The Global Space-based Inter-Calibration System

Mitch Goldberg, NOAA/NESDIS
GSICS Executive Panel chair
NOAA/NESDIS

GSICS Official Members

- NOAA
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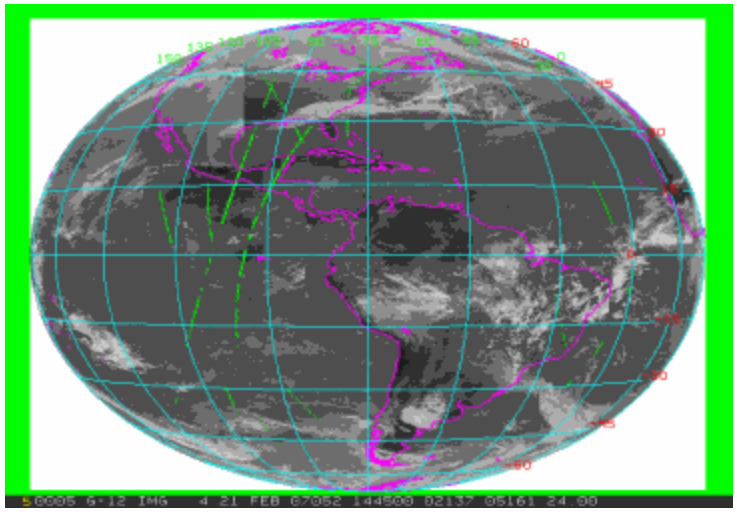
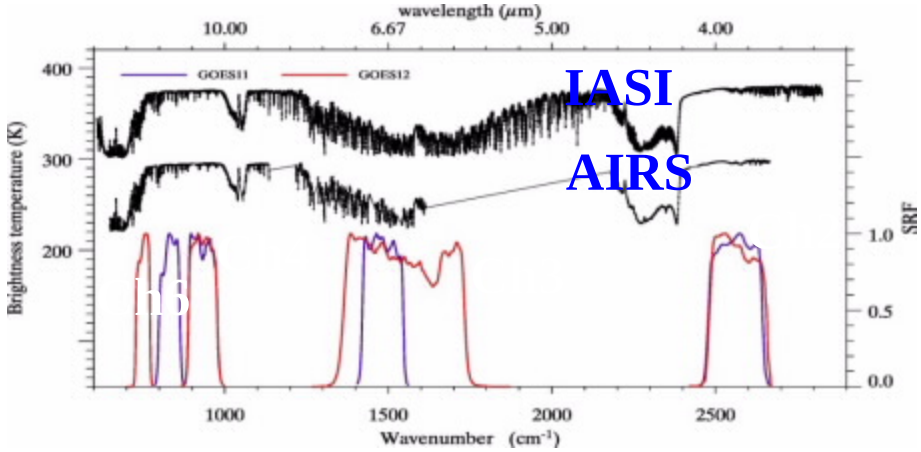
- NASA
- EUMETSAT
- CNES
- CMA
- JMA
- KMA
- WMO
- ISRO
- IMD
- JAXA
- USGS
- ROSHYDROMET
- ESA (observer)

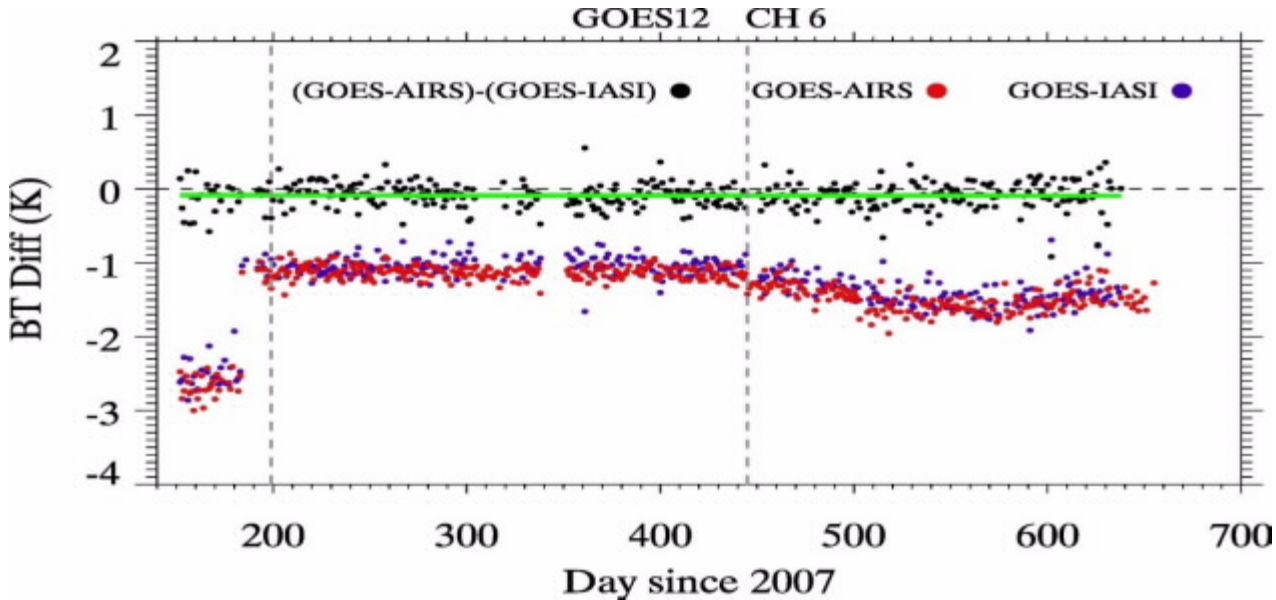
CEOS Precipitation Constellation is working with GSICS via GPM X-Cal Working Group.

