

**TERMS OF REFERENCE FOR THE CEOS  
SEA SURFACE TEMPERATURE VIRTUAL CONSTELLATION**

**VERSION 1.0**

**LAST UPDATED: 19 DECEMBER 2013**

**CONSTELLATION NAME:** The Sea Surface Temperature Virtual Constellation (SST-VC)

**MISSION STATEMENT & OBJECTIVES**

The SST-VC exists to foster the best quality sea surface temperature data and their availability for applications across all relevant spatial and temporal scales in the most effective and efficient manner through international collaboration, scientific innovation, and rigor.

The SST-VC addresses the following strategic objectives to address this aim:

- Maintain a strong and mutually supportive relationship and interface between CEOS and the activities of the Group for High Resolution SST (GHRSSST);
- Foster better engagement by Nations operating or preparing satellite SST sensors;
- Work to assure the long term continuity of all necessary space-based components including passive microwave and dual-view, high quality IR reference-sensor SST data;
- Synthesize the driving requirements for SST measurements from space;
- Support outreach, education and development of new SST practitioners;
- Promote GHRSSST standards for satellite SST;
- Advocate priority areas for funding of SST activities;
- Promote the sharing of data.

**CHARACTERISATION OF THE MEASUREMENTS AND DATA COLLECTIONS WITHIN SCOPE**

The geophysical parameter concerning the SST-VC is Sea Surface Temperature measured by infrared and passive microwave satellite sensors supported by in situ measurements required for quality control.

The SST-VC works with GHRSSST to publish technical guidelines for GHRSSST compliant datasets known as the GHRSSST Data Specification (GDS). CEOS Agencies wishing to contribute their datasets to GHRSSST and the SST-VC conform to the GDS. GHRSSST and the SST-VC maintain data discovery and access to all GHRSSST-formatted products, using the GHRSSST Global Data Assembly Centre, the GHRSSST Long Term Stewardship and Reanalysis Facility, GHRSSST Regional Data Assembly Centres, and the CEOS-WGISS Integrated Catalogue as appropriate.

**CHARACTERISATION OF THE SPACE SEGMENT CONCERNED**

The SST-VC addresses all SST-capable space-based platforms as well as relevant in situ platforms, including but not limited to polar and geostationary orbiting platforms, infrared and microwave-based sensors, in situ radiometers, surface drifters, moored buoy arrays, and near-surface profiling instruments – implicating a large number of CEOS agency missions. The core missions that are currently the priority for coordination efforts by the SST-VC are:

- Metop series (AVHRR/IASI);
- NOAA POES series (AVHRR);
- Suomi NPP (VIIRS);
- GCOM-W series (AMSR2)

- TRMM (VIRS/TMI)
- TERRA/AQUA (MODIS/AMSR-E)
- Coriolis (WindSat)
- METEOSAT series (SEVIRI/MVIRI)
- GOES series (Imager)
- MTSAT series (IMAGER)
- HY series (COCTS/RAD)
- FY series (Imager)
- INSAT-3D series (Imager)
- COMS series (Imager)

With the following future missions being of particular importance: Sentinel-3 (SLSTR), GCOM-C (SGLI), JPSS (VIIRS), GOES-R (Imager), MTG (FCI), FY-4 (MCSI). SST-VC activities include coordination of capabilities of a much broader range of CEOS agency missions and instruments.

Other SST-VC activities include the coordination of homogenous SST climate data records from past space-based sensors (dating from the early 1970s), better specification of uncertainty estimates within SST products, better use of reference sensors (e.g., ENVISAT AATSR and the Sentinel-3 SLSTR) within the Constellation, and efforts to assure the long-term continuity of passive microwave SST data.

The CEOS Missions, Instruments and Measurements database (available at <http://database.eohandbook.com/>) provides a comprehensive reference for SST missions. Not all of these missions are currently contributed to GHRSSST and the SST-VC.

## ACTIVITIES, OUTCOMES, AND DELIVERABLES

The SST-VC has identified the following high-level outcomes and deliverables on 3- and 5-year horizons. Annual activities leading toward these longer-term outcomes are identified and updated each year in the separate SST-VC Implementation Plan document.

