



Operations Notes

FOS Team @ ESAC

Reported by:

J. Fauste/J.M. Castro Cerón

Topic:

Date:

Issue:

FOS Report for week 05, year 2020

from 27 JAN 2020 to 03 FEB 2020

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1 General Comments

Activities scheduled for this week are those planned for the 05th calendar week of 2020:

27 JAN 2020 to 03 FEB 2020 (DOYs 027 to 034).

The following routine activities were planned this week (see Gantt chart on next page and CRF 863).

- One PMS Offset on 30 JAN 2020 (DOY 030), including three Short Calibrations at 07:25:00.0z, 07:25:34.8z, and 07:26:09.6z (orbit 53833).
- Local Oscillator Calibrations every 10 minutes.
- X band Passes over ESAC and Svalbard.
- A routine Orbit Correction Maneuver (OCM) was scheduled for 30 JAN 2020 at 23:05:00z. The affected time period went from 2020-01-30T22:54:37,426z to 2020-01-30T23:14:04,304z. Science data for that period was flagged with an external APID. One regular X band GS pass over Svalbard (AOS = 2020-01-30T23:12:21z; LOS = 2020-01-30T23:22:37z) was not scheduled because it conflicted with the OCM.

2 Mission Planning Deviations

None.



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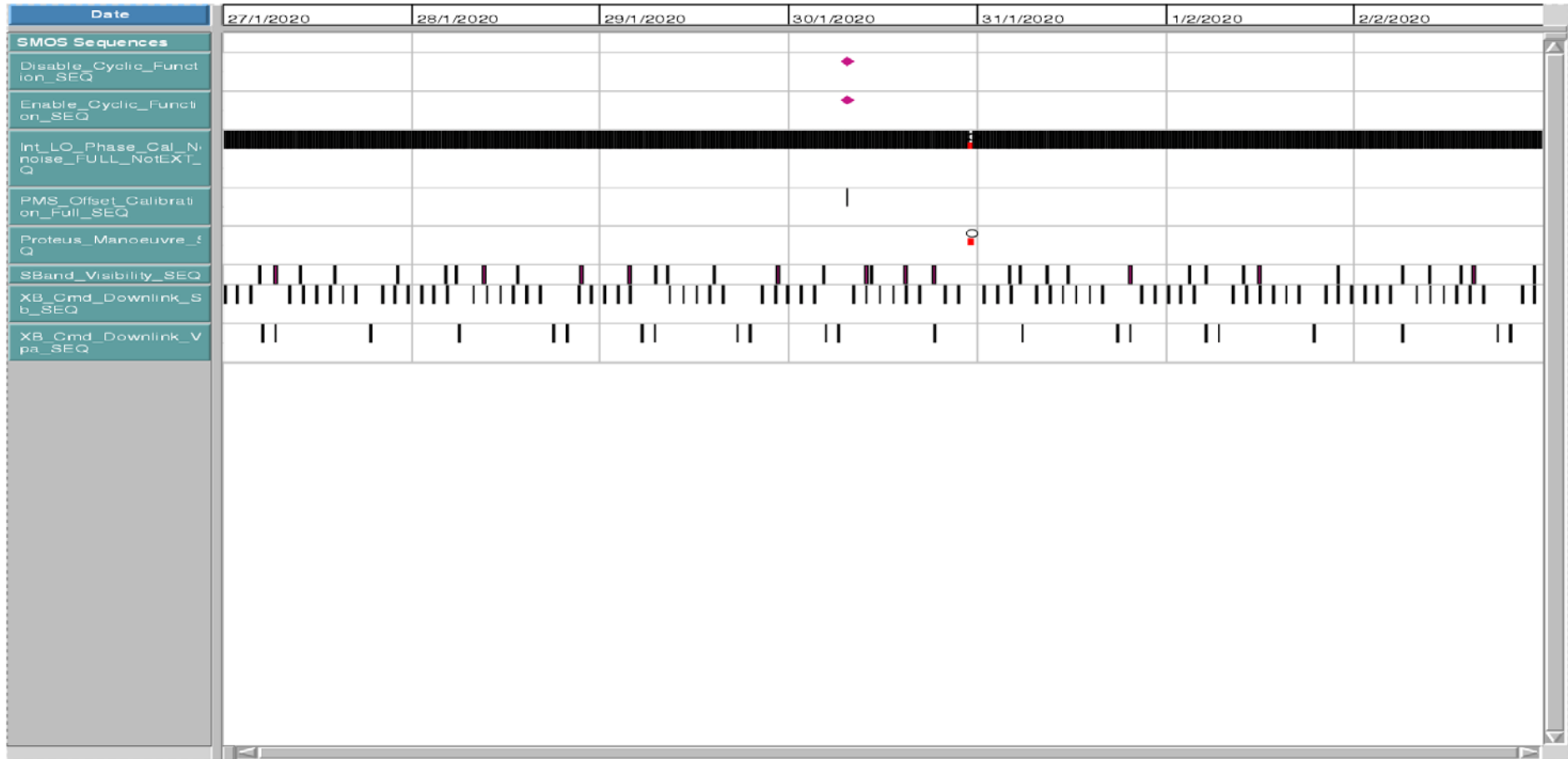
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Schedule Name: 2020_w05_cr ### Display start: 27-01-2020 00:00:00.000 ### Display end: 03-02-2020 00:00:00.000





