SCIAMACHY	Operation Change Request	OCR No: 050 Issue:

Title: Tangent height permanent adjustment

Description of Request:
OCR_048 modified several measurement parameters for SCIAMACHY measurement operations in the ENVISAT mission extension orbit. Some of them concerned ESM settings in the Basic Scan Profile table reflecting fixed altitudes.

Geolocation analysis had revealed that the specified tangent heights for limb-type measurements were not fully achieved with the modified Basic Scan Profile angles and a test with fine-tuned parameters was executed on December 8th (OCR_049). The limb tangent heights derived from these settings are illustrated in annex 1. It is obvious that the required altitudes

- limb first scan: 0 km
- limb dark current step: 264 km
- limb_mesosphere first scan: 150 km

were almost met. Only small discrepancies persisted (limb first scan 310 m too high, limb dark current step 975 m too low, limb_mesosphere first scan 675 too low). Similar small deviations from the specified altitudes were also present in the nominal orbit.

Since limb retrieval experts do not consider these deviations critical (C. von Savigny, e-mail dated 15/12/2010) we propose to upload the test Basic Scan Profile table for permanent implementation.

Originator: M. Gottwald, E. Krieg, DLR-IMF	Date of Issue: 16/12/2010	Signature: M. Gottwald via email 16/12/2010

Assessment of SSAG/SQWG (necessary for requests by scientists):

SSAG: H. Bovensmann, IUP	Date: 20.12.2010	Signature: H. Bovensmann, e-mail 20.12.2010

Classification of OCR:

OCR Analysis (incl. Implementation Option):
Use the Basic Profile Scan CTI table given in annex 2. For the upload we propose orbit 46340 (January 10th) with a validity start at about 03:02 UTC. This avoids conflicts with the Christmas holiday period and ensures quick verification of successful implementation.

Note that the Basic Profile value for the dark current step in the limb_mesosphere_thermosphere state (370 km) has not been tested on December 8th. We assume however, that the adjusted parameter provides as in the case of the values for 0 km, 150 km and 264 km the correct geolocation within the same accuracy range.

SOST: M. Gottwald, E. Krieg, DLR-IMF (ESA, Industry if necessary)	Date: 16/12/2010	Signature: M. Gottwald via email 16/12/2010

Approval of Proposed Implementation:

Originator Approval: M. Gottwald, E. Krieg, DLR-IMF	Date: 16/12/2010	Signature: M. Gottwald via email 16/12/2010
SSAG Approval: H. Bovensmann, IUP	Date: 20.12.2010	Signature: H. Bovensmann, e-mail 20.12.2010

Decision / Approval:
To be implemented as described

DLR Approval: A. Friker (if necessary NIVR, SPEC)	Date: 20.12.2010	Signature: A. Friker via e-mail 20.12.2010

Implementation by SOST:
The Basic Scan Profile CTI table will be uploaded in orbit 46340 (January 10th, 2011, 03:02:00 UTC). With the start of t/l 1 in orbit 46340 the new final flight configuration will become operational.

SOST M. Gottwald/E. Krieg, DLR-IMF	Date: 20/12/2010	Signature: M. Gottwald via e-mail 20/12/2010

