

solar orbiter



# **RPW cruise phase operations (Commissioning, LTP01&02)**

June 26, 2020

*Virtual RPW consortium meeting*

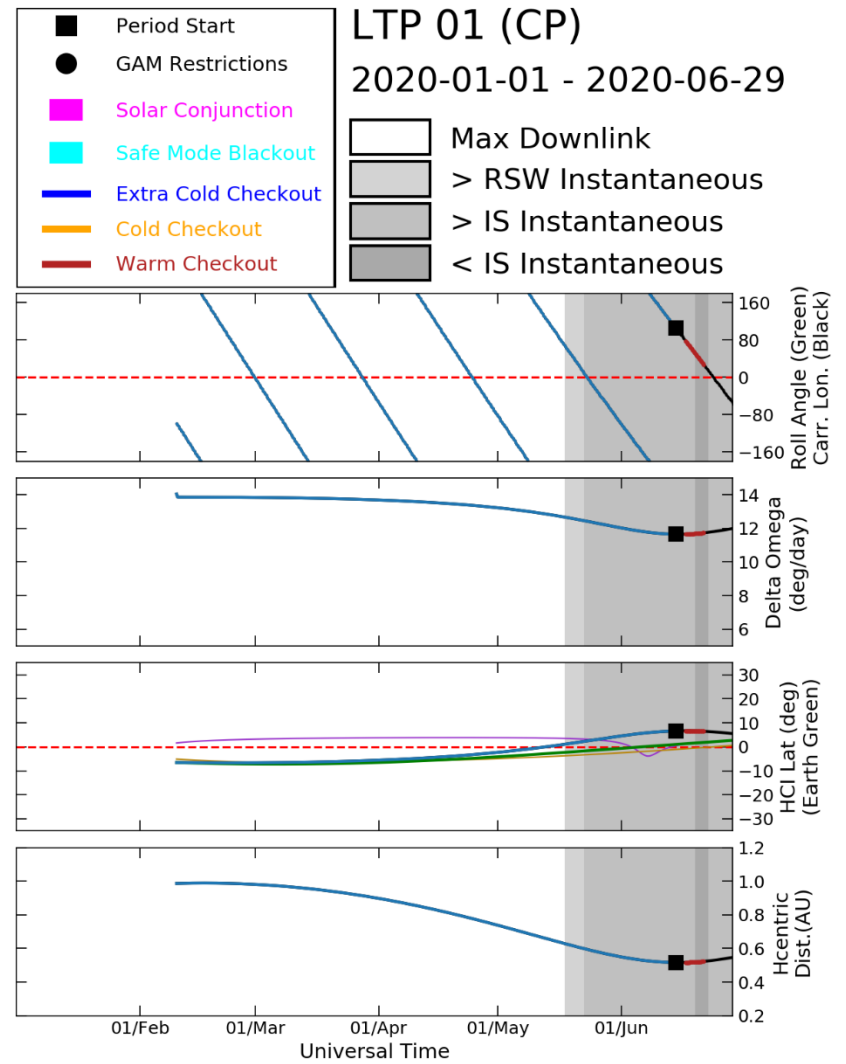
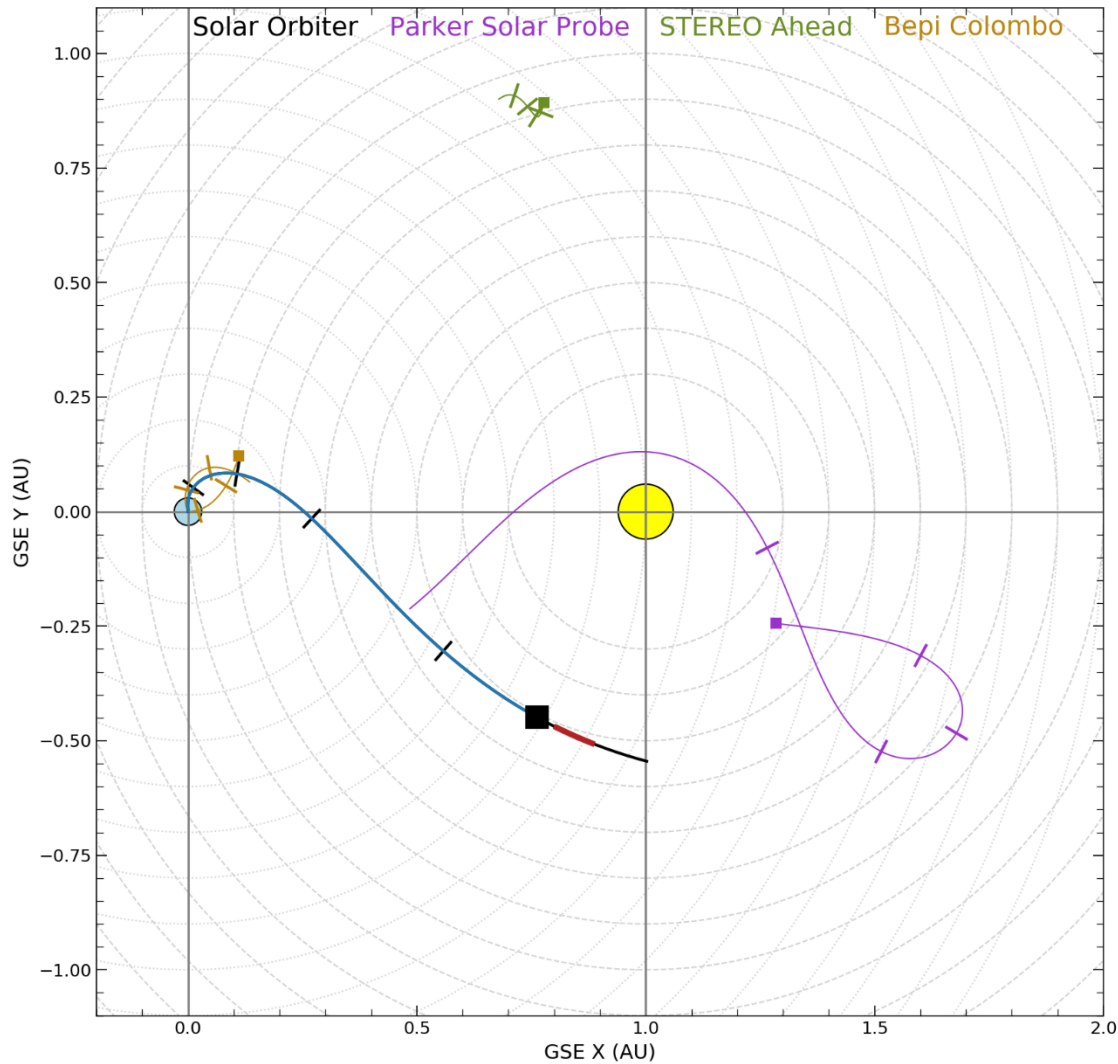
# RPW operations in cruise (and before)

