BeppoSAX Announcement of Opportunity AO5 Guest Observer Program, Primary Time

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On behalf of: The BeppoSAX Scientific Steering Committee and ASI

Contents

1 Mission Description

The BeppoSAX mission (acronym for the Italian Satellite per Astronomia in raggi X, SAX, later renamed BeppoSAX in honor of Giuseppe Occhialini) is a program of the Italian Space Agency (ASI) with participation of the Netherlands Agency for Aerospace Programs (NIVR), developed with the support of a consortium of Institutes in Italy and in The Netherlands and the Space Science Department of ESA.

BeppoSAX is the first X-ray mission offering a very wide spectral coverage from 0.1 and up to 300 keV, with well balanced performances of the low energy and high energy instrumentation, a good energy resolution (8%@6 keV, 4% or 15%@60 keV) and imaging capabilities (resolution of the order of about 1.2 arcmin HPR at 6 keV) in the 0.1-10 keV range. The scientific payload sensitivity allows the exploitation of the full band of BeppoSAX for relatively weak sources (1 mCrab, or $\approx 2 \times 10^{-11}$ erg cm^{-2} s^{-1}). The MECS and LECS sensitivity goes down to $\approx 10^{-13}$ erg cm^{-2} s^{-1}.

A detailed description of the mission, necessary for proposal preparation, is given in the *BeppoSAX Observers' Handbook* and in its *Addendum* . Both documents can be retrieved from the following anonymous ftp services:

- ftp sax.sdc.asi.it
  cd pub/sax/doc/handbook

or from the mirrors

- ftp legacy.gsfc.nasa.gov
  cd sax/ao_info/handbook

Detailed and frequently updated information about this AO and the mission in general is also available on-line from the BeppoSAX Web pages at the ASI Science Data Center (ASDC)

- http://www.asdc.asi.it/bepposax/
  and the HEASARC:
- http://heasarc.gsfc.nasa.gov/docs/sax/saxgof.html

The instrument complement is composed of:

- Four identical X-ray telescopes (double cone approximations of the Wolter 1 configuration and referred to as Concentrators) with Gas Scintillation Proportional Counters in their focal plane: three of these work in the 1-10 keV energy range, the fourth one (with a thin entrance window) operates in the 0.1-10 keV energy range. The first set of instruments is referred to as the MECS (Medium Energy Concentrator System), the second as the LECS (Low Energy Concentrator System). Since May 1997 only two of the three MECS are operative.
- A High Pressure Gas Scintillation Proportional Counter (3-120 keV), HPGSPC.
- A Phoswich Detector System (15-300 keV), PDS.

All these instruments have narrow fields of view (of about 1 degree) and point in the same direction (Narrow Field Instruments, or NFI).

The BeppoSAX mission is also capable of monitoring large regions ($\sim$ 3000 square degrees) of the sky with a resolution better than 5 arcmin in the 2-30 keV energy band, and therefore to study long term variability of sources down to about 1 mCrab and to detect X-ray transient phenomena for follow up observations with the NFI. This is obtained by means of two coded mask proportional counters (Wide Field Cameras; WFC) pointing in opposite directions perpendicular to the NFI.

Finally, the anticoincidence scintillator shields of the PDS is used as a gamma-ray burst monitor in the range 40-700 keV.

BeppoSAX was launched on April 30, 1996 by an Atlas 1-Centaur from Cape Canaveral into a 600 km orbit at 4 degrees inclination. The satellite thus nearly avoids the South Atlantic Anomaly and takes full advantage of the screening effect of the Earth magnetic field in reducing the cosmic ray induced background. This is important to achieve the necessary sensitivity for observations of weak sources with the high energy experiments, particularly with the PDS.

The satellite achieves 1 arcmin pointing stability. The main attitude constraint derives from the need to maintain the normal to the solar arrays (X axis) within 30 degrees from the Sun. The scientific instruments are pointing in a direction perpendicular to the X axis. Therefore at any time the sky region accessible to NFI is a band 60 degrees wide (50 % of the sky), and for the WFC a slightly larger region. Depending on target position, the observing efficiency will be limited to 50 % on average, by Earth eclipses (which subtends an angle of about 130 degrees at 600 km) and by passages in high background regions. Further constraints are imposed by attitude operations (see *Addendum*)

The satellite is operated from an Operational Control Center (OCC), while the quick look of scientific data is performed at the Scientific Operation Center (SOC). Both are located in the same site in Rome, and are connected to the ground station in Malindi, Kenya by a relay satellite (Intelsat). The satellite passes over the ground station every orbit. This allows a

prompt operation and control of the satellite, particularly important in the case of Targets Of Opportunity (TOO) that require timely follow up observations. During each orbit up to 450 Mbits of data are stored onboard and relayed to the ground during station passage. The average data rate available to instruments will be about 60 kbit/s, but peak rates of up to 100 kbit/s can be accommodated. A Science Data Center (SDC), partly co-located with the OCC, takes care of mission scheduling, raw data archiving (about 1 GByte of data produced every day) and FOT (Final Observing Tape) production.

