

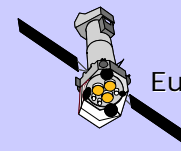
XMM Operations

Marcus G. F. Kirsch

with Inputs from the Flight Control Team at ESOC

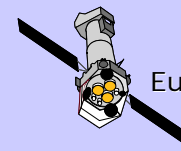
European Space Agency (ESA)
European Space Operations Centre (ESOC)

March, 2010



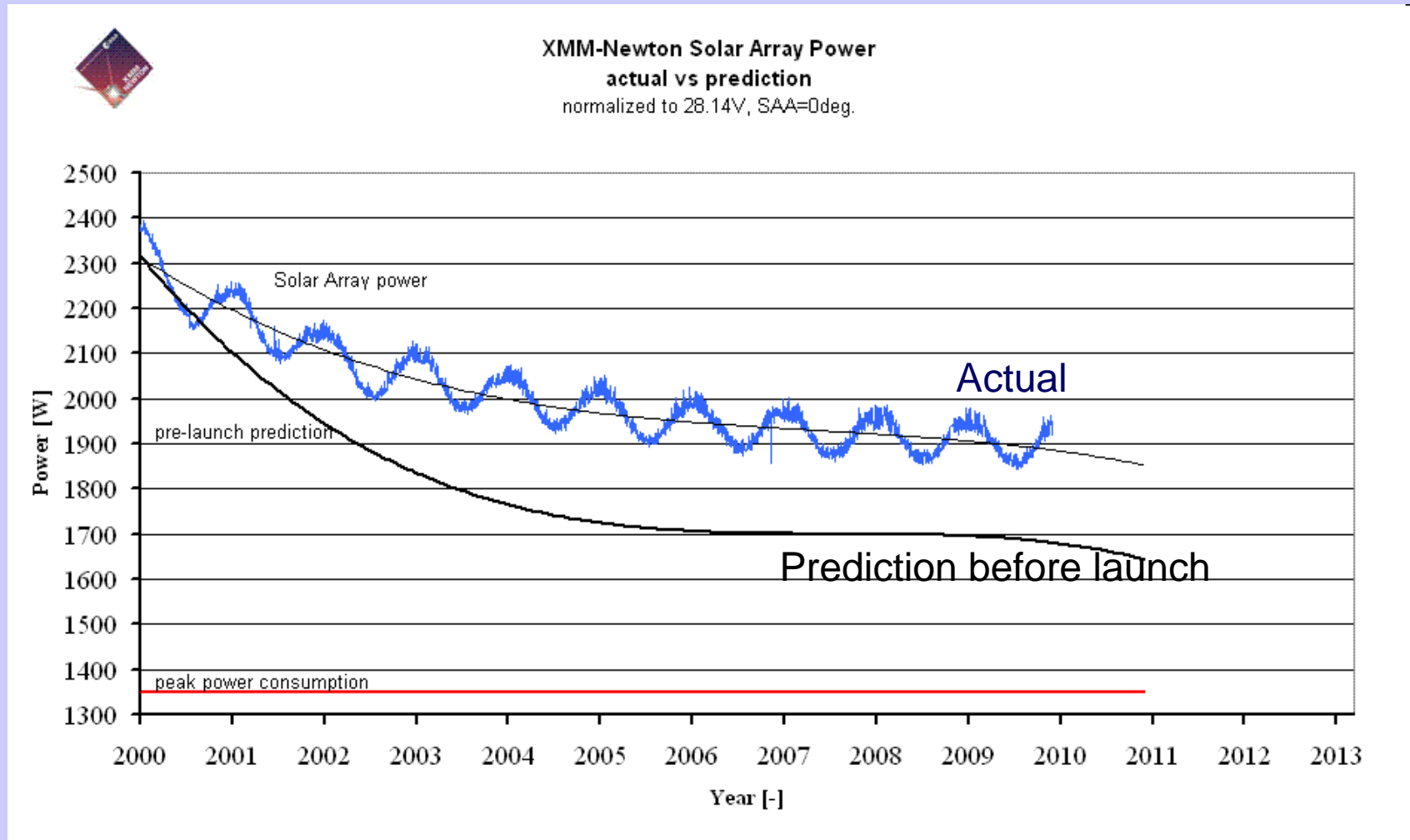
menu

- Spacecraft status & mission performance
- Special events
- Outlook

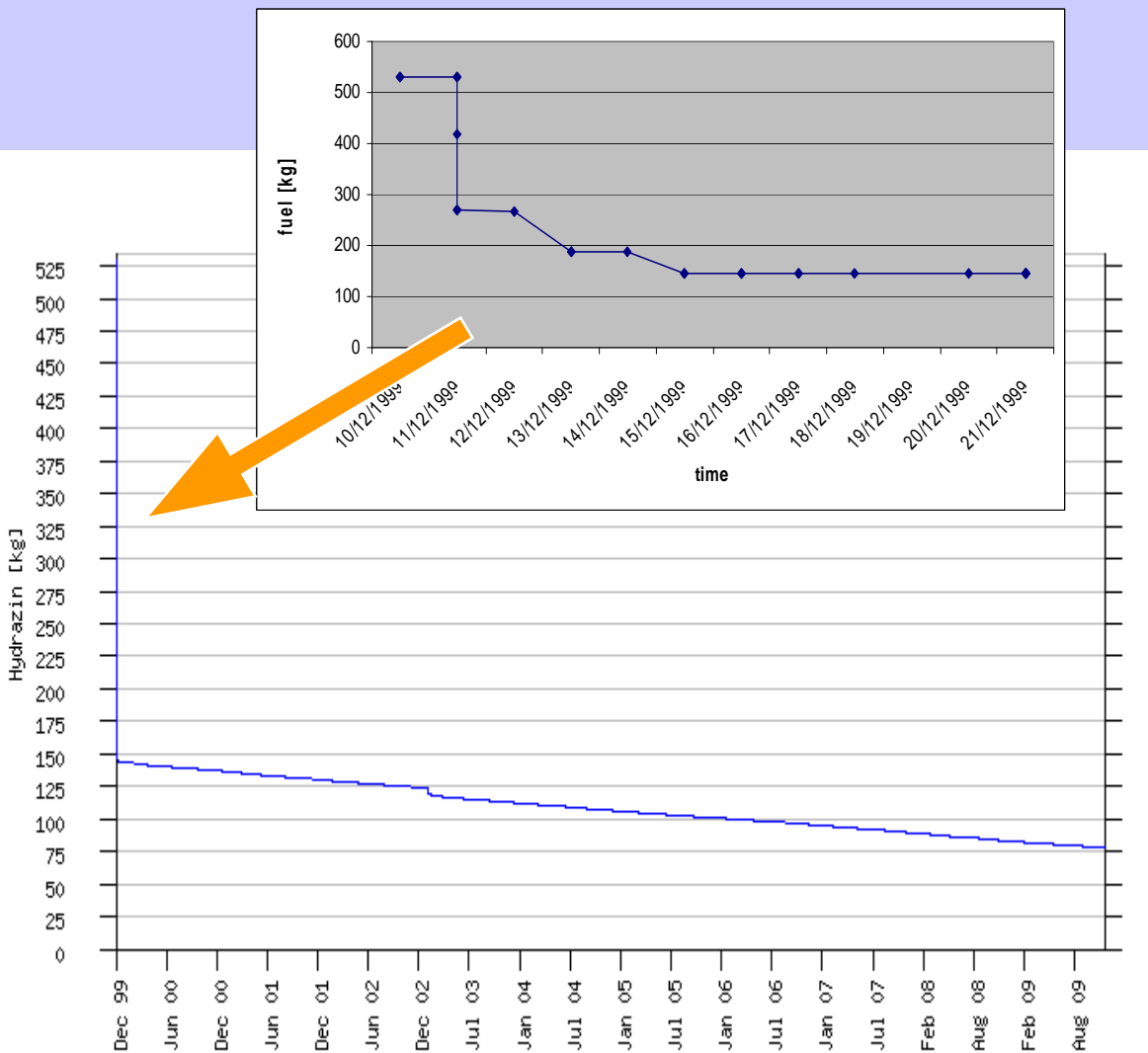


solar arrays

