



INTEGRAL

Announcement of Opportunity for Observing Proposals (AO-2)

Policies, Procedures and Forms

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15 July 2003
Issue 2

Ref. nr. INT-SOC-DOC-025

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I. Introduction

1. Purpose of this document

This document describes the procedures that should be followed by the observers when preparing proposals to observe with INTEGRAL, the policies that ESA will follow with respect to the proposals, proposal submission and proposal evaluation and the form in which the proposals should be submitted to ESA. The observers are advised to follow these procedures, since otherwise the proposal will not be accepted by ESA for evaluation.

2. Schedule and scope for AO-2

The following is the schedule for INTEGRAL AO-2.

- **15 July 2003: release of INTEGRAL AO-2**
- **5 September 2003, 15.00 CEST (13.00 GMT): deadline for proposals**
- **13 - 17 October 2003: Meetings of the INTEGRAL Time Allocation Committee (TAC).**
- **November 2003: Proposals in the ISOC database, ready for scheduling**
- **December 17 2003: Formal start of AO-2 programme.**
- **This AO for INTEGRAL is open to proposers from the ESA member states, and the countries participating in INTEGRAL (Russia, USA, Czech Republic and Poland), but proposals from other countries will also be considered by the Time Allocation Committee.**

3. US Proposers

Proposers at institutions in the United States may respond to this AO either as Principal Investigators or as co-Investigators on non-US proposals. Funding will be made available by NASA to accepted US investigators through a separate solicitation.

4. Overview of the Call for Proposals

This call for INTEGRAL proposals consists of a number of documents, a proposal submission tool and other software tools to help preparing proposals. The following documents are available:

- *“Policies, Procedures and Forms”* (this document)
- *“INTEGRAL manual”* (describes the INTEGRAL satellite, observation modes, orbit and ground segment)

- “*IBIS observer’s manual*” (describes the IBIS instrument)
- “*SPI observer’s manual*” (describes the SPI instrument)
- “*JEM-X observer’s manual*” (describes the JEM-X instrument)
- “*OMC observer’s manual*” (describes the OMC instrument)
- “*INTEGRAL Guaranteed time*” (gives details on the INTEGRAL Core Programme)
- “*Annexe: INTEGRAL Science Data Rights*” (describes the data rights policies).
- “*Glossary of Terms*” (gives a list of all acronyms used in the documents).
- “*Guidelines for your INTEGRAL AO Scientific Justification and Proposal Submission Checklist*” (to help a proposer write and submit his/her proposal)

All these documents are available on line at ESA’s INTEGRAL Science Operations Centre (ISOC) home page: (<http://rssd.esa.int/Integral/isoc>). On the same homepage the observers can find links to download the Proposal Generation Tools (PGT) and links to access the Observing Time Estimator (OTE) and the Target Visibility Predictor (TVP). Note that OTE and TVP run remotely through the web, whereas PGT needs to be downloaded and installed on the users’ local machine.

5. Future calls for proposals

The current AO (AO-2) is for the second year of INTEGRAL routine operations (nominal mission) only, although approved observations of grade A are transferred to later years, if they are not completed in the first year. INTEGRAL is currently funded until the end of AO-2. For the later years of INTEGRAL operations a request for mission extension will be made and, if successful, new AOs will be issued. The current plan is that the AO-3 observations would be available for scheduling about one year after the start of AO-2 operations.

II. Available observing time

About $2.6 \cdot 10^7$ seconds of integration time are available for scientific observations for the second year of INTEGRAL operations (i.e. AO-2). This time is divided between the Guaranteed Time (used for Core Programme observations, see separate document “*INTEGRAL Guaranteed Time*” for details of the Core Programme), and the Open Time (used for General Programme observations). For the first year of operations the split between Guaranteed Time and Open Time was 35% and 65% respectively. For the second year this is now 30% and 70%, and after that 25% and 75% (TBC). For the second year that means that about $1.8 \cdot 10^7$ seconds are available for the general observers. Note that this estimate of the available observing time does not include the instrument calibrations, which need to be done regularly during the operational phase. Also, some grade A observations from AO-1 may be carried forward into the AO-2 timeframe due to scheduling constraints. Therefore the numbers given above represent the maximum available time for scientific observations.

