



Operations Notes

FOS Team @ ESAC

Reported by:

J. Fauste/J.M. Castro Cerón/A. Vázquez

Topic: **FOS Report for week 31, year 2024**

Date: from 29 JUL 2024 to 05 AUG 2024

Issue: **1.0**

1 General Comments

Activities scheduled for this week are those planned for the 31st calendar week of 2024:

29 JUL 2024 to 05 AUG 2024 (DoYs 211 to 218).

The following routine activities were planned this week (see Gantt chart on next page and CRF N° 1208):

- One PMS Offset on 01 AUG 2024 (DoY 214), including three Short Calibrations at 05:11:00.0z, 05:11:34.8z, and 05:12:09.6z (orbit 77502).
- Local Oscillator Calibrations every 10 minutes.
- X band Passes over ESAC and Svalbard.

2 Mission Planning Deviations

Because of the CCU reset 04 AUG 2024 the following X band GS passes were not acquired (see Sect.4):

Station	AoS	LoS	Duration (s)
Xband_SVAL	2024-08-04T20:43:20	2024-08-04T20:53:44	623
Xband_SVAL	2024-08-04T22:22:09	2024-08-04T22:32:26	616
Xband_SVAL	2024-08-05T00:00:49	2024-08-05T00:11:08	618
Xband_SVAL	2024-08-05T01:39:36	2024-08-05T01:50:02	626
Xband_SVAL	2024-08-05T03:18:51	2024-08-05T03:29:12	621
Xband_SVAL	2024-08-05T08:22:06	2024-08-05T08:28:05	359
Xband_SVAL	2024-08-05T10:04:36	2024-08-05T10:08:29	232
Xband_SVAL	2024-08-05T11:46:17	2024-08-05T11:50:06	229

The following X band GS passes were acquired with the autodownlink function:

Station	AoS	LoS	Duration (s)
Xband_ESAC	2024-08-04T19:15:58	2024-08-04T19:23:38	459
Xband_ESAC	2024-08-05T04:51:18	2024-08-05T04:57:46	387
Xband_ESAC	2024-08-05T06:29:32	2024-08-05T06:36:45	433



