



Newsletter of the INTEGRAL Science Operations Centre



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3rd Announcement of Opportunity (AO-3)

Christoph Winkler - Project Scientist

The deadline (29 October 2004, 15:00 CEST) for submission of INTEGRAL proposals for AO-3 open time observations is now a few days behind us. All proposals are in the ISOC database. Below are some preliminary statistics on the proposals that have been received.

Total number of proposals

The total number of proposals received was 108. The total observing time requested in all proposals is approximately 111 Msec (for all types of observation, i.e. fixed time, normal time, and TOO). Here, 10% of the requested total TOO time has been taken into account. Given that up to about 27 Msec of observing time are available for the AO-3 observing programme (18 months duration starting on 18 February 2005), this corresponds to an oversubscription by a factor of about 4.1 (see details below). This is a very high value, showing the continued high interest of the scientific community in the INTEGRAL mission.

Proposals per category

In the following table we give the breakdown of number of proposals as a function of the proposal category. Note that the numbers on requested observing times do include TOO proposals, but it has been assumed here, that a typical TOO proposal requests about 10% of its total observing time as entered into PGT from all the candidate sources included in a TOO proposal. Further analysis may modify this assumption but the impact on the overall results should not be large.

Category	N ^a	T ^b (10 ⁶ s)	F ^c
Compact objects	54	27.7	1.03
Extragalactic objects	25	39.9	1.48
Nucleosynthesis	15	36.5	1.35
Miscellaneous (incl. GRB)	14	7.1	0.26
Total	108	111.2	4.12

- a. N = number of proposals
- b. T = requested observing time
- c. F = oversubscription factor

In number of proposals the *Compact objects* category is the biggest, followed by the *Extragalactic objects* category. *Nucleosynthesis* and *Miscellaneous* are clearly smaller. In amount of requested observing time per proposal, however, the *Nucleosynthesis* category is significantly larger.

The Time Allocation Committee, in charge of peer reviewing all proposals, and recommending the scientific observing programme to ESA, will meet in December at ESTEC, followed by ESA's announcement of the final AO-3 observing programme towards the end of 2004. Observations of the AO-3 cycle will commence on 18 February 2004.

Science Highlights

Erik Kuulkers - Operations Scientist

Most of September and October 2004 have been devoted to observations of the Galactic Centre region (GCDE and Open Time proposals). It was only 'interrupted' by observations of the Sagittarius Arm region (including GRS 1915+105), IC443, a TOO on 4U 0115+63 (see below), the GPS and calibration observations of the Crab. Now that the visibility window for the Galactic Centre has been closed again, we focus on observations of the Cygnus X region and Cas A, as well as performing various coordinated observations with XMM-Newton, Chandra and/or RXTE (GRS 1915+105, Cygnus X-1, NGC 7172, and 3C 273), see http://www.rssd.esa.int/Integral/isoc/html/schedules/AO2_Long_Term_Plan.html.

During the last Galactic Centre visibility period a couple of new transient sources were discovered by INTEGRAL, i.e. IGR J16465-4507 (ATel #329), IGR J17331-2406 (ATel #328) and IGR J17407-2808 (ATel #345; see also GCN 2793). IGR J18410-0535 (ATel #340) was reported as a possible new source, however, it is uncomfortably close (~7 arcmin) to another (faint) INTEGRAL source, IGR J18406-0539. A relatively old transient was seen to become active again as well: XTE J1743-363 (ATel #332). SGR 1806-20 continues to be in an active bursting state (GCN 2706, 2760, 2763, 2764, 2823, 2827, 2831). At a completely different location, during GPS observations, the well-known X-ray transient pulsar 4U 0115+634 was found to go into a long-awaited outburst (ATel #326, #331); at first it triggered IBAS alerts (GCN 2704). The outburst triggered an Open Time observation, which was performed at the end of September.

