



Operations Notes

FOS Team @ ESAC

Reported by:

J. Fauste/J.M. Castro Cerón

Topic:

Date:

Issue:

FOS Report for week 36, year 2023

from 04 SEP 2023 to 11 SEP 2023

1.0

1 General Comments

Activities scheduled for this week are those planned for the 36th calendar week of 2023:

04 SEP 2023 to 11 SEP 2023 (DoYs 247 to 254).

The following routine activities were planned this week (see Gantt chart on next page and CRF n° 1144).

- One Warm NIR Calibration on 06 SEP 2023 (DoY 249) with ETO 16:19:00z (orbit 72760; ASCENDING: thermally UNSTABLE) and with the following expected calibration values:

B.T.	=	3.81°
R.M.S.	=	0.43
Sun elevation	=	1.28°
Moon elevation	=	43.91°
R.A.	=	77.72°
DEC.	=	-18.31°
- One PMS Offset on 07 SEP 2023 (DoY 250), including three Short Calibrations at 06:58:00.0z, 06:58:34.8z, and 06:59:09.6z (orbit 72769).
- Local Oscillator Calibrations every 10 minutes.
- X band Passes over ESAC and Svalbard.

2 Mission Planning Deviations

Collision avoidance manoeuvre:

CNES notified the need to execute a collision avoidance manoeuvre [CAM, estimated collision probability = 5.7e-04]. The time of closest approach was forecast for Tuesday 05 SEP 2023 at 15:49z. The manoeuvre was scheduled for Tuesday 05 SEP 2023 at 14:59:45z (burn 1) and Tuesday 05 SEP 2023 at 16:39:50z (burn 2).

The manoeuvre had an efficiency of 95.86% with 0.6 m of residual SMA increment. The risk was successfully mitigated.

The MIRAS on-board timeline was disabled and the instrument science data flagged with external APID from 2023-09-05T14:50:19z to 2023-09-05T16:56:26z. The commands for this special manoeuvre were uploaded during S band GS pass KUX-05 with AoS=2023-09-05T10:17:19z. The following X band GS pass was cancelled since the MIRAS ITL had been disabled: AoS=2023-09-05T15:47:06z; LoS=2023-09-05T15:55:37z.

Consequence of this collision avoidance manoeuvre, Warm NIR Calibration with ETO=2023-09-06T16:19:00z was suppressed (CRF n° 1145; see Sect. 1 above) because it came less than 36 hours after this



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CAM. The spacecraft did not change attitude and science data was not flagged with External API.



