



28 May 2024 (report covers data release for 1-28 Feb 2022)

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 2022.

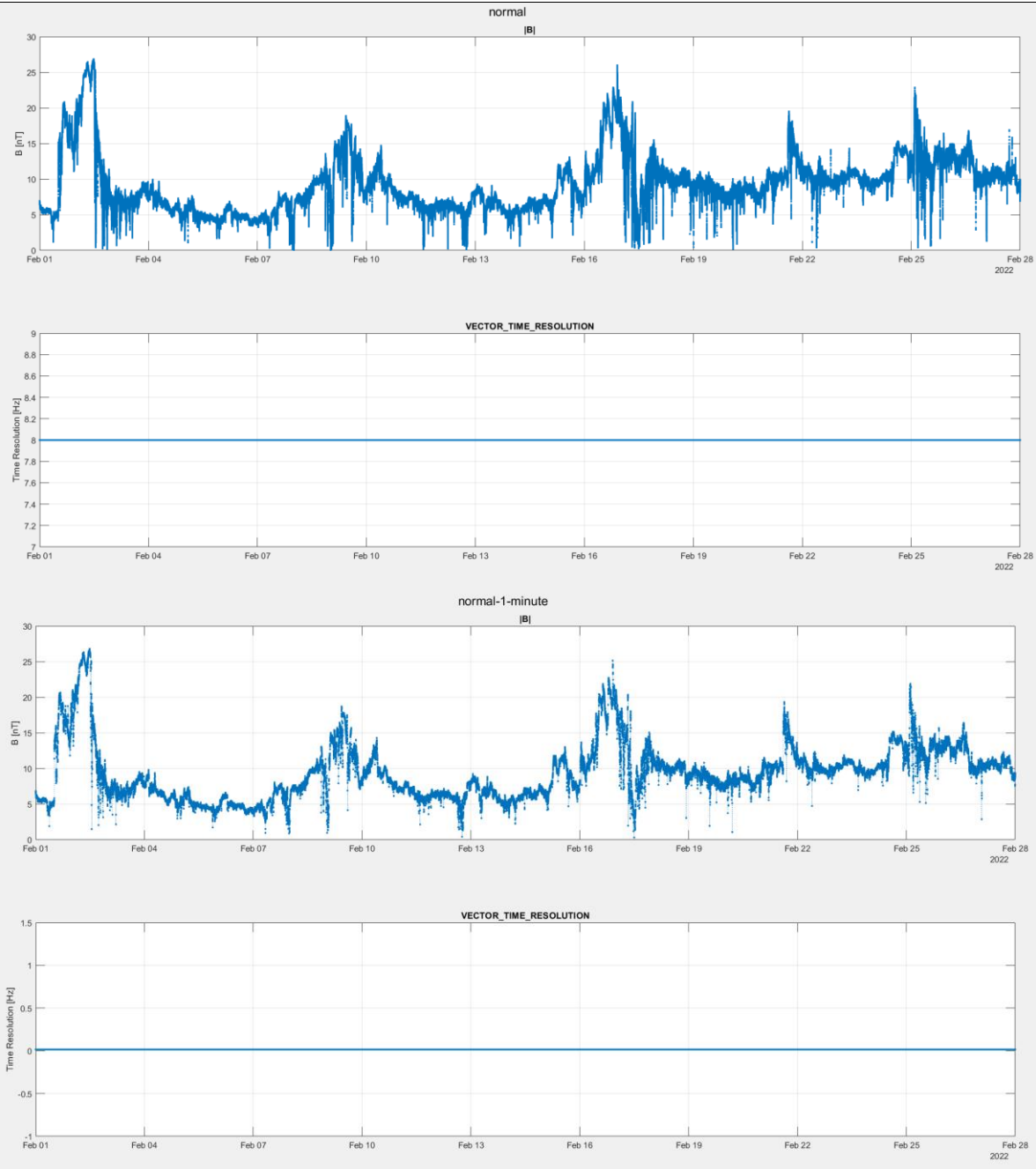
**Spacecraft noise** was observed particularly in IBS data for several periods (there was significant noise for a total of 282 hours in the period 1-28 Feb 2022). This noise is very clear in IBS, the source has not been identified. We can see evidence for it being there in OBS as well, and have not got 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.