GSICS current focus is on the intercalibration of operational satellites, and makes use of key research instruments such as AIRS and MODIS as reference instruments for the operational instruments

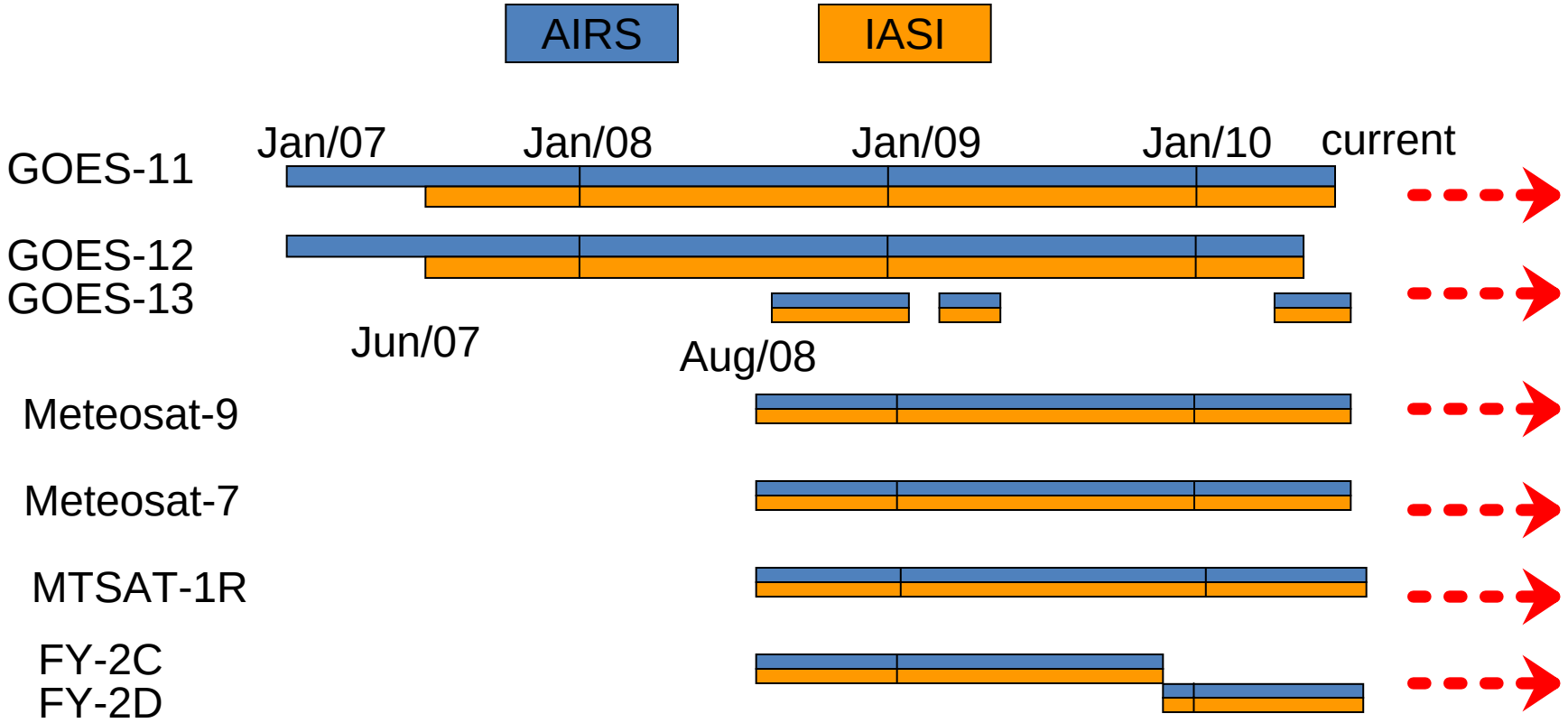
First international coordinated GSICS project is the intercalibration of geostationary infrared channels with IASI and AIRS







