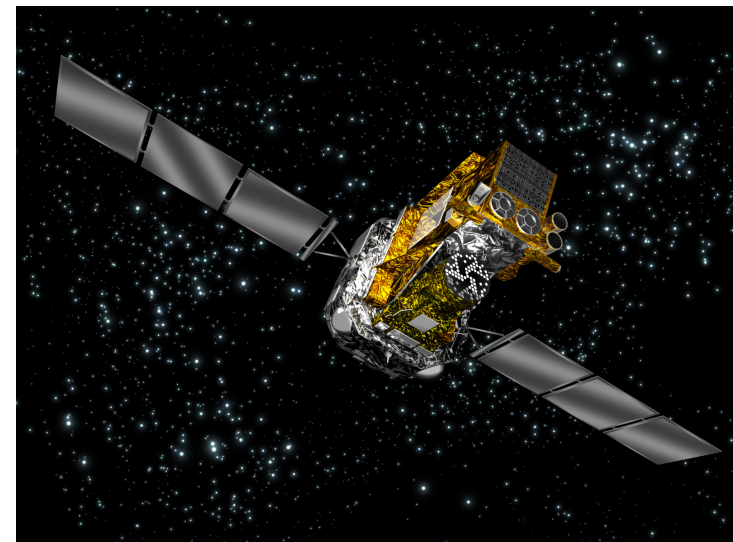




# Next mission extension exercise: plan(s), ideas & who does what/ when

Erik Kuulkers  
(ESA/ESAC)

IUG Meeting ESTEC – 26&27/11/2013



# [INTGRAL] extension: when?



- Need input from management on structure report
- Assume same set-up as 2012 extension case
  - Mission extension request document – 6 pages:  
~5 pages science case + ~1 page S/C & GS-stuff
- Possible Timeline
  - Nov 26/27 – IUG meeting: kick-off
  - early May 2014?: first draft?
  - End July 2014: science case ready (5 pages + appendices?)
  - September 2014: finetuning
  - October 15/16 2014 (TBC): present case at AWG?

# [INTEGRAL] extension: how/what? - I



- Same contents strategy as last time (extension 2012)?
    - 6 pages with:
      - Mission impact + metrics
      - Conformation of performance 2015-2016
      - Case for 2017-2018: subjects A1-A3, B1-B7, C1-C5, D1-D3
      - Complementarity & uniqueness
      - IUG Recommendation
      - S/C, Payload & GS status
    - 2 appendices
      - A: References, figures & tables
      - B: List of PhD theses and INTEGRAL publications
- update and outline the unique capabilities of INTEGRAL?

# [INTEGRAL] extension: how/what? - II



- Or: modify & outline few specific key question(s) only INTEGRAL can answer? (but keep previous report headlines) - What does the AWG expect?
  - Mission science objectives instead of mission performance objectives
  - What defines INTEGRAL / what makes INTEGRAL unique?
- Ideas for INTEGRAL legacy science
  - Extra-galactic science:
    - Survey AGN at high  $z$ ? Complement NuSTAR?
    - Ultra-deep field (proposal V. Beckmann) [vs. Swift/BAT: homogeneous exp.]
  - CXB?
  - Polarization studies (Cyg X-1, Crab, GRB)? INTEGRAL unique!
  - Nucleosynthesis? E.g., more SNe ( $^{44}\text{Ti}$ )?
  - Continue Galactic science?
    - Transient sources (LMXBs, HMXBs, SFXTs, magnetars, etc.)
    - msec X-ray pulsars
    - Monitoring? – able to follow evolution. Deep exposures?

# [INTEGRAL] extension: how/what? - III



## ➤ INTEGRAL in the broad-band – important, but need to consolidate (proposals!)

- Multi-wavelength synergy - new opportunity to study universe through different channels – new discovery space?

- Coordinations with other high-E observatories (Fermi?, NuSTAR?, Suzaku?)

Currently: XMM-Newton - up to 300 ksec; AO12: Swift - 150ksec;

1 or 2 `large' programs (~100-300 ksec?) with other facilities?

- Future coordinations with high-E observatories: ASTRO-H, HXMT, eROSITA?

- Coordinations with ground-based observatories?

Radio (surveys, wide FOV, e.g., LOFAR)? Coordinate with NOAO (VLA/GBT/VLBA)?

IR: coordinate with ongoing VISTA wide IR survey?

LSST, Zwicky Transient Facility (>2015) ~45 deg<sup>2</sup>; other optical surveys

- Very high energies: HESS, Veritas? Neutrino's: ICECUBE, HAWC, CTA?

- Follow-up radio transients (FRBs)?

- GW: follow-ups of (advanced: 2015) LIGO-Virgo events? INTEGRAL: wide FOV!

- Fermi transient follow-up? LAT transients / GBM gamma-ray bursts?

# [INTEGRAL] extension: how?



- How to accomplish INTEGRAL legacy science?
  - Continue as we do now (Msec proposals, multi (2) year proposals)?
  - Need (more) large/long-term programs?
  - Public time?
    - Set aside public time for 1 or 2 large programs to address key questions?
- IUG Discussion...
  - More/other ideas?
  - Who does what? Splinters in 3 subjects (Galactic Astronomy, Extragalactic Astronomy, Nucleo-synthesis and diffuse continuum/line emission)? Chairs?
  - Timeline reasonable?
    - Nov 26/27 – IUG meeting: kick-off
    - early May 2014?: first draft?
    - End July 2014: science case ready (5 pages + appendices?)
    - September 2014: finetuning
    - October 15/16 2014 (TBC): present case at AWG?
  - AOB?