

 SCIAMACHY	<h1 style="text-align: center;">Operation Change Request</h1>		OCR No: 052
			Issue:
Title: Increased rate of monitoring measurements			
<p><u>Description of Request:</u> Currently the instrument is in a period of rapid throughput recovery. In order to follow the changes with sufficient time resolution, and to potentially improve the quality of degradation correction, the following is requested:</p> <ul style="list-style-type: none"> • During the period of rapid throughput recovery (expected to last no longer than a couple of months), increase the light path monitoring measurements to at least once per day, where possible. Emphasis is on sub-solar and WLS measurements. • Synchronise the monitoring measurements to be executed in the same or adjacent orbits, where possible. • Implement as soon as possible. The recovery is not understood, and it may stop any moment. 			
Originator: Ralph Snel, SRON	Date of Issue: 2011-12-05	Signature: RS	
<p><u>Assessment of SSAG (necessary for requests by scientists):</u> The current very fast recovery is a very unique situation and needs to be measured at an adequate temporal resolution. The proposed measurements will help to improve data quality and also will contribute to a better understanding of degradation/recovery of optical components in space.</p> <p>Therefore OCR analysis is highly recommended.</p>			
SSAG: H. Bovensmann, IUP-IFE	Date: 09/12/2011	Signature: via e-mail 09/12/2011	
Classification of OCR:			
<p><u>OCR Analysis (incl. Implementation Option):</u> Implementing this OCR affects mission scenarios and timelines. It is proposed to define a new final flight status (not a test status) for both including</p> <ul style="list-style-type: none"> • One subsolar measurement each day: Using the NCWM at a higher rate increases its inflight budget. Since we are currently (planning up to end of February) at 95%, the 100% limit will be reached in the first half of 2012 depending on the start of this OCR. Accepting this limit exceeding should be clearly stated in the approval of this OCR. If necessary, a dedicated ARB shall be organized. <p>Note: Because of the LLI issue our implementation option does not include the maximum number of 3 subsolar measurements per day (= number of assigned subsolar calibration opportunities). If the LLI issue is considered less critical, the approval should indicate an increase of the 1/day subsolar rate up to 3/day.</p> <ul style="list-style-type: none"> • One WLS measurement in the same orbit as the subsolar measurement: The state ID 61 (lwc01) is included once in the new timelines t/l 36_61_02 and t/l 36_62_02 (see annex 1). T/l 61 is the equivalent to the eclipse t/l 44 and t/l 62 the equivalent to t/l 53. Every orbit with a subsolar measurement, either t/l 61 or 62 are scheduled depending on the status of the alternating limb/nadir pattern. Both new timelines are stored permanently onboard where they replace the t/l 36_61_01 and 36_62_01 which are only used in two monthly calibration orbits. Whenever a monthly calibration is due, we include a corresponding timeline exchange in the OSDF. Scheduling WLS measurements with a higher rate is uncritical from an LLI inflight budget point of view. End of February almost 10 years of operations have accumulated 19% of the assigned WLS inflight switches and 36% of the WLS burning time. However it is worth to also consider the WLS switches when a subsolar rate > 1/day is proposed. <p>An example of a sequence of orbits for two days from an OSDF is given in annex 2.</p> <p>Nominal implementation of the option described above would start on March 1st when the next OSDF is due. The planning for the period January/February 2012 has already been delivered to RGT and FOCC. If possible, we try to overwrite the January/February planning as soon as possible early next year. However this depends on OCR approval timescale and ENVISAT ground segment internal work</p>			

flows.

The increased subsolar rate and the new timelines, i.e. the new final flight status, shall remain implemented until a change is requested by the calibration & monitoring experts. This should occur via another OCR.

SOST: M. Gottwald, E. Krieg, DLR-IMF (ESA, Industry if necessary)	Date: 09/12/2011	Signature: via e-mail 09/12/2011
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Approval of Proposed Implementation:

R. Snel (Originator): The proposed implementation option is fine with me. However, I would like to urge all involved to try and implement this NCR as soon as possible, rather than wait till after the Christmas and new year break.

