

ROC status

*RPW Team meeting,
Oct. 3, 2023*



solar orbiter



ROC STATUS OVERVIEW (1/2)

RPW Data processing/dissemination/archiving

- Nominal
- Software and data updates needed (see next slides)
- Currently focus on:
 - Continuing to implement L3 data (see dedicated session)
 - Continuing support activities on added-value data for RPW (quicklooks, events catalogs, Zooniverse, etc.)
 - Improving RPW science data accessibility and visibility (L3 CDF content, data readers, tutorial, new Web portal for data users, ...)
 - Working with Paris Observatory and LESIA IT teams to mitigate frequent network outages
- RPW data availability in Solar Orbiter Archive (SOAR):
 - L0 → Up to end of 2022 (but issue on SOAR side to ingest > V02 file)
 - L1 → Up to May 2022 (wait for CDF 3.9.0 upgrade)
 - L2 → Up to June 2023 (On time)
 - L3 → Up to Nov. 2021 for Bias density/scpot/efield. Up to Dec. 2020 for Bias VHT. Up to Dec. 2022 for TNR FP (On time w.r.t. files delivered by teams)

RPW monitoring and operation

- Nominal, except for SBM
- Currently focus on "SBM" selective downlink life-cycle in terms of:
 - On-board detection (see Diane's presentation)
 - SBM event selection
 - Science data retrieval, accessibility and visibility (see slides 10 & 11)

Pipelines and data interfaces status

- Current pipelines versions: RODP 1.24.1 and RIVP 2.7.2
- Stable in overall, but still few bugs to fix
- Important upgrade to be planned (Outflow framework migration)
 - Not applied before 2024 (TBC)
 - Should be fully transparent w.r.t. RCS software and RPW data products
- Data access is OK, but intermittent network issues encountered this year

RPW data user support software status

- Tutorials and support software exist to read/plot/handle RPW science data files in CDF format (see in RPW Web site¹)
- ROC will pursue supports to RPW data users
- Especially, ROC is working with MASER4PY² development team to have readers for main RPW data products in a single Python package

¹ <https://rpw.lesia.obspm.fr/rpw-data/data-reading/>

² <https://pypi.python.org/pypi/maser4py>



RCS STATUS

Current L1R/L2 Processing :

- BICAS V7.0.0
- LFR_CALBUT V2.1.0
- SCMCAL V1.2.0
- TDS_CALBA V2.2.1
- THR_CALBAR V2.4.0

Current L3 Quicklook & Summary Plots Processing :

- BIA_QL3 V1.2.1
- LFR_CALBUT V2.1.0
- SCM_QL3 V1.1.0
- TDS_QL3 V1.6.0
- TNR_QL3 V0.5.1



- TNR_QL3 needs to be fixed : No solo_L3_rpw-thr-surv_*.png summary plots anymore due to « Wrong sensor in HFR or TNR reader »

Software environment

- Processing servers run on Debian 12 ("Bookworm")
- Current software versions supported at LESIA¹:
 - IDL 8.5
 - Matlab 2019b
 - Python 3.6, 3.8, 3.11
- **RCS Teams to notify to ROC before CDF update campaign (see next slide) if there is a need to upgrade software dependencies**

¹ https://confluence-lesia.obspm.fr/display/ROC/Software+environment?preview=/3114735/122619820/ROC_Servers_Config.xlsx

L1/L2/L3 CDF update is required:

- Compliance with SolO metadata standards 2.5¹
- Main changes:
 - Implement "QUALITY_BITMASK" (L1), "QUALITY_FLAG" (L2, L3)
 - Remove "Parent_version" global attribute
 - Set "MODS" global attribute (RCS ICD 1.5)
 - Possible use of CDF zVariable compression (GZIP.6)
 - Add DOI info (see slide 9)
- Upgrade to CDF 3.9.0 (instead of 3.7.1)
- Fix remaining inconsistencies in CDF (to be discussed with each team)

¹ <https://s2e2.cosmos.esa.int/confluence/display/SOSP/Metadata+Definition+for+Solar+Orbiter+Science+Data>

What's next?