Support to the scientific community is provided by the newly established ASI Science Data Center (ASDC). This includes FOT distribution to PI's, software maintenance and calibration archiving.

After launch, all satellite sub-systems have been checked-out (Commissioning phase); the first calibration phase (Science Verification Phase, SVP) has been carried out in the period Jul. - Sept. 1996, after which the AO1 program started.

In flight verification showed that scientific instruments and system components performed nominally (or better) with the following modifications :

- MECS unit 1 is not operative since May 1997.
- Due to sunlight contamination the LECS can only be operated in earth shadow : this introduces further constraints on the observing window to achieve an observing efficiency that is typically $30\% - 60\%$ of that of MECS.
- Attitude system : due to a series of gyro failures, a new pointing mode - making use of 1 gyro only – (1 gyro mode) has been implemented and successfully uploaded on board on Aug. 1997. For part of the AO5 phase we expect to operate the satellite in gyro-less mode. This mode will rely primarily on the use of star trackers, with further constraints on scheduling that, along with the constraint from the LECS operation, will limit time critical programs (see next section).
- HPGSPC operating policy is changed since July 1999. In order to maximize the operational life time of the HPGSPC (which occasionally shows an anomalous behaviour) it has been decided to use the instrument only for bright sources, when the expected target flux exceeds 10 mCrab. Furthermore, the collimator will be kept fixed in the on position. Upon request, and only for target with declination $> 70\,\mathrm{deg}$ (or $< -70\,\mathrm{deg}$), the collimator will be set in rocking mode.

  Furthermore the typical manoeuvre will last a minimum of 1-2 orbits. This sets the minimum pointing duration to 40 ksec.

See the *Addendum to the SAX Observers' Handbook* for further details on instruments' performances.

1.1 General Observing parameters

As of March 2001 BeppoSAX carried out about 1600 pointings, with typical duration of 20-100 ksec; for AO5 the minimum exposure has been set to 40 ks. Furthermore, due to

the implementation of the new gyroless pointing system with a potential loss of observing efficiency in the early phases of testing, the project will aim to minimize the total number of observations to be performed in AO5 . For this reason, programs based on long pointings (rather than repetition of shorter observations on a same target) will be generally preferred.

As in the past the NFI are expected to be selected as the prime instruments most of the time, the WFC will be operated in prime mode to monitor selected regions of the sky. Thanks to their large field of view, the WFC are normally operated, in the so-called secondary mode, to search for transient phenomena, when the NFI perform their sequence of pointed observations. The observing program will include follow-up (TOO) observations of transients with the NFI. The operation capability of BeppoSAX will allow target acquisition usually within 30 hours from its discovery. Shorter reaction times can be achieved in favorable situations, but they cannot be guaranteed. TOO observations are open for proposals, as described is the section 2.2 (but see also sect. 1.1.1).

1.1.1 Time critical Observations

An effort in supporting the execution of coordinated observations, TOO follow up pointings or, more generally, observations imposing scheduling constraints, has been made in the design of the scheduling procedures. It should however be stressed that such observations may significantly reduce the overall efficiency of the observing plan and therefore should be of primary scientific relevance.

Due to the constraints introduced by the LECS and by the attitude system, the observing efficiency within the requested time window may be substantially below the optimum value. The level at which these observations will be feasible remains to be assessed after the gyro-less mode is operational. The project reserves the right not to perform an observation in case the efficiency is less than 20%**.**

For the fifth year of operations not more than 7% of the program will be allocated to time-constrained (e.g. coordinated, phase-dependant) observations.

1.1.2 Priority

Approved targets will be assigned a priority flag as follows:

- priority A targets have high priority in the scheduling process. In case a pointing is terminated by an unforeseen reason (e.g. technical difficulty) an observation is considered as completed if the overall time spent on the target (including all the pointings) is larger than 70% of the approved time.

- priority B targets are approved to cover more than the available time to optimize the observing schedule. Therefore, only a fraction of these targets will be observed in the present AO. In case an observation cannot be performed, the target will not be rescheduled in the following AO, if any.

- TOO targets. Although TOO observations have the highest priority in the scheduling process, they will be performed only if a valid trigger and a follow up program compliant

with the approved protocol is verified during the AO for which they are submitted (Sect.2.2).

