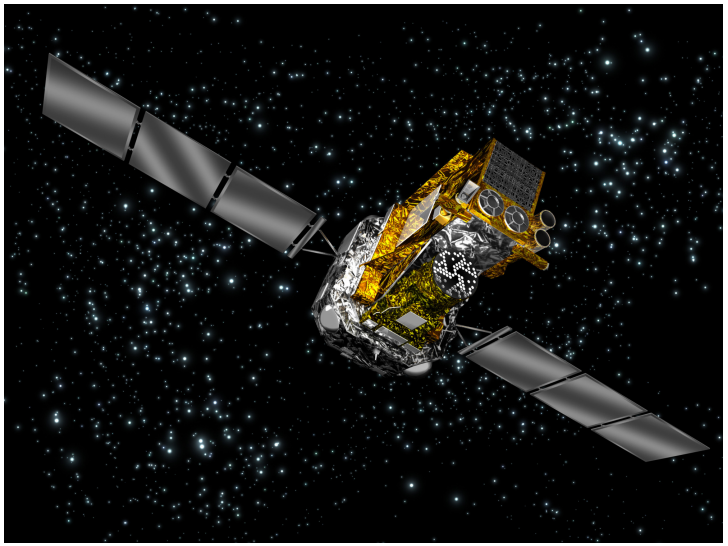
INTEGRAL
Project Scientist Report

Erik Kuulkers
(ESA/ESAC)

