INTEGRAL

Announcement of Opportunity for Observing Proposals (AO-3)

Policies, Procedures and Forms

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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-3

The following is the schedule for INTEGRAL AO-3.

- **13 September 2004: release of INTEGRAL AO-3**
- **29 October 2004, 15.00 CEST (13.00 GMT): deadline for proposal submission**
- **6 - 10 December 2004: Meetings of the INTEGRAL Time Allocation Committee (TAC).**
- **January 2005: Proposals in the ISOC database, ready for scheduling**
- **18 February 2005: Formal start of AO-3 programme. Unlike earlier AO's, AO-3 will last for eighteen months, until August 17 2006.**
- **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. Accepted US investigators should request funding from NASA via 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 major 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).

All these documents are available on line at ESA's INTEGRAL Science Operations Centre (ISOC) home page: **(http://www.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(s).

5. Future calls for proposals

The Science Programme Committee has approved a four year extension to the nominal 2.2 year mission duration. This means that INTEGRAL operations are expected to continue to 16 December 2008. The current plan is that the AO-4 would be released about one year after the start of AO-3 observations.

II. Available observing time

About 3.6 x 10^7 seconds of integration time are available for scientific observations for the third cycle of INTEGRAL operations (i.e. AO-3). 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), which is 25% of the total, and the Open Time (used for General Programme observations), which is 75%. For the third cycle this means that about 2.7 x 10^7 seconds are available for 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 unfinished observations from AO-2 may be carried forward into the AO-3 timeframe. 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 October 29, 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://www.rssd.esa.int/Integral/). 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. **The scientific justification should not be more than five A4 pages, including figures and tables.** 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).

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 by the ISOC for the check of the technical feasibility for all observations (see chapter IV)**. 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 to be performed (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 earlier AOs 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 proposals from earlier AO’s, updating them as necessary for AO-3. However. PGT has been modified for AO-3 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-3 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.*

In order to aid proposal submission, in chapter VII we provide a description of the proposal format, and a checklist of scientific questions and proposal submission procedures.

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, prior to the TAC meeting, 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 three panels, covering the 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 and miscellaneous; includes: Supernovae, supernova remnants, novae, Wolf-Rayet stars, diffuse (line) emission and interstellar phenomena, gamma-ray burst sources and anything not in the two categories given above.

The TAC will allocate observing time to successful proposals on an observation-by-observation basis.

All accepted observations (normal, fixed-time and TOO) will recieve from the TAC a scientific grade (A is the highest, C is the lowest) and, within each grade, a final mark (100 is the highest, 10 is the lowest). The TAC will be advised to allocate time for an oversubscription of about 1.5 to increase scheduling efficiency.

The TAC is advised not to accept observations that simply duplicate (as opposed to enhance) the scientific results obtained from the Core Programme, or the executed AO-1 and AO-2 programmes. Proposers are thus strongly advised to carefully check any possible duplication of their observations. This can be done by accessing the INTEGRAL target list. The list can be accessed via the ISOC home web page, by clicking on ‘Schedule Information’ and then on ‘Approved Target Lists’, or directly at

http://www.rssd.esa.int/integral_webapps/index.jsp?proplist

Clicking on the proposal number in this list will display the proposal abstract.

The TAC recommends the AO-3 programme to the ESA Director of Science, who will take the final decision on acceptance. Then ESA will notify the proposers of the decisions. The decisions on acceptance or rejection of a proposal are final and non-negotiable. Reasons for the rejection of a proposal can be provided on request to the INTEGRAL helpdesk.

V. Ongoing modifications to the observing programme

During in-orbit operations changes to the instrument performances may occur. In addition, the instrumental background varies 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 influence the integration time required for the observations. The effects of any such changes on the instrumental performance are routinely monitored. If the expected changes in integration time or signal to noise are significant, the observers will be notified, the TAC chairman will be consulted, and the integration times modified by ISOC. In principle once an observation is approved it would not be subsequently rejected if the required integration time increases, provided of course that the observation is still feasible.

Note that not all changes will be allowed after the proposal has been approved. 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 (preferably) via 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 J***HHMMm+DDMM* or **IGR J***HHMMm-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 arcminutes. Coordinates must be truncated, not rounded, to comply with this convention.

VII. Appendix: Proposals - format and checklists

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

While ISOC will perform some checks on the fidelity of the source 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. (PGT only performs a range check on the coordinates). 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 must 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 details will be 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 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).

6. 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 must 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. The form can be found at**

http://www.rssd.esa.int/Integral/isoc/html/too/my_too_alert.html

or alternately via the 'Target of Opportunity Alert' link on the ISOC home page.

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*".

7. Coordinated observations with other facilities

ISOC 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).

8. Checklist for the proposal

The proposal text must contain;

- the scientific case
- the observation strategy
- demonstration of the feasibility of the observations

The above three are mandatory

The proposal should be checked against the following questions:

• Is your science justification complete? Does it contain the mandatory three sections mentioned above?

• Have you filled in the Observations Details Panel for *all* observations of *every* source in the proposal?

• If your observation has any scheduling constraints, have you marked it as a fixed time observation in PGT?

• If your proposal is for gamma-ray burst data, have you supplied the trigger criteria and the time interval of the data you request?

• If you are not using the standard 5 x 5 dither, have you justified the use of the alternative dither pattern?

• If you plan to observe a region of the sky which will be observed in the Core Programme, or has been observed in the Core or Open Time programmes, have you explained what new science will be addressed by your proposed observations?

• Why can your programme only be done with INTEGRAL? If so, why can’t it be done using archival data?

• Have you checked the latest news on the INTEGRAL WWW?