MAG Data Release Report 2106

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

Report Version	2	L2 ground processing software version:	V2.26.1
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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.

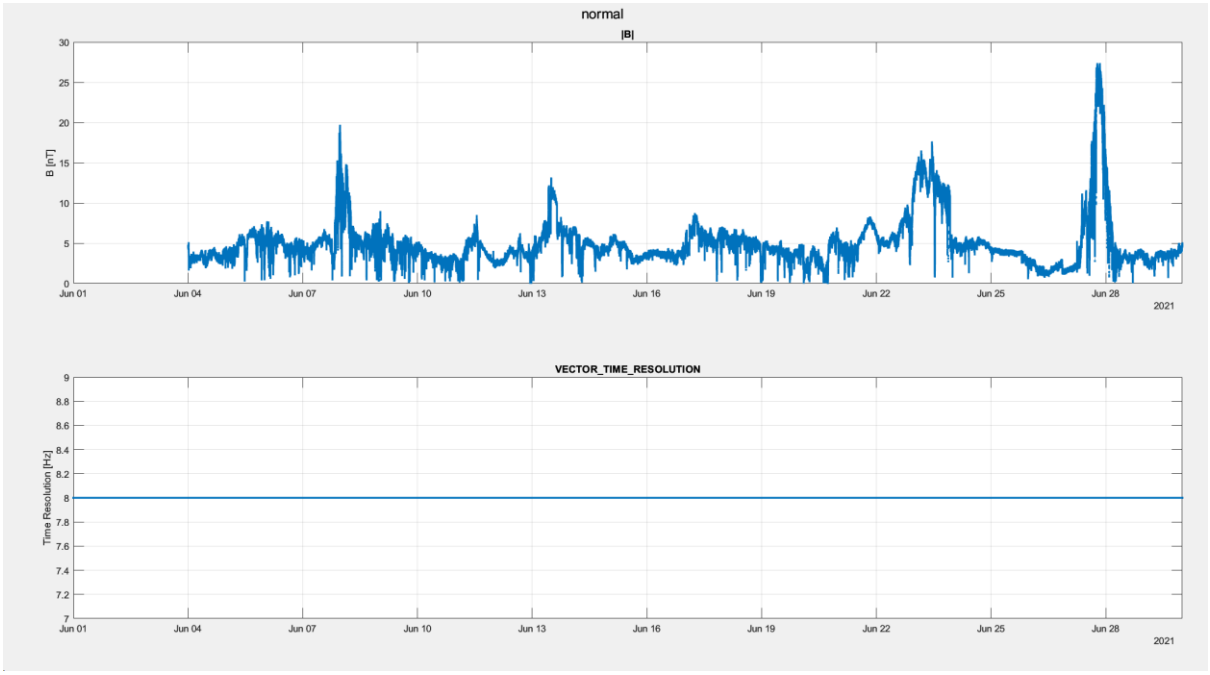
V1:

MAG was on for the period 4-31 June 2021. The data for the 1st-2nd-3rd of June cannot be released due to the SC interference caused by the HGA movements and SA movements.

Spacecraft noise was observed particularly in IBS data for several periods (there was significant noise for a total of 85 hours during June, comprehending 1-3 Jun). 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 spacecraft started the month at 0.95AU and ended it at 0.91AU.

