INTEGRAL

Announcement of Opportunity for Observing Proposals (AO-2)

INTEGRAL Guaranteed Time

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15 July 2003
Issue 2

Ref. nr. INT-SOC-DOC-020

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I. Introduction

According to the Science Management Plan for INTEGRAL, the observing time is defined as that time during which the scientific instruments on INTEGRAL are in nominal operation, less idle time and less time necessary for slewing, uplink commands, calibration, testing and maintenance.

Scientific observing time for the observing programme during the nominal/extended mission phases, starting at the end of the initial commissioning phase of 2 months duration, is divided into the open time for the General Observer (General Programme) and the **guaranteed time** for the INTEGRAL Science Working Team (**Core Programme, CP**). The breakdown into these two programme elements is shown in Figure 1.

The observing time (**guaranteed time**) during the **Core Programme** is the return to the INTEGRAL Science Working Team (ISWT) for their contributions to the development and execution of the INTEGRAL programme. The ISWT is composed of 15 scientists, namely: 2 Co-PI’s for the spectrometer SPI; one PI and one Co-PI for the imager IBIS; one PI each for the optical monitor OMC, X-ray monitor JEM-X and INTEGRAL Science Data Centre, respectively; five Mission Scientists (three from Europe, one from Russia, one from USA); one scientist each representing the participating partners Russia and USA; and the ESA Project Scientist[1]. It is a task of the ISWT to define the Core Programme in full detail.

1. The elements of the Core Programme

The Core Programme consists of three elements which will be further discussed below:

- Frequent scans of the Galactic plane (Galactic Plane Scans, GPS)
- A deep exposure of the Galactic central radian (Galactic Central Radian Deep Exposure, GCDE)
- Pointed observations of selected sources.

This document describes in detail, for each CP element,

- the scientific rationale,
- the detailed observing strategy, and,
- exposure times and estimated sensitivities.

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2. Time allocation for Core Programme elements

Given the characteristics of the INTEGRAL operational orbit, described in the *INTEGRAL Manual* in detail, and using the annual share of the Core Programme (CP) time (Figure 1), the allocation of observing time as shown in Table 1 has been derived for the three elements of the Core Programme for the second year of the mission. The allocation has been driven by the highest scientific priority which has been given to GPS and GCDE. Note that Table 1 takes the assumption into account that science observations will only be performed above an altitude of 60,000 km prior to perigee entry and above 40,000 km following perigee exit.

The ISWT will, as determined by significance of unforeseen scientific events, maintain some (limited) flexibility in the time allocation for the CP elements throughout the year (see below for details).

Table 1: Core Programme time allocation for the second year of the nominal mission

Total observing time per year (10^6 s)	**Total CP (10^6 s) [%]**	**GCDE (10^6 s)**	**GPS (10^6 s)**	**Pointed observations (10^6 s)**
26.4	7.92 [30%]	4.74	1.80	1.38

It has to be noted that in-flight calibrations during the nominal mission phase may occur like it was done during AO-1. In line with the definition of observing time (see above), exposure time for in-flight calibration will lead to some reduction in the Core Programme time (Table 1) and General Programme (open) time. The total amount of that required time is yet to be determined.

