EPIC operations status 2023

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Summary

- *All continue working fine*
  - [paste here the presentation from last year…]

- Since last year had happened…
  - Just one internal incident (another PN EPEA autoreboot)
  - Two external incidents (CDMU halt and F-RTU trip OFF)
  - A few changes in operations (how operate the EPICs after safe they against high radiation) in preparation for automate it recovery.

Incidents (internal to the instruments)

1. PN EPEA quadrant 0 cpu software crash and autoreboot to the ROM sw version on 1st Oct 2022

   Known issue (see old NCR#87), the last one happened the previous year (on other quadrant).

   This is lately happening about one every year and a half (no clear periodicity).

   Probable radiation induced SEU (happened just after perigee).

   Recovered without issues.

   *This recovery may be a candidate to be fully automated in the future.

+ *And nothing more* ☺

Incidents (external ones)

A. CDMU halt and reset on 30th Aug 2022; The EPIC instruments set they self in Safe Standby.

The recovery of MOS 1&2 was direct, but for PN the procedure for unknown cases was followed (there was no TLM), so the instrument was powered OFF/ON and fully reconfigured. No major impact but the science time lost. The “recover from Safe Standby” procedures are being automated.

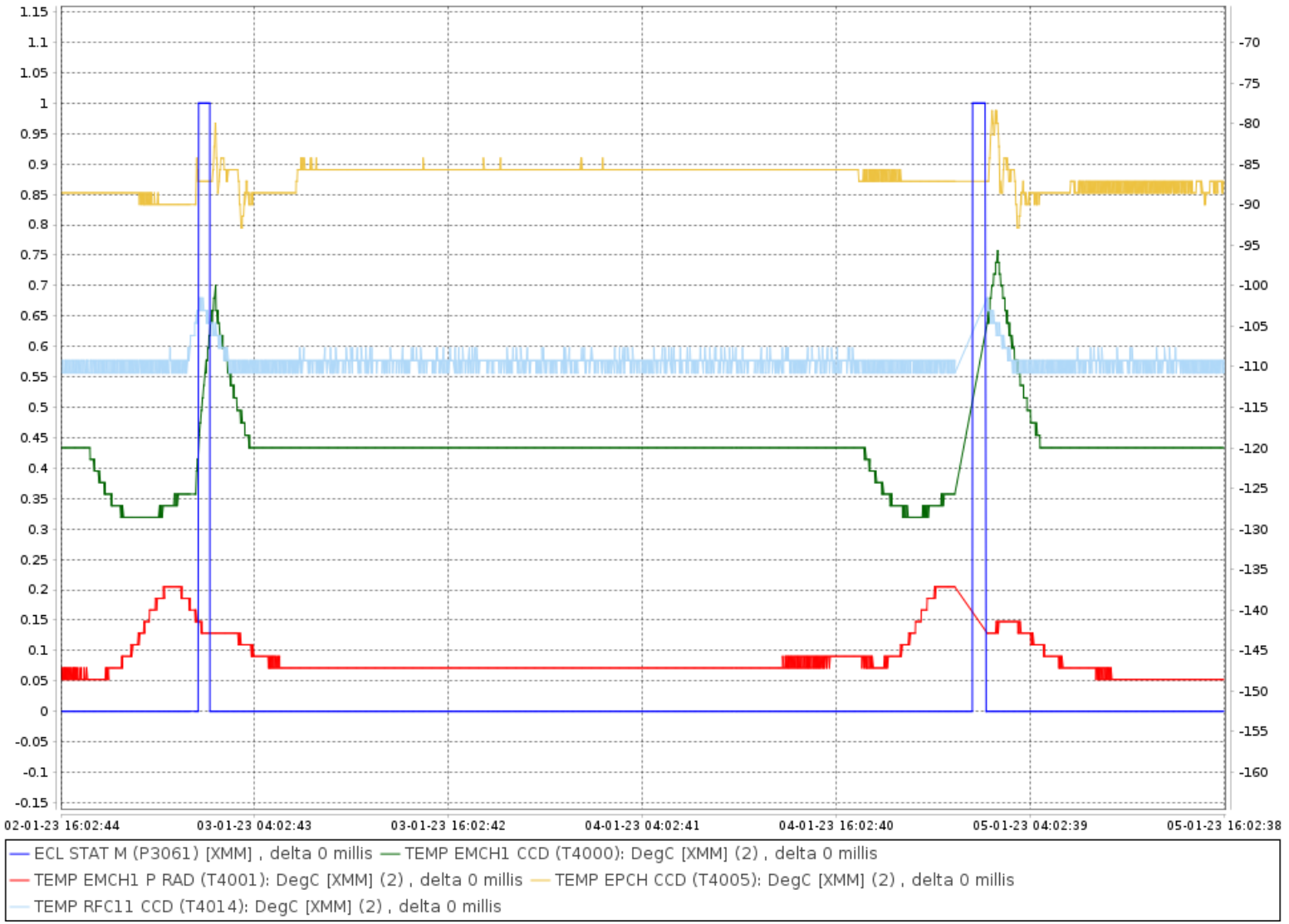
B. F-RTU-A trip OFF on 4th January 2023;