3 TC Failures

None.

4 On Board Anomalies

- A new MIRAS CCU reset happened on 2020-02-02T04:35:28.967z. The reset took place at the end of the third Svalbard pass of the day with AOS=04:32:14z. The anomaly was noticed by the CNES oncall engineer upon reception of S-Band pass with AOS 05:59:36z. Following that, FOS on call engineer was notified by a phone call from Ops Call manager around 07:10z. The last TM packet before the reset was received on 2020-02-02T04:35:28.967z. The FOS team had produced, in advance, a suitable re-planning for this contingency. Included in CRF No 864, that was uploaded by CNES during GS passes IVK-2 and KER-1 with respectively AOS at 2020-02-02T09:32:27 and 2020-02-02T13:31:35z. MIRAS X-band downlink activities were successfully resumed on 2020-02-02T1439:21z.

Incidentally, this CCU reset sorted out the P0 latch-up from 31 JAN 2020

Because of this reset, 3 minutes and 46 seconds of science data were lost (from 2020-02-02T04:32:17z to 2020-02-02T04:36:03z), and the following X band GS passes were not acquired:

Type	Start Time	Stop Time	Duration (s)
ESAC	2020-02-02T06:02:17	2020-02-02T06:10:27	489
SVAL	2020-02-02T07:54:28	2020-02-02T08:01:06	398
SVAL	2020-02-02T09:36:57	2020-02-02T09:41:18	260
SVAL	2020-02-02T11:18:59	2020-02-02T11:22:32	212
SVAL	2020-02-02T12:59:42	2020-02-02T13:04:56	314

The sequence of events including alarm and event packets leading to the CCU reset was:

2020.033.04.31.54 XBand powered on
2020.033.04.32.18 MM Full Dump Start

and 214 seconds after the switch on of the X-band transmitter the instrument reset. No alarm packets were received before the reset but immediately after the reset the two following uncorrelated TM error packets were issued by the instrument indicating a slow time



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synchronization of the payload with PROTEUS (error already seen in some other resets)

2020.033.06.51.07z Time_Correlator_unexpected.UTC

2020.033.06.51.07z Time_Correlator_unexpected.PPS

As in previous occasions, the instrument boot report packet indicated as reason for the anomaly reset the usual “Task Overrun” error.

- MIRAS instrument MM, partition P0, latched up 2020-01-31T10:08:12,780z (DOY 031).

The following parameters went out of limits in the PLPC system:

2020.031.10.08.12,780z DMASME12 LU Switch P0

2020.031.10.08.12,780z DMASME37 SDD LU Detected

This anomaly was geolocated over inner Antarctica:

Latitude = -81.60°

Longitude = 27.30

At the time of the anomaly, the Read and Write pointers were on partition P0. The anomaly recovered by itself following a CCU reset 02 FEB 2020.

At the time of the anomaly the position of the MM pointers were as follows:

Read = 64168 (partition P0)

Write = 200920 (partition P0)

- The MIRAS instrument CCU reset on 2020-01-30T06:22:26,532z (DOY 030). An early heads-up came from DPGS operators when no data was delivered for Svalbard X band GS pass with AOS=2020-01-30T08:11:18z. Reset was then confirmed by FOS upon reception of S band GS pass IVK-11 (AOS=2020-01-30T09:48:45z), and notified to DPGS, KSAT, and CNES (email 11:20z).