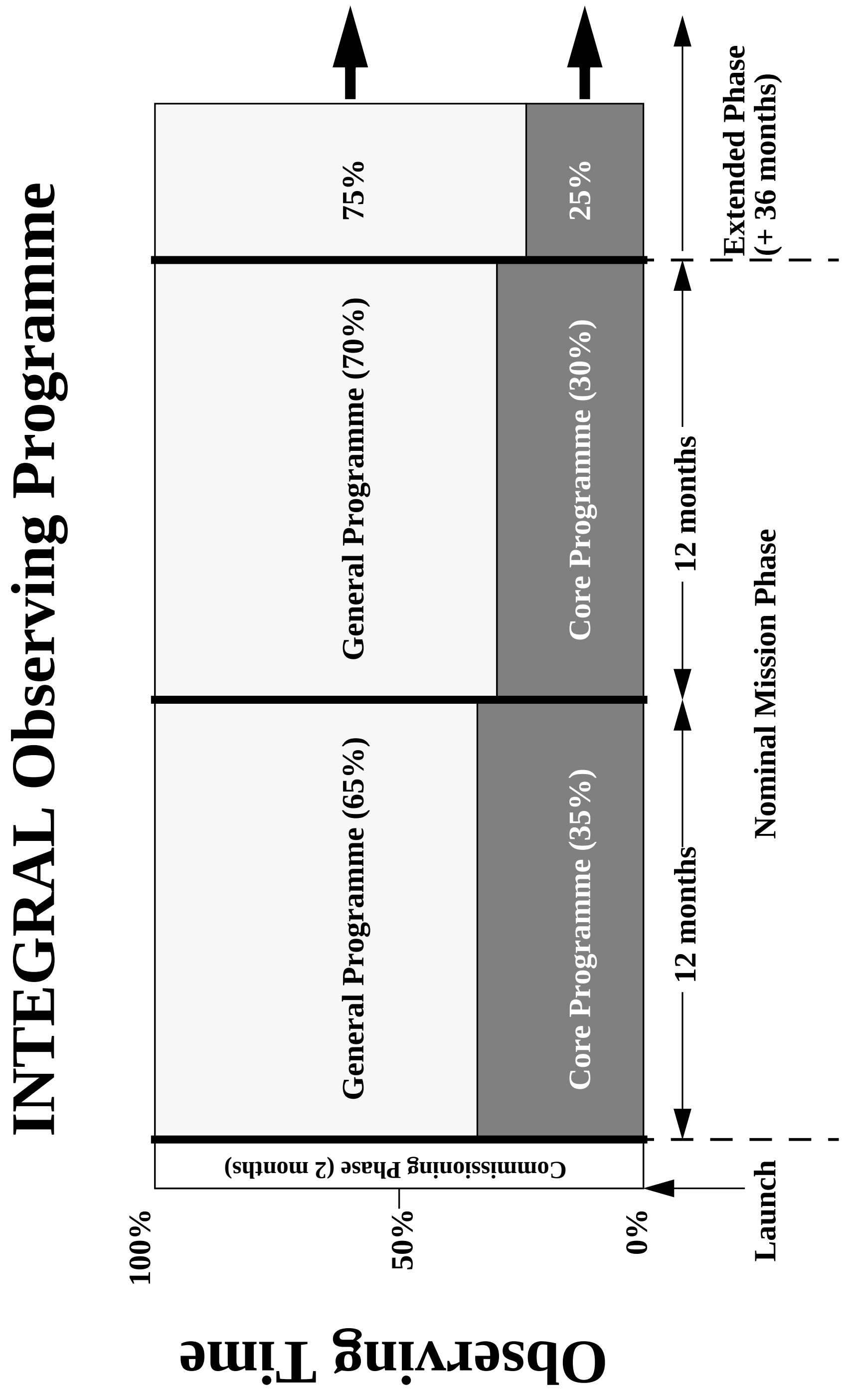

Figure 1. Breakdown of INTEGRAL observing time

II. The Galactic Plane Scans (GPS)

1. Scientific rationale

The scanning of the Galactic plane will be mainly done for two reasons: the most important one is to provide frequent monitoring of the plane in order to detect transient sources because the gamma-ray sky in the INTEGRAL energy range is dominated by the extreme variability of many sources. The scans would find sources in high state (outburst) which warrant possible scientifically important follow-up observations (Target of Opportunity [TOO] observations). The second reason is to build up time resolved maps of the Galactic plane in continuum and diffuse line emission such as ^{26}Al and 511 keV with modest exposure. As the scanning is provided by the entire spacecraft, all four instruments onboard INTEGRAL will simultaneously collect scientific data during the GPS (as well as during the other elements of the Core Programme).

The GPS scans executed during the first year of operations (INTEGRAL AO-1) were successful as 3 out of the 10 new INTEGRAL (IGR) sources were discovered between Jan. 29 and May 2, 2003 during GPS scans. CGRO and SIGMA have also been detecting Galactic transient sources of several different categories/groups which include X-ray binaries (e.g. X-ray novae, Be binary pulsars) and in particular superluminal sources (GRS 1915+105 and GRO J1655-40). The occurrence rate for events that INTEGRAL can observe is about 2 events/year for each of these classes, taking pointing constraints due to the fixed solar arrays into account. The important time scales for the transient outbursts vary significantly from class to class and from event to event, but a typical duration of an event is 1 - 2 weeks and a typical variability time scale is of the order of 1 day. This implies that a regular scans of the Galactic plane at 1-2 weeks frequency will allow the transients to be found. Obviously more frequent scanning at lower sensitivity that would find fast transients had to be traded-off against less frequent scanning at higher sensitivity that would find weak events.

Other topics of scientific interest include: study of previously unknown persistent sources; comparison of spectral and temporal characteristics (neutron star and black hole candidates); gamma-ray properties of pulsars.

