Operations Notes

FOS Team @ ESAC

Reported by:

J. Fauste/J.M. Castro Cerón

Topic:

Date:

Issue:

FOS Report for week 43, year 2016

from 24 OCT 2016 to 31 OCT 2016

1.0

1   General Comments

Activities scheduled for this week are those planned for the 43th calendar week of 2016:

```
24 OCT 2016 to 31 OCT 2016 (DOYs 298 to 305).
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The following routine activities were planned this week (see Gantt chart on next page and CRF 613):

- One PMS Offset on 27 OCT 2016 (DOY 301), including three Short Calibrations at 07:45:00,0z, 07:45:34,8z, and 07:46:09,6z (orbit 36710).
- Local Oscillator Calibrations every 10 minutes.
- *X* band Passes over ESAC and Svalbard.
- A new Orbit Correction Manoeuvre (OCM) was performed on 26/10/2016 at 22:30z. The affected time period for the manoeuvre went from 22:29:55z to 22:52:09z. Science data for that period was flagged as usual with an external APID..

2   Mission Planning Deviations

- Due to MIRAS CCU reset that happened on the 24th of October the following XBand passes did not take place.

Ground Station	AOS	LOS	Duration
Xband_ESAC	2016-10-24T06:57:56z	2016-10-24T07:02:52z	295
Xband_SVAL	2016-10-24T08:50:10z	2016-10-24T08:55:29z	318
Xband_SVAL	2016-10-24T10:32:35z	2016-10-24T10:36:09z	214
Xband_SVAL	2016-10-24T12:13:52z	2016-10-24T12:18:09z	257
Xband_SVAL	2016-10-24T13:54:05z	2016-10-24T14:00:39z	394
Xband_SVAL	2016-10-24T15:33:52z	2016-10-24T15:42:30z	518

- The OCM scheduled on the 26th of October clashed with an scheduled Xband pass over Svalbard from 22:32:08z to 22:42:52z, due to that said pass was cancelled.

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OCT-2016

| Day 298, Mon, 24-OCT-2016 | Day 299, Tue, 25-OCT-2016 | Day 300, Wed, 26-OCT-2016 | Day 301, Thu, 27-OCT-2016 | Day 302, Fri, 28-OCT-2016 | Day 303, Sat, 29-OCT-2016 | Day 304, Sun, 30-OCT-2016 |

SMOS

ESAC_PASS

KSAT_PASS

LOCAL_OSCILATOR

PMS_OFFSET

SBAND_PASS

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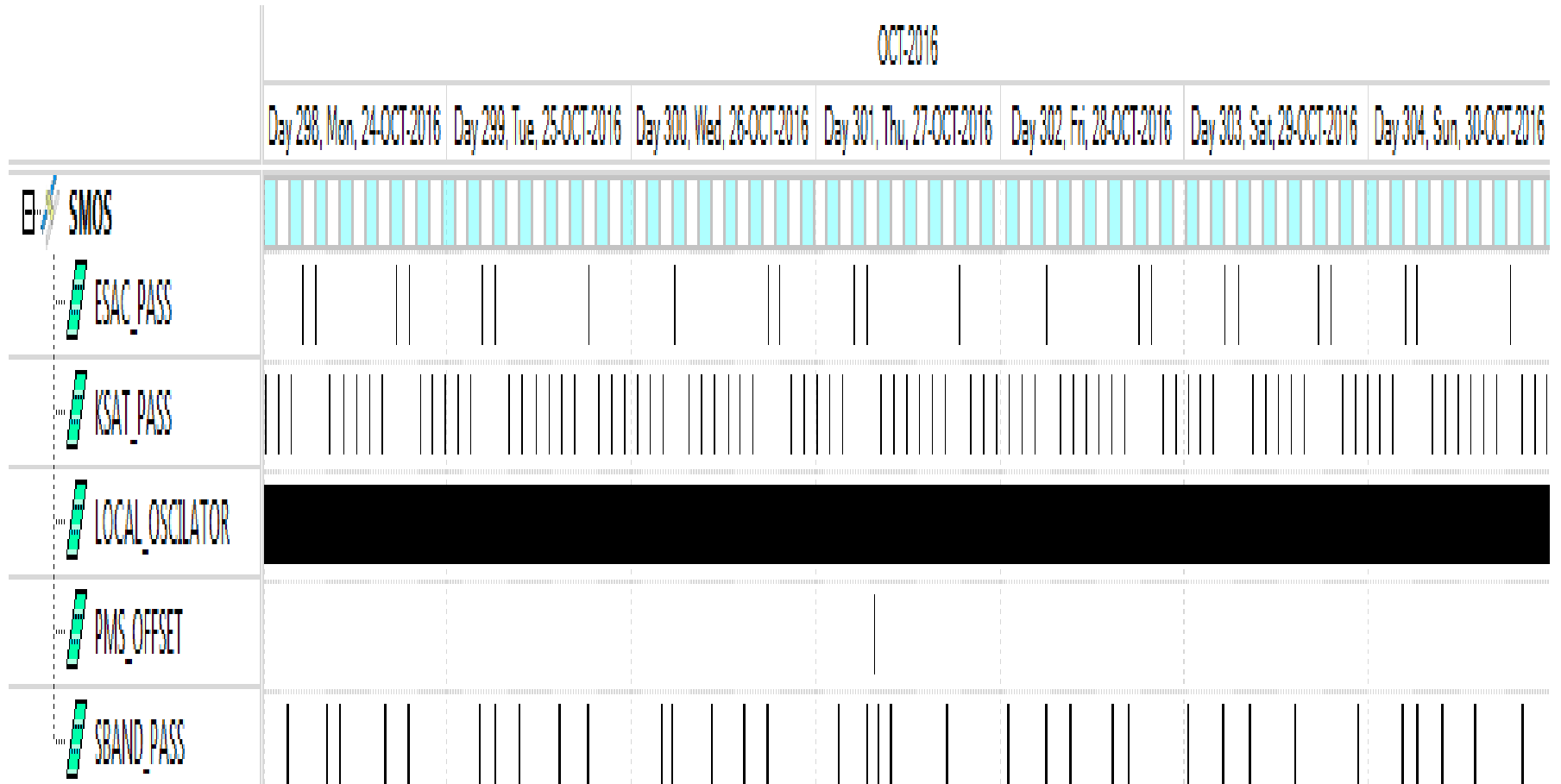
3 TC Failures

None.

4 Unforeseen Out of Limits (OOLs)

Two main groups of PLPC out of limits were received at the time of the Mass Memory Latch up on the 30th of October and the CCU Reset of the 24th of October (see sections 5 and Appendix-A of this report for further details).

Also temperature of LICEF A10, telemetry parameter NCNMN3T03, went out of limits several times due to the known anomaly on that LICEF and the nominal seasonal variations taking place during this time of the year. The increase of that temperature should continue up to the 31st of January 2017 where shall reach its maximum seasonal value.

5 On Board Anomalies