On the other hand, the main instruments IBIS and SPI have large fields of view. Therefore multiple targets can often be observed simultaneously, increasing the scientific efficiency of the observatory. For this ISOC will amalgamate observations of different sources, see also the other documents: “*INTEGRAL manual*” and the “*Annexe: INTEGRAL Science Data Rights*”.

III. Proposal Submission Procedure

Proposals for INTEGRAL observations can only be submitted electronically (no paper copies). **Proposals must reach ISOC by Friday September 5, at 15.00 CEST (13.00 GMT) at the latest. Proposals must be prepared and submitted using the Proposal Generation Tool (PGT) software, available from the ISOC web pages (<http://rssd.esa.int/Integral/isoc>). Other formats will not be accepted!!!**

The PGT software allows the preparation, editing, printing and submission of INTEGRAL proposals. The scientific justification for the proposals should be attached (through a PGT button) to the proposal, and submitted electronically together with the rest of the proposal (Using the PGT button “Submit Proposal to ISOC”). **The scientific justification should not be more than 5 A4 pages, including figures and tables.** This a change to the 10-page limit used in AO-1. The PGT software is written in JAVA and runs locally on the observers computer. Installation scripts are provided with the software. The user should make sure that the correct version of the JAVA run time libraries are installed (see PGT readme file for details).

In contrast to AO-1, the proposer does NOT need a proposer ID to be able to submit proposals for AO-2.

Several other software tools are available to observers via the ISOC homepage that allow them to check the visibility of their sources (the target visibility predictor, TVP), and to calculate observing times for the two main INTEGRAL instruments (Observing Time Estimator, OTE). The OTE is the only official way to calculate the observing times for the two main INTEGRAL instruments (SPI and IBIS). It is also used for the check of the technical feasibility for all observations. **Observers are therefore strongly advised to use the OTE to calculate the observing times. Also, since feasibility checks will be done on all observations, it is imperative that sufficient information is provided in the proposals to allow these checks (see also Chapter IV on page 12.**

The ISOC will try to avoid any updates to these software tools and the documentation between the issue of the AO and the deadline for proposals. However it cannot be excluded that an update is necessary. **Users are therefore strongly advised to sign into the email distribution list for updates of the ISOC provided software and documentation.** Signing up to this list can be done by sending an email to the INTEGRAL helpdesk (inthelp@rssd.esa.int). **Observers who have signed up to this list in AO-1 do not need to re-apply.** For questions on the instruments, the AO and any other query that has to do with INTEGRAL, observers can make use of the INTEGRAL helpdesk mentioned above.

Prospective proposers may wish to ‘re-use’ their old AO-1 proposals, updating them as necessary for AO-2. However. PGT has been substantially modified for AO-2 and the old proposals are no longer consistent with the new software. To support the community in this, the ISOC will, on request only, generate a copy of an old proposal in the new format (consistent with the AO-2 PGT), and send it to the proposer. A proposer should send such a request to the INTEGRAL helpdesk, quoting the Proposal ID of the relevant proposal. *ISOC will only send a proposal back to the original PI.*

IV. Proposal evaluation and selection

The INTEGRAL proposals will be assessed on their scientific merit only by a single international Time Allocation Committee (TAC). The ISOC will, in parallel to the TAC review, perform technical feasibility checks on all observations. The results of these checks will be made available to the TAC in their review process.

