RPW Consortium

2023 Operations Overview

02/10/2023

Diane BERARD, Xavier BONNIN, Jan SOUCEK

Operation status and notable events

Flight software updates:

- TDS last update in January 2022: fixed a bug in triggering algorithm
- LFR update in March 2023: Improved on-board spectral product calculations

After the updates, the RPW software operates reliably and the performance of the instrument is now largely understood, allowing for streamlined operations.

- A small number of largely fixed TDS/TNR/LFR configurations is being used
- A few parameters are varied depending on available TM:
  - Length of Burst mode interval per day
  - Cadence of TDS and LFR periodic waveform snapshots
  - Volume of TDS triggered snapshots and MAMP (maximum amplitude) data product

Anomalies and interference observed:

- The so called 50 kHz interference still appears intermittently, but was greatly reduced by updated BIAS current settings.
- BIAS DC E-field saturation observed this year due to worsening spacecraft charging

Special events:

- Venus flyby on September 4th, 2022 around 1:20. An SBM1 mode scheduled around the time of expected bow shock crossing. Very high resolution Venus bow shock data have been collected – E and B sampled at 4096 Hz continuously.

SBM1 & SBM2 data: covered by the following presentation

Typical configurations

Sub-system	Product	Nominal configuration (frequently used)	Low rate configuration (almost never used)	High rate configuration (used very often)
TDS	**Regular snapshots**	Every 10 min	Every 30-60 min	Every 20-30s
	Triggered snapshots	Every 2h	Every 4-6h	Every 30 min
	MAMP	Enabled 4X	Disabled	Enabled 1X
	Statistical data	Enabled	Enabled	Enabled
LFR	**Waveform snapshots**	Every 5 min	Every 30-60 min	Every 30 min
	Average Spectral Matrix	Every 1h	Every 1h	Every 52s
	Basic Parameters	Every 4s (BP1) and 20s (BP2)	Every 8-16s (BP1) and 40-80s (BP2)	Every 4s (BP1) and 20s (BP2)
TNR-HFR	Very low impact on telemetry volume → always the same configuration			

How operations work

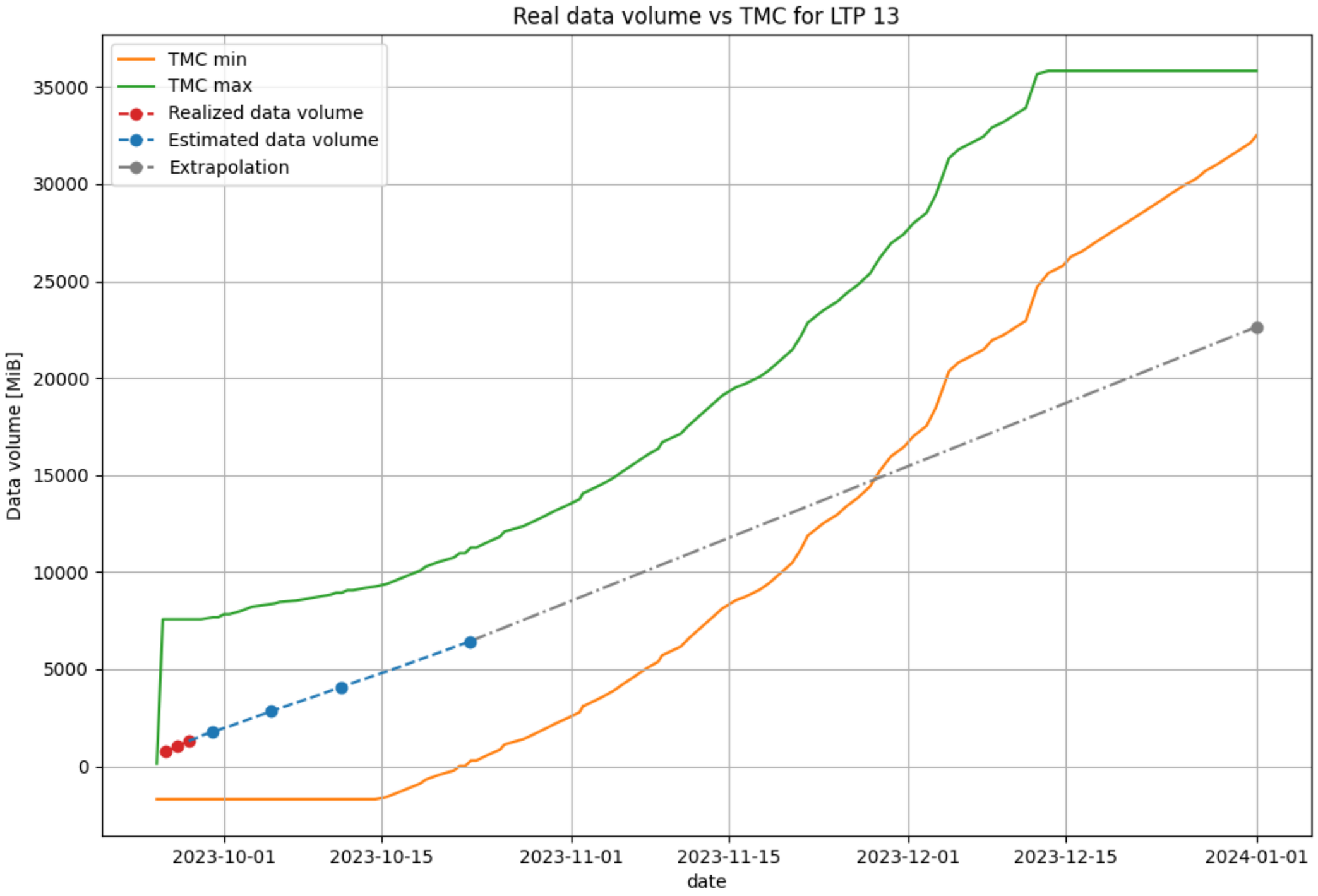
Year is divided in 4 Long-Term Plannings (LTP)

1) On each LTP, all instrument teams meet at ESAC, Madrid, to share and optimize the telemetry use, in agreement with science goals defined at SWT.
→ Telemetry corridor is provided by SOC to ROC (RPW Operations Center) team : constraints on telemetry day after day.

