

XMM-Newton EPIC TTD Meeting

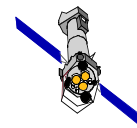
Preparation for next eclipse season

7th Feb 2001

Mauro Casale



ESA H/Q: 7th February 2001



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Facts / lessons learned from previous eclipses

- 1) the eclipses will occur before perigee in the period 19-03-2001 / 24-04-2001
- 2) the shortest time between "end of eclipse" and Perigee time is about 22 minutes; in most of the other cases it is around 30-31 min except at the beginning where it is longer (up to 1 h for the first eclipse).
- 3) the manual procedures used during the last eclipse season for the activation of the EPIC instruments worked very well; conversion of these manual procedures into automated procedures implies a major effort and a considerable risk and it is dependent on System changes (e.g. implementation of RCR-461 at the SOC, relaxation of the constraint on max number of parameters in an ED at the MOC). The EPIC activation will therefore be left unchanged (i.e. manual operations)



- 4) the OM and RGS's activation can be "easily" converted into an automated procedure; during the next eclipse season OM & RGS's will therefore be activated via automatic timeline.

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Targets

- 1) Minimize the thermal excursions on the instruments by optimizing the OFF/ON sequence/strategy (see below)

- 2) Increase further the overall efficiency: start instrument operations (Observation window) at perigee + 4.5 h
Advantages will be:
 - execute EPIC calibration exposures as well at the beginning of REV
 - save science time for RGS

- 3) Minimize the preparation activity (DB/IFOP); basically almost all DB items already exist and are fully debugged (only a few to be defined)



4) Relax criticality of RCR-461 at the SOC



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Principles

- 1) The post perigee window arrangement in the timeline will be as follows:
Perigee + 40 min: AOS TC Perth, start of AOS_CHK window (duration = 30 min)
Perigee + 1 h 10 min: start of SOPS window for RWL biasing (duration = 50 min)
Perigee + 2 h: start of SOPS window for preparation of next eclipse (TT command load etc.); duration = 70 min
Perigee + 3 h 10 min: start of Instrument ACTIVATION window
- 2) The EPIC can be switched on still before perigee; this will be always possible under VILSPA coverage. takes 5 minutes. This activity takes 5 minutes and it will be manually executed (one single ED)
- 3) The EPIC instruments will be manually activated in the period Perigee + 40 min and Perigee + 3h in parallel with other activities; tentatively this will be done in the following periods:
 - activation of MOS-1 & MOS-2 still under VILSPA coverage (one ED per instrument of a duration of 35 min; the two instruments can be activated in parallel via two MSTACK)
 - activation of EPIC-PN during the SOPS window for preparation for next eclipse (under Perth); one single ED of a duration of 40 min
- 4) It will be no problem to execute the first slew in parallel (all or partially) with the automated activation activities of OVI and RGS;



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Base-line for instrument re-activation

- T0 - 30 min: End of Eclipse
- T0 - 20 min: Manual switch of EPIC's & thermal control activation (ED EE0011); will be executed under VILSPA coverage
- T0 - 15 min: Start activation of EPIC-MOS1/2 (ED's EE0110, KE0110); duration = 35 min
- T0: Perigee pass
- T0 + 30 min: LOS VILSPA
- T0 + 40 min: AOS TC Perth
- T0 + 2 h: activation of EPIC-PN (ED FE0110) in parallel with MOC activities (SOPS window)
- T0 + 3 h 10 min: Start of ACTIVATION window in the timeline: automatic activation of RGS-1/2 and OM

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- T0 + 4 h 35 min: End of Activation / Start of Observation window in the Timeline



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Strategy to minimise thermal excursions (1)

- T0 - 4h: end of observation window
- T0 - 3.5h: **3 TTC's for safe-standby of EPIC**, p-n TTC deleted if everything is nominal, so that EPCH- EPEA stay on.
- T0 - 2h: **one TTC for EPIC p-n** to safe standby (EPEA-EPCH OFF, no htr); this TTC will be let to execute.
- T0 - 1.6/1h: Eclipse start. ECLIPSE signal switch EPICs off, all eltr htr OFF and turn on CCD substitution heater (branch A only)
- T0 - 1.6/1h: Eclipse start + 5 min: OM heater reconfig: Nom OFF / Red ON; **2 TTC's**
- T0 - 1.0/0.5h: Eclipse End
- T0 - 20 min: Switch on EPIC's + thermal control (EPEA-EPCH OFF, no htr) + RGS electronic Htr on
- T0 - 15 min: Start of EPIC-MOS reconfiguration (EPEA-EPCH on within 10 minutes)
- T0 + 1h: **Two TTC for EPIC CCD htr A+B on**, TTCs deleted before if EPIC Switch-on successful
- T0 + 2h: Start of EPIC-PN Quad-CCD's ON



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Strategy to minimise thermal excursions (2)

Advantages of above strategy are:

- 1) RAE-RFC are OFF without htr for max 1h in eclipse + 1.25h during activation. This is less than the usual 8h of RGS in SETUP during normal perigee.
 - 2) The EPEA-EPCH are off without eltr htr for ~ 2.5h with more than 3h to stabilize before the start of the closed cal.
 - 3) The p-n CCD's are left without thermal control with a single substitution heater for max 2.5h. This should limit the CCD temperature excursion to only a few degrees as there will be no earth shine while we are in eclipse. Even if we miss the EPIC switch-on before perigee, the second substitution htr will go on after max 2.8h from the beginning of the eclipse; by that time (or soon after depending of the S/C attitude) we will also get the earth shine and albedo on the radiators.
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