Imperial College London

MAG Data Release Report 2007

30 September 2020 (report covers data release for 1 - 31 July 2020)

| Report Version	1.0	L2 software version:	1.3 1.4 (7/7 SRF burst only)
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Data Summary

The operational philosophy of the MAG instrument was to be on throughout the period.

The Spacecraft started the month at 0.56 AU, and ended at 0.74 AU.

The L2 MAG data products are based on the data collected by the outboard MAG sensor (OBS). Considerable effort has gone into cleaning the data of the major magnetic field signatures generated by the spacecraft, however the data is produced by a non-magnetically clean spacecraft so artificial artefacts will remain. Users are therefore encouraged to:

1. View the quality flag and bitmask in parallel to the data. Particularly take note when the quality flag has been dropped from Level 3, to Level 2 (survey quality).
2. If you see anything strange do contact the MAG team. We can ascertain a lot about the quality of the data by revisiting the inboard sensor (IBS) data for the period in question to judge if the spacecraft was generating a significant varying field at the time. Variations in the cleaned, calibrated IBS-OBS dataset is the baseline for the SCINTERFERENCE bit which indicates if there is a large signal present in the IBS-OBS time series, indicating a signal generated by the spacecraft, but our algorithms do not necessarily capture all events.
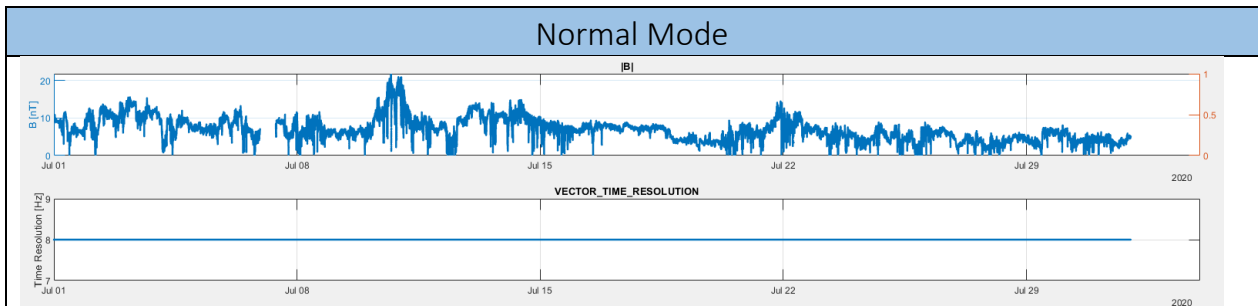
Normal Mode

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

| Operational Phase	1-31 July	Cruise phase
Operational Events of Note	19 July:	Calibration roll, seen in SRF data, should be corrected in RTN coordinates
	24 July:	Solar Array movement from 60 to 56 degrees. This change did not have an impact on the sensor offsets.
Data Gaps	6-7 July ~23:00 – 09:12	SC telemetry use to clean MAG data (SC heater status) lost due to ground pass problem. MAG data from this period has therefore not be cleaned and is not part of this data release.

Burst Mode
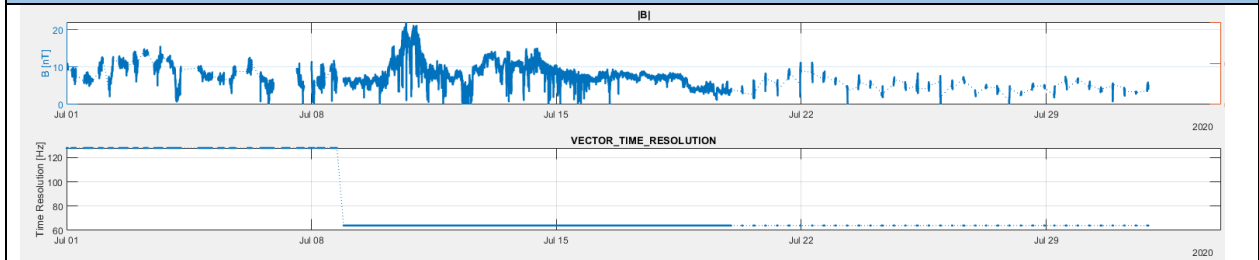
MAG allocated varying telemetry. Coverage as table below, some periods of 128Hz and 64Hz cadence.

| Coverage	From	To	
	1/7	7/7	12 hours per day 128Hz
	8/7	8/7	11.5 hours 128Hz, 2 hours 64Hz
	9/7	19/7	24 hours per day 64Hz
	20/7	31/7	3 hours per day 64Hz

