EPIC operations status 2024

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Summary

- *All continue working fine*
  - let's hope this continue…

- Since last year had happened…
  - One MOS2 and other PN onboard software crashes
  - New Offset Tables for MOS 1&2
  - And some changes in the operations, including automation.

Software crashes

1. PN had an EPCE sw autoreboot on 7th Dec 2023

   It was a clean warm reset. The ongoing exposure was not affected.

   Radiation was high at the time

   This is the first case since 2019, and the previous were in 2016 and 2012 (one every 3 or 4 years).

2. MOS-2 had an RBI crash on 6th Feb 2024 (it stop communicating with the spacecraft).

   I was when doing heavy manual configuration commanding investigating an issue that later resulted be at ground software configuration ☹.

   The manual recover was correct as per procedure, but just after the Filter Wheel position was lost (at sw level) due to ground commanding too quick. Also recovered with nothing but more time lost.

   It's the first sw crash on MOS-2 since 2010.

New MOS Offset Tables

New MOS 1&2 Offset Tables, now at version 22, were installed.

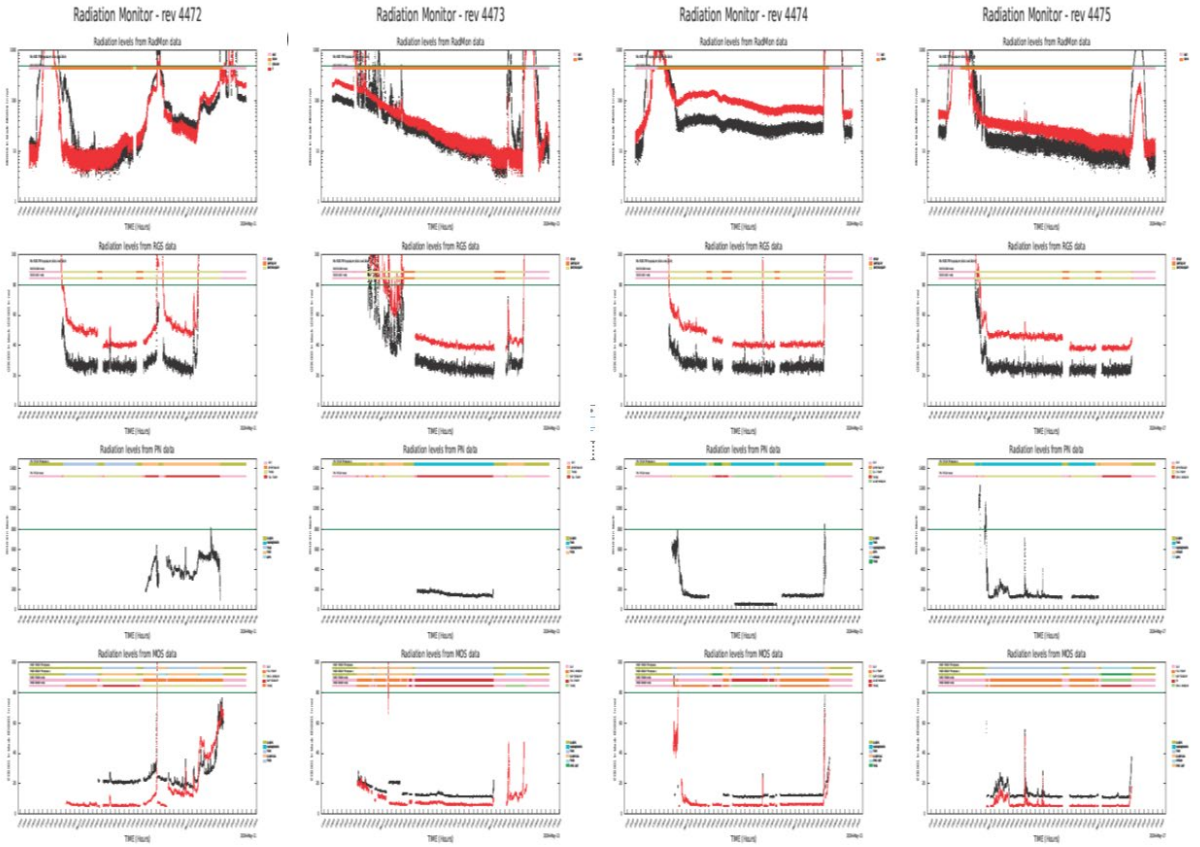
They are in use since revolution 4334, on 8th August 2023 (*the previous was from Nov 2018*)

They were included into the ODB 7.18 and RCF 243.

