



# Operation Change Request

OCR No: 008

Issue: B

Title: Change of final Limb tangent height step ('Limb dark') from 150km to 250km  
Supplement: Re-implementation of state ID27 limb-mesosphere

### Description of Request:

It is proposed to change the tangent height of the final scan step in *all* Limb states (i.e. limb, limb edarks) from the current value of 150km to 250km. The reason for the change is that the spatial stray light at 250km is around one order of magnitude lower than at 150km. All other parameters of the states should remain unchanged.

To harmonise the dark determination and enable proper monitoring of the darks also the tangent height for *all dark states except for the WLS hot mode dark (state ID 39)* should be set to 250km. All other parameters stay unchanged.

Originator: G. Lichtenberg  
(SRON)

Date of Issue: 9.05.03

Signature: email 9.05.03

### Assessment of SSAG (necessary for requests by scientists):

As shown in IFE-SCIA-JS-20030430 the straylight contribution to the limb background measurements can be reduced drastically when measuring the background at 250 instead of 150 km. It the implementation of the proposed change is therefore recommended.

SSAG:  
H. Bovensmann

Date:  
9.5.2003

Signature:  
e-mail, 9.5.2003

### Classification of OCR:

### OCR Analysis (incl. Implementation Option):

Changing the dark current altitude from 150 km to 250 km in the limb states and the dark current states is achieved by changing the basic profile 9 in elevation from the angle equivalent to 150 km to the angle equivalent to 250 km (average -22.51 deg ILOS, i.e. tangent height range 243-264 km, see figures attached). In both state types the transition time prior to the dark current measurement is sufficient to also accommodate an additional mirror movement of 100 km (to be confirmed by simulation).

Since no change in limb state timing is required, no changes are needed w.r.t. timelines. Thus the implementation is independent from the delivery of mission planning inputs to RGT.

### Note:

Since elevation basic profile 9 is also used in the limb\_mesosphere state (ID 27) to step from 150 km down to about 80 km, a change is required here as well. This modification will introduce a transition from 250 km down to 150 km before the scans down to 80 km will start. In order not to change the duration of the state, the time for the transition will be cut off the measurement phase of the state (small compared to the overall duration of the measurement phase).

Taking into account the required modification of the limb\_mesosphere state, implementation is expected within 4 weeks after having received the finally approved OCR. If an early implementation would be required for the dark current measurements, one could only modify basic profile 9 and leave state 27 as it is currently defined. Then, however, the limb\_mesosphere measurements would become obsolete.

### Re-implementation of state ID27 limb\_mesosphere:

In order to start limb\_mesosphere measurements from 150km downwards, ESM basic profile 5 (originally used for moon states) will be used to generate the ESM position for 150km tangent height needed for state ID27 as start position. Consequently the definition of this profile in all moon states (note: the basic profile parameters are nominally not used since overwritten by the parameters contained in the START-Timeline-mcmd) has to be altered. ESM basic profile 3 will be defined, which provides the identical position parameter but a higher angular rate, since this profile is the back-up for sun-observations. In total 6 CTI-files will be generated.

SOST: M. Gottwald, SOST-IMF

Date: 12/05/2003

Signature: e-mail 12/05/2003

### Approval of Proposed Implementation:

Originator Approval:  
G. Lichtenberg

Date: 2003-05-13

Signature: e-mail 2003-05-13

SSAG Approval: H. Bovensmann S. Noël	Date:2003-05-13 & 2003-07-09 (re-implementation of limb_mesosphere)	Signature: e-mail 2003-05-13 & telephone (re-implementation of limb_mesosphere)
Decision / Approval: Implementation shall be performed in two steps: modify profile 9 as soon as possible and adapt state 27 later. The loss of limb mesosphere measurements for 4 to 6 weeks is accepted.		
DLR Approval: Ch. Chlebek	Date:2003-05-13 & 2003-07-07 (re-implementation of limb_mesosphere)	Signature: e-mail 2003-05-13 & 2003-07-07 (re-implementation of limb_mesosphere)
Implementation by SOST : In a first step the basic profile 9 will be changed to reflect an altitude of 250 km. The corresponding parameter table is generated and transferred to FOCC 030521 to ensure an upload for orbit 6456.  Step two requires simulation of the modified limb_mesosphere state (planned within the next 2 weeks). In case the results of the simulation confirm feasibility of the modification, the on-board implementation will occur after about 4-6 weeks ( <i>note added July 2003: this solution was not feasible; a different approach as described above has been selected</i> ). The SOST webpage will warn potential users of the limb_mesosphere measurements.  Re-implementation of state ID27 limb_mesosphere: Onboard implementation as described and approved above is planned for 24 <sup>th</sup> July. The SOST webpage will inform about the exact time when limb_mesosphere measurements will start again at an altitude of 150 km.		
SOST: M. Gottwald, SOST-IMF E. Krieg, SOST-IMF	Date: 09/07/2003	Signature: via e-mail 09/07/2003

