



# ***SensorML description of remote sensing instruments for calibration/ validation activities***

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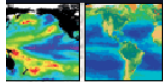
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# CEOS WGCV

## WORKING GROUP ON CALIBRATION & VALIDATION

[WGCV](#)[SUBGROUPS](#)[DOCUMENTATION](#)[CEOS](#)[LINKS](#)

The **28th WGCV Plenary** will be held in Sanya, China between 26-29th of February, 2008.



The **27th WGCV Plenary** was held in Teddington (near London), United Kingdom 12-15 June, 2007.

The **26th WGCV Plenary** was held in Chiang Mai, Thailand 31 October - 3 November, 2006.

The **25th WGCV Plenary** was held in Budapest, Hungary from 9-12 May 2006

The **24th WGCV Plenary** was held in Frascati, Italy from 8-11 Nov 2005

The **23rd WGCV Plenary** was held near Cordoba, Argentina from 7-10 March 2004

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### Recommendation 1 – CEOS 18<sup>th</sup> Beijing, China, November 2004

**Reference Datasets** are required to support the understanding of climate change and quality assure operational services by Earth Observing satellites. The data from different sensors and the resulting synergistic data products require a high level of accuracy that can only be obtained through continuous **traceable calibration and validation activities**.

### WGCV Requirement

Initiate an activity to document a **reference methodology** to predict Top of Atmosphere (TOA) radiance for which currently flying and planned wide swath sensors can be **intercompared**, i.e. define a standard for traceability. Also create and maintain a **fully accessible web** page containing, on an instrument basis, links to all instrument characteristics needed for intercomparisons as specified above, ideally in a common format. In addition, create and maintain a **data-base** (e.g. SADE) of instrument data for specific **vicarious calibration sites**, including site characteristics, in a common format. Each agency is responsible for providing data for their instruments in this common format.

### Recommendation

The required activities described above should be supported for an implementation period of two years and a maintenance period over two subsequent years. The CEOS should encourage a member agency to accept the lead role in supporting this activity. CEOS should request all member agencies to support this activity by providing appropriate information and data in a timely manner.

