SCIAMACHY	Operation Change Request	OCR No: 043
		Issue:

Title: Revision of calibration states 8, 26, 46, 63 and 67

Description of Request:
The goal of the five “Dark Current Calibration” states (8, 26, 46, 63 and 67) are to derive the bias component for each pixel, referred to as fixed pattern noise (FPN) or analog offset, and a time-dependent component, referred to as leakage current (LC). The FPN and LC are calculated, for each pixel, by a (weighted) linear least square fit, see ATBD (section 3.4).

The requested modifications aim to increase the coverage of PET's used for science measurements, replace noisy long PET measurements (> 1.5 sec) by more accurate PET's between 0.25 and 0.75 seconds. Channel 1 and 2 measurements with integration times > 1 second are likely affected by high energy particle hits. Channel 8 measurements with PET's equal to 2 seconds have many pixels going into saturation or they seem to get in the strong non-linear part of the QE curve.

New Pixel Exposure Times and Co-Adding Factors:

State_id: 46 (dark current 1)
Repetitions in state: 10
State duration: 10 seconds.

Channel	1	2	3	4	5	6	7	8
PET	0.0625	0.0625	0.0625	0.0625	0.125	0.0625	0.0625	0.0625
coadding	8	8	8	8	4	8	16	8

State_id: 63 (dark current 2)
Repetitions in state: 40
State duration: 30 seconds.

Channel	1	2	3	4	5	6	7	8
PET	0.375	0.750	0.375	0.375	0.375	0.375	0.375	0.375
coadding	2	1	2	2	1	1	2	1

State_id: 67 (dark current 3)
Repetitions in state: 80
State duration: 80 seconds.

Channel	1	2	3	4	5	6	7	8
PET	0.5	0.5	0.125	0.125	0.5	0.125	1.0	1.0
coadding	1	1	4	4	1	2	1	1

State_id: 26 (dark current 4)
Repetitions in state: 10
State duration: 30 seconds.

Channel	1	2	3	4	5	6	7	8
PET	1.0	1.5	0.75	0.75	1.5	1.5	0.5	0.5
coadding	1	1	2	2	1	1	1	1

State_id: 8 (dark current 5)
Repetitions in state: 10
State duration: 40 seconds.

Channel	1	2	3	4	5	6	7	8
PET	0.25	0.25	1.0	1.0	0.25	0.5	0.125	0.125
coadding	2	2	1	1	2	1	4	4

Originator: Richard van Hees / SRON	Date of Issue: April 27, 2010	Signature: RvH

Assessment of SSAG (necessary for requests by scientists):
Investigation on implementation options are recommended, as the proposed change has the potential to improve dark current characterisation for short PET's. Special attention by SOST needs to be paid to avoid adverse effects for nominal nadir, limb, occultation and calibration measurements.

It is recommend that after a sufficient number of new dark current measurements are taken, the L2 experts needs to perform retrievals using L1 data with new dark currents applied. Results should be reported within 3 month after implementation of the OCR, assuming that after 4 weeks L1 data with new darks are available.

SSAG: H. Bovensmann	Date: 17.5.2010	Signature: e-mail, 17.5.2010

Classification of OCR:

OCR Analysis (incl. Implementation Option):
Following the proposed modifications to the dark states 8, 26, 46, 63 and 67 only settings of the pixel exposures times and the 5 co-adding tables uniquely allocated to these states are necessary. This will result in totally 10 CTI-tables to be created. The excerpts from the PET-sheet and the Co-Add-sheet relevant for the 5 states and detailing the future setting of PETs and Co_Adds are given further down.

State ID46 will produce a mean data rate of 391.6416 kb/s which is slightly exceeding the nominal limit given for low data-rate of 390.000 kb/s. This small excess is expected to be tolerated by the PMC.

No other states than the 5 dark states are affected by the proposed modifications.

No changes to the duration of any state are required. All present timelines can remain unchanged. Thus the above implementation is decoupled from the nominal planning cycle such that it can be made effective after receipt of the final approval for this OCR.

NOTE: This OCR_043 is not related to the upcoming OCR_044, which concerns partly the settings of the dark states but is intended to be implemented for a short test session of several orbits only.

