



19 Feb 2024 (report covers data release for 1-30 Apr)

Report Version	2	L2 ground processing software version:	V2.26.1
MAG PI	Tim Horbury t.horbury@imperial.ac.uk		
MAG IM	Helen O'Brien h.obrien@imperial.ac.uk		
Report Prepared By	Jean Morris j.morris23@imperial.ac.uk		

Data Summary

V2 updates 2024:

After an investigation by ESA, Airbus and Imperial, the unexplained spacecraft interference has been confirmed not to impact the science quality of the OBS data. Cleaning of data around thruster firings requires use of the contaminated IBS data so users should beware of data during these periods, which can be identified by the thruster flag. These now re-released periods have also been quality flagged to level 2, due to the effect on the IBS data, as IBS-OBS is also an important tool in offset determination. This SC interference had historically resulted in the data not being released for these periods. The MAG team is now working to re-release these previously retracted periods, please see the Appendix for the periods now released.

V1:

MAG was on for the period 1-30 April.

BM coverage is not continuous, over average there are 2 1-hour burst mode windows each day in the period 2-25 April, timed to coincide with designated spacecraft EMC quiet periods. There is no BM available for the 5th of April because there were no EMC quiet windows on that day.

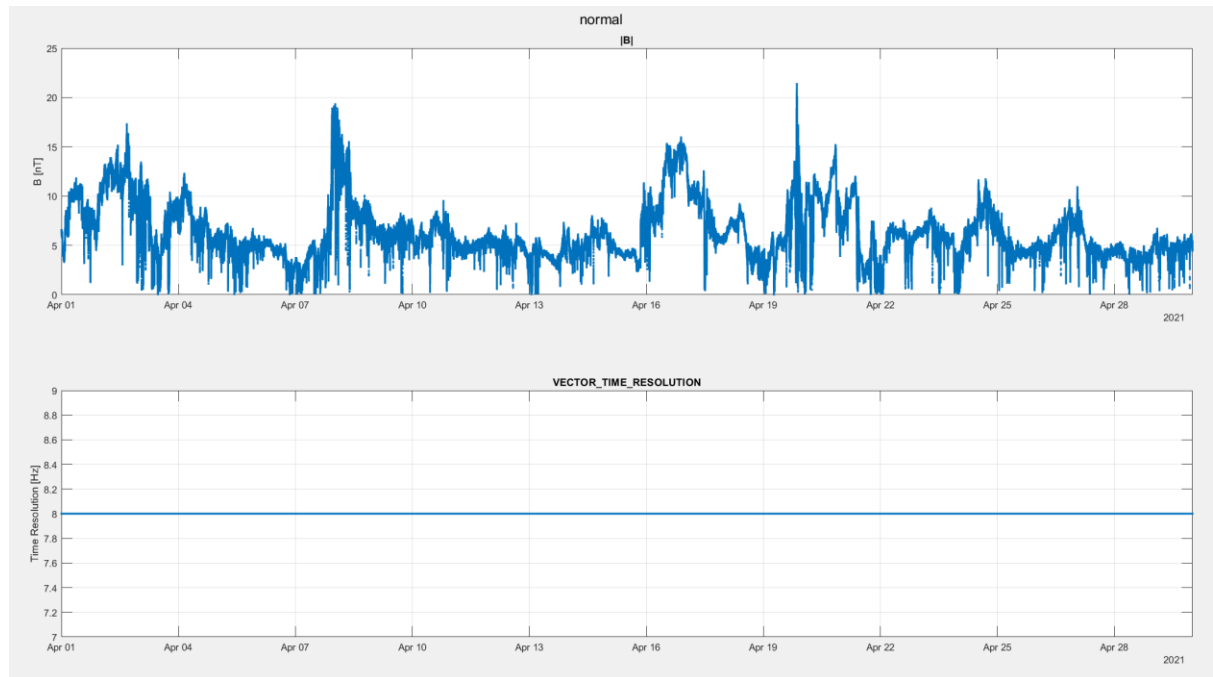
On the **12st of April**, there was a solar array current event. This kind of event has not been fully understood yet, but it affected the offset at the inboard sensor.