- ❑ Commissioning phase: launch -> June 14<sup>th</sup>
  - Interrupted by COVID-19
  - Primarily focused on instrument testing.
  - On the other hand, RPW was run nearly continuously during commissioning and the data are (mostly) scientifically valid.
  - Some very interesting and very high rate periods.
- ❑ Cruise phase officially started on June 15<sup>th</sup>
  - One month later than planned, so the high rate operations planned for the beginning were largely lost
  - RPW (as well as MAG/SWA/EPD) is planned to operate continuously throughout the cruise
- ❑ Cruise operations: two long term planning periods in 2020
  - LTP01 (a very short one – until end of June)
  - LTP02 (July to December 2020)

# Commissioning data highlights

- Multiple days where RPW was in extremely high datarate mode
  - Snapshots every 11 second or 22 seconds. Originally for EMC characterization, but contain valid science data.
  - Long periods of burst mode
  - Variety of configurations for TDS (dipole, monopole, etc..)
  - EMC interference campaign, when RPW was listening to payload being turned on and off. RPW was in a very high rate mode.
  - There is even some Selective Burst Mode data (4 kHz waveform)
- Crossing of the tail of comet Atlas (May 30 to June 8 and perhaps beyond)
  - Lots of wave activity and some dust (see the TDS presentation in the afternoon). Signatures seen on SWA and MAG too.
  - RPW was put in specifically designed modes (high datarate, lots of snapshots)
  - SWA-PAS was (exceptionally) on for two days, providing good data