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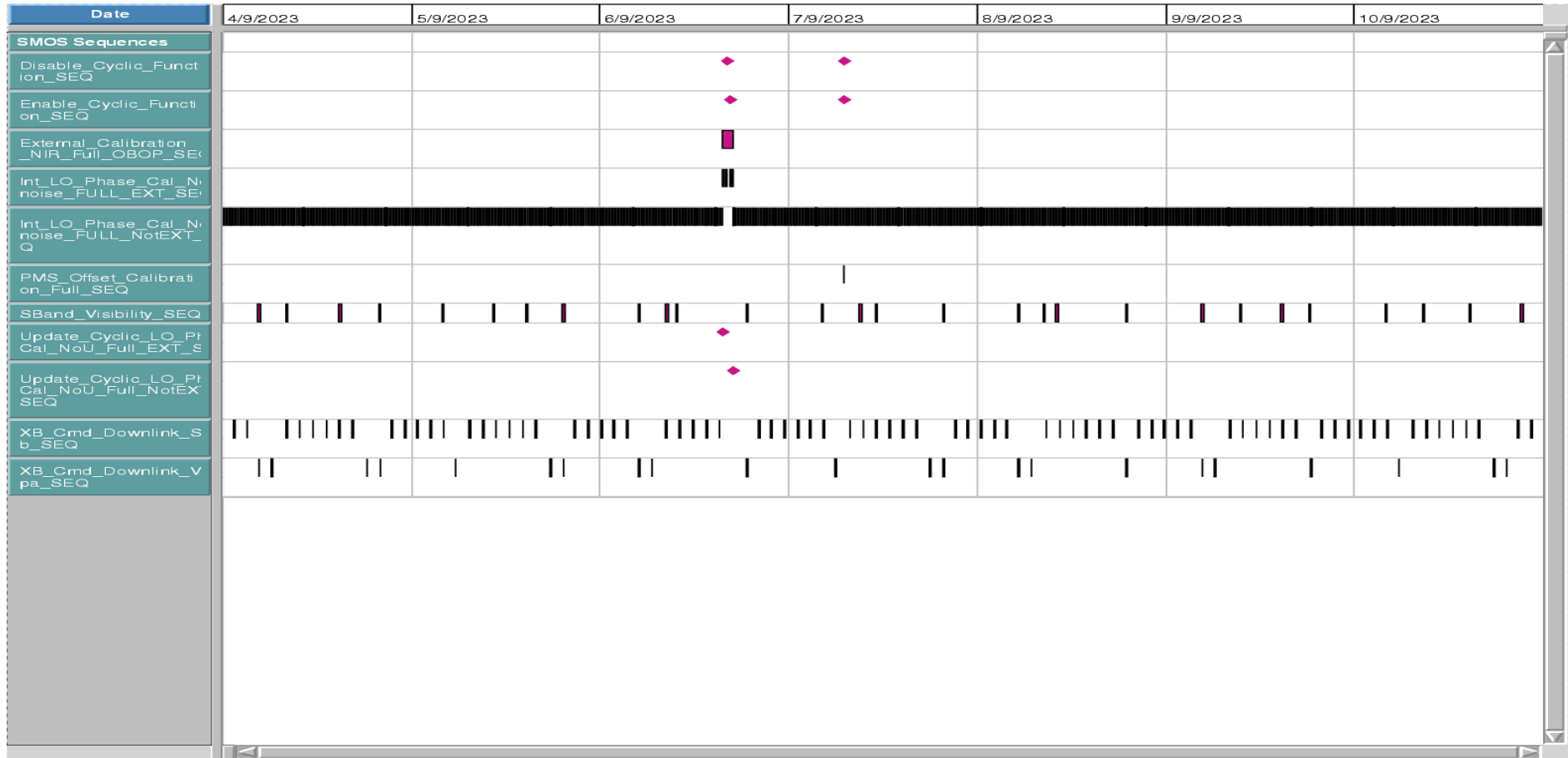
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Schedule Name: 2023_w36_cr ### Display start: 04-09-2023 00:00:00.000 ### Display end: 11-09-2023 00:00:00.000





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3 TC Failures

None.

4 On Board Anomalies

None.

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	2023.248.22.01.22	22487DC
RAM Single Bit Error	730	WARNING	2023.251.20.24.38	234672C
RAM Single Bit Error	730	WARNING	2023.253.21.08.06	23A52E4
RAM Single Bit Error	730	WARNING	2023.253.22.48.37	23189A0

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, with the following exceptions:

- S band GS pass:

STATION	PASS	AoS	LoS
KUX	08	2023.251.08.22.23	2023.251.08.34.42

could not be acquired because of an issue with the receiving station.

Gap went:

PUS HKTM

2023-09-08T05:12:30z to 2023-09-08T08:24:19z; 4593 packets lost

E HKTM

2023-09-08T05:12:20z to 2023-09-08T08:24:21z

8 X Band Data Reception in PXMF

- To achieve completion MIRAS PUS TM was recovered from the X band PXMF system and ingested into the MUST-SMTA system 08 SEP 2023. The corresponding E HKTM was lost.

