



# GOES-R CWG IT Survey Responses: July, 2010

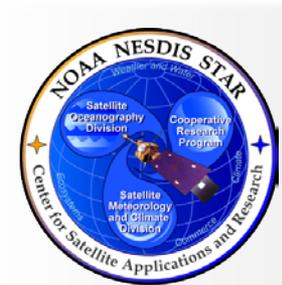
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1. ERT
2. 2. I. M. Systems Group  
NOAA/NESDIS/STAR



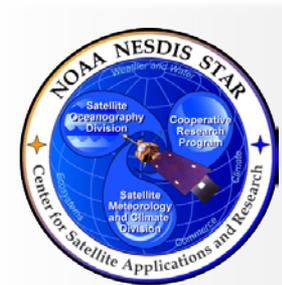
# Purpose of the IT Survey

- Preparation for GOES-R computer processing needs
  - » *Needed to anticipate the needs of running calibration software for the GOES-R satellite series.*
- Address inconsistencies across the group.
  - » *Software requirements*
  - » *Data sets*
  - » *Best practices*
  - » *Software quality*



# Tasks

- The CWG is involved with many different projects relating to the calibration of many different instruments:
  - » *LEO-LEO SNO inter-calibration*
  - » *Spacecraft orbital predictions*
  - » *TVAC inter-comparison of AVHRR/Metop and HIRS/Metop*
  - » *Vicarious calibration of current GOES Imager and Sounder*
  - » *Instrument performance monitors*



# Tasks, cont.

- » *Inter-comparison of GOES-14 with GOES-11/12 Imager and Sounder*
- » *Stray light investigations*
- » *GOES-R SRF tools*
- » *Hyperion TOA reflectance tools*
- » *Lunar calibration tools*
- » *GOES-R Space Weather calibration tools*
- » *GSICS GEO-LEO inter-calibration for the visible and IR channels*



# Tasks, cont.

- » *Geo-location image matching using GOES Imager as a proxy for GOES-R ABI*
- » *GEO-LEO and GEO-GEO instrument inter-calibration*
- » *Moon, star, desert, ocean, lake, Rayleigh Scattering, sun-glint, aerosol and deep convective cloud vicarious calibration*
- » *Comparison of GOES-R ABI/GLM against radiances simulated using numerical weather prediction and radiative transfer models*
- **The CWG is responsible for 16 projects at the time of this survey**



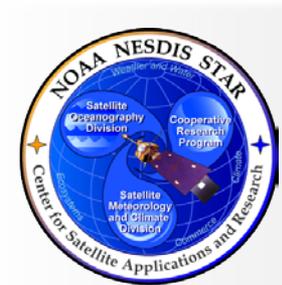
# CWG Software

- The current list of software that is maintained and run by the GOES-R CWG:
  - » *GOES Imager PSF generator*
  - » *Geolocation Image Matching*
  - » *GOES Mirror Reflectivity*
  - » *Spectral Response Functions for GOES-13/14/15*
  - » *GSICS GEO-LEO IR operational inter-calibration*
  - » *GOES instrument performance monitoring*
  - » *Operational Calibration for the GOES Imager visible channel*



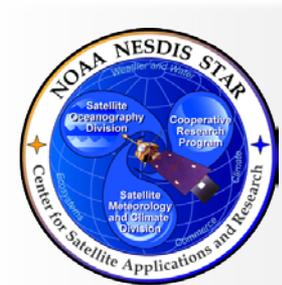
# Software, cont.

- » *SGP4 and associated scripts.*
- » *LEO-LEO SNO package*
- » *POES MEPED Data Analysis Tool*
- » *Spectral Response Function Analysis Tools*
- » *Hyperion Data Tool*
- » *Lunar Exploitation*
- » *Lunar images processing system*
- » *DCC processing system*
- » *Sounder visible channel calibration*



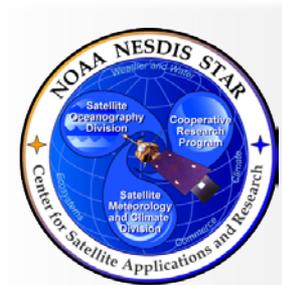
# Software, cont. (2)

- » *GOES14 real-time data collector*
- » *Processing GEO images, statistical analysis and plotting*
- » *Calculation of Sun positions in satellite coordinates for stray light analysis*
- » *Current GOES SXI operational and calibration data analysis*
- **At the time of this survey, the CWG maintains 20 different software projects**



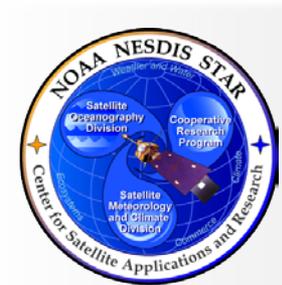
# Data Sets

- The data sets utilized by the CWG:
  - » *Current GOES SXI Data*
  - » *GOES-12 GVAR data*
  - » *GOES-13 ASCII Lunar*
  - » *Landsat TIFF Data*
  - » *AVHRR HDF Data*
  - » *GOES, Landsat and AVHRR ASCII Spectral Response Functions*
  - » *GOES HDF and AREA Data Sets*
  - » *GOES B11 GVAR Data*



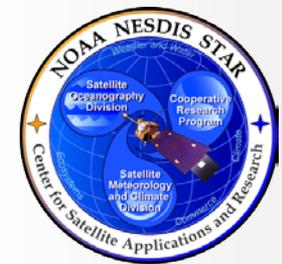
# Data Sets, cont.

