob Rutledge
Provide
Deliver
Forecast
Validate
Verify
Administrative & Technical Support Branch
Kent Doggett
Assist
Facilitate
Support
Maintain
Enable
Plan
Strategic Direction Team
Execute
Project Management Team

New Customers: Increase in Subscription Rate Develops



9,585
customers
on 3/30/10

SES Satellite	Inmarsat	FEMA	Boeing	FAA
North America Electric Reliability Corp. (NERC)	L-3 Communications	Florida Division of Emergency Mgnt.	British Petroleum America	Bonneville Power Administration
Washington St. Dept of Transportation	Caterpillar, Inc.	Alaskan Airlines	United Launch Alliance	Salem and Hope Creek Nuclear Stations

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New Budget Numbers: Increasing Base Allocations in FY10 and FY11

	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11
President's Request	$7.2M	$7.3M	$6.1M	$6.1M	$8.8M	**$10.8M**
House Mark	$7.2M	$5.0M	$6.1M	SWPC is no longer a separate line item in the Congressional Budget		
Senate Mark	$7.0M	$7.3M	$6.1M			
Enacted	$3.9M	$3.9M	$6.1M	$6.1M	$8.8M	---------
Actual	**$5.9M**	**$7.1M**	**$6.4M**	**$7.6M**	**$9.0M**	---------

Actual – Enacted = One-time relief provided by NOAA/NWS

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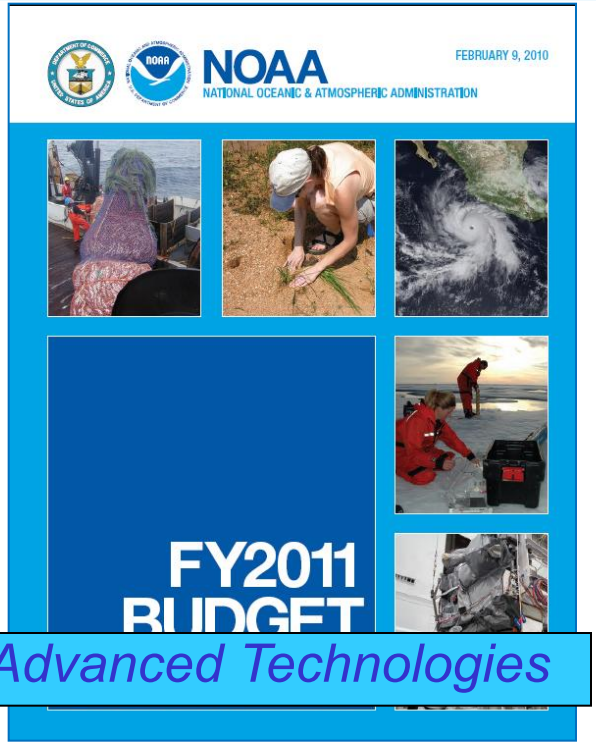
NOAA's FY 2011 Budget

