

 SCIAMACHY	<h1>Operation Change Request</h1>		OCR No: 016 Issue: A
Title: 2004 Venus transit observations by SCIAMACHY			
<u>Description of Request:</u> Venus will transit the sun from 5h 6m 30.5s to 11h 32m 56.0s UTC on June 8, 2004. It is requested that on all orbits from 0h to 16h UTC on June 8, 2004 SCIAMACHY obtain a minimum of 10 minutes of solar diffuser observations per orbit. This would most conveniently be done during the onset of the daylit portion of each orbit, but the actual time of acquisition is not critical to the science requirements.			
Originator: Kelly Chance	Date of Issue: February 25, 2004	Signature: e-mail, K. Chance, 2004-02-25	
<u>Assessment of SSAG (necessary for requests by scientists):</u> The investigation of the implementation of this OCR is recommended, as the observation of the Venus during its transit of the sun offers a very observation unique opportunity of Venus atmosphere. It is expected that the nominal limb-nadir sequence will be affected not significantly.			
SSAG: H. Bovensmann	Date: 3.3.2004	Signature: e-mail, H. Bovensmann, 2004-03-04	
Classification of OCR: D			
<u>OCR Analysis (incl. Implementation Option):</u> SOST proposes the special Venus transit measurements as follows: <ul style="list-style-type: none"> • use of the ASM diffuser • PET and co-adding settings are those of the ASM diffuser calibration measurements, i.e. 1 sec integration time in all clusters • start measurement at a Sun altitude as close to 120 km as possible because this is the altitude at which the preceding sun occultation measurement stops (solar elevation is about 25.3 deg) • the ASM diffuser normal will point to an azimuth of 273 deg, • the ASM diffuser rotates by 14 deg line of sight during the measurement, i.e. solar incidence onto the diffuser is about 50-64 deg (averaging of signal) - see approach described below • the ESM will point to an altitude of 250 km (basic profile value as in ASM diffuser calibration measurements) • the ESM stays fixed during the measurement • total ASM diffuser measurement time in one orbit (Sun occultation & calibration window) is about 100 sec, an additional 60 sec can be gained taking into account that the limb total clear field of view is slightly larger in elevation than specified • the ASM diffuser measurement will be planned in each orbit from 11880 (ANX 8-JUN-2004, 00:20:19) to 11889 (ANX 8-JUN-2004, 15:25:42), i.e. total observation time is about 1000-1600 sec with 400-640 sec for the transit phase <p>In case it is finally preferred to execute the transit measurement without scanning the ASM diffuser, a two step approach shall be pursued:</p> <p>Step 1: A special ASM diffuser state as specified above shall be implemented. In addition a second ASM diffuser state which differs from the first one only by fixing the ASM diffuser normal at 273 deg (no scanning) during the measurement shall also be defined. For both special ASM diffuser states a test measurement shall be planned around mid April (2 orbits each) in order to ensure that the parameter settings are correct.</p> <p>Step 2: Come to a final conclusion until April 20 (deadline for planning inputs) which special ASM diffuser state to use for the Venus transit observation. The state selected will be the one implemented onboard for June 8th.</p> <p>Note that the test measurements do not reduce scientific data since they do only replace nominal scan measurements of the Sun above the atmosphere.</p>			

SOST: M. Gottwald, DLR-IMF (ESA, Industry if necessary)	Date: 10/03/2004	Signature: via e-mail 10/03/2004
Approval of Proposed Implementation:		
Originator Approval: K. Chance	Date: 10/03/2004	Signature: via e-mail 10/03/2004
SSAG Approval: H. Bovensmann	Date: 2004-03-16	Signature: e-mail, H. Bovensmann, 2004-03-16
Decision / Approval: OCR shall be implemented as proposed.		
DLR Approval: Ch. Chlebek	Date: 2004-03-16	Signature: e-mail, Ch. Chlebek, 2004-03-16
<p><u>Implementation by SOST:</u></p> <p><u>State Definition:</u> The states 17 and 18 are temporarily overwritten by modified ASM_diffuser states. Scanner State, State Duration and Basic Scan Profile tables have to be modified.</p> <ul style="list-style-type: none"> • Scanner State: phase 2 is set to 160 sec (= total measurement duration) • State Duration: SDPU Duration is set to 2560 BCPS, Wait Measurement Execution to 40936 cts, State Duration to 43329 cts • Basic Scan Profile: <ul style="list-style-type: none"> – azimuth position of profile 4 is set to 0003089233 (diffuser normal + 180° = 177°) and scan rate to -001527 (14° in 160 sec) - this profile applies to modified state 17 – azimuth position of profile 10 is set to 0003089233 (diffuser normal + 180° = 177°) and scan rate to 0° (no scan) - this profile applies to modified state 18 <p><u>Timeline Definition:</u> Two timelines are generated in set 09. Timeline 09_01 executes the modified state 17 (with scan) and timeline 10_01 executes the modified state 18 (without scan). The Sun_fixed criterium had to be set to <i>solar tangent_height</i> = 150 km since the preceding occultation timeline stops above 100 km (variable over the year). The total measurement time per orbit within the <u>specified</u> limb TCFoV is about 95 sec. Another 30 sec can be gained from the wider limb TCFoV (the measurement phase is defined such that we observe the Sun even further in case the limb TCFoV is even wider - no exact figure does exist for the elevation width of the limb TCFoV).</p> <p>Both timelines are high data rate timelines. It is confirmed that the longer high data rate duration because of the extended measurement interval (compared to nominal operations) is still well within the orbital phase where there is no conflict with MERIS operations.</p> <p><u>Measurement Execution:</u> In orbits 11168/11169 the ASM_diffuser state with scan will be tested, in orbits 11171/11172 the ASM_diffuser state without scan (April, 19). Since the test measurement is executed 7 weeks earlier than the transit, the Sun incidence angle onto the ASM diffuser will be smaller by about 5° during these orbits. The actual Venus transit measurement will then be performed in orbits 11880-11889 (June 8) with the state finally selected.</p>		
SOST: M. Gottwald, DLR-IMF	Date: 11/03/2004	Signature: via e-mail 11/03/2004