1-5-6-23 February 2022 cannot be released because the data have been all converted to NaNs.

Except the NaNs, the NM and BM coverage is continuous, respectively with 8Hz and 128Hz cadence.

The spacecraft started the month at 0.86AU and ended it at 0.59AU from the Sun.

**Normal Mode**



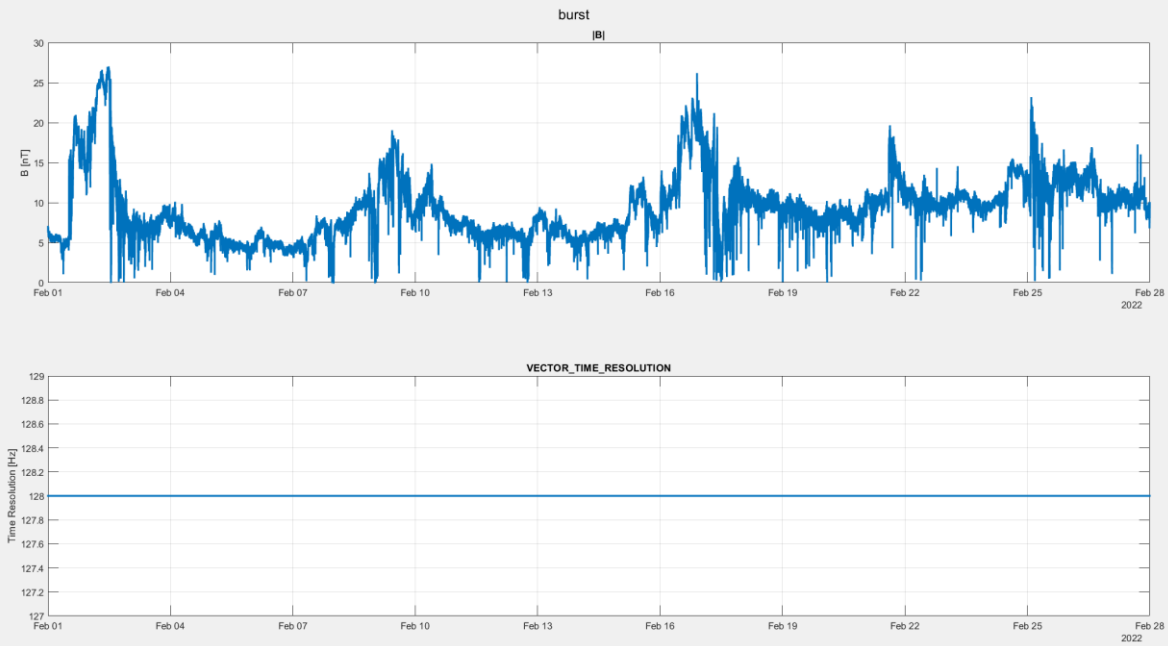
MAG was on with 8Hz cadence normal mode data returned, for exceptions see below.

Operations	1-28 February	Cruise phase throughout period, normal data returned
Operational Events of Note	None	

**Data Gaps greater than one minute:**

NaNs have been introduced during the noisiest periods because the data was highly disturbed. See Appendix for details.