Spacecraft noise was observed particularly in IBS data for several periods (there was significant noise for a total of 92 hours during April). This noise is very clear in IBS, the source has not been identified. We can see evidence for it being there in OBS as well, and have not got algorithms to clean this from the data. The magnetic field data have been converted to NaNs when the noise in the data was particularly high. The full period of missing data is listed in the appendix of this report. If you have particular need for any data during these periods, please contact the MAG team and we see if the data maybe suitable for release for certain applications.

The following days have not been released because the whole data set for these days is affected by the SC noise: 3-4 April 2021.

The spacecraft started April at 0.75 AU and ended it at 0.89AU.

Normal Mode



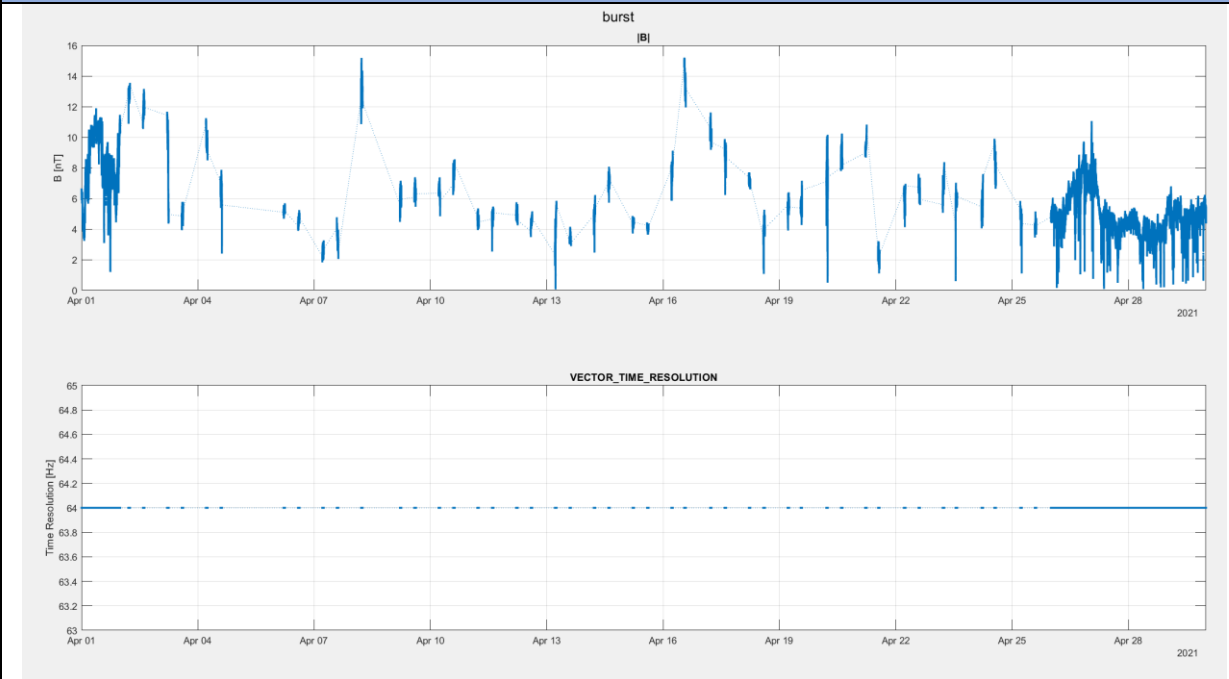
For whole month, MAG was on with 8Hz cadence normal mode data returned, for exceptions see below.