The TAC consists of four panels, covering the four main scientific topics addressed with INTEGRAL:

- Compact objects; includes: black hole candidates and neutron star binaries, pulsars, isolated neutron stars and galactic jet sources.
- Extragalactic objects; includes: AGN, Seyferts, Blazars, quasars, but also normal galaxies, clusters of galaxies and cosmic background.
- Nucleosynthesis; includes: Supernovae, supernova remnants, novae, Wolf-Rayet stars, diffuse (line) emission and interstellar phenomena.
- Miscellaneous; includes gamma-ray burst sources and anything not in the three categories given above.

The TAC will allocate observing time to proposals per observation. The observing time will be allocated in 3 grade bands, where grade A is highest. The TAC will be advised to allocate time for an oversubscription of at least a factor 2 to increase scheduling efficiency. Every attempt will be made to perform observations of grade A and B. Grade C observations are “fillers”. The TAC is advised not to accept proposals that duplicate part of the Core Programme, as described in the “*INTEGRAL Guaranteed Time*” document, in target, observing mode, or science. **Proposers are thus strongly advised to carefully read the document describing the Core Programme to avoid such duplications.** (Checks on duplicate pointings with the CP will be done on source coordinates, not names). In addition, duplicating the executed AO-1 programme should be avoided. **Observations which were allocated grade A in AO-1 will, if not completed by the end of AO-1, be automatically carried forward into AO-2 (this excludes ToO proposals which would have to be re-submitted). AO-1 grade B and C observations will not be carried forward and, if they are not executed during AO-1, it is recommend that the observer should re-apply for time in AO-2.** The AO-1 approved programme and proposal abstracts can be found on the ISOC web site under ‘approved target list’ and the schedule status under ‘schedule info’.

The TAC recommends selected proposals to the ESA Director of Science, who will take the final decision on the observing programme. Then ESA will notify the proposers of the decisions. The decisions on acceptance or rejection of a proposal are final and non negotiable. Following ESA policy, reasons for the rejection of a proposal will not be provided.

V. Ongoing modifications to the observing programme

During in-orbit operations changes to the instrument configuration tables may be necessary (e.g. following updates to response matrices). In addition, it is anticipated that the instrumental background will vary with the Solar cycle since, at Solar minimum, the Sun's magnetic field is lower, and cosmic rays, which are the dominant cause of the background in SPI and IBIS, can propagate more easily into the inner Solar System. These changes may have influence on the integration time required for the observations. The ISOC will check the influence of each change to the performance of an instrument (using a tool similar to the OTE, but with some added functionality). If the expected changes in integration time or signal to noise are significant, the observers will be notified, and the TAC chairman will be consulted. In principle once an observation is approved by the TAC it will be performed even if the required integration time may increase due to updated instrumental performance (provided of course that the observation is still feasible).

If changes to observations are needed, two possible scenarios can be used, depending on the situation. In case all observations of a given type (e.g. instrument or dither pattern) need to be changed (e.g. the integration times need to be increased by a given amount), then these changes will be done by the ISOC on the entire database. If however a few individual observations require changes, then the ISOC will make the changes on a n individual in consultation with the observer.

Note that not all changes will be allowed after the proposal has been approved by TAC. Examples of changes that are not allowed are (see "*INTEGRAL Manual*" for description of observation modes):

- Change of source or pointing for an observation.
- Change from normal observation to fixed time observation.
- Change from normal or fixed time observation to TOO observation.
- Change from TOO observation to normal or fixed time observation.

VI. INTEGRAL Data

1. Data products and distribution

The INTEGRAL Science Data Centre (ISDC) in Versoix, Switzerland will be in charge of the processing and distribution of INTEGRAL data (see also the “*INTEGRAL manual*”, chapter III). The data will be distributed either on hard media or through the internet. The proposer can specify his/her preferred means of data distribution in the “Admin details” panel of the Proposal Generation Tool. The selection of a data distribution medium is mandatory. The proposer also should specify here the address the data should be sent to, if it differs from the PI’s address.

