WGCV Microwave Sensors Subgroup

September 2003 Report

Last Meetings of the Subgroup

The CEOS WGCV Microwave Sensors Subgroup (MWS) called in for a meeting during last IGARSS 2003 conference held in Toulouse, last 21-25 July. The main subject of this meeting was Chapter 3 of the document on terminology, which deals with Polarimetric Radiometers.

The previous meeting of the subgroup had happened during the 2nd International Microwave Radiometer Calibration Workshop (μCal-2002) and CEOS WGCV Meeting in Barcelona, during last October 9-11, 2002. The main objective of this MWS meeting was the preparation of the document on "Frequently Used Terms in Microwave Radiometry", as well as the discussion on two recommendations to the CEOS plenary (see below).

Progress since Last Meeting

As an outcome of the meeting during IGARSS 2003, Chapters 1 through 3 of the document on terminology (general, real aperture and polarimetric radiometry) are now in its final form, that means, its contents being "accepted definitions" by the experts (contact: Janne.Lahtinen@esa.int). Chapter 4 on interferometric radiometers is still at a "proposed definition" level, but it is likely to advance quickly in the context of the eventual approval of ESA's SMOS mission Phase C/D.

During μCal-2002, the MWS prepared two recommendations that were presented at the WGCV-20 meeting in Hobart (Australia). These were:

> ***Recommendation 1:*** *The Microwave Sensors Subgroup of the CEOS Calibration and Validation Working Group recommends that all future missions carrying a microwave radiometer are designed to allow the view of the cold sky of its primary reflector at least twice in the whole mission taking into account its value against its cost. A survey of ground sites where the sky is observed at different microwave frequencies of interest in Earth remote sensing should be done (useful at lower frequencies).*
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> ***Recommendation 2:*** *The Microwave Sensors Subgroup of the CEOS Calibration and Validation Working Group recommends that an analysis of available microwave radiometer records over different potential cal / val areas of the World is performed, in particular Dome-C in Antarctica (for radiometers in its view), deserts, tropical rain forest and the oceans. Presently flying radiometers should continue gathering data on these areas of interest to continue the research on their suitability as cal/val sites for long-term applications. Study on stable areas on the Earth surface suitable for radiometer inter-calibration purposes should be pursued.*

WGCV-20 considered that the wording of both recommendations had to be amended to include the cost and risk impact to the missions, and to clarify the driving reason for each of them.

To date, these recommendations have not been discussed further within MWS, and so there is no further progress into their amendment. This subject will be included in the agenda of next MWS meeting.

Next Meeting

The next meeting of the MWS group is expected to take place in coincidence with the 8th Specialist Meeting on Microwave Radiometry and Remote Sensing Applications, 24-27 February 2004, in Rome, Italy.

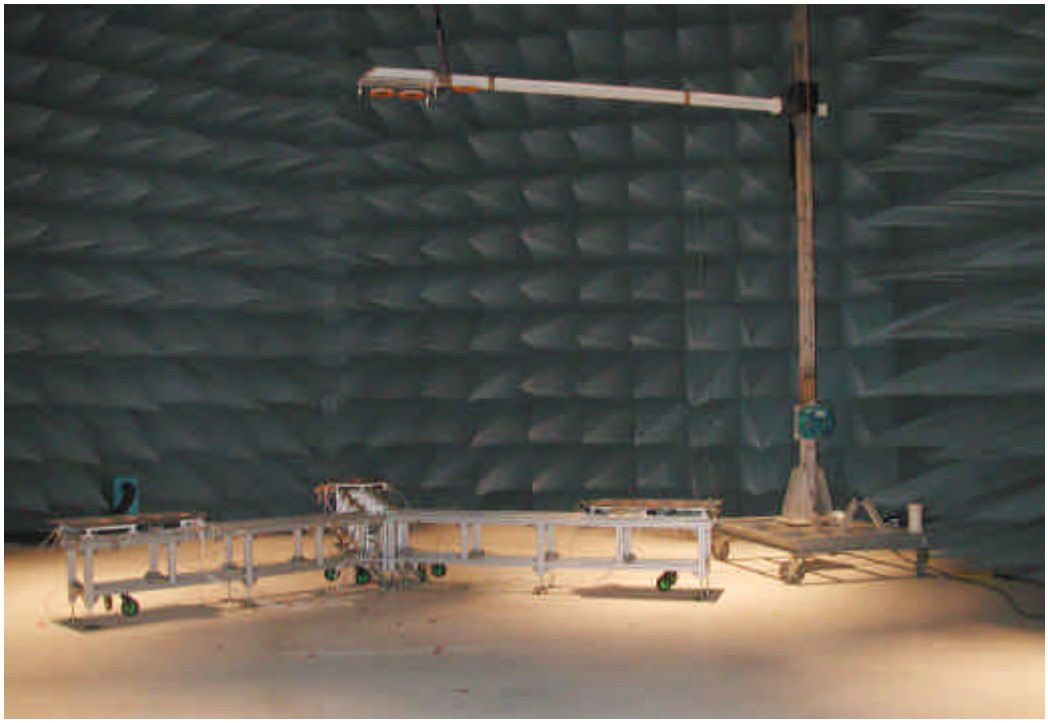
Main subjects will be the rewording of the above recommendations and Chapter 4 on interferometric radiometers of the document of terminology.

