24. SCIAMACHY Science Advisory Group Meeting (SSAG) March 6, 2002, University of Bremen, Germany

Approved Minutes

Attendees (26): H. Bovensmann (ife, Secretary), K. Bramstedt (ife), J. P. Burrows (ife, Chairman), J. Carpay (NIVR), C. Chlebek (DLR-BO), R. de Beek (ife), A. Dehn (ESRIN), J. Frerick (ESTEC), A. Friker (DLR-BO), A. Goede (KNMI), M. Gottwald (DLR-MF), E. Hilsenrath (NASA GSFC), J. Kaiser (ife, SAST), H. Kelder (KNMI), G. Lichtenberg (SRON), C. Muller (IASB-BIRA), S. Noel (ife, SOST), A. Piters (KNMI), U. Platt (Univ. Heidelberg), H. Schrijver (SRON), C. Sioris (SAO), J. Skupin (ife), P. Stammes (KNMI), R. Veiga (NASA LARC), A. von Bargen (DLR-IMF), M. Wuttke (ife, SOST)

1. Welcome (Burrows)

Participants were welcomed to the 24th SSAG by J. P. Burrows. He and the SSAG congratulated ESA, the Ariane and ENVISAT teams on the successful launch and delivery of ENVISAT into orbit on March 1st, 2002.

2. Approval of the Agenda (Annex 1, All)

The agenda was approved as proposed.

3. Acceptance of the Minutes of the 23rd SSAG Meeting (Annex 2, All)

The draft minutes of the 23rd SSAG meeting were approved. The final version of the minutes is included in the annex (Annex 02). It was recommended to distribute the Minutes of the Meeting earlier.

A summary on the status of all action items can be found as Annex 14 of these minutes.

4. Current Status of the SCIAMACHY Project and Instrument (DNPM)

Status of SCIAMACHY and ENVISAT (oral, C. Chlebek)

C. Chlebek summarised the status of SCIAMACHY and ENVISAT after the successful launch on March 1st, 2002. ENVISAT arrived in the planned orbit and was already switched on. Also SCIAMACHY was switched on successfully and first short functional tests (SFT) were executed, including an internal WLS measurement. From contractual point of view the ownership of SCIAMACHY is since launch at DLR and NIVR (50% each).

Commissioning Phase Schedule (Annex 3, C. Chlebek)

The schedule of the SODAP part of commissioning phase was presented (Annex 3) giving all the milestones and measurement windows until July 2002. The current planning for the SODAP phase is also posted on the SOST web pages: http://atmos.af.op.dlr.de/projects/scops/. The ENVISAT commissioning phase review is planned for April 2002. At a Phase E Readiness Teleconference all in the SODAP activities involved parties stated there readiness for commissioning (w.r.t. data reception tools etc.).

Data Distribution (Annex 3, C. Chlebek)

The details of the data distribution during commissioning phase and early validation (until L+9) were agreed between ESA and AOP (DLR) and are written down in an Annex of the GSOCP (PO-PR-ESA-GS-01193/Annex A). Results are summarised in Annex 3 of this MoM. PO-PR-ESA-GS-

01193/Annex A will be made available via the SCIAMACHY Validation web pages. The reached and documented agreement closes AI 23.01.

U. Platt proposed to use L1 data from the NRT Data Distribution chain (DDS link) to generate scientific limb products to support the balloon campaigns. It has to be noted that currently the time delay between sensing and DDS distribution is open.

As it will not be possible to order OL data via the User Service Facility (USF) for individual PIs in the first months after launch, all validation PIs are invited to forward their order directly to Johannes Frerick, ESA ("On Demand Data Distribution").

Status PR activities

DLR Bonn issued an update of the SCIAMACHY brochure in German and English as well a general ENVISAT brochure (German only). DLR is also discussing a "first data" event, but the date is TBD.

At the University of Bremen two events took place: on December 12, 2001 a SCIAMACHY and an ENVISAT model were handed over to the scientists (http://www.iup.physik.uni-bremen.de/extra_scia/index.html) and on February 28, 2002 the Space Night Bremen took place celebrating the launch of ENVISAT with over 300 national and international guests (http://www.iup.physik.uni-bremen.de/spacenight).

On the Dutch side a brochure and a fact sheet in Dutch will be prepared. A tri-lateral press event (D, NL, B) is under discussion. The Dutch SCIAMACHY launch event was combined with the ESTEC Envisat launch event. The publicity achieved in the media (radio, TV and newspapers) in The Netherlands was very positive, with a focus on SCIAMACHY and the use of its data.

ESA is planning a press conference during the validation workshop in ESRIN in December 2002.

