

WGCV Report to 20th CEOS Plenary

*Stephen Ungar (NASA), Chair
Changyong Cao (NOAA), Chair-elect*

The CEOS Working Group on Calibration and Validation

- The Working Group on Calibration and Validation (WGCV) was established in 1984. This resulted from the recognition by CEOS that calibration and validation activities should play a key role in all satellite Earth Observation missions to ensure the clear and quantitative understanding of the data they generate.
- **Calibration:** The process of quantitatively defining the system responses to known, controlled signal inputs.
- **Validation:** The process of assessing, by independent means, the quality of the data products derived from the system outputs.

CEOS WGCV Subgroups

WGCV (NASA)

SAR (CSA)

IVOS (NPL)

MS (ESA)

TM (UCL)

LPV (CNES)

ACSG (NASA)

- **Synthetic Aperture Radar (SAR)**
Chair Dr. S. Srivastava, CSA
- **Infrared Visible Optical Sensors (IVOS)**
Chair Dr. N. Fox, NPL
- **Microwave Sensors**
Chair C. Buck, ESA
- **Terrain Mapping (TM)**
Chair Prof. J. Peter Muller, UCL
- **Land Product Validation (LPV)**
Chair Dr. F. Baret, CNES
- **Atmospheric Chemistry (ACSG)**
Chair Dr. E. Hilsenrath, NASA

Status of WGCV

Progress Since the 19th Plenary

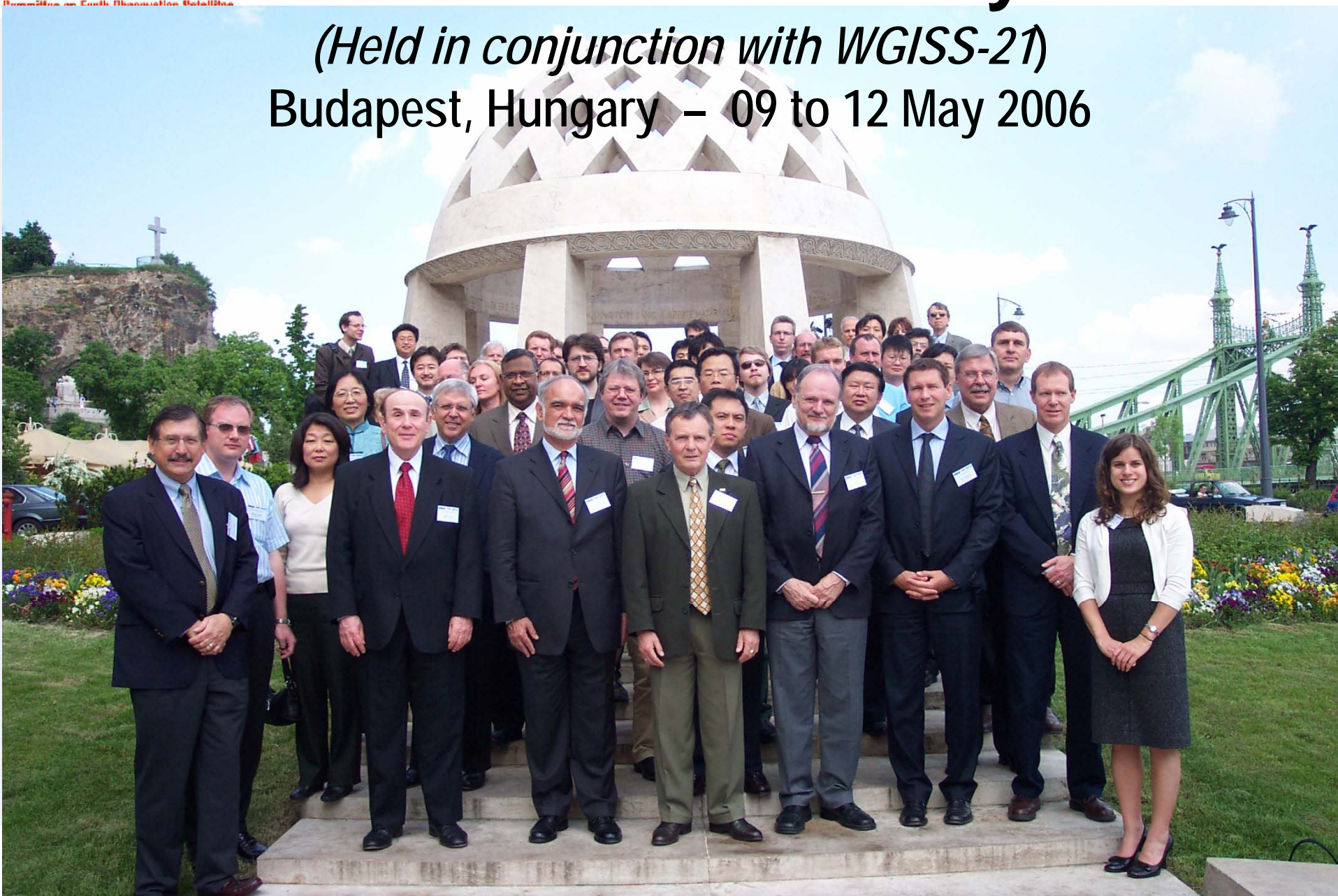
I am preparing a summary of the highlights of WGCV activities, which occurred during my tenure as chair, for inclusion in the next CEOS WGCV Newsletter. Today's report will be focused on the following three areas of critical interest to the plenary:

- Actions required to sustain the continued governance of the working group;
- Activities centered around achieving GEO-related tasks as set down by the CEOS SIT;
- Recommendations to the Plenary growing out of WGCV-25 and WGCV-26.

WGCV 25th Plenary

(Held in conjunction with WGISS-21)

Budapest, Hungary – 09 to 12 May 2006



CEOS WGCV 26th Plenary

Chiang Mai, Thailand – 31 Oct to 03 Nov 2006



31 10 2006



The 26th Working Group on Calibration and Validation Meeting

The Infrared and Visible Optical Sensors Subgroup Meeting

Chiang Mai, Thailand

October 30 – November 3, 2006



CEOS WGCV IVOS Meeting

Chiang Mai, Thailand – 30 October 2006

CEOS WGCV-26 Meeting Objectives

Select new “chair” to represent WGCV at CEOS and GEO venues and advocate on behalf of the international Cal/Val community.

Clarify WGCV role and activities in GEO Tasks as well as involve GEO Task members in WGCV.

Generate Action Items and Recommendations for CEOS-20 Plenary.

WGCV Leadership Candidates

- Chair November 2006-November 2008
 - Dr. Changyong Cao (NOAA/NESDIS)
- Vice Chair November 2006-November 2008
Chair November 2008-November 2010
 - Pascal Lecomte (ESA/ESRIN)

CEOS WGCV Subgroups

WGCV CHAIR (NASA) VICE CHAIR (ESA)

SAR (CSA)

IVOS (NPL)

MS (ESA)

TM (UCL)

LPV (CNES)

ACSG (TBD)

- **Synthetic Aperture Radar (SAR)**
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- **Land Product Validation (LPV)**
Chair Dr. F. Baret, CNES
- **Atmospheric Chemistry (ACSG)**
Chair TBD

CEOS WGCV-26 Agenda Overview

Tuesday, October 31, 2006

- Host Address, Normal Business, Subgroup Reports, Country and Agency Reports

Wednesday, November 1, 2006

- Complete Country Reports, Review/Generate Action Items and Recommendations for Plenary
- Status of WGCV contributions to GEO
- Detailed discussions of GEO tasks DA-06-02 and CL-06-02 followed by Breakout Sessions

Thursday, November 2, 2006

- Review previous day's activities and continue detailed discussions
- Generate Action Items and Recommendations based on the discussions of the GEO tasks