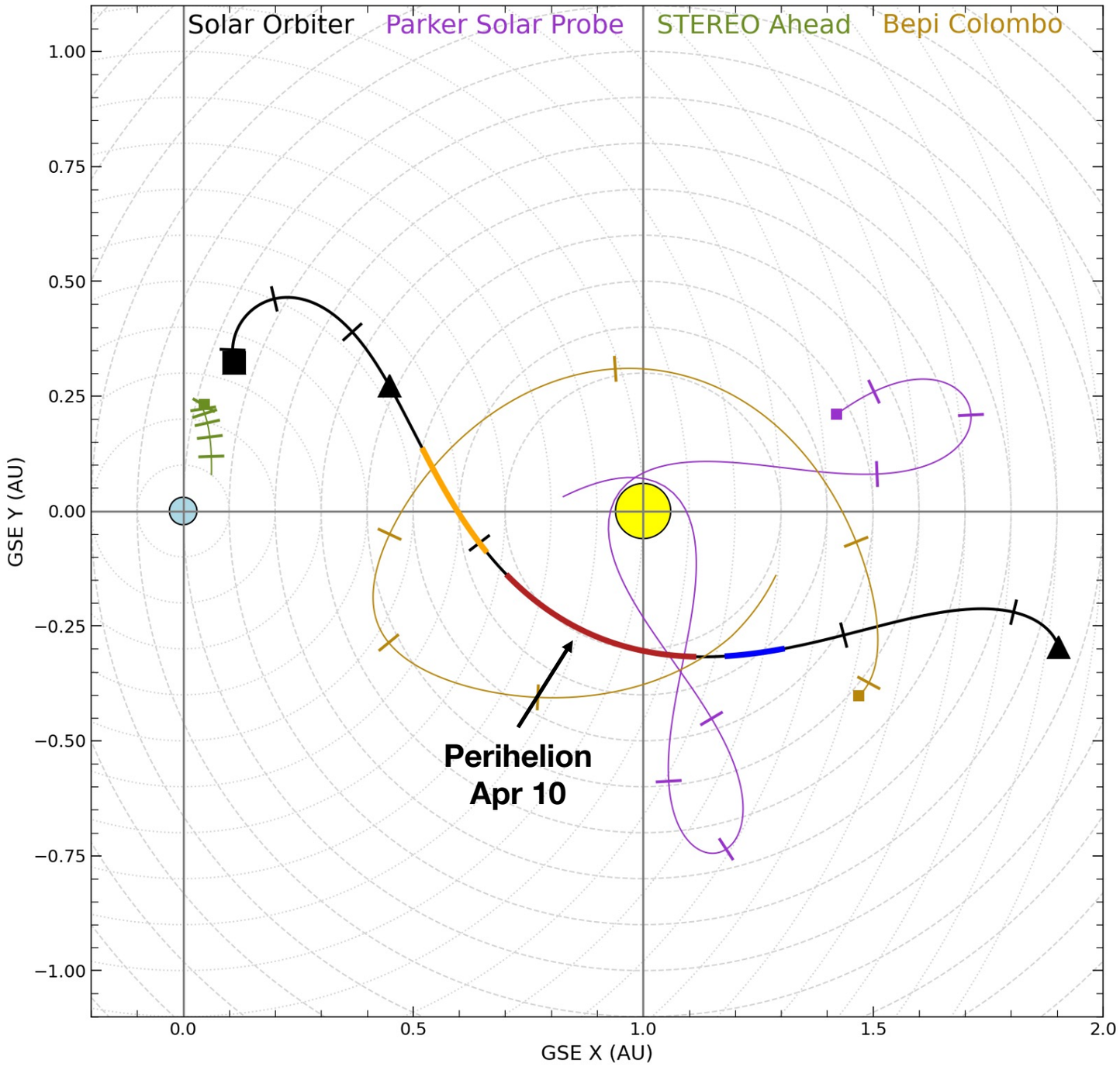
2) Every week, detailed operations planning must be sent to SOC by ROC team. PI of each sub-system (LFR, TNR, TDS, BIAS) can require specific configuration at any time, and ROC team optimizes the configuration in order to fit their requests and SOC/MOC constraints

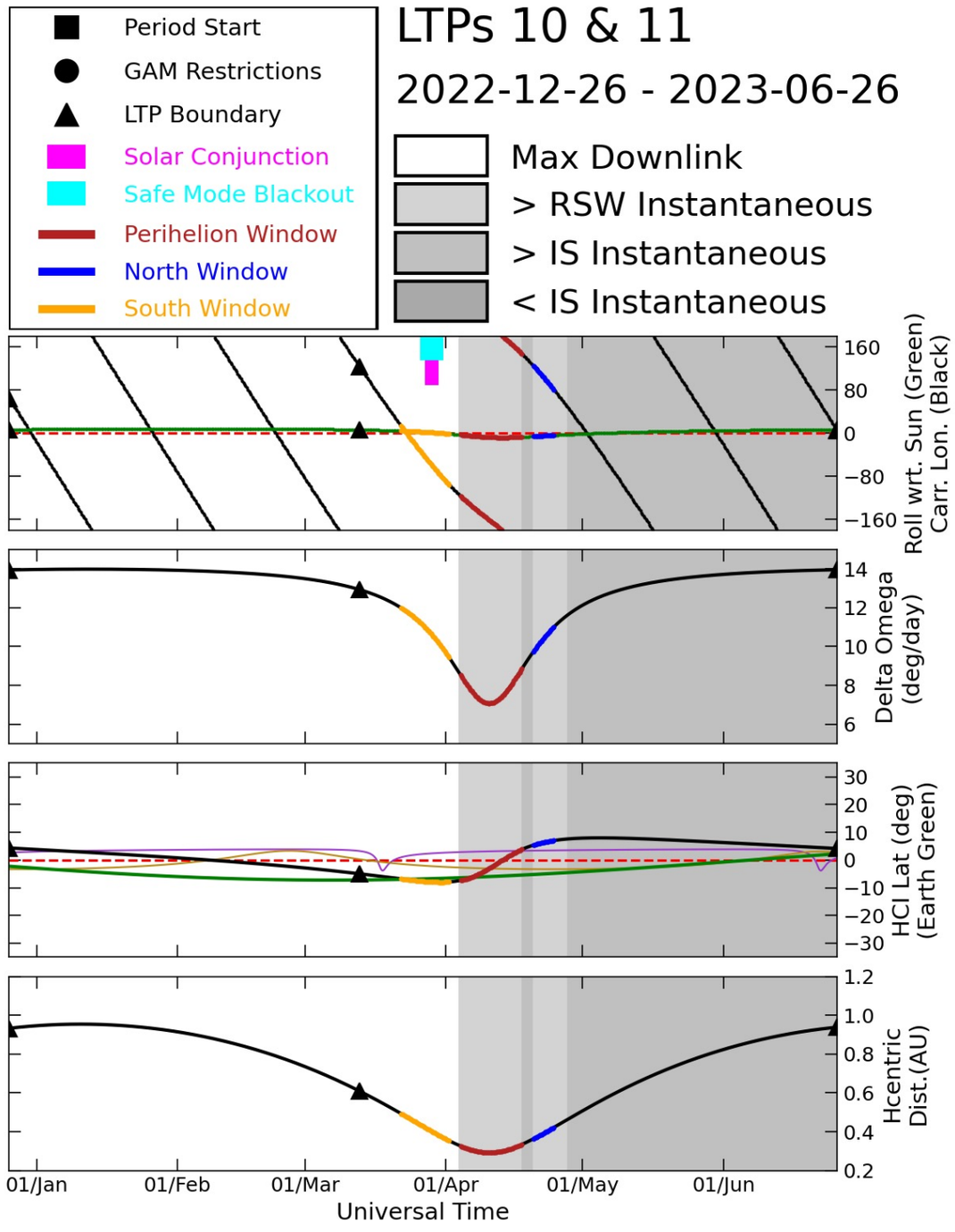
3) After operations have been run in flight, SOC sends to ROC each day a telemetry volume state. This allows ROC to adjust operations to fit telemetry corridor.