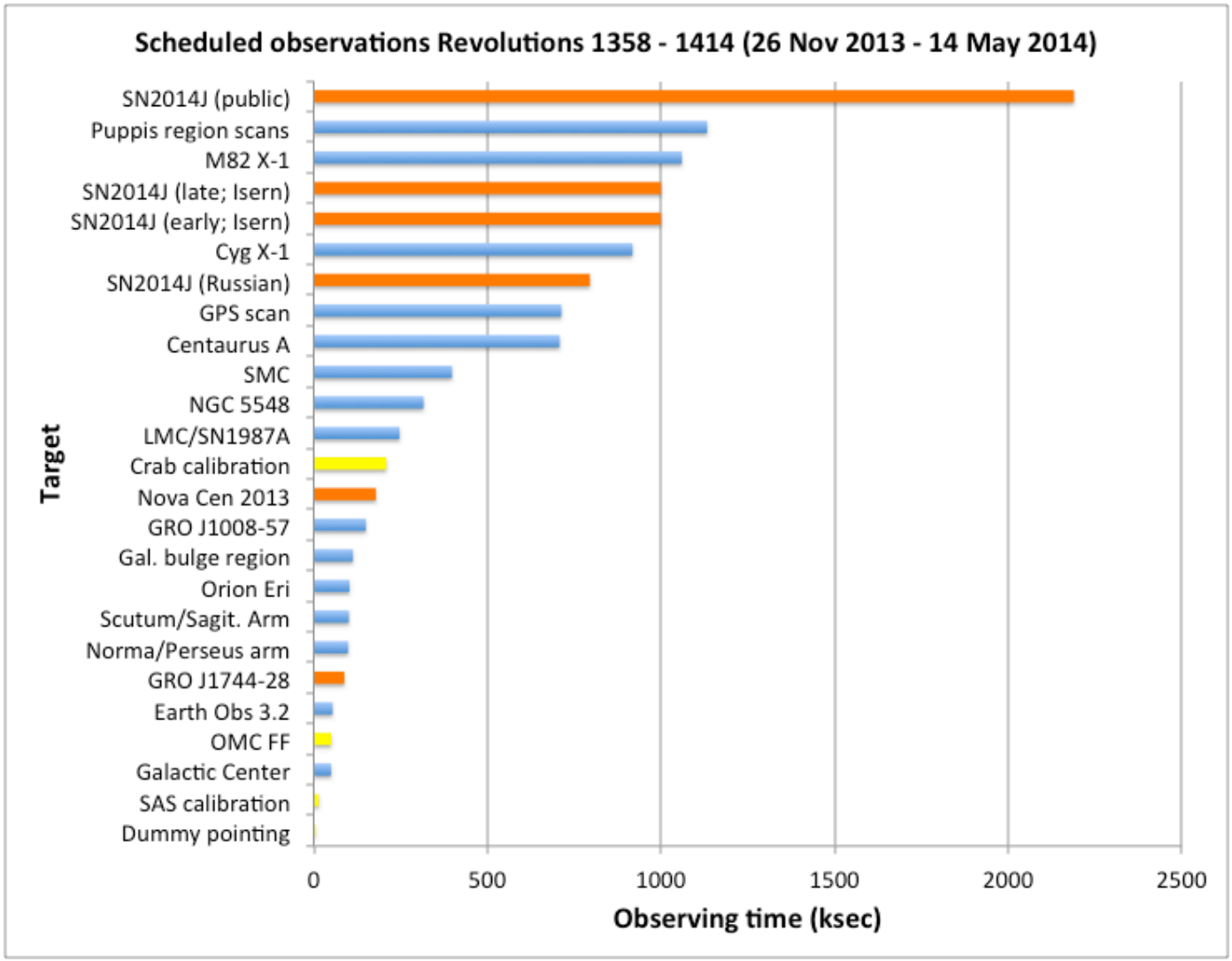


IUG Meeting ESTEC – 13&14/05/2014

[INTEGRAL] Project Scientist Status Report

- **Observatory status**
- Community interfaces
- Science highlights
- Outreach

[INTEGRAL] Observatory status



TOO follow-up observations + GRB (Jan 2013 – Nov 2013)

Trigger Date	Source	PI	Comments
20 Dec 2013	Nova Cen 2013	P. den Hartog	#1040030, scheduled
30 Jan 2014	SN2014J	J. Isern	#1140011, scheduled
"30 Jan 2013"	SN2014J	Public	#new, scheduled
"5 Feb 2014"	SN2014J	R. Sunyaev	#new, scheduled
3 Feb 2014	GRO J1744-28	N. Masetti	#1140005, scheduled
13 Nov 2013	GRB 131122A	L. Hanlon	#1040009
18 Dec 2013	GRB 131218A	L. Hanlon	#1040009
24 Dec 2013	GRB 131224A	L. Hanlon	#1040009
6 Feb 2014	GRB 140206A	L. Hanlon/D. Götz	#1140004/1140025
20 Mar 2014	GRB140320B	L. Hanlon	#1140004
20 Mar 2014	GRB140320C	L. Hanlon	#1140004

ToO on SN2014J (in M82)

Revolution	Date	Days after explosion (15 Jan)	PI	Scheduled (Msec)	Comment
1380	31 Jan–2 Feb	16-18	public	0.21	ATel #6099
1381-1386	3 Feb-18 Feb	19-34	Isern	1	ATel #6099
1388-1392	21 Feb-9 Mar	37-53	public	0.94	ATel #5992
1393-1396	11 Mar-22 Mar	55-66	Sunyaev	0.8	ATel #5992
1397-1402	23 Mar-8 Apr	67-83	Isern	1	
1402-1407	8 Apr-24 Apr	83-99	public	1.04	
				Total = 5 Msec	

IUG: thanks for the support!