Friday, November 3, 2006 - **Wrap up and write up**



WGCV Participation *in GEO Tasks*

WGCV Participation in GEO Tasks

Task #	GEO'06 Specific Tasks by Societal Benefit Area	WGCV Role	WGCV Responsibility/Action	Organization
Agriculture				
AG-06-03	Begin production of products based on HR global land cover change data set. Propose mechanism for regular analysis/reporting of LCC	CONTRIBUTE	Establish the set of cal/Val procedures needed to meet the objectives	WGCV/LPV, NASA
AG-06-04	Assessment effort on forest / forest changes; Ensure appl. of standardized classifications and harmonization of existing datasets	CONTRIBUTE	Provide expertise as needed, to determine the cal/Val procedures and information, which must be included in the metadata. Provide guidance for, and assistance in, the retrospective calibration of data	WGCV/LPV, NASA
Biodiversity				
BI-06-05	Facilitate interoperability obs. network	CONTRIBUTE	Establish the EOS set of cal/Val procedures needed to meet the objectives	WGCV

WGCV Participation in GEO Tasks

Task #	GEO'06 Specific Tasks by Societal Benefit Area	WGCV Role	WGCV Responsibility/Action	Organization
Climate				
CL-06-01	Mechanism for reanalysis and reprocessing climate data	PARTICIPATE, PROVIDE EXPERTISE AS NEEDED	Provide guidance for, and assistance in, the retrospective calibration of Earth RS data	NASA, NOAA
CL-06-02	Establish actions securing the provision of key data for climate studies and forecasting from satellite systems	WGCV CO-LEAD	Establish the set of cal/Val procedures needed to meet the objectives	NASA, NOAA
CL-06-03	Establish framework for the preparation of guidance materials, standards for terrestrial EOS for climate. Coordinate mechanisms for terrestrial climate observations	PARTICIPATE, PROVIDE EXPERTISE AS NEEDED	Determine the cal/Val procedures and information, which must be included in the metadata to meet the objectives	WGCV/ACSG
CL-06-05	Coordinate with IPY to enhance the utilization of EO	PARTICIPATE, PROVIDE EXPERTISE AS NEEDED	Establish the set of cal/Val procedures needed to meet the objectives	WGCV/ACSG

WGCV Participation in GEO Tasks

Committee on Earth Observation Satellites

Task #	GEO'06 Specific Tasks by Societal Benefit Area	WGCV Role	WGCV Responsibility/Action	Organization
Data Management				
DA-06-02	Develop GEO data quality assurance strategy, beginning with space-based observations and evaluating expansion to <i>in-situ</i> observations	WGCV LEADING ROLE	Develop GEO data quality assurance strategy, beginning with space-based observations and evaluating expansion to <i>in-situ</i> observations	WGCV/IVOS + Others
DA-06-04	Facilitate development and harmonization of data, metadata, and products for basic maps, LC products	CONTRIBUTE	Participate and suggest appropriate LU classes and sources for DEM	WGCV
DA-06-09	Establish GEOSS Best Practices Registry	PARTICIPATE	Establish a cal/Val best practices registry consistent with the GEOSS Best Practices Registry	WGCV
Disasters				
DI-06-01	Encourage agencies to acquire data over tsunami regions	PARTICIPATE	Participate	
DI-06-05	Planning production for coastal zones: bathymetry, LU/LC high res. maps and DEM	SECONDARY ROLE	Participate and suggest appropriate LU classes and sources for DEM	WGCV/LPV& TM; NASA, NPL

WGCV Participation in GEO Tasks

Task #	GEO'06 Specific Tasks by Societal Benefit Area	WGCV Role	WGCV Responsibility/Action	Organization
Ecosystems				
EC-06-01	Support IGCO develop global C observations, particularly <i>in-situ</i> CO ₂	SUBSTANTIAL ROLE	Determine the cal/Val procedures and information, which must be included in the metadata. Provide guidance for, and assistance in, the retrospective calibration of data	ACSG
EC-06-02	Establish Ecosystems Classification Task Force to create a globally agreed classification scheme	CONTRIBUTE	Build on the WGCV LC scheme used for cal/Val as a straw man model for meeting wider community needs	WGCV/LPV, NASA
EC-06-03	Harmonization of observing methods	TERRESTRIAL PORTION	Establish the EOS/terrestrial set of cal/Val procedures needed to meet the objectives	WGCV/LPV, NASA and USGS
EC-06-07	Global network of organizations for ecosystems	PARTICIPATE, PROVIDE EXPERTISE AS NEEDED	Establish the set of cal/Val procedures needed to meet the objectives	WGCV/LPV, NASA