- The MIRAS instrument MM, partition P9, latched up on 2016-10-30T18:49:53.224z (DOY 304). This anomaly was geolocated in the central part of the South Atlantic Ocean at the following geographical coordinates:

  Latitude   = -12°.025275
  Longitude   = 345°.729167

  No science data losses did happen since the anomaly took place in one of the MM spare partitions. Recovery will take place on 2016-11-02T12:30:00z (CRF 618)

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

  Read   = 173966 (partition P0)
  Write   = 218346 (partition P0)

- A new MIRAS CCU reset happened on 2016-10-24T03:50:35.418z (DOY 298). A phone call from CNES to the FOS hotline in the morning of the 24 OCT 2016 alerted about this anomaly. The reset was confirmed on reception of S band GS pass KUX-31 (AOS = 2016-10-24T08:26:27z).
  The reset befell at the end of a Svalbard X band GS pass commencing on 2016-10-24T03:47:23 (transponder on). Said GS pass was scheduled for a duration of 615 seconds. The reset occurred 216 seconds after AOS, and before the switch off of the X band antenna, scheduled on 2016-10-24T03:50:35z. The last

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TM packet received before the reset was time stamped at 2016-10-24T03:50:35.418z.

MIRAS re-planning was issued by FOS in the morning of the 24 of October 2016 via CRF No. 616 and uploaded by CNES, following the execution of PRO-CRP-100, during S band GS pass KUX-32 on 2016-10-24T10:04:37z. As per this re-planning, nominal MIRAS X band GS dumps resumed on 2016-10-24T17:27:27z (ESAC pass). Because of this reset 228 seconds of science data were lost (from 24/10/2016 03:47:22z, to 24/10/2016 03:51:10z).

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

> *2016.298.03.46.59,107 ==> XBand Powered On*
> *2016.298.03.47.23,107 ==> MM Full Dump Start*
> *2016.298.03.50.35,418 ==> MM_Science_Write_Failure*
> *2016.298.03.50.35,418 ==> MM_Science_Write_Failure*

After the reset event, it took one instrument Epoch to synchronize the time between the platform and the instrument and as result of that the two following alarm packets were also received after the reset:

> *Time Correlator Unexpected UTC*
> *Time Correlator Unexpected PPS*

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

> *Read=1023056,   MM Partition P2*
> *Write=1023056,   MM Partition P2*

This reset fixed MM partition P8, latched-up on 2016-10-21T12:30:16,909z (DOY 295).

6 On Board Events Telemetry

The following Alarm telemetry packets were received at the time of MIRAS CCU reset:

Event Description	Severity	Event Time
MM Science Write Failure	ALARM	2016.298.03.50.35.418
MM Science Write Failure	ALARM	2016.298.03.50.35.318

The following RAM Single Bit errors befell this week:

Event Description	Severity	Event Time	Parameters

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RAM single Bit Error	WARN	2016.297.22.09.03.887	2164990
