

MISSION EXPERTS DIVISION (EOP-SM)  
DIRECTORATE OF EARTH OBSERVATION PROGRAMMES

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<b>to</b>	Members of the SMOS Science Advisory Group (distribution list attached)	
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<b>Subject:</b>	<b>Minutes of the 12<sup>th</sup> SMOS SAG Meeting held at CESBIO, Toulouse, France, 24 &amp; 25 July 2003</b>	

Dear Colleague,

Enclosed you will find the minutes of the twelfth SMOS SAG meeting held at CESBIO, Toulouse, France on 24 and 25 July 2003. Please note that this document is also available on the SMOS SAG ftp server. The version on the ftp site also contains the presentation viewgraphs used during the meeting.

I already now would like to ask you to mark the dates for our next SAG meeting which will take place at ESTEC, **1-2 October 2003**. It is planned to combine this meeting with the final presentation of the *Soil Moisture Retrieval* study, scheduled for **3 October 2003**. An invitation and a draft agenda will be send to you in due time.

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

Yours sincerely,

Dr. M. Berger  
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**MINUTES OF THE  
TWELFTH  
SOIL MOISTURE AND OCEAN SALINITY (SMOS) MISSION  
SCIENCE ADVISORY GROUP MEETING**

**24 & 25 July 2003**

**CESBIO, Toulouse, France**

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

Excused: G. Lagerloef, T. Jackson

Guests: A. Camps (part time)

ESA: H. Rebhan, N. Floury (part time), M. Berger

### 1. *Welcome and Introduction - Objectives of the Meeting*

Y. Kerr and M. Berger welcomed the SMOS SAG members to their 12th SMOS SAG meeting which was organized as a side meeting during the IGARSS Symposium.

G. Lagerloef and T. Jackson were excused.

The main objectives of this meeting were:

- to inform the SAG on the status of the project,
- to discuss the impact of the -3 and -6 receivers configuration,
- to discuss the upgrade of the SEPS software.

### 2. *Approval of Draft Agenda*

M. Berger introduced the draft agenda.

The agreed agenda is attached to the minutes (Annex A).

### 3. *Actions from the Last Meeting*

Action items from the last meeting were reviewed and their status updated.

No.	Category	Subject	to	due	Status
1.26	Promotion	To provide planned promotion activities/publications to MB	all		On-going
3.9	Promotion	To draft GEWEX article - PV and GL to provide inputs	YK/PV/ GL	15/9	Re-issued
6.10	MRD	To update MRD on OS requirements	JF/GL	30/9	Re-issued
8.6	Cal/Val	To draft a calibration scheme and a validation plan	YK	30/9	Re-issued
8.13	Science Report	To draft Science Report	MB	30/9	On-going
9.3	Studies	To draft requirements for an assimilation study	PV	30/9	Re-issued
10.4	Instrument	To provide a TN/presentation on the validity of NIRs to the SAG at their 13 <sup>th</sup> meeting	MMN	2/7	Re-issued
10.5	Cal/Val	To forward draft ELDAS validation plan to YK	PV	1/9	Re-issued
10.6	Cal/Val	To provide detailed feedback to the draft cal/val document which will be distributed by YK	SAG	1/11	Open
11.1	Camp. Doc.	To provide Y. Kerr with the summary paper of the EuroSTARRS/WISE/LOSAC campaign workshop	MB	15/3	closed
11.2	Requirements	To draft a TN outlining orbit requirements	BD/MB	1/4	closed
11.3	SMOS WS	To invite SEPS developers to the WS	YK	15/3	closed

11.4	SMOS WS	To provide YK and AH with a list of SEPS users	MB	15/3	closed
11.5	Studies	To send the GOCE ATBD to the SAG	MD	1/4	open
11.6	GS	To provide inputs to YK's draft GS processing scheme	SAG	1/4	closed
11.7	Promotion	To liaise with YK and JF on a list of research topics for the Portuguese call for outline proposals	MB	15/3	closed

Remarks:

**Action 10.4:** M. Martin-Neira will be asked to give a presentation outlining the functioning of the NIRs at the next SAG meeting. In this context the question came-up in how far N. Skou is involved in the NIR review board. M. Berger will ask Kevin McMullan (**AI: 12.1**).

**Action 11.5:** M. Berger will ask M. Drinkwater to distribute the GOCE ATBDs to the SAG.

#### **4. Project Status**

Representatives of the project could not attend the SAG meeting because of an industrial project progress meeting that took place in parallel to the SAG meeting.