WGCV Participation in GEO Tasks

Task #	GEO'06 Specific Tasks by Societal Benefit Area	WGCV Role	WGCV Responsibility/Action	Organization
Water				
WA-06-04	Global data set mapping catchments	WGCV PROVIDE INPUT, SECONDARY ROLE	Participate and suggest appropriate LU classes and sources of data	WGCV/LPV; USGS
Weather				
WE-06-01	Advocate a complete stable surface-based Global Observing System (GOS)	PARTICIPATE	Provide expertise/advice as needed	WGCV

Road Map for proposed activities addressing task GEO DA-06-02

Phase 1	Planning (<i>develop strategies, determine elements/activities/tasks</i>)					
Phase 2	Implementation (<i>develop and/or establish a set of commonly accepted shared technical tools and inter-agencies collaborations and agreements</i>)					
Phase 3				Delivery (<i>present and explain to the community and distribute to CEOS member agencies</i>)		
	2006	2007	2008	2009	2010	2011
						2012

GEO Task DA-0602,

Activities required by the GEO 2006 Work Plan

- Define standards for quality assurance of at sensor measurements and derived products: *Quality assurance should include both Calibration of the at satellite measurements and validation of the products. The satellite agencies QA strategy for future missions should include the products (spectra/instrument, data) higher and lower requirements.*
- Specify document content requirements for Earth Observation sensors and methods used to derive level 1, level 2 (geophysical) and higher level products: *The QA process will be approached initially by WGCV at the data category level, and the measurement and instrument higher and lower requirements will be listed. The process is to be conducted initially by WGCV/SGs and then to be summarized at the WGCV/SG level (Action Item WGCV26-5). The initial progress of the SGs is to be reported at WGCV27, in preparation for the Cal/Val workshop planned for October 2007.*
- Create and maintain an internet-accessible information data base containing all information from (4.2) and (4.1); - Cal/Val portal. *In preparation Joint GEO/CEOS Workshop on Cal/Val Processes has been scheduled for October 2007 (Joint WGCV25/WGISS21 to 20th CEOS plenary, Appendix 2).*

GEO Task DA-0602, Activities required by the GEO 2006 Work Plan

- Define standards for quality assurance of at sensor measurements and derived products: *WGCV25/WGISS21 to 20th CEOS plenary, Appendix 2*).
- Provide/publish reference methods in a readily accessible form and including pre-flight characterisation, vicarious calibration, radiative transfer computation, post-launch activities, calibration sites...etc. *WGCV suggested cal/val practices web page will be added to the WGCV site where WGCV adopted documents will be posted initially. Consequently, the materials will be transferred to the Cal/Val portal when ready (Action Item WGCV26-1, Appendix 2).*
- The CEOS virtual constellation will be used as a test bed for assessing the strategies developed through the preceding activities.
- The approach developed for space observations will expand to *in situ* observations.

WGCV Recommendations to CEOS 20th Plenary

WGCV-26 Recommendation 1:

Request that all CEOS members ensure that all future missions include a quality assurance component, stating the products higher and lower accuracy requirements.

WGCV-26 Recommendation 2:

CEOS recommends that member space agencies coordinate efforts with existing cal/val archives and that member agencies supply the necessary resources to implement the requirement to establish uniform data protocols for collecting, archiving, and accessing validation data across Earth science disciplines.

WGCV-26 Recommendation 3:

CEOS requests that their *operational* member agencies (e.g. WMO, NOAA, EUMETSAT, USGS, etc.) devise a comprehensive cal/val plan that meets the needs of the *extended* (e.g. research) user community.