Quality Flag
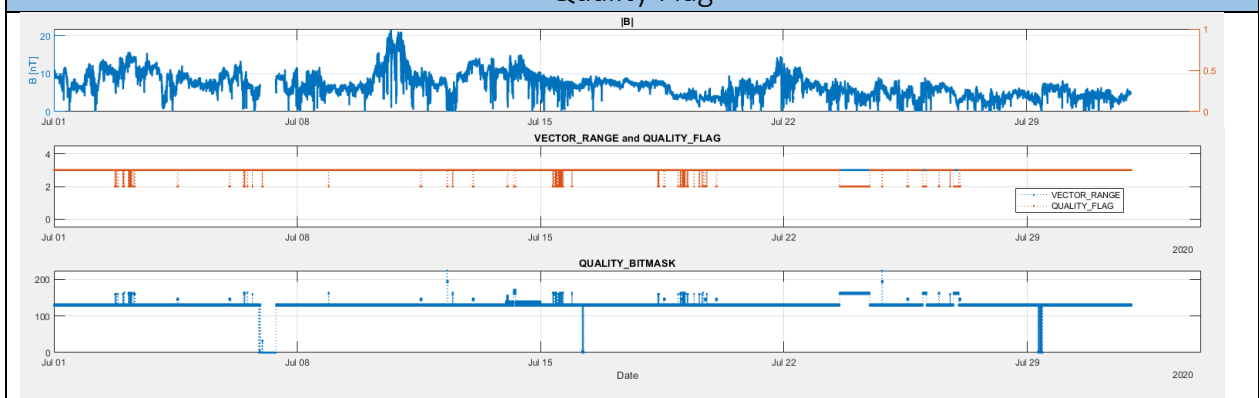
Quality Flag	Flags in use for this period Level 3 – good for publication, subject to PI approval Level 2 – survey data, possibly not publication quality		
Causes of flag drop from 3 to 2			
1. SC events which disturb the field	• Thruster firings • Solar array lubrications (solar array is moved 15 degrees, then returned to original position) • Solar array movements (solar array angle is changed, and then remains at new angle due to sun-SC distance thermal constraints)		
2. SC related issues	From	To	Comment
	14/07/2020 05:30	14/07/2020 06:45	1nT Step change in IBS-OBS, all axes. TCM was planned for before this period 13-7 2100 - 14-7 0300
	23/07/2020 14:30	24/07/2020 11:15	Disturbance in IBS-OBS, X axis, no clues in planning
	25/07/2020 23:45	26/07/2020 02:30	Disturbance in IBS-OBS, Y axis, no clues in planning
	26/07/2020 10:50	26/07/2020 11:20	Disturbance in IBS-OBS, X axis, no clues in planning
	26/07/2020 21:10	27/07/2020 00:40	Disturbance in IBS-OBS, X axis, no clues in planning
	Throughout for smaller time periods.		Large signal detected in IBS-OBS

Offset	

Outboard Sensor Offset — OBSX, OBSY, OBSZ

Inboard Sensor Offset — IBSX, IBSY, IBSZ
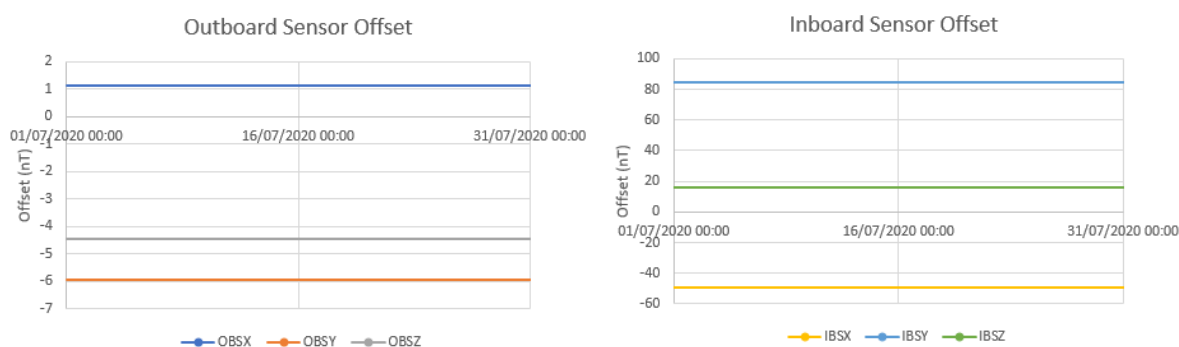
The offsets applied to both sensors for L2 data production were constant for the whole month.

Known bugs/features

The follow are known bugs or features of this data release.

Issue#	Period affected	Comment
3	Throughout	8Hz tone from spacecraft (feature). A sharp digital tone can be seen periodically in the burst mode data. It is generated by the spacecraft.
4	Throughout	Inconsistencies between SC interference flags in BM and NM. The times listed in the SC related issues above, the SCINTERFERENCE flag is raised in both BM and NM. However, the algorithm that picks out smaller time scale discrepancies between IBS and OBS which indicate SC generated signals is run independently on the normal and burst streams – so although in general they are raised at similar times, there are some point where the NM flag is raised, but the BM is not and vice versa.