Status of GEO-LEO Inter-Calibration



Near-real time monitoring and correction for six operational GEO with baseline algorithm

Example of GSICS Bias Monitoring

From JMA: Time Series of MTSAT-1R-IASI/AIRS Standard Biases [K]

Meteorological Satellite Center (MSC) of JMA

Home | Calibration | Products | Operations | Supports

Current position: Home > GSICS MTSAT Calibration Monitoring > MTSAT-1R IR Intercalibration with AIRS/IASI

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GSICS MTSAT Infrared Intercalibration

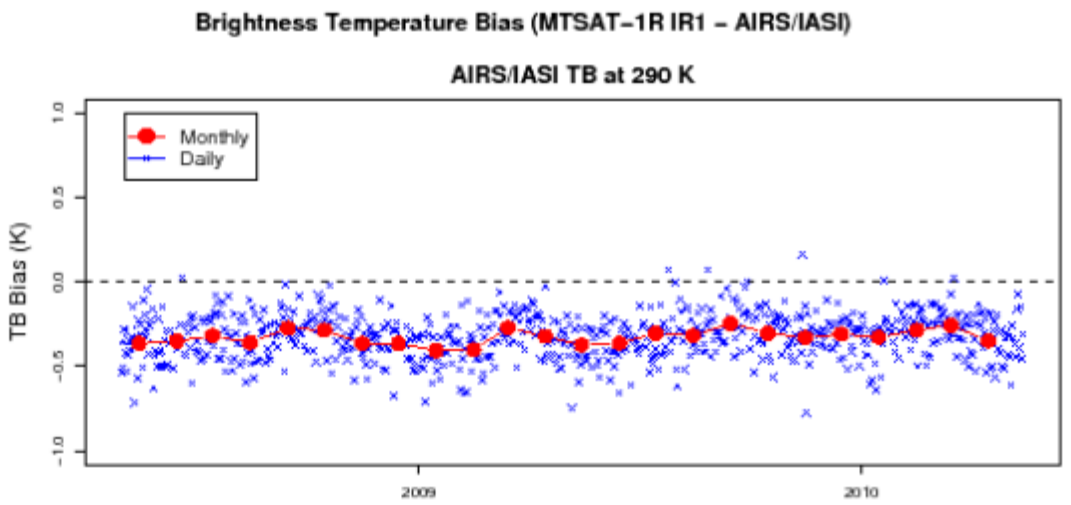
MTSAT-1R IR Intercalibration with AIRS/AQUA and IASI/METOP-A

MTSAT-1R Infrared Channel

- (•) IR1 (10.8 μm)
- ( ) IR2 (12.0 μm)
- ( ) IR3 (6.8 μm)
- ( ) IR4 (3.8 μm)

LEO Data

- (•) AIRS & IASI (all)
- ( ) IASI (des,9:30am)
- ( ) AIRS (asc,1:30pm)
- ( ) IASI (asc,9:30pm)
- ( ) AIRS (des,1:30am)



Example of GSICS Bias Monitoring

From EUMETSAT: Time Series of Meteosat9-IASI Standard Biases [K]

EUMETSAT — Monitoring weather and climate from space

SEARCH GO

ABOUT EUMETSAT | WHAT WE DO | ACCESS TO DATA | IMAGE GALLERY | DOCUMENTATION | NEWS

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ACCESS TO DATA

- Product Navigator
- Delivery Mechanisms
- Meteosat Image Services
- Meteosat Meteorological Products
- Data Collection and Retransmission
- Environmental Data Services
- Other Geostationary Services
- Metop & NOAA Services
- **Inter-calibration Services**
  - Meteosat - NOAA HIRS
  - **GSICS Meteosat IR Inter-calibration**
- EUMETSAT Data Centre
- User Support

GSICS Meteosat IR Inter-calibration

This page demonstrates prototype results of the inter-comparison of equivalent infrared channels of geostationary **Meteosat imagers** and the polar-orbiting **IASI** sounder from collocated observations. The data will be updated twice every 5 days, around 0700UTC. The activity is an important milestone toward an operational GSICS. Similar activities are currently pursued by other GSICS participants. The results, using the **inter-calibration algorithm**, can also be downloaded as **Statistical Data**, in **NETCDF Format**, from **EUMETSAT's GSICS Data and Product Server**. The results for 2007 were analysed by Hewison and König, 2008 (See **Inter-Calibration of Meteosat Imagers and IASI** from the Proceedings of the EUMETSAT Satellite Conference, Darmstadt, Germany, September 2008).