- » *GEO (GOES and foreign satellites) Imager/Sounder McIDAS AREA File Data*
- » *AIRS HDF Data*
- » *AMSU-A, AVHRR, HIRS, IASI, MHS, and MSU Data*
- » *GSICS NetCDF Subset GEO data*
- » *GSICS GEO-LEO NetCDF Collocated data*
- » *GOES-IPM NetCDF Data*
- » *LEO-LEO SNO Data Sets*
- » *Two-Line Element Files*
- » *Metop Space Weather Data*



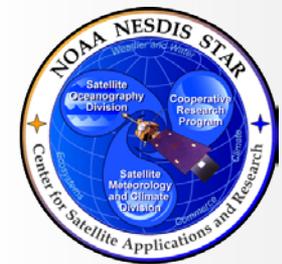
# Data Sets, cont(2)

- » *GOES Lunar Image GVAR Data*
  - » *GOES13 Stray Light GVAR Data*
  - » *GOES11/12/13 April 2009 Stray Light Experiment AREA Data*
  - » *GOES08 and GOES10 DCC Analysis GVAR Database*
  - » *GOES11/12/14 Imager and Sounder during GOES14 PLT Science Test AREA Data*
  - » *GOES11/12/14 Imager and Sounder during GOES14 PLT Science Test Binary Data*
  - » *AVHRR/Metop and HIRS/Metop T-Vac data*
- 24 different data sets!**



# Programming Languages

- Programming Languages currently used by the CWG:
  - » *IDL*
  - » *Matlab*
  - » *Mclidas*
  - » *C/C++*
  - » *FORTRAN*
  - » *BASH/C-Shell scripting*
  - » *Python*



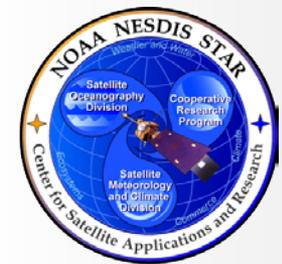
# Revision Control

- Currently, the CWG has no set standard or recommendation for revision control
- To date, only casual revision control is used, if at all
  - » Version numbering and backup copies
- Will work with the AWG and STAR IT to make RC easy for all group members



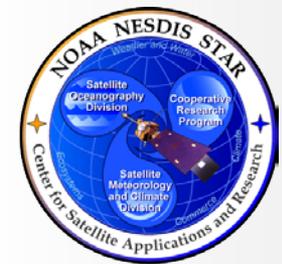
# Computer Processing

- Current servers:
  - » *STAR shared servers:*
  - » *GOES-R CWG servers:*
- Planned future servers:
- Requested Upgrades:
  - » *GOES-R SUVI: Linux desktop, 2-4Tb hard disk space, dual or quad core processor, 4Gb RAM.*
  - » *GSICS LEO-LEO dedicated machine, 2-4TB hard disk space, dual-core or greater.*



# CWG IT environment

- The CWG has been leveraging AWG experience to resolve concerns about the efficient and intelligent use of IT resources
  - » *Coding standards*
    - Since there is no one general programming language, coding standards must be flexible and language-independent.
    - The CWG has developed a guide to best programming practices including coding standards and taken actions from the AWG for further refinement.



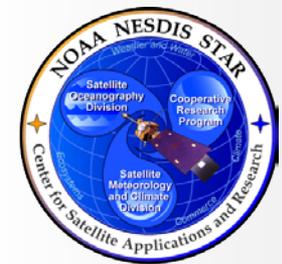
# CWG IT Environment, cont.

## » *Common Data Sets*

- For sets of data used by multiple group members, create shared repositories

## » *Group Software*

- Allow the group to “publish” routines and software to a group site.
  - | *Eliminate “re-inventing the wheel”*
  - | *Bug catching*
  - | *Generalize routines for flexible inputs*
  - | *Lessons Learned, Knowledge Capture*



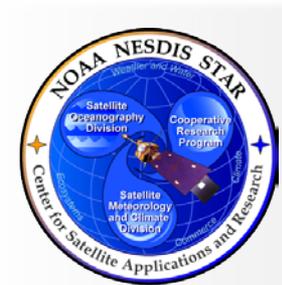
# CWG IT Environment, cont. (2)

## » *Revision Control/Universal back-up*

- Options for revision control such as Clearcase, Git, and Subversion are being researched.
- Regular back-ups to a high-capacity tape drive

## » *The CWG Wiki*

- Pages for:
  - | *FAQs*
  - | *How-To pages*
  - | *Lessons Learned*
  - | *Knowledge Base*
- Group-only access
- No ITAR material



# Summary

- The CWG works on many projects, all geared towards guaranteeing data integrity of instruments
- Responsibility for developing and maintaining many software tools falls to the CWG.
- The CWG is taking steps to guarantee the availability and robustness of the calibration data and software products for its current and future projects.