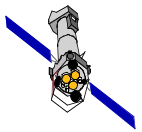
# XMM-Newton
# TTD Meeting
# Status of EPICs operations

7th of February 2001

Stéphane Rives



XMM

# Status of EPICs operations - Introduction

**1) Current situation since last TTD meeting (October 2000)**

**2) Recent implementations applicable after next database release (7th of February)**

**3) Foreseen tasks and improvements**

# Status of EPICs operations - Part 1

**1) Slew exposures**

**2) Bright Pixel Tables**

**3) Offset Calculations**

**4) EPDH version I Loading**

**5) Timing mode**

**6) Double Bore-sight**

**7) Super ED**

**8) In house tools**

# Part 1 - Slew exposures

- **Functionality in place in MP System for EPIC's as of REV-166**

- **Implementation:**
  - Slew exposure inserted only if Open Loop Slew longer than 3800 sec and restricted to Open Loop slew
    => 1 slew exposure every 3.5 revolution: **inefficient!**
  - Slew exposures are currently of fixed length (1 h); RCR on XSCS to increase flexibility (variable duration)
  - The Slew exposures consist of:
    - MOS: Full Frame exp. With FW = MEDIUM CAL (**i.e. open position !!)**
    - PN: same mode as per last exposure with FW = CLOSE_CAL

- **Operational aspects:**
  - Radiation alert procedures also apply during slew (for EPIC-MOS): procedures updated accordingly
  - If previous exposure not successful, then PN slew exposure needs to be skipped: CRP_SYS_5004 updated accordingly

# Part 1 - Bright Pixels Tables

- **PN** bright pixels/columns: new BPT in the database release 3.7 on the 13-12-00. Systematically used as of rev. 192.
- **MOS** bright pixels table: new BPT in the database release 3.7 on the 13-12-00. Uploaded and systematically used as of rev. 186.
- Satisfying results

# Part 1 - Offset tables

**1) MOS:**

- No change to the fixed offset tables.
- Tables corresponding to LW, SW and FF modes for all FW positions.
- Timing mode and Full Frame Double Nodes mode still require an offset calculation. Any delivery foreseen?

**2) PN**

- The offset calculation used up to now was suspected to be responsible for the instability observed at the Bright Pixel level. PN scientists recently proposed to go back to the calculation method used at the beginning of the mission.

# Part 1 - EPDH version I loading

On the 19th of January, version I of the EPDH software has been uploaded

- Fix of two non-conformances:
  - XMM-NC-VIL-0009: rejected TLC
  - XMM-NC-VIL-0014: HBR Data Mixed
- In-flight behavior nominal up to now.

# Part 1 - Timing mode

**1) <u>MOS:</u>**

- MOS1: works quite well.
- MOS2: seldom works. Problems not fully understood and under investigation. No action in concrete but ideas dealing with the voltages setting together with the upload of Fixed Offset Tables.

**2) <u>PN:</u>**

- Timing mode suffers from a high background level

# Part 1 - Double Bore-sights (1/2)

**Requirements:**

- The current bore-sights of RGS & PN are not optimised; improvement required.
- Using a “better” bore-sight for RGS & PN implies that the MOS window modes (Small/large Window, Timing) don’t work any longer
- Need to:
  - re-define CCD sequences for above modes (Instrument team)
  - have different CCD sequences for RGS and PN prime, respectively
  - **re-commission completely** the EPIC-MOS window modes for both RGS & PN prime
  - have an automatic selection for different activities (for the same mode) depending on which instrument is prime (RCR issued on XSCS)

# Part 1 - Double Bore-sights (2/2)

## Implementation activities

- Several **functional tests** have been executed since beginning of October with the following outcomes:
  - MOS-1 / RGS prime: LW OK (with increased integration time), SW OK with increased integration time & reset voltage set to 8 V, Timing OK
  - MOS-1 / PN prime: LW OK, SW OK, Timing OK
  - MOS-2 / RGS prime & PN prime: LW OK, SW OK, Timing OK
- **Performance tests:**
  - RGS bore-sight: all modes successful except MOS 2 Timing, but the centering was not perfect: new SIAM matrix required
  - PN bore-sight: executed in LW only. The test was aborted due to incorrect pointing. Reason: sign error on the SIAM matrix. A new one is to be delivered.