# LTP01 (June 15-28<sup>th</sup>)

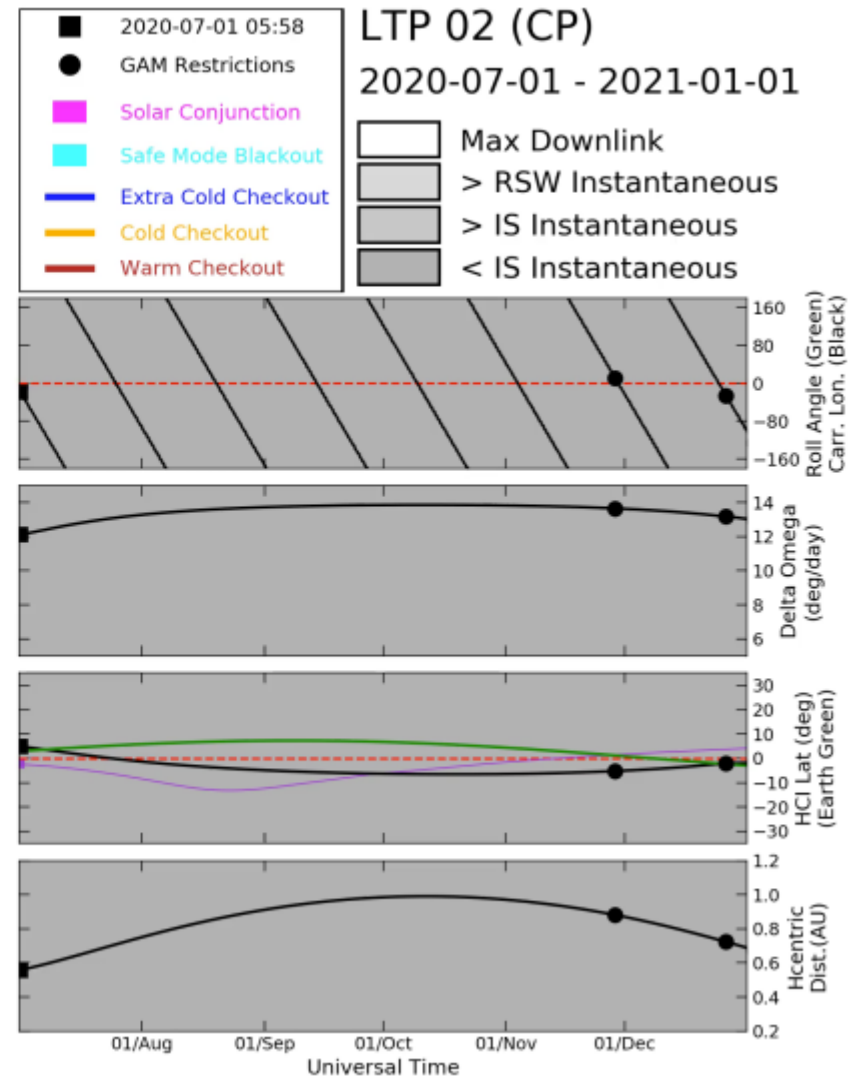