As a reminder regarding the NCWM life cycles: this is not a real life limit, but rather the side-effect of a time-limited test of the NCWM after a refurbishment. We had extensive discussions about this around June 2006. See also section 6 of TN PO-TN-DLR-SH-0018 on predictions for the mission extension beyond 2010. My proposal is to ignore the assigned in-flight budget for the NCWM. The mechanism is nearly identical to the APSM, which has survived a 220 000 cycle test, see TPD-PP-SCI-RPT-157 (Report of Aperture Mechanism (APM) additional lifetest).

SSAG: Feedback within the SSAG was all in favour of an implementation.

The issues w. r. t. the interference with the block of 15 Limb_Mesosphere_Lower_Thermosphere orbits was resolved between Manfred Gottwald, Ralf Snel and Miriam Sinnhuber, with the result that there will be no interruption of this measurement block.

Therefore I recommend — on behalf of SSAG — OCR 52 for implementation as soon as possible.

Originator Approval: R. Snel, SRON	Date: 2011/12/09	Signature: via e-mail 2011/12/09
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SSAG Approval: H. Bovensmann, IUP-IFE	Date: 2011/12/14	Signature: via e-mail 2011/12/14
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Decision / Approval:

BIRA, NSO, ESA, and DLR approve to implement the OCR as soon as possible in order to better understand the throughput recovery.

The OCR is to be implemented with the adaptations mentioned in the SSAG approval.

This OCR includes the violation of a life limit (exceeding the max. cycle number of the Nadir Calibration Window Mechanism). This life limit is explicitly ignored for this OCR. As the Nadir Calibration Window Mechanism is considered similar to the extensively tested Aperture Stop Mechanism it is assumed that it – though not fully tested – has a similar life limit. Budget monitoring of the Nadir Calibration Window Mechanism should continue in awareness of the violated limit and should monitor, that there remains considerable margin between the number of cycles performed by the Nadir Calibration Window Mechanism and the limit established for the comparable Aperture Stop Mechanism.

Approval: Achim Friker, DLR Harry Förster, NSO Christian Muller, BIRA Thorsten Fehr, ESA	Date: DLR 2011/12/15 NSO 2011/12/12 BIRA 2011/12/12 ESA 2011/12/12	Signature: A. Friker via e-mail: 2011/12/15 H. Förster via e-mail: 2011/12/12 C. Muller via e-mail: 2011/12/12 T. Fehr via e-mail: 2011/12/12
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Implementation by SOST:

Two new eclipse timelines (36_61_02 and 36_62_02) have been added to timeline set 36. They both include one WLS measurement (state 61 lwc01).

Implementation occurs in two steps:

- Starting January 1st a subsolar measurement is executed each day. This uses already existing timelines and does not require a modification of the on-board configuration. Thus it is uncritical w.r.t. the forthcoming vacation period.
- Upload of the new eclipse timelines occurs on January 9th (vacation period has ended) in orbit 51569. From then on a WLS measurement is executed each subsolar orbit.

In orbits where a subsolar measurement would be possible but cannot be implemented because of the limb_mesosphere_lower_thermosphere state only the WLS state is executed in eclipse.

The corresponding OSDF 3611 has been ingested into the ground segment.

SOST: M. Gottwald, E. Krieg, DLR	Date: 16/12/2011	Signature: via e-mail 16/12/2011
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Annex 1: New Eclipse Timelines