2. Detailed observing strategy

The baseline set of parameters describing the GPS scans are summarised in Table 2 below. They are the result of an optimization process taking spacecraft and ground segment elements, instrument characteristics and scientific objectives into account. Basically the scans will be performed once per 4 revolutions (i.e. 1 scan per 12 days) by executing a “slew and stare” manoeuvre of the spacecraft across the visible (accessible) part of the Galactic plane with an extent in latitude up to +/-10^{o}. The angular distance between two “staring points” along the scan path is 6^{o}, the extremes in latitude of the pointings are at b = +/- 6.45^{o}. The scans will be performed in a saw-tooth pattern with inclination of 21^{o} with respect to the Galactic plane, each subsequent scan being shifted by 27.5^{o} in galactic longitude. Note that the scan frequency will be reduced by a factor of 2 for the intervals of galactic longitude between l = 90^{o} and l = 270^{o} (anticentre region). A schematic view of two consecutive scans is shown in Figure 2. The sum of all GPS scans during a year provides a set of grid points ("dither pattern") which facilitates the imaging with SPI. The accessible part of the Galactic plane depends on viewing constraints, including the solar aspect angle, and on the season of the year. Figure 3 shows the Galactic plane visibility during first year of operations which is identical to the one for AO-2.

Table 2: Baseline parameters of GPS scans

Parameter	Value	Notes
Solar Aspect Angle	+/- 40 deg	
Slew mode	open loop	
Inclination wrt gal. plane	21 deg	
Max latitude	$\lvert b \rvert = 6.45$ deg	
Step size along path	6.0 deg	12 points per saw-tooth period (Figure 2)
Duration of 6^o slew	200 s	Based on s/c specification
Time for initial slew prior to each GPS scan	780 s	Assumes a 30 deg slew (140 deg/hr) prior to each GPS scan. For all scans within one year $\sim 4 \times 10^4$ s are needed.
Exposure per point	2200 s	
Exposure time/slew time	11.0	
Total (slew + exposure) per point	2400 s	
Phase shift for subsequent scans in longitude	27.5 deg	
Scan frequency	1 per 4 revolutions ($270^o<l<360^o$; $0^o<l<90^o$) 1 per 8 revolutions ($90^o<l<270^o$)	

The instrument modes for GPS exposures are nominal, i.e.: SPI (photon-by-photon), IBIS (photon-by-photon [ISGRI], histogram [PICSIT]), JEM-X (full imaging), OMC (normal).