(BA IN THOUSANDS)	FY 2011 REQUEST	FY 2012	FY 2013	FY 2014	FY 2015
DSCOVR	9,500	38,300	25,400	3,800	2,400

(BA IN THOUSANDS)	FY 2011 REQUEST	FY 2012	FY 2013	FY 2014	FY 2015
COSMIC-2	3,700	8,300	10,300	9,500	16,500



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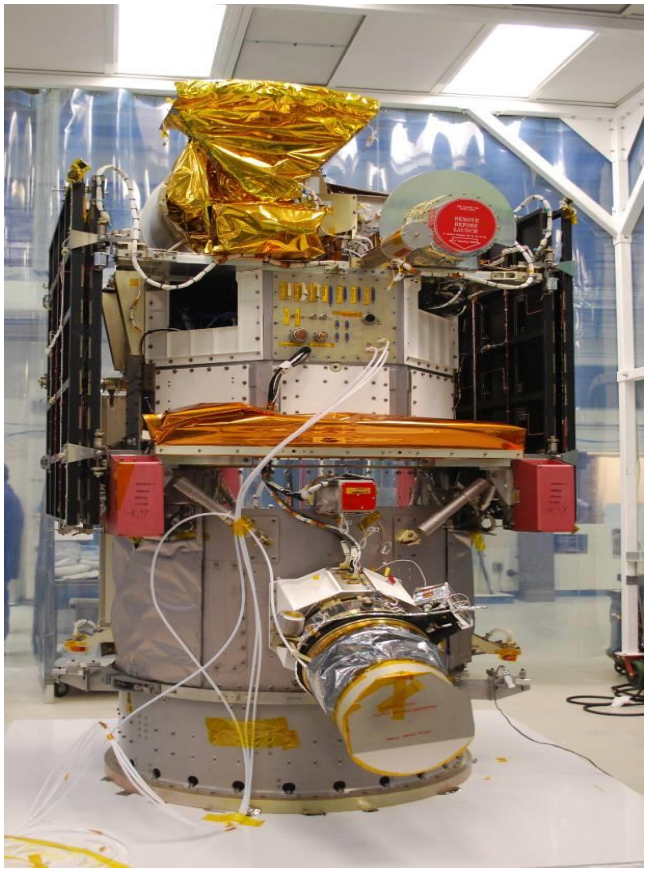
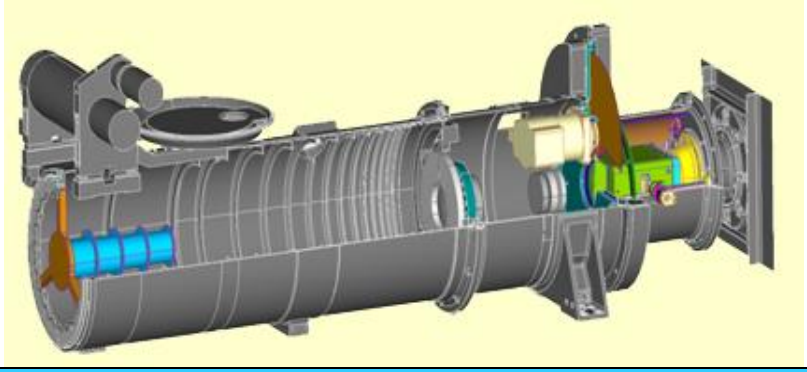
Deep Space Climate Observatory (DSCOVR) Solar Wind Mission



- The DSCOVR spacecraft will be refurbished and readied for launch in December 2013
- Satellite and sensors will be transferred to NOAA
- Refurbishment of satellite and Plas-Mag sensor will be performed at NASA/GSFC under reimbursement by NOAA
- USAF plans to begin acquiring a launch vehicle in 2012
- All data will be downlinked to the Real Time Solar Wind Network (RTSWnet)
- DSCOVR earth science sensors are in the process of being refurbished
- A commercial partner will be solicited for the mission to help evaluate the potential of commercial service for a follow on mission

Compact Coronagraph (CCOR)