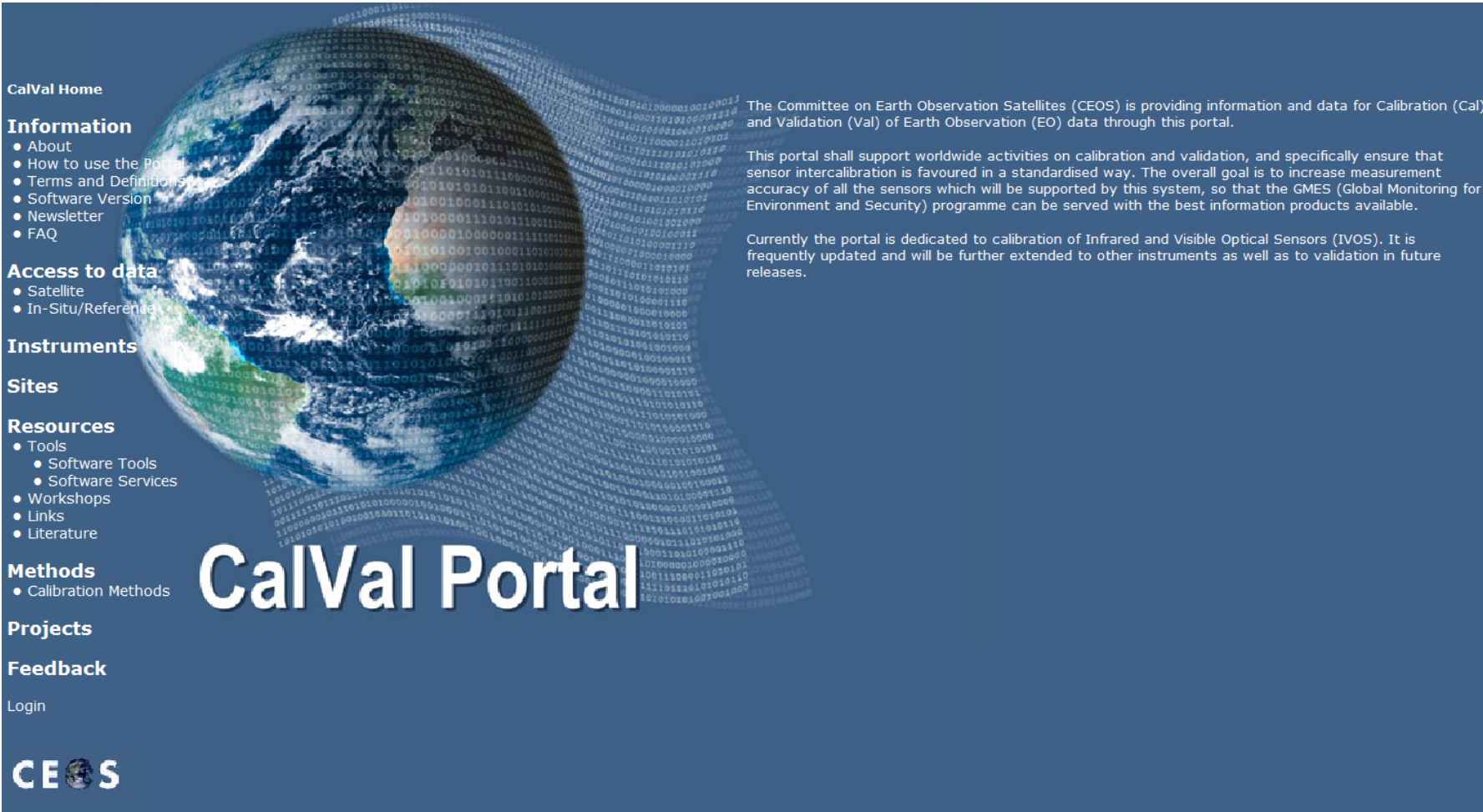
### WGCV follow-up activities

- WGCV/IVOS to create and distribute an orbital propagator tool for large scale optical sensors (ESA);
- IVOS, in conjunction with the CAL/VAL community and WGISS to specify a data format to be used in a database such as SADE for intercomparison purposes (ESC/CNES);
- WGCV to contact instrument teams to encourage adherence to the previous recommendation, i.e., to provide instrument descriptions and intercomparison data in a common format (IVOS to establish White Paper containing rationale and defining benefits and intended use);
- IVOS in cooperation with WTF to encourage the use of diagnostic sites as established by international CAL/VAL teams.

<http://wgcv.ceos.org/>



# CalVal portal



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**CalVal Portal**

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The Committee on Earth Observation Satellites (CEOS) is providing information and data for Calibration (Cal) and Validation (Val) of Earth Observation (EO) data through this portal.

This portal shall support worldwide activities on calibration and validation, and specifically ensure that sensor intercalibration is favoured in a standardised way. The overall goal is to increase measurement accuracy of all the sensors which will be supported by this system, so that the GMES (Global Monitoring for Environment and Security) programme can be served with the best information products available.

Currently the portal is dedicated to calibration of Infrared and Visible Optical Sensors (IVOS). It is frequently updated and will be further extended to other instruments as well as to validation in future releases.

<http://www.brockmann-consult.de/CalValPortal/welcome.do>



# CalVal portal / Instruments

## CalVal Portal

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**CEOS**

### Instrument Overview

Platform	Sensor	
ALOS	<a href="#">AVNIR-2</a>	Advanced Visible and
	<a href="#">PRISM</a>	Panchromatic Remot
ENVISAT	<a href="#">AATSR</a>	Advanced Along-Track
	<a href="#">MERIS</a>	Medium Resolution I
ERS-1	<a href="#">ATSR</a>	Along-Track Scannin
	<a href="#">ATSR-2</a>	Along-Track Scannin
KOMPSAT-2	<a href="#">EOC</a>	Electro-Optical Came
	<a href="#">TM</a>	Landsat Thematic Mapper
LANDSAT-5	<a href="#">ETM</a>	Landsat Enhanced Thematic Mapper
	<a href="#">AVHRR-3</a>	Advanced Very High Resolution Radiometer
SPOT-4	<a href="#">HRV</a>	High Resolution Visible Imaging Instrument
	<a href="#">Vegetation</a>	Vegetation Instrument
TERRA	<a href="#">ASTER</a>	Advanced Spaceborne Thermal Emission Radiometer