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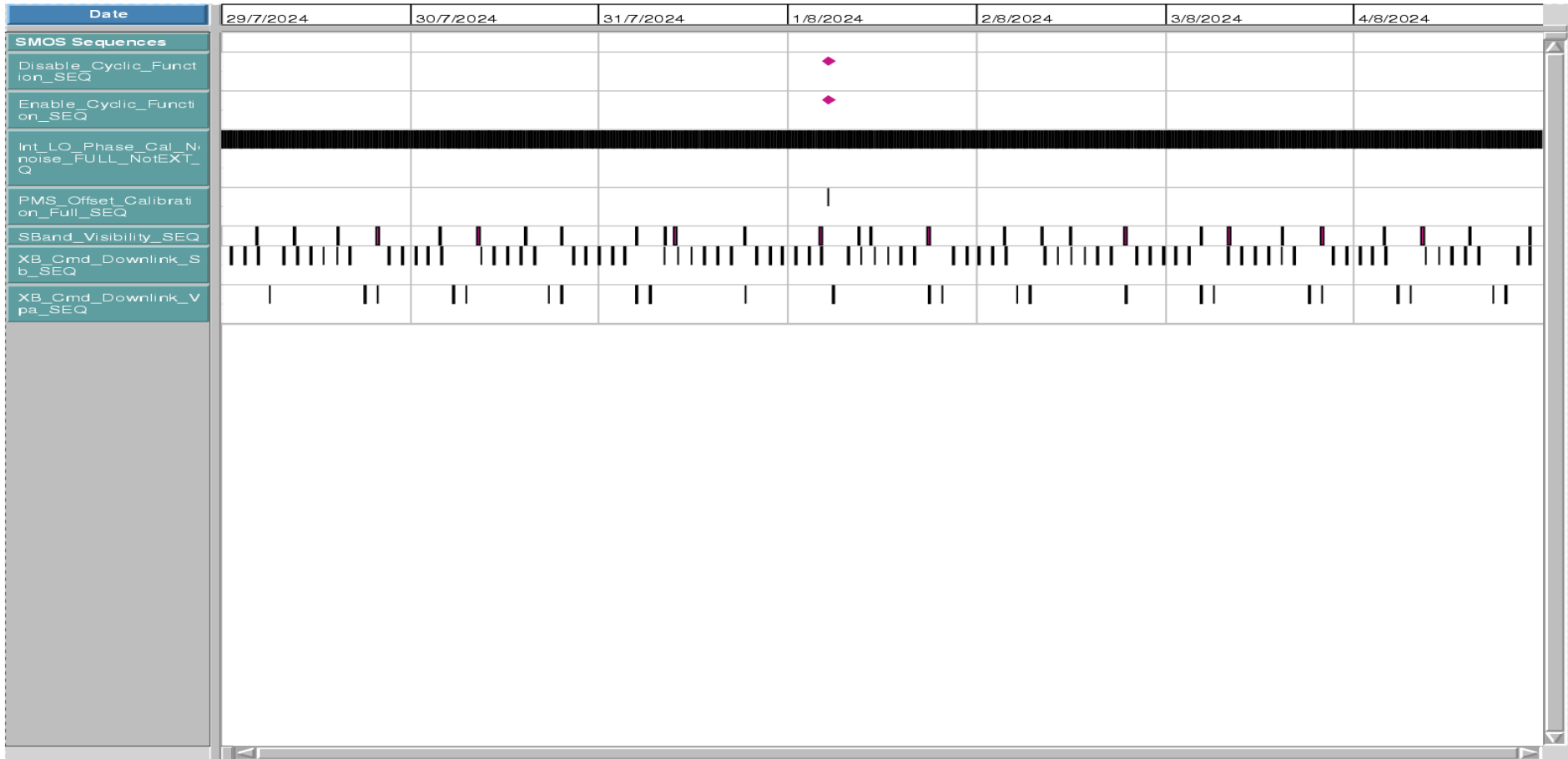
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Schedule Name: 2024_w31_cr ### Display start: 29-07-2024 00:00:00.000 ### Display end: 05-08-2024 00:00:00.000





3 TC Failures

- TC groups for week 30 [22-28 JUL], year 2024 [CRF N° 1206], were generated Wednesday morning 17 JUL 2024. They included NIR+LONG calibrations, in a stack with 225 commands. First [07:24z] attempt yielded a faulty signature file. Given this potential corruption, and as per standard FOS custom, all PUS_TC files were deleted, then regenerated a second [07:46z] time.

This second set of TC groups was passed on to CNES and uplinked successfully Thursday 18 JUL 2024. Saturday 27 JUL 2024, X band GS pass over Svalbard, with: AoS = 2024.209.14.16.55.821, LoS = 2024.209.14.23.40.719, was not executed by MIRAS. There was no data loss because of the overlap.

A preliminary investigation by FOS revealed that, in one of the TC groups, the number of instances the X band transmitter was switched on did not match the number of switch-offs. A switch-on command had been autonomously omitted in converting from mission planning stack to TC group.

An offline test did not reproduce the issue, the cause of which remained under investigation as of this writing.

4 On Board Anomalies

- MIRAS instrument MM, partitions P4 and P5, latched up simultaneously 2024-07-30T04:30:05z (DoY 212). The following parameters went out of limits in the PLPC system:

2024.212.04.30.05z	DMASME08	LU Switch P4
2024.212.04.30.05z	DMASME07	LU Switch P5
2024.212.04.30.05z	DMASME37	SDD LU Detected

This anomaly was geolocated over the Cook Islands (Polynesia):

LAT.	= -15.88°
LONG.	= 200.28°

These were two simultaneous, rather short lived, latch-ups (P4=15.6 s; P5=16.8 s). They occurred in the middle of PRO-CRP-800 execution to recover previously latched up P3 (see report for week 30).