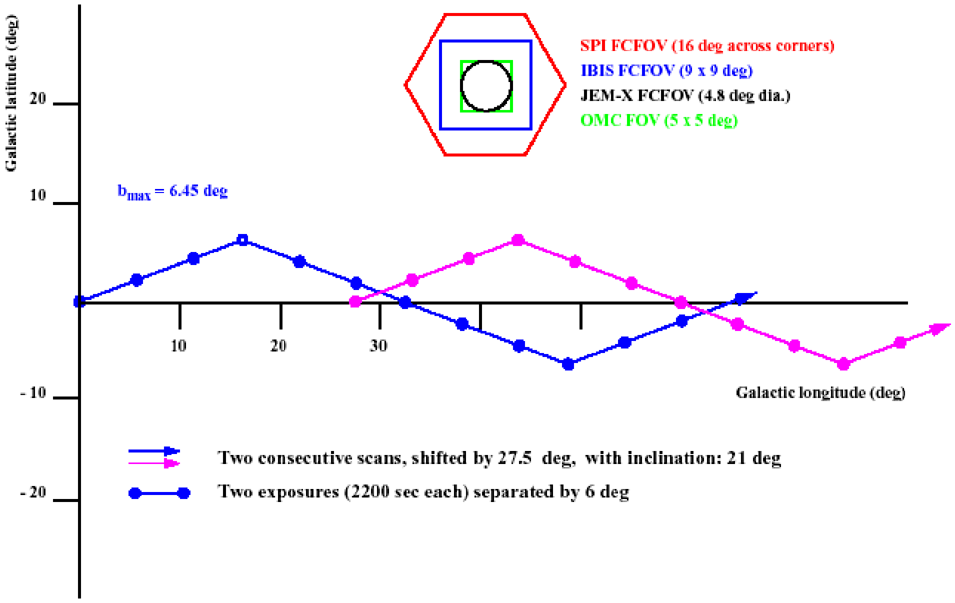

Figure 2. Schematic view of two consecutive GPS scans

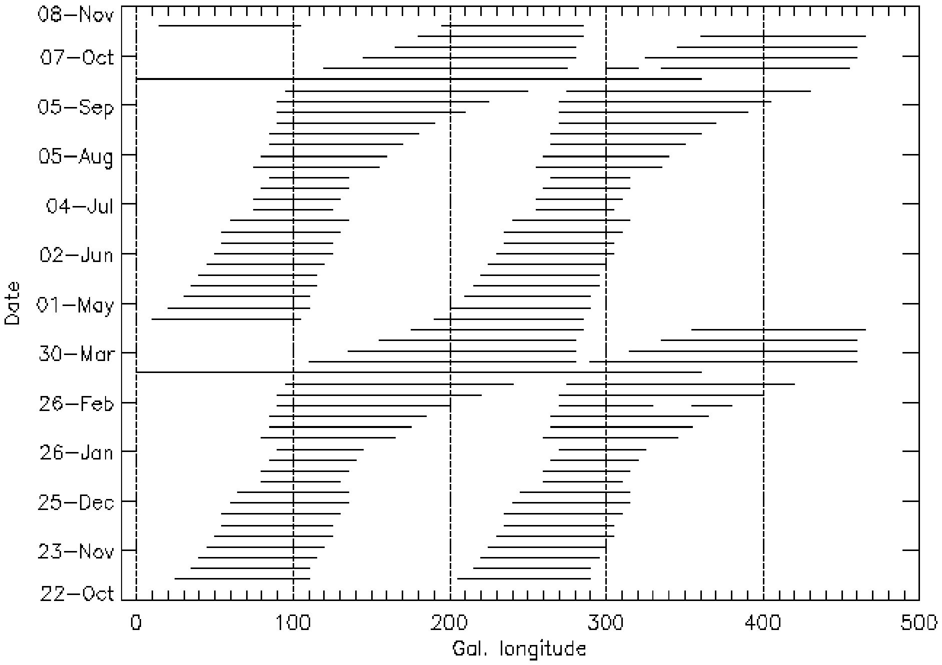

Figure 3. Visibility of the Galactic Plane. The extent of the visible (i.e. accessible) part of the Galactic plane (with +/- 10^{o} in galactic latitude) is shown by the solid lines.

3. Exposure time and sensitivities

In-orbit performance of INTEGRAL during AO-1 has been used to derive sensitivites.These are the 5σ sensitivities relevant for transient detection and galactic plane mapping of diffuse continuum and line emission. The sensitivities for SPI, IBIS and JEM-X were calculated using in-orbit background in each instrument measured since launch. The IBIS number is for the low-energy ISGRI portion of the response and relevant for single pointings (2200 sec) in a scan. JEM-X is also quoted for single pointings. For SPI, with its wide field of view, the sensitivity is derived from analysis of sources seen in a single GPS scan: a source is seen ~3 times in a scan, hence the average exposure is ~6600 s, depending on the source position with respect to the scan path.

Table 3: Sensitivities achieved during AO-1 GPS observations

Case	Exposure	Instrument	Energy Range	5σ Sensitivity
Single scan	2200 s	IBIS	(15-40) keV	36 mCrab
Single scan	‘’	JEM-X	(5-20) keV	20 mCrab
Single scan	6600[a] s	SPI	(20-40) keV	62 mCrab
Yearly average	100000 s	SPI	1809 keV line	1×10^{-5} ph cm^{-2} s^{-1}

[a] Due to its wide partially coded FOV, the same GPS point will be ‘’seen’’ 3.3 times during a scan.

III. The Galactic Central Radian Deep Exposure (GCDE)

1. Scientific rationale

A deep survey of the central Galactic radian is driven by the following objectives: mapping the line emission from nucleosynthesis radioisotopes (e.g. ^{26}Al, ^{44}Ti, 511 keV), mapping continuum emission of the Galactic ridge and performing deep imaging and spectroscopic studies of the central region of the Galaxy.

Early INTEGRAL results from the GCDE performed during the first half of the INTEGRAL AO-1 have revealed a 511 keV map from the galactic Centre region and a clear detection of the narrow 1.8 MeV line from ^{26}Al. Other isotopes such as ^{60}Fe produce lines which are thought to be detectable by INTEGRAL. Several interesting emission regions in or near the Galactic plane have been identified by CGRO/OSSE and CGRO/ COMPTEL: these include the ^{26}Al (7×10^5 years half life) mapping of the nucleosynthesis sites over the past million years in the Galaxy (Diehl et al., 1995, A&A 298, 445), and the ^{44}Ti emission (half life ~ 60 year) which has been detected by COMPTEL from the Cas A SNR (Iyudin et al., 1994, A&A 284, L1). OSSE mapping of the positron - electron annihilation radiation at 511 keV shows a central bulge, emission in the Galactic plane and an enhancement of extension of emission at positive latitudes above the Galactic centre (Purcell et al., 1997, ApJ 491, 725).