The change is (as per CCR#2529):

MOS	CCD	MODE	Change (ADU)
1	1	FF	-1
1	4	FF	-1
2	1	FF	-1
2	2	FF	-1
2	3	FF	-1
2	5	FF	-1
2	6	FF	-2

The famous Solar Storm of 10th May …



The Solar Geomagnetic Storm that started on 10th May 2024, described as G4 ‘severe’ on NOAA scale, affected to the XMM EPIC instruments only slightly.

PN only lost about 6 hours of normal science time, and the MOSs about 14 hours.

The MOIS Automation avoid lost more time, but on some periods kept starting and immediately stopping exposures, mainly for MOS 1&2 (up to 20 exposures more than scheduled in this period).

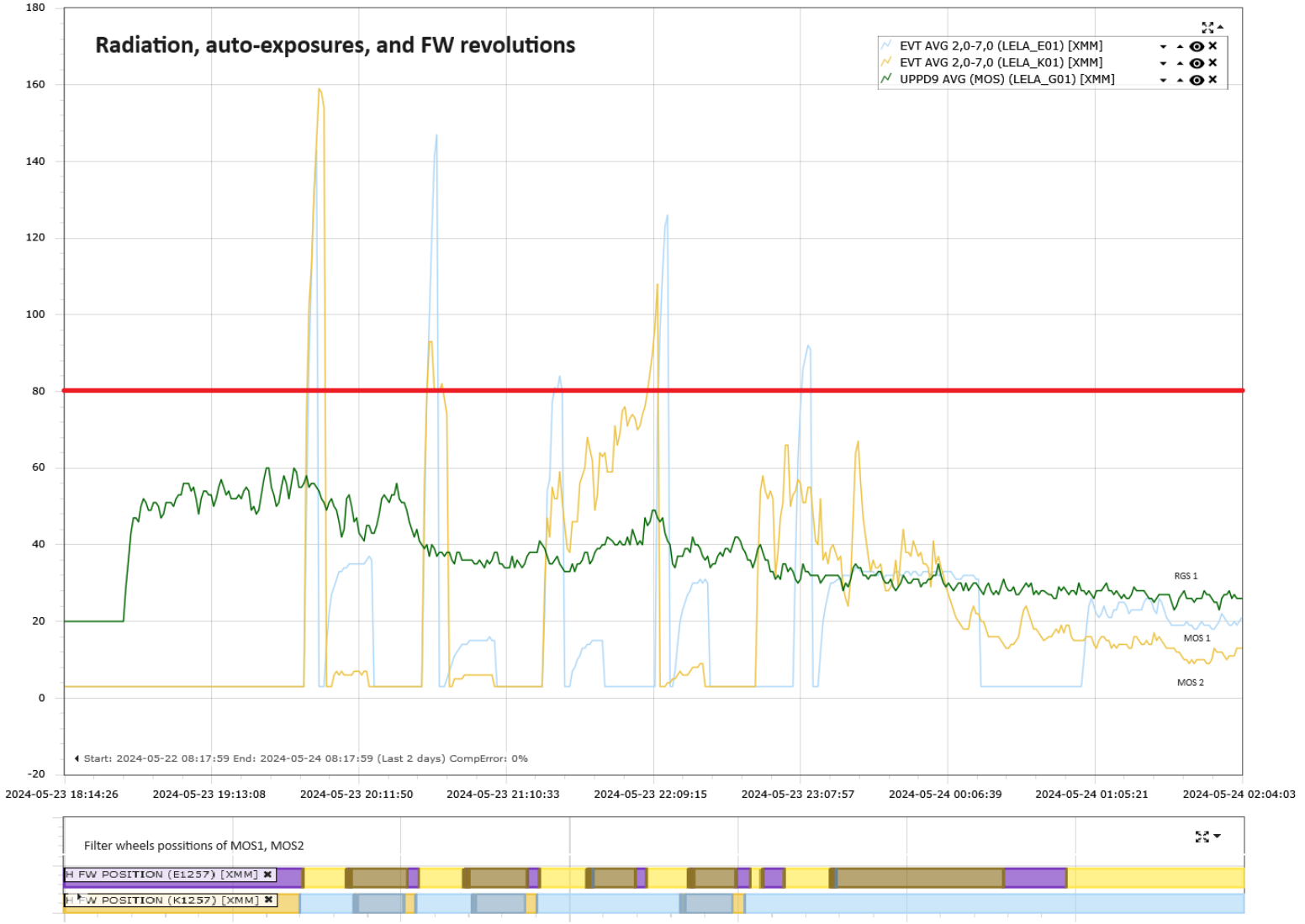
Changes in operations

Since the last meeting …

- The automation of the recovery of the instruments after radiation is now fully working.
    - This had allowed another change: planning fix internal calibration observations at the begging of the revolutions now is substituted by planning science from the earliest possible and start observing when the radiation go low using the automation.

- The next group of automation items are being prepared for add more cases to the recoverable ones (SSB, slews, ground station/TC fails) and for improve the ones already in use (quicker, more robust, less calls for human help, etc)