RAM single Bit Error	WARN	2016.298.08.57.30.000	2164990
RAM single Bit Error	WARN	2016.302.13.47.34.990	223A814

7 FOS Systems Status

All FOS systems nominal with exception of:

- On the 26th of October, PXMFPRM server was found to be unresponsive for the most part. Further research revealed that the entire file system had unmounted and "re-mounted" as "read only". This rendered the server effectively inaccessible for all practical purposes. The only course of action left was a "hard reset", following that, the server did not boot, yielding instead the following error message:

  PCIe training error: Slot 2
  System halted!

  As result of this and since a new virtual version of this FOS susbsystem will be installed soon, the machine was permanently declared failed and take it out from its operational usage. For the time being and until the new PXMF virtual system will become available, PXMFBKP machine remains as unique FOS XBand system.

  As consequence of this change, it took some time to GMV SW support team to reconfigure properly PXMFBKP system in order to ingest XBand telemetry on the SMTA machine.

8 Data Reception from CNES

All *S* band passes were correctly received from CNES and successfully processed by the FOS PLPC system, with the following exceptions:

- Sband GS pass AUS-38 (AOS = 2016-10-30T06:21:52z; LOS = 2016-10-30T06:35:16z) contained four PUS TM gaps. The MIRAS PUS TM gaps went:

  from 2016-10-30T05:49:38z to 2016-10-30T05:50:39z
  from 2016-10-30T05:57:15z to 2016-10-30T05:57:21z
  from 2016-10-30T05:58:26z to 2016-10-30T06:05:50z
  from 2016-10-30T06:07:15z to 2016-10-30T06:15:25z
  from 2016-10-30T06:15:43z to 2016-10-30T06:23:38z

  The following E_HKTM intervals were also lost:

  from 2016-10-30T05:59:27z to 2016-10-30T06:01:03z

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from 2016-10-30T06:09:03z to 2016-10-30T06:18:07z
from 2016-10-30T06:19:11z to 2016-10-30T06:23:59z

- Sband GS pass HBX-16 (AOS = 2016-10-26T14:44:52z; LOS = 2016-10-26T14:39:25z) was lost because of an Earth terminal anomaly on the CNES side. Attempts the following day from CNES to retrieve the TM by reading the relevant PROTEUS Mass Memory zone, failed and the data was finally lost. As consequence of that the following MIRAS and E_HKTM telemetry gap was produced in the FOS telemetry archive (MIRAS PUS Telemetry was anyway retrieved and archived from the XBand)

    from 2016-10-26T10:29:14z to 2016-10-26T14:46:59z

- Because an issue with the receiving station, S band GS pass AUS-32 (AOS = 2016-10-25T18:22:21z; LOS = 2016-10-25T18:37:02z) contained two PUS TM gaps. The gaps went:

    from 2016-10-25T14:59:13z to 2016-10-25T14:59:41z
    from 2016-10-25T15:00:05z to 2016-10-25T15:00:19z