The origin of the clumpy structure of the COMPTEL observed ^{26}Al maps and the ^{44}Ti emission from hidden supernovae are key targets of INTEGRAL research. The INTEGRAL deep exposure will also study the continuum gamma-ray and hard X-ray emission from the Galactic plane. This “galactic ridge” is concentrated in a narrow band with a latitude extent of ~ 5^{o} and a longitude extent of +/- 40^{o} (Gehrels & Tueller, 1993, ApJ 407, 597; Strong et al., 1999, Proceedings 3rd INTEGRAL workshop, Ap.Lett.& Comm. 39, 221; Valinia & Marshall, 1998, ApJ 505, 134). The exact distribution and spectrum of the ridge emission is not well known. The origin is thought to be Bremsstrahlung from cosmic ray electrons, but this is also not fully established. INTEGRAL will be able to map the emission with high sensitivity and high angular resolution. This should allow the removal of the point-source origin of the emission so that the spectrum can be determined with high confidence.

The GCDE will resolve isolated point sources with arcmin location accuracy and provide source spectra with high energy resolution. At least 90 sources known as X- and gamma-ray emitters are contained in the region at ~ 10 keV and BeppoSAX, SIGMA and other earlier experiments have found this region to be filled with a number of highly variable and transient sources (Vargas et al., 1997, ESA SP-382; 129, Ubertini P., et al., 1997, Proc 4th CGRO Symposium, AIP 410, 1527). Many are thought to be compact objects in binary systems undergoing dynamic accretion. However, even for some of the brightest sources in the region (1E 1740.7-2942, GRS 1758-258) the detailed nature of the systems is not known. INTEGRAL will study the faintest sources with high angular resolution allowing multi-source monitoring within its wide field of view during single pointings. Also interesting will be searches for gamma-ray emission from SgrA* at the Centre of the Galaxy (Sunyaev et al., 1993, ApJ 407, 606).

Other topics of scientific interest include: spectral studies of emission lines, new and persistent point sources, the central annihilator.

2. Detailed observing strategy

The central radian of the Galaxy will be observed using a pattern of 3 pointing grids symmetric around the Galactic Centre (see Figure 4).

- Grid 1: pitch = 2.4^{o}, symbol “X”, 267 pointings
- Grid 2: pitch = 2.4^{o}, symbol “+”, 176 poitings
- Grid 3: pitch = 2.0^{o}, symbol “❐”, 25 pointings

Note that Grid 3 is a standard 5x5 dither pattern centred on the Galactic Centre.

The GCDE pattern is chosen to minimise SPI imaging artefacts and to optimize the IBIS sensitivity towards the Galactic plane. The GCDE observing strategy will:

- extend the longitude coverage to two radians
- have a significant exposure at high latitudes near the Galactic Centre
- have at least 2 Msec exposure at the Galactic Centre (l, b) = $(0^{o},0^{o})$

Slew time between points is conservatively - and in line with AO-1 - assumed to be 200 s for a 6 deg open loop slew. The nominal exposure per point is 1800 seconds. The grids will be scanned as follows (‘’one cycle’’):

- Grid 1: twice per 6 months
- Grid 2: twice per 6 months
- Grid 3: 12 times per 6 months

After 6 months, one ‘’cycle’’ is complete.

The total duration of one cycle (one complete pattern of all 3 grids including slews with a scan frequency as shown above) is estimated to 2.37×10^{6} s. Within the total time allocation for the GCDE (Table 1) one cycle will be therefore performed twice per year. Due to visibility constraints, the entire pattern can never be scanned at once, but ISOC will schedule a series of subscans (at constant latitude).

The instrument modes for GCDE exposures are nominal, i.e.: SPI (photon-by-photon), IBIS (photon-by-photon [ISGRI], histogram [PICSIT]), JEM-X (full imaging), OMC (normal).