WGCV Recommendations to CEOS 20th Plenary

WGCV-26 Recommendation 4:

CEOS requests that all member agencies:

- provide support to perform additional ground measurements for direct validation, taking advantage of already existing networks;
- prepare subsets of data/products for global land product inter-comparisons, as described by CEOS/WGCV/LPV;
- support the actual processing of these data sets and the dissemination of the corresponding validation results.

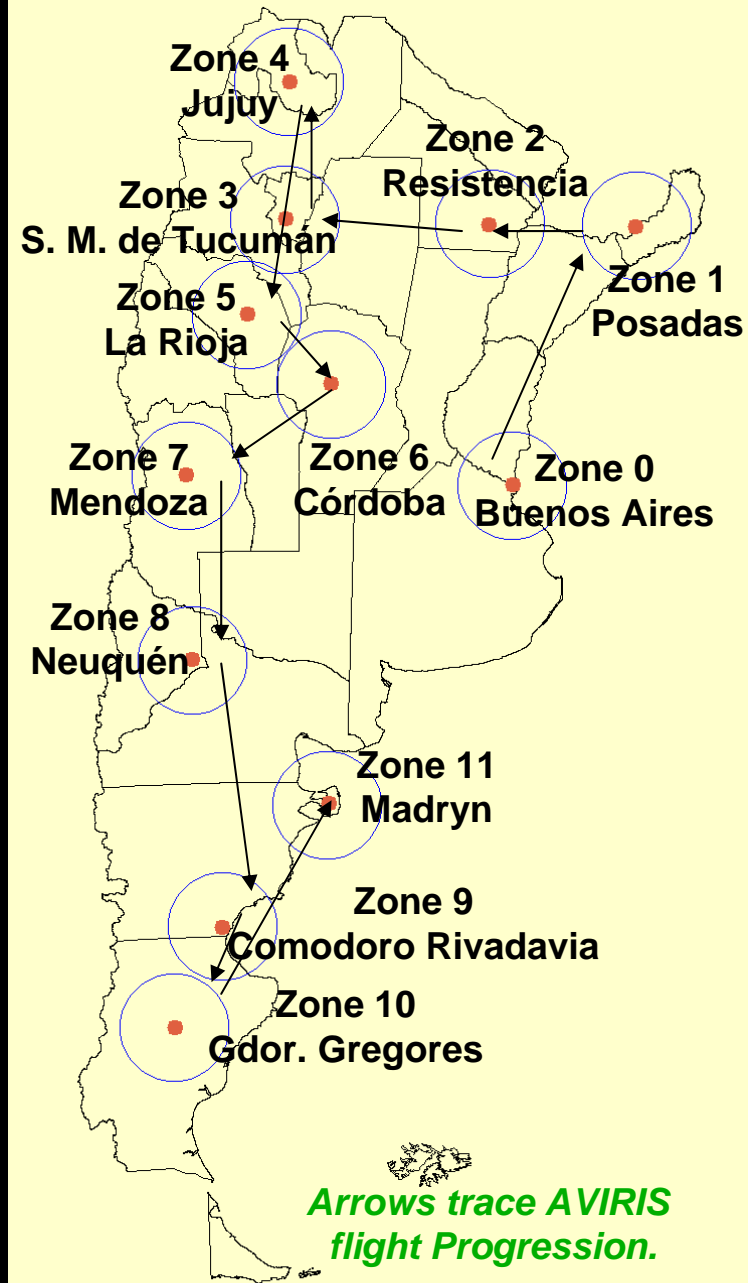
Joint WGCV-25/WGISS-21 Request/Recommendation:

Request CEOS endorsement of a joint GEO/CEOS Workshop on Cal/Val Processes (to be held in October 2007 at the GEO Secretariat in Geneva). Recommend CEOS encourage continued support by appropriate members to address issues associated with the operationalization of capabilities developed by the CEOS WTF and the ESA Cal/Val Portal.

EO-1 Accelerated Mission Southern Hemisphere Field Campaigns *January – February 2001*



AVIRIS Twin Otter Aircraft



Argentina/AVIRIS Sites

The EO-1 2002 Field Campaign

Salar de Arizaro - 11 Dec. 2002



Why does Steve wear a hat?