**Additional Information**

<a href="#">SensorML Handbook</a>	SensorML Handbook describing the package below
<a href="#">SensorML Package</a>	SensorML Package including descriptions for all sensors listed above

### MERIS: Instrument Information

**General Information**

Resource	Description
<a href="#">MERIS</a>	MERIS Overview at ESA Earthnet
<a href="#">Sensor Information</a>	Sensor Information in SensorML Format
<a href="#">Sensor Information</a>	Structured Presentation of Sensor Description (derived from SensorML)

**Spectral Response Function Information**

Graphics	Table	Reference	Title/Description
<a href="#">MERIS-SRF Cam1 B1-5</a>	<a href="#">MERIS-SRF Cam1 B1-5</a>	<a href="#">MERIS characteristics</a>	MERIS Instrument Characteristics and Performance
<a href="#">MERIS-SRF Cam1 B6-10</a>	<a href="#">MERIS-SRF Cam1 B6-10</a>	<a href="#">MERIS characteristics</a>	MERIS Instrument Characteristics and Performance
<a href="#">MERIS-SRF Cam1 B11-15</a>	<a href="#">MERIS-SRF Cam1 B11-15</a>	<a href="#">MERIS characteristics</a>	MERIS Instrument Characteristics and Performance

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### MERIS Spectral Response Function Information

**MERIS Spectral Response Function (Cam 1)**

The graph displays the normalized Spectral Response Function (SRF) for five MERIS channels (B1, B2, B3, B4, B5) across a wavelength range from 400 to 550 microns. The y-axis represents the normalized SRF from 0.0 to 1.0, and the x-axis represents the wavelength in microns. Channel B1 (red) peaks at approximately 412 microns, B2 (blue) at 443 microns, B3 (green) at 667 microns, B4 (yellow) at 675 microns, and B5 (orange) at 865 microns. The legend at the bottom identifies the channels by color: B1 (red), B2 (blue), B3 (green), B4 (yellow), and B5 (orange).



# SensorML – VAST - OGC

**VAST**

**OGC** "Making location count"

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## Sensor Model Language (SensorML)

### OpenGIS Sensor Model Language (SensorML)

- 1) Overview
- 2) Downloads
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#### 1) Overview

The primary focus of SensorML is to define processes and processing components associated with the measurement and post-measurement transformation of observations. The SensorML document also defines the SWE Common data types used throughout the SWE encodings and services.

For additional information on SensorML, go to <http://vast.uah.edu/SensorML>

#### 2) Downloads

Version	Document Title (click to download)	Document #	Type
1.0.0	OpenGIS Sensor Model Language (SensorML)	07-000	IS
	OpenGIS SensorML Encoding Standard v 1.0 Schema Corregendum 1 (1.01)	07-122r2	ISC
0.9.0 (1.0 beta 1)	OpenGIS Sensor Model Language (SensorML)	05-086	D-BP
0.8.0 (1.0 beta)	Sensor Model Language (SensorML) for In-situ and Remote Sensors	04-019r2	D-RP
0.7	Sensor Model Language (SensorML) for In-situ and Remote Sensors	02-026r4	D-DP
0.4d	SensorML	02-026r1	D-DP