Satellite: Meteosat-9 SEVIRI

Channel: IR13.4

Date: Year 2009 Month 05 Day 27

Time: 2130

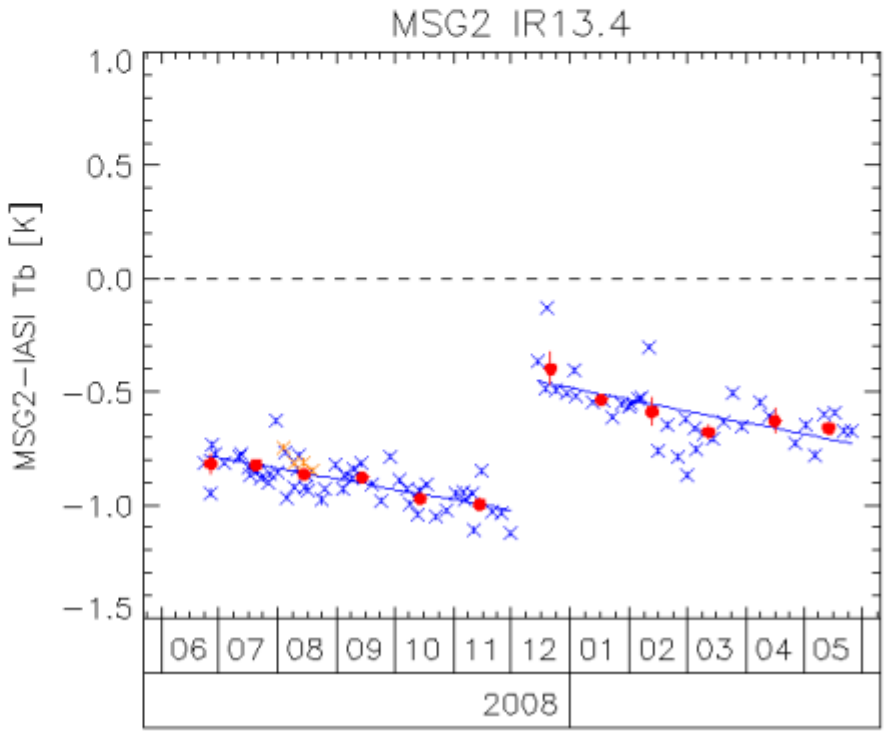
Display: Time Series Plot

Download: Statistical Data

Legend

- Bias fitted at T_{bref} from 1 night-time overpass
- Bias fitted at T_{bref} from 1 day-time overpass
- Monthly mean Bias from all night-time data
- Trend in night-time data

Error bars: 1-σ uncertainty



Example of GSICS Bias Monitoring

From NOAA: Time Series of GOES12-AIRS Standard Biases [K]

STAR Center for Satellite Applications and Research
formerly ORA — Office of Research and Applications

NOAA Satellites and Information
National Environmental Satellite, Data, and Information Service

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  - > GCC GSICS Homepage
  - > GSICS wiki
  - > GSICS Partners Webpage
    - > CMA
    - > EUMETSATthis link opens in a new window
    - > KMA

GOES-12 Imager vs. Aqua AIRS and Metop-A IASI

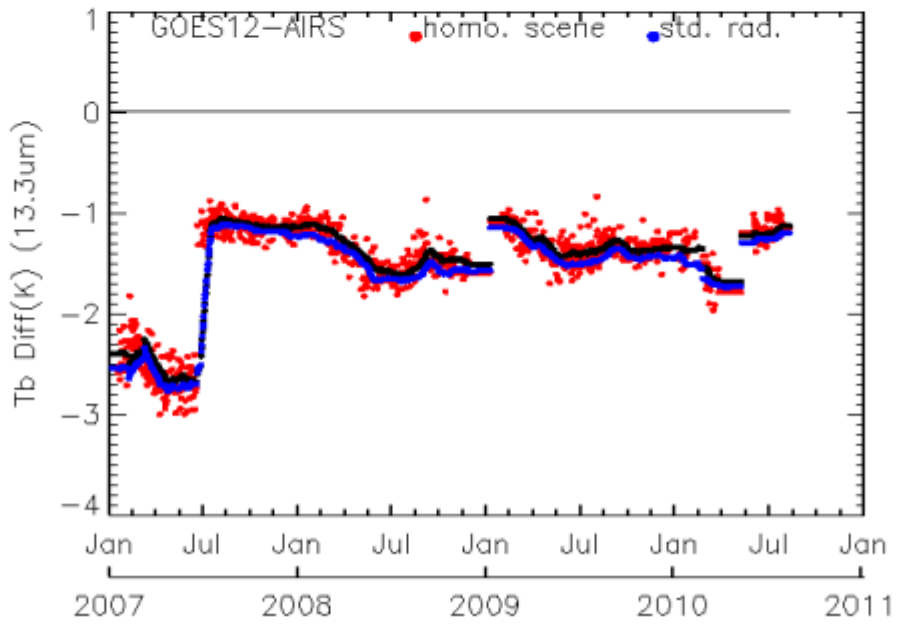
Please select a channel, then press 'Display' button

