



17 Jan 2024 (report covers data release for 1-28 Feb)

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 1-28 February, in burst mode throughout.

In February there were events such as the solar arrays and high gain antenna movements, which generated **offset changes** in the inboard and outboard sensors.

On **15th February**, 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 and at the outboard sensor.

Spacecraft noise was observed particularly in IBS data for several periods (there was significant noise for a total of 62 hours during February). 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.

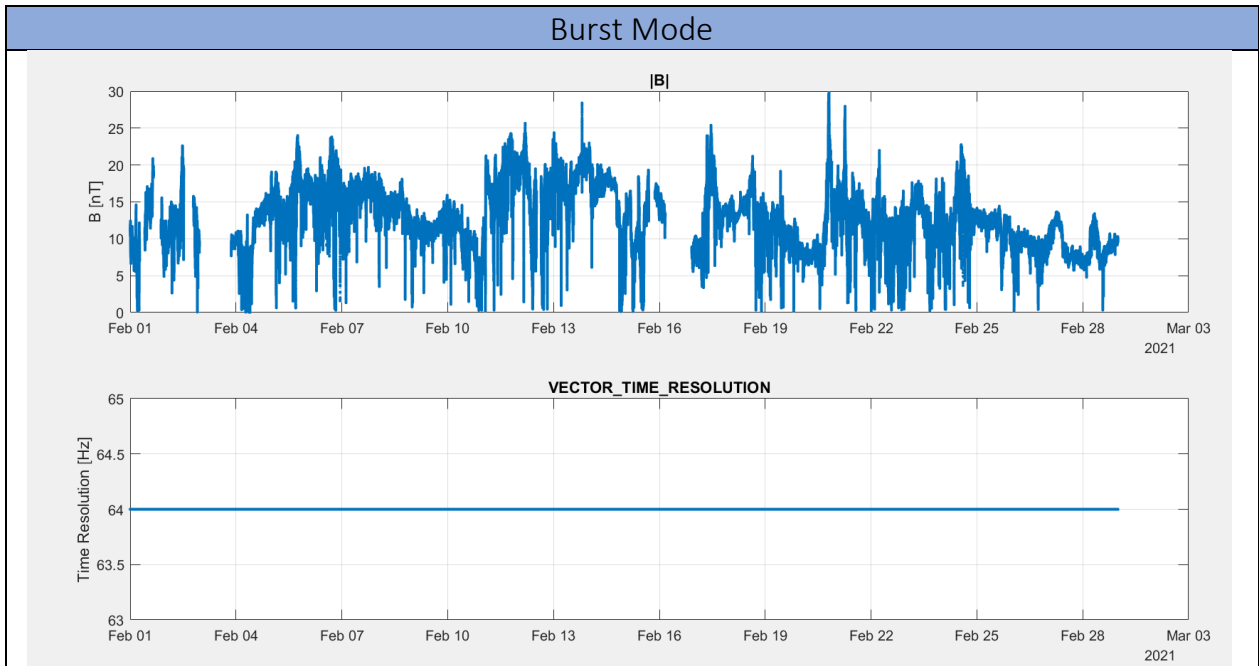
The spacecraft started February at 0.51 AU and ended it at 0.55AU.

Normal Mode



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

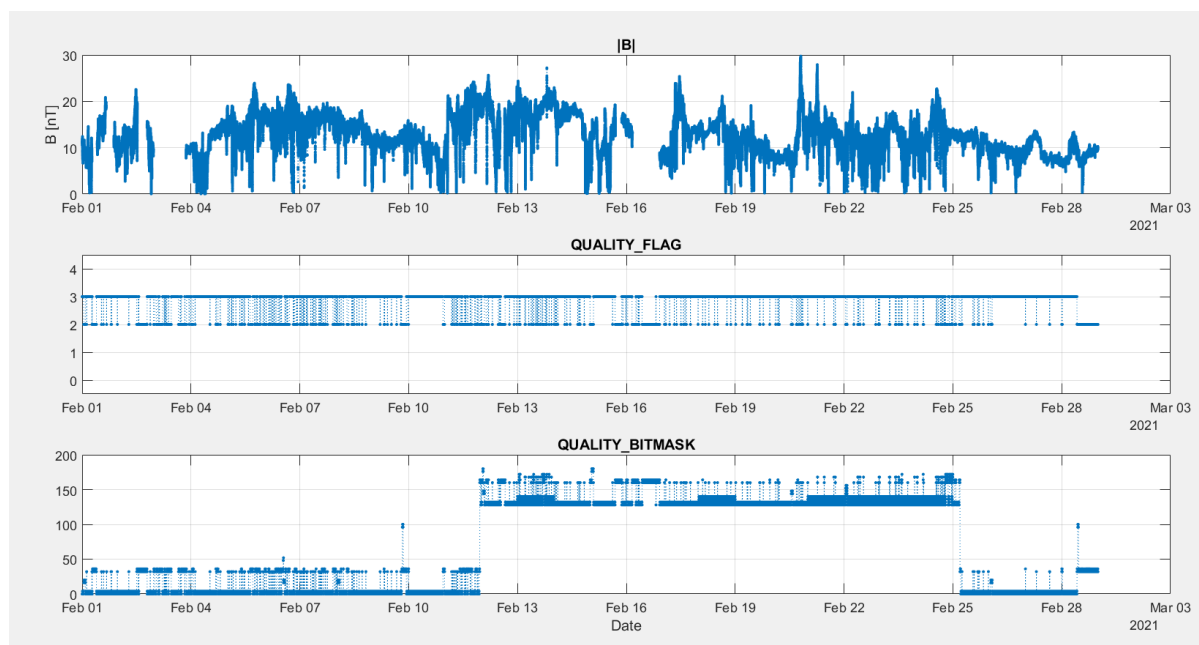
Operations	1-28 Feb	Cruise phase throughout period
Operational Events of Note	None	



Coverage continuous. Data at 64 Hz cadence.