Telemetry volume management

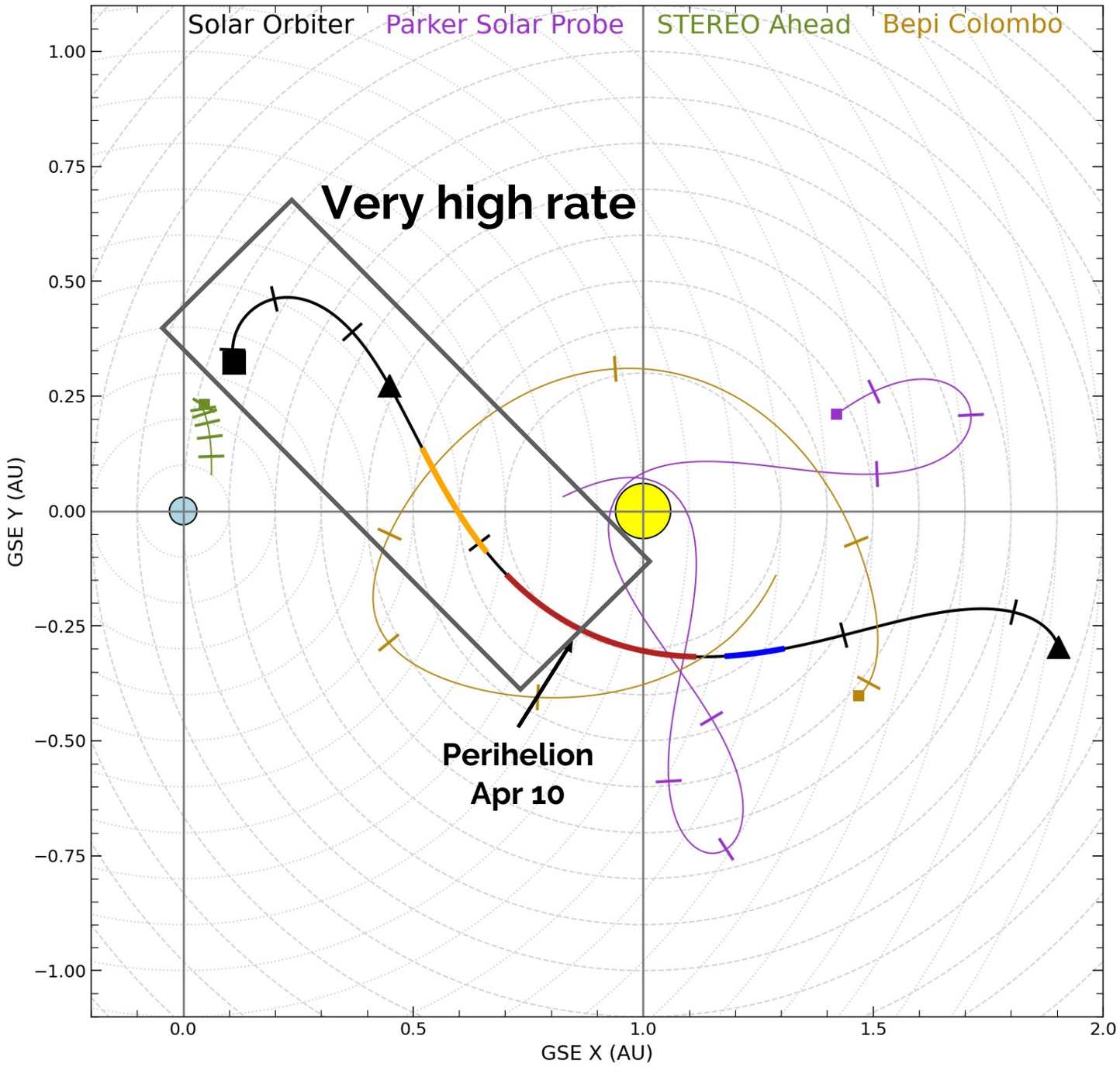


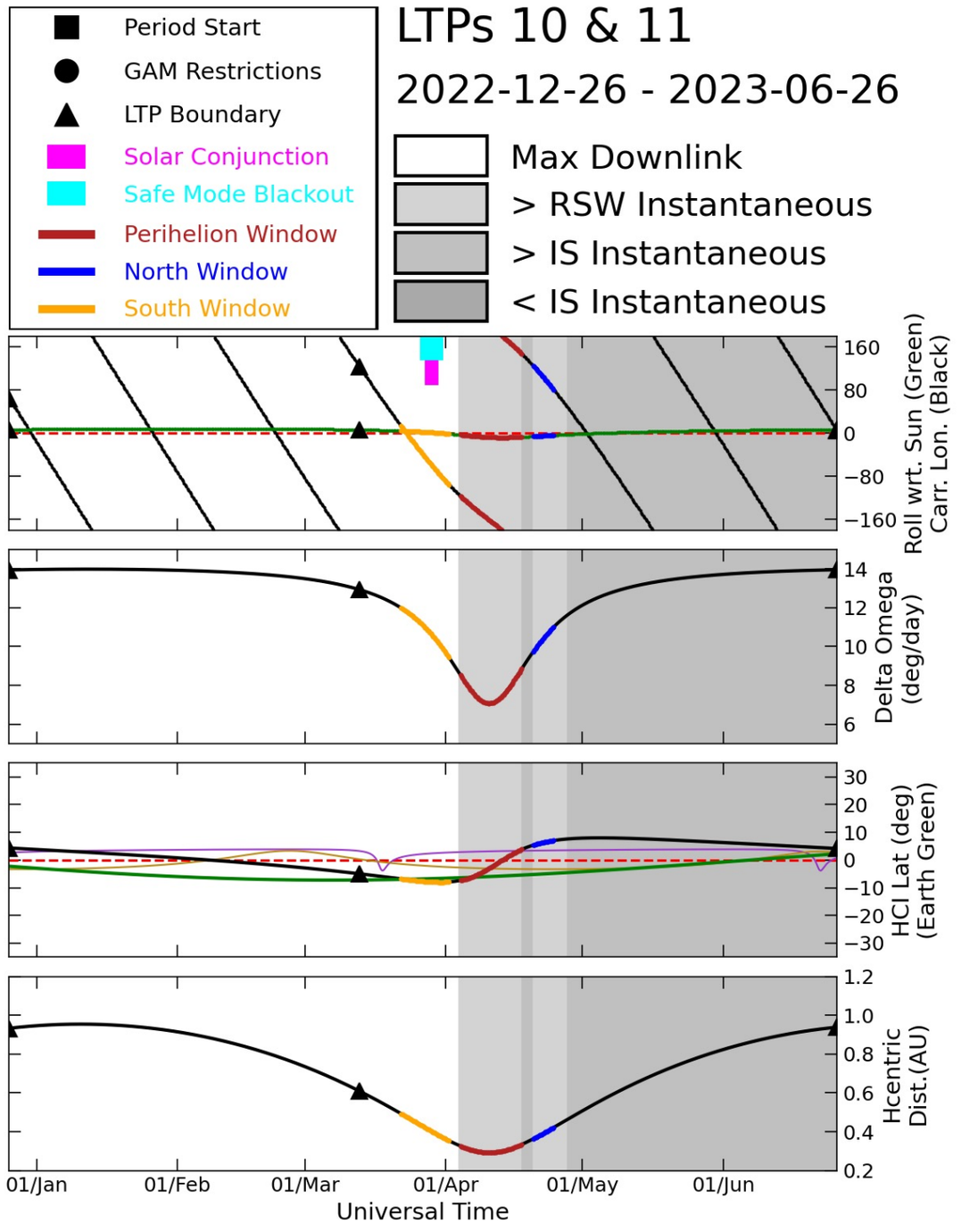