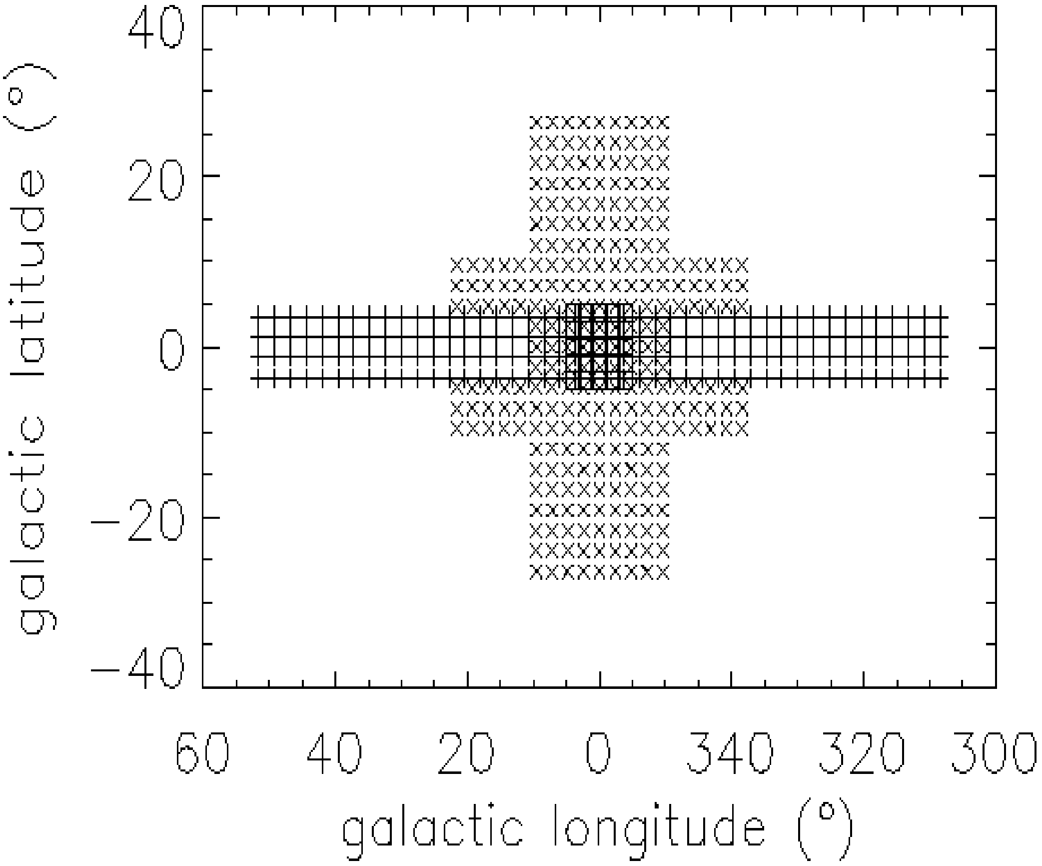

Figure 4. GCDE pattern using 4 grids (see text for details).
(grid 1: X grid 2: + grid 3: ❑)

3. Exposure time and sensitivities

The area covered by the GCDE pattern and centred will receive a net exposure of ~4.5×10^6 s which will give SPI a 3σ sensitivity of ~10^{-5} photons cm^{-2} s^{-1} for narrow lines in the 100 keV - 2 MeV region, sufficient for mapping and for detailed line shape studies at 1809 keV of the bright ^{26}Al "hot spots" (Gehrels & Chen, 1996, A&AS 120, 331) with typical line fluxes of ~ 3×10^{-5} photons cm^{-2} s^{-1} as detected by COMPTEL.

The continuum sensitivities (3σ) in the 100 keV to 1 MeV range will be ~ 6×10^{-7} photons cm^{-2} s^{-1} keV^{-1} (SPI) and ~3×10^{-7} photons cm^{-2} s^{-1} keV^{-1} (IBIS) while JEM-X will achieve ~ 5×10^{-6} photons cm^{-2} s^{-1} keV^{-1} in the 4 to 35 keV range.

IV. Pointed observations of selected sources

1. Scientific rationale

1.1 Introduction

Remaining Core Programme observing time not spent on GPS and GCDE will be devoted to follow-up observations on TOOs which have been detected during the GPS and GCDE or where the trigger has been observed by other observatories.

The greatest advantage of INTEGRAL, as compared to other high energy missions, is its high spectral resolution and high sensitivity at energies above 100 keV. The satellite and ground segment response time to a TOO call is about 20 to 36 hours on average (see *INTEGRAL Manual*) and INTEGRAL has - during AO-1 - succesfully performed several TOO (open and core time) observations. The strongest motivation for INTEGRAL to respond to a TOO call is thus the potential detection of transient high energy emission features, such as the positron annihilation line at 511 keV, its scattering feature at 170 keV, the Li^7 deexcitation line at 480 keV, or the MeV bump, etc. It is worth noting that transient emission features around 500 keV has so far only been detected by HEAO-1 and SIGMA, and the only simultaneous observation of OSSE and SIGMA failed to produce positive confirmations of the emission feature. This makes the INTEGRAL observations more critical.

The second most important objective for an INTEGRAL TOO to achieve is to measure the high energy continuum evolution of transient high energy events, such as a blazar flare or a X-ray nova outburst. The evolution of the high energy cutoff or spectral break as a function of time may provide critical information to our understanding of the emission mechanism and the system parameters. Historically, the above mentioned spectral features were seen only rarely and for very short periods of time ranging from a few hours to a day or so. The sources that showed these features were either transients whose outburst onset is totally unpredictable (such as X-ray nova Muscae 1991) or highly variable source (such as Cyg X-1 and 1E1740.7-2942). More importantly, the occurrence time of the desired spectral features is always unpredictable.