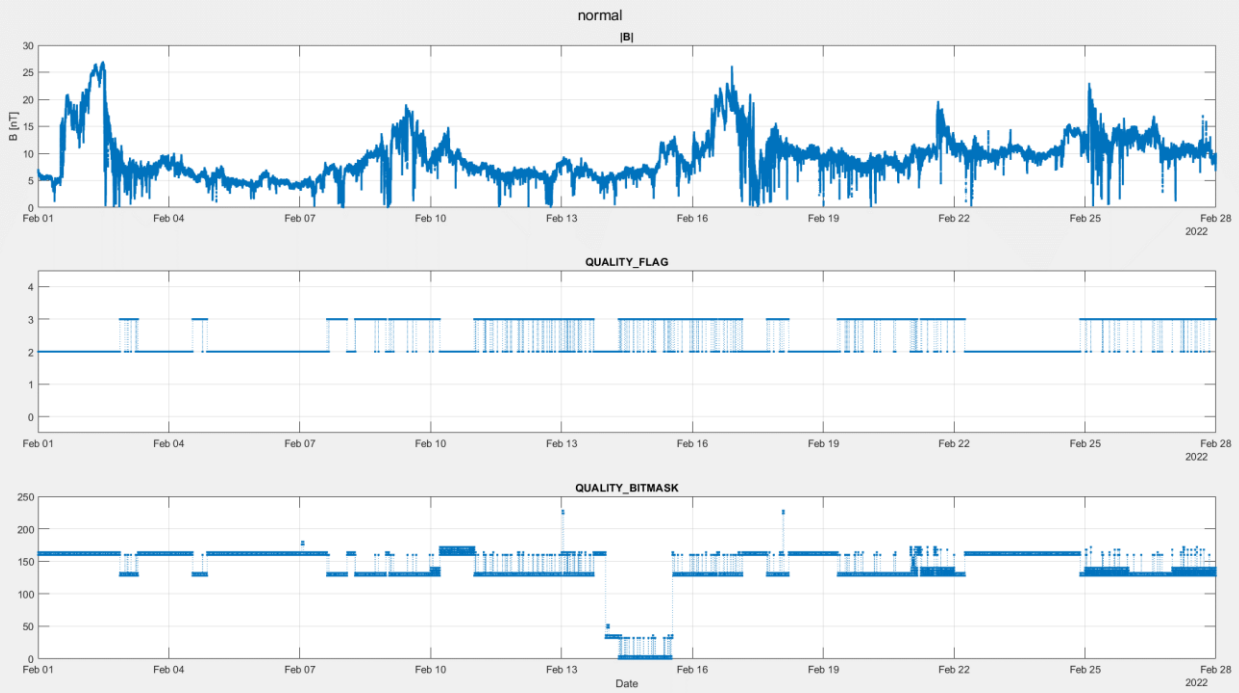
## Burst Mode



Coverage is continuous, except the data gaps due to bad weather at the ground station on the 14<sup>th</sup> of March.

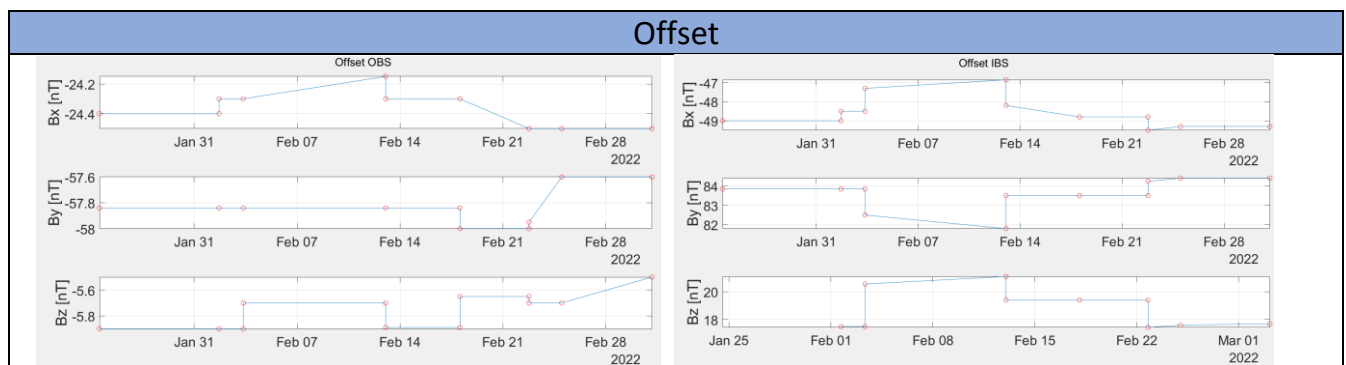
Coverage	From	To	Coverage
	01/03	01/03 06:00	24 hours per day 128 Hz
	01/03 06:00	17/03	24 hours per day 64 Hz

