

EARTH SCIENCES DIVISION (EEM-FS)
DIRECTORATE OF EARTH AND ENVIRONMENT MONITORING FROM SPACE

date	reference	number of pages
11 September 2001	EEM-FS/0475/MB-dr	Page 1 of 13
from	M. Berger (EEM-FSL)	Telephone: +31 71 565 Fax: +31 71 565 5675 e-mail: Michael.Berger@esa.int
to	Members of the SMOS Science Advisory Group (distribution list attached)	
	Dr. P. Waldteufel, ISPL, F	Fax: (33) 1 3925 4822
	Dr. G. Lagerloef Earth and Space Research, Seattle, WA, USA	Fax: (1) 206 726 0524
	Dr. D. Le Vine, NASA GSFC, Greenbelt, MD, USA	Fax: (1) 301 614 5558
	Dr. T.J. Jackson USDA ARS Hydrology Lab, Beltsville, USA	Fax: (1) 301 504 8931
c.c.:	ESA HQ: C. Mastracci (D/EEM)	
	ESRIN: S. Briggs (EEM-A), W. Lengert (EEM-AM), J. Benveniste (EEM-AEU)	
	ESTEC: A. Ginati (EEM-F), E.A. Herland (EEM-FS), A. Tobias (EEM-FP), P. Silvestrin (EEM-FPP), M. Rast (EEM-FSL), E. Attema (EEM-FSS), N. Floury (TOS-EEP), M. Borgeaud (TOS-EEP), P. Wursteisen (EEM-FSS), M. Martin-Neira (TOS-ETP), P. Baptista (TOS-EEP), H. Rebhan (EEM-FSO), A. Hahne (EEM-PTO), M. Drinkwater (EEM-FSO), S. Ribo (TOS-ETP)	

Subject: **Minutes of the 6th SMOS SAG meeting held at ESTEC,
27 & 28 June 2001**

Dear Colleague,

Enclosed you will find the minutes of the sixth SMOS SAG meeting held at ESTEC, 27 and 28th June 2001.

Please note that this document is available in PDF format for downloading on our ftp server.

The next SMOS SAG meeting is scheduled for 24 & 25 September 2001 at ESTEC with the objective to review the Soil Moisture objectives of the mission.

Should you have any questions concerning the minutes, please feel free to contact me.

Yours sincerely,

Dr. M. Berger
Land/Surfaces Unit
Earth Sciences Division

**MINUTES OF THE
SIXTH
SOIL MOISTURE AND OCEAN SALINITY (SMOS) MISSION
SCIENCE ADVISORY GROUP MEETING**

27 & 28 June 2001

ESTEC/ESA, The Netherlands

Participants: Y. Kerr, J. Font, N. Skou, M. Greiner (representing M. Peichl), M. Hallikainen, P. Waldteufel (part time), P. Ferrazzoli, G. Lagerloef, D. LeVine

Excused: M. Peichl, T. Jackson

Guests (28th): A. Camps, J. Boutin, J. Etcheto, J. Johannessen, P.-Y. Le Traon, C. Gabarro, M. Vall-llossera

ESA: A. Hahne (part time), P. Silvestrin, M. Martin-Neira (part time), N. Floury (part time), S. Ribo (part time), H. Rebhan (part time), P. Wursteisen (part time), M. Rast (part time), M. Drinkwater (part time), Jerome Benveniste (part time), M. Berger.

1. Welcome and Introduction – Objectives of the Meeting

M. Berger welcomed the SMOS SAG members to their 6th Meeting.

T. Jackson and M. Peichl were excused. M. Peichl was represented by M. Greiner.

J. Benveniste from ESRIN introduced himself to the SAG.

The objectives of the meeting were:

- to discuss the salinity objectives of the mission, and
- to review related activities.

2. Approval of Draft Agenda

M. Berger outlined the rationale of updating the agenda as circulated before the meeting. In agreement with the LIs it was decided to keep the first day of the meeting exclusively for SAG members and to have the invited presentations for the OS objectives review at the second day of the meeting.

P. Silvestrin proposed to discuss the sampling/dwell time strategy and the A/D offset correction strategy within a small group interested in technical aspects of the mission offline.