    Also the following interval of E_HKTM was lost:

    from 2016-10-25T15:00:08z to 2016-10-25T15:01:12z

9 *X* Band Data Reception in PXMF

The FOS XBand system, PXMF was used extensively used during this reporting week to recover all the multiple PUS TM gaps detailed in section 8.

10 Exceptional Activities

The ones related with the MIRAS instrument reconfiguration after the MIRAS CCU reset (execution of procedure PRO-CRP-100) on the 24th of October.

11 AOB

None.

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APPENDIX A: OOLs

The following Out of Limits were received on the FOS PLPC system at the time of the Mass Memory Latch up in partition P9:

GS_TIME	OBTIME	PARAMETER	DESCRIPTION	OOL Value	Check Value
2016.304.20.48.52.925	2016.304.18.49.53.224	DMASME37	SDD LU Detected	FALSE	TRUE
2016.304.20.48.52.924	2016.304.18.49.53.224	DMASME03	LU Switch P9	OFF	ON

During the OCM scheduled on the 26 of October and at the time the MIRAS ITL went disable the following OOL was received on the PLPC system:

GS_TIME	OBTIME	PARAMETER	DESCRIPTION	OOL Value	Check Value
2016.301.03.44.44.504	2016.300.22.29.46.273	NTLHK022	ITL Ena State	Disable	Enable

The same OOL as the one before, was also received during the execution of the CCU recovery procedure:

GS_TIME	OBTIME	PARAMETER	DESCRIPTION	OOL Value	Check Value
2016.298.16.32.10.449	2016.298.10.07.51.279	NTLHK022	ITL Ena State	Disable	Enable

At the time of MIRAS CCU reset on the 24th of October the following parameters went out of hard limits:

GS_TIME	OBTIME	PARAMETER	DESCRIPTION	OOL Value	Check Value

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2016.298.03.50.35.418	2016.298.08.57.30.000	XNIRCAST	NIR CA VALID ST	NOT-OK	OK
2016.298.03.50.35.418	2016.298.08.57.30.000	XNIRBCST	NIR BC VALID ST	NOT-OK	OK
2016.298.03.50.35.418	2016.298.08.57.30.000	XNIRABST	NIR AB VALID ST	NOT-OK	OK
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM13167	H3 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM12172	H2 LO_locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM11167	H1 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPC02106	Instrument_Mode	Inst Init	Any Other
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM17167	B1 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM16167	A3 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM15167	A2 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM14167	A1 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM20167	C1 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM19167	B3 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM18167	B2 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM22167	C3 LO_Locking	Unlock	Lock
2016.298.03.50.35.418	2016.298.08.57.30.000	SPM21167	C2 LO_Locking	Unlock	Lock