Operations	1-30 Apr	Cruise phase throughout period
Operational Events of Note	None	

Data Gaps greater than one minute:

Several periods of data set to NaN due to SC interference, see Appendix for details

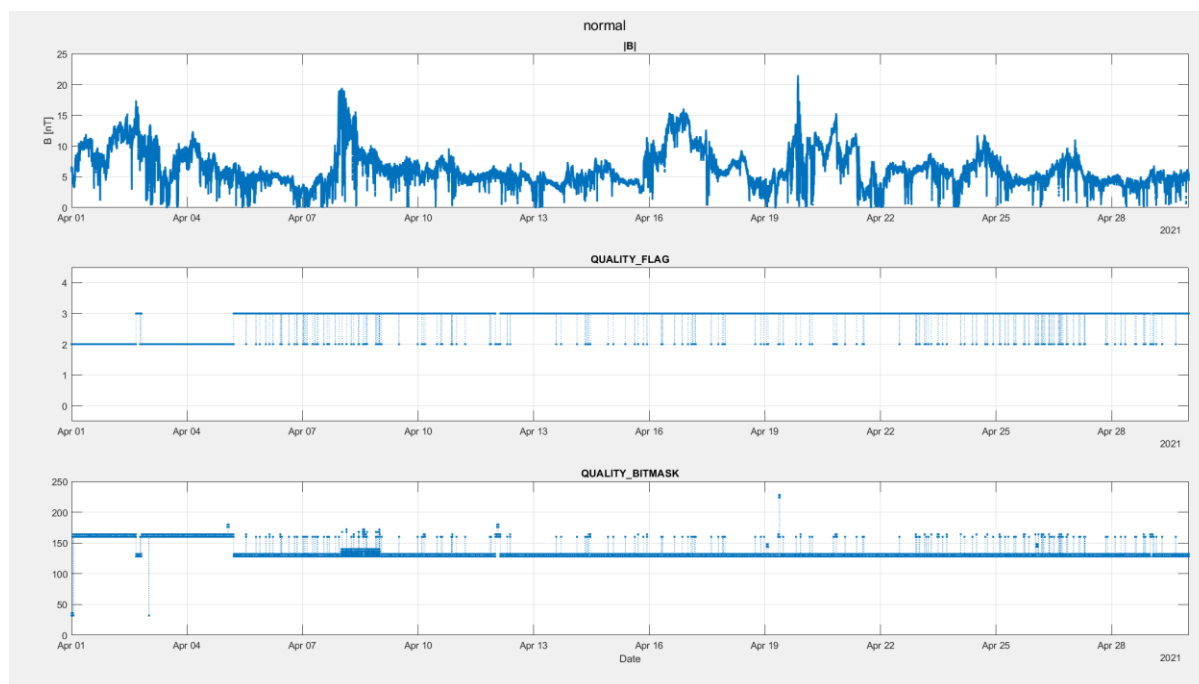
Burst Mode



Coverage not continuous. Data at 64 Hz cadence.

Coverage	From	To	Coverage
	1/04	01/04	24 hours 64 Hz
	02/04	25/04	2 x 1hour of 64 Hz per day to fill the two EMC windows. Except for 5 th April: no BM.
	26/04	30/04	24 hours 64 Hz

