EARTH SCIENCES DIVISION (SCI-VR)
DIRECTORATE OF THE SCIENTIFIC PROGRAMME

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from M. Berger (APP-FSL)

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to Members of the SMOS Science Advisory Group (distibution list attached)

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c.c.: M. Reynolds (APP-F), C.J. Readings (APP-FS), A. Tobias (APP-FP), P. Silvestrin (APP-FPP), M. Rast (APP-FSL), E. Attema (APP-FSS), N. Floury (TOS-EEP), M. Borgeaud (TOS-EEP), P. Wursteisen (APP-FSS), M. Martin-Neira (TOS-ETP), P. Baptista (TOS-EEP), H. Rebhan (APP-FSO), G. Ratier (APP-PPI), A. Hahne (APP-PTO).

Subject: **Minutes of the 1st. SMOS SAG meeting held at ESTEC, April, 3rd/4th 2000.**

Dear Colleague,

Enclosed you will find the minutes of the first SMOS SAG meeting held at ESTEC, April 3rd/4th, 2000. Copies of the meeting viewgraphs are also enclosed.

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

Yours sincerely,

M. Berger
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Earth Sciences Division
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MINUTES OF

FIRST

SOIL MOISTURE AND OCEAN SALINITY MISSION SCIENCE ADVISORY GROUP MEETING

3rd/4th April 2000

ESA/ESTEC, Noordwijk, THE NETHERLANDS

Participants:	Y. Kerr, J. Font, P. Viterbo, N. Skou, M. Peichl
Excused:	M. Hallikainen, P. Ferrazzoli
ESA:	C. Readings (part time), P. Wursteisen (part time), N. Floury, P. Silvestrin, M. Martin-Neira, A. Hahne (part time), M. Rast, H. Rebhan, M. Berger

1. Welcome and introduction – Objectives of the meeting

Y. Kerr and M. Berger welcomed the SMOS SAG members at ESTEC. In the course of the meeting C. Readings took the advantage to outline the challenge of SMOS to the new established SAG.

M. Hallikainen and P. Ferrazzoli were excused.

SAG members introduced themselves outlining their field of expertise and their possible contribution to SMOS.

The main objectives of the meeting were:

to introduce the members of the SAG,
to outline their role,
to review the MRD,
and to discuss SMOS campaigns and support studies.

2. Approval of draft agenda

The draft agenda was approved.

3. The role of the SAG

The rationale of composing the SMOS SAG was outlined in the context of the references of the SAG (see attached VGs). M. Berger stressed that the composition may change during the mission. Further, it was emphasised that experts of fields not presented by the SAG members can be invited on an ad hoc basis.

4. Actions from the last meeting

All actions defined in previous SMOS working meetings are closed besides item 2.7.1 (scientific objectives which needs to be addressed by campaign activities) which is covered under agenda point 7.

5. Status of the project and next steps

P. Silvestrin gave an overview of the status of the project and outlined the next steps. Industry ‘Kick-Off is planned for next month involving three studies:

Instrument system study,
System support study (platform, ground segment, operations),
SMOS performance simulator.

P. Silvestrin noted that the industrial consortium still needs to be finalised.

M. Martin-Neira provided an overview of MIRAS Demonstrator Pilot Project (MDPP).
He informed the SAG that LICEF is delayed to May/June which has impacts to the overall schedule. The final review is now expected for Jan./Feb. 2001.

6. Review of the MRD

Each SAG member provided 'his impression' on the current version of the MRD (Version 3). Comments on the MRD and campaign document of SAG members who were not able to attend the meeting were read by Y. Kerr and M. Berger.

In the general discussion it was emphasised that the text needs to be improved by providing figures instead of general statements whenever possible. This may require further support studies, e.g. a study addressing the needed timeliness to observe auxiliary data required for the retrievals. In particular a more comprehensive paragraph on the influence of wind speed on the SSS retrieval should be included. Further, it was agreed that the MRD could be improved by including striking illustration material.

In the discussion a range of action items were identified which are attached to the minutes.

7. Support studies and campaigns

Y. Kerr outlined the scope of the campaign document which shall identify and prioritise further studies and campaign activities.

P. Wursteisen from the ESD Campaign Unit presented the WISE campaign planned for Oct. this year. In the meantime a study on the signal loss due to the radome, which was planned to be used to protect the instrument in the harsh environment was performed. Due to the losses it was decided not to use the fixed radome covering the entire equipment, but to maintain a radome mounted directly on the antenna. This requires a re-design of the mechanical parts in particular the pointing devices. A technical note on this study will be made available to the SAG.

J. Font indicated that a proposal addressing disturbing factors of salinity retrievals in different regions was submitted to the EU. A final answer is expected end of June.

H. Rebhan outlined the scientific objectives of the salinity study. The assessment of the proposals received in response to the ITT is closed but the outcome is not yet made public. Kick-off is planned for May.

M. Berger provided an overview of the scientific objectives of the soil moisture study. The ITT still is open until 10th. of April.