SOST: (ESA, Industry if necessary) E.Krieg; M.Gottwald	Date: 18.05.2010	Signature: email 18.05.2010

Approval of Proposed Implementation:

Originator Approval: R. van Hees	Date: 19. Mai 2010	Signature: via e-mail 19. Mai 2010 17:54
SSAG Approval: H. Bovensmann	Date: 19.05.2010	Signature: via e-mail 19.05.2010 17:54

Decision / Approval:
Approved for preliminary implementation. Scientific assessment of results is needed (as recommended by SSAG) before final decision. (for implementation see SOST below).

DLR Approval: (if necessary NIVR, SPEC) Achim Friker	Date: 21.05.2010	Signature: via E-Mail 21.05.2010

Implementation by SOST :
OCR_043 will be implemented in orbit 43362 on 16th June 2010 with validity from 08:33 UTC onwards. In total 2*5 CTI-files will be loaded to modify the PET-tables for states ID 08, 26, 46, 63 and 67 and the related Co-Adding tables 52; 51; 45; 49, 50 (see state_index-table).

OCR_043 is planned as a permanent change and therefore generates a new final flight configuration also meaning that this is reflected in FOCC's procedures from the date of implementation onwards. If after data analysis it would be decided that the OCR_043 settings are not appropriate and further modifications needed (e.g. restore the former configuration) this would require a new OCR.

SOST M.Gottwald; E.Krieg	Date: 21.05.2010	Signature: e-mail 21.05.2010

Annex

PET

State ID	Data Rate	Channel 1a	Channel 1b	Channel 2b	Channel 2a	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8	
BCPS												
8	Low	4	4	4	4	16	16	4	8	2	2	Dark Current 5
	High	4	4	4	4	16	16	4	8	2	2	Dark Current 5
26	Low	16	16	24	24	12	12	24	24	8	8	Dark Current 4
	High	16	16	24	24	12	12	24	24	8	8	Dark Current 4
46	Low	1	1	1	1	1	1	2	1	1	1	Dark Current 1
	High	1	1	1	1	1	1	2	1	1	1	Dark Current 1
63	Low	6	6	12	12	6	6	6	6	6	6	Dark Current 2
	High	6	6	12	12	6	6	6	6	6	6	Dark Current 2
67	Low	8	8	8	8	2	2	8	2	16	16	Dark Current 3
	High	8	8	8	8	2	2	8	2	16	16	Dark Current 3
Support (sec)												
8	Low	0,25000	0,25000	0,25000	0,25000	1,00000	1,00000	0,25000	0,50000	0,12500	0,12500	Dark Current 5
	High	0,25000	0,25000	0,25000	0,25000	1,00000	1,00000	0,25000	0,50000	0,12500	0,12500	Dark Current 5
26	Low	1,00000	1,00000	1,50000	1,50000	0,75000	0,75000	1,50000	1,50000	0,50000	0,50000	Dark Current 4
	High	1,00000	1,00000	1,50000	1,50000	0,75000	0,75000	1,50000	1,50000	0,50000	0,50000	Dark Current 4
46	Low	0,06250	0,06250	0,06250	0,06250	0,06250	0,06250	0,12500	0,06250	0,06250	0,06250	Dark Current 1
	High	0,06250	0,06250	0,06250	0,06250	0,06250	0,06250	0,12500	0,06250	0,06250	0,06250	Dark Current 1
63	Low	0,37500	0,37500	0,75000	0,75000	0,37500	0,37500	0,37500	0,37500	0,37500	0,37500	Dark Current 2
	High	0,37500	0,37500	0,75000	0,75000	0,37500	0,37500	0,37500	0,37500	0,37500	0,37500	Dark Current 2
67	Low	0,50000	0,50000	0,50000	0,50000	0,12500	0,12500	0,50000	0,12500	1,00000	1,00000	Dark Current 3
	High	0,50000	0,50000	0,50000	0,50000	0,12500	0,12500	0,50000	0,12500	1,00000	1,00000	Dark Current 3