In addition it was mentioned that outreach activities for SCIAMACHY are currently not well developed. It was proposed that members of the SCIAMACHY team contribute to the GLOBE (Global Learning and Observations to Benefit the Environment) initiative (see http://www.globe-germany.de).

A summary on the status of relevant action items can be found as Annex 14 of these minutes.

5. Status of Operations & Mission Planning Activities (SOST, Annex 4)

Status SOST activities (M Gottwald, Annex 4)

M. Gottwald summarised the overview about the planning of SCIAMACHY SODAP activities. A schedule with the major milestones was presented and the current version is available via the SOST web site http://atmos.af.op.dlr.de/projects/scops/. He highlighted that the SODAP phase is very ambitious in comparison to nominal operations and to succeed a close cooperation between all involved parties (ESTEC, ESOC, Astrium SOST etc.) is required.

In addition, M. Gottwald summarised the requirements from validation on commissioning phase activities. Further requirements on operations during validation should be forwarded to SOST (M. Gottwald).

24.01	SCIAVALIG	To forward any new requirements from validation on operations to M. Gottwald/SOST.	To be reported at next SSAG

The SSAG was informed that all information about SCIAMACHY mission planning is made

available on the SOST web site (see above).

A summary on the status of relevant action items can be found as Annex 14 of these minutes.

6. SSAG Subgroup Reports

a) *Data & Algorithm (P. Stammes)*

P. Stammes represented K. Chance at the 23rd SSAG.

Status NRT Processor Development and Verification (J. Frerick, Annex 5)

The work on the NRT processors (0-1, 1-2) is finalised and the current versions are frozen. The NRT processor verification during commissioning phase is currently organised. The key communication element is the verification database (http://atmos.af.op.dlr.de/cgi-bin/home.cgi?page=scia_ol_ver_plan) where the verification tasks are laid down and results will be communicated.

It was criticised by SSAG members that the NRT and OL nadir processor (SDP) is based on the GDP version 2.4 with all the known (since 1998), documented and already fixed (in the GDP) problems. It is therefore strongly recommended to update the SDP nadir part (NRT and OL) to GDP 3.0 before validation.

24.02	ESA, J. Frerick	To initiate the implementation of the upgrades from GDP 2.4. to GDP 3.0 into the SDG.	Next SSAG

The extraction/application software (SCIAL1c-tool) which will be distributed with ENVIVIEW is verified and distributed. A significant improvement in the computational performance was achieved. It is very important that the tool will be tested asap with real to identify and fix additional bugs. Problems/bugs should be reported to eth EO-Helpdesk at ESRIN and to Johannes Frerick directly.

Status Level 1-2 Off-Line Processing (A. von Bargen, Annex 6)

The project management for the SCIA OL processor was handed over from Wolfgang Balzer to Albrecht von Bargen on January 1st, 2002. The current status of the Off-Line Limb processor was reported. The nadir algorithm is identical with the NRT algorithm (see above) and ready for processing in July 2002. The limb prototype is under verification (self-consistency etc.). Test spectra and multiple scattering correction tables for O_3 are calculated with the SCIATRAN/CDI-PI RTM code from University of Bremen. The calculation of NO_2 multiple scattering correction tables is outstanding. The processor implementation is not ready but progressing. The schedule for the limb OL processor was updated resulting in significant changes w.r.t. the planning presented at the 23rd SSAG for the limb processing. The readiness of the limb processing in the UV/Vis is delayed until end of November 2002. NIR processing of limb data is open. Therefore Limb products will not be ready during early validation. Science team members from KNMI, SRON, NASA, SAO, IFE Bremen and IUP Heidelberg offered to provide scientific limb data products for validation campaign support in case limb products from the operational processor are not available. For example E. Hilsenrath proposed to apply the SOLSE/LORE algorithms to SCIAMACHY limb data. In addition it was proposed to use the limb prototype algorithm to process selected data sets, determined by the needs of the validation campaigns, during early validation. Management meetings to improve the situation are planned.

SAST Report (J. Kaiser, Annex 7)

The activities of the SCIAMACHY Algorithm Support Team (SAST) are focussing on the verification of the limb off-line processor. Limb test scenarios were calculated with CDI-PI and DLR was supported to implement SCIATRAN/CDI-PI on their Linux-cluster and to calculate MS

correction tables. In a case study the impact of neglecting refraction was assessed. For O_3 additional errors up 10 % can occur when refraction is neglected.

P. Stammes pointed out that currently polarisation is missing in the used RTM codes, which might be an important error source which needs to be quantified. Another area to be studied in more detail is the Ring effect in limb. One option to minimise the impact of no (or not perfect) Ring correction is to use ratios of limb spectra instead of the ratio of limb radiance to solar irradiance.