1. ROC to exchange with RCS teams to prepare activities and make sure there is no technical or planning (availability) issue
2. ROC to provide samples of new RPW L1 CDF to RCS teams
3. RCS teams to provide new software version data pack to ROC for testing/validating
4. ROC to re-produce all RPW L1/L1R/L2 CDF as well as summary plots/quicklooks
5. RCS teams to re-produce and deliver to ROC RPW L3 CDF
6. ROC to deliver new version CDF to SOAR

To discuss with teams about when start this activity. (Let us know in particular if you need time to do perform additional RCS software/data upgrades on your side)

NOTE: For the future, ROC would like to re-process data on a more regular way (to be scheduled every TBD months)

RPW data identification and traceability

ESA instrument DOI¹ approach

- ESA is setting up DOI for SolO payload²
- There is a one ESA DOI/landing page per instrument
- RPW must provide information for the DOI landing page hosted by ESAC

MASER data collection DOI approach

- MASER portal³ also offers data identification and traceability
- There is one MASER DOI/landing page per data product (and version)
- Interesting approach for RPW data product description and traceability

ROC team is discussing with both ESA (contact: A.Masson) and MASER (contact: B.Cecconi) to see if we can combine both approaches for RPW

1 Digital Object Identifier (https://en.wikipedia.org/wiki/Digital_object_identifier)

2 See for instance <http://esdcdoi.esac.esa.int/doi/html/data/heliophysics/SolarOrbiter/SWA.html>

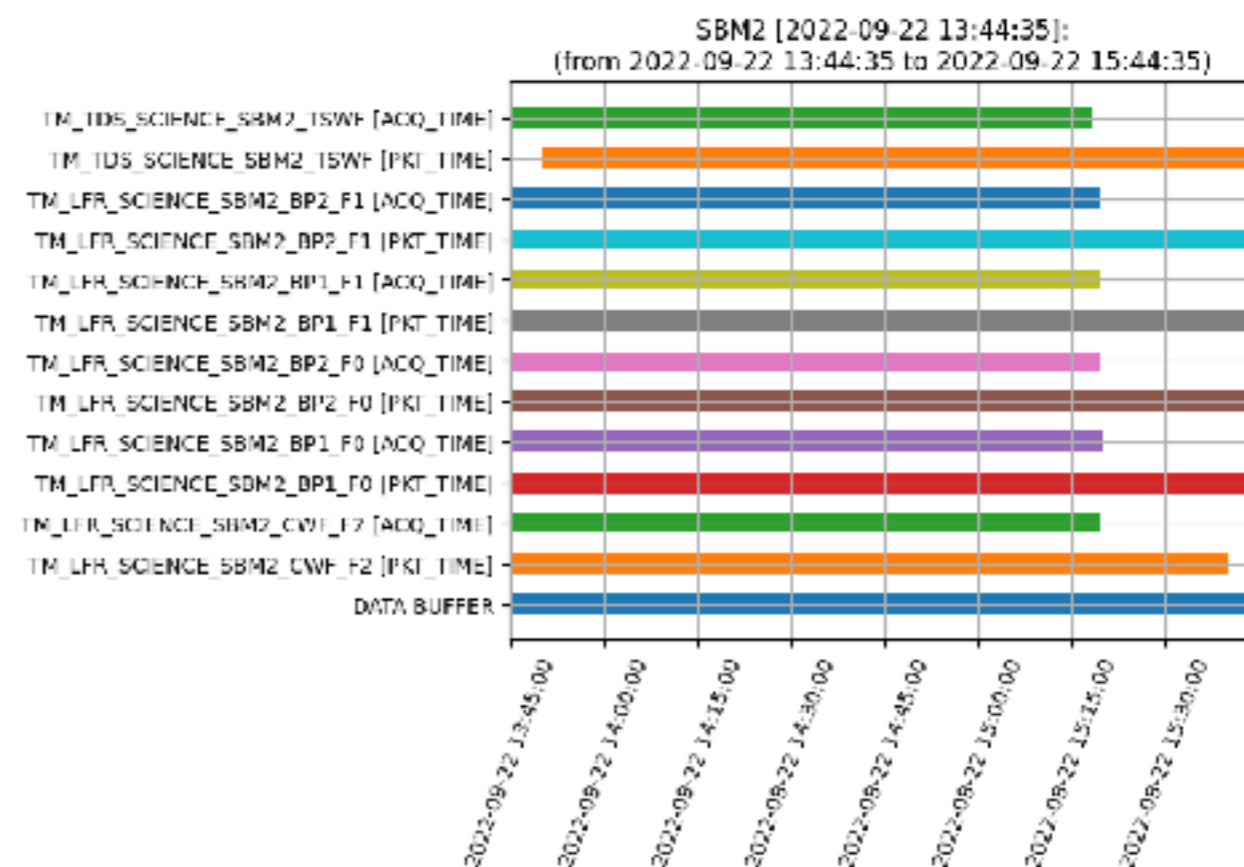
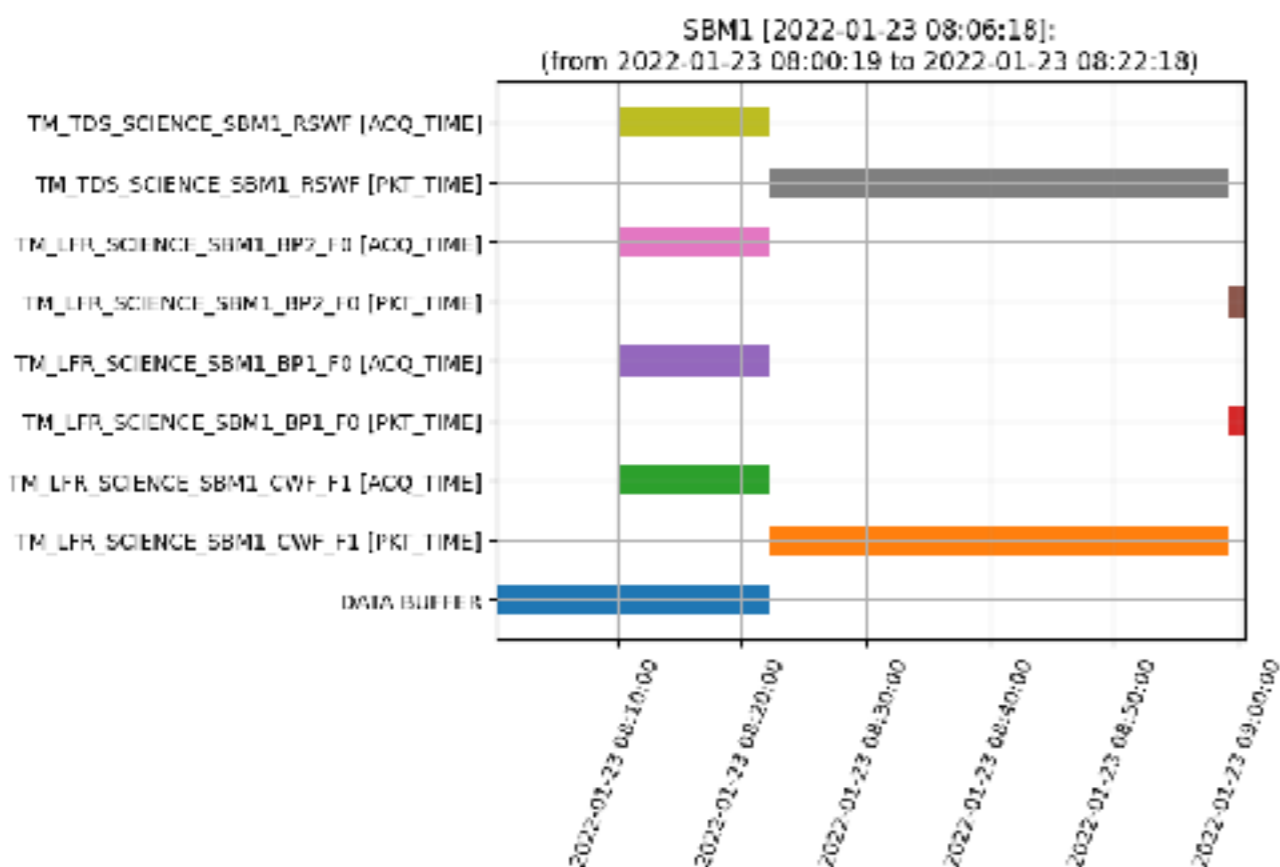
3 <https://maser.lesia.obspm.fr>