It was agreed to cover the following topics under AOB:

- SMOS Science Report
- Preparation of the 3rd SMOS WS
- The full polarimetric mode (presentation by M. Martin-Neira and S. Ribo)
- Image validation test (presentation by S. Ribo)
- ELDAS (presentation by P. Viterbo)

It was also agreed to start discussions on higher level OS data product at this meeting.

The agenda was adopted accordingly.

3. Actions from the Last Meeting

No.	Category	Subject	to	due	Status
1.17	Camp. Doc	To keep master copy	NS		On-going
1.18	Camp. Doc	To send inputs/comment to NS	all		On-going
1.26	Promotion	To provide planned promotion activities to MB	all		On-going
1.27	Promotion	To generate/update list of planned promotion activities	MB		On-going
2.4	Promotion	To provide publications to MB for archiving	all		On-going
2.13	Camp. Doc	To circulate updated version for further reviewing	NS		On-going
2.20	Studies	To circulate schedule of planned campaigns	NS		On-going
3.5	Faraday	To simulate Faraday effects over DOME-C	NF		On-going

3.6	Faraday	To analyse short-scale Faraday effects	NF		On-going
4.17		To report on further COST activities relevant for SMOS to the SAG	MH		closed
2.15	Instrument	To draft requirements for short term stability	PW	20/6	On-going
3.9	Promotion	To draft GEWEX article	YK/PV /GL	20/6	open
4.2	Calibration	Review draft calibration document as circulated by PhW during the SAG meeting	all	20/6	open
4.7	Collaboration	To evaluate Japanese activities for OS	GL	20/6	closed
4.18	System	Define the characteristics of the scenes to be made in OS and SM	MP	???	closed
4.19	Reconstruction	Simulated test scene (Ocean and Land) to MP	GL/YK	1/7	closed
5.1	Campaigns / Collaboration	To contact Joe Comiso for an outline of the Antarctica campaign planned for 2003 and to check possible collaboration	DV	20/6	open
5.2	Studies	To check if monthly reports of all SMOS related studies could be provided to YK and JF	MB	20/6	closed
5.3	Studies	To ask B. v.d. Hurk for a copy of the ELDAS proposal for YK	MB	20/6	closed
5.4	ITU issues	To provide B. Rommen with the note describing the freq. requirements for SMOS	MB	30/4	closed
5.5	ITU issues	To provide update of ITU document 7C when available to the SAG	BR		closed
5.6	ITU issues	To distribute ESA article SFCG-20 to the SAG	MB	30/4	closed
5.7	Promotion	To distribute current SMOS logo	YK	30/4	closed
5.8	Promotion	To comment on SMOS logo	all	20/6	closed
5.9	Campaigns	To contact A. Camps for a WISE presentation at the next SAG meeting	MB	30/4	closed

Remarks:

Actions 1.17-3.6: It was agreed to shorten the list by merging similar actions

Action 4.17: M. Hallikainen reported that there are no further COST actions planned

Action 4.2: The action was changed to: N. Skou, to contact C. Ruf asking for the status of the 'calibration document'

4. Status of the Project and Next Steps

SEPA and SEPS:

Under this agenda item P. Silvestrin summarised the industrial extended Phase A, SEPA and the SMOS End-to-end Performance Simulator activities, SEPS. He informed the SAG that the preparation of Phase B/C/D will start this summer. Early kick-off of Phase B is expected in April/May next year. In order to keep momentum activities in a transition phase are being prepared.

He also informed the SAG about the option of a SEPS MS WINDOWS version. The SAG expressed strong interest. He further informed that an SEPS β -version is expected being available in July. Y. Kerr, J. Font, M. Hallikainen, Ph. Waldteufel and David Le-Vine are interesting in testing the β -version. Comments on the software performance will be provided to P. Silvestrin.

Baseline mission and SAG recommendation:

Y. Kerr and P. Silvestrin explained the SAG the rational of selecting a 3x6 configuration as the baseline configuration. The reasoning was well accepted by the SAG. It was agreed to consider the recommendation R5.1 as obsolete.

MDPP update:

M. Martin-Neira reported on the various MDPP activities:

LICEF-1

The two LICEF-1 units have been completed and end-to-end tested, both in the laboratory and in an anechoic chamber at UPC. Results are nominal, i.e. required similarity between receivers has been achieved. The LICEF-1 units have been further protected for operation in outdoor conditions (Image Validation Test - 1) and have been equipped with proper buffers and control circuits to be easily operated and connected to DICOS-3, the correlator unit.

