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

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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 cailbration 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*
  - *McIdas*
  - *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.