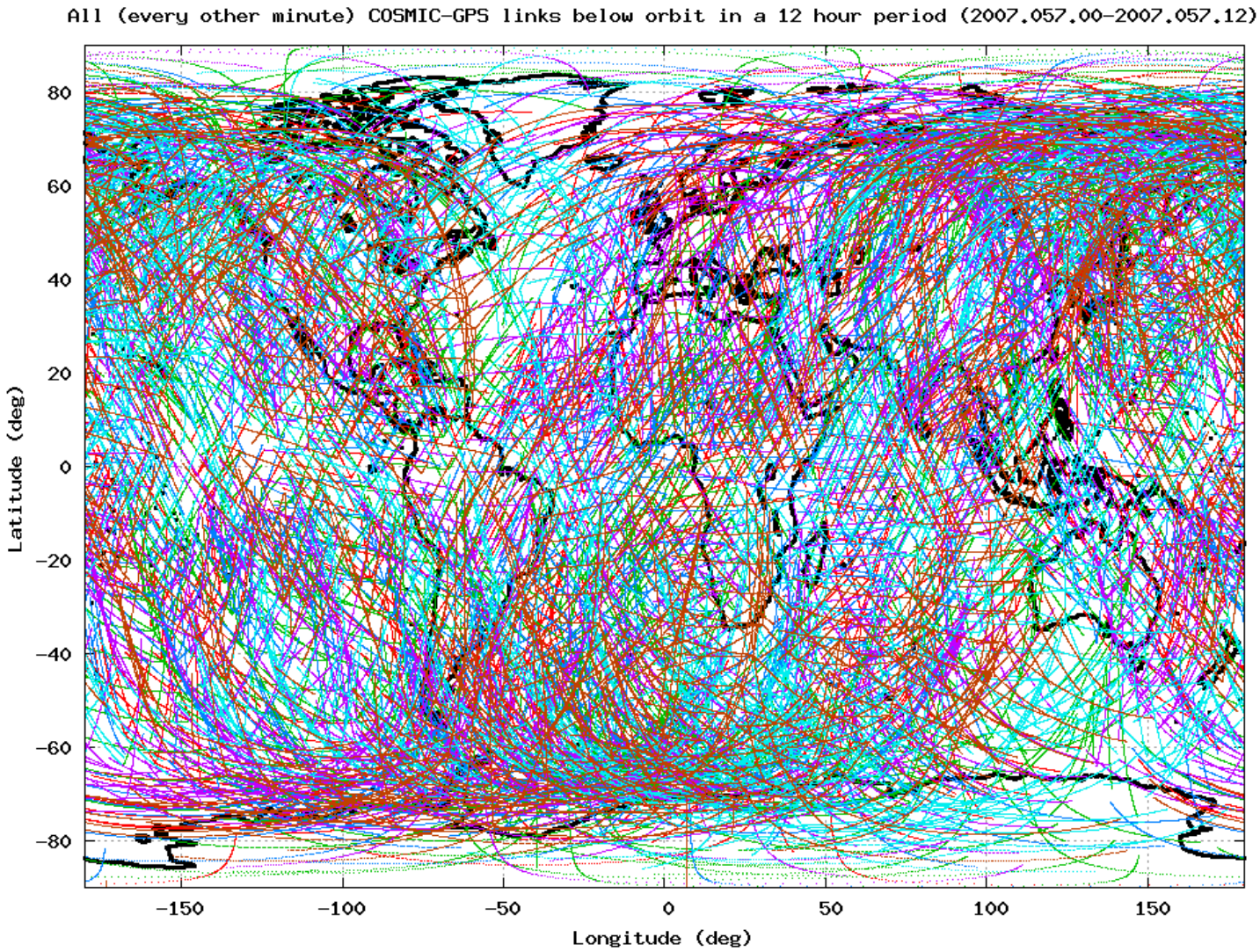
- NOAA and NRL are currently collaborating on a Phase A study for a demonstration compact coronagraph
- A reimbursable project for sensor development will begin at NRL in FY11
- CCOR is a reduced mass, volume, and cost coronagraph design
  - 6 kg telescope, 17 kg for sensor
  - Optical train is 1/3 the length of traditional coronagraph designs
- CCOR will fly on DSCOVR if schedule permits
  - CCOR has been submitted to the DoD Space Test Program (STP) for flight as a back-up strategy if necessitated by schedule