Normal Mode

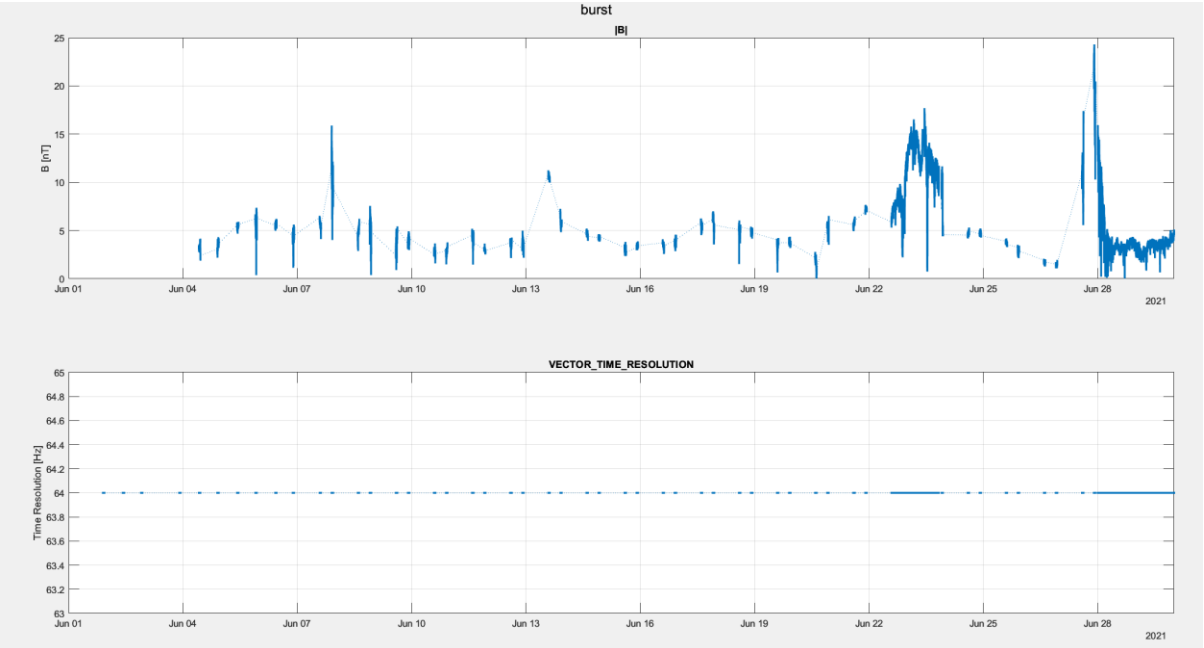


For whole month, MAG was on with 8Hz cadence normal mode data returned, for exceptions see below.

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

Data Gaps greater than one minute:
1-4 June due to solar array movement disturbing offsets.

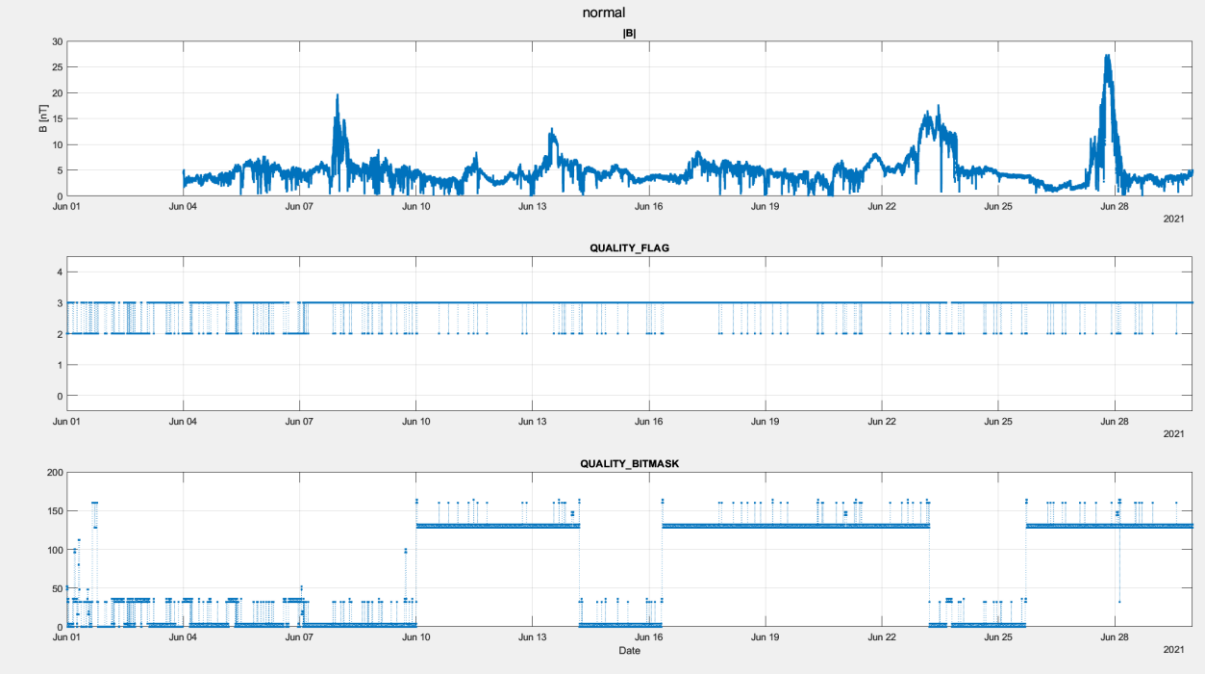
Burst Mode



Coverage continuous. Data at 64 Hz cadence.