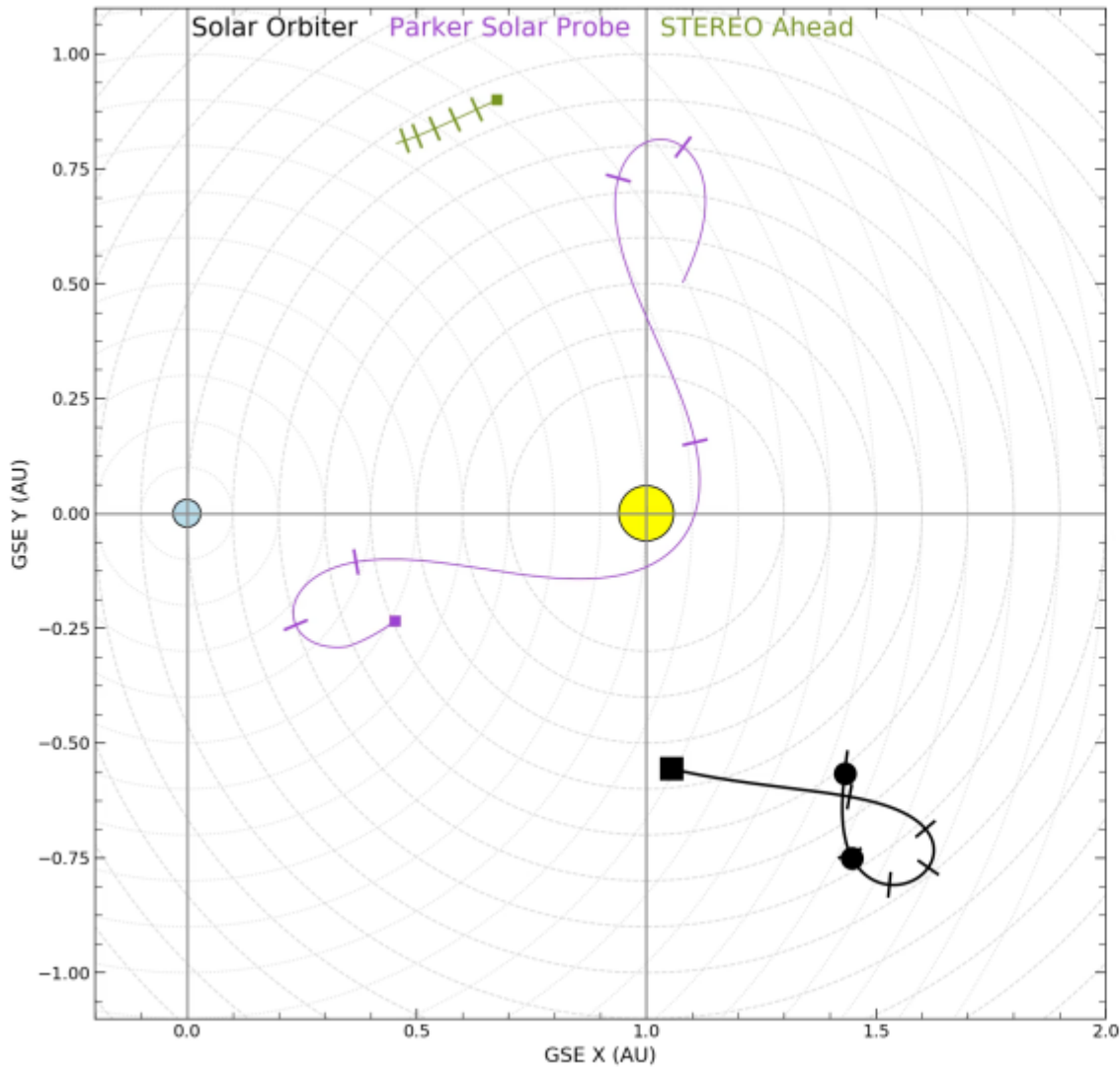