    - The list of things that can be automated is long as for have work for several years.

MOS start & stop in MOIS automatic (with radiation)



In about 8 hours at the beginning of a revolution (4479), MOS1 did 10 exposures and MOS2 did 7 exposures, until they start the scheduled ones.

All in automatic (*almost*..)

Each exposure caused one full revolution of the Filter Wheel.

… and an OLB entry, and an ODF, and an Archive entry …

The future

May we reduce the movements of the Filter Wheel ?

The FW is one of the very few mechanical system on all the spacecraft because they use to have a limited live.

EPICs FW are OK, but the builder warranty expired time ago.

And the mechanical part of the FW have no redundancy (the electronics has it).

- Maybe we could change the configuration of some calibration exposures (the no planned ones done when rad is high) for be done with FW = Closed instead of Cal_Closed, so avoiding force another revolution per exposure to the FW mechanism (the fw ever is closed when in idle).

The future

May we re-equilibrate the TLM bandwidth among PN and MOS ?

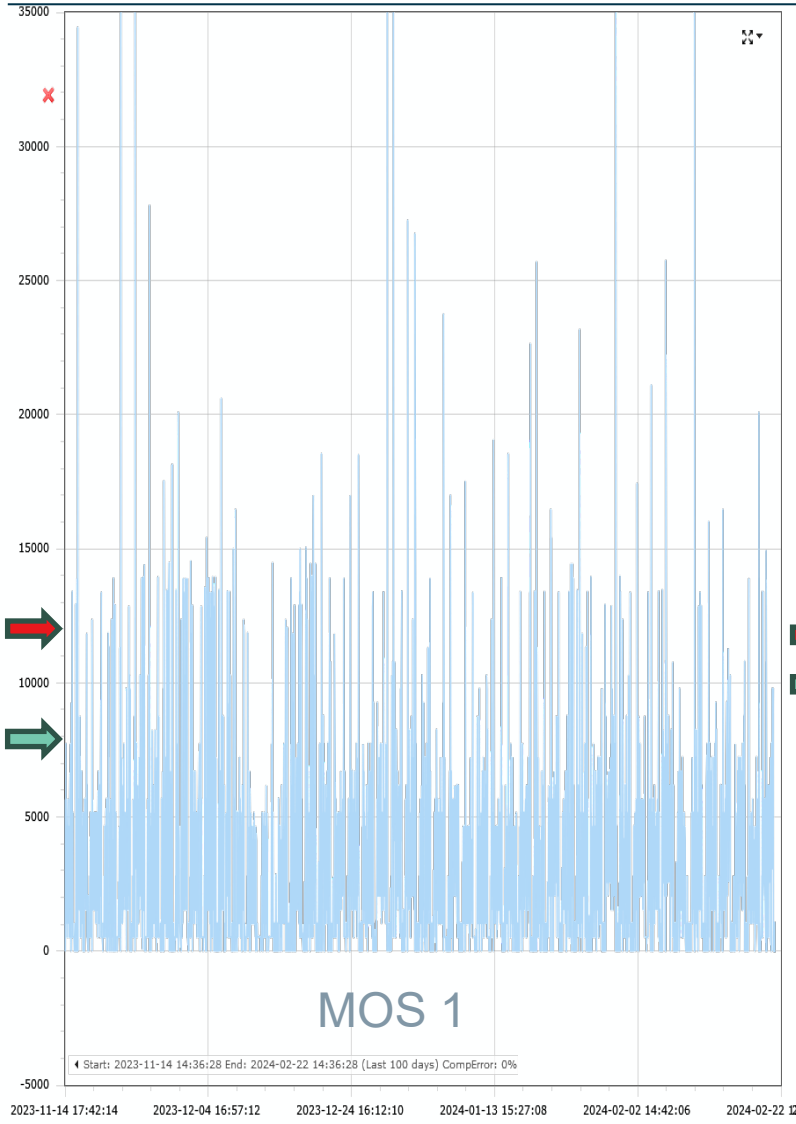
PN enter in Counting Mode (losing sci data due to overload) more often than MOS 1&2.

