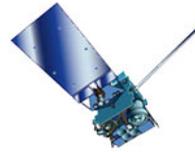


An Overview of the GOES-13 Science Test



Donald W. Hillger*
NOAA/NESDIS, Satellite Applications and Research (STAR)
Regional And Mesoscale Meteorology Branch (RAMMB)
Fort Collins CO 80523-1375

*E-mail: hillger@cira.colostate.edu



Timothy J. Schmit
NOAA/NESDIS, Satellite Applications and Research (STAR)
Advanced Satellite Products Branch (ASPB)
Madison WI 53706



Abstract

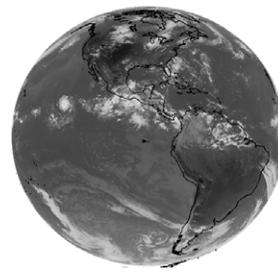
The next three Geostationary Operational Environmental Satellite (GOES): GOES-13/O/P will have instruments similar to GOES-8/12, but will be on a different spacecraft bus. The new bus will allow improvements both to the navigation and registration, as well as the radiometrics. The first of this new series, GOES-13, was launched in May of 2006. The NOAA Science Test was conducted during December of 2006.

Current plans call for GOES-13 to become operational after the on-orbit spare, GOES-11, is first used operationally. By supplying data through the eclipse, the GOES-13/O/P system addresses one of the major current Imager limitations which are eclipse and related outages. This is possible due to spacecraft batteries. Outages due to Keep Out Zones (KOZ) will be minimized. There will be radiometric improvements. The GOES-13+ instruments (Imager and Sounder) will be less noisy. A colder patch temperature is the main driver. In addition, there is a potential reduction in striping to be achieved through increasing the Imager scan-mirror's dwell time on the blackbody from 0.2 sec to 2 sec.

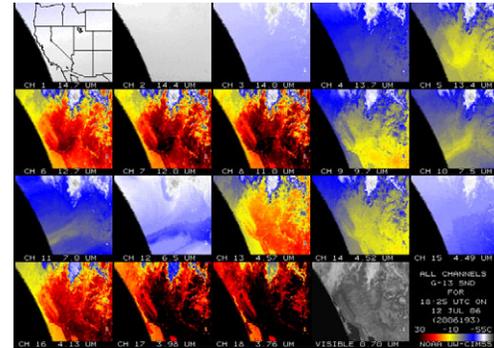
There will be improvements in both the navigation and registration on GOES-13+. The GOES-13 navigation will be improved due to the new spacecraft bus and the use of star trackers (as opposed to the current method of edge-of-earth sensors). In general, the navigation (at nadir) will go from between 4-6 km with today's imager to less than 2 km with those on the GOES-13/O/P satellites. Both within-frame and frame-frame registration will also be improved.



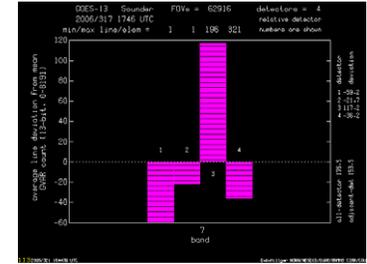
GOES-13 visible (0.7 μm) image at 1801 UTC on 22 June 2006, the first image captured at CIRA's satellite ground station.



GOES-13 band-4 (10.7 μm) longwave window image at 1800 UTC on 20 July 2006.



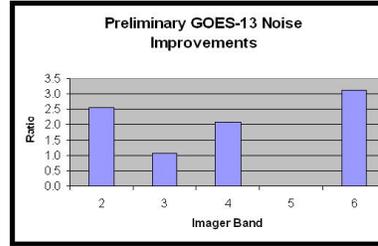
Composite of the GOES-13 Sounder images for all 19 bands for a sector over the western U.S. These data were ingested by the SSEC Data Center.



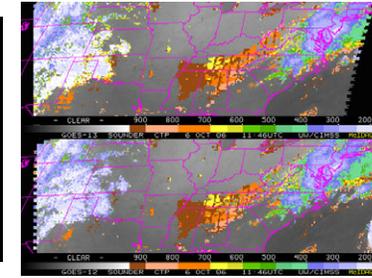
Example of detector-to-detector striping for the GOES-13 Sounder band-7 (12.0 μm). It appears that there is about twice as much striping with current GOES-13 Sounder data than with current GOES-12 data, at least in certain Sounder bands.