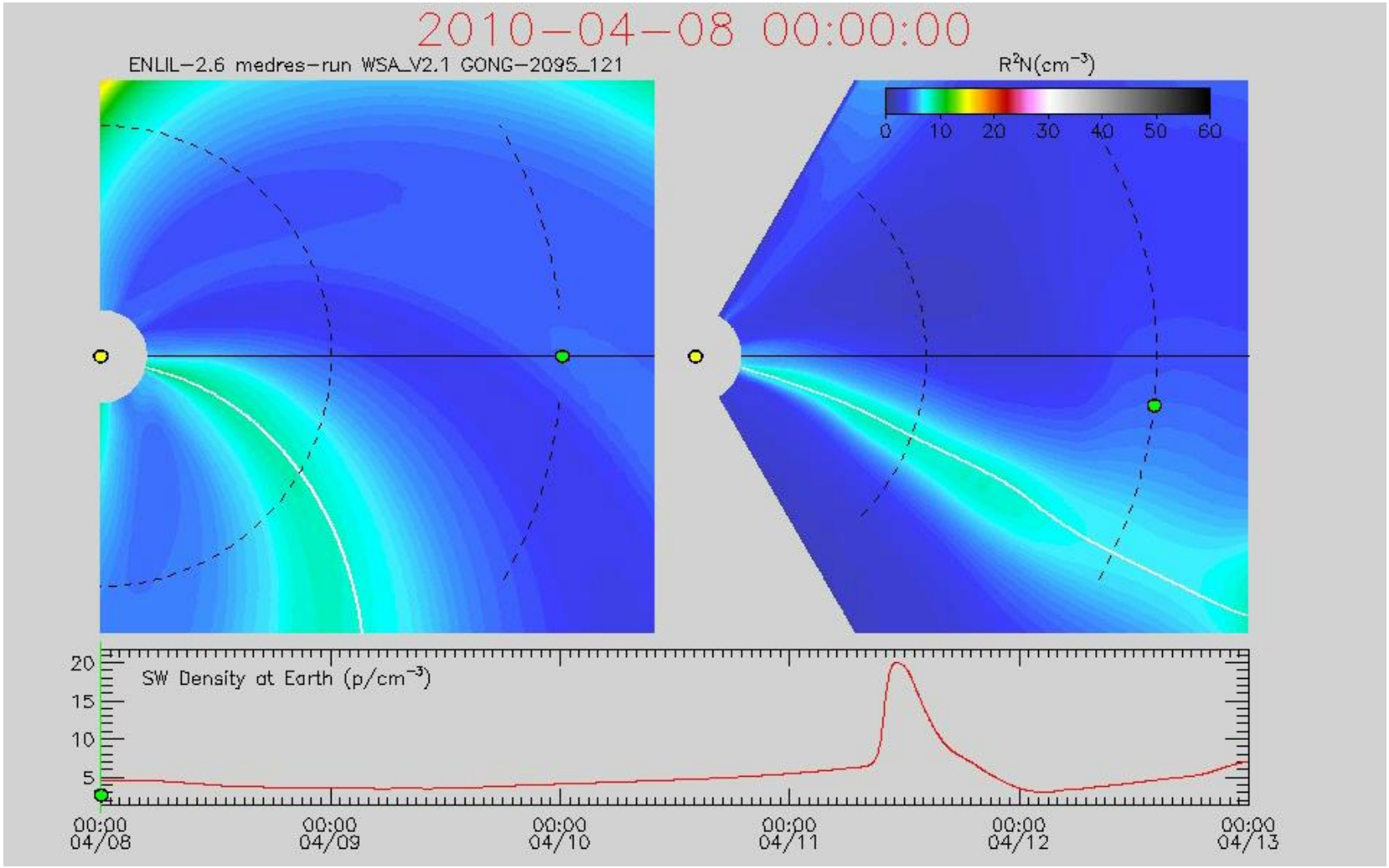
COSMIC Follow On (COSMIC 2)

- COSMIC begins to degrade in 2011 (end of life)
- Significant data reduction expected by 2014-2015 due to loss of satellites
- President's budget supports initial launch of COSMIC 2 in 2014
- Proposed partnership with Taiwan –
  - Taiwan to provide: 12 spacecraft and integration of payloads onto spacecraft, ground system command & control
  - NOAA to provide: 12 payloads (receivers), 2 launches, ground system data processing
  - System will provide 8000+ worldwide atmospheric and 10-12,000 ionospheric soundings per day (all weather, uniform coverage over oceans and land)
- Commercial data purchase for enhancement/gap coverage under consideration

Observed TEC Rays in 12-hour period (COSMIC)



WSA-Enlil Transition Update

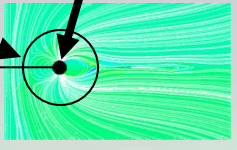


GOES Update: Successful Launch of GOES O and P

GOES 15 2010	PLT	
GOES 14 2009	Store	XRS/SXI
GOES 13 2006	East	MAG/HEPAD/EPS
GOES 12 2001	South	
GOES 11 2000	West	

GOES 11/12/13/14/15 IN GEOSTATIONARY ORBIT

EARTH



EARTH'S MAGNETOSPHERE

ABOUT 1 % OF THE DISTANCE FROM THE EARTH TO THE SUN, ACE IS OUR SPACE WEATHER SENTINEL.