- power generation capabilities are normal.
- No sign of unexpected degradation visible

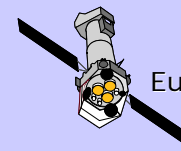


current fuel

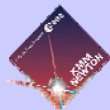


(C) XMMWeb 2009/12/03 12:12:21z

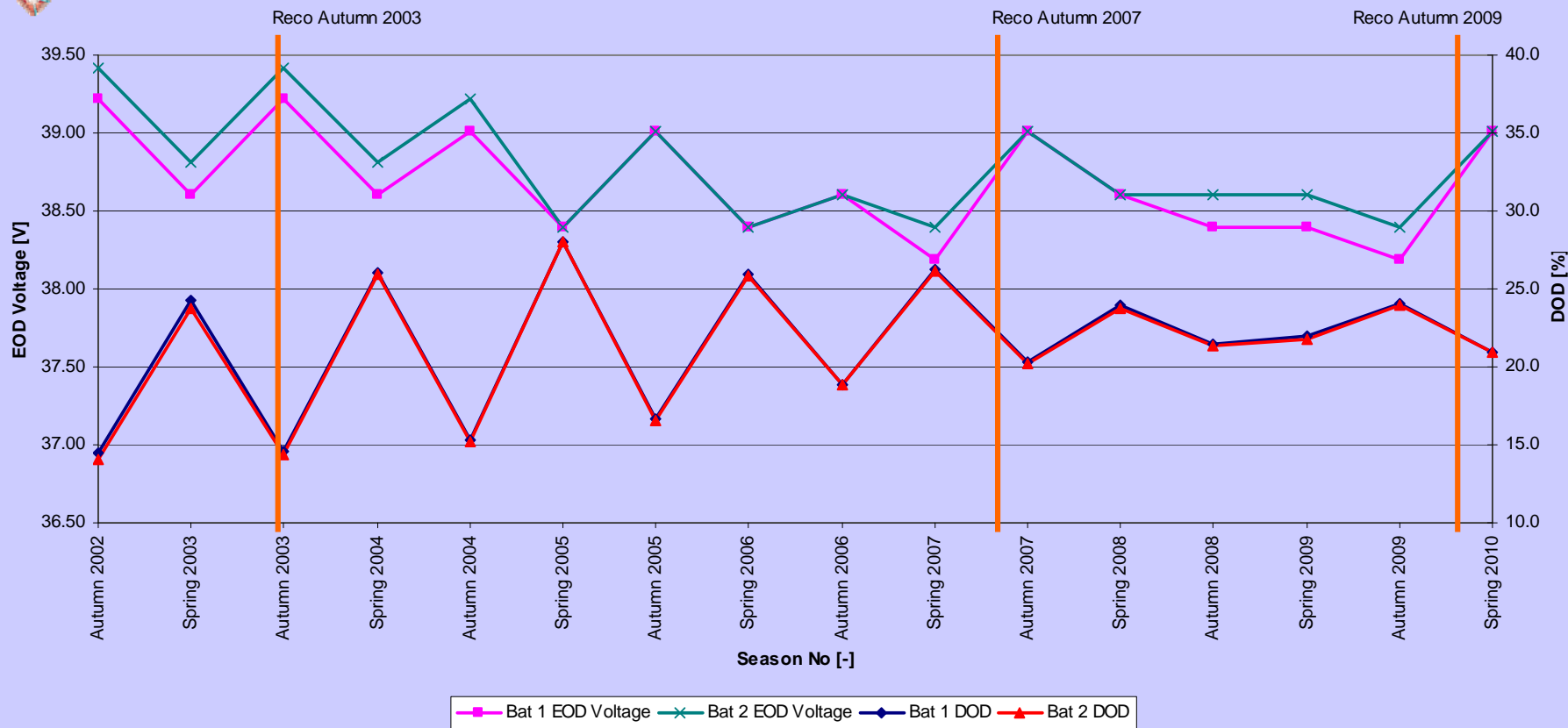
Remaining fuel	76. [kg]
Consumption last 12 month	5.1 [kg]
average fuel consumption (since 2003-03-01)	0.48 [kg/month]
residual lifetime in month	118 [-]
extrapolated milage	Sept 2019