H:\scia\timing\timeline_set_36\tl_36_61_02.xls		ecl_beg_ecl_end_cal_orbit_daily_2		Table start ID = 3841		Event_type = n/a	
DURATION <s>=	1267.42187500	DTX0 <s>=	n/a	DTX1 <s>=	n/a	DTX2 <s>=	n/a
SCHED_TYPE =	NF_FB	GEO_TYPE =	n/a	GEO_NUM <>=	n/a	FOV_CHECK =	NO
RATE_TYPE =	LOW	DTX3 <s>=	n/a	DTX4 <s>=	n/a	TL_PAD <s>=	1.00000000
State Running Index	State ID	State Description	State TT (relative, ct)	State TT (relative, sec)	Start Time (absolute, sec) T1 +	State Duration (sec)	End Time (absolute, sec) T1 +
		T/L setup			0	2.77	
1	27	elimb01	709	2.77	2.77	44.06	46.83
2	27	elimb01	11279	44.06	46.83	44.06	90.89
3	27	elimb01	11279	44.06	90.89	44.06	134.95
4	8	dcc05	11279	44.06	134.95	43.56	178.50
5	26	dcc04	11151	43.56	178.50	33.56	212.06
6	46	dcc01	8591	33.56	212.06	13.56	225.62
7	63	dcc02	3471	13.56	225.62	33.56	259.18
8	67	dcc03	8591	33.56	259.18	83.56	342.74
9	8	dcc05	21392	83.56	342.74	43.56	386.30
10	26	dcc04	11151	43.56	386.30	33.56	419.86
11	46	dcc01	8591	33.56	419.86	13.56	433.42
12	63	dcc02	3471	13.56	433.42	33.56	466.98
13	67	dcc03	8591	33.56	466.98	83.56	550.54
14	61	lwc01	21392	83.56	550.54	23.35	573.89
15	27	elimb01	5977	23.35	573.89	44.06	617.95
16	27	elimb01	11279	44.06	617.95	44.06	662.00
17	27	elimb01	11279	44.06	662.00	44.06	706.06
18	27	elimb01	11279	44.06	706.06	44.06	750.12
19	27	elimb01	11279	44.06	750.12	44.06	794.18
20	27	elimb01	11279	44.06	794.18	44.06	838.24
21	8	dcc05	11279	44.06	838.24	43.56	881.80
22	26	dcc04	11151	43.56	881.80	33.56	915.36
23	46	dcc01	8591	33.56	915.36	13.56	928.91
24	63	dcc02	3471	13.56	928.91	33.56	962.47
25	67	dcc03	8591	33.56	962.47	83.56	1046.04
26	27	elimb01	21392	83.56	1046.04	44.06	1090.09
27	27	elimb01	11279	44.06	1090.09	44.06	1134.15
28	27	elimb01	11279	44.06	1134.15	44.06	1178.21
29	27	elimb01	11279	44.06	1178.21	44.06	1222.27
30	27	elimb01	11279	44.06	1222.27	44.06	1266.33
31	End of Timeline	End of Timeline	11279	44.06			
32	End of Timeline	End of Timeline	0				
33	End of Timeline	End of Timeline	0				
34	End of Timeline	End of Timeline	0				
35	End of Timeline	End of Timeline	0				
36	End of Timeline	End of Timeline	0				
37	End of Timeline	End of Timeline	0				
38	End of Timeline	End of Timeline	0				
39	End of Timeline	End of Timeline	0				
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44	End of Timeline	End of Timeline	0				
45	End of Timeline	End of Timeline	0				
46	End of Timeline	End of Timeline	0				
47	End of Timeline	End of Timeline	0				
48	End of Timeline	End of Timeline	0				
49	End of Timeline	End of Timeline	0				
50	End of Timeline	End of Timeline	0				
51	End of Timeline	End of Timeline	0				
52	End of Timeline	End of Timeline	0				
53	End of Timeline	End of Timeline	0				
54	End of Timeline	End of Timeline	0				
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56	End of Timeline	End of Timeline	0				
57	End of Timeline	End of Timeline	0				
58	End of Timeline	End of Timeline	0				
59	End of Timeline	End of Timeline	0				
60	End of Timeline	End of Timeline	0				
61	End of Timeline	End of Timeline	0				
62	End of Timeline	End of Timeline	0				
63	End of Timeline	End of Timeline	0				
64	End of Timeline	End of Timeline	0				
		T/L Cleanup	324180		1266.33	0.09	1266.42