The SAG was informed about the next steps to be taken to proceed to Phase C/D. Industry currently is preparing the Phase C/D proposal. ESA is preparing documentation for the PB-EO meeting scheduled for end September.

Ph. Waldteufel reported on ideas for the GS. Up to level 2 will be processed at Villafranca. Level 3 and 4 products will be processed at dedicated Science Centres (Centres of Excellency). CNES expressed interests to also support the OS processing in their centre.

In the discussion it was mentioned that the Villafranca X-band antenna is also used for other purposes than for SMOS data telemetry. The availability for SMOS indicates a loss of 10-20% of data which is considered unacceptable. It was agreed to make the Project aware of this. The use of the antenna for other purposes for a time as long as needed for deep sky calibration (1 orbit out of 200) is considered acceptable (about 0.5% data loss).

#### **5. Discussion on the Impact of the -3 and -6 Configuration**

Y. Kerr summarized the current discussions and findings of the -3 and -6 receiver configuration. According to the Project no decision has been taken yet but it is likely that the -3 receiver configuration is being favoured because of weight and power saving as well as due to mechanical aspects in accommodating the receivers on the hub.

In the discussion it was recommended to use SEPS to analyse the impact on particular ocean scenes. In addition a detailed risk assessment of the loss of redundant receivers should be performed. Considering that the gain in weight is only marginal the SAG requests additional

information on the rationale of dropping receivers in particular for the -3 configuration where the benefit seems to be minor (see **R12.1**).

## **6. Discussion on the SEPS Upgrade**

A. Camps from UPC introduced the new SEPS version which is planned to be released in October. In the discussion it was noted that the new term used in the visibility function is not understood by the experts. The paper of I. Corbella presented at the IGARSS refers to an unpublished paper. The SAG therefore asks ESA for a pre-copy (confidentiality will be assured). M. Berger will contact I. Corbella for a pre-copy (**AI:12.2**).

The understanding of the new visibility function is also essential for the image reconstruction study. In this context M. Peichl mentioned that the DLR reconstruction algorithm never was activated within the previous version of SEPS. The issue was addressed at the SEPS meeting in June but no decision was taken. M. Berger will ask B. Duesmann to follow the issue (**AI: 12.3**). In addition to this the tremendous work-load of UPC for updating SEPS and maintaining it was mentioned. It was agreed to seek for project support, e.g. in terms of financing a PhD student who could be responsible for the 'SEPS helpdesk'.

## **7. Orbit Requirements - Open Issues**

Y. Kerr explained to the SAG where the issue was with respect to the orbit definition. Up to now a circular orbit around a spherical earth was considered when the orbit of 755.5 +/- 5 km was defined. Using a more representative orbit and Earth model, and following B. Duesman calculations the issue is to assess what altitude and argument of perigee to use. A TN outlining the SMOS orbit requirements is available for downloading from the SMOS SAG ftp site to explain this further and in more details.

The SAG concluded that the orbit requirements should be those which satisfy the criteria, complete coverage with only ascending (respectively descending) orbits in 3 days (swath of 1060 km), no phasing per se but a cycle of 160-190 days adequate, with a sub cycle of 5 to 10 days with an argument of the perigee giving the altitude close to 755 km at about 45° latitude north.

## **8. Radiometer Procurement - Long-term Airborne Experiment, Cal/Val Plan**

### *Radiometer procurement:*

The idea of the Project to support the procurement of ground-based radiometers was discussed and well received. However, it was also stated that ESA would need to support the maintenance and operation of these radiometers in campaigns. A range of potential institutes was identified. N. Skou in particular expressed strong interest and indicated that it would be feasible to build 2 radiometers within a year. Ideally would be 3 instruments. One furnished for harsh environments like Antarctica, one for land and one for the use on aircrafts.

*Long-term airborne experiment:*

A long-term airborne experiment as introduced in the previous SAG meeting was discussed again. The idea to extend the experiment also including OS experiments was well received. Also US colleagues should be invited to participate. It was agreed to draft an experimenters' handbook involving key-scientists and to discuss details with a larger science community at the next SMOS workshop. J. Font will discuss campaign requirements with the OS community and draft the appropriate chapters for the handbook. E. Lopez Baeza and J.C. Calvet will do the same for the SM objectives. Y. Kerr and J. Font will contact the US communities for possible cooperation. M. Berger will coordinate the preparatory activities.

**9. AOB***SMOS brochure:*

M. Berger informed the SAG that a brochure similar to the CRYOSAT brochure (an example was distributed at the meeting) is currently being drafted. The draft will be distributed to the SAG for comments / inputs in the near future.

