

GSICS PILOT PROJECT FOR WIGOS

Project Name	Global Space-based Inter-calibration System Pilot Project for WIGOS
Acronym	GSICS-WPP
Project Type	Pilot
Project Status	<p>The Global Space-based Inter-calibration System (GSICS) is a joint initiative of WMO and the Coordination Group for Meteorological Satellites (CGMS), implemented along the GSICS Implementation Plan adopted in April 2006. Nine organizations are currently participating (CMA, CNES, EUMETSAT, JMA, KMA, NASA, NIST, NOAA, and WMO).</p> <p>CGMS-36 (3-7 November 2008) considered GSICS as a model case for global integration of space-based observations and recommended developing a WIGOS pilot project proposal based on GSICS activities. This was agreed on 7 November 2008 by the GSICS Executive Panel and subsequently by SG-WIGOS-1 which requested D/OBS to submit a Pilot Project proposal based on GSICS.</p> <p>The GSICS Pilot Project for WIGOS was presented at TECO WIGOS and brought to the attention of CBS-XIV (Dubrovnik, Croatia, March 2009).</p> <p>Intercomparison is currently performed on a preoperational basis for several LEO and GEO multispectral radiometers against LEO reference instruments. This is expected to be performed on a routine and standardized basis for all operational geostationary imagers by the 3rd quarter of 2009.</p>
Project Overview	<p>Under the overall guidance of WMO and CGMS, the project will:</p> <ul style="list-style-type: none"> - Develop and enforce common best practices for pre-launch instrument calibration traceable to SI standards; - Develop and enforce common best practices for improved on-orbit instrument calibration against earth-based reference sites or celestial targets; - Develop algorithms, software, common operational procedures compliant with agreed standards, and an operational data management infrastructure, to perform operational intercalibration of on-orbit instruments, using the most suitable instruments for benchmark measurements; - Deliver high accuracy calibration coefficients and intercalibration results on a timely and operational fashion, in accordance with user needs. <p>The project will be overseen by the GSICS Executive Panel, supported by the WMO Space Programme Office. Scientific and technical activities will be performed by the GSICS participating organizations, in accordance with the agreed-upon Operations Plan.</p>
Project Aims	<p>Ensuring accuracy and consistency of satellite observations is a prerequisite for using this data to observe climate variability. The growing number of agencies contributing to the space-based GOS opens an unprecedented opportunity to enhance observing capabilities; it also creates a compelling need for common practices ensuring data consistency in order to realize the full benefit of these systems. Cooperation is needed to leverage the scientific and technical capabilities of the individual satellite operators.</p> <p>The overarching goal of GSICS is thus to ensure comparability of satellite measurements collected at different times, with different instruments, operated by different agencies, and for different programmes, to tie these measurements to common references and enable recalibration of archived data.</p> <p>The WIGOS Pilot Project is expected to:</p> <ul style="list-style-type: none"> - Help capitalize the experience gained in implementing GSICS; - Provide an evaluation of GSICS with respect to the WIGOS objectives; - Ensure that space-based aspects are addressed in the WIGOS development; - Strengthen space agencies' involvement in WIGOS, as recommended by the 8th Consultative Meeting on High-level Policy on Satellite Matters (CM-8); and - Involve representative beta-users in an end-to-end demonstration.