GOES-AIRS Tb bias (Daytime at Std. Rad.) GOES vs. AIRS Ch6 (13.3μm) Display

Tb Double Diff. (daytime at homo. scenes) Ch2 (3.9μm) Display

Evaluation of the MBCC Calibration Ch2 (3.9μm) Display

GOES12 vs. AIRS/IASI Spectra GOES12 vs. AIRS/IASI Spectra Display



Example of GSICS Bias Monitoring

From CMA: Time Series of FY2D-IASI Standard Biases [K]

风云卫星遥感器定标与检验
Calibration and Validation for FY Sensors

Home | Calibration | Sensors | GSICS | IPM

You Are Here： Introduction > FY_2X > GSICS

中文 | English

GEO: FY-2D
LEO: IASI
Channel: ALL
Date: 2010 05 17
Time: day ○ night ◉ all ○
Display: Serials TbBias

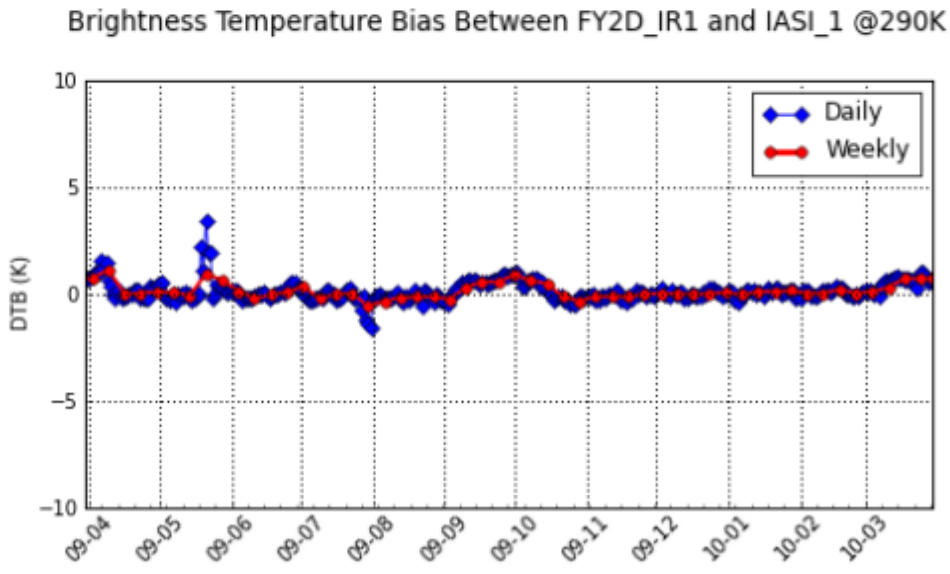
Push the button to get GSICS Correction NetCDF file with IASI

Download: Download

GSICS FY-2X IR Inter-calibration

For technical information on FY-2X infrared intercalibration in terms of comparison examination methods and how to read the charts on this page, please see the GSICS FY-2X Infrared Intercalibration Guide.

Terms: Bias@290K



GSICS Procedure for Product Acceptance

- Products progress from
  - Demonstration Mode
- Through
  - Pre-Operational Mode
- To
  - Operational Mode
- By a series of reviews
- Over period of ~1.5yr
- Subject to meeting
  - acceptance criteria