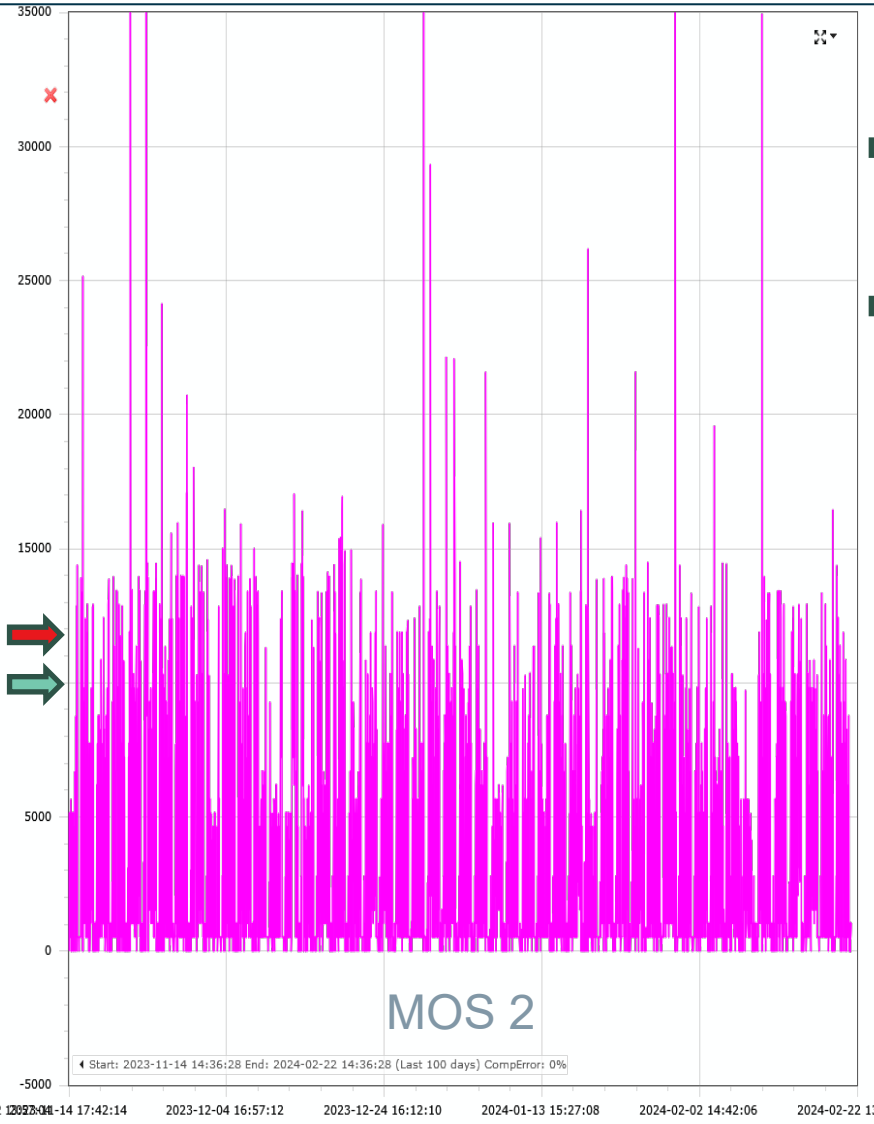
On last year 2023 PN was in counting mode 20063 times, MOS1 10837 and MOS2 1238 times.