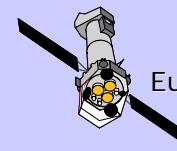
batteries



XMM-Newton Battery 1 & 2 Parameters
max DOD/ min EOD Volts vs. Season



Batteries have just been reconditioned the 3rd time and have approx. same capacity as at launch

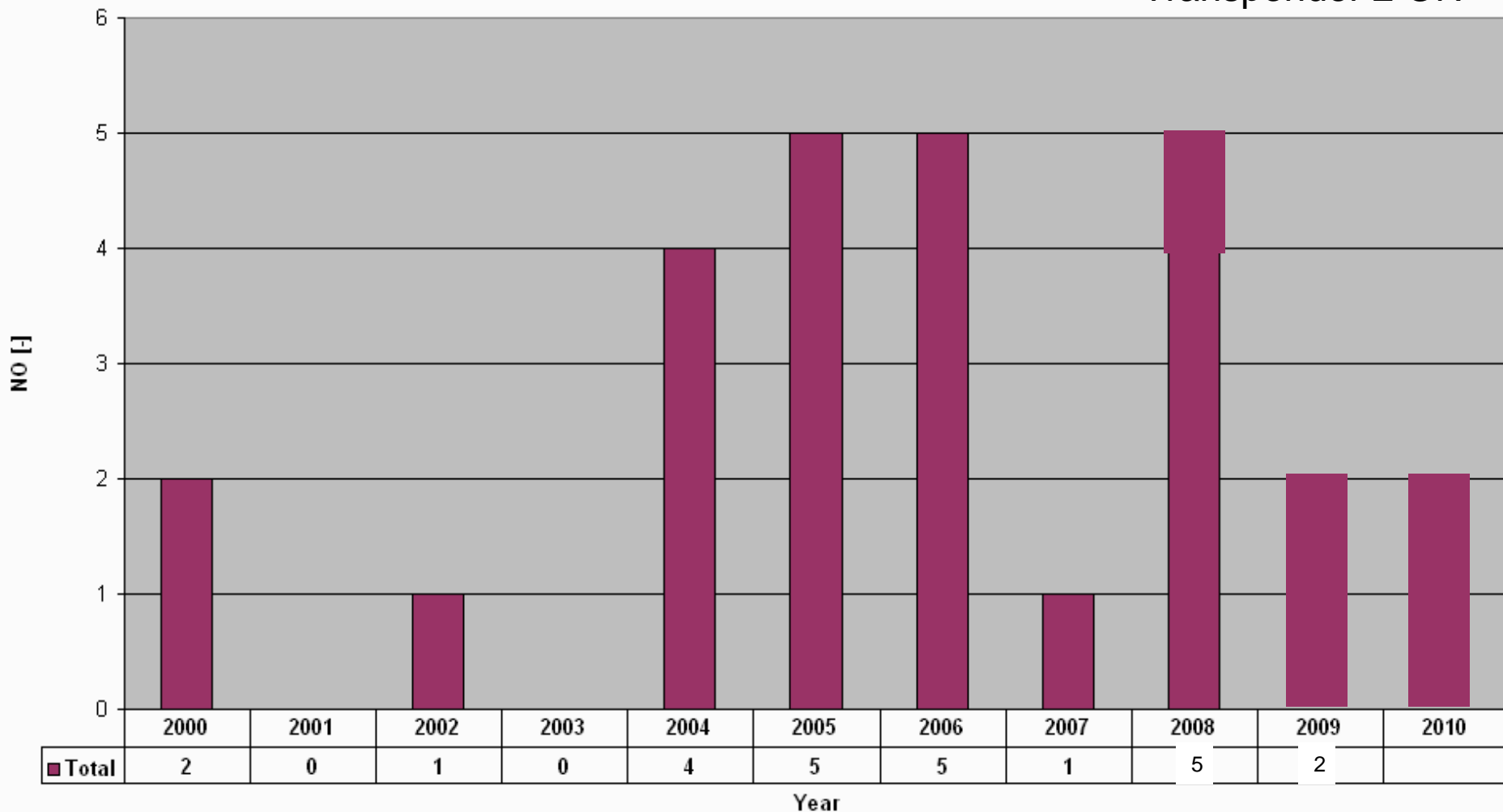


LCL statistics



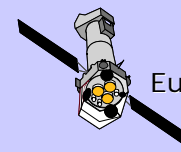
XMM-Newton LCL trips
(per year)