Partners/ Participants	Participating organizations: <ul style="list-style-type: none"> • China Meteorological Administration (CMA) • Centre National d'Etudes Spatiales (CNES) • European Organization for Meteorological Satellites (EUMETSAT) • Japan Meteorological Agency (JMA) • Korea Meteorological Administration (KMA) • National Space and Aeronautical Administration (NASA) • National Institute of Standards and Technology (NIST) • National Ocean and Atmosphere Administration (NOAA) Coordination and support <ul style="list-style-type: none"> • WMO Space Programme Office • Coordination Group for Meteorological Satellites (CGMS) Partner organizations or projects <ul style="list-style-type: none"> • Committee on Earth Observation Satellites (CEOS) Working Group on Calibration and Validation (WGCV) • WCRP/GEWEX International Satellite Cloud Climatology Project (ISCCP) • Global Climate Observing System (GCOS) • Sustained Coordinated Processing of Satellite Data for Climate Monitoring (SCOPE-CM, formerly named R/SSC-CM) • NWP centres and other partners who may wish to join GSICS in future.
Funding Source(s)	The project will, to the maximum extent possible, make use of the expertise to be provided through the working structure of GSICS and CGMS. Implementation costs will be met by the participating organizations. Additional support will be required through the WMO budget and/or WIGOS-WIS Trust Fund to support reporting to WIGOS and user involvement. (Estimation: 10 K CHF)
Project Timescale	February 2009: Pilot Project proposal endorsed by the Executive Panel; March-July 2009: Development of the project, specification of deliverables in relation with target users September 2009: Initial operational intercalibration for LEO-LEO* and GEO-LEO* November 2009: Report to CGMS-37 January 2010: Report to CM-10; End 2010: Conclusions, Report prepared for Cg-XVI. <i>(*) LEO= Low Earth Orbit satellites; GEO= Geostationary satellites)</i>
Expected Key Deliverables	The Pilot Project will have the following deliverables: <ul style="list-style-type: none"> (i) Documents on best practices for pre-launch instrument characterization and SI traceability; (ii) Agreed-upon algorithms, data management practices, and deliverables for on-orbit satellite data intercomparison; (iii) Implementation of WIS-compatible data description and designation standards for satellite data intercomparison; (iv) Distributed operational infrastructure (software modules, data servers, web servers); (v) Routine availability of "GSICS Correction"; (vi) Assessment of the consistency of data sets originated from different satellite systems, enabling their merging for the derivation of climate products or other applications. (vii) End-user evaluation of the benefit of GSICS results in 2 key applications.

<p>Project Summary</p>	<p>Scope</p> <p>Accurate calibration and consistency of measurements is essential to get the full benefit of space-based capabilities, in particular for climate monitoring. However, because of the indirect nature of remote-sensing, and the impossibility to access the instruments once they are on orbit, precise calibration of space-based instruments poses scientific and technical challenges. The Pilot Project will address these challenges and foster cooperation among operational and R&D satellite operators with the aim to achieve integration of space based observing systems from different missions and operators.</p> <p>The data sets will be produced according to agreed upon standards and the quality control procedures documented according to QM principles. This integration will enhance the consistency of the data sets and the usefulness of each instrument for quantitative applications such as climate monitoring and NWP.</p> <p>Activities</p> <p>Define best practices for pre-launch instrument calibration traceable to SI standards;</p> <ul style="list-style-type: none"> • Define best practices for on-orbit instrument calibration against earth-based reference sites or celestial targets; • Develop algorithms, software, common operational procedures compliant with agreed standards, and an operational data management infrastructure, to perform operational intercalibration of on-orbit instruments, using hyperspectral instruments (AIRS and IASI) for benchmark measurements; • Produce and deliver high accuracy calibration coefficients and intercalibration results on a timely and routine operational fashion, in accordance with user needs; intercalibration will be implemented incrementally: <ul style="list-style-type: none"> ○ LEO-LEO Infrared channels ○ GEO-LEO infrared channels ○ LEO and GEO visible channels ○ LEO-LEO microwave channels • Perform an end-to-end demonstration involving beta-users from NWP and climate communities; more specifically: <ol style="list-style-type: none"> 1) Working with the NWP community to reduce their dependency on a NWP statistically derived instrument bias adjustment and establish a physically derived adjustment based on the GSICS intersatellite calibration results, 2) Working with ISCCP to independently assess the IASI/AIRS-derived calibration adjustments of the clear-sky GEO satellite imager radiances. <p>User interaction</p> <p>User feedback will be sought to refine the specifications of external deliverables and determine development priorities.</p> <p>The planned end-to-end demonstration will actively involve users to evaluate benefits of GSICS in some key applications.</p> <p>Structure and governance</p> <p>The project is overseen by an Executive Panel assisted by a Data Management Working Group (GDWG) and a Research Working Group (GRWG).</p> <p>Operational and research activities are performed centrally by the GSICS Coordination Centre (GCC) and in a distributed manner by the Processing and Research Centres (GPRC). The GCC is operated by NOAA. Each participating satellite operator is a GPRC. Additional support is provided by Calibration Support Segments (GCC) e.g. through laboratories or field sites.</p>
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Project links	http://gsics.wmo.int
Acronyms	<p>ATBD Algorithm Theoretical Basis Document CSS Calibration Support Segment CEOS Committee on Earth Observation CGMS Coordination Group for Meteorological Satellites GCC GSICS Coordination Centre GDWG GSICS Data Management Working Group GEO Geostationary satellite GPRC GSICS Processing and Research Centre GRWG GSICS Research Working Group IP Implementation Plan LEO Low Earth Orbit satellite SNO Simultaneous Nadir Overpass WGCV Working Group on Calibration and Validation (CEOS)</p>
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