On itself this is nothing for the instruments. But happened only about an hour before an eclipse…

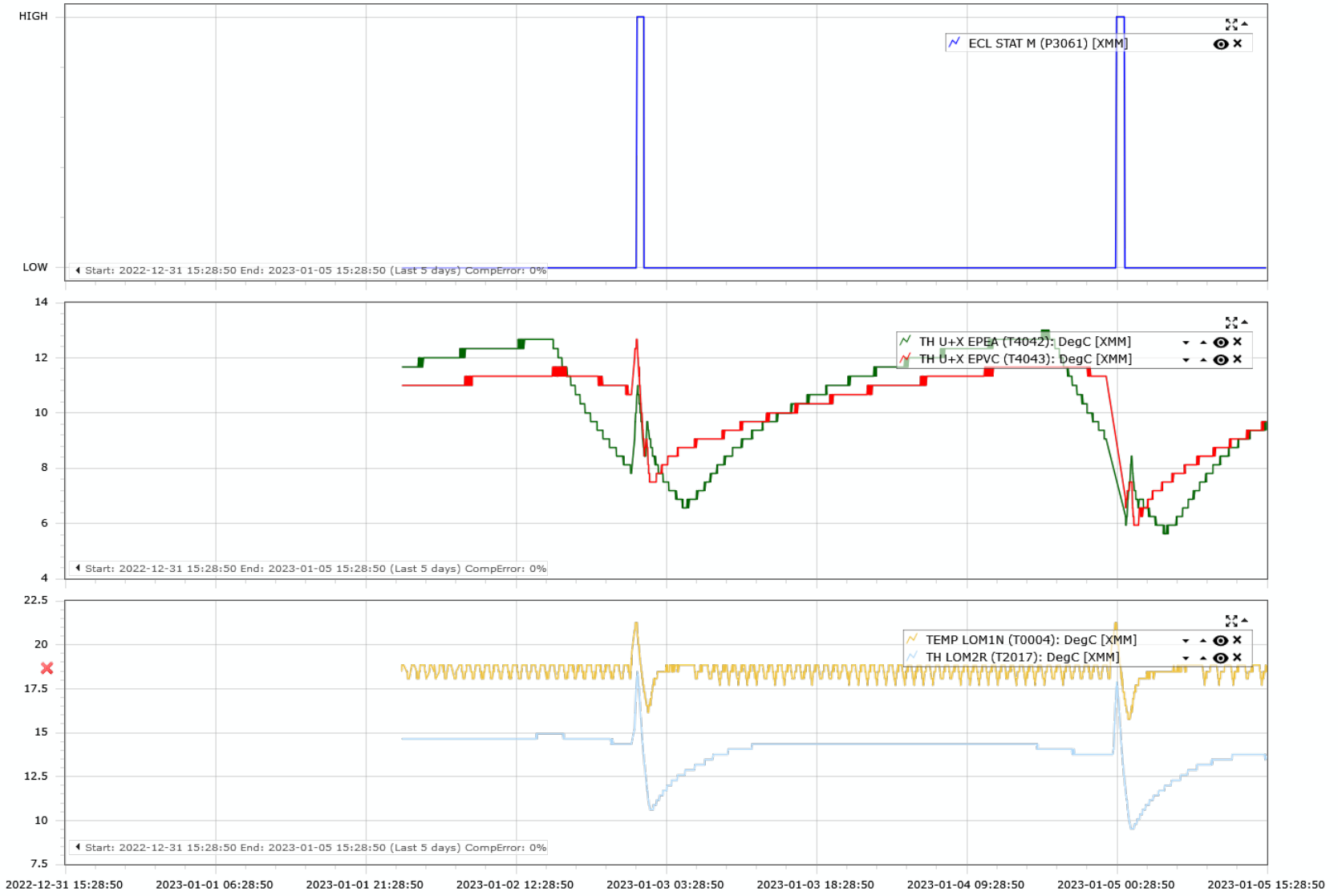
The F-RTU control the TLM/TC for the Power & Thermal subsystem of the focal plane Power Distribution Unit, which serve to all the EPICs electronic equipment.