Only two GRBs appeared in the field-of-view since the last ISOC Newsletter. These were a soft one lasting ~10 sec (GRB 040903; GCN 2690, 2691, 2693), probably an X-ray flash

(GCN 2699), and a faint ~30 sec long one (GRB 041015; GCN 2805).

Nucleosynthesis observations in particular need long integration times, in order to well resolve line emission. INTEGRAL has by now pretty much covered most of the sky. Using the SPI instrument a systematic search for 511 keV emission (resulting from positron-electron annihilation) was performed. The emission is - so far - only seen towards the center of our Galaxy (see the INTEGRAL Picture of the Month for November: <http://www.rssd.esa.int/Integral/POMNov2004.html>). The spatial distribution of the emission is equally compatible with galactic bulge or halo distributions, the combination of a bulge and a disk component, or a combination of a number of point sources. Such distributions are expected if positrons originate either from low-mass X-ray binaries, novae, Type Ia supernovae, or, even more exciting, possibly light dark matter. This exciting new result made it into the News Focus of Science (2004, vol. 305, p. 1899), reporting from the September 7-11 Meeting of the AAS High Energy Astrophysics Division.

Mission Status

Arvind Parmar - Mission Manager

INTEGRAL continues to operate smoothly with all the spacecraft sub-systems performing nominally. Fuel consumption remains low at around 0.1 kg/week, with approximately 167 kg remaining as of October 2004. The power sub-system is working nominally with about 2100 W available from the solar arrays. This is sufficient power to continue operations at a solar pitch angle of 40° for the foreseeable future. Thermal control is working nominally and all temperatures are as expected. The spacecraft orbit control is working satisfactorily by choosing the pointing positions and times around the orbit when momentum wheel dumps take place. This active control is neces-

sary to ensure ground station coverage down to 40,000 km and long enough overlap between the NASA Goldstone and ESA Redu ground stations to allow smooth handovers.

Investigations are continuing on the failure of SPI Ge detector #17 in July 2004. This is the second detector failure, following that of #2 in December 2003. From the observed symptoms and analysis of the data obtained during recovery attempts, the two detectors appear to have failed in different ways, although the cause could be the same. In order to investigate whether there is any link with the annealing, which in both cases occurred some 2 weeks before the failures, the PI is conducting a thermal vacuum test using Flight Spare hardware. The equipment is being subjected to the same thermal profile as during annealing in order to investigate the failure mechanism. In addition, thermal tests of individual components and computer modelling simulations are being conducted at ESTEC. It is expected that these tests will be completed by the end of December 2004, so that a decision can be made on whether to proceed with the next annealing in around January 2005.

Preparations for the move of the ISOC from ESTEC to ESAC continue and most of the computer hardware needed by the ISOC is now in place. It is expected that following an overlap period where science operations will be conducted in parallel from both ESTEC and ESAC, the transfer to ESAC control will occur at the start of AO-3 observations. L. O'Rouke, a software integration engineer, has joined the ISOC team for 6 months during the transition. P. Kretschmar and E. Kuulkers will join the ISOC team in ESAC as staff from 1 January 2005. It is expected that an additional contractor operations scientist position will be announced shortly.

INTEGRAL Public Data Archive

Owen Rees Williams - Software Engineer

After a proprietary period of one year, INTEGRAL data become publicly available via the INTEGRAL archive. The year is counted from the time data are distributed to the PI of the observation. For the sake of simplicity, the data are made public revolution by revolution. The only exception to this rule is calibration data, for which there is no proprietary period and is therefore available immediately after it has been ingested into the INTEGRAL archive. The timetable as to when data will be made public can be found at <http://isdc.unige.ch/index.cgi?Data+release>. As of the beginning of November the data from following revolutions have been made publicly available: 1-80, 89-97, 100-103, 116-118. Dates of data releases in the near future are shown below, when the following data will be made public:

Date	Data from following revolutions become publicly available
19-11-2004	98, 99, 104-106, 109, 119-122
10-12-2004	107, 108, 110-115, 130

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