If the objective of a TOO is to observe the high energy continuum, several pointings for each flare or outburst are required to achieve a meaningful science return since the spectral evolution, instead of simply the spectral shape, is the main objective here. Separation between the exposures depends on the time scale of the event. A TOO monitoring of the continuum will always produce positive results unless the source has a very soft spectrum. Since there is no sure way to predict when transient spectral features may appear, the best strategy is to always point on the source as soon as possible and observe it as long (or as frequently) as possible.

Important TOO observations, triggered mostly by observations outside INTEGRAL (e.g. optical ground based telescopes) include Supernovae and Novae. The response time and exposure required to perform observations after the initial trigger depends on the source (model) and is briefly described below.

The CP TOO follow-up pointed observations in AO-2 will be targeted at unknown (new) transient sources.

1.2 Strategy for selection of unknown transient sources

These events can be triggered from INTEGRAL detections of “high state” during GPS and/or GCDE observations or from observations external to INTEGRAL (e.g. ground-based optical telescopes) and are considered as TOO follow-up observations.

The following strategy will be applied: the allocation of 1.38×10^6 s shall be used for unknown transient sources of the following type:

- local group Supernovae, type II
- Supernovae, type Ia
- classical novae
- previously unknown X-/γ-transients

whatever TOO event comes first. Trigger criteria (see Section 3.1) have been defined so that these events listed above become scientifically an exceptionally unique - and for INTEGRAL important - target.

The reader is also referred to the TOO rules and guidelines (*INTEGRAL Manual*) and data rights concerning TOOs as described in AO document (annexe) on *INTEGRAL Science Data Rights.*

It is understood that some flexibility should be kept by the ISWT in case a **major** (“once in a lifetime”) **TOO event** (e.g. close-by SN) would occur and no or insufficient CP time for follow up observations would be available anymore because the ceiling has been already reached. In this case the ISWT could review the priority assigned for GCDE and GPS and, if available, probably re-assign remaining time from these CP elements. This would be an exception to the routine case where the execution of TOO follow-up observations will be decided by the Project Scientist.

In case **none** of the TOO events as described above take place during the second year of the mission, the allocated time will be spent on observations on GCDE and/or GPS.

2. Scientific rationale

2.1 Unknown X-ray novae

X-ray novae outbursts (soft X-ray transients) provide the best opportunity for studying stellar-sized accreting black holes over a large dynamic energy range (> 3 orders of magnitude) in an optimal time frame of a few weeks to several months. The precise shape of the high energy continuum spectrum, the potential line emission near 0.5 MeV and the rarely seen high energy tail above 1 MeV are among the most rewarding contributions that INTEGRAL is uniquely suited for, thereby increasing our understanding of the perplexing black hole accretion phenomenon.

X-ray novae are undoubtedly one of the most important scientific targets for INTEGRAL, as thus they deserve a large fraction of core programme time. On the one side, they are bright sources for which a high quality spectrum can easily be produced. On the other side, during their outburst they pass through very different mass accretion rates in a timescale of 100 - 200 days. It is therefore mandatory to observe the outburst at different moments in order to produce a high quality spectrum for every spectral state of the source.

2.2 Supernovae (SN Ia and local group SN II)

A long standing goal of gamma-ray astronomy has been the detection of radioactive ^{56}Ni and ^{56}Co from supernovae. So far, the ^{56}Co-lines have been (marginally) detected only from one single type Ia SN (SN 1991T by COMPTEL). But the ^{56}Co-lines from the type II SN 1987a in the Large Magellanic Cloud have been extensively studied in the pre-CGRO era. ^{57}Co lines have also been detected by OSSE from this exceptionally nearby supernova.

The chance that a supernova of type Ia occurs with detectable gamma-ray line emission from the $^{56}\text{Ni} \rightarrow {}^{56}\text{Co} \rightarrow {}^{56}\text{Fe}$ decay chain in the INTEGRAL life-time is promising. It will depend on the line broadening up to which distance a type Ia supernova can still be detected by SPI. If an expansion velocity of 10,000 km/s is assumed, the SPI sensitivity limit for detecting the 847 keV ^{56}Co-line is about 3×10^{-5} photons $\text{cm}^{-2}\ \text{s}^{-1}$. For a ^{56}Ni-yield of a 1 M_o supernova, this results in a detectability up to a distance of ~5 Mpc. Within this distance, one type Ia supernova can be expected every two or three years (Gehrels et al., ApJ 322, 215, 1987).

The chance to detect gamma-ray line emission from a nearby type II supernova is much smaller, because of the lower ^{56}Ni-yield and the long obscuration time of type II supernovae to gamma-rays.