The sequence of events was as follows:

- P3 latched up 27 JUL 2024
- 2024.212.44.30.00,000z: PRO-CRP-800 started
- 2024.212.44.30.04,556z: P04 latched up
- 2024.212.44.30.04,556z: P05 latched up
- 2024.212.44.30.17,756z: P03 cleared
- 2024.212.44.30.20,156z: P04 cleared
- 2024.212.44.30.21,356z: P05 cleared

MM scrubbing had been disabled during recovery (NMASME47). An elevated number of SB errors afterwards suggested a real



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occurrence. Similar ones have already taken place during the mission. As in those occasions, no clear conclusions could be drawn as to the causes of this anomaly.

There were no science data losses associated with these anomalies because it affected partitions P4, and P5, while the Read and Write pointers were both on partition P1. Recovery took place within the already on-going PRO-CRP-800 [CRF N° 1209, started 30 JUL 2024, 04:30:00z].

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

READ = 542605 (*partition P1*)
WRITE = 637618 (*partition P1*)

- MIRAS Correlator and Control Unit reset Sunday 2024-08-04T17:42:28z (DoY 217), at the end of ESAC X band GS pass 2024-08-04T17:38:48z. Anomaly was detected by KSAT operators upon not receiving Svalbard X band GS passes 2024-08-04T20:43:15z and 2024-08-04T22:22:04z. It was confirmed by FOS engineer on call upon reception of S band GS pass KRX-02 (AoS = 2024-08-04T22:20:53z). FOS engineer contacted both KSAT (night time) and CNES (morning time). Recovery was agreed for S band GS pass IVK-03 (AoS = 2024-08-05T09:59:08z; CRF N° 1211), with S band GS pass PAM-01 (AoS = 2024-08-05T12:39:34z; maiden pass) as back-up.

Last MIRAS TM packet received before reset was time stamped 2024-08-04T17:42:28z. Reset was triggered by the standard OBSW error Task Overrun (information included in the Boot Report packet). No alarm TM packets preceded this anomaly. Nominal MIRAS X band GS dumps resumed Monday, 2024-08-05T13:26:49z, over Svalbard. See Sect. 2 for a list of X band GS passes not acquired/autodownlinked, and Appendix A for a list of OOLs displayed in the FOS PLPC system immediately after the reset.

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

READ = 633339 (*partition P1*)
WRITE = 930275 (*partition P2*)

The anomaly was geolocated over the Governorate of Tataouine (Tunisia):

LAT. = 32.67°
LONG. = 10.03°

This reset caused 233 s of science data losses.

- The MIRAS CMN, unit H1, unlocked 2024-08-04T21:16:18z (DoY 217). This anomaly was geolocated over the Estado de Goiás (Brazil):

LAT. = -16.28°
LONG. = 308.66°



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Both parameters, output power SPM11162 and locking status SPM11167, went out of limits in the FOS PLPC system. The anomaly recovered by itself in 5 epochs.

5 On Board Events Telemetry

The following RAM Single Bit errors befell this week:

Event Description	Packet ID	Severity	Event Time	Parameters
RAM Single Bit Error	730	WARNING	2024.213.11.54.45	2003DB8
RAM Single Bit Error	730	WARNING	2024.215.13.21.55	21E2048
RAM Single Bit Error	730	WARNING	2024.217.17.43.06	21E2048

6 FOS Systems Status

All FOS systems nominal.

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

- Starting 2024-08-03T16:48:07z (DoY 216), SMOS entered reduced mode for Command & Control because of a GPS anomaly. Both platform and payload status remained OK. Despite the occurrence, PVT data were correct; orbit restitution for this date was nominal (OK).