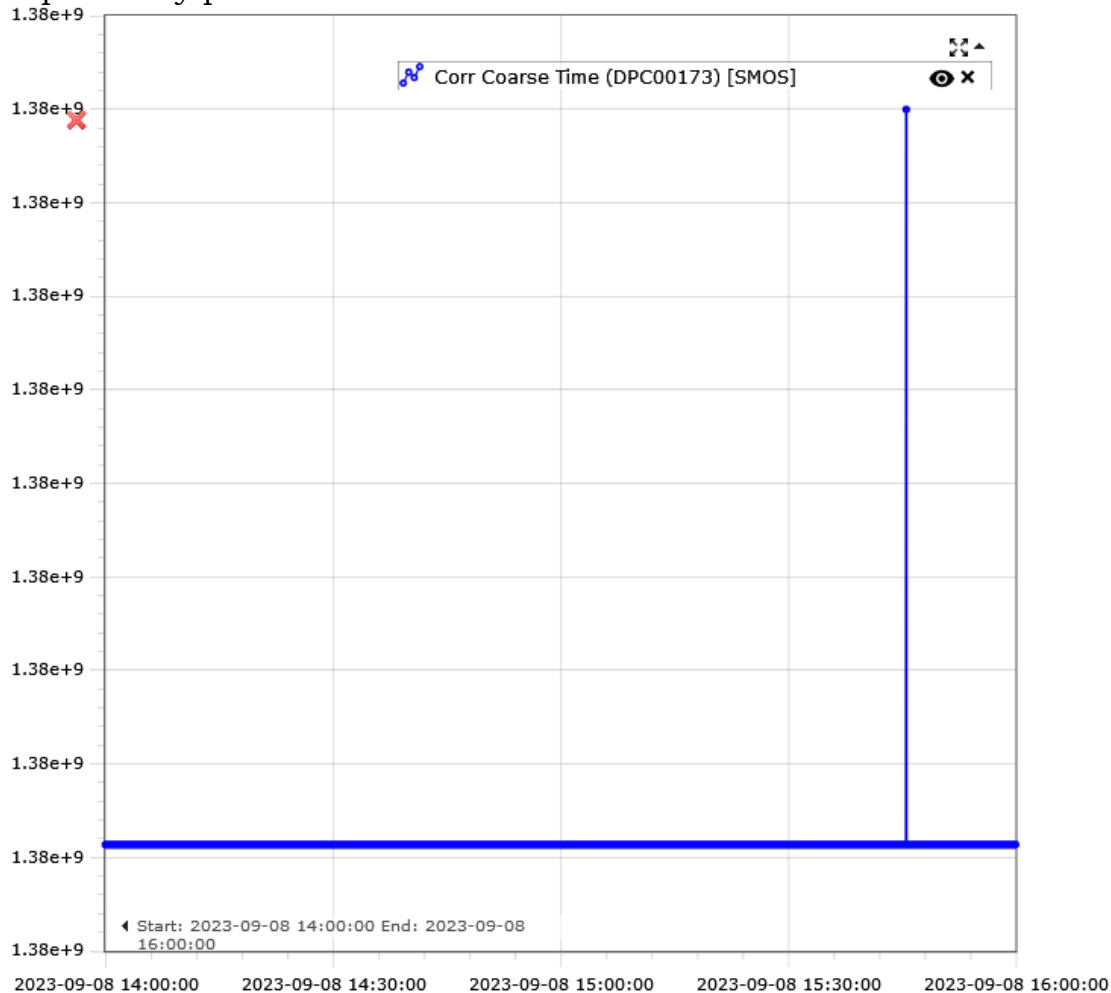


9 Exceptional Activities

GPS time shift anomaly:

- On 2023-09-08T15:45:33z a sudden jump of 39286 s in the GPS on-board time triggered a PROTEUS FDIR, and caused the on-board time source to autonomously change from GPS to PROTEUS (mode *CC REDUCED*). The anomaly manifested at FOS by parameters DPC10107 [*UTC Cur Source*] and SPC1010 [*PPS_ERROR_FLAG*] coming out of limits in the PLPC system, followed by MIRAS OBSW issuing error packets *Time_Correlator_Mode_TimeOut* and *Time_Correlator_Unexpectd_PPS*.

PPS signal recovered about one second later, so parameter SPC10107 returned to limits; parameter DPC10107 stayed out of limits and platform time remained in mode *CC REDUCED*. The time jump was captured by parameter DPC00173:



This time jump set 12 TC momentarily in the past, what resulted in them being deleted from the instrument on-board ITL without execution. They corresponded to X band transponder on/off switches, and thus the next six GS passes were not received. Outside the reach of the time jump, X band passes commencing at 03:03z and after were



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received as expected, though DPGS processors failed to produce valid science data because of significant time/position shifts stamped in the TM packets.

CNES reported PROTEUS parameter GPSOPSATUS=*nosat* (remained as such as of this writing). The anomaly was followed by a period of nearly one hour with GPS erratic values, then LONG/LAT parameters behaviour returned to nominal sinusoidal curves, yet shifted in time (i.e., PROTEUS parameter DIFFOBTTPS included a 39286 s overhead), so OBT evolution could not be followed.

An exceptional OCG was held Monday 11 SEP 2023. Decision was made to cold restart the PROTEUS GPS as a first solution. The cause of the anomaly (never observed before in a PROTEUS platform) was still under investigation.

10 AOB

None.