Technical News:
Advance in the Calibration of Interferometric Radiometers

Some image validation tests have been carried out with ESA's MIRAS (Microwave Imaging Radiometer with Aperture Synthesis) prototype in a EMC chamber of INTA (Spain).

Techniques for the calibration of the planarity of the arm as well as several electrical imperfections (offsets, in-phase and quadrature errors) have been proved successfully. MIRAS produced an image of the warm absorber of the EMC chamber with an accuracy better than 3 K in accordance with expectations.

Arm deployment demonstration for planarity calibration measurements. (EADS-CASA courtesy)



MIRAS during the EMC image validation tests
(INTA Courtesy)

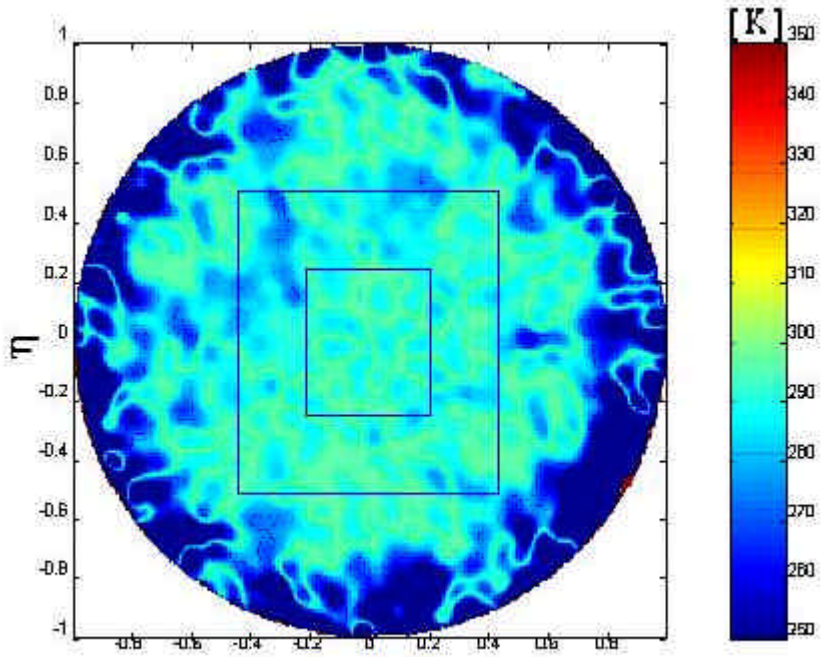


Image of the EMC chamber obtained with MIRAS.
(EADS-CASA Courtesy)

In addition some work has been carried out to calibrate the polarimetric noise injection radiometer of the same MIRAS instrument, both in terms of accuracy and linearity. Special techniques to calibrate the 3rd and 4th Stokes parameters readings are being developed. Some results for the 1st and 2nd Stokes parameters were presented during IGARSS 2003 in Toulouse earlier this July.