DICOS-3

A correlator unit designed specifically for the Image Validation Tests using the LICEF-1 receivers has been completed by Astrium GmbH, and delivered to MIER for integration with the LICEF-1 receivers. DICOS-3 can perform all correlation pairs from the two LICEF-1 I and Q outputs and in addition has the capability to perform fringe-washing and 0-1 correlations.

MIRAS Demonstrator Pilot Project - 1

A deployment demonstration was shown to ESA people at CASA premises, in ambient conditions. Everything worked nominally. Plenty of data on the mechanical behaviour of the mechanisms, friction, torques, angular accuracy, etc. were gathered for further processing.

The LICEF-2 antennas are manufactured. The first measurements show no deviation with respect to prototype. The four antennas will be fully tested in CASA's anechoic chamber stand alone. Intermediate layer behaves as expected.

LICEF-2 electronics are in progress. The MMIC circuits are undergoing electrical test as well as thermal tests, the latter providing experimental inputs for Phase-A study in relation to instrument stability and calibration issues. Critical components such as LNA, Mixer and RF amplifier have improved performances over LICEF-1 circuits.

MOHA-2 (Optical Harness) is under test but has experienced some delay due to technical difficulties on FODRU operation in the end-to-end tests. MOHA-2 is expected to be finished by end of July.

CAS-2 (calibration system) tests have been almost completed. Only tests missing are the noise source stability measurements, which had been delayed due to difficulties in the electrical ground support equipment.

November is still the date for chamber tests of the full demonstrator.

MIRAS Demonstrator Pilot Project - 2

PM-1 happened successfully. ITT packages for the Band Pass Filter (BPF-2) and the DICOS-2 (Correlator unit) were prepared and issued. The Noise Injection Radiometer (NIR) was

reviewed and a new architecture proposed which is much better in terms of building NIR from LICEF, a system requirement. Deployment demonstration design is well advanced. Image validation test definition is in its preliminary phase.

Image Validation Test - 3 using the LICEF-1 receivers

UPV (Valencia University) has selected a football field with a water sprinkling system for the soil moisture Image Validation - 3 tests.

HUT-2D Image Validation update:

M. Hallikainen reported on the current status of the HUT-2D airborne demonstrator development.

He informed the SAG that there is a delay in building the instrument. Airborne test flights are now foreseen for March/early April next year. A report on the test flights should be provided to ESA on the 20th of April.

To demonstrate the 2-D interferometric concept before the Phase-A review it is planned to simulate the concept by moving two units (4 receivers each) on a tower in a T-like configuration. Image delivery to ESA is due 19th of Oct 2001.

The SAG expressed concerns about this image validation experiment since it will not proof the coupling of the receivers. In addition similar experiments were already conducted by other groups. The SAG recommended a fixed T-configuration with low spatial resolution and to focus the experiment on coupling issues. M. Hallikainen noted that this experiment is also included.

Report on the 2nd Inter-Agency Meeting:

M. Berger reported on the outcome of the 2nd Inter-Agency Meeting which took place at ESA HQ, Paris, 21 May. The findings could be summarised as follows:

- The results for the SM objectives are encouraging but validation with airborne and ground data is still outstanding. Further, it was found that the first results of the campaigns and studies related to the SSS objectives are optimistic but more work remains to be done in particular on the models/retrievals improvements.
- Assuming Phase-B activities will be kicked-off in April 2002, a launch date end of 2005/beginning of 2006 is feasible under optimistic assumptions.
- The definition of the Ground Segment has to be started. The scheme as outlined in the proposal needs to be elaborated.
- A 3x6 configuration is the baseline configuration and is compatible with the Proteus bus. X-band could be needed and is subject for further discussions.

It was also noted that the HUT-2D image validation should not invalidate the scientific review.

Phase-A Scientific Review:

M. Berger outlined to the SAG the scheme of the scientific Phase-A review, which is basically following the 'CRYOSAT example'.

The ESAC Scientific Peer Review Panel, chaired by an ESAC member and consisting of two external scientists and an ESA secretary will be supported by two SAG members complementing the expertise of the group. It is planned to invite the group to the PRR and the SMOS workshop. A draft assessment report should be available early January for ESAC review.