Orbit on Jan – June 2023



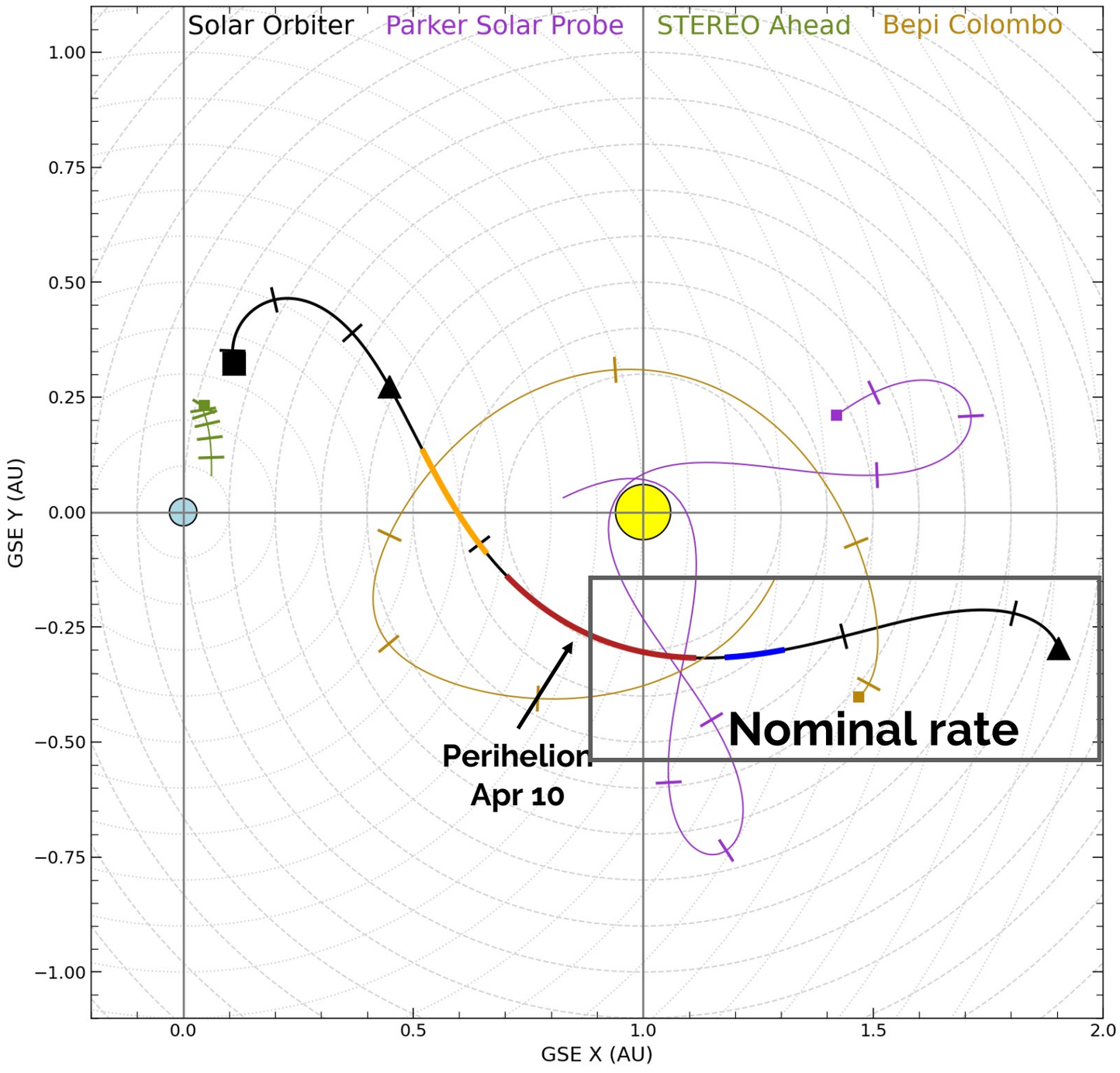


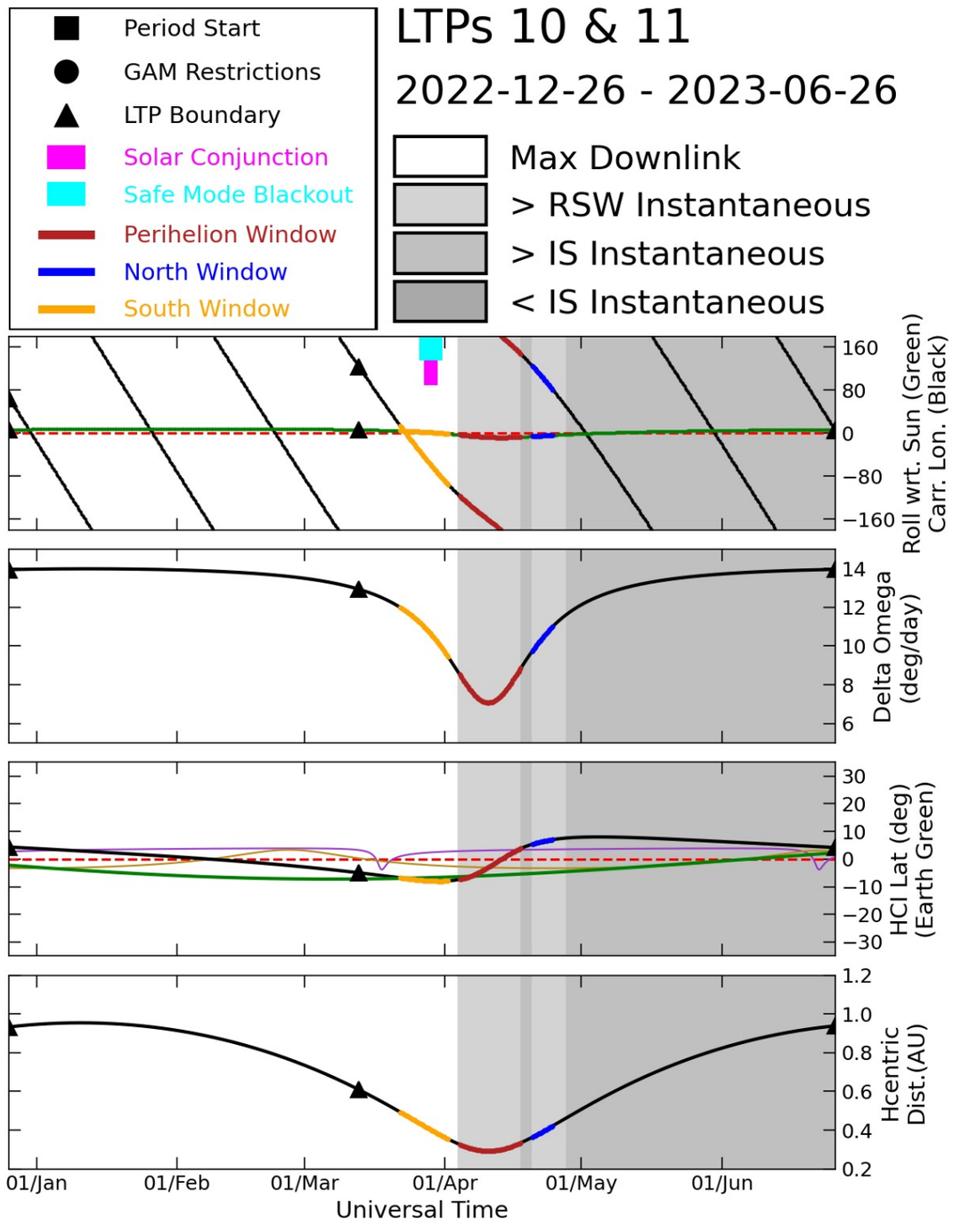
