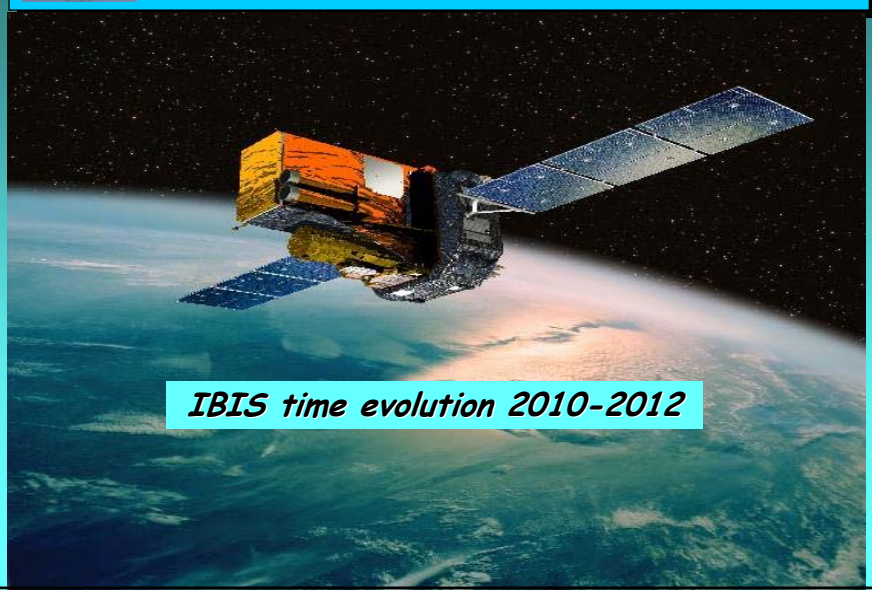
Copenhagen November 27, 2006
INTEGRAL Coordination Meeting
P. Ubertini, IASF/INAF - Roma



IBIS time evolution 2010-2012

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IBIS TIME EVOLUTION

1. The main effect that can affect the IBIS performance is the possible instrument degradation due to in orbit operation:

So far this evolution has been minimal and no actual failures reported.
The main sign of stability is:

- **the evident slow increase of ISGRI and PICSIT dead pixels (negligible so far),**
- **the high voltage stability of the VETO (due to great performance of the BGO and PMs) and**
- **the (predicted) drop of calibration count/rate, fully compensated by background line fitting for ISGRI and good gain stability for PICSIT.**

>>> the IBIS gain/evolution is FULLY under controll and the instrument is very helthy (see IBIS status report from GLR & EMQ)

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Then the main driver for "visible" changes are:

1. the Sun activity:

The main predictable evolution is the background variation induced by the solar cycle: we are already experimenting the actual impact on BGD increase and in turn TLM occupation by different instruments in different operative modes. >> G. La Rosa (OM) to investigate with AB and FL. >> lower BGD after 2008-2012?

2. the orbit evolution (see M. Schmidt document)

2007	**12,500 km**
2008	**8,900**
2009	**6,000**
2010	**3,900**
2011	**3,000**
2012	**3,000**

After 2009 the the BGD activation may increase in the first part of the orbit, resembling the initial part of the injection in orbit when the S/C severely impinged at low altitude

>>>in this case a perigeo rising option could be possible? >> MS to invstigate?

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Calibration issues

For the time being a **5x5 dithering on Crab is mandatory** to assess possible instrument evolution and to fine tune the .arf/.rmf production on the long time scale. We are approaching a "long live mission". The final output will surely improve if we are able to maintain as much as possible constant the IBIS performances and give to the general user a tool to treat the whole data set is a single mode.

"Ad Hoc" calibration run may be necessary to check, solve particular detector behaviours or unsolved doubts :off-axis response, high energy rise time corrections etc

Please, send all request/inputs to A. Bazzano, Calibration Scientists

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Bright Source Operability - 1

1. Strong counting rates induced by bright sources can hamper the proper IBIS response and operation.
2. As an example ISGRI data flow was severely limited by TLM gap or shutted-off when strong GRBs or in the case of the SGR flare in December 2004.
3. Very high photon or particle flux will impact at different system level:
   - TLM, if not very high count rates >> loose data, grey filter equivalent
   - Instrument dead-time, saturation for intermediate flux >> pile up algorithms or ??
   - HEPI/DPE crisis, for strong flux >> switch-off part of the modules, apply high thresholds, different TLM thresh
4. >>Suggest ction on G. La Rosa and F. Lebrun to investigate and suggest possible countermeasures, some possible way to go:

- Decrease the ISGRI risetime upper threshold (get better events only)
- Deactivate PICSIT (&Compton); this will only work for an extra crab flux (about 240 more ct/s)
- Extreme measure:de-activate (switch off ?) 2 to 4 ISGRI modules!! Effective area reduced>>1/4 to 1/2 BGD rate
- Switch OFF SPI!!
- Switch OFF Jem-X!!

As far as the TLM packets allocation my feeling is that change the IBIS operative modes do not help a lot for a real bright source AS also pointed out by the Roland mail.

In particular, we may have very nice surprise with PICSIT and Compton mode in case of 5-10 Crab transient!

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Bright Source Operability - 2

R. Walter hints:Very Bright transient instrument set-up:it depend very much on the type of transient. If is a soft one with a soft spectral index, one can decide to disable PICSIT (13 pkt! And you can simply transmit about 100 ct/s more than usual that is not really a good increase, about 0.5 Crab); this is clearly not sufficient (see Cyg X-1 flare last year, rev. 388).

If it is showing an hard spectral index it could be worth tomaintain PICSIT and play with TLM priority.In any case it could be decided also depending on source location and hence give priority to IBIS and JEM X or maintain all instrument and disable for IBIS all other mode
a part from ISGRI (S1)

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