2010:
- Heater of RW1 OFF
- Transponder 2 ON



Spacecraft/mission status

Money	Funded until next extension request	End 2010 in 2010→2014
Fuel	remaining Use per year Mileage left	76 kg 6 kg →2019
Solar array power	Maximum required Current margin Margin end of 2018	1350 W 550 W 350 W
Battery	According to UHB	15+ y
Gyros/(IMUs)	Usage	< 20 %
Reaction wheels	Usage	< 37 %
RF switches	Usage	Stuck at one position Back up not used instead transponders are switched
Transponder switches		TX A LCL switches 227 TX B LCL switches 243 (Qualified to 25000)



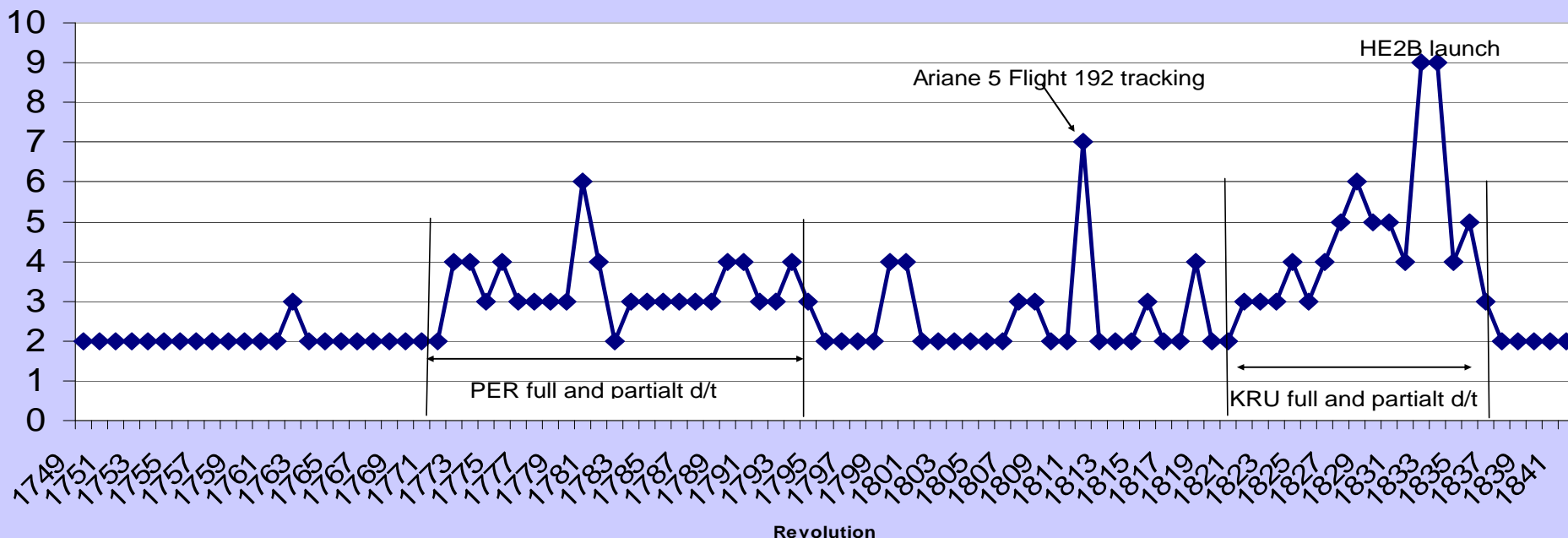
G/S maintenance

- Heavy G/S maintenance 2009 in July, August, November and December: 4/6 month
- Nominal revolutions: only 46/93
- Lots of additional late requests for G/S maintenance requires manual action of FCT also outside working hours