- Observatory status
- **Community interfaces**
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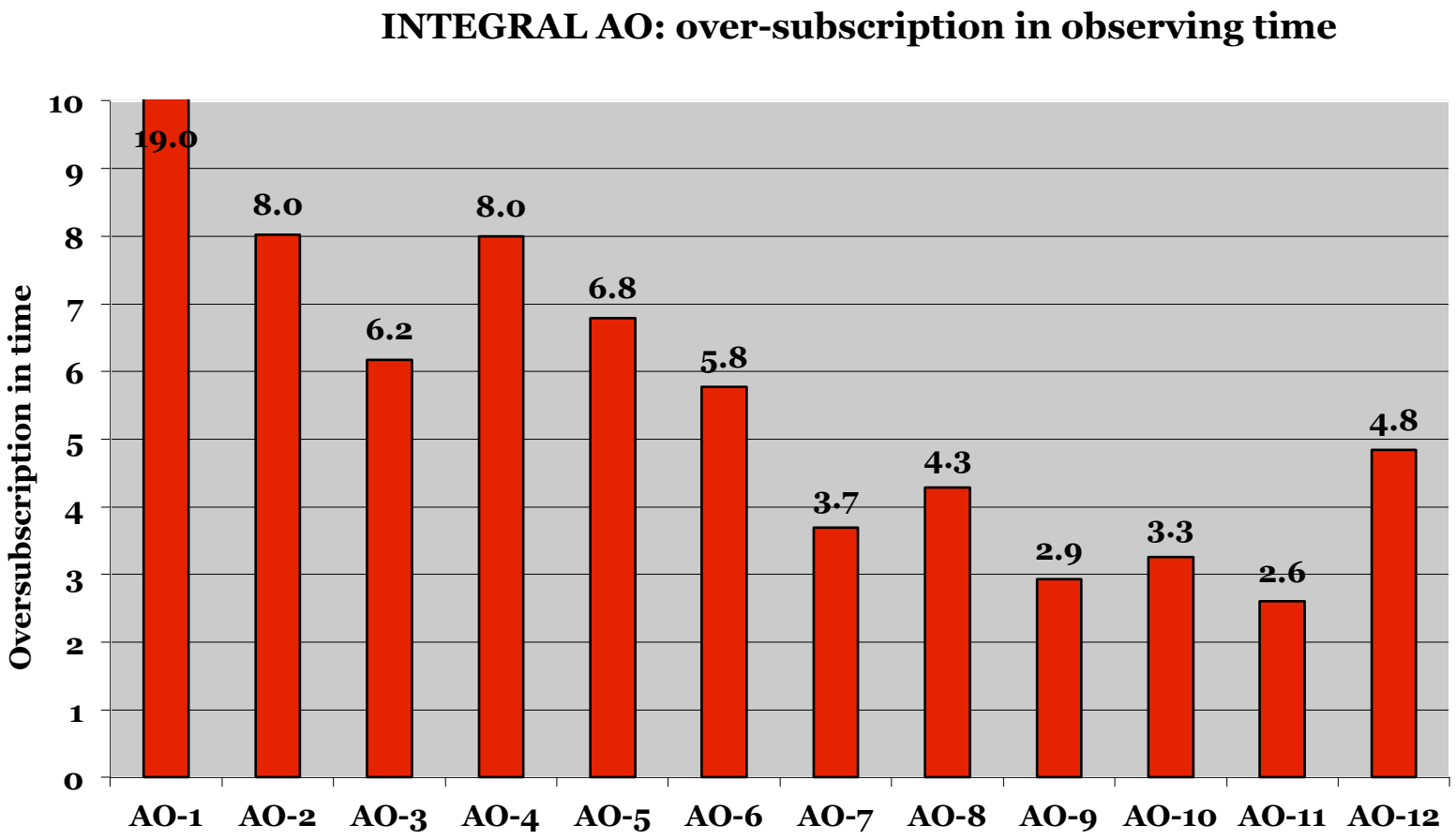
[INTEGRAL] Community interfaces

- New IUG chair from July 2014: Peter von Ballmoos (CESR/Toulouse)
- AO-12 Observing Time proposals
  - 4 April: 77 proposals
  - Over-subscription in time: 4.8 (AO-11: 2.6)
  - 23 KP (incl. 7 new MY), 37 ToO
  - Non-ToO proposals: 523 data right sources/fields
  - 12 proposals INTEGRAL/XMM-Newton
  - 12 proposals INTEGRAL/Swift
  - TAC meeting: 20-22 May

Scientific Category	Number of proposals	Requested observing time (Ms), includes ToO times x 10%
Galactic Astronomy	50	29.5
Extragalactic Astronomy	17	46.2
Nucleosynthesis and diffuse continuum/line emission	10	31.1
Total	**77**	**107**

- Remember: no 2nd, data rights, AO-12 round
- Extension case: confirmation 2015/2016; extension 2017/2018: this meeting