Annex 1: Verification of Limb Tangent Heights of OCR_049 Test

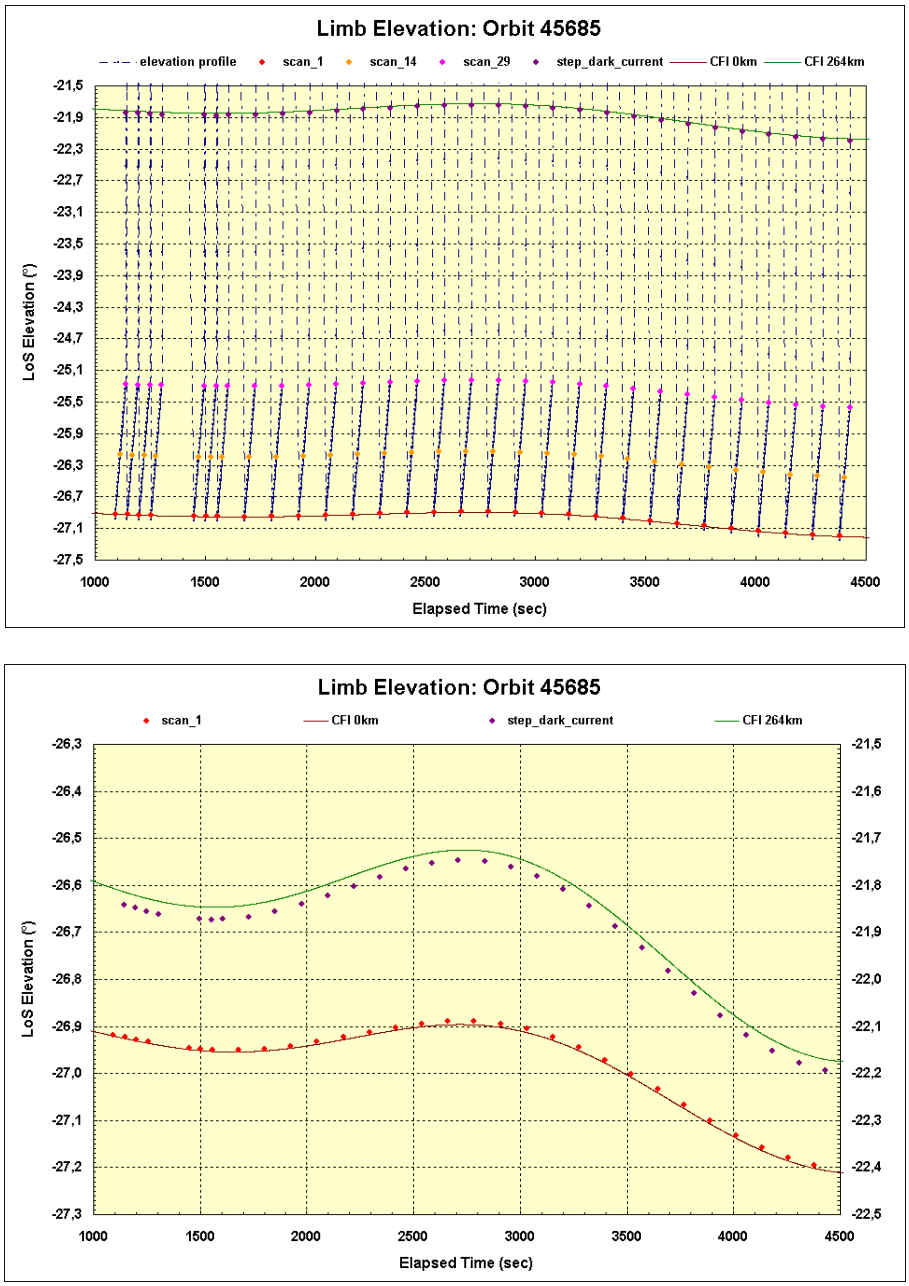

Fig. 1: Limb sequence in orbit 45865. The top graph displays ESM readings, selected scans (dots) and tangent altitudes as derived from the CFIs (solid lines). The bottom graph shows the specified altitudes of 0 km (left axis) and 264 km (right axis) in detail.