The reset befell towards the end of ESAC X band GS pass commencing 2020-01-30T06:18:50,859z (transponder on). Said GS pass was scheduled for a duration of 462 seconds. The reset occurred 3.59 minutes after AOS, and before the switch off of the X band antenna, scheduled on 2020-01-30T06:26:51,619z. The last TM packet received before the reset was time stamped at 2020-01-30T06:22:26.532z. This reset was triggered by the standard Task Overrun error (Boot Report).



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FOS team re-planned activities for the remainder of week 05 and the full of week 06 that same day, 30 JAN 2020. Included in CRF No. 865, it was uploaded by CNES, following the execution of PRO-CRP-100, during S band GS pass IVK-12 on 2020-01-30T14:43:42z. Incidentally, the standard planning for week 06 had been uploaded (as typically scheduled) during S band GS pass IVK-11 (i.e. the pass which provided confirmation for the reset on-board). FOS decided to play safe and deleted those TC groups after recovery (PRO-CRP-100) and before uploading the re-planning of both week 05 and week 06.

As per this re-planning, nominal MIRAS X band GS dumps resumed on 2020-01-30T19:54:22,604z.

Because of this reset, 36 seconds (preliminary, analysis still ongoing due to the network intervention tonight) of science data were lost (from 2020-01-30T06:22:23z to 2020-01-30T06:22:59z), and the following X band GS passes were not acquired:

PASS	AOS	LOS	Duration
SVAL	2020-01-30T08:11:37	2020-01-30T08:17:52	374
SVAL	2020-01-30T09:54:08	2020-01-30T09:58:11	242
SVAL	2020-01-30T11:35:58	2020-01-30T11:39:39	221
SVAL	2020-01-30T13:16:29	2020-01-30T13:22:08	338
SVAL	2020-01-30T14:56:24	2020-01-30T15:04:19	474
SVAL	2020-01-30T16:36:03	2020-01-30T16:45:34	571
ESAC	2020-01-30T18:27:13	2020-01-30T18:35:25	492

The sequence of events leading to the CCU reset was as follows:

OBT	ID	Severity	Event
2020.030.06:18:50	725	NORM	XBand Powered On
2020.030.06:19:14	695	NORM	MM Full Dump Star
2020.030.06.22.25	689	ALARM	MM_Error_Counters_Acquisition_Fail
2020.030.06.22.25	690	ALARM	MM_Scrub_Frequency_Acquisiti
2020.030.06.22.25	684	ALARM	MM_Address_Acquistion_Failure
2020.030.06.22.25	682	NORM	MM Dump Ended
2020.030.06.22.25	692	ALARM	MM_Science_Write_Failure

The values of the READ and WRITE pointers at the time of the reset were:

Read = 3675220, *MM Partition P8*

Write = 3930436, *MM Partition P8*

The anomaly was geolocated approaching the Gulf of Cádiz:



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Latitude = 37.43°

Longitude = 348.23°

5 On Board Events Telemetry

Just immediately before the CCU reset on the 30th of January 2020, the following Alarm packets were received.

Event Description	Packet ID	Severity	Event Time
MM_Error_Counters_Acquisition_Failure	689	ALARM	2020-01-30T06:22:25
MM_Scrub_Frequency_Acquisition_Failure	690	ALARM	2020-01-30T06:22:25
MM_Address_Acquisition_Failure	684	ALARM	2020-01-30T06:22:25
MM_Science_Write_Failure	692	ALARM	2020-01-30T06:22:25

Just after the CCU reset the following two error TM packets were received indicating some delays on the MIRAS synchronization with PROTEUS.