It was mentioned that SRON and KNMI within a national project (SCIARALI) also started the development of an RTM and retrieval algorithms for SCIAMACHY limb data analysis. Progress will be reported to the SSAG.

A summary on the status of relevant action items can be found as Annex 14 of these minutes.

b) Calibration and Characterisation (A. Goede)

Major work during the last month was performed by the calibration tiger team on the interpretation of the closed loop tests w.r.t the quality of the key data, the ASM diffuser calibration and temperature dependence of key data. In addition KNMI reported about their findings on an improved polarisation correction algorithm.

Calibration Status (G. Lichtenberg, Annex 8)

The tiger team gives detailed summary and recommendations about their findings in the fields of closed loop tests w.r.t the quality of the key data, the ASM diffuser/mirror calibration and temperature dependence of key data (see presentation). It is recommended by the tiger team that at the begin of nominal operations the following is needed:

1. a complete set of un-smoothed key data
2. temperature adjusted key data (dependent on in orbit temperatures)
3. new limb key data based on the ASM mirror component level measurements

The SSAG fully supports this recommendation.

The work of the tiger team was judged to be very effective and SSAG recommended to continue the work at least during commissioning phase.

A summary on the status of relevant action items can be found as Annex 14 of these minutes.

A new way to perform polarisation correction for SCIAMACHY (P. Stammes, Annex 9)

P. Stammes presented the work of N. Schutgens and himself on a new approach to polarisation correction algorithm. The main idea of this approach is to better represent the spectral dependence of polarisation by using set of base functions. The new algorithms reduces radiance errors well below 1 % (GOME PCA: 10% UV, 3 % Vis). A publication on this approach is in preparation. The SSAG supported activities to implement the approach in the next version of the 0-1 processor.

24.03	P. Stammes, J. Frerick	Clarify the steps required to come to an implementation of the new polarisation correction algorithm.	Next SSAG

c) Validation and Interpretation (H. Kelder)

SCIAVALIG Report (A. Piters, Annex 10)

The SCIAVALIG reported no major discrepancies in the preparation for validation. Product co-ordinators were nominated, tools are being developed. An area of concern is the frequency of

processor upgrades as there seems to be currently no concrete schedule of updating the processors.

24.04	J. Frerick ESA A. Friker, A. v. Bargen, DLR	To prepare a plan for processor upgrades after commissioning and during nominal operations.	Next SSAG

Another area of concern is the limited funding for long term validation activities. Currently the funding for the validation project is very limited after 2003. Discussions with national agencies are ongoing.

The "SCIAMACHY Detailed Validation Plan" was made available by the SCIAVALIG web site (http://www.knmi.nl/sciamachy-validation/sciavalig/) and should be checked by relevant SSAG members. The printed version will be distributed in May 2002.

SAGE-III Status (R. Veiga, Annex 11)

R. Veiga reported about the successful launch and switch-on of SAGE-III (http://www-sage3.larc.nasa.gov) in December 2001. Regular solar occultation measurements starts on March 2nd, 2002. No major anomalies were reported. SAGE-III contribution to ENVISAT Validation will focus on profiles retrieved from same spectral regions. In Feb-March 2003 the SOLVE-2 campaign will collect data for SAGE-III validation (info on SOLVE-1: http://cloud1.arc.nasa.gov/espo/solve/). A co-ordination with ENVISAT validation campaigns is planned.

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7. Scientific Use of SCIAMACHY Data (H. Bovensmann)

This new topic is intended to get an overview about ongoing and planned scientific data usage of SCIAMACHY data and to intensify the link between the different scientific data users communities and the SSAG. It was proposed that at every SAG one member reports about the (potential) use SCIAMACHY data in the following research fields.

- Upper Atmospheric Research (AI 23.03, Ch. Muller, Annex 12)
- Tropospheric Research
- UT/LS Research
- Stratospheric Research

In the discussion the research areas "Climate Research" and "Surface Processes" were added.
In addition it is proposed to optimise the link between SSAG and EU, national and relevant ENVISAT AO projects.

Ch. Muller started to summarise the potential of ENVISAT atmospheric chemistry payload in the area of Upper Atmospheric Research (Annex 12). His presentation closes AI 23.03.

8. Any Other Business

No other AOB was brought up.

9. Date and Venue of the Next Meetings

It was proposed that the next SCIAMACHY SAG meeting will take place at ESTEC (together with the ENVISAT Commissioning Review).

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The subgroup meetings will be organised by their chairman.