Response to AO-12



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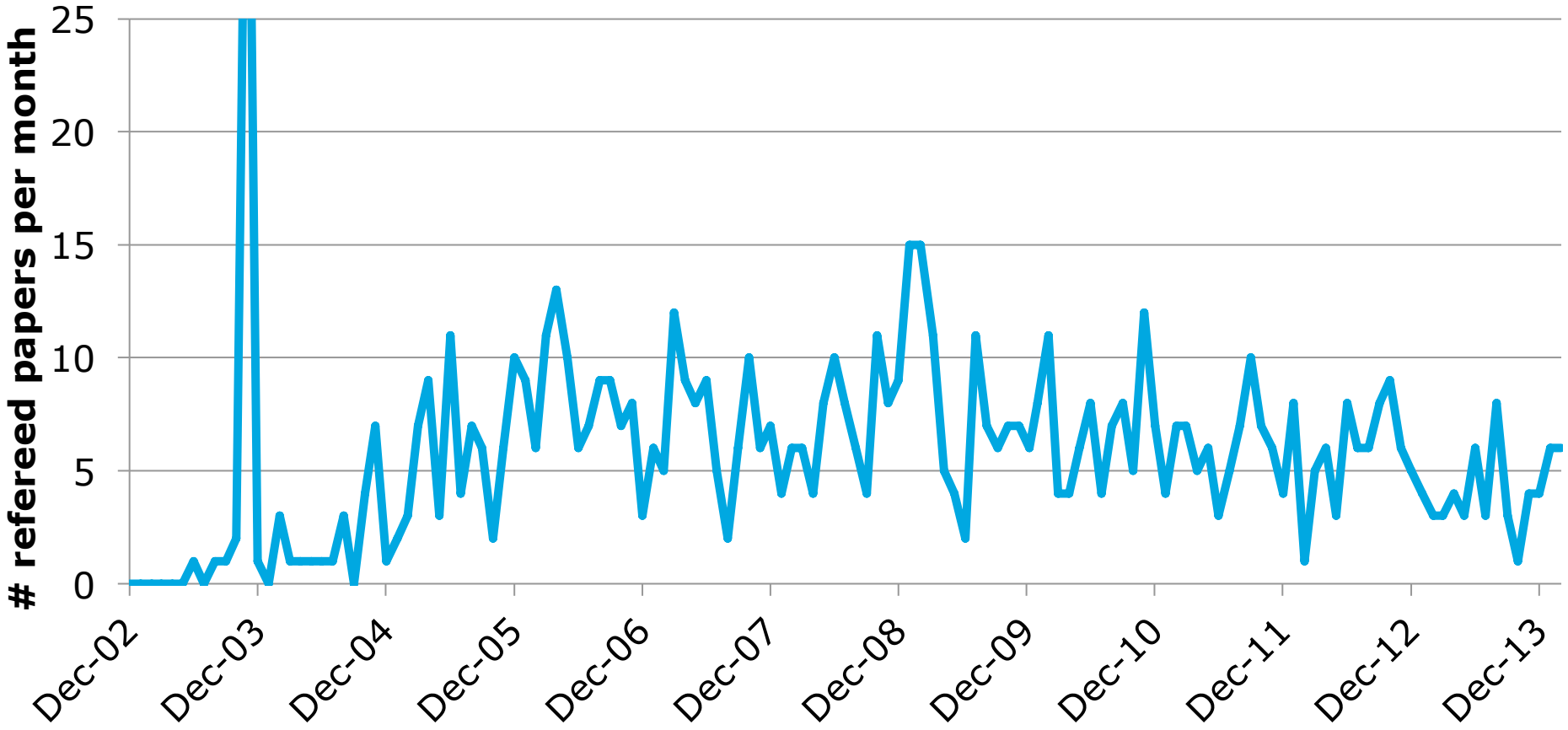
[INTEGRAL] Science highlights