	From	To	Coverage
Coverage	1/02	28/02	24 hours 64 Hz

Quality bitmask



Quality bit mask events

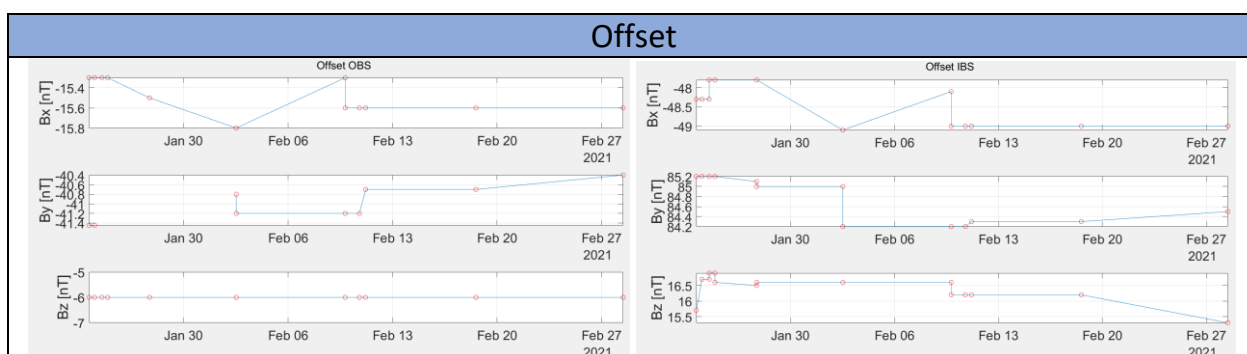
SC events which disturb the field

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

Time	Event
02/02/2021 12:39	Unknown event affecting the offset
03/02/2021 09:03	HGA movement
05/02/2021 09:16	HGA movement
08/02/2021 10:20	HGA movement
09/02/2021 19:49	SA lubrication
10/02/2021 18:40	Unknown event affecting the offset
11/02/2021 04:40	Unknown event affecting the offset
15/02/2021 00:05	HGA movement
15/02/2021 15:30	SA current event (linear change)
18/02/2021 14:00	Unknown event affecting the offset
28/02/2021 10:33	SA movement from 70 to 60 deg
01/03/2021 00:45	SA current event

The period between 28/02/2021 at 10:36 (SA movement) and 01/03/2021 at 00:45 (SA current event) has been flagged to L2 because it was impossible to determine accurate offset and heater profile valid between these two events.



1-28 Feb:

Both IBS and OBS offsets have been modified by the solar array current events and movements. Changes unrelated to any known SC events have been detected on 2,10,11,18 February. These offsets have been quantified and removed from the L2 data.

Offset	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	
111	24/01/2021 01:00	-15.3	-41.45	-6	-48.3	85.2	16.7	End linear trend z
127	24/01/2021 12:45	-15.3		-6	-48.3	85.2	16.7	IBS range 2
128	24/01/2021 12:45	-15.3		-6	-47.8	85.2	16.9	IBS range 3
129	24/01/2021 22:00	-15.3		-6	-47.8	85.2	16.9	Start SA current event
130	24/01/2021 22:00	-15.3		-6	-47.8	85.2	16.6	End SA current event
131	27/01/2021 17:20	-15.5		-6	-47.8	85.1	16.5	Pre unknown event affecting Bz
132	27/01/2021 17:20	-15.5		-6	-47.8	85	16.6	Post unknown event affecting Bz
133	02/02/2021 12:39	-15.8	-40.8	-6	-49.1	85	16.6	Pre unknown event affecting By
134	02/02/2021 12:39	-15.8	-41.2	-6	-49.1	84.2	16.6	Post unknown event affecting By
135	09/02/2021 19:49	-15.3	-41.2	-6	-48.1	84.2	16.6	Pre SA lubrication
136	09/02/2021 19:49	-15.6	-41.2	-6	-49	84.2	16.2	Post SA lubrication
136	10/02/2021 18:40	-15.6	-41.2	-6	-49	84.2	16.2	Start linear trend y
137	11/02/2021 04:40	-15.6	-40.7	-6	-49	84.3	16.2	End linear trend y
137	18/02/2021 14:00	-15.6	-40.7	-6	-49	84.3	16.2	Start linear trend y
138	28/02/2021 10:36	-15.6	-40.4	-6	-49	84.5	15.3	SA movement from 70 to 60 deg
139	01/03/2021 00:46	-15.6	-39.5	-6	-50.2	86.1	13.1	SA current event

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
01/02/2021 06:30	01/02/2021 10:00	Noise from SC mainly in By
01/02/2021 16:00	01/02/2021 21:00	Noise from SC mainly in By
02/02/2021 12:30	02/02/2021 19:00	Noise from SC mainly in By
02/02/2021 23:15	03/02/2021 20:45	Noise from SC mainly in By
12/02/2021 12:30	12/02/2021 15:30	Noise from SC mainly in Bx
15/02/2021 16:45	15/02/2021 21:00	Noise from SC mainly in By
16/02/2021 04:00	16/02/2021 22:00	Noise from SC mainly in By

Appendix – Files released.

Filename
solo_L2_mag-rtn-burst_20210201_V03.cdf
solo_L2_mag-rtn-burst_20210202_V03.cdf
solo_L2_mag-rtn-burst_20210203_V03.cdf
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solo_L2_mag-rtn-burst_20210206_V03.cdf
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solo_L2_mag-rtn-burst_20210209_V03.cdf
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