<http://www.opengeospatial.org/standards/sensorml>





# CalVal SensorML – Schema - Handbook - Dictionnary

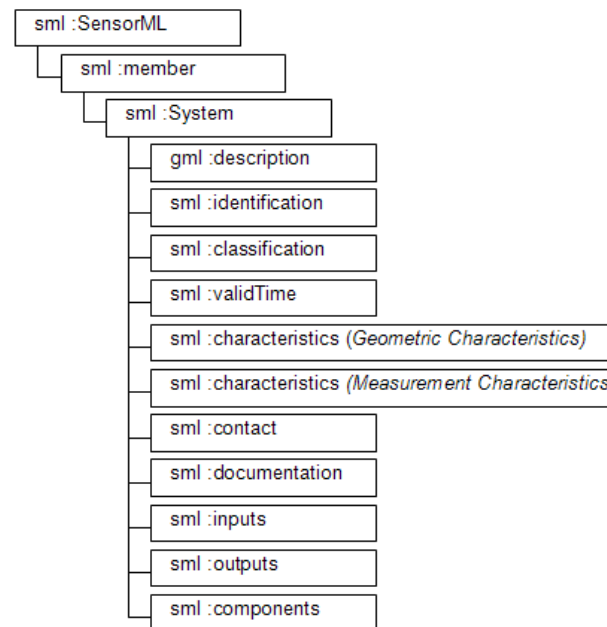
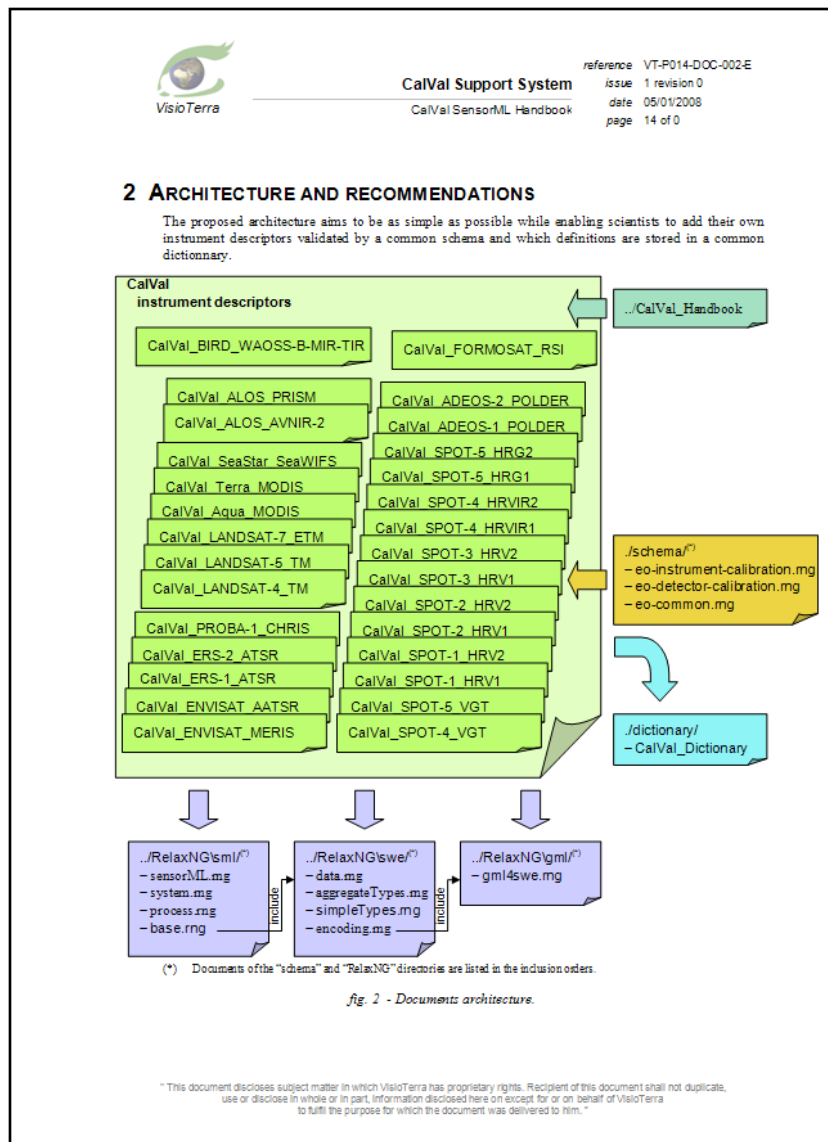
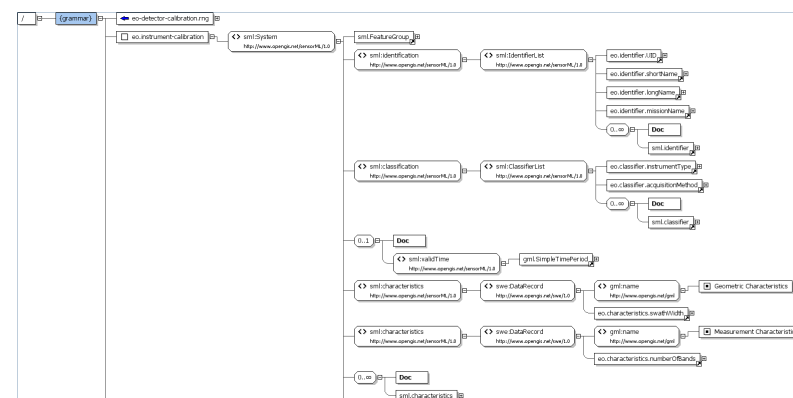