2 Observational Program and Allocation of Observing Time

2.1 Observing Time Subdivision and Proposal Selection

This AO5 calls for proposals for Prime Observing Time (OT) of NFI and WFC. Following the positive decision to extend the BeppoSAX mission for another year, taken by ASI on April 10 2001, **AO5 will cover the period June 2001[1] - end of April 2002**.

The proposals will be reviewed and selected, on the basis of their scientific merit and of their feasibility, by a peer committee, the Time Allocation Committee (TAC), under the auspices of the BeppoSAX Scientific Steering Committee (SSSC).

Data from the Gamma-Ray Burst Monitor **(GRBM)** require very specific and detailed knowledge of the instrument. Scientists interested in these data may find more details in Sect. 4.6 of the Sax Observers' Handbook (SOH) and should contact the hardware team for details. A letter of intent may be submitted to the SSSC (c/o SAX SDC, e-mail to helpdesk@sax.sdc.asi.it) within the same deadline of the Prime OT.

For AO5 100% of the prime OT is dedicated to the Guest Observer Program (GOP) and is open for competition to proposals led by PIs from any country worldwide.

The deadline for proposals submission is May 21, 2001

The AO1, AO2, AO3 & AO4 lists of approved pointing and the corresponding abstracts can be accessed from the ASDC WWW interface and its mirror:

- http://www.asdc.asi.it/bepposax/ao_browser.html

The list of approved observations is also available via

- http://heasarc.gsfc.nasa.gov/W3Browse

The AO1, AO2, AO3 & AO4 pointing lists can also be accessed in any of the following ways:

Anonymous FTP:

- ftp sax.sdc.asi.it

  and then

  cd pub/sax/doc/ao5

[1] Pending the evaluation of the operational necessity of the ESM2 (gyro-less pointing) implementation

get ao1_exec.log

get ao2_approved.log

get ao3_approved.log

get ao4_approved.log

or:

- ftp legacy.gsfc.nasa.gov

  cd sax/timelines

  get all_targets.log

Access to the list of performed observations is also available via Web browsers at the following URLs:

- http://www.asdc.asi.it/archive_browser.html
- http://heasarc.gsfc.nasa.gov/W3Browse

The successful proponents must obtain all the necessary financial support from their home institution or national agency.

2.2 Scientific Guidelines

High priority will be given to proposals aimed at exploiting the unique instrumental and operational capabilities of BeppoSAX, which will allow studies of key astrophysical objects and phenomena that cannot be done with any other orbiting X- or Gamma-ray observatory during the AO5 period. In particular:

1. Programs aimed at exploiting the operational flexibility of the mission in performing TOO observations (see next section on TOO programs), triggered either by GRBM and/or WFC or by other astronomical instruments.

2. Program aimed at studying the broad band spectral behaviour of sources, with particular regard to the high energy range (E>10 keV) and/or to sources which emit the bulk of their energy beyond 10 keV. While the main scientific goal of a proposal shall be achieved with BeppoSAX itself, the added value of a combined observation by BeppoSAX with Chandra or Newton-XMM in providing the highest quality spectral data from 0.1 to 200 kev will be favourably considered vis a vis with the limitation on the total time than can be spent on time critical observations (see section 1.1.1).

An extended account of the scientific objectives specific of BeppoSAX which can serve as guidelines for the AO5 program can be found in the "Scientific Justification for BeppoSAX AO5 extension" at http://www.asdc.asi.it/bepposax/scijust.html or http://www.ias.rm.cnr.it/sax/AO5/scij

2.3 Targets Of Opportunity Policy

Interested proponents should be aware that implementing TOO observations imposes heavy requirements on the Ground Segment operations and will inevitably have a negative impact on the overall observing efficiency. Furthermore due to the constraints introduced by the LECS and by the attitude system, the observing efficiency of the target at the requested time may be substantially reduced or be, in a worst case situation, unfeasible. While the scientific merit of TOO observations in the context of this mission is clear, the level at which they will be feasible, with an acceptable efficiency reduction, after the implementation of the gyro-less mode, remains to be assessed. Proponents should be in particular aware that the LECS efficiency - that depends on the period of observation - cannot be optimized and can be, in worst cases - near to zero. They must then specify in the proposal, on the basis of the scientific case, the minimum LECS efficiency considered acceptable. If this is not verified, the observation will not be carried out. As a reference, the typical LECS efficiency normalized to MECS ranges from 30% to 60% with an average of 40% as a result of the scheduling optimization.