*CCN for SM retrieval study:*

The SAG was informed that the software developed within the SM study could be extended to implement OS retrieval. In the discussion it was agreed to invite the OS community to the software demonstration planned for beginning September at CESBIO to discuss the extension with the experts.

*Next SMOS WS:*

The SAG was asked if they still consider the yearly SMOS WS as useful or if the frequency and setting should be changed. There was consensus that the WS should be kept. As a possible next venue place the Technical University of Denmark was mentioned. April/May next year is considered as the appropriate timeframe.

*Breakout meeting at the 3<sup>rd</sup> GPM meeting*

The SAG was informed that a SMOS-Aquarius-GPM coordination meeting took place as a breakout meeting at the end of the 3<sup>rd</sup> GPM workshop. A common strategy towards a satellite constellation for the global water cycle was agreed.

*Bulletin article:*

M. Berger informed the SAG that the SM Bulletin article will be published in ESA Bulletin No 115.



*Aquarius-SMOS Synergy Study:*

H. Rebhan noted that an invitation to tender (ITT) for a study addressing Aquarius-SMOS synergies and OS retrieval techniques would be released soon. J. Font and N. Skou were asked to provide H. Rebhan with inputs to this study. In this context it was noted that it would be useful to invite T. Elfouhaily to one of the next SAG meetings to present his research work on ocean surface roughness modelling.

*Higher level requirements:*

The request by the project to specify the higher-level requirement was not understood by the SAG. M. Berger will ask the Project to give examples (AI: 12.4)

*Comments on the Processing & Archival scheme:*

Comments on the draft Processing & Archival scheme were provided by SAG members during the meeting and incorporated on the spot.

*French SMOS User Group Meeting:*

A French User Group meeting took place in Paris end of June. Emanuel Dinnat, currently working as a research fellow at the Ocean Unit/Mission Experts Division - ESA/ESTEC attended the meeting and drafted a short summary. H. Rebhan was asked to refurbish the minutes with E. Dinnat and distribute them to the SAG (AI: 12.5).

**10. Date and Place of Next Meeting**

The next SAG meeting was scheduled for **1 and 2 October** at ESTEC. The meeting will be organized back to back with the final presentation of the *Soil Moisture Retrieval Study*.

**11. Summary and Conclusion**

Y. Kerr and M. Berger thanked the SAG for attending the meeting. They apologized for the time pressure, which was imposed by the IGARSS. The meeting nevertheless was considered as useful.

**List of Recommendations:****R12.1:**

*In the discussion of the -3 and -6 configuration the SAG noted the degradation in the global sensitivity and recommends to the Project to assess the impact using SEPS in particular for ocean scenes.*

*In addition a detailed risk assessment of the loss of redundant receivers should be performed. Considering that the gain in weight is only marginal the SAG requests additional information on the rationale of dropping receivers in particular for the -3 configuration where the benefit seems to be minor.*

**R12.2:**

*The SAG regrets that it was not properly informed in time of critical issues to respond adequately. It is therefore recommended to improve the information exchange.*

**List of Actions:**

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10.5	Cal/Val	To forward draft ELDAS validation plan to YK	PV	1/9	Re-issued
10.6	Cal/Val	To provide detailed feedback to the draft cal/val document which will be distributed by YK	SAG	1/11	Open
11.5	Studies	To send the GOCE ATBD to the SAG	MD	1/4	open
12.1	Instrument	To check involvement of SAG experts in instrument design review boards	MB	1/9	
12.2	Reconstruction	To ask I. Corbella for a pre-copy of the article introducing the new term in the visibility function	MB	15/9	
12.3	SEPS	To ask B. Duesmann to clarify the activation of the DLR algorithm	MB	15/9	
12.4	GS	To ask the product of a definition/ examples of higher level requirements	MB	15/9	
12.5		To return and distribute the minutes of the French user group meeting	HR	15/9	

12<sup>th</sup> SMOS SAG Meeting

24-25 July 2003

CESBIO, Toulouse, France

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**Agenda**

1. Welcome and Introduction - Objectives of the meeting
2. Approval of draft agenda
3. Actions from the last meeting
4. Project status
5. Discussion on the impact of the -3 and -6 configuration
6. Discussion on the SEPS upgrade
7. Orbit requirement - open issues
8. Radiometer procurement - long-term airborne experiment, Cal/val plan
9. AOB (SMOS brochure, WS, ...)
10. Date & Place of next meeting