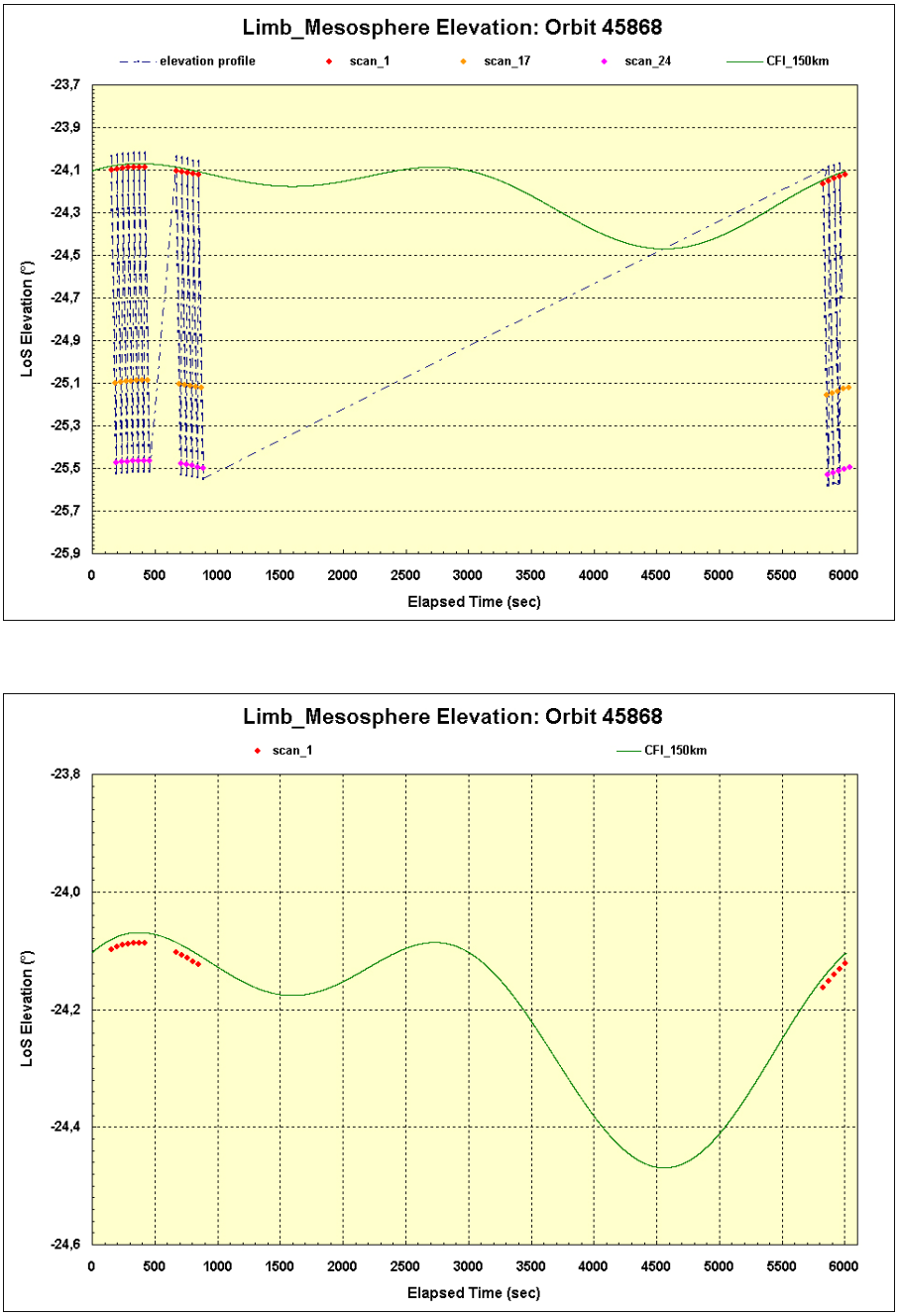

Fig. 2: Same as fig. 1 but now for the limb_mesosphere state (ID 27) sequence in orbit 45868. The bottom graph shows the specified altitudes of 150 km in detail.

Annex 2: Modified Basic Scan Profile table

Basic Scan Profile ID	Azimuth		Elevation		Note: All positions are effective scanner positions.
	Basic Scan Position	Basic Scan Rate	Basic Scan Position	Basic Scan Rate	Conversion algorithms of H/W- constellation are not considered. All angular positions/rates are given in ASM/ESM scanner notation.
	10-6 rad	10-6 rad/sec	10-6 rad	10-6 rad/sec	Intended use
0	0000000000	000000	-0000261799	000000	ASM position IDLE ESM position IDLE
1	0000000000	000000	-0000794125	000000	ASM new unused position pointing into telescope, mirror not used ESM pointing in nadir direction (-z) - start position for nadir_pointing_left
2	-0000785398	000000	-0000235322	000000	ASM pointing in direction of velocity vector (-y) ESM pointing at an altitude of -3 km
3	-0000471239	000131	-0000170276	000000	ASM following trajectory of sun from position of sunrise ESM pointing at an altitude of 370 km
4	0003298672	-008145	0000986111	000000	ASM_Diffuser_1 - starting position +9 deg diffuser normal ESM pointing to mean sun elevation within sub-solar window
5	-0001003564	-000174	-0000212417	000000	ASM following moon trajectory from mean position of the full moon (245 deg) - currently unused ESM pointing at an altitude of 153 km
6	-0000468621	000131	0002879793	000000	ASM following sun trajectory ESM diffusor in fixed ESM pos. of 180-15 deg - timing required for normal incidence of sun on ESM
7	-0006283185	000000	-0006283185	000000	ASM position for 360 deg revolution of scanner bearings ESM position for 360 deg revolution of scanner bearings
8	-0000468621	000131	0000570714	000222	ASM following sun trajectory ESM following sun via extra_mirror with half angular velocity from start at 150 km above horizon
9	-0000785398	000000	-0000194958	000000	ASM pointing in direction of velocity vector (-y) ESM pointing at an altitude of 264 km
10	0003263766	-008145	0000170480	000000	ASM_Diffuser_2 - starting position +7 deg diffuser normal; ASM_diffuser_atmosphere ESM pointing to SLS (9.768 deg)
11	0003228859	-008145	0003319617	000000	ASM_Diffuser_3 - starting position +5 deg diffuser normal ESM pointing diffusor to internal calibration sources (10.2 + 180 deg)
12	0003193953	-008145	0000183658	000000	ASM_Diffuser_4 - starting position +3 deg diffuser normal ESM pointing to WLS (10.523 deg)
13	0003159046	-008145	0000186279	000000	ASM_Diffuser_5 - starting position +1 deg diffuser normal* ESM pointing to WLS under non-optimal angle (10.673 deg)
14	-0000471239	000227	-0000233153	000000	ASM following trajectory of sun from position of sunrise ESM pointing at an altitude of 17.2 km