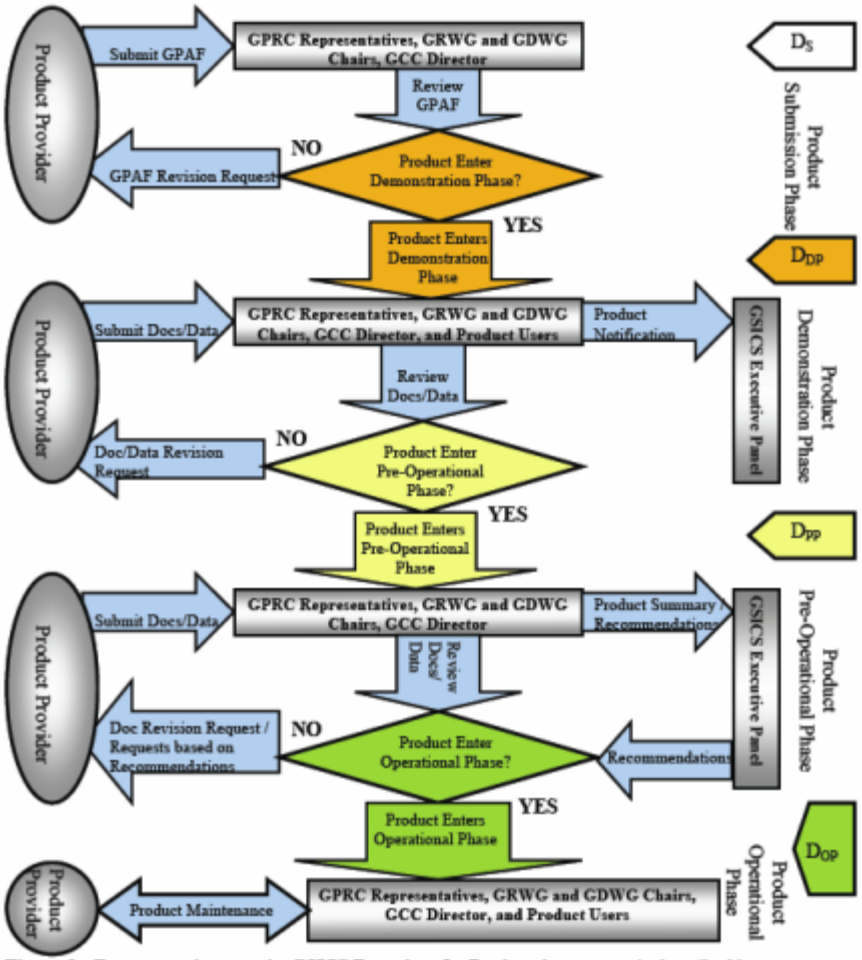


Figure 1: From top to bottom, the GSICS Procedure for Product Acceptance is described by four phases - Product Submission Phase, Demonstration Phase (DP), Pre-operational Phase (PP), and Operational Phase (OP) – and their review and revision cycles. The time markers at the far right, and their defined limits, are: date of submission (D_S); and the number of days from D_S to fulfill requirements to enter DP ($D_{DP} \leq D_S$+90days), PP ($D_{PP} \leq D_{DP}$+365days), and OP ($D_{OP} \leq D_{PP}$+180days).

Recommended Action

- 39.XX: IMD and ROSHYDROMET to present papers at CGMS-40 on progress towards implementing GEO to LEO corrections and bias monitoring established by NOAA, EUMETSAT, KMA, JMA and CMA

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Enter search term(s)
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- NOAA-19 AVHRR
- NOAA-19 HIRS
- MetOP-A AMSU-A
- MetOP-A MHS
- MetOP-A AVHRR
- MetOP-A HIRS
- NOAA-18 AMSU-A
- NOAA-18 MHS >>
- NOAA-18 HIRS
- DMSP F16 SSMIS
- DMSP F17 SSMIS
- DMSP F18 SSMIS
- GOES-11 Sounder
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- GOES-13 Sounder
- GOES-14 Sounder
- GOES-15 Sounder

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»Publications

Satellite Integrated Calibration / Validation System (ICVS)