Event Description	Packet ID	Severity	Event Time
Time_Correlator_Unexpected_UTC	652	ERROR	2020-02-02T06:51:07
Time_Correlator_Unexpected_PPS	653	ERROR	2020-02-02T06:51:07

The following RAM Single Bit errors befell this week:

Event Description	Packet ID	Severity	Event Time	Parameters
RAM single Bit Error	730	WARN	2020-01-27T22:03:39	21D3FDC
RAM single Bit Error	730	WARN	2020-01-30T06:23:00	21D3FDC
RAM single Bit Error	730	WARN	2020-01-30T10:25:17	2051774
RAM single Bit Error	730	WARN	2020-01-31T09:41:55	204469C
RAM single Bit Error	730	WARN	2020-02-02T06:51:07	204469C
RAM single Bit Error	730	WARN	2020-02-02T22:07:53	201CA7C

6 FOS Systems Status

- On 27th of January, a new SSL certificate was installed on SMTA machine with a validity period from 27 JAN 2020 to 27 JAN 2022.
- At FOS request, EOP-PES checks the Orbit Scenario File (OSF) biannually. A new entry in this file was required to compensate additional orbital drift observed from MAY 2019 (orbit 50 000). Consequently, a new version of the OSF adjusting this drift was issued by FOS 10 JAN 2020 and distributed for testing and



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validation purposes to CEC. Following a successful validation, the new OSF was officially delivered by FOS on 29 JAN 2020.

7 Data Reception from CNES

All S band passes were correctly received from CNES and successfully processed by the FOS PLPC system.

8 X Band Data Reception in PXMF

None, all S band passes successfully received and processed.

9 Exceptional Activities

None.

10 AOB

None.



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APPENDIX A: OOLs

During the execution of the CCU recovery procedure on the 2^{sd} of February, the following parameter went out of limits on the PLPC system indicating that the MIRAS ITL was disable.

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOL Value	Check Value
2020-02-02T14:03:38	2020-02-02T09:39:49	NTLHK022	ITL Ena State	Disabled	Enabled

At the time of the CCU reset on the 2^{sd} of February, the following TM parameters went temporary out of limits on the PLPC system

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOL Value	Check Value
2020-02-02T06:51:08	2020-02-02T04:36:04	TCO_FLAG	TCO Restart flag	NOT-OK	OK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM22167	C3 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM21167	C2 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM20167	C1 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM19167	B3 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM18167	B2 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM17167	B1 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM16167	A3 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM15167	A2 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM14167	A1 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM13167	H3 LO_Locking	UNLOCK	LOCK



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2020-02-02T06:51:07	2020-02-02T06:51:07	SPM12172	H2 LO_locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPM11167	H1 LO_Locking	UNLOCK	LOCK
2020-02-02T06:51:07	2020-02-02T06:51:07	SPC10107	PPS_ERROR_FLAG	Unexpect PPS	valid
2020-02-02T06:51:07	2020-02-02T06:51:07	SPC02106	Instrument_Mode	Inst Init	Any
2020-02-02T06:51:07	2020-02-02T06:51:07	XNIRABST	NIR AB VALID ST	NOT-OK	OK
2020-02-02T06:51:07	2020-02-02T06:51:07	XNIRBCST	NIR BC VALID ST	NOT-OK	OK
2020-02-02T06:51:07	2020-02-02T06:51:07	XNIRCAST	NIR CA VALID ST	NOT-OK	OK

The MM memory latch up of partition P0 generated the two following out of limits on the PLPC system.

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOl Value	Check Value
2020-01-31T12:04:52	2020-01-31T10:08:12	DMASME37	SDD LU Detected	FALSE	TRUE
2020-01-31T12:04:52	2020-01-31T10:08:12	DMASME12	LU Switch P0	OFF	ON

During the execution of the CCU recovery procedure on the 31st of January, the following parameter went out of limits on the PLPC system indicating that the MIRAS ITL was disable.

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOl Value	Check Value
2020-01-31T04:43:13	2020-01-30T22:54:29	NTLHK022	ITL Ena State	Disabled	Enabled

At the time the OCM manoeuvre was executed the MIRAS ITL was made disable and the following TM parameter went temporary out of limits on the PLPC system.

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOl Value	Check Value
2020-01-30T18:56:29	2020-01-30T14:45:53	NTLHK022	ITL Ena State	Disabled	Enabled



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At the time of the CCU reset on the 30th of January, the following TM parameters went temporary out of limits on the PLPC system

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOL Value	Check Value
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM22167	C3 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM21167	C2 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM20167	C1 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM19167	B3 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM18167	B2 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM17167	B1 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM16167	A3 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM15167	A2 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM14167	A1 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM13167	H3 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM12172	H2 LO_locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPM11167	H1 LO_Locking	UNLOCK	LOCK
2020-01-30T10:23:50	2020-01-30T06:22:59	SPC02106	Instrument_Mode	Inst Init	Any