SCIAMACHY	Operation Change Request	OCR No: 011 Issue: A

Title: Improvement of limb/nadir matching

Description of Request:
It is proposed to improve the limb/nadir matching by skipping the last 4 horizontal scans in each limb state. This will lead to center the limb ground pixels (ILOS tangent hight 0 km at state start and 100 km at state stop) in the matching nadir pixels. The resulting maximum limb altitude will be about 92.9 km. Details of the proposed approach can be found in the attached technical note.

Skipping 3 or 5 horizontal scans would also be possible but centering the limb pixels in the nadir pixels is not as good as in the proposed solution or the maximum limb altitude would be too low.

We propose a two-step implementation approach:

a) At the beginning of the next planning cycle, a 2 day test phase shall execute timelines with the modified limb states. Quick analysis of these measurements enables us to ensure that nadir and limb states are executed at the correct orbital phase (note that the reduced limb duration causes all timelines with limb states to change; thus the assignement of nadir and limb states to the appropriate location in a timeline, equivalent to the correct orbital phase, has to be ensured). In case no e.g. saturation is observed, these test timelines will become the operational timelines, otherwise the test timelines have to be modified. For step a) the re-definition of 8 timelines only is required.
b) Implement the timelines defined in step a) plus all remaining timelines as the timelines for nominal operations. This can be done for the planning cycle succeeding the one in step a).

The 2-day test is considered to provide supplemental information as it allows to detect potential inconsistencies in timeline definition up to a certain degree which can then be corrected for the definition of the operational timelines. No scientific measurement time is lost since the test timelines are equivalent to those intended to be used in nominal operations.

Originator: M. Gottwald, DLR-IMF	Date of Issue: 21/07/2003	Signature: via e-mail 21/07/2003

Assessment of SSAG (necessary for requests by scientists):
As the current limb-nadir matching is not optimal for a combined retrieval of tropospheric columns directly from limb-nadir measurements (see also TN on Limb/Nadir Matching from 18.7.2003) it is recommended to perform a test (step a) with improved state parameter setting.

The final implementation needs to take into account the evaluation of the data from the test phase, some theoretical RTM investigations, investigations on the impact of the loss of mesospheric measurements and the formal approval of the SSAG.

SSAG: H. Bovensmann	Date: 23.7.2003	Signature: via e-mail 23.7.2003

Classification of OCR: D

OCR Analysis (incl. Implementation Option):
Implementation of the limb/nadir matching improvement proposal requires the modification of final flight states and timelines.

States: The Scanner State tables of the limb states have to be changed. In addition State Duration is modified.
Timelines: For the operational implementation all timelines executing a limb state need re-definition. This impacts timelines 01, 02, 15-42 (all sub-IDs), 47-52, 55, 56 of timeline sets 25, 26, 29, 30. Since it involves almost entire timeline sets, the final flight set IDs have to change as well. They will become set IDs 31-36 (an option to use 01-06 needs further tests with ESOC and is still tbc - however for the implementation of this OCR this is irrelevant). The 2-day test needs implementation of 8 timelines (01, 02, 47-52) in set 09.

If approval of the OCR can be achieved very quickly (23/07/2003), it is possible to include the 2-day test in the planning input which is due to be submitted to ENVISAT by 25/07/2003. Then the test would be executed in the second half of August. Note that the decontamination at the same time would not endanger the test goal. Operational implementation of the modified timelines and states could then be done beginning of October - provided that the test confirms the selected approach. Otherwise implementation would shift by 1 cycle and the nominal measurements would be obtained with an improved limb/nadir matching from about November onwards.

SOST: M. Gottwald, DLR-IMF (ESA, Industry if necessary)	Date: 21/07/2003	Signature: via e-mail 21/07/2003

Approval of Proposed Implementation (Step 1):
The proposed implementation for step a) should be implemented for the test phase of 2 days.

Originator Approval: M. Gottwald, DLR-IMF	Date: 23/07/2003	Signature: via e-mail 23/07/2003
SSAG Approval: H. Bovensmann, IFE	Date:23.07.2003	Signature: via e-mail 23.7.2003

Decision / Approval:
Step 1 shall be implemented.

DLR Approval: Ch. Chlebek	Date: 2003-07-23	Signature: e-mail 2003-07-23

SSAG Approval of Proposed Implementation (Step 2):

The test to improve the limb/nadir matching was successfully executed in orbits 7862-7889. Measurement data analysis confirms the correct definition and execution of states and timelines. After consultation of scientists working on mesospheric retrieval, the impact of the optimised limb-nadir sequence on the coverage of the mesosphere (now only up to 93 km) is judged as acceptable. The implementation of step b) is therefore recommended. Before final implementation it has to be assured with data processing that the modified states will be nominally processed.

Originator Approval:	Date:	Signature:
SSAG Approval: H. Bovensmann	Date: 17.9.2003	Signature: e-mail 17.9.2003

Decision / Approval:

DJO could process data measured during step1 from L0 to L1b with the NRT version 4.03.
Step 2 shall be implemented.

DLR Approval: Ch. Chlebek	Date: 2003-09-22	Signature: e-mail 2003-09-22

Implementation by SOST :
Step 1:
The limb states with wide swath are reduced in duration by skipping the last 4 horizontal scans (note that the dark current measurement at an altitude of 250 km is unchanged). For the test only wide swath states are required since only these timelines will be executed. This reduces the number of CTI uploads. In total 6 Scanner State and 6 State Duration CTIs will be generated.
Test timelines are defined in set 09. The test timelines concern IDs 01, 02, 47-52. The OSDF for the planning cycle August 16 - October 2 will include 2 days running these test timelines. The test timelines will execute routine measurements on the dayside of the orbit, i.e. no scientific data is lost. The test will be executed while the warm-up phase of the long decontamination is running.

The CTI table and timeline loads will be such that the test timelines will run between orbits 7633-7660 (August 16-18).

Step 2:
The limb states, both for wide and small swath, have been modified as required. This resulted in 12 Scanner State and 12 State Duration CTIs. These 24 CTI files are considered permanent and will become part of ERCORMS.
All final flight timelines of set 25 were re-generated and assigned to the new final flight timeline set 31 (FFT_031015).

The CTI tables and timelines of set 31 will be uploaded at the beginning of orbit 8489 (October 15). From that date onwards the limb/nadir matching will be improved as required in OCR 11.

SOST: M. Gottwald, DLR-IMF	Date: 23/07/2003 & 24/09/03	Signature: via e-mail 23/07/2003 & 24/09/03