Timeline 36_61_02

H:\scia\timing\timeline_set_36\Tl_36_62_02.xls		ecf_beg_ecf_end_cal_orbit_daily_1		Table start ID =	3905	Event_type =	n/a
DURATION <s>=	1267.42187500	DTX0 <s>=	n/a	DTX1 <s>=	n/a	DTX2 <s>=	n/a
SCHED_TYPE =	NF_FB	GEO_TYPE =	n/a	GEO_NUM <>=	n/a	FOV_CHECK =	NO
RATE_TYPE =	LOW	DTX3 <s>=	n/a	DTX4 <s>=	n/a	TL_PAD <s>=	1.00000000
State Running Index	State ID	State Description	State TT (relative, ct)	State TT (relative, sec)	Start Time (absolute, sec) T1 +	State Duration (sec)	End Time (absolute, sec) T1 +
		T/L setup			0	2.77	
1	8	dcc05	709	2.77	2.77	43.56	46.33
2	26	dcc04	11151	43.56	46.33	33.56	79.89
3	46	dcc01	8591	33.56	79.89	13.56	93.45
4	63	dcc02	3471	13.56	93.45	33.56	127.00
5	67	dcc03	8591	33.56	127.00	83.56	210.57
6	61	lwc01	21392	83.56	210.57	23.35	233.91
7	27	elimb01	5977	23.35	233.91	44.06	277.97
8	27	elimb01	11279	44.06	277.97	44.06	322.03
9	27	elimb01	11279	44.06	322.03	44.06	366.09
10	27	elimb01	11279	44.06	366.09	44.06	410.15
11	27	elimb01	11279	44.06	410.15	44.06	454.21
12	27	elimb01	11279	44.06	454.21	44.06	498.27
13	27	elimb01	11279	44.06	498.27	44.06	542.32
14	8	dcc05	11279	44.06	542.32	43.56	585.88
15	26	dcc04	11151	43.56	585.88	33.56	619.44
16	46	dcc01	8591	33.56	619.44	13.56	633.00
17	63	dcc02	3471	13.56	633.00	33.56	666.56
18	67	dcc03	8591	33.56	666.56	83.56	750.12
19	27	elimb01	21392	83.56	750.12	44.06	794.18
20	27	elimb01	11279	44.06	794.18	44.06	838.24
21	27	elimb01	11279	44.06	838.24	44.06	882.30
22	27	elimb01	11279	44.06	882.30	44.06	926.36
23	27	elimb01	11279	44.06	926.36	44.06	970.41
24	27	elimb01	11279	44.06	970.41	44.06	1014.47
25	27	elimb01	11279	44.06	1014.47	44.06	1058.53
26	8	dcc05	11279	44.06	1058.53	43.56	1102.09
27	26	dcc04	11151	43.56	1102.09	33.56	1135.65
28	46	dcc01	8591	33.56	1135.65	13.56	1149.21
29	63	dcc02	3471	13.56	1149.21	33.56	1182.77
30	67	dcc03	8591	33.56	1182.77	83.56	1266.33
31	End of Timeline	End of Timeline	21392	83.56			
32	End of Timeline	End of Timeline	0				
33	End of Timeline	End of Timeline	0				
34	End of Timeline	End of Timeline	0				
35	End of Timeline	End of Timeline	0				
36	End of Timeline	End of Timeline	0				
37	End of Timeline	End of Timeline	0				
38	End of Timeline	End of Timeline	0				
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44	End of Timeline	End of Timeline	0				
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60	End of Timeline	End of Timeline	0				
61	End of Timeline	End of Timeline	0				
62	End of Timeline	End of Timeline	0				
63	End of Timeline	End of Timeline	0				
64	End of Timeline	End of Timeline	0				
		T/L Cleanup	324180		1266.33	0.09	1266.42

Timeline 36_62_02

Annex 2: OSDF Excerpt (example only)

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RECORD orbit: ABS_ORBIT_NUM=+51462 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51463 ID="02,03,08,48,52,63,62" ENDRECORD;
orbit_no_moon_daily_calibration_1
RECORD orbit: ABS_ORBIT_NUM=+51464 ID="02,04,09,50,63,44" ENDRECORD;
orbit_no_moon_daily_calibration_2
RECORD orbit: ABS_ORBIT_NUM=+51465 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51466 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51467 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51468 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51469 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51470 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51471 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51472 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51473 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51474 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51475 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51476 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51477 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51478 ID="02,03,08,51,49,63,61" ENDRECORD;
orbit_no_moon_daily_calibration_1
RECORD orbit: ABS_ORBIT_NUM=+51479 ID="02,04,09,47,63,53" ENDRECORD;
orbit_no_moon_daily_calibration_2
RECORD orbit: ABS_ORBIT_NUM=+51480 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51481 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51482 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51483 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51484 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51485 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51486 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51487 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51488 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51489 ID="01,47,63,53" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51490 ID="01,50,63,44" ENDRECORD; orbit_no_moon
RECORD orbit: ABS_ORBIT_NUM=+51491 ID="01,47,63,53" ENDRECORD; orbit_no_moon

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Entries in blue: timeline with subsolar state (state ID 53 – sscp02)

Entries in green: new eclipse timelines (62 equivalent to 53, 61 equivalent to 44)