Calibration activities at ESAC

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European Space Agency
• NRCO’s & EOR’s

• MOS column dependent CTI verification

• pn Burst mode calibration

• pn time jump detection

• automation of pn relative and absolute timing monitoring

• MOS timing mode calibration

• XMM-Chandra Cross Calibration

• calibration preview tool and diagnostic tools
NRCO’s and EOR’s

• NRCO:
  - #64: EPIC soft flux discrepancies  
    50 ks **NGC 7172** scheduled for 24.04.2007 
  - #67: MOS off-axis-1: redistribution off axis and QE check @ low energies 
    40 ks **RXJ1856.6-3754** 
  - #68: MOS off-axis-2 redistribution off axis and QE check @ high energies 
    60 ks **REJ2248-511** 
  - #69: pn quadboxtemp Draft

• EOR:
  - #1: MOS 3x3 mode QE and pattern 
    50 ks **Vela PWN** during RGS routine CAL
MOS column dependent CTI and gain update

- 26 new CTI CCFs + SW
  --> brings some individually strange columns in agreement with the rest

- 26 new gain/CTI CCFs
  --> refinement of epochs
  --> energy cal within +/-5 eV
• investigate flux stability
• develop timing monitoring analog to pn

--> project will start after summer
pn Burst mode correction

- Correction developed from low rate Cas-A observation is still ok for medium Crab rate sources, but introduces strong residuals for very bright sources.
- Rate dependent CTI in pn is not correct.
- Similar features seen in timing mode.
- Need to inform user and improve rate dependent correction.
### old_CCF_old_tol

<table>
<thead>
<tr>
<th>Revolution</th>
<th>FF</th>
<th>Eff</th>
<th>SW</th>
<th>LW</th>
<th>T</th>
<th>B</th>
<th>Sum</th>
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<td>3328</td>
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<td>200-400</td>
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Sum: 15.62%

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### new_CCF_new_tol

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Sum: 3.27%

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### old CCF

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<th>Timing</th>
<th>Burst</th>
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### new CCF

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<th>All</th>
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<tbody>
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<td>12</td>
<td>1</td>
<td>1.7</td>
<td>6</td>
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### Comparison

- **FF**
  - Old CCF: 5.8 %
  - New CCF: 0.7 %
  - New CCF tol=20: 3.4 %

- **eFF**
  - Old CCF: 20.8 %
  - New CCF: 20 %
  - New CCF tol=20: 3.6 %

- **SW**
  - Old CCF: 37.2 %
  - New CCF: 12.5 %
  - New CCF tol=20: 6.4 %

- **LW**
  - Old CCF: 39.0 %
  - New CCF: 1.3 %
  - New CCF tol=20: 1.3 %

- **Timing**
  - Old CCF: 12.0 %
  - New CCF: 1.7 %
  - New CCF tol=20: 1.3 %

- **Burst**
  - Old CCF: 52.9 %
  - New CCF: 6.0 %
  - New CCF tol=20: 2.9 %

- **All**
  - Old CCF: 15.6 %
  - New CCF: 5.0 %
  - New CCF tol=20: 3.3 %

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**-->further refinement of tol parameter needed**
Relative and absolute timing are monitored with automated scripts.

Results are available and updated on a regular basis on the internal EPIC pages.

Still some issues with refined ground station overheads regarding absolute timing to be verified.
• Chandra data analysis is now integrated in the cross calibration archive (see talk about preview tool)

• analysis by M. Smith at XCCT
check of various proposals for calibration changes:

- NEW pn XRT3 calibration
- various MOS new QE files (SI, SiO₂, Si +H₂O+X)