Orbit on Jan – June 2023



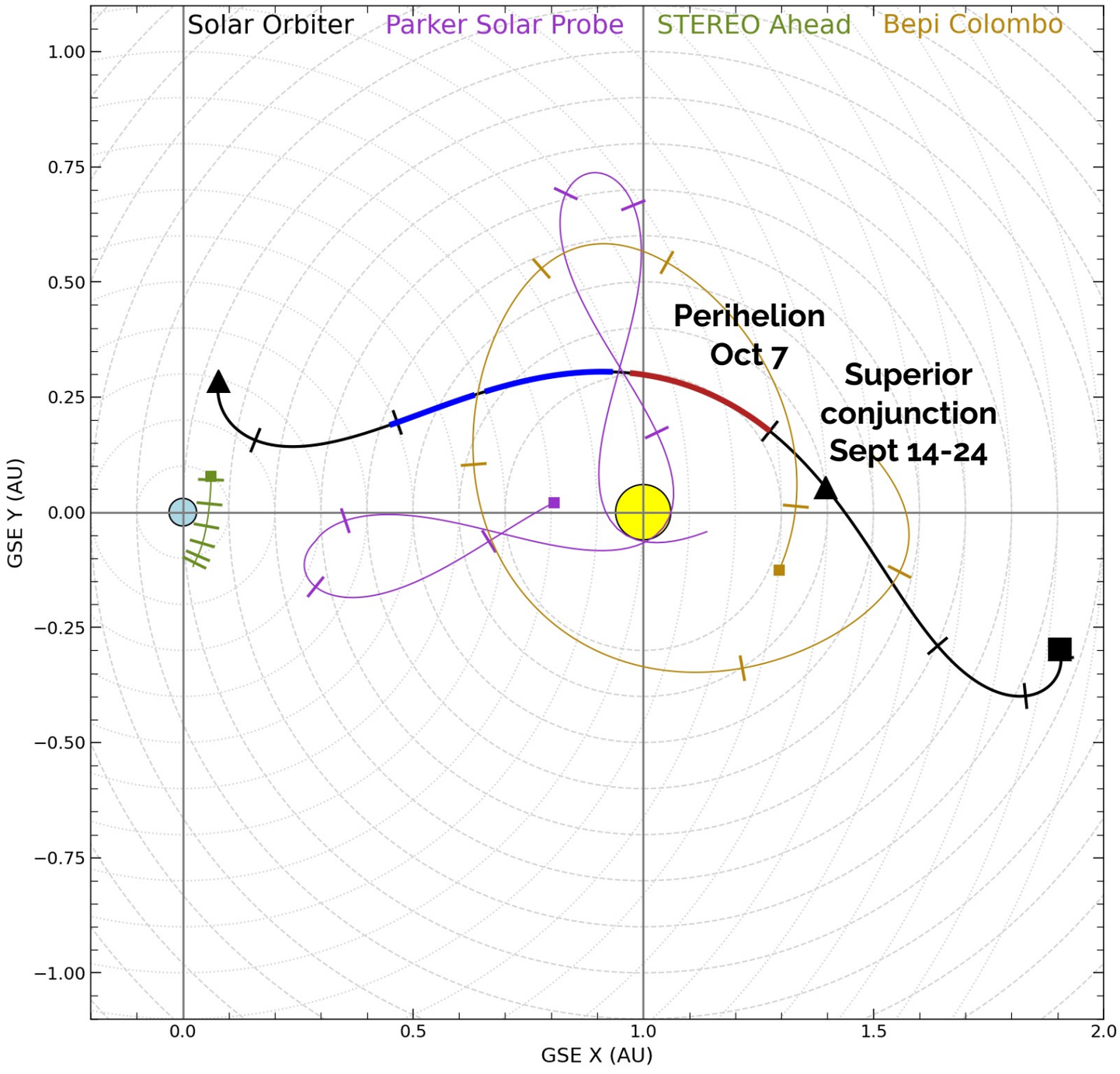