MOON

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Continuing Observational Space Weather Programs

- Joint Polar Satellite System (JPSS):
  - SEMS will be continued through the end of the POES, DMSP, and Metop C
  - Subsequent program is in planning stage and not yet funded
- GOES R
  - Improved versions of the GOES space weather sensors are under development:
    - Solar Ultra Violet Imager (SUVI), EXIS, SEISS and MAG
    - Launch is planned for 2015

New Partnerships for Progress

- Joint NOAA/FEMA/MSB/EU Exercise
- NOAA-Korea RRA LOA on ACE R/T data acquisition and delivery service
- NOAA-DLR LOA on ACE R/T data acquisition and delivery service
- NOAA-ESA agreement on ACE R/T data acquisition and delivery service
- NWS-NESDIS space weather satellite data acquisition and ingest roadmap
- NWS-OAR space weather research initiative
- ISES-WMO space weather programme
- ISES-ICAO space weather in aviation

esa DLR ISES ICAO EU

Safeguarding Our Nation's Advanced Technologies

RRA 방송통신위원회 전파연구소 RADIO RESEARCH AGENCY

UCAR Review of NCEP/SWPC: Key Findings and Recommendations

Review Panel

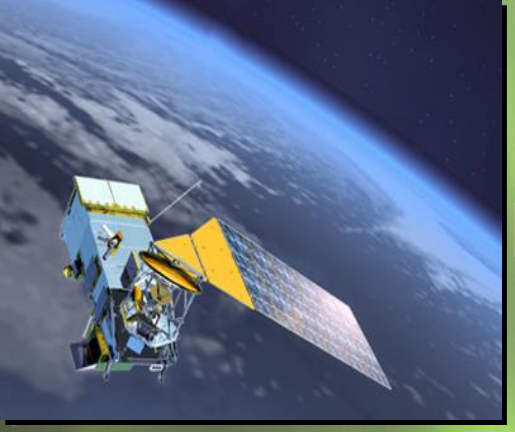
- **Genene Fisher, chair**
- **David Boteler**
- **Gilbert Brunet**
- **Maura Hagan**
- **James Kinter**
- **John Lanicci**
- **Chris St. Cyr**
- **Michael Stills**

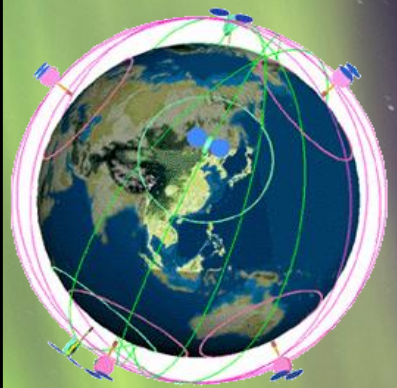
- Develop a formal project management plan to transition the *WSA-Enlil* model into operations.
- Ensure the continuation of sufficient funding to
  - (1) complete the migration from legacy hardware/software information systems to modern equipment; and
  - (2) maintain and upgrade the equipment, as necessary, after the migration is completed.
- Develop a space weather research program internally that is aligned with the SWPC mission.
- Review the current personnel qualifications and assignments to assess any possible gaps; individual shortfalls may be filled by providing additional training, direction or detailed guidance to employees tasked with new or different responsibilities as a result of the reorganization.
- Develop comprehensive, robust business models for the SWPT and the R2O function.

Leaning Forward: Addressing the Science and Technology Gaps

- Attention all Researchers:
  - How to feed CMEs to Enlil at 25 R_{SUN} ?
  - When is the next X-class flare?
  - How to forecast ionospheric scintillation?
  - How to forecast regional dB/dt?
- Attention all Satellite Data Providers:
  - Solar Wind/Coronagraph/SXI at L1 ***and*** L5
  - GPS-RO everywhere all the time every time
  - Molniya orbits for polar situational awareness

Safeguarding Our Nation's Advanced Technologies





SWPC's Goal:
Partnering with YOU to:

Provide the *right* information… in the *right* format...
at the *right* time… to the *right* people…
to make the *right* decisions!