Title	Reference
INTEGRAL observations of SS433: system's parameters and nutation of supercritical accretion disc	A.M. Cherepashchuk et al. 2013, MNRAS 436, 2004
Kinematics of massive star ejecta in the Milky Way as traced by 26Al	K. Kretschmer, et al. 2013, A&A 559, A99
The long helical jet of the Lighthouse nebula, IGR J11014-6103	L. Pavan, et al. 2014, A&A 562, A122
The spectral catalogue of INTEGRAL gamma-ray bursts: results of the joint IBIS/SPI spectral analysis	Ž. Bošnjak, et al. 2014, A&A 561, A25
IGR J17488-2338: a newly discovered giant radio galaxy	M. Molina, et al. 2014, A&A 565, A2
Cutoff in the hard X-ray spectra of the ultraluminous X-ray sources HoIX X-1 and M82 X-1	Sazonov et al. 2014, AstL 40, 65
Detection of the 847 keV gamma-ray line of radio-active Co56 from the Type Ia Supernova SN2014J in M82 with INTEGRAL	E. Churazov et al. 2014, Atel #5992
Early gamma-ray emission from SN2014J during the optical maximum as obtained by INTEGRAL	J. Isern et al. 2014, Atel #6099

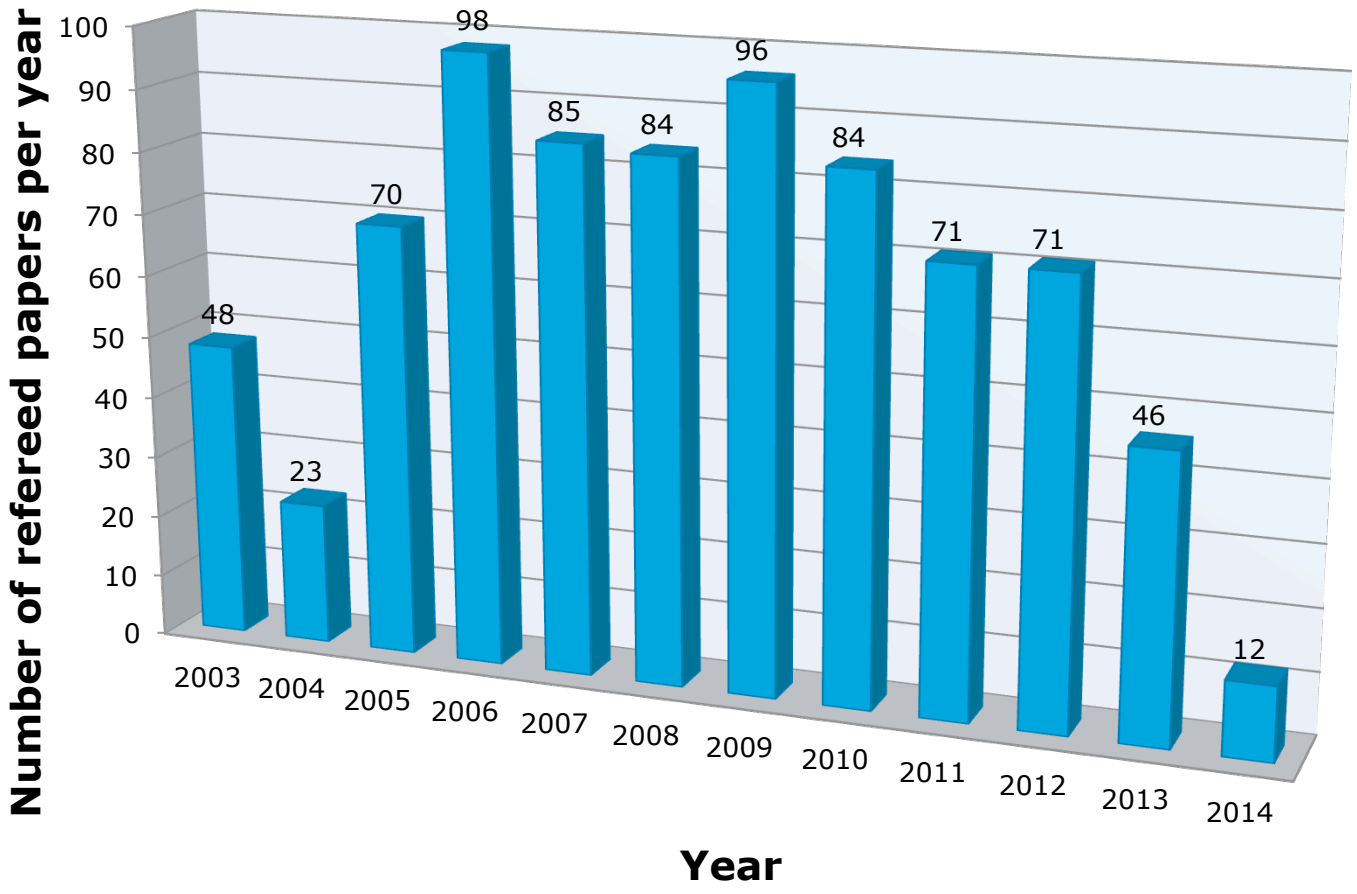
- Earth Observation Dec 2013 (EO3.2)
- Results (sent yesterday May 12 by Marc Türler): http://www.isdc.unige.ch/~turler/earth/EO3.2/
- Do we want another EO in Dec 2014? Or wait the decision of the TAC regarding AO-12 proposal?