# LTP01 operations



- ❑ Only 2 weeks, ending this Sunday.
- ❑ LTP01 starts around perihelion at 0.5 AU.
- ❑ Nominal TM available to RPW. RPW is in default configuration with 10 minutes of burst mode per day.
  - Unfortunately, due to SBM1 issues, not all BM intervals were activated (TBC).
- ❑ SWA-PAS instrument is off
- ❑ RPW configured in SBM detection mode
  - This mode is designed to detect interplanetary shocks by detecting discontinuities in MAG and SWA data and trigger high rate mode if a shock is crossed. Later in the mission, this SBM data will be downloaded via selective downlink.
  - SWA data not available in LTP01, so RPW defaults to using spacecraft potential.
  - It seems the detection thresholds are not set properly, because RPW triggers too often (many times a day). This needs to be tuned during cruise.
- ❑ Selective downlink not available in cruise. ROB decided that until we are sure of SBM operation, the SBM data is not downloaded. But we will still know when triggers happened.

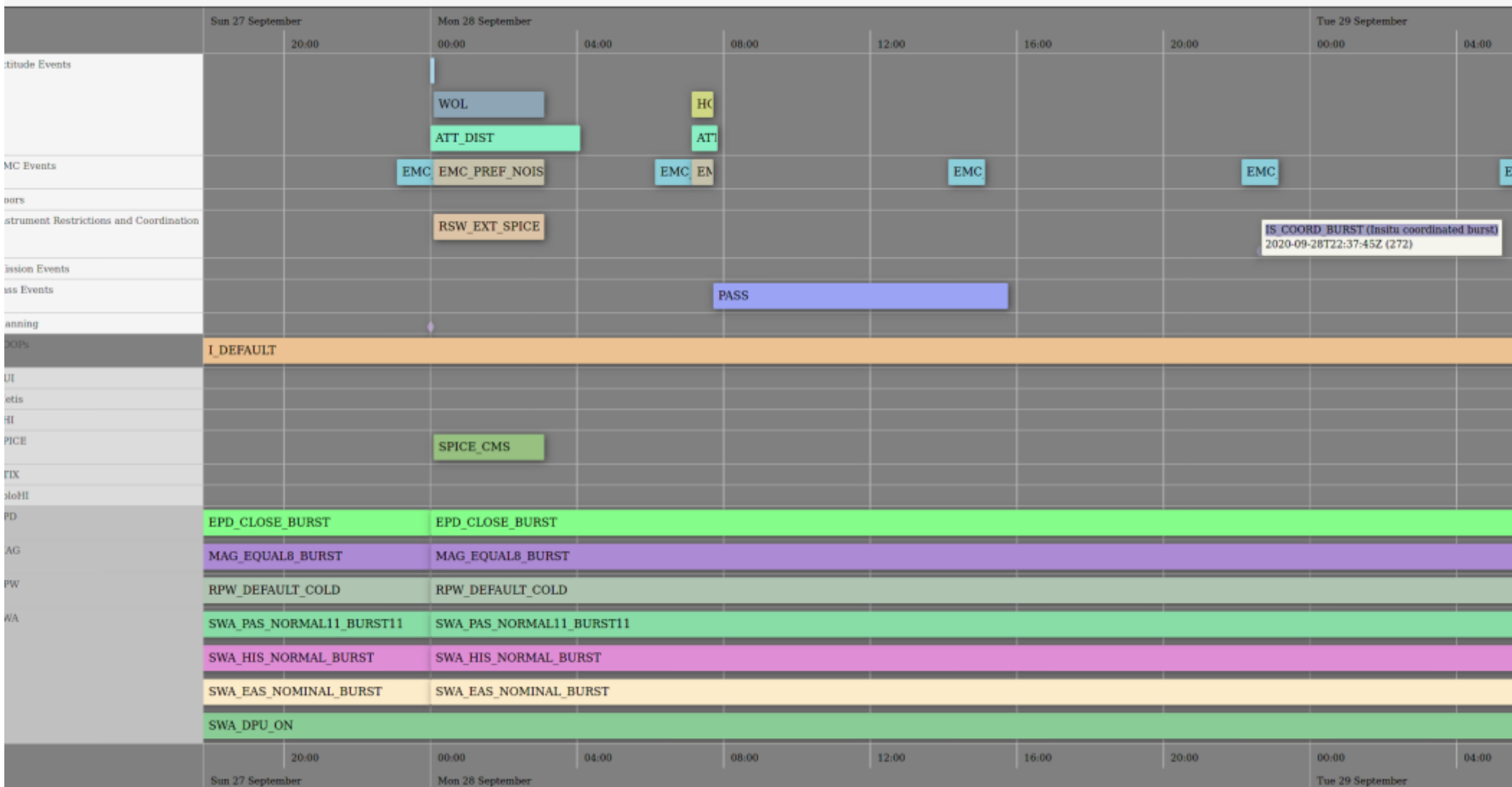
# LTP02 (July 1<sup>st</sup> – December 31<sup>st</sup>)



# LTP02

- ❑ LTP02 will start next week.
- ❑ Additional TM is available, in particular in the first month
- ❑ The following configuration is used in early weeks:
  - LFR waveform snapshots every 100 seconds (instead of 300)
  - 2 hours / day of burst mode (instead of 10 minutes)
  - 24 TDS snapshot dumps per day (instead of 6)
- ❑ LTP02 starts around 0.6 AU so this can be interesting and rich data.
- ❑ RPW is currently running in the same SBM detection mode as in LTP01, but thresholds need to be adjusted to avoid the frequent triggering.
- ❑ Special operations for Parker Solar Probe radial alignment in September and Venus flyby in December are planned.