As a rule, for a source or a class of sources to be taken into consideration for TOO observations, it is required that special proposals (TOO proposals, see Sect. 3.3.1) be submitted, even in the event that a source (or sources) might be target(s) in an ordinary proposal.

The overall time devoted TOO observations will be no more than 25 % of the total AO time.

A list of possible subjects for TOO proposals includes:

1. Bright X-ray transients, including those known to be recurrent, but for which the epoch when the appropriate intensity level in an outburst is reached cannot be predicted with the precision required for a time-constrained observation.
2. Highly interesting changes in the state of emission of persistent sources, which from previous experience are known to take place but whose epoch of occurrence cannot in general be predicted.
3. Soft gamma ray burst repeaters.
4. Supernova explosions.
5. Gamma-ray bursts

Interested scientists are invited to consider that the already approved CP and GOP TOO programs, see Sect 2.2 (Table 1,2,3,4) and the URL:

- http://www.asdc.asi.it/bepposax/too.html

Please note that the total time allocated for TOO proposals in AO5 is limited to a ceiling of 2.5 Msec (including GRB programs). Due to the unpredictable nature of TOO, the overall time of approved proposals is greater than 2.5 Msec. TOO observations will be therefore carried out on a first-come first-served basis. Should the ceiling be reached before the end

Table 1: BeppoSAX AO1 CP and GOP and project TOO observations

Class	Targets	Approved Exposure ksec	Status
Dwarf Novae	1	200	NA
Known Be transients (P<20 s)	2	300	NA
New Be transient or Known P>20 s	1	200	PE,NA
New transients: WFC trigger	3	60	C
Soft X-ray transient	1	200	C
New soft X-ray transient	1	200	NA
Recurrent BHC transient	1	130	NA
New BHC transients	2	300	NA
Cyg X-1: high state	1	100	NA
Cyg X-1: Batse trigger	1	60	NA
BHC transient	1	200	C
Atoll source: Batse trigger	1	190	NA
Active state of SGR sources	1	100	NA
New Supernova event	1	150	NA
Classical and Recurrent Novae in outburst	1	120	C
GRO1744-28	1	150	C
Rapid Burster	1	90	NA
EGRET γ-ray sources	2	40	NA
GRB afterglow (SAX Trigger)*	8	500	C
Comet Hale-Boop *	1	50	C
XTE J0054-72 or SAX J0054.9-7226 *	1	30	C

NA: not activated; C : program completed; PE : partially executed; * Project TOO

Table 2: BeppoSAX AO2 CP and GOP TOO observations

Class	Targets	Approved Exposure ksec	Status
CygX-1 in High state	1	100	NA
Recurrent BHC Transients (a)	1	200	C
New transients BHC (a)	1	200	C
Flaring Blazars	2	100	C
Fast spinning Hard X-ray Transients (b)	1	180	C
Fast spinning Hard X-ray Transients in outburst (b)	1	180	C
Slow X-ray PSR transients (b)	1	180	C
V0332+53 during Outburst (b)	1	180	C
GX339-4	1	50	NA
The supersoft source RXJ 0527-6954	1	75	NA
New transients: WFC trigger	8	160	PE
GROJ1655-40 during radio outburst	1	90	NA
GROJ1655-40 during X-ray outburst	1	90	NA
Soft Gamma repeaters	2	120	C
CYGX-3 during radio outburst	1	110	NA
Hard X-ray burster (BATSE trigger)	1	100	NA
VWHyi and UGem in outburst	1	200	C
BSAX & CGRO of CentaurusA	1	60	NA
Soft X-ray transients in outburst	2	185	C
GRB afterglows detected by OSSE	1	50	NA
A0535+26 in outburst	1	100	NA
Low state of Eta Carinae	1	50	C
High Latitude Transients (Part II)	2	60	PE
AGN HighState	2	100	PE
MXB1730-335	1	90	C
GRB afterglow (SAX trigger)	9	913	C
GRB afterglow (BATSE/RXTE-PCA trigger)	6	600	PE

NA: not activated; C : program completed; PE : partially executed; (a), (b): merged proposals.

Table 3: BeppoSAX AO3 CP and GOP and project TOO observations

Class	Targets	Approved Exposure ksec	Status
Hard X-ray transients	1	150	C
Nova U Sco*	1	50	C
Broad band spectra of BHC	1	80	PE
Multif. campaign on GRS1915+105 (a)	2	390	PE
Study of new superluminar XTEJ1748-288 (a)	2	390	PE
Obs. of GROJ1655-40 in outburst (a)	2	390	PE
CygX-1 in High state	1	100	PE
Flaring Blazars	2	150	C
New transients: WFC trigger	6	120	PE