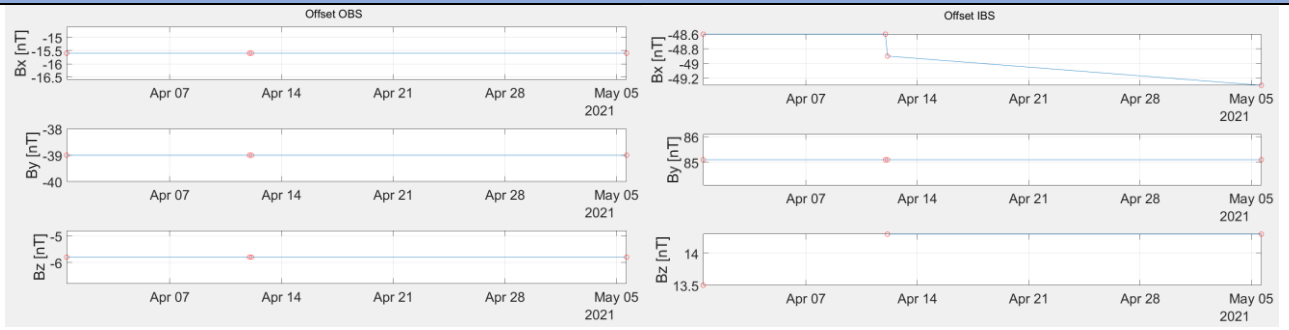
Quality bitmask



Quality bit mask events

SC events which disturb the field	<ol style="list-style-type: none"> 1. Thruster firings 2. Solar array lubrications (solar array is moved 15 degrees, then returned to original position) 3. Solar array movements (solar array angle is changed, and then remains at new angle due to sun-SC distance thermal constraints) 4. High gain antenna movements 						
SC related issues	<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 30%;">Time</th> <th>Event</th> </tr> </thead> <tbody> <tr> <td>12/04/2021 00:00</td> <td>SA current event</td> </tr> <tr> <td>19/04/2021 8:44</td> <td>SA lubrication</td> </tr> </tbody> </table> <p>The HGA azimuth and elevation changed throughout the month. The period right after the SA movement on the 31st of March, i.e. 1st and 2nd April, is characterized by a bad heater profile because its determination has been disturbed by the interference from the SA movement. Thus signals having the same periodicity as the MAG heater switching can be noticed in the data: please, check the quality bitmask, bit 3, for the MAG heater ON times.</p>	Time	Event	12/04/2021 00:00	SA current event	19/04/2021 8:44	SA lubrication
Time	Event						
12/04/2021 00:00	SA current event						
19/04/2021 8:44	SA lubrication						

Offset



1-30 Apr:

IBS offsets have been modified by the solar array current event. OBS offsets remain constant from the start to the end of the month.

These offsets have been quantified and removed from the L2 data.

Offset	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	Comment
144	31/03/2021 13:12	-15.6	-39	-5.8	-48.6	85.1	13.5	Post SA movement from 56 to 30 deg. Start linear trend in IBS Y
145	12/04/2021 00:05	-15.6	-39	-5.8	-48.6	85.1		Pre SA current event
146	12/04/2021 03:07	-15.6	-39	-5.8	-48.9	85.1	14.3	Post SA current event
146	05/05/2021 15:00	-15.6	-39	-5.8	-49.3	85.1	14.3	Final offset

Appendix

SC Interference Re-Release
<p>After an investigation by ESA, Airbus and Imperial, the unexplained spacecraft interference (SC interference) has been confirmed not to impact the science quality of the OBS data, so this is no longer being removed from these periods. Cleaning of data around thruster firings requires use of the contaminated IBS data so users should beware of data during these periods, which can be identified by the thruster flag. These now re-released periods have also been quality flagged to level 2, due to the effect on the IBS data, as IBS-OBS is also an important tool in offset determination.</p>

Appendix – Periods now released.

StartTime	EndTime	Comment
01/04/2021 12:05	02/04/2021 16:10	Noise from SC mainly in By
02/04/2021 20:00	05/04/2021 05:00	Noise from SC mainly in By
30/04/2021 17:00	01/05/2021 00:00	Noise from SC mainly in By

Appendix – Files released

solo_L2_mag-rtn-burst_20210401_V03.cdf
solo_L2_mag-rtn-burst_20210402_V03.cdf
solo_L2_mag-rtn-burst_20210403_V02.cdf
solo_L2_mag-rtn-burst_20210404_V02.cdf
solo_L2_mag-rtn-burst_20210406_V03.cdf
solo_L2_mag-rtn-burst_20210407_V03.cdf
solo_L2_mag-rtn-burst_20210408_V03.cdf
solo_L2_mag-rtn-burst_20210409_V03.cdf
solo_L2_mag-rtn-burst_20210410_V03.cdf
solo_L2_mag-rtn-burst_20210411_V03.cdf
solo_L2_mag-rtn-burst_20210412_V03.cdf
solo_L2_mag-rtn-burst_20210413_V04.cdf
solo_L2_mag-rtn-burst_20210414_V04.cdf
solo_L2_mag-rtn-burst_20210415_V04.cdf
solo_L2_mag-rtn-burst_20210416_V04.cdf
solo_L2_mag-rtn-burst_20210417_V04.cdf
solo_L2_mag-rtn-burst_20210418_V04.cdf
solo_L2_mag-rtn-burst_20210419_V04.cdf
solo_L2_mag-rtn-burst_20210420_V04.cdf
solo_L2_mag-rtn-burst_20210421_V04.cdf