2.3 Classical Novae

Some radioactive elements being synthesized during nova explosions have yet to be detected through gamma-ray line emissions. Short lived beta unstable nuclei may be detected via the 511 keV annihilation emission. Today's most interesting gamma-ray lines are 1275 keV (^{22}Na, $t_{1/2}$ = 3.8 y) and 478 keV ($^{7}\text{Be} \rightarrow {}^{7}\text{Li}$, $t_{1/2}$ = 53 d) (Hernanz et al. 1996, ApJ 465, L27; Hernanz et al. 1999, Proc. 3rd INTEGRAL workshop, Ap.L. & Comm. Vol. 38, 407).

1275 keV: Recent results on two near novae (Nova Her 1991, Nova Cyg 1992) as observed by CGRO established 2σ upper limits of ~ $(2 \text{ to } 3) \times 10^{-5}$ photons $\text{cm}^{-2}\ \text{s}^{-1}$. SPI should be able to achieve a positive detection on similar events.

478 keV: Assuming an ejected mass of $10^{-5}\ M_o$, SPI should detect 478 keV emission for close (~ 500 pc) novae just after outburst. INTEGRAL should provide evidence whether C-O novae do produce ^{7}Li, which is under-abundant in standard big bang nucleosynthesis as compared to solar abundance by more than an order of magnitude;

3. Detailed observing strategy

3.1 Trigger criteria for unknown transient sources

The criteria for these sources triggering Core Programme TOO follow-up observations with INTEGRAL are listed in Table 4.

Table 4: Unknown transient sources (CP TOO follow-up observations)

Source	Priority[a]	Frequency	Trigger criterion	$T_{int,min}$ (s)	Inst. mode & dithering	Response alert → observation	Repeated obs?	T_{total} (s)	Trigger from
Unknown X-ray novae (e.g. Novae Mus)	2	0.5 / y	(1) flux < 10 keV at 1 Crab during outburst AND high energy detection, e.g. 0.5 Crab @ 100 keV (IBIS), 300 mCrab @ 60 keV (SPI) (2) flux < 10 keV at 3 Crab during outburst if no high energy data available.	Type 1: 8×10^5 Type 2: 4×10^5	Nominal[b], 5×5 pattern	One Type 1 observation as soon as possible, no later than 5 days after outburst. Additional Type 1 observations to be considered if source exhibits rare features such as relativistic outflows.	A series of *n* Type 2 observations with $2<n<5$ spaced by 30 days, starting 30 days after outburst	1.6×10^6	internal and/or external
Sources with NS characteristics	2	several/y	flux > 150 mCrab @ 30 keV	1×10^5	Nominal[b] 5×5 pattern	About one week	3 more observations, each week	4×10^5	in and/or external
Sources with BHC characteristics	2	several/y	flux > 150 mCrab @ 80 keV	1×10^5	Nominal[b] 5×5 pattern	About one week	3 more observations, each week	4×10^5	in and/or external
SN Ia	2	0.5 / y	$m(V, peak) < 13^m$ $F_{847} \sim 10^{-5}$ ph cm^{-2}s^{-1}	10^6/observation	Nominal[b], 5×5 rectangular pattern	1: immediately 2: 100 d later	2 observations	2×10^6	external
Classical Novae	2	0.3 / y	$m(V) < 7^m$ $F_{1275} \sim 10^{-4}$ ph cm^{-2}s^{-1} $F_{478} \sim 10^{-5}$ph cm^{-2}s^{-1}	10^5/observation	Nominal[b], 5×5 rectangular pattern	1: few (<5) days after nova event for 511 keV (line/cont) 2: Within 30 d after event for 478 keV 3: ~ 2 months after event for 1275 keV (intensity/shape).	3 observ. 1: 10^5 s 2: 10^5 s 3: 10^6 s	1.2×10^6	external
Local group SNII	1	0.05 / y	various	10^6/observation	Nominal[b], 5×5 rectangular pattern	1: after 100d 2: after 200d 3: after 300d	3 observations	3×10^6	external

[a] Highest priority = 1

[b] Nominal instrument modes are: SPI (photon-by-photon), IBIS (photon-by-photon [ISGRI], histogram [PICSIT]), JEM-X (full imaging), OMC (normal)

V. Data rights

According to the INTEGRAL Science Management Plan, the data from the Core Programme belong to the ISWT for the usual proprietary period of one year after the data under consideration have been made available to the ISWT by the ISDC. Further details on scientific data rights and TOO rules and guidelines, are described in the AO documents on *INTEGRAL Science Data Rights* and *INTEGRAL Manual*.