In order to account for the time pressure of Phase A, the SAG formulated the following recommendations:

R1a . ***to speed-up the assessment procedure of the soil moisture study,***
R1b. ***and to maximise the interaction between selected contractors and SAG***

In the course of the discussion it was agreed that a list of the most pressing scientific questions may be quite useful. Y. Kerr agreed to start the iteration using the email circular.

8. International collaboration

M. Berger informed the SAG that currently a memorandum of understanding (MoU) between NASA and ESA is being prepared which also includes possible collaboration in the frame of the SMOS mission.

G. Lagerloef was identified as a ideal candidate as a SMOS SAG member.

9. AOB

Under AOB the promotion of the mission including its web presentation, posters and publications was discussed. It was agreed that a list of planned promotion activities could be useful. M. Berger will compile such a list and keep it updated.

The SAG was asked for their opinion to rename SMOS. It was agreed to stick to SMOS since the scientific community currently gets acquainted to the abbreviation. It was stated that a new name could be discussed at a later stage.

P. Silvestrin indicated that the industrial studies currently only consider level 1b data processing. In the discussion it became obvious that higher level data processing is considered essential. Y. Kerr and J. Font agreed to give an overview of possible retrievals for SSS and SM at the next SAG meeting. The SAG formulated the following recommendation:

R2. ***The SAG recommends to include higher level data processing (level 2: SM & SSS) in the data exploitation plan***

Furthermore, Y. Kerr addressed questions raised during the last technical meeting under AOB.
Concerning yaw steering, it was stressed that it could be useful but need to be analysed in more detail. Concerning polarimetric data acquisition, it was noted that the need for polarimetric data acquisition is not yet proved. More detailed insights on this are expected from the support studies. Y. Kerr stressed that the requirements for a polarimetric acquisition mode will be analysed considering trade-offs which have to be made and their possible impacts on the system design. E.g. a doubling of the receiver is considered not feasible and hence this is not considered a system option for polarimetric data acquisition.

10. Summary and conclusions

The SAG summarised the first meeting as a fruitful and constructive meeting. It was criticised that some of the discussions were too much technical orientated. This is considered natural at the beginning of a mission exploiting a complicated instrument and hopefully will change as the maturity of the mission evolves.

11. Date and Place of the 2nd. SMOS SAG meeting:

In the meeting it was agreed to combine the 2nd. SMOS meeting with the WISE 2000 experimenters meeting, now planned for the 22nd and 23rd of May. This would enable A. Camps, WISE 2000 prime Contractor, to report on the equipment planned to be used during the campaign.

Following this request the next SMOS SAG meeting is scheduled at ESTEC for the 23rd. and 24th. of May. A WISE 2000 presentation will be given in the morning of the 23rd.

List of SAG Recommendations:

R1a. The SAG recommends to speed-up the assessment procedure of the proposals received in response to the Soil Moisture ITT.
R1b. Further, it is recommended to keep the SAG informed of the progress of the SM study to allow maximum interaction.
R2. The SAG recommends to include higher level data processing (level 2: SM & SSS) in the data exploitation plan

List of Actions:

1.1	all	to cross-check email list – smos_sag@jw.estec.esa.nl
1.2	MMN	to present MIRAS failure assessment at the next SAG meeting
1.3	JF	*MRD:* to provide text on salinity dependency
1.4	JF	*MRD:* to provide rationale on GODAE requirements
1.5	PS	*MRD:* to provide a 'unified' figure for the radiometric sensitivity
1.6	PV	*MRD:* to provide text for the coupled ocean-atmosphere models
1.7	YK	*MRD:* to include rationale such as T equilibrium for better justification
1.8	PV	*MRD:* to provide text on forecast
1.9	MB/NF	to invite expert to the SAG to report on TEC
1.10	MB/YK	*MRD:* to compile list of acronyms
1.11	YK	to draft a definition of SMOS spatial resolution for further iteration with the SAG
1.12	YK	*MRD:* to re-write 4.3 – inputs from MH?
1.13	MB/YK	*MRD:* summary of all boxes/ table of requirements after each chapter and executive summary
1.14	YK/NS	*campaign document:* to include technical details of the instruments – one page each

1.15	YK/JF	*campaign document:* to include site description (photos)
1.16	MB	*campaign document*: to compile a list of abbreviations
1.17	NS	*campaign document:* to keep master copy of campaign document
1.18	all	*campaign document:* to send comments/inputs to NS
1.19	NS	*campaign document:* to clarify what is meant by amplitude value (wind direction)
1.20	JF	*campaign document:* to re-phrase sentence p. 3 2.13 2nd para.
1.21	YK	*campaign document:* to smooth crane requirement in chapter 4
1.22	PW	to provide the technical note on radome signal loss to MB for circulation within the SAG
1.23	YK	to circulate a draft list of open questions which needs to be addressed/supported by studies/campaigns
1.24	JF	to provide YK with the documents which already exists
1.25	NF	dielectric constant accuracy – to check model and provide feedback to the SAG
1.26	all	to provide planned ‘promotion activities’ to MB
1.27	MB	to generate/update the list of planned SMOS promotion activities

The objectives of the meeting are:

- to introduce the members of the SAG,
- to outline their role,
- to review the MRD,
- to discuss SMOS campaigns and support studies.