2. Data rights and publication

In accordance with ESA’s policy for scientific missions, all scientific data remain property of the observer for one year, and they will be publicly available through the archive one year after they have been processed and dispatched to the observer by the ISDC. However, due to some important science objectives addressed by INTEGRAL (e.g. Targets of Opportunity) and because of some design aspects of the payload in particular, i.e the large field of view of the INTEGRAL instruments and the nature of coded mask instruments (all data of the entire field are needed to reconstruct the image of the sky), the data rights for INTEGRAL have been detailed for a number of cases, including amalgamations and multiple sources in the field of view, and in line with INTEGRAL’s Science Management Plan. These are described in a separate document (“*Annexe: INTEGRAL Science Data Rights*”).

Proposers are informed that publications making use of INTEGRAL data should acknowledge via a footnote to the title, on the title page containing a text as shown below:

“Based on observations with INTEGRAL, an ESA project with instruments and science data centre funded by ESA member states (especially the PI countries: Denmark, France, Germany, Italy, Switzerland, Spain), Czech Republic and Poland, and with the participation of Russia and the USA.”

3. Source Naming Convention

A unique source naming convention for new sources detected by INTEGRAL has been established in agreement with the IAU. Source designation are **IGR JHHMMm+DDMM** or **IGR JHHMMm-DDMM** (equatorial coordinates, epoch J2000), where *HHMMm* is the right ascension of the source in hours, minutes and fractions of a minute, and *DDMM* is the declination of the source in degrees and arcmin

VII. Appendix: Proposals - format

1. Introduction

The only interface for submission of proposals is the PGT software. Since the PGT software formats the proposal, based on the inputs given by the observer, no specific format will be given here. Instead some general information and rules for the inputs to PGT are given here that may help the observer writing a proposal.

2. PGT inputs

The PGT inputs are split into several screens:

- The main screen, where the Proposal ID can be entered.
- The Admin Details screen, where the administrative details of the PI and Co-Is need to be entered (e.g. names, addresses etc.)
- The Proposal Details screen, where detailed information for the entire proposal is given (title, abstract, category and scientific justification). The scientific justification (see below) is to be added as an attachment to the proposal.
- The Observation Details screen, where the detailed information for each observation is given.

. The **Proposal ID** is only needed when re-submitting proposals (because of updates). The Proposal ID is assigned by the Proposal Handling System at ISOC and will be sent to the observer by email upon first time submission and successful reception of a proposal.

3. Target coordinates

It is the ultimate responsibility of the proposer to make sure that the (epoch J2000) coordinates entered into PGT for the target are correct. No checks will be done by ISOC on the correctness of coordinates given by proposers (PGT only performs a range check on the coordinates). The only check ISOC performs using the coordinates is the check of the visibility of the target. Since changes to the source or pointing are not allowed after TAC approval (except obvious errors discovered by the proposer), observations for which target coordinates are wrong could be lost. Proposals for new (unknown) TOOs or GRBs in the field of view may use coordinates (0,0) in PGT.

4. Scientific justification

The scientific justification has to be **written in English** and should be attached to the proposal in the Proposal details panel (using the “New Attachment” button at the bottom of the page). **The attached file should preferably be a PDF file. In case PDF format is not possible, a postscript file is also acceptable. The justification should use A4 paper format, and a maximum of 5 pages is allowed (including figures and tables). In addition, the font size should not be smaller than 10-point.**

The Observation Details panel in PGT allows only a small amount of information on the source flux to be entered in the proposal. In many cases this may not be sufficient information to judge the technical feasibility of the proposal. In those cases the proposer is advised to give details on fluxes, spectral shape, line strength, line width etc. for his sources in the scientific justification. These values can then be taken into account by ISOC when doing the technical feasibility check.