NOAA-18 MHS Instrument Performance Monitoring

Please select the instrument performance index & press 'Display' Button

MHS NEΔT
H-3 Display

MHS Gain
10-Day Snapshot Display

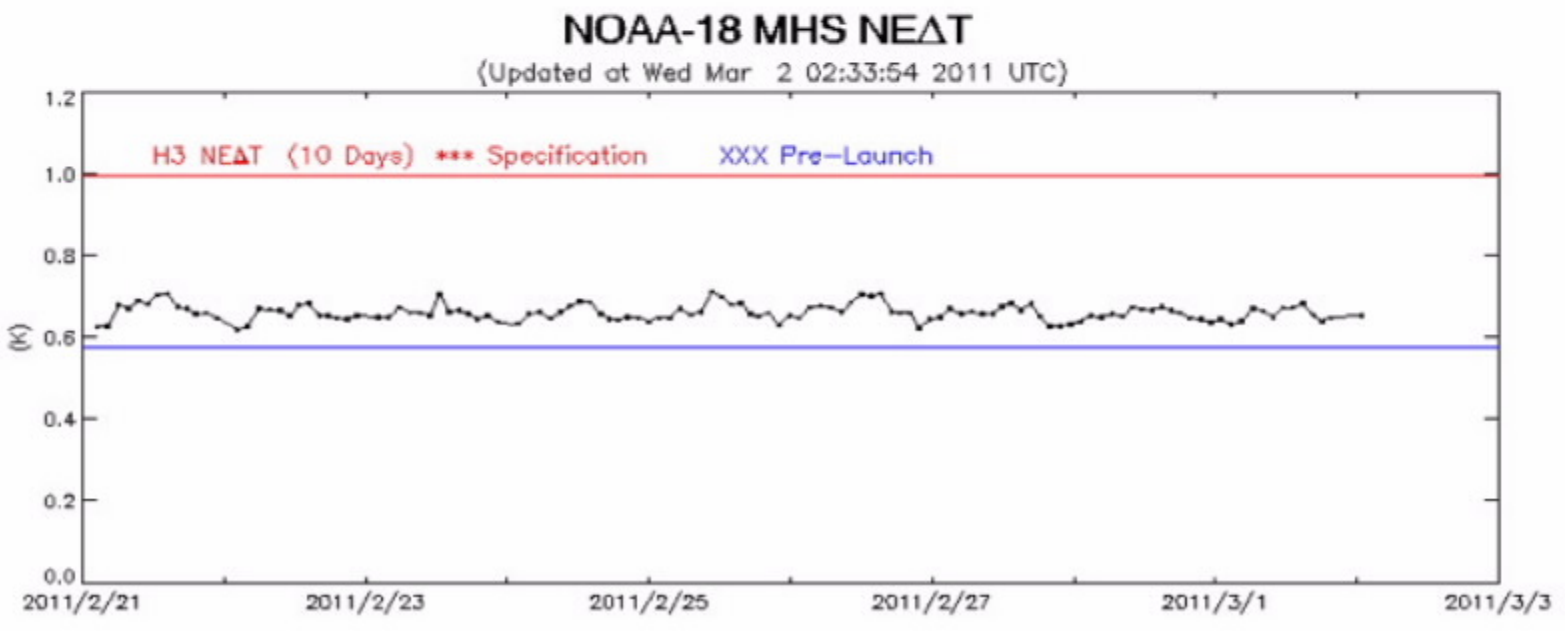
MHS Space View Count
10-Day Snapshot Display

MHS PRT Temperature
OBCT PRT Temperature Display

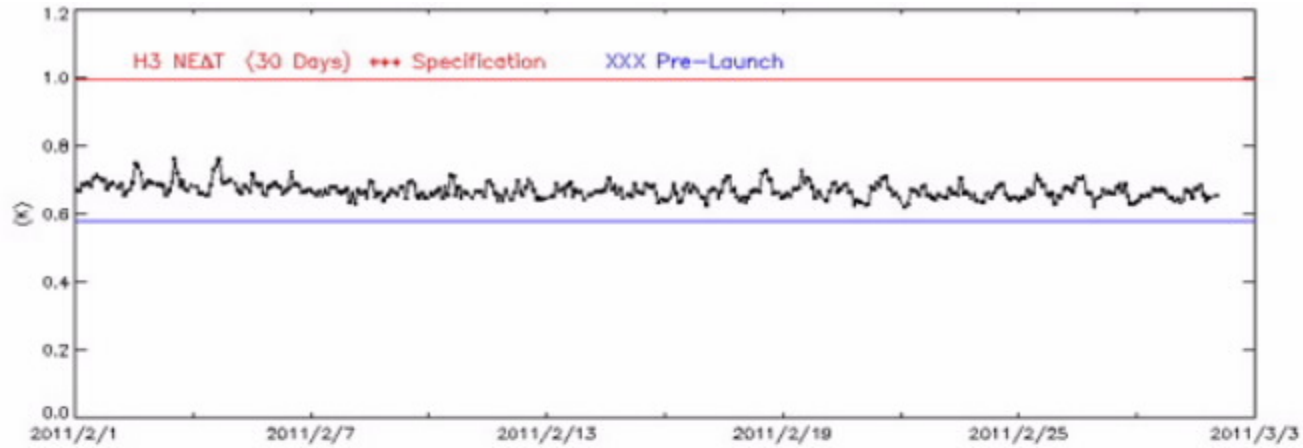
MHS Local Oscillator Temperature
H-1 Display