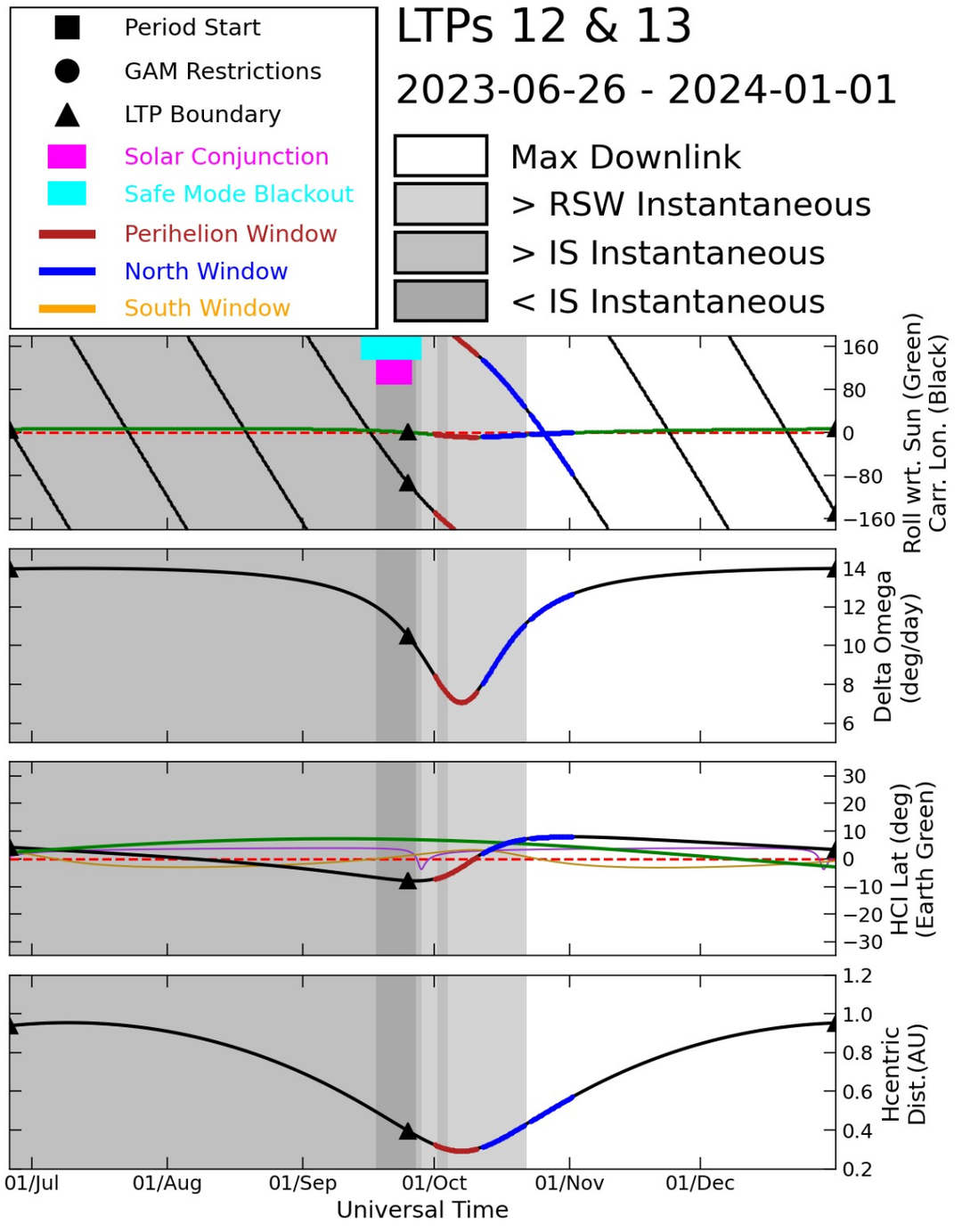
Orbit on Jan – June 2023



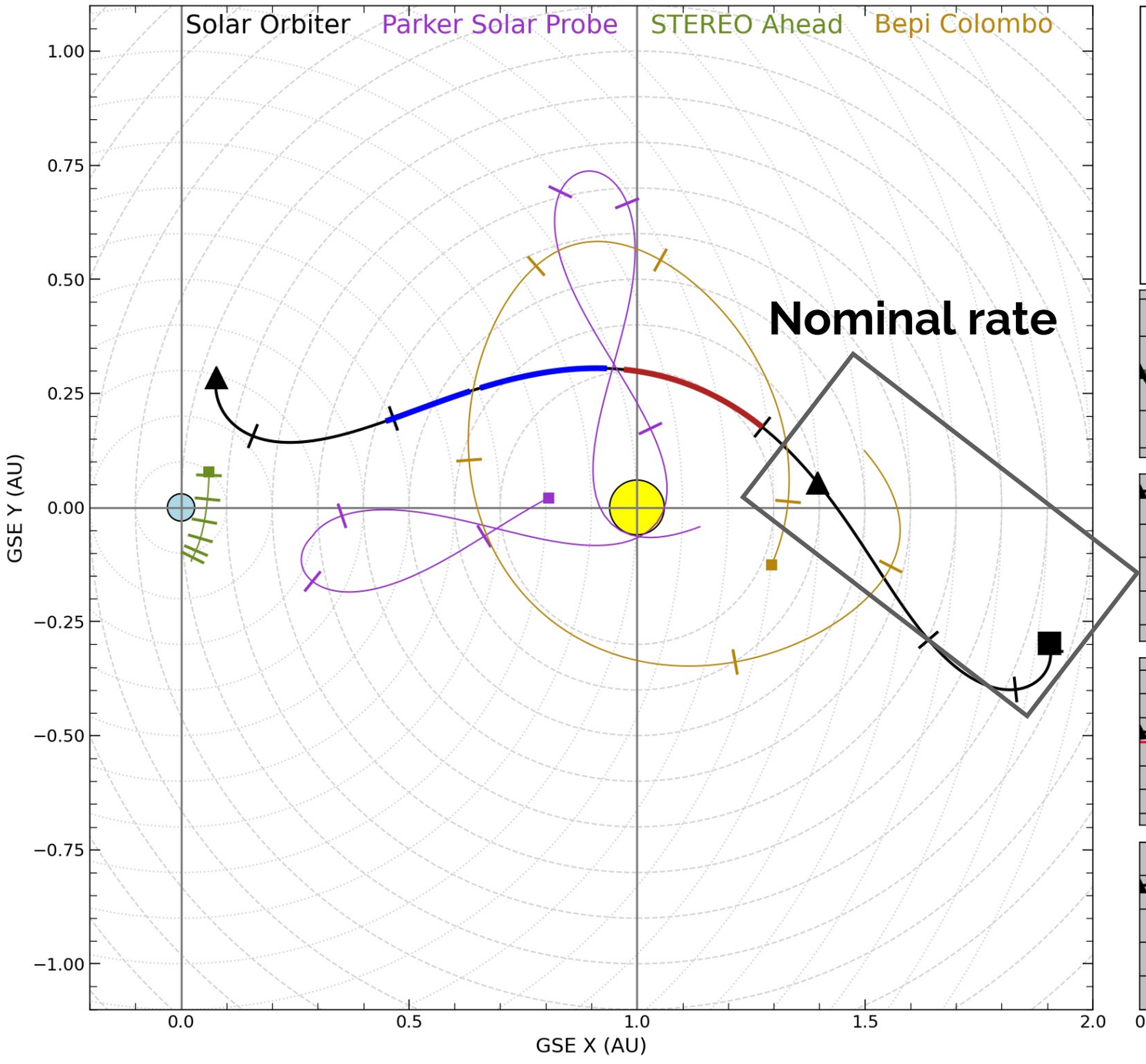