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

2024.216.16.48.07z	DPC10107	UTC Cur Source
2024.216.17.24.18z	TCO_FLAG	TCO Restart flag
2024.216.17.24.19z	SPC10107	PPS_ERROR_FLAG

Anomaly was followed by this set of error TM packets:

Event Description	Packet ID	Severity	Event Time
Time_Correlator_Mode_Timeout	651	ERROR	2024.216.17.24.19z
Time_Correlator_Unexpected_PPS	653	ERROR	2024.216.17.24.19z

S band GS pass HBX-01 [AoS=2024-08-04T14:34:15z] revealed no hardware anomaly and evidenced the receiver working correctly. Consequently, S band GS pass IVK-03 [AoS=2024-08-05T09:59:08z] uplinked Command & Control to NOM value.

Following reception of all HKTm for the day, CNES confirmed SMOS was back to nominal mode for Command & Control, and FOS



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confirmed MIRAS was receiving GPS as time source. GPS went back to control loop at 10:00:42z.

Anomaly signature (parameter SPM11102) was identical to the three previous occurrences.

10 AOB

None.



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APPENDIX A: OOLs

The following OOLs befell at the time the MIRAS instrument MM, partition P4, latched up 2024-07-30T04:30:05z (DoY 212; see Sect. 4):

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOl Value	Check Value
2024.212.08.54.01	2024.212.04.30.05	DMASME08	LU Switch P4	OFF	ON
2024.212.08.54.01	2024.212.04.30.05	DMASME37	SDD LU Detected	FALSE	TRUE

The following OOLs befell at the time the MIRAS instrument MM, partition P5, latched up 2024-07-30T04:30:05z (DoY 212; see Sect. 4):

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOl Value	Check Value
2024.212.08.54.01	2024.212.04.30.05	DMASME07	LU Switch P5	OFF	ON
2024.212.08.54.01	2024.212.04.30.05	DMASME37	SDD LU Detected	FALSE	TRUE

The following OOLs befell at the time the PROTEUS platform entered reduced mode for Command & Control, 2024-08-03T16:48:07z (DoY 216; see Sect. 9):

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOl Value	Check Value
2024.216.20.14.25	2024.216.16.48.07	DPC10107	UTC Cur Source	PROTEUS	GPS
2024.216.20.15.24	2024.216.17.24.19	TCO_FLAG	TCO Restart flag	NOT-OK	OK
2024.216.20.15.24	2024.216.17.24.19	SPC10107	PPS_ERROR_FLAG	Unexpect PPS	valid



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The following OOLs befell at the time the MIRAS instrument CCU reset 2024-08-04T17:42:28z (DoY 217; see Sect. 4):

GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOL Value	Check Value
2024.217.22.47.21	2024.217.17.43.05	SPC02106	Instrument_Mode	Inst Init	Any-Mode
2024.217.22.47.21	2024.217.17.43.05	SPM11167	H1 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM12172	H2 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM13167	H3 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM14167	A1 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM15167	A2 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM16167	A3 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM17167	B1 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM18167	B2 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM19167	B3 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM20167	C1 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM21167	C2 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	SPM22167	C3 LO_Locking	UNLOCK	LOCK
2024.217.22.47.21	2024.217.17.43.05	XNIRABST	NIR AB VALID ST	NOT-OK	OK
2024.217.22.47.21	2024.217.17.43.05	XNIRBCST	NIR BC VALID ST	NOT-OK	OK
2024.217.22.47.21	2024.217.17.43.05	XNIRCAST	NIR CA VALID ST	NOT-OK	OK

The following OOLs befell at the time the MIRAS instrument, CMN unit H1, unlocked 2024-08-04T21:16:18z (DoY 217; see Sect. 4):



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GS_TIME	OB_TIME	PARAMETER	DESCRIPTION	OOL Value	Check Value
2024.217.22.51.26	2024.217.21.16.18	SPM11167	H1 LO_Locking	UNLOCK	LOCK
2024.217.22.51.26	2024.217.21.16.18	SPM11162	H1 LO_Out_Power	NOT-OK	OK