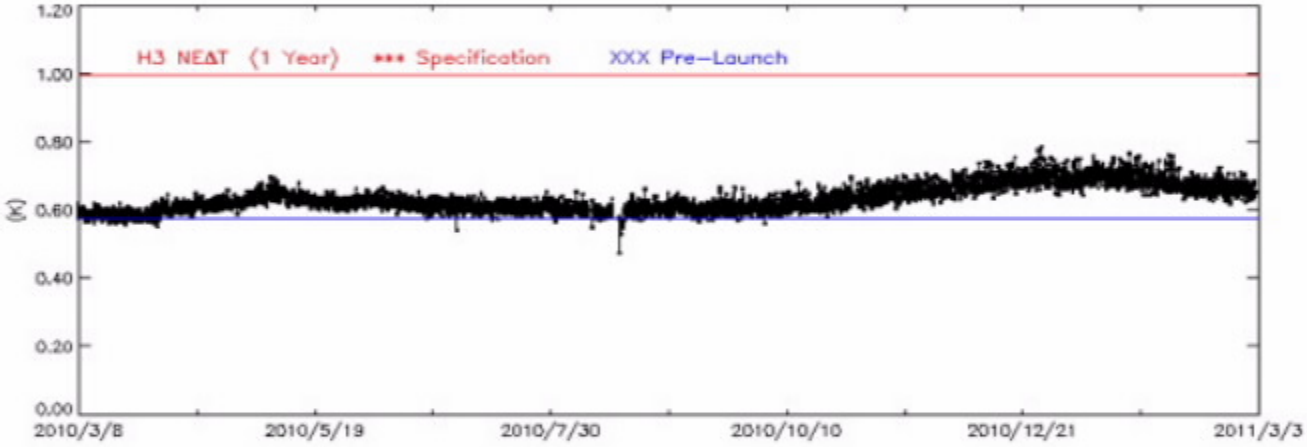
MHS Mixer/LNA Temperature
H-1 Display

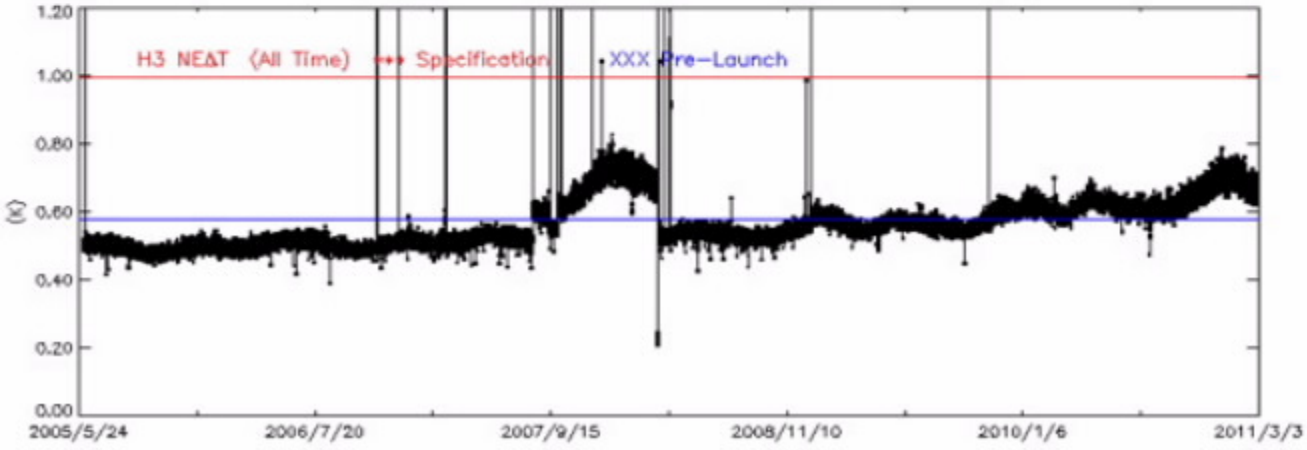
MHS Status
Weekly Orbit Status Display



Data and images displayed on STAR sites are provided for experimental use only and are not official operational NOAA products.
More information>>







Recommended Action

- 39.XX: CGMS agencies to report at CGMS-39 on activities to implement web-accessible instrument monitoring website.

User Engagement

THE GLOBAL SPACE-BASED INTER-CALIBRATION SYSTEM

BY M. GOLDBERG, G. OHRING, J. BUTLER, C. CAO, R. DATLA, D. DOELLING, V. GARTNER, T. HEWISON, B. IACOVAZZI, D. KIM, T. KURINO, J. LAFEUILLE, P. MINNIS, D. RENAUT, J. SCHMETZ, D. TOBIN, L. WANG, F. WENG, X. WU, F. YU, P. ZHANG, AND T. ZHU

An international project will tie observations from operational low-earth-orbiting and geostationary environmental satellites to those from in-orbit sensors that serve as calibration standards.

The satellite component of the Global Observing System

Improved calibration of space-based Earth-observing instruments is a fundamental, urgent scientific need. There is an increasing demand for more accurate measurements and intercalibration of observations from different instruments in response to such issues as interoperability within the Global Earth Observation System of Systems (GEOSS), data assimilation in numerical weather prediction (NWP), climate change detection, and near-real-time operational applications. For example, as NWP models become more reliable, their appetite for more accurate data input steadily grows. As the requirements for monitoring global climate become clearer (Ohring et al. 2005)—temperature changes as tiny as a few tenths of a degree per decade, ►

Recommended Actions

- CGMS to nominate vice chair for GSICS

- CGMS agencies to consider hosting GSICS EP-12 meeting in Spring 2012