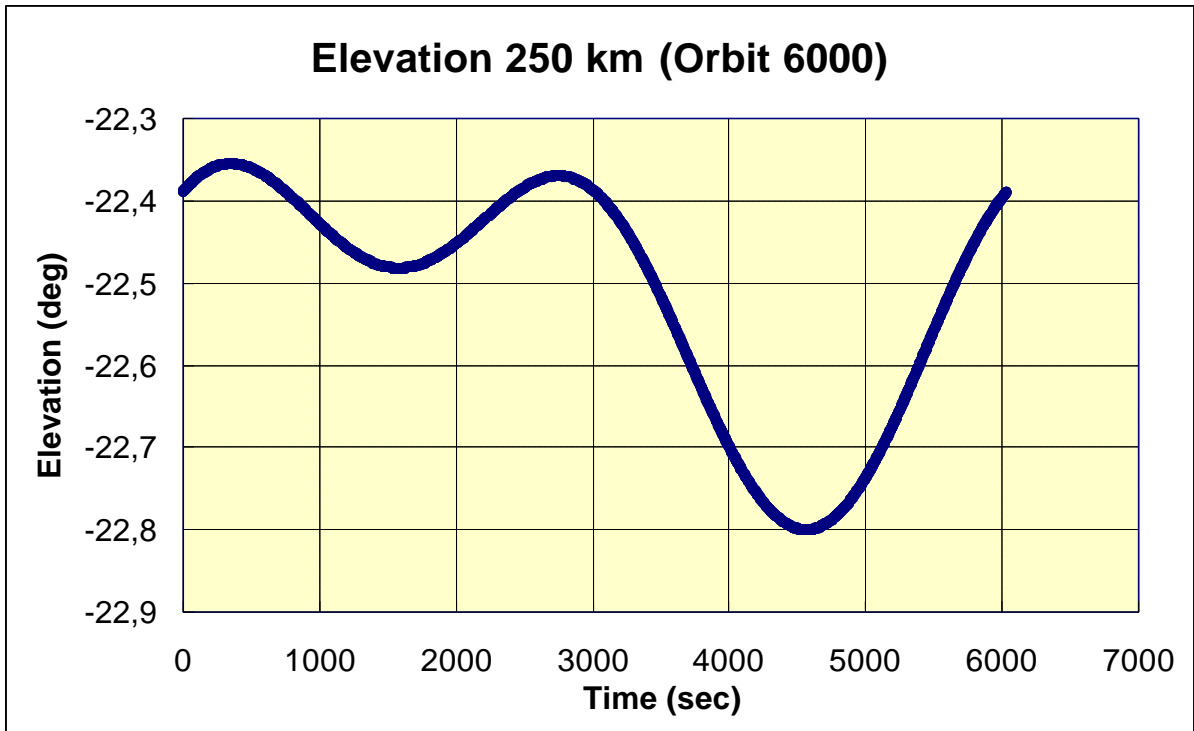


Figure: Elevation equivalent to tangent height altitude = 250 km over a complete orbit

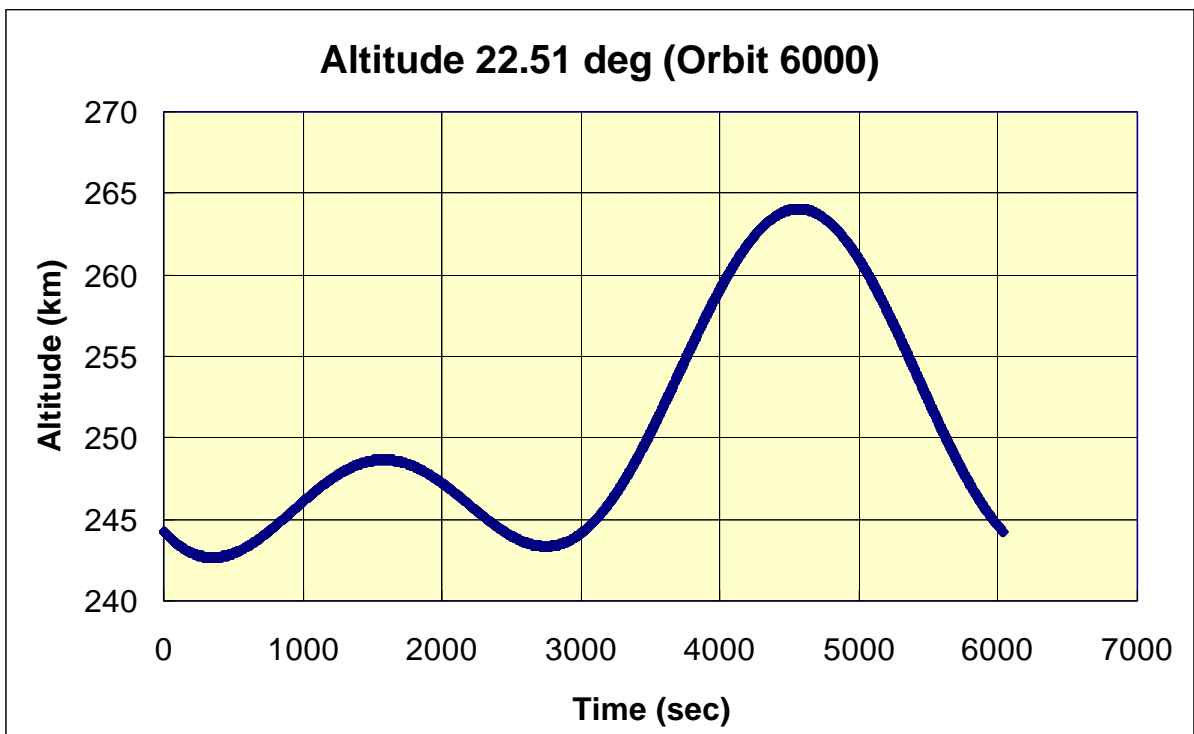


Figure: Tangent altitude equivalent to mean elevation = 22.51 deg over a complete orbit