	3-year horizon	5-years or more horizon
<b>Space Segment</b>	<ul style="list-style-type: none"> <li>Documented plan for the required virtual constellation</li> <li>The 2015 constellation will have many of the core elements required to satisfy the main user requirements (with the planned launch of the first Sentinel-3 (with SLSTR) closing the current gap in dual-view IR capability).</li> </ul>	<ul style="list-style-type: none"> <li>It is hoped that sustained effort will sustain C-band passive microwave SST products and develop a real aperture capability approaching 10 km.</li> <li>Dual-view IR reference sensor is expected to be reinstated with the launch of Sentinel-3 SLSTR.</li> <li>An optimistic launch schedule suggests that the IR imaging capability is well supported.</li> </ul>
<b>Ground Segment &amp; Information Systems</b>	<ul style="list-style-type: none"> <li>100% of GHRSSST Products Discoverable through the CEOS IDN and CWIC system</li> </ul>	<ul style="list-style-type: none"> <li>100% of GHRSSST Products Discoverable through the CEOS IDN and CWIC system</li> </ul>
<b>Products &amp; Services</b>	<ul style="list-style-type: none"> <li>GDS2.0 specification in widespread use; Fully developed Climate Data Assessment Framework (CDAF)</li> <li>International exchange of common-specification data sets in place for many (but not all) SST satellite sensors</li> <li>Basic uncertainty information attached to some data sets</li> </ul>	<ul style="list-style-type: none"> <li>SST Climate Data Assessment Framework (CDAF) implemented routinely for all GHRSSST data designated as ECV products.</li> <li>International exchange of all SST satellite data sets using common specifications.</li> <li>Uncertainty estimates attached to all SST data sets</li> </ul>

Reports to SIT from the SST-VC will emphasise progress towards achievement of these outcomes and deliverables and the issues and obstacles for SIT attention.

#### **IMPLEMENTATION AND COORDINATION ISSUES TO BE ADDRESSED BY SIT**

Achievement of the SST-VC objectives requires the following implementation and coordination issues to be addressed by SIT:

1. The necessary CEOS agency participation - many agencies currently contribute to the SST-VC and GHR SST, but many that could be participating are not currently doing so.
2. CEOS agency participation in Satellite SST metrics to assess, monitor and improve the collective SST capability for user communities.
3. Support to the SST-VC activities striving to achieve and maintain standards based traceability for on-orbit validation activities (i.e. in situ radiometer round-robin activity).
4. Endorsement of the SST-VC white paper describing and justifying the overall scope and components of the CEOS SST- Virtual constellation.

#### **SCHEDULE**

<b>Activity</b>	<b>Milestone</b>	<b>Target Date</b>
1. Develop and optimize the SST constellation	Develop a White Paper describing and justifying the SST- Virtual constellation.	Sept. 2015
2. Develop and implement metrics for SST services, products, and users	Focus discussion at 2014 GHR SST/SST-VC workshop Preparation of position paper	June 2015 September 2015
3. Coordinate consensus SST reference documents	Publish updated GHR SST Data Specification 2.0 (GDS2).	Annually
4. Encourage timely access to products	53/60 GHR SST now fully integrated in IDN/CWIC (WGISS)	Complete by Sept. 2014
5. Develop and improve the satellite SST ECV	Complete and publish the SST Climate Data Assessment Framework (CDAF)	2014/15
6. Improve SST calibration, inter-calibration, and validation	Hold an IR radiometer inter-comparison exercise building on the ISSI focus group conclusions	2015

SST-VC meets normally once per year in conjunction with the annual GHR SST Science Team Meeting. More details of the SST-VC schedule of activities and milestones is maintained and updated annually in the separate SST-VC Implementation Plan document.

## **MEMBERSHIP AND LEADERSHIP**

### **Current Co-Leads are:**

- NOAA, Kenneth S. Casey (Kenneth.Casey@noaa.gov)
- ESA, Craig Donlon (Craig.Donlon@esa.int)

And the following CEOS agencies are actively involved in SST-VC:

JAXA	Misako Kachi (Kachi.Misako@jaxa.jp)
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G. Corlett	WGCV representative and GHR SST Project Office (ex officio)
P.J Minnett	GHR SST Science Team Chair (ex officio)

### **RESOURCES**

The SST-VC leverages existing contributions by participants in GHR SST and on a volunteerism basis with additional resources provided by member Agencies (e.g. ESA Climate Change Initiative, Support to the GHR SST Project Office, NASA PO.DAAC, NOAA NODC data stewardship)