5. Campaigns

EuroSTARRS:

M. Berger reported on recent developments in defining and organising the EuroSTARRS campaign (see previous minutes).

Aircraft operations by the Spanish INTA institute had to be disregarded due to high cost for aircraft modifications which would have been necessary to mount the STARRS radiometer. Alternative options were evaluated and it seems that DLR could do the aircraft operations. A campaign pre-meeting to finalise instrument exploitation, aircraft operations and data processing is planned for 9th/10th of July.

Avignon:

Y. Kerr reported that measurements with the TUD radiometer mounted on a crane are on-going till end of July. First results are not being expected before end of summer/beginning of autumn.

Toulouse:

Y. Kerr also reported on the activities at the Toulouse site. The site is ready and the team is waiting for the radiometer, which currently is being build. The radiometer should be available by the end of this year.

Others:

It was stressed by Y. Kerr to start discussions on a possible US-EU joint campaign in the Antarctica as soon as possible in particular considering the difficult logistics which need to be sorted-out well in advance.

6. Support Studies

Update on the Salinity Data processing Study

N. Floury reported on the salinity data processing study. The activity has been kicked off on July 2nd. The study should rely on the results of the on-going Salinity Requirements study to advance the modelling aspect, to deal with specific issues related to SMOS (impact of errors in auxiliary data, natural cal/val areas) and to propose inversion and assimilation tools adapted to SMOS measurements. The first progress meeting is scheduled for November 2001.

Update on the Soil Moisture Requirement Study

M. Berger reported on the status of the soil moisture study, which is at full swing now after some contractual problems at the beginning. Currently the study team is busy with forward modelling which should be finished by the end of the summer. The 2nd progress meeting is planned for November. It is also planned to invite the study team for presenting first results to the SAG at the next SAG meeting.

Update on the Soil Moisture Retrieval Study

M. Berger informed the SAG that the statement of work is finalised and all administrative paperwork was done. It is being expected that an ITT will be released within the next few days.

7. AOB*SMOS Science Report:*

M. Berger outlined the scope of this document to the SAG. It should serve as a reference document for the scientific community to learn what the SMOS mission is all about and what could be expected from the mission. A. Hahne distributed the GOME Science Report as an example.

It was stressed that a lot of effort is required to produce the Science Report and that actions should be identified already now. In the discussion the following tentative list of content and the responsible book-captains (underlined) as well as the supporting authors were agreed.

Science Report Content:

Introduction (Background, The Underlying Scientific Rationale, The Observation Principle)

Y. Kerr

Scientific Objectives and Mission Requirements:

- Introduction
- Soil Moisture Y. Kerr, P. Viterbo, P. Ferrazzoli
- Ocean Salinity J. Font, N. Skou, G. Lagerloef
- Cryosphere M. Hallikainen, Y. Kerr

Mission and System Overview P. Silvestrin, A. Hahne

Instrument Concept P. Silvestrin, A. Hahne, M. Martin-Neira

Characterisation and Calibration (on-board, vicarious)

A. Hahne, P. Silvestrin, Ph. Waldteufel,
M. Martin-Neira (possible support by C. Ruf)

Scientific Data Processing, Data Products and Validation

- Soil Moisture A. Hahne, Y. Kerr, P. Ferrazzoli
- Ocean Salinity A. Hahne, J. Font, G. Lagerloef, N. Floury

Concluding Remarks Y. Kerr, J. Font

It was further agreed to produce a first draft version until the 15 November which should be discussed in detail at the SAG meeting planned for December.

Preparation of the 3rd SMOS WS:

Although dates of the WS collide with the AGU conference it was decided to organise the WS on 10th to the 12th of Dec, starting 10th Dec noon. M. Berger will sort out logistics with M. Peichl and evaluate ESA support. In the discussion it was agreed that it would be a good idea to organise a splinter on Cryosphere to furthering this mission objective. Invited keynote speaker might be helpful to draw the attention of this community. M. Drinkwater was asked to inform the community and to try to get them interested. Y. Kerr and M. Berger will iterate on an agenda which should be distributed before the summer vacations.