solo_L2_mag-rtn-burst_20210422_V03.cdf
solo_L2_mag-rtn-burst_20210423_V03.cdf
solo_L2_mag-rtn-burst_20210424_V03.cdf
solo_L2_mag-rtn-burst_20210425_V03.cdf
solo_L2_mag-rtn-burst_20210426_V03.cdf
solo_L2_mag-rtn-burst_20210427_V03.cdf
solo_L2_mag-rtn-burst_20210428_V03.cdf
solo_L2_mag-rtn-burst_20210429_V03.cdf
solo_L2_mag-rtn-burst_20210430_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210401_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210402_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210403_V02.cdf
solo_L2_mag-rtn-normal-1-minute_20210404_V02.cdf
solo_L2_mag-rtn-normal-1-minute_20210405_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210406_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210407_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210408_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210409_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210410_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210411_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210412_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210413_V04.cdf
solo_L2_mag-rtn-normal-1-minute_20210414_V04.cdf
solo_L2_mag-rtn-normal-1-minute_20210415_V04.cdf
solo_L2_mag-rtn-normal-1-minute_20210416_V04.cdf
solo_L2_mag-rtn-normal-1-minute_20210417_V04.cdf
solo_L2_mag-rtn-normal-1-minute_20210418_V04.cdf
solo_L2_mag-rtn-normal-1-minute_20210419_V04.cdf
solo_L2_mag-rtn-normal-1-minute_20210420_V04.cdf

solo_L2_mag-rtn-normal-1-minute_20210421_V04.cdf
solo_L2_mag-rtn-normal-1-minute_20210422_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210423_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210424_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210425_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210426_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210427_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210428_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210429_V03.cdf
solo_L2_mag-rtn-normal-1-minute_20210430_V03.cdf
solo_L2_mag-rtn-normal_20210401_V03.cdf
solo_L2_mag-rtn-normal_20210402_V03.cdf
solo_L2_mag-rtn-normal_20210403_V02.cdf
solo_L2_mag-rtn-normal_20210404_V02.cdf
solo_L2_mag-rtn-normal_20210405_V03.cdf
solo_L2_mag-rtn-normal_20210406_V03.cdf
solo_L2_mag-rtn-normal_20210407_V03.cdf
solo_L2_mag-rtn-normal_20210408_V03.cdf
solo_L2_mag-rtn-normal_20210409_V03.cdf
solo_L2_mag-rtn-normal_20210410_V03.cdf
solo_L2_mag-rtn-normal_20210411_V03.cdf
solo_L2_mag-rtn-normal_20210412_V03.cdf
solo_L2_mag-rtn-normal_20210413_V04.cdf
solo_L2_mag-rtn-normal_20210414_V04.cdf
solo_L2_mag-rtn-normal_20210415_V04.cdf
solo_L2_mag-rtn-normal_20210416_V04.cdf
solo_L2_mag-rtn-normal_20210417_V04.cdf
solo_L2_mag-rtn-normal_20210418_V04.cdf
solo_L2_mag-rtn-normal_20210419_V04.cdf
solo_L2_mag-rtn-normal_20210420_V04.cdf
solo_L2_mag-rtn-normal_20210421_V04.cdf
solo_L2_mag-rtn-normal_20210422_V03.cdf
solo_L2_mag-rtn-normal_20210423_V03.cdf
solo_L2_mag-rtn-normal_20210424_V03.cdf
solo_L2_mag-rtn-normal_20210425_V03.cdf
solo_L2_mag-rtn-normal_20210426_V03.cdf
solo_L2_mag-rtn-normal_20210427_V03.cdf
solo_L2_mag-rtn-normal_20210428_V03.cdf