Worst case: rev 1832

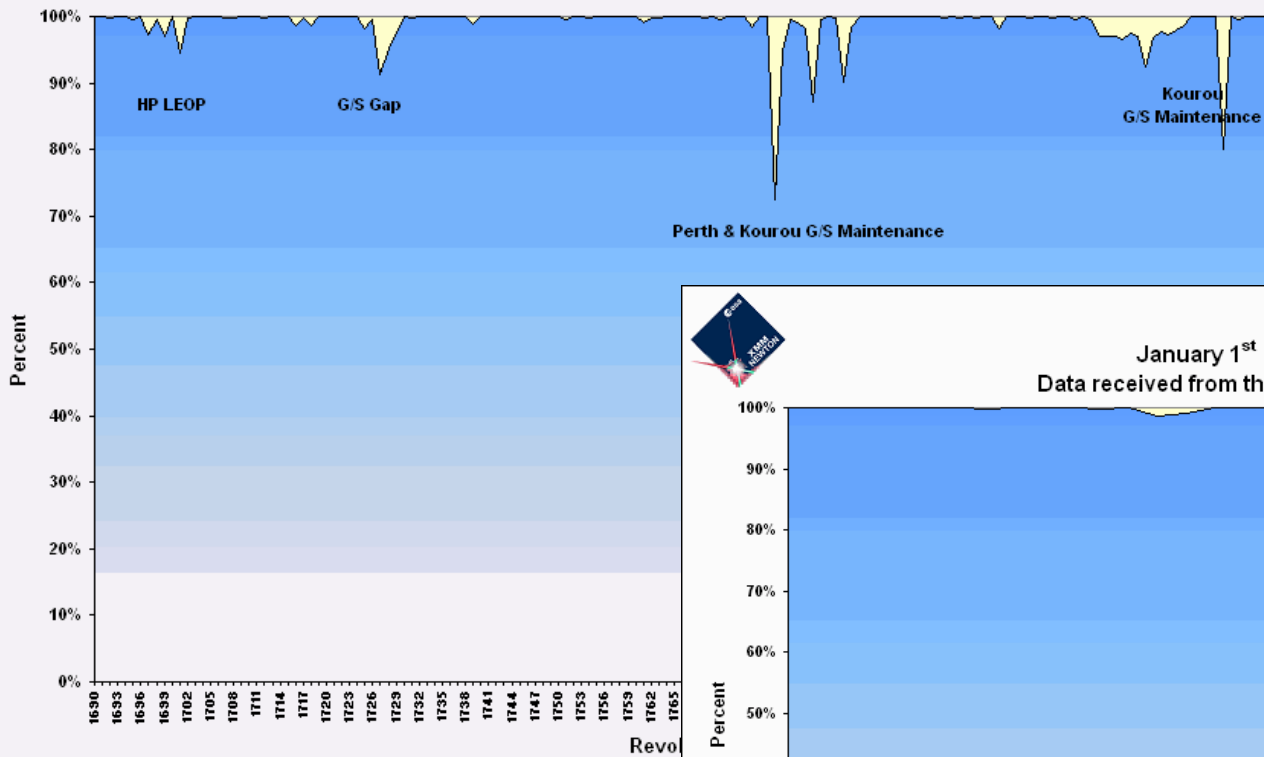


Number of Handovers per Revolution

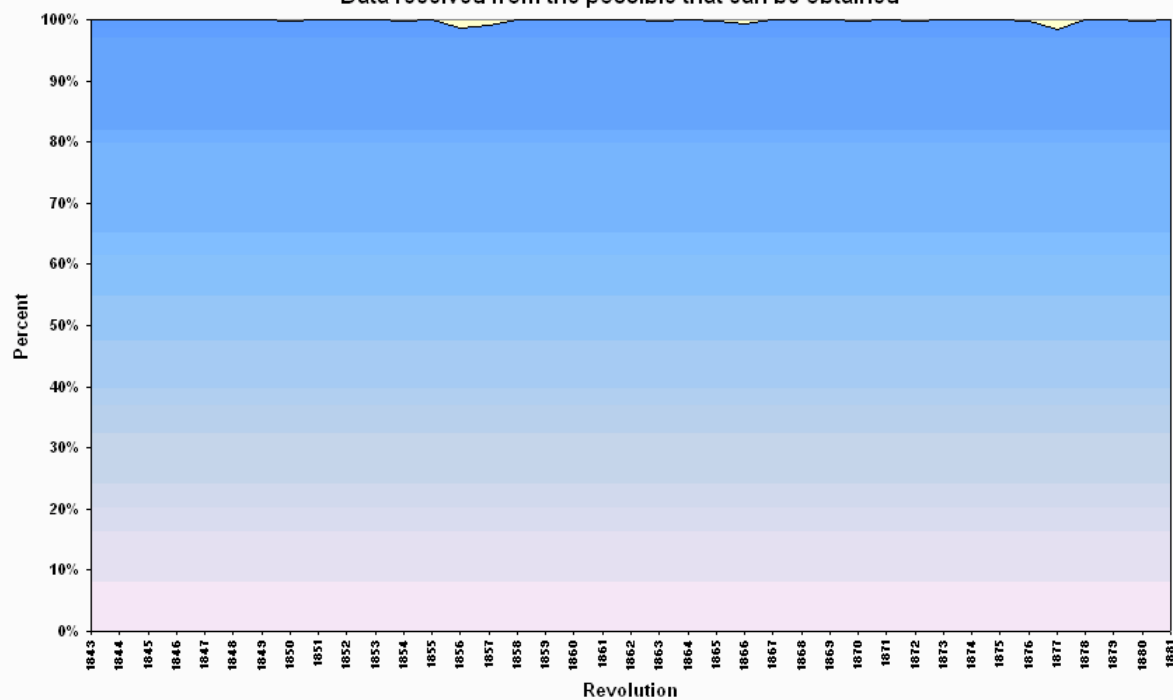


data recovery

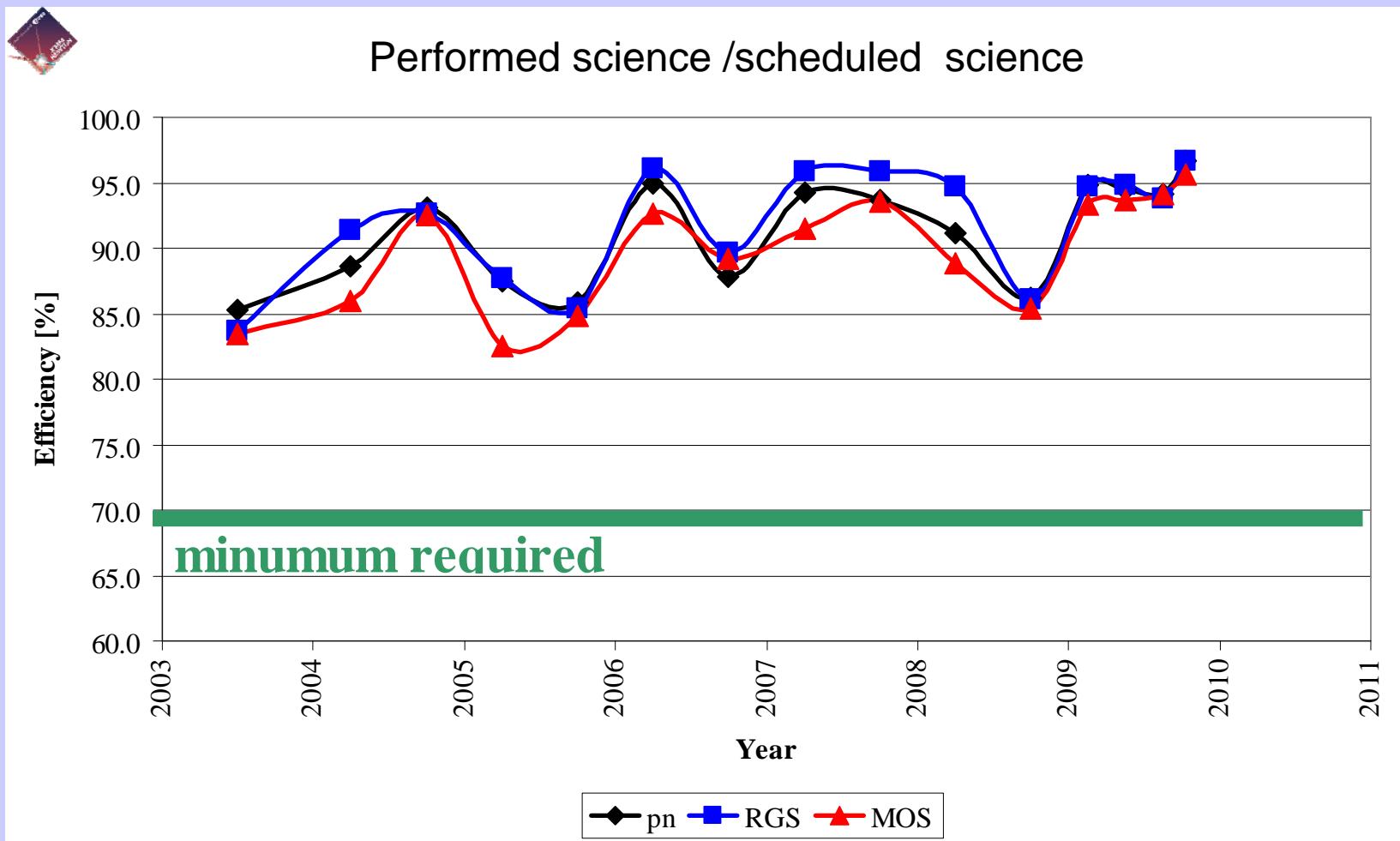
March 1st - December 31st 2009
Data received from the possible that can be obtained



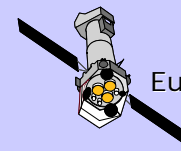
January 1st - March 21
Data received from the possible that can be obtained