Only targets included in the PGT input will be considered for approval. *Observations mentioned in the text of the justification or abstract but not entered into PGT will not be accepted.*

5. Integration times and dither patterns

When INTEGRAL is observing a dither pattern it will integrate on each dither point for 30 minutes or longer, before slewing to the next point in the pattern. The dither point dwell time is scaled at ISOC such that the entire dither pattern is uniformly sampled. This means that for a hexagonal dither pattern (7 points) in order to get one full dither a minimum of 210 minutes or 12600 seconds is needed. For a 5 by 5 dither pattern this is 750 minutes or 45000 seconds. If a shorter time is specified the dither pattern will not be completed, and in case of the 5 by 5 dither this could mean that the central pointing is missed completely, because of the way the pattern is observed. **It is the responsibility of the observer to make sure that the specified integration times are long enough to complete at least one full dither pattern.**

In order to allow for optimum background in SPI, it is strongly recommended that the 5 x 5 dither be used in most cases - see the SPI observer’s manual for details.

6. Integration times and gamma ray burst observations

For all observations proposers have to specify an integration time in PGT (this is a mandatory field in PGT and cannot be left blank). In general the integration time should be calculated using the Observing Time Estimator software (OTE), which will calculate how much time is required to achieve a given significance for a given flux. ISOC will use the same software to perform the technical feasibility checks on the proposals.

The situation is different for observations of gamma ray bursts in the field of view. The duration of these events (of the order of 100 seconds), and the possible afterglow (few hours), is short compared to the typical duration of an INTEGRAL observation. Also these cannot be treated as normal TOO follow up observations, since no re-pointing of INTEGRAL is possible on these very short time scales. Observers interested in data of gamma-ray burst sources in the field of view

therefore cannot estimate their integration times using the OTE, since they are basically interested in receiving data for a period of time around the gamma ray burst event. However, OTE can still be used to estimate the minimum detectable flux in a given energy band with the SPI and IBIS instruments, thus giving a possibility to predict the detectability of a gamma-ray burst. **When proposing for gamma ray bursts in the field of view proposers therefore should specify in PGT the period of time for which they want to receive the data of the gamma ray burst.** This can be before and after the event (the split between the time before and after the event needs to be specified in the scientific justification).

7. TOO and fixed time observations

For Targets of Opportunity (TOO) and Fixed Time observations, the proposer has to fill in a short justification for each observation in PGT in addition to the scientific justification for the proposal. These justifications should be entered in the appropriate window in the PGT observation details screen. For TOOs this should specify why this observation should be regarded as a TOO, and when the TOO should be triggered (flux levels etc.). Note however that it is ultimately the responsibility of the proposer to inform the INTEGRAL Project Scientist at ISOC that the TOO target has become active and should be observed (for TOOs discovered in the field of view of INTEGRAL and for which a proposal exists, the proposer will be informed that this TOO is active, after which the proposer decides whether to activate the TOO follow-up observation or not). **The ToO alert form on the ISOC web site should be used to request that a ToO be scheduled.**

For fixed time observations the proposer needs to specify in the justification, why a fixed time observation is required, and when the fixed time observation should be performed, if already known. This information will be used by ISOC to determine when to schedule the observation. **Note that for fixed time observations, for which a time or date for the observation is already known, it is imperative that the proposers check the visibility of their sources using the Target Visibility Predictor for the dates and times they want their observation to be performed.** The reader is also referred to the TOO guidelines in the “*INTEGRAL Manual*”.

8. Coordinated observations with other facilities

INTEGRAL will support coordinated observations with other facilities. Proposers who want their observation to be coordinated with another facility should enter it as a fixed time observation, specifying as reason for the fixed time that it is coordinated with another observatory (specifying also which observatory). Through contact with the observer the ISOC will try to accommodate the coordinated observation. Necessary contacts with other observatories are ultimately the responsibility of the proposer, however the ISOC mission planners are in regular contact with mission planners on other missions such as RXTE, XMM-Newton and Chandra. Note however that due to visibility, scheduling and other constraints it may not always be possible to accommodate fixed time observations. Also, since INTEGRAL observations are in general long,

it may be easier for other observatories to follow the INTEGRAL scheduling (especially ground based observatories).