Co-Adding

CO_ADDING	45							
Cluster Index	1	2	3	4	5	6	7	8
Co_Adding Factor	8	8	8	8	8	8	8	8
Cluster Index	9	10	11	12	13	14	15	16
Co_Adding Factor	8	8	8	8	8	8	8	8
Cluster Index	17	18	19	20	21	22	23	24
Co_Adding Factor	8	8	8	8	8	8	4	4
Cluster Index	25	26	27	28	29	30	31	32
Co_Adding Factor	4	4	4	8	8	8	8	8
Cluster Index	33	34	35	36	37	38	39	40
Co_Adding Factor	16	16	16	16	16	8	8	8
Cluster Index	41	42	43	44	45	46	47	48
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	49	50	51	52	53	54	55	56
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	57	58	59	60	61	62	63	64
Co_Adding Factor	0	0	0	0	0	0	0	0

CO_ADDING	51							
Cluster Index	1	2	3	4	5	6	7	8
Co_Adding Factor	1	1	1	1	1	1	1	1
Cluster Index	9	10	11	12	13	14	15	16
Co_Adding Factor	1	1	1	1	2	2	2	2
Cluster Index	17	18	19	20	21	22	23	24
Co_Adding Factor	2	2	2	2	2	2	1	1
Cluster Index	25	26	27	28	29	30	31	32
Co_Adding Factor	1	1	1	1	1	1	1	1
Cluster Index	33	34	35	36	37	38	39	40
Co_Adding Factor	1	1	1	1	1	1	1	1
Cluster Index	41	42	43	44	45	46	47	48
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	49	50	51	52	53	54	55	56
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	57	58	59	60	61	62	63	64
Co_Adding Factor	0	0	0	0	0	0	0	0

CO_ADDING	49							
Cluster Index	1	2	3	4	5	6	7	8
Co_Adding Factor	2	2	2	2	2	2	1	1
Cluster Index	9	10	11	12	13	14	15	16
Co_Adding Factor	1	1	1	1	2	2	2	2
Cluster Index	17	18	19	20	21	22	23	24
Co_Adding Factor	2	2	2	2	2	2	1	1
Cluster Index	25	26	27	28	29	30	31	32
Co_Adding Factor	1	1	1	1	1	1	1	1
Cluster Index	33	34	35	36	37	38	39	40
Co_Adding Factor	2	2	2	2	2	1	1	1
Cluster Index	41	42	43	44	45	46	47	48
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	49	50	51	52	53	54	55	56
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	57	58	59	60	61	62	63	64
Co_Adding Factor	0	0	0	0	0	0	0	0

CO_ADDING	52							
Cluster Index	1	2	3	4	5	6	7	8
Co_Adding Factor	2	2	2	2	2	2	2	2
Cluster Index	9	10	11	12	13	14	15	16
Co_Adding Factor	2	2	2	2	1	1	1	1
Cluster Index	17	18	19	20	21	22	23	24
Co_Adding Factor	1	1	1	1	1	1	2	2
Cluster Index	25	26	27	28	29	30	31	32
Co_Adding Factor	2	2	2	1	1	1	1	1
Cluster Index	33	34	35	36	37	38	39	40
Co_Adding Factor	4	4	4	4	4	4	4	4
Cluster Index	41	42	43	44	45	46	47	48
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	49	50	51	52	53	54	55	56
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	57	58	59	60	61	62	63	64
Co_Adding Factor	0	0	0	0	0	0	0	0

CO_ADDING	50							
Cluster Index	1	2	3	4	5	6	7	8
Co_Adding Factor	1	1	1	1	1	1	1	1
Cluster Index	9	10	11	12	13	14	15	16
Co_Adding Factor	1	1	1	1	4	4	4	4
Cluster Index	17	18	19	20	21	22	23	24
Co_Adding Factor	4	4	4	4	4	4	1	1
Cluster Index	25	26	27	28	29	30	31	32
Co_Adding Factor	1	1	1	2	2	2	2	2
Cluster Index	33	34	35	36	37	38	39	40
Co_Adding Factor	1	1	1	1	1	1	1	1
Cluster Index	41	42	43	44	45	46	47	48
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	49	50	51	52	53	54	55	56
Co_Adding Factor	0	0	0	0	0	0	0	0
Cluster Index	57	58	59	60	61	62	63	64
Co_Adding Factor	0	0	0	0	0	0	0	0