- Observatory status
- Community interfaces
- Science highlights
- **Outreach**

Refereed publication statistics (up to/including Feb 2014)



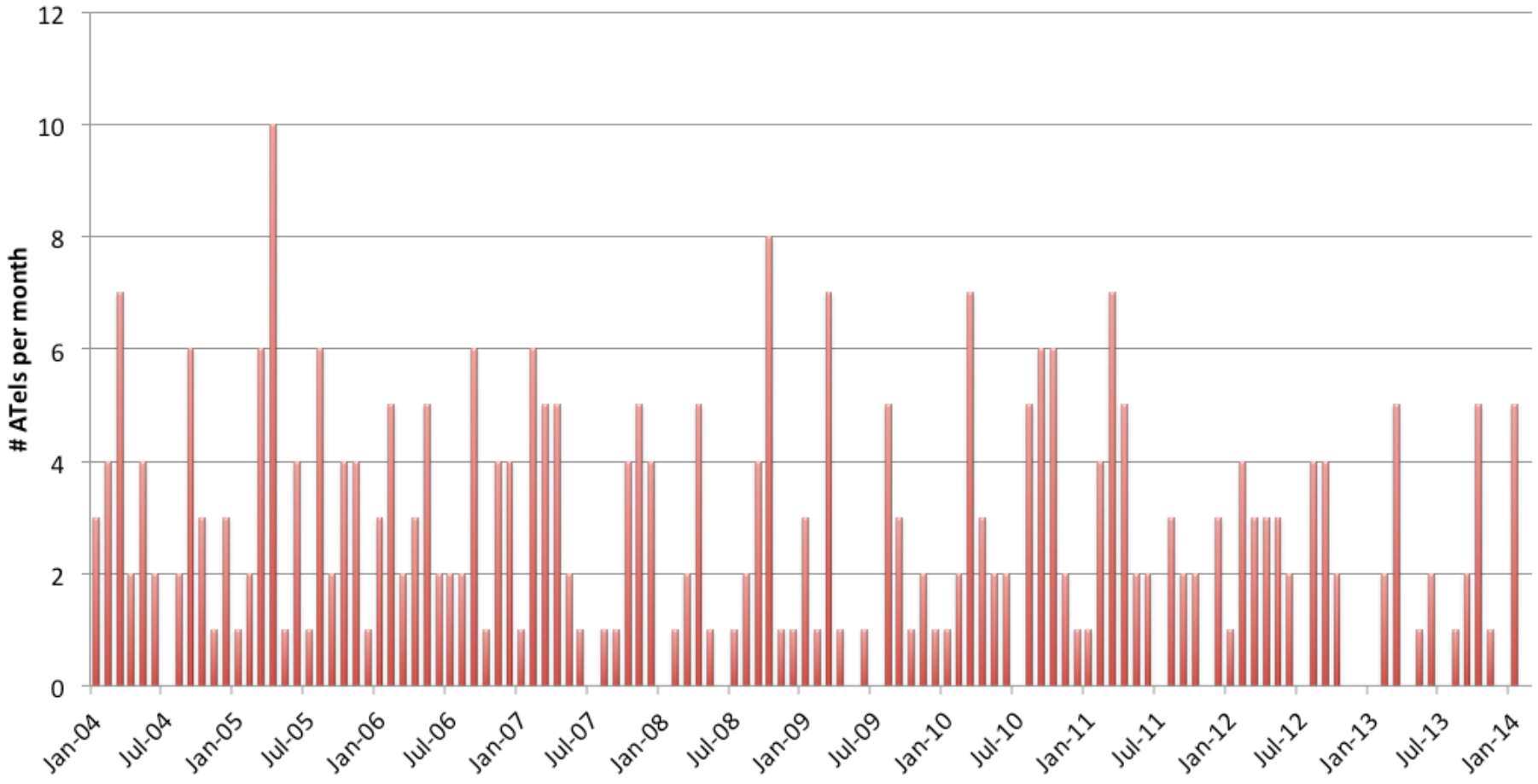
Refereed INTEGRAL papers per year



Total since launch (up to Feb 2014): **2128** papers

788 refereed, **1340** non-refereed

ATel publication rate (up to/including Feb 2014)



Status since last meeting (November 2013)

ESA web-stories (already presented last IUG meeting!)	