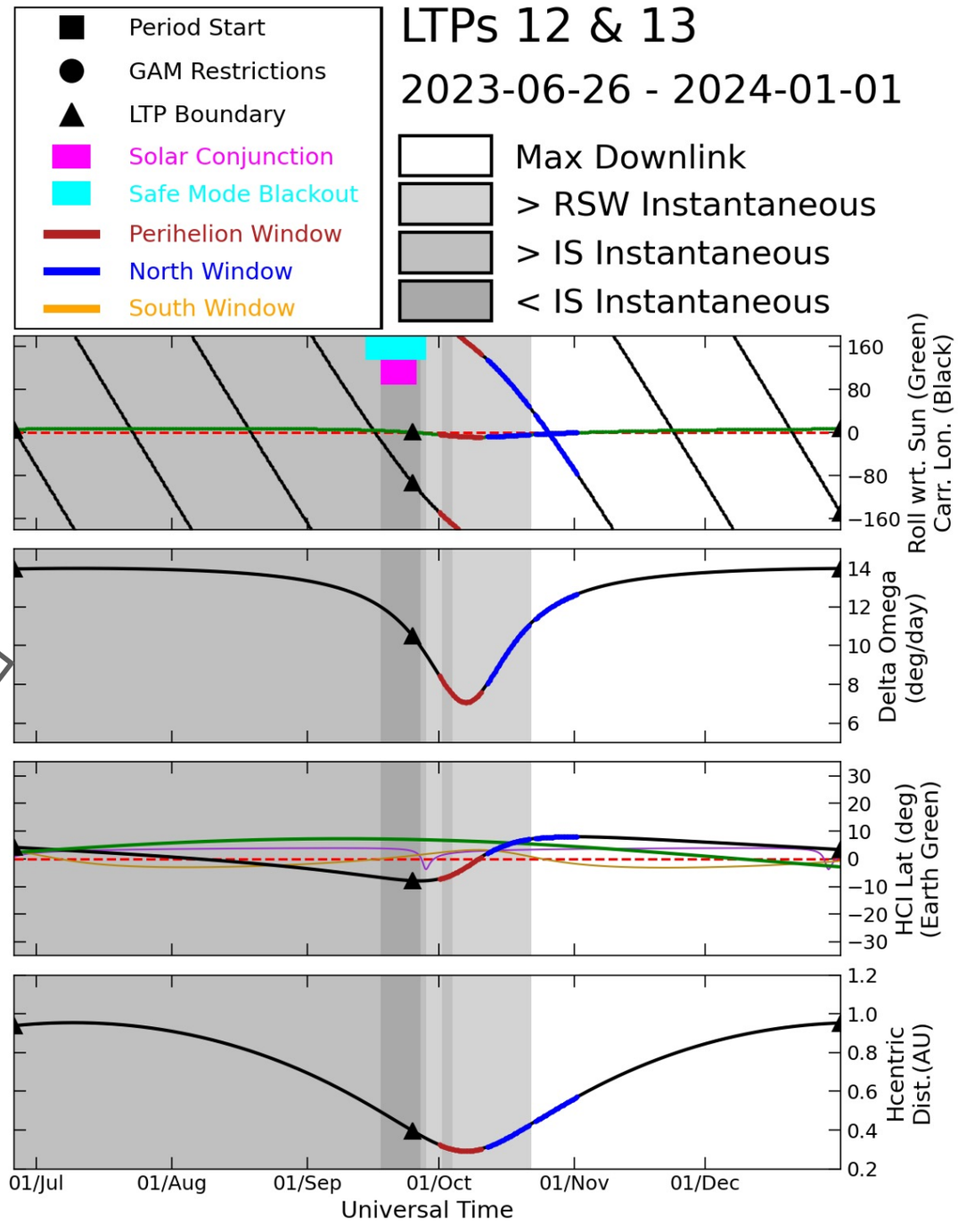
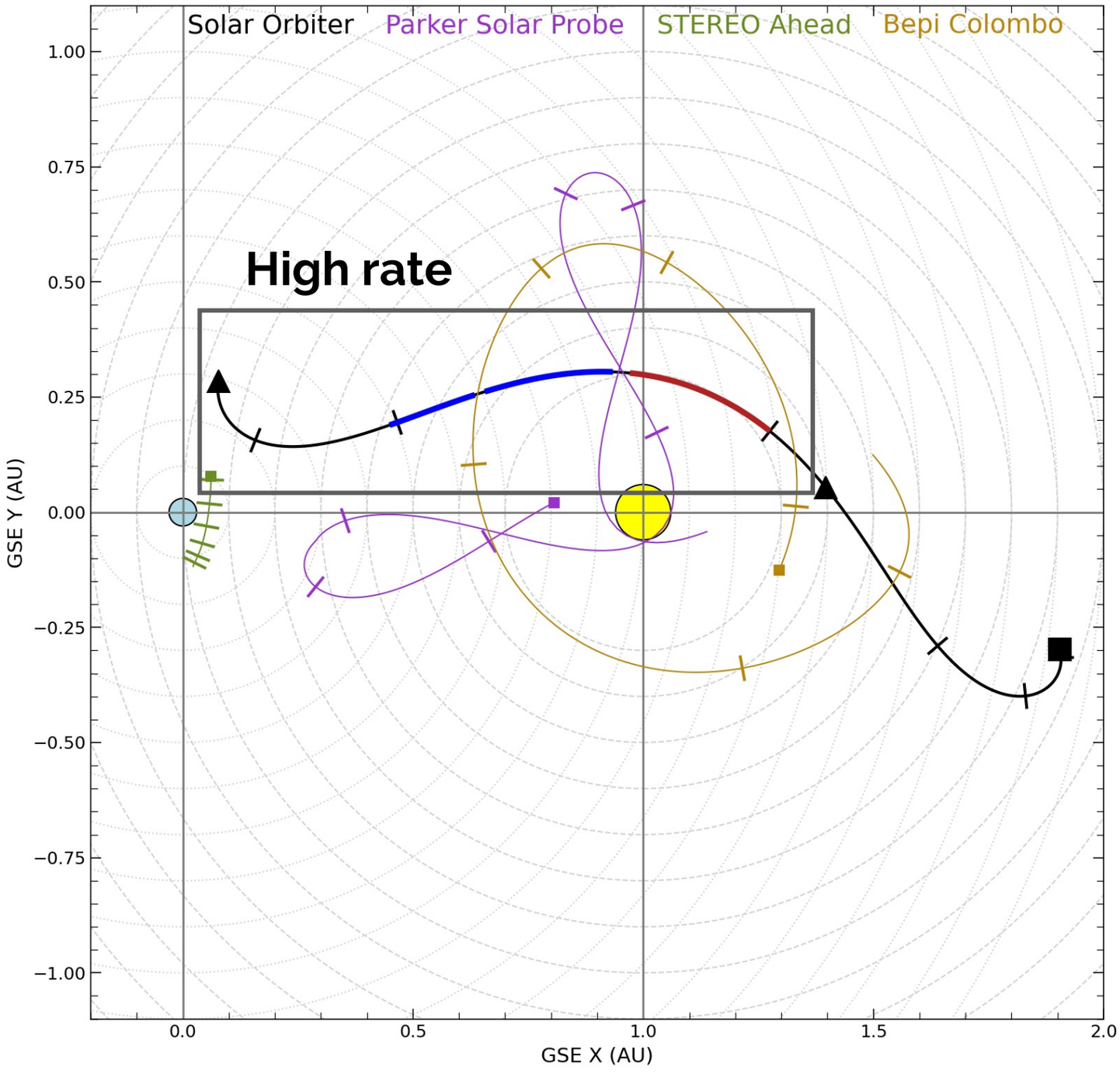
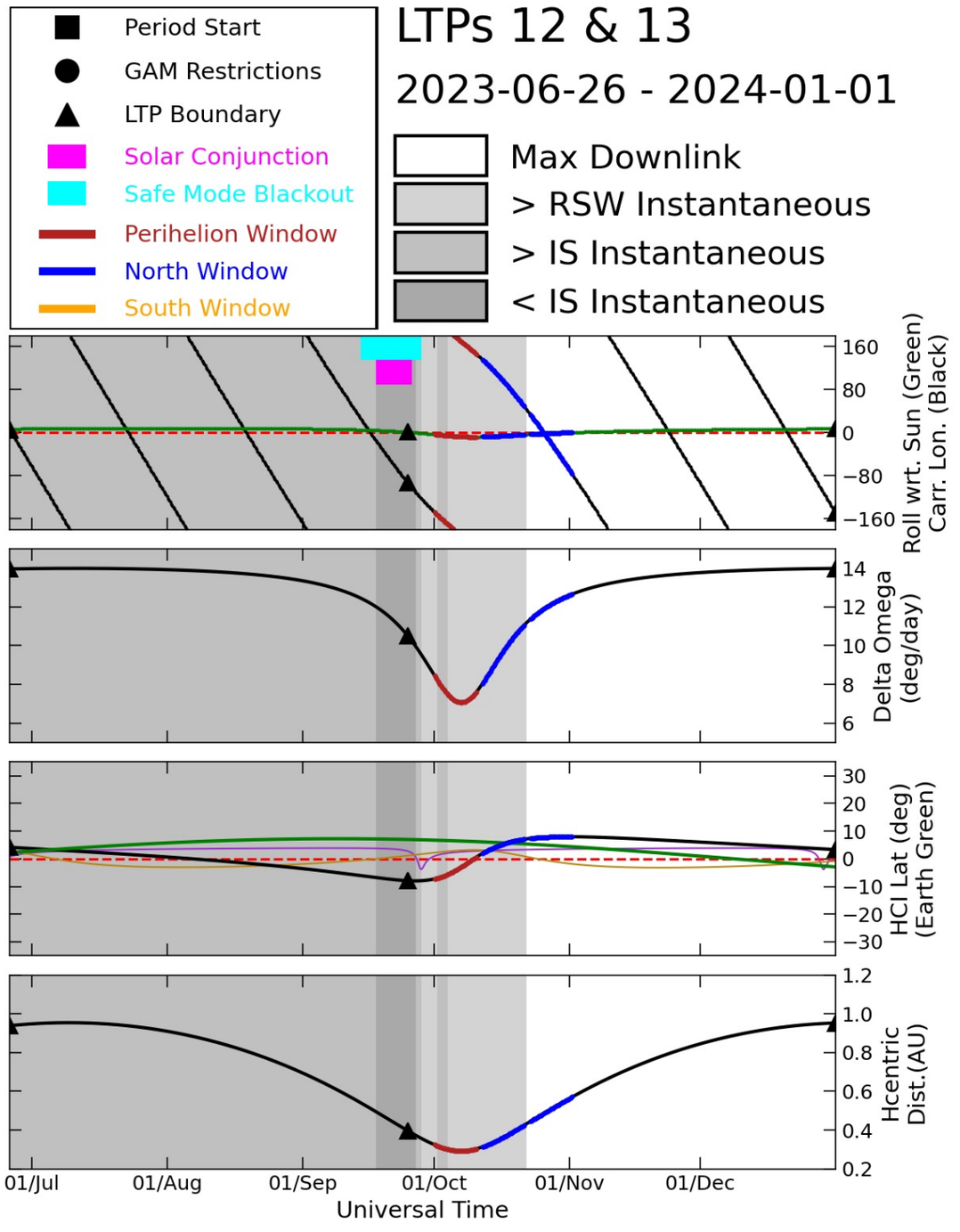
Orbit on July – Dec 2023





Orbit on July – Dec 2023





Orbit on July – Dec 2023