# SOOP kitchen



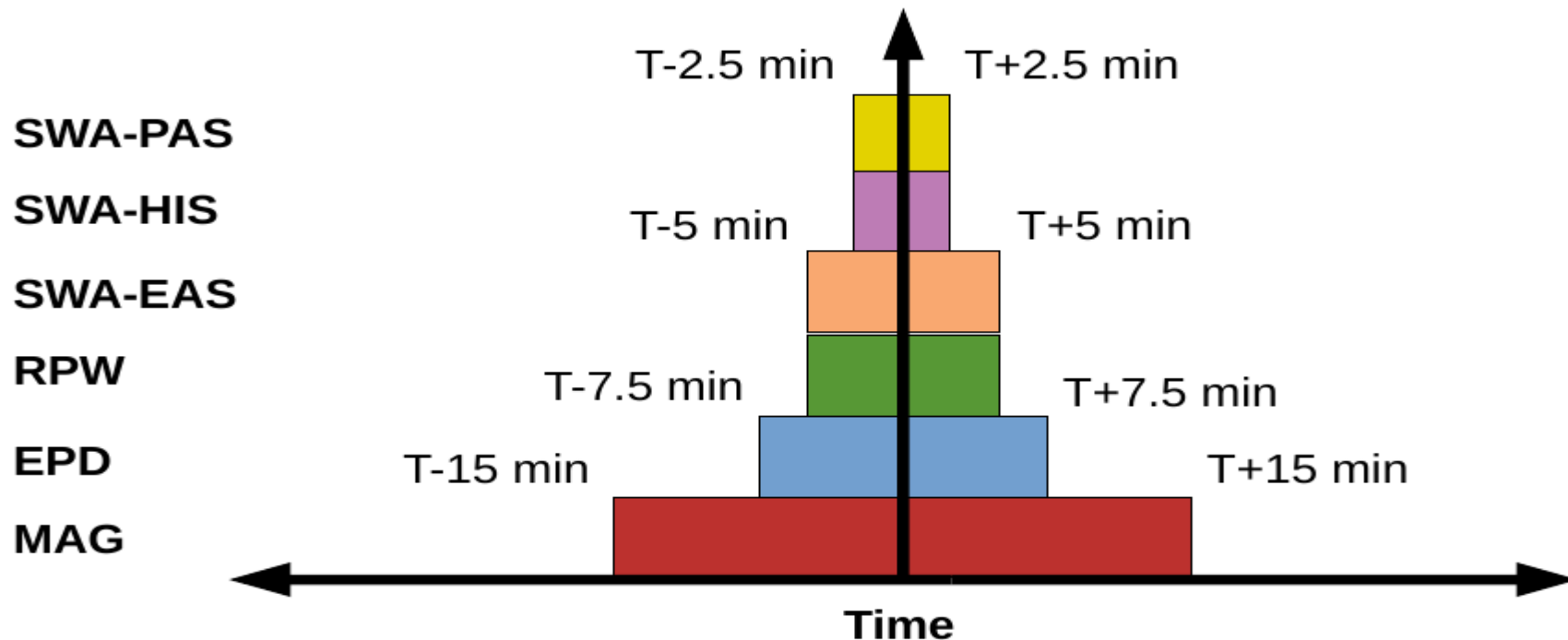
□ High level planning tool: instrument modes, in-situ burst points, EMC events.... This is planned by SOWG and refined by SOC.



# In-situ burst mode coordination



- ❑ MAG, SWA and RPW all have a short burst mode planned
  - SWA: 5 minutes 2 x per day (4 second moments, 8 Hz PA distributions)
  - MAG: 64 Hz data (> 10 minutes per day)
  - RPW: Our BURST mode (1 per day) with 256 kHz w
- ❑ Indicative burst times (1 per day) are shown in SOOP kitchen. All instruments try to center their burst on this point. This is always within EMC quiet time.
- ❑ Sometimes, more burst TM is available. Coordination currently not fully systematic, this is being discussed in ISWG.



# Short Term Planning cycle

- ❑ Long term planning done by SOWG and put in SOOP kitchen in 6 months periods. This results in telemetry allocation.
- ❑ We plan the instrument operation on a short term (~2 weeks ahead) See Diane's slides for how this is done.
- ❑ However we can do pretty much anything reasonable as long as we stay in the TM corridor and provide the data expected by other instrument teams.
- ❑ Proposals from the RPW team for special operations are possible:
  - If you have an idea and want a specific mode / measurement / instrument configuration, let Milan/ROB know.