fig. 3 - CalVal structure – "SensorML" element





# CalVal SensorML

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="/xslt/geo_document.xsl" version="1.0"?>
<?oxygen RNGSchema="/schema/geo-instrument-calibration.rng" type="xml"?>
<!--
***** PURPOSE *****
This descriptor provides with the values required to perform calibration /
validation (CalVal) activities and that are relative to :
Mission : ENVISAT
Instrument : MERIS
***** COPYRIGHT NOTICE *****
You may modify, distribute or copy this file provided that the present
notice is kept intact and the name of the initial developer(s) and all
contributors are preserved. Do not hesitate to contact the developers
for more information.
Initial Developers:
Alexandre Robin - Sensia Software LLC - <alex.robin@sensiasoftware.com>
Serge Riazanoff - VisioTerra SARL - <serge.riazanoff@visioterra.fr>
Contributors:
***** HISTORY OF MODIFICATIONS *****
2006-12-19: Creation of the first version
2007-05-19: Updated to validate with SensorML schema v1.0
2007-08-03: Changed hierarchy of camera outputs
2007-08-13: Processing of all the cameras/bands
2007-10-04: Introduction of centralWavelengthPerPixel
-->
<smil:SensorML xmlns:smil="http://www.opengis.net/sensorML/1.0"
xmlns:swes="http://www.opengis.net/swes/1.0" xmlns:gml="http://www.opengis.net/gml"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink"
version="1.0">
<!-- -->
<smil:member xlinkrole="urn:x-esa:definition:ESA:documentRoles:v01#instrument_calibration">
<!-- -->
<smil:System gml:id="ENVISAT_MERIS">
<!-- -->
<!-- System Description -->
<!-- -->
<gml:description> MERIS is a programmable, medium-spectral resolution, imaging spectrometer
operating in the solar reflective spectral range. Fifteen spectral bands can be selected
by ground command, each of which has a programmable width and a programmable location in
the 390 nm to 1040 nm spectral range. </gml:description>
<!-- -->
<!-- System Identifiers -->
<!-- -->
<smil:identification>
<smil:identifierList>
<smil:identifier name="System UID">
<smil:Term definition="urn:x-esa:definition:ESA:uid">
<smil:value>urn:x-esa:object:instrument:ESA:Envisat:MERIS:v01</smil:value>
</smil:Term>
</smil:identifier>
<smil:identifier name="Short Name">
<smil:Term definition="urn:x-esa:definition:ESA:shortName">
<smil:value>MERIS</smil:value>
</smil:Term>
</smil:identifier>
<smil:identifier name="Long Name">
```

## Instrument Calibration Information - ENVISAT\_MERIS

### Description

MERIS is a programmable, medium-spectral resolution, imaging spectrometer operating in the solar reflective spectral range. Fifteen spectral bands can be selected by ground command, each of which has a programmable width and a programmable location in the 390 nm to 1040 nm spectral range..

### Identification

**System UID:** urn:x-esa:object:instrument:ESA:Envisat:MERIS:v01

**Short Name:** MERIS

**Long Name:** Medium Resolution Imaging Spectrometer

### Classification

**Instrument Type:** Imaging Multispectral Radiometer

**Acquisition Method:** Pushbroom

### Geometric Characteristics

**Swath Width at Nadir:** 1150 km

### Measurement Characteristics