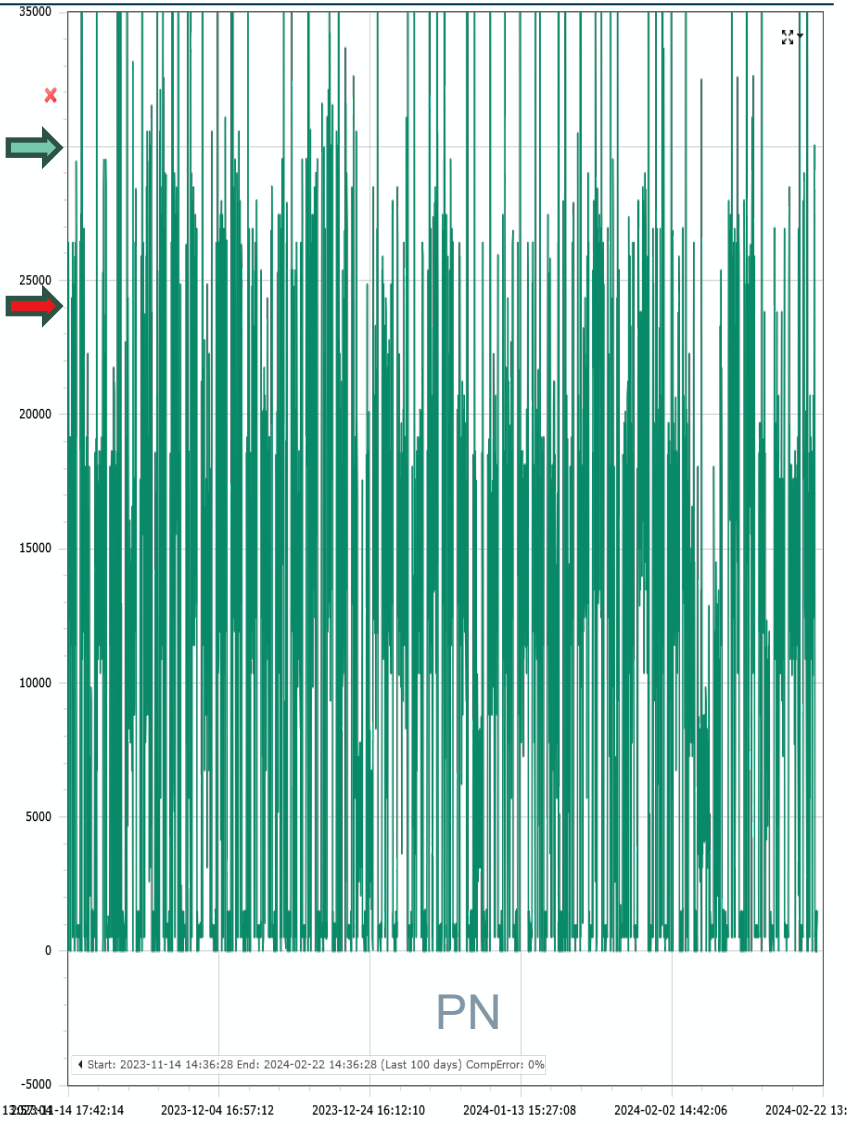
Current nominal bandwidth distribution is 24 kbps for PN and 12 kbps for each MOS. The original (until year 2006) was 16 kbps for each EPIC.

- Maybe we could change the configuration of the nominal bandwidth distribution (BRAT) for take a bit from MOS1 and MOS2 for PN.
- A proposal: MOS1 to 8 kbps, MOS2 to 10 kbps, PN to 30 kbps. See SOC CCR#2548.