The instruments were into the eclipse following the very basic, hardwired, pre-launch defined configuration. All was within limits but out of normal. PN had to be manually restarted due to a delay in the recovery of the EPEA temperatures.

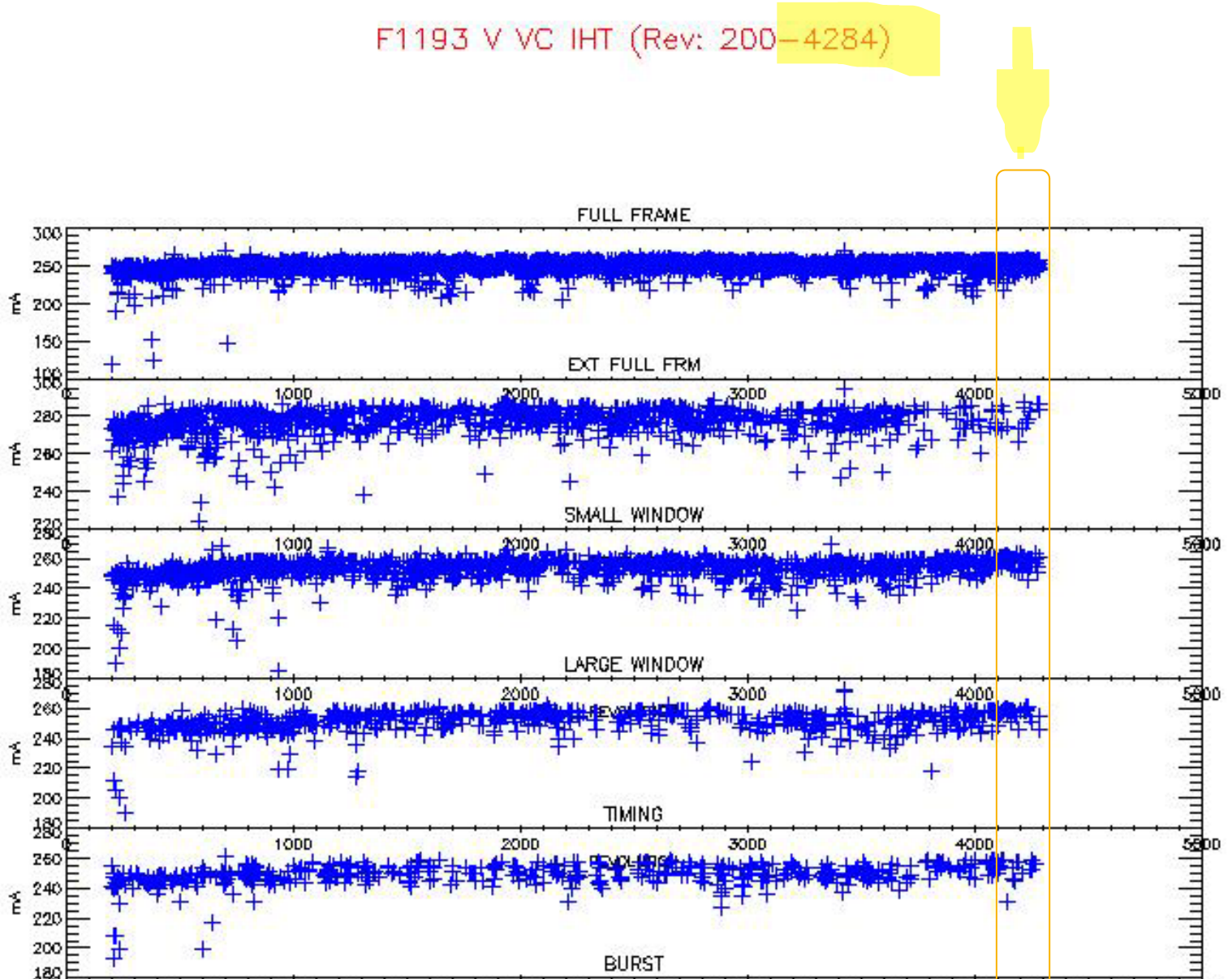
F-RTU trip OFF, anormal Eclipse temperatures (CCDs)