Draft agenda

1. Welcome and Introduction - Objectives of the meeting
2. Approval of draft agenda
3. The role of the SAG
4. Actions from the last working meeting
5. Status of the project and next steps
6. Review of the MRD
7. Support studies and campaigns
8. International collaboration
9. AOB
10. Summary and conclusions
11. Date and place of next meeting

SAG TORs

The SAG should advise on:

- Detailed scientific mission objectives;
- The compatibility of technical specifications and scientific objectives;
- Campaigns and announcement of opportunity exercises;
- Data processing and algorithm development;
- Characterisation, validation and calibration;
- Scientific activities required to support the development of the instrument;
- Scientific activities for support data exploitation.

Therefore

- The SAG must be balanced and capable of providing the expert advice required during a particular phase of a project;
- The members should all be recognised experts in their fields;
- The number of members should be kept small to ensure effective and efficient working;
- Within these constraints there should be as wide a geographic representation as possible.

• Y. Kerr	F	LI, land - SM retrievals
• J. Font	E	Co-LI, oceanography
• M. Peichl	D	Image reconstruction
• N. Skou	DEN	Campaigns
• M. Hallikainen	FIN	Cryosphere
• P. Ferrazzoli	I	Land, modelling
• P. Viterbo	ECMWF	GCM, NWP modelling

technical advisor: P. Waldteufel

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ESTEC staff involved in SMOS

EO Future Programmes Department/APP-F (M. Reynolds):

Future Programmes & Tech. Studies/APP-FP (Alberto Tobias):

Pierluigi Silvestrin (project manager)	Ext: 3689
Roland Meynart	

Earth Science Division/APP-FS (C. Readings):

Michael Berger (SAG convenor)	Ext: 5158
Michael Rast, Evert Attema (campaigns), Helge Rebhan	

EO Programmes Development Department/APP-P (R. Zobl):

Achim Hahne (programmatic support)	Ext: 3696

Manuel Martin-Neira (TOS-ETP) (technical support)	Ext: 4052

Actions from the 2nd. working meeting

***List of Actions*:**

1.3.4 Y. Kerr and Ph. Waldteufel Due date: techn. meeting- date tbd

to draft a SMOS 'battle plan' – point should be raised at the next technical meeting

1.7.1 M. Berger Due date: techn. meeting – date tbd

to iterate with EOPP colleagues concerning the failure assessment study for MIRAS – point should be raise at the next technical meeting

2.3.1 M. Berger Due date: N/A

to contact Y. Kerr concerning the email list for the SMOS science community.

2.4.1 J. Font Due date: during SSIWG meeting

to ask G. Lagerloef if he still agrees to become a SMOS SAG member

2.5.1 Y. Kerr and J. Font Due date: 2/2

to provide feedback on the definition of the roles of the LI and Co-LI to M. Berger.

2.7.1 Y. Kerr and J. Font Due date: YK 7/2 – JF 21/2

to provide a list with scientific objectives (in order of priorities) which need support by campaigns.

2.8.1 M. Berger Due date: on-going

to further iterate on the structure of the SMOS EOQ article

2.9.1 M. Berger Due date:

to draft one pager for SMOS for the ESTEC web pages

SMOS - status quo

Science:

ITT Salinity Study - ITT closed

ITT Soil Moisture - ITT still open

Campaigns:

(extra agenda point)

System:

Industrial Phase A kick-off planned for end of April

System Phase A support study (platform, Ground segment, operations) in parallel

SMOS Performance Simulator

Technology and support:

MIRAS Demonstrator Pilot Project (MDPP) on-going

Manufacturing in 2000

Testing and flight hours in 2001

Objectives:

1. to review the research fields which require soil moisture observations and to quantify the requirements in terms of accuracy, spatial and temporal resolution;
2. to demonstrate the soil moisture retrieval capability of polarimetric brightness temperature observations acquired by a space-borne L-band interferometric radiometer and to review existing soil moisture retrieval techniques to determine the limits of validity and the requirements of the observations
3. to improve existing retrieval techniques and-or to develop new retrieval algorithms for soil moisture and to analyse the sensitivity of the retrievals to key features of the target to be observed as well as the capability of the system such as polarisation sensivity
4. to define field and airborne campiagns to support algorithm validation and improvement and to define impact studies
5. to validate retrieval algorithms
6. to assess the impact of the retrieved soil moisture on the research areas identified in objective 1.

analysis of V, H and 3rd and 4th Stoke's parameter due to:

- amount of biomass
- roughness
- topography
- heterogeneity (mixed pixel - water bodies, rural, urban, ciultivated land etc.)
- local time of observation (diurnal temp. variaten and dew effects
- penetration depth (soil moisture profile)
- atmospheric effects (in particular Faraday rotation)
- different incident angles (0°-55°)

AOB - Date and place of next meeting

Promotion of SMOS - Web

- EOQ article

- Backscatter article

New name for SMOS?

Date and place of the 2nd SMOS SAG meeting:

proposed: June, 27th/28th or July, 4th/5th