## Quality bitmask



Quality bit mask events

SC events which disturb the field	<ol style="list-style-type: none"> <li>1. Thruster firings</li> <li>2. Solar array lubrications (solar array is moved 15 degrees, then returned to original position)</li> <li>3. Solar array movements (solar array angle is changed, and then remains at new angle due to sun-SC distance thermal constraints)</li> <li>4. High gain antenna movements</li> </ol>	
SC related issues	Time	Reason
	03/02/2022 08:10	Solar Array current event
	13/02/2022 00:53	Solar Array movement from 30 to 56 deg
	18/02/2022 01:47	Solar Array movement from 56 to 60 deg
	22/02/2022 18:36	Solar Array current event



**1-28 February:**

OBS offset, as well as IBS offset, was affected by the solar arrays events listed in the previous sections: two movements and two current events made the offsets jump. The SA current event on the 22<sup>nd</sup> of February introduced a linear trend in OBS By, which ended on the 25<sup>th</sup>.

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

Offset	Date	OBSX	OBSY	OBSZ	IBSX	IBSY	IBSZ	Comment
220201	24/01/2022 13:20	-24.6	-57.84	-6	-48.4	83.84	16.23	Pre SA movement from 0 to 30 deg
220202	24/01/2022 13:25	-24.4	-57.84	-5.9	-49	83.84		Post SA movement from 0 to 30 deg
220203	01/02/2022 16:36	-24.4	-57.84	-5.9	-49	83.84		Pre IBS range change from 2 to 3
220204	01/02/2022 16:36	-24.3	-57.84	-5.9	-48.5	83.84	17.5	Post IBS range change from 2 to 3
220204	03/02/2022 08:10	-24.3	-57.84	-5.9	-48.5	83.84	17.5	Pre SA current event
220205	03/02/2022 08:10	-24.3	-57.84	-5.7	-47.3	82.5	20.56	Post SA current event
220206	13/02/2022 00:35	-24.15	-57.84	-5.7	-46.85	81.8	21.1	Pre SA movement from 30 to 56 deg
220207	13/02/2022 00:39	-24.3	-57.84	-5.89	-48.2	83.5	19.4	Post SA movement from 30 to 56 deg
220208	18/02/2022 01:47	-24.3	-57.84	-5.89		83.5	19.4	Pre SA movement from 56 to 60 deg

220209	18/02/2022 01:48	-24.3	-58	-5.65	-48.8	83.5	19.4	Post SA movement from 56 to 60 deg
220210	22/02/2022 18:36		-58	-5.65	-48.8	83.5	19.4	Pre SA current event
220211	22/02/2022 18:37	-24.5	-57.95	-5.7	-49.5	84.24	17.44	Post SA current event
220212	25/02/2022 00:00	-24.5	-57.6	-5.7	-49.3	84.4	17.6	End linear trend after SA current event
220213	03/03/2022 03:32	-24.5	-57.6	-5.5	-49.3	84.4	17.7	Pre SA movement from 60 to 70 deg

## 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

### Appendix – Periods now released

StartTime	EndTime	Comment
01/02/2022 00:00	02/02/2022 21:00	SC interference
03/02/2022 07:00	04/02/2022 13:00	SC interference
04/02/2022 21:00	07/02/2022 15:00	SC interference
08/02/2022 02:00	08/02/2022 06:00	SC interference
08/02/2022 23:50	09/02/2022 00:45	SC interference
10/02/2022 05:00	11/02/2022 00:00	SC interference
13/02/2022 00:35	13/02/2022 00:40	Solar array movement
13/02/2022 17:40	14/02/2022 07:30	SC interference
16/02/2022 13:45	16/02/2022 14:30	SC interference
17/02/2022 03:59	17/02/2022 16:32	SC interference
18/02/2022 01:47	18/02/2022 01:48	Solar array movement
18/02/2022 05:20	19/02/2022 08:00	SC interference
22/02/2022 06:00	24/02/2022 21:00	SC interference

### Appendix B: Files within this release

Filename
solo_L2_mag-rtn-burst_20220202_V01.cdf
solo_L2_mag-rtn-burst_20220203_V01.cdf
solo_L2_mag-rtn-burst_20220204_V01.cdf
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