F-RTU trip OFF, anormal Eclipse temp. (electronics)



Monitoring: Are you able to see the differences?



Modifications on the operations

Changes in how are operated the EPIC after safe they due to high radiation (ODBs 7.14 to 7.16).

1. PN do not try to do filter-wheel closed calibration along the high radiation periods.

   It was not really being able to do it any way…

   MOS 1&2 continue doing close-cal exposures with high radiation.

2. All the EPICs subsystems now are left disabled in the Auto Stack

   No more “pseudo auto rejoint”, in preparation for MOIS automation of the same.

3. MOS 1&2 old radiation limit for observations of celestial targets plus calibration source is unified to the normal (no cal source) radiation limit.

   The photons from the calibration source do not foolish the alarms since long time ago.

Automation of the recovery after radiation

The protection of the instruments against high radiation is automated since long time ago.

The rejoint of the operations was automated after the merge of MOC operations with Gaia, a few years ago.

But the starting of these rejoints is manual, requiring of the Spacons the taking of decisions by themselves and at the adequate time. With only one Spacon for 3 spacecrafts that not ever is done immediately.

Solution: *automate the decision of start the rejoint when the radiation go down*.

Much more easy to say that to do…

There are 6 radiation measures, 5 instruments affected on different ways, each one with several combinations of instruments modes and filter wheels to be considered… and the radiation is unpredictable and use to have peeks returned to be high for only several minutes after have returned within limits, among others complications.

Anyway a tree of automated procedures and new derived TLM parameters is assembled and being tested this days. We hope do it works so all the radiation operations became automated.

Future work

- MOS Offset Tables version 22 are being prepared.

- The procedures for recover the EPICs from Safe Standby mode are starting to be automated.
    - Needed for MOIS 1500 procedures version 2 (improved rejoints). In normal cases the 1500 will do the recovery from SSB by itself.
    - For more out of normal procedures the current manual procedures (CRP_E[M1|M2|PN]_0000) will be copied into MOIS procedures without automated launch (only the SOEs may take the decision on such cases).
        - Here it is assumed that a full reconfiguration of the instrument is required.

- The MOIS 1500 T/L rejoint procedures, version 2 (improved rejoints).

- Others automations ?
    - EPEA sw crash? Clear alarm, clear reaction procedure, it works smooth, few problems envisioned.

That’s all, questions ?

xmm-newton