Debris from stellar explosions in the Galaxy's fast lane (Kretschmer et al.)	19 November 2013

Average # stories in:

2014 - 0 

2013 - 4

2012 - 7

2011 - 9

2010 - 6

Sent suggestions and proposals for new outreach products, please (not only Nature or Science papers!)

[INTEGRAL] 10th Workshop

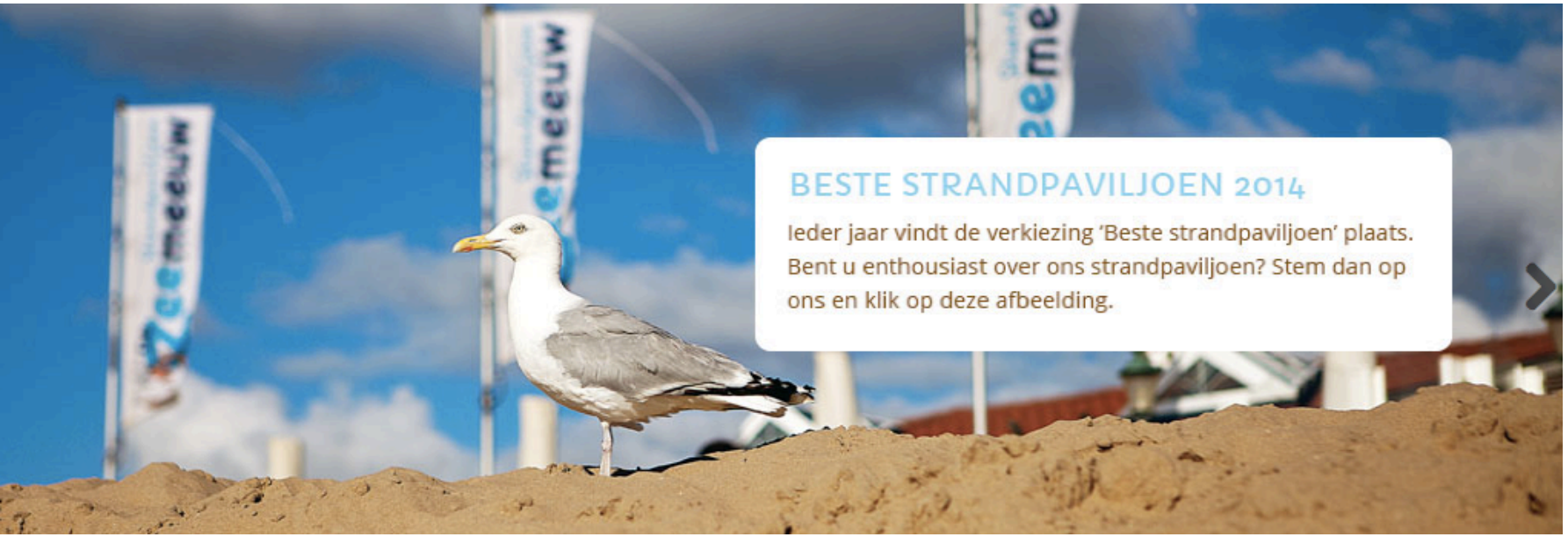
"A Synergistic View of the High Energy Sky"
15-19 September 2014
Annapolis, MD, USA