mission performance



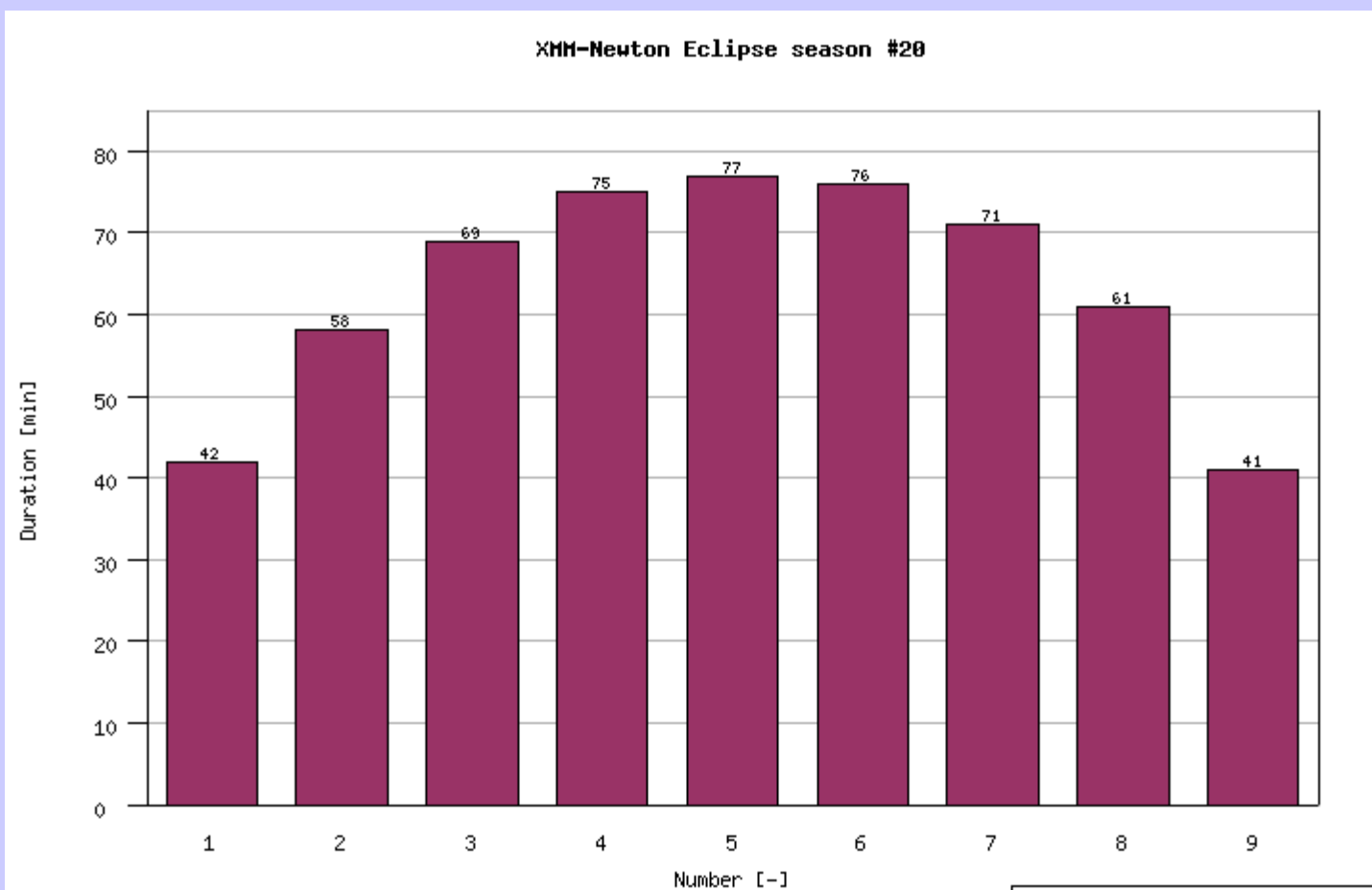
Numbers collected from SOC page



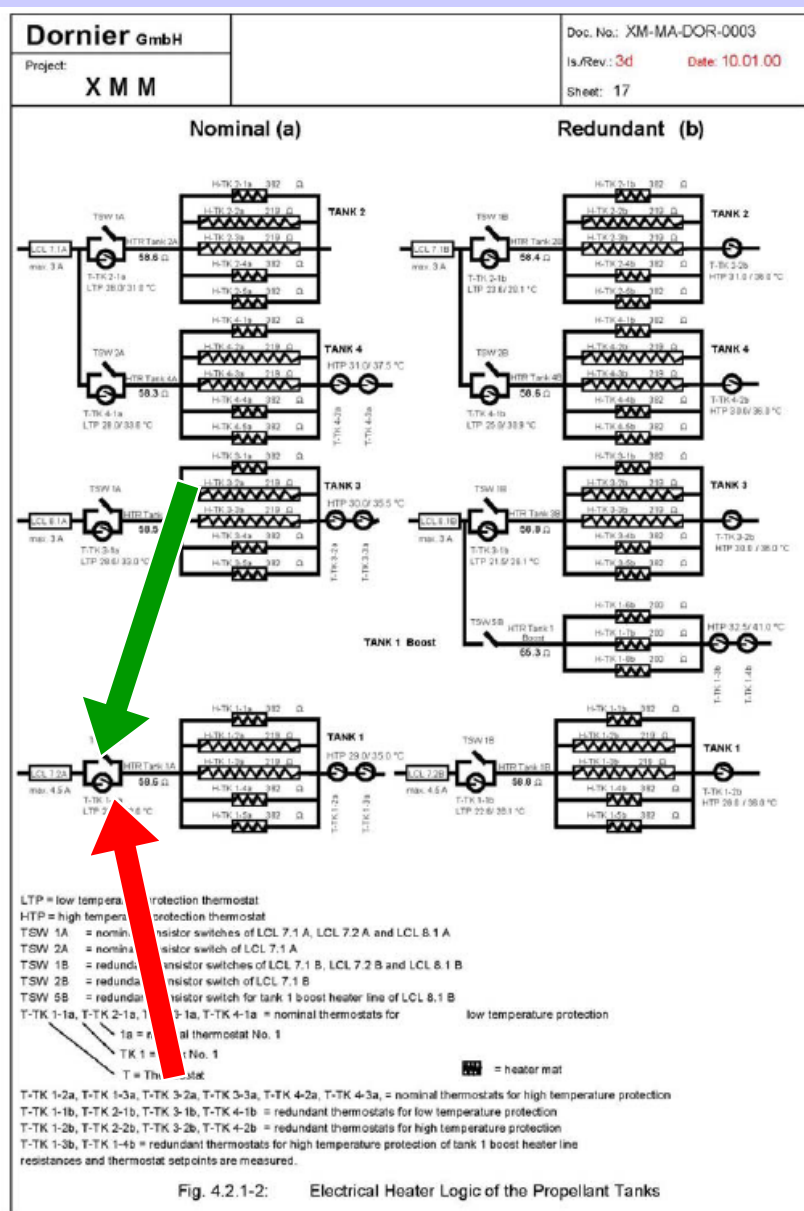
eclipse 2009 July

- 05-21/07/09
- max. discharge duration: 01h13m11s
- Max. Depth of Discharge: 24.0 % (100%=35Ah)