4 See for instance <https://maser.lesia.obspm.fr/publications/doi/cassini-rpws-jupiter-encounter.html?lang=en>

IP shock[SBM1]/in situ type 3[SBM2] data (1/2)

RPW SBM science data retrieval status

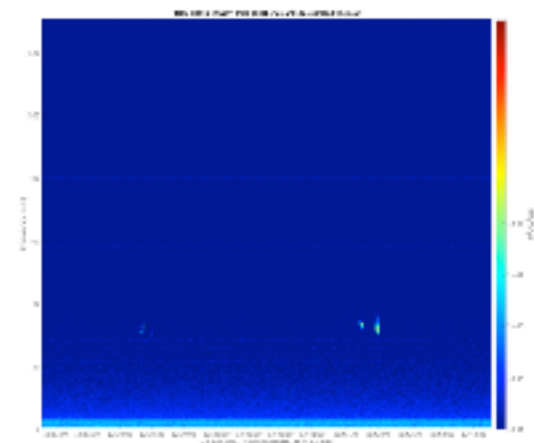
- Science data for 778 "IP shock" (SBM1) events and 7 "in situ type 3" (SBM2) events have been downlinked since the beginning of the Cruise Phase (i.e., 2020/06/15)
- Some SBM1 data are not real shocks (automatically retrieved by ESA when there was enough telemetry rate for RPW)
- Some SBM1/SBM2 events partially retrieved —> Investigation in progress



IP shock[SBM1]/in situ type 3[SBM2] data (2/2)

RPW SBM science data release strategy

- Currently all SBM CDF are stored in the same location in the ROC private data server at LESIA. No public release.
- SBM summary plots are available from RPW LESIA Web site
- Which strategy for public release of SBM science data ?
 - Sort SBM science data CDF and plots into two categories: real shocks (requested by ROB) and other data ("false detection" shocks)?
 - Additionally provide a catalog of real shocks detected on-board?
 - Do we plan to generate SBM (L3) added-value science products? (Including for instance other in situ instrument data?)
- The ROC team is thinking about deploying at LESIA a new RPW Web Portal dedicated to data users. It could be a good occasion to decide how we want to provide SBM data to science community.





EXTRA SLIDES

SOLO Metadata standard V2.5

- CDF Changes
 - Note added to explain structure of SCET as coarse.fine
 - Clarifications on acceptable ISTP keyword values
 - Project = SOLO>Solar Orbiter
 - Source_name = SOLO>Solar Orbiter
 - Data_type, e.g., L2>Level 2 Data
 - LEVEL, equal to Data_type, e.g., L2>Level 2 Data
 - Descriptor: descriptor in upper case followed by the meaning in full, e.g., **EPD-EPT-ASUN-BURST-ELE-CLOSE>Energetic Particle Detector, Electron Proton Telescope, Anti-Sun direction, Burst, Electrons, Close mode**
 - Instrument, e.g., RPW>Radio and Plasma Waves
 - Logical_source: Source_name, level, and full descriptor, i.e., filename up to date, e.g., **solo_L1_mag-obs-normal**
 - Logical_file_id: the name of the CDF file
 - Logical_source_description: full words associated with the Logical_source, e.g., **Solar Orbiter, Level 2 Data, Energetic Particle Detector, Electron Proton Telescope, Anti-Sun direction, Burst, Electrons, Close mode**
 - Mission_group = Solar Orbiter
 - Parents: name of the CDF file(s) that were processed to become this file, e.g., CDF>[logical_file_id of parent file]
 - CDF keyword Instrument added as mandatory
 - CDF keyword Parents made mandatory
 - CDF keyword SOOP_NAME added and mandatory with 'none' acceptable for files without SOOPs