Important Dates

Second circular and registration open	Early May 2014
Abstract submission deadline	31 May 2014
Preliminary Scientific Program	mid-June 2014
Early Registration Deadline (basic fee)	15 July 2014
Late Registration Deadline (increased fee)	15 August 2014
WORKSHOP	15 – 19 September 2014
Papers due	November 2014
Publication of proceedings (on-line)	March 2015

[INTEGRAL] Dinner tonight

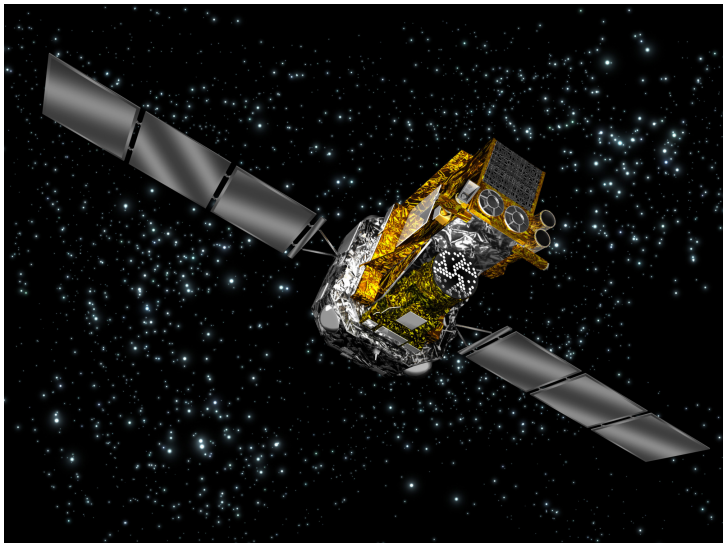
Restaurant "De Zeemeeuw" in Noordwijk – www.zeemeeuw.com



@19:30 - Who's joining?

Mission extension 2014 exercise

Erik Kuulkers
(ESA/ESAC)



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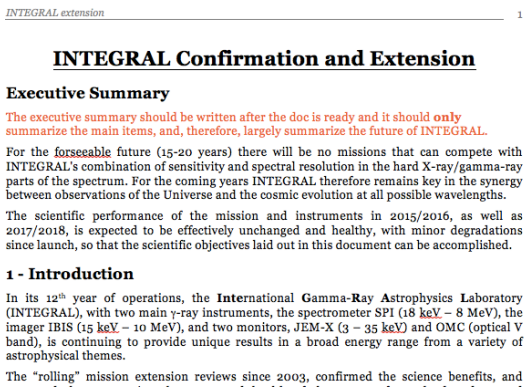
[INTEGRAL] extension: when?

- 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 13/14 2014: present case at AWG



INTEGRAL extension 1

INTEGRAL Confirmation and Extension

Executive Summary

The executive summary should be written after the doc is ready and it should **only** summarize the main items, and, therefore, largely summarize the future of INTEGRAL.

For the forseeable future (15-20 years) there will be no missions that can compete with INTEGRAL's combination of sensitivity and spectral resolution in the hard X-ray/gamma-ray parts of the spectrum. For the coming years INTEGRAL therefore remains key in the synergy between observations of the Universe and the cosmic evolution at all possible wavelengths.

The scientific performance of the mission and instruments in 2015/2016, as well as 2017/2018, is expected to be effectively unchanged and healthy, with minor degradations since launch, so that the scientific objectives laid out in this document can be accomplished.

1 - Introduction

In its 12th year of operations, the **Inter**national **G**amma-**R**ay **A**strophysics **L**aboratory (INTEGRAL), with two main γ-ray instruments, the spectrometer SPI (18 keV – 8 MeV), the imager IBIS (15 keV – 10 MeV), and two monitors, JEM-X (3 – 35 keV) and OMC (optical V band), is continuing to provide unique results in a broad energy range from a variety of astrophysical themes.

The "rolling" mission extension reviews since 2003, confirmed the science benefits, and

[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 (in text also?) & tables?
    - B: List of PhD theses and INTEGRAL publications?

→ update and outline the unique capabilities of INTEGRAL!

[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^2; 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 Earth occultation. December 17th, 2013.
OMC view.