Coverage	From	To	Coverage
	1/06	21/06	2 x 1 hours of 64 Hz per day to fill the two EMC windows
	22/06 14:00	23/06 20:00	64 Hz
	24/06	27/06	2 x 1 hours of 64 Hz per day to fill the two EMC windows
	28/06	30/06	24 hours of 64Hz per day

Quality bitmask

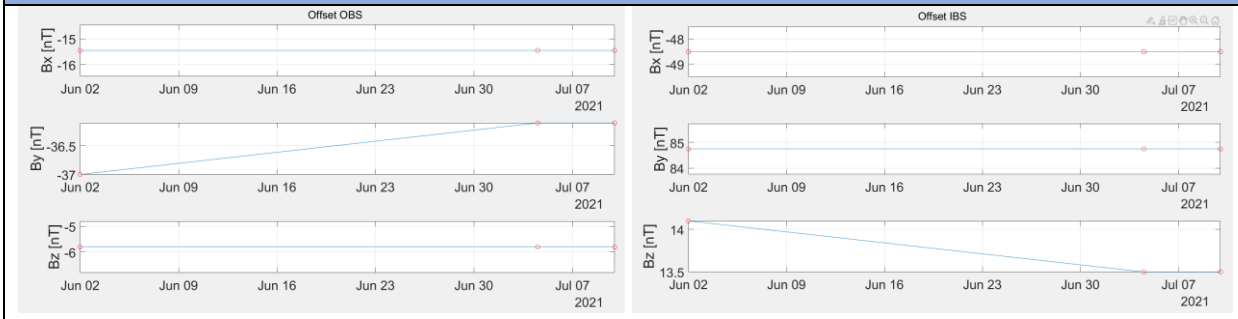


Quality bit mask events	
SC events which disturb the field	1. Thruster firings 2. Solar array lubrications (solar array is moved 15 degrees, then returned to original position) 3. Solar array movements (solar array angle is changed, and then remains at new angle due to sun-SC distance thermal constraints) 4. High gain antenna movements
SC related issues	See table below

Time	Reason
01/06/2021 03:23	HGA azimuth from 138 to 0 deg
01/06/2021 4:35	SA movement from 0 to -81 deg and back to zero
03/06/2021 02:18	HGA azimuth from 0 to 138 deg
09/06/2021 17:13	SA lubrication

The data for the 1st-2nd-3rd of June cannot be release due to the SC interference caused by the HGA and SA.
The MAG heater profiles for the 4th and 9th could not be accurately determined, 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.

Offset



1-30 Jun:
Both IBS and OBS offsets have been modified by the solar array and HGA movements at the beginning of the month (1-3 June) and introduced a linear trend in By OBS. The SA lubrication modified only Bz IBS.
These offsets have been quantified and removed from the L2 data.

Offset	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	
150	02/06/2021 00:00	-15.5	-37	-5.8	-48.5	84.75	14.1	Offset valid at beginning of 2nd Jun 2021
151	09/06/2021 17:14					84.75	14.1	Pre SA lubrication
152	09/06/2021 17:21					84.75	13.5	Post SA lubrication
153	04/07/2021 12:45	-15.5	-36.1	-5.8	-48.5	84.75	13.5	Final offset

Appendix

SC Interference Re-Release
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.

Appendix – Periods now released.

StartTime	EndTime	Comment
04/06/2021 16:00	04/06/2021 17:00	Noise from SC mainly in By
05/06/2021 04:00	05/06/2021 08:00	Noise from SC mainly in By
06/06/2021 14:00	06/06/2021 15:30	Noise from SC mainly in By
06/06/2021 17:00	06/06/2021 20:30	Noise from SC mainly in By
06/06/2021 21:45	06/06/2021 22:30	Noise from SC mainly in By
23/06/2021 15:50	23/06/2021 19:15	Noise from SC mainly in By

Appendix – Files released

solo_L2_mag-rtn-burst_20210601_V01.cdf
solo_L2_mag-rtn-burst_20210602_V01.cdf
solo_L2_mag-rtn-burst_20210603_V01.cdf
solo_L2_mag-rtn-burst_20210604_V02.cdf
solo_L2_mag-rtn-burst_20210605_V02.cdf
solo_L2_mag-rtn-burst_20210606_V02.cdf
solo_L2_mag-rtn-burst_20210607_V02.cdf
solo_L2_mag-rtn-burst_20210608_V02.cdf
solo_L2_mag-rtn-burst_20210609_V02.cdf
solo_L2_mag-rtn-burst_20210610_V02.cdf
solo_L2_mag-rtn-burst_20210611_V02.cdf
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solo_L2_mag-rtn-burst_20210621_V02.cdf
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