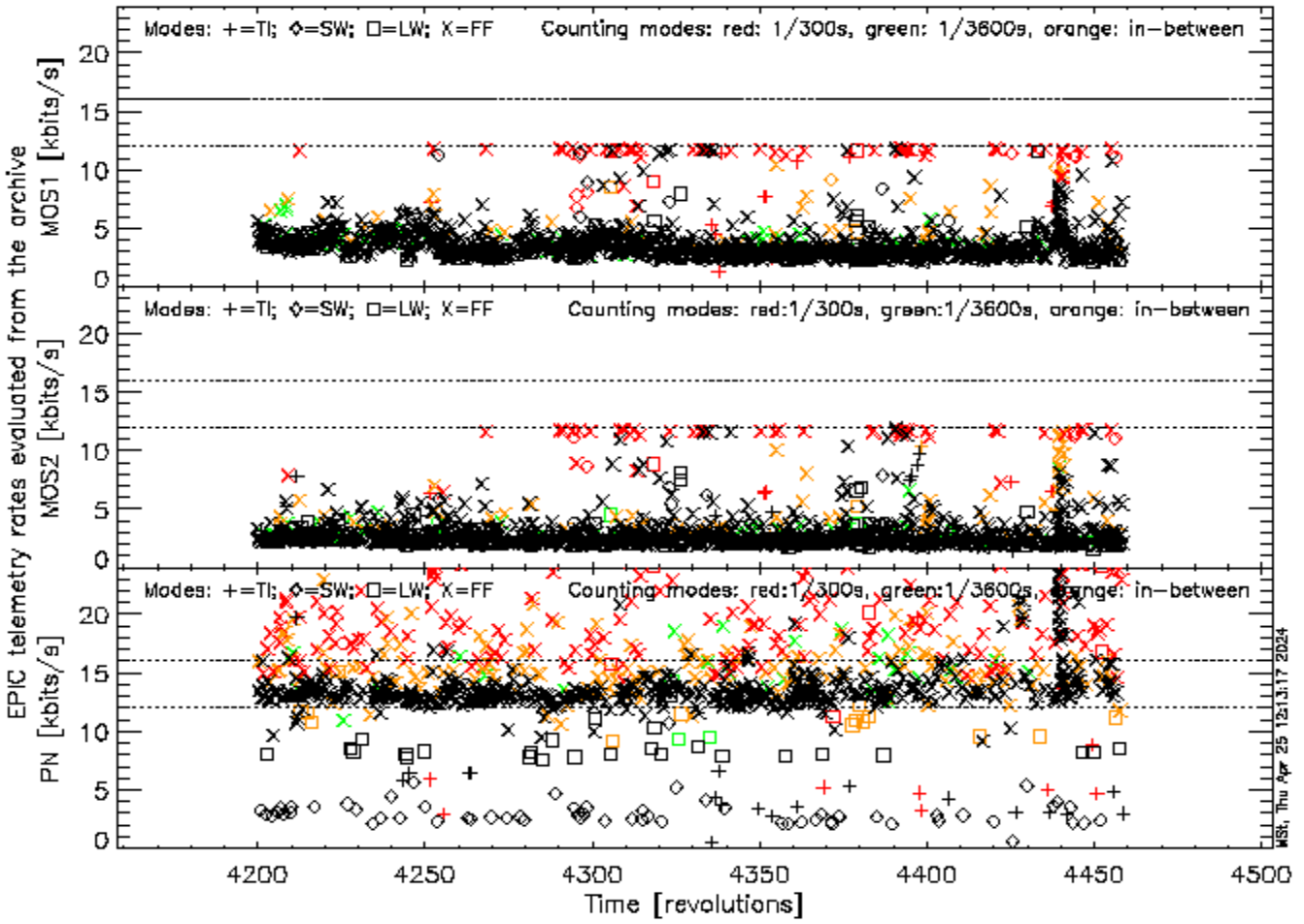
Bandwidth used on last 100 revolutions







Other proposal (MSt): 9, 9, 30 kbps



That’s all, Questions ?