# Part 1 - Super ED

- A Super ED for any mode exists now for MOS and PN and can be used in case of contingency.

- Last one created: PN exetended Full Frame (with and without offset dump)

# Part 1 - In House Tools

**MOS:**

- Tool created to generate automatically the Database sequences corresponding to the inputs for the clock sequencers.
- Tool with the same capabilities also created for the Offset tables and the Bright Pixel Tables.
- An ICD has been produced: XMM-SOC-ICD-0016-SSD issue 2.0

**PN:**

- Pending task

# Part 2 - Recent implementations

Recently, many items have been implemented on the database which will be delivered on the 7th of February. These new features will be applicable as of the timeline generation process will use this new database.

1) Optimisation on MOS

2) New activities

3) New sequences and ED to perform the bore-sight tests

4) Slew Failure on MOS

5) PN offset calculations

# Part 2 - Optimisation on MOS (1/2)

New global approach for the upload of the offset tables and the sequencers configuration for optimisation purposes on MOS.

- Up to now, peripheral offset tables were loaded at the beginning of each exposure. As they are used in all the modes except for a few “exotic” ones, it was a waste of time.
- The central CCD sequencers were reconfigured to FF when the mode was not FF at the end of the activity.
- Upload of the peripheral CCDs Offset Tables and reconfiguration of sequencers have now been discarded from all the activities (End of Observation activity included) except for the following ones: Diagnostic, Diagnostic 3x3.
- Only those activities which configure the peripheral CCDs to another mode than FF (at sequencer and Offset Table levels) perform a reconfiguration at the end of the activity to FF (exception of Timing mode).

# Part 2 - Optimisation on MOS (2/2)

**Consequences:**

- Slew exposures will be now performed in the last imaging mode.
- Gain of time from 5 to 8 minutes per observation

# Part 2 - Activities created/modified on MOS

**Two new activities have been created/modified on MOS**

- FF exposure with FW closed and no BPTs loaded.

  Objective: analyze the current status of all the CCD pixels.

- Diagnostic 3x3: 10 diagnostics per CCD are performed instead of one previously. Total duration of the diagnostic lower than the required 8000 seconds.

# Part 2 - New Bore-sight ED/SEQ

- New sequences and EDs have been implemented for MOS to configure the sequencers for the two types of Bore-sight.
- These sequences and EDs will be used for the next tests to be performed soon.

# Part 2 - Slew Failure on MOS

Previously, MOS was disabled in case of a slew failure.

- Now, the MOS are kept enabled and the “return on target” is flagged. This applies to all the modes where we don’t calculate the offset . Gain of time and operations smoother.

- This improvement was not possible for PN because an offset calculation is always necessary on PN

# Part 2 - PN offset calculations (1/2)

- It has been decided to return to the old settings for the offset calculation on PN (the ones used at the beginning of the mission).

- For all the modes, the method used is “Median correction Off” and 94 frames are used to carry out the calculation. On top of giving better results, this new method is faster for FF and LW (a little bit slower for Ext. FF).

- Test Super ED have also been created to get rid of the calculation of the first 12 columns which are not used for the observation (gain of time).

- At the same time, the MIP reduction has been reduced to 1 column (2 previously).

# Part 2 - PN offset calculations (2/2)

- **Consequences:** modification of all the activities and Super EDs on PN. Gain of time in most of the cases.

- In the same frame, the activity to perform a standalone offset and noise calculation has been fixed and can be used now.

# Part 3 - Foreseen tasks and improvements

- EMDH version J expected soon. If not received before the 16th of February, it will be loaded after the eclipse season (19th of March to 24th of April).
- Procedures to handle possible spurious trip off from ON to OFF of the LCL need to be implemented.
- Bore-sight: waiting for the go ahead to perform the performance tests. When the Sequences/EDs are validated, implementation of new activities (the Offset tables have been delivered)
- Can we expect an offset table for Timing mode on MOS?
- A few changes in the operational approach will be incorporated for the next eclipse season.