→ fully nominal



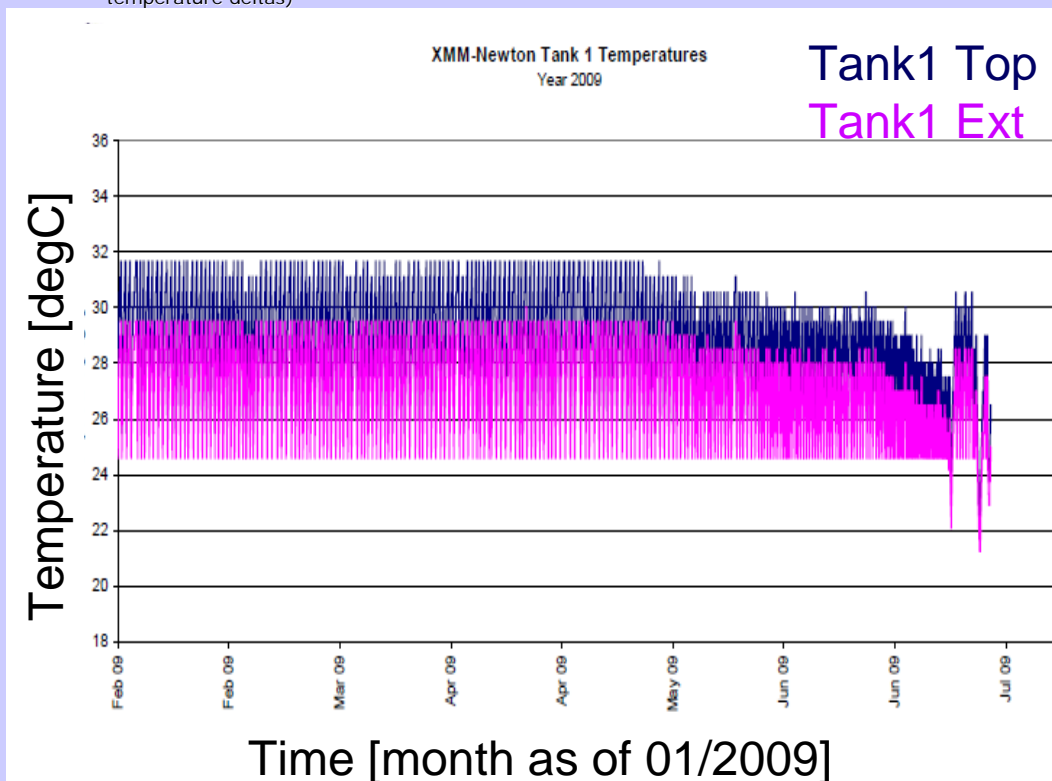
tank1 thermostat failure



- **Indicator:** After July Eclipse #4: DP TM TD057 (tank temps. range) OOL HH (10.41)
Reason: tank 1 temperatures low
 –T6072 (TH L TANK 1 TOP) : 22.5
 –T6073 (TH L TANK 1 EXT) : 21.25
 These temperatures have never been lower than 24.5 degC before!

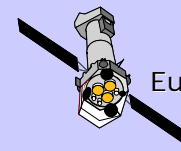
- **Assumption:** LTP thermostat not closing properly
- **Cure:** TSW, connected in parallel to LPTP is closed with time tags: cycle pattern: 3h35m closed, 38m open → this guarantees a temperature range of T1 EXT of 27-28 degC and a temp delta between all tanks of < 5 degC (Note: average temp in 2009 with working LTP was 27.5 degC)

- why not to redundant LTP:
 - other units would have been as well effected (STR, OM)
 - lower (4 deg) temperature range → need to change all other tanks as well to redundant heaters (do big temperature deltas)
- why not HTP:
 - higher temperature range → need to change all other tanks as well to redundant heaters (do big temperature deltas)



MCS upgrade

- Current status:
 - H/W: EoSL: 2011
 - S/W: OS Solaris 8 (End of support date March 2012)
S2K3.1 M-05
 - Options for evolution (currently under study)
 - Linux SLES 11, S2K3
 - Hybrid (Servers Solaris, Clients Linux), S2K3
 - Linux SLES 11, S2K5
 - Virtual emulation of Solaris 8
 - Other combinations using virtual machines
- Tests are underway for Linux for INTEGRAL



outlook

- **short term:**
 - **LCTF REDU** to be upgraded and tested in April (Issue with communication to KRU solved)
 - **MCS S/W release in April:**
 - Flexible timeline in MCS S/W 10.2.3
 - Automation of Antenna Swap process
 - **Refurbishment of the DCR** (Move in May to interim DCR, back Sept. 2010)
→ Impact: no Too support during the actual move(s) (2+2 days)
 - Eclipse 2010 01/07-15-07

- **medium term:**
 - **Automation of Eclipse** procedure
 - **MUST** implementation
 - **Star Tracker:** 12 blemish pixels identified. Feasibility of the Blemish pixel compensation on board is ongoing with the OBSM STR SW test campaign.
 - **New G/S at Kourou** (Kourou Galliot) validation (pending issues with timing accuracy)
 - G/S maintenance of PER (2-4 August) and KRU (September 2-4 May)

- **long term:**
 - **MCS evolution** to be decided after next extension in 2010 for implementation in 2011
 - evaluation of possibility to use auto **commanding to trigger flexible time**