Implementation of GOES-13 Science Test Schedules (Daily starting time: 1630 UTC)

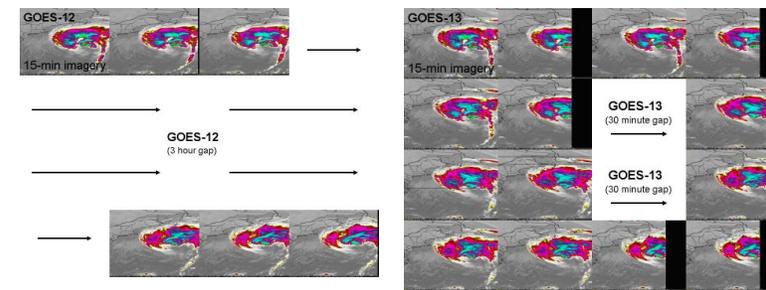
Starting Date [Julian Day]	Test Schedule Name	Imager	Sounder	Notes
December 7 [341] (Thursday)	C1CON	5-minute CONUS	30-minute CONUS	Great Lakes lake effect snow
December 8 [342] (Friday)	CSRTN	GOES-east routine emulation	GOES-east routine emulation	
December 9 [343] (Saturday)	C6FD	30-minute Full Disk	Alternating east and west limb/space views	Noise, striping, etc.
December 10 [344] (Sunday)	C6FD	30-minute Full Disk	Alternating east and west limb/space views	Noise, striping, etc.
December 11 [345] (Monday)	CSRTN	GOES-east routine emulation	GOES-east routine emulation	
[345] 2350 UTC to [346] 0010 UTC (inserted into schedule above)	C7MOON	Capture moon off edge of earth	GOES-east routine emulation	Test ABI lunar calibration concepts
December 12 [346] (Tuesday)	C3RSO	30-second Rapid Scan centered at 34.6°N, 86.75°W	30-minute CONUS	Hazardous Weather Testbed, Huntsville AL
December 13 [347] (Wednesday)	C2RSO	1-minute Rapid Scan centered at 34°S, 66°W	30-minute CONUS	Severe weather over Argentina
December 14 [348] (Thursday)	C4RTN	GOES-west routine emulation	GOES-west routine emulation	
December 15 [349] (Friday)				
December 16 [350] (Saturday)				



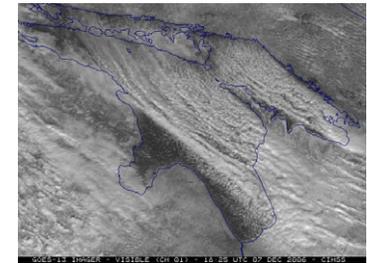
First estimates of noise for the GOES-13 Imager, as compared to the operational GOES-12 Imager.



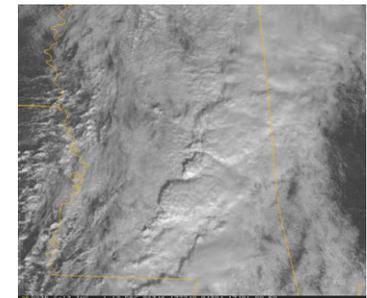
Preliminary comparison of GOES-13 (top) and GOES-12 (bottom) Sounder cloud-top pressure images. The images have been remapped into a common GOES-12 projection. (Figure provided by Tony Schreiner, CIMSS)



Sequences of images comparing GOES-13 to GOES-12 through eclipse. Rather than one long gap while the sun is behind the earth, there are two gaps when the sun is within view on each side of the earth.



GOES-13 visible image showing the development of lake-effect snow (LES) bands across the Great Lakes region, depicting well-defined, persistent LES bands that had developed over Lake Huron. 5-minute ABI-temporal-resolution imagery was collected this day of the Science Test. (Figure provided by Scott Bachmeier, CIMSS)



GOES-13 visible image showing the development of a line of convection across the southern U.S. 30-second rapid scan imagery were collected this day of the Science Test, in coordination with the Huntsville AL Hazardous Weather Testbed. (Figure provided by Dan Lindsey, NOAA/RAMMB)