solo_L2_mag-rtn-normal_20210429_V03.cdf
solo_L2_mag-rtn-normal_20210430_V03.cdf
solo_L2_mag-srf-burst_20210401_V03.cdf
solo_L2_mag-srf-burst_20210402_V03.cdf
solo_L2_mag-srf-burst_20210403_V02.cdf
solo_L2_mag-srf-burst_20210404_V02.cdf
solo_L2_mag-srf-burst_20210406_V03.cdf
solo_L2_mag-srf-burst_20210407_V03.cdf
solo_L2_mag-srf-burst_20210408_V03.cdf
solo_L2_mag-srf-burst_20210409_V03.cdf
solo_L2_mag-srf-burst_20210410_V03.cdf
solo_L2_mag-srf-burst_20210411_V03.cdf
solo_L2_mag-srf-burst_20210412_V03.cdf
solo_L2_mag-srf-burst_20210413_V04.cdf
solo_L2_mag-srf-burst_20210414_V04.cdf
solo_L2_mag-srf-burst_20210415_V04.cdf
solo_L2_mag-srf-burst_20210416_V04.cdf
solo_L2_mag-srf-burst_20210417_V04.cdf
solo_L2_mag-srf-burst_20210418_V04.cdf
solo_L2_mag-srf-burst_20210419_V04.cdf
solo_L2_mag-srf-burst_20210420_V04.cdf
solo_L2_mag-srf-burst_20210421_V04.cdf
solo_L2_mag-srf-burst_20210422_V03.cdf
solo_L2_mag-srf-burst_20210423_V03.cdf
solo_L2_mag-srf-burst_20210424_V03.cdf
solo_L2_mag-srf-burst_20210425_V03.cdf
solo_L2_mag-srf-burst_20210426_V03.cdf
solo_L2_mag-srf-burst_20210427_V03.cdf
solo_L2_mag-srf-burst_20210428_V03.cdf
solo_L2_mag-srf-burst_20210429_V03.cdf
solo_L2_mag-srf-burst_20210430_V03.cdf
solo_L2_mag-srf-normal_20210401_V03.cdf
solo_L2_mag-srf-normal_20210402_V03.cdf
solo_L2_mag-srf-normal_20210403_V02.cdf
solo_L2_mag-srf-normal_20210404_V02.cdf
solo_L2_mag-srf-normal_20210405_V03.cdf
solo_L2_mag-srf-normal_20210406_V03.cdf
solo_L2_mag-srf-normal_20210407_V03.cdf
solo_L2_mag-srf-normal_20210408_V03.cdf
solo_L2_mag-srf-normal_20210409_V03.cdf
solo_L2_mag-srf-normal_20210410_V03.cdf
solo_L2_mag-srf-normal_20210411_V03.cdf
solo_L2_mag-srf-normal_20210412_V03.cdf
solo_L2_mag-srf-normal_20210413_V04.cdf
solo_L2_mag-srf-normal_20210414_V04.cdf
solo_L2_mag-srf-normal_20210415_V04.cdf

solo_L2_mag-srf-normal_20210416_V04.cdf
solo_L2_mag-srf-normal_20210417_V04.cdf
solo_L2_mag-srf-normal_20210418_V04.cdf
solo_L2_mag-srf-normal_20210419_V04.cdf
solo_L2_mag-srf-normal_20210420_V04.cdf
solo_L2_mag-srf-normal_20210421_V04.cdf
solo_L2_mag-srf-normal_20210422_V03.cdf
solo_L2_mag-srf-normal_20210423_V03.cdf
solo_L2_mag-srf-normal_20210424_V03.cdf
solo_L2_mag-srf-normal_20210425_V03.cdf
solo_L2_mag-srf-normal_20210426_V03.cdf
solo_L2_mag-srf-normal_20210427_V03.cdf
solo_L2_mag-srf-normal_20210428_V03.cdf
solo_L2_mag-srf-normal_20210429_V03.cdf
solo_L2_mag-srf-normal_20210430_V03.cdf