The full polarimetric mode:

A proposal for the full polarimetric mode of MIRAS was presented by M. Martin-Neira and S. Ribo. Key issues is a double sequence 123-4 of the pol-switching scheme with equal integration time for 123 than for 4. Interlacing has to be applied within 123 and DICOS-2 is being requested with such flexibility. The pol-switching sequences swap H and V every 1234 cycle, to balance sensitivity in all 3 final images HH, VV and HV.

Software simulations of point sources were shown which led to the proposed full polarisation scheme.

Image validation test

S. Ribo reported on this activity. The mechanical structure is being built in the mechanical workshop at ESTEC and is almost finished. LICEF-1 and DICOS-3 are expected to arrive to ESTEC the 9th of June from MIER. The measurement location will not be ESTEC due to RFI. The measurement will take place during the second half of July. Data processing is expected to take place in September.

ELDAS:

P. Viterbo outlined the objectives and scheme of the European Land Data Assimilation System study, which recently was approved by the EC. It was noted that this study could support the advancement of the underlying science of SMOS and prepare the modeller community for SMOS data. The approval of the ELDAS study by the EC thus is highly appreciated by the SAG.

8. Date and Place of the Next Meeting

During the meeting the 25th/26th of September were agreed for the next SAG meeting. In the meantime it proofed that there will be no meeting room available at ESTEC for the 26th. It therefore was decided, after re-checking the availability of the SAG members, to re-schedule the meeting for the **24th and 25th of September**.

The main objectives of the meeting will be the review of the Soil Moisture objectives of the mission and all related activities.

9./10. Review of the salinity objectives / Discussions

Various presentations (see agenda) were given by the study and campaign teams. Discussions covered emissivity model discrepancies, wind effects (roughness, azimuthal dependency, influence of foam due to different sea spectra), diurnal sea temperature variations and higher level data products. Later proved to be in a very pre-mature status and only very vague and diffuse ideas exist in the community. This topic therefore needs to be re-addressed in the forthcoming SAG meetings.

Discussion on the OS requirements concluded to change the present requirement as stated in the MRD to the original requirement (0.1psu / 200km / 10 days) and to outline that even data with coarser temporal and spatial resolution may have a large impact.

11. Summary and conclusion

Since the meeting had to be closed under time pressure, it has been decided to summarise the findings of the meeting at the forthcoming meeting and to discuss further actions required to improved/solve the various issues related to the Ocean Salinity objectives.

M. Berger stressed that although the presentations outlined the many problems still existing for the OS retrievals, lots of progress was achieved during the last year. On behalf of the SAG and the Agency M. Berger thanked the study and campaign teams for their effort and the presenters for their excellent presentations.

List of Actions:

No.	Category	Subject	to	due	Status
1.17	Camp. Doc	To keep master copy/ circulate updates	NS		On-going
1.26	Promotion	To provide planned promotion activities/publications to MB	all		On-going
3.5	Faraday	To simulate Faraday effects over DOME-C	NF		On-going
3.6	Faraday	To analyse short-scale Faraday effects	NF		On-going
2.15	Instrument	To draft requirements for short term stability	PW	20/6	On-going
3.9	Promotion	To draft GEWEX article	YK/PV /GL	20/6	open
4.2	Calibration	To contact C. Ruf and asked him about the status of the calib. document	NS		
5.1	Campaigns / Collaboration	To contact Joe Comiso for an outline of the Antarctica campaign planned for 2003 and to check possible collaboration	DV	20/6	open
6.1	Reconstruction	To present simulated scenes at the next SAG	MP	24/9	
6.2	ITU issues	To provide documents related to RFI	GL	31/8	
6.3	Promotion	To circulate updated SMOS logo	YK	31/8	
6.4	Simulator	To provide PS with improved simulated land scenes	YK	asap	
6.5	Campaigns	To further update the SAG on the ESTAR Trans-Atlantic flight	DV	24/9	
6.6	SMOS WS	To encourage key scientists of the Cryosphere community to attend the WS	MD	31/8	
6.7		To circulate WS information to the SAG (special session on salinity)	GL	27/7	
6.8	SMOS WS	To draft WS agenda and send out invitations	YK/M B	asap	
6.9	Promotion	To circulate format instructions for the Science Report to the SAG	MB	31/8	
6.10	MRD	To update MRD on OS requirements	JF/GL	31/8	
6.11	Data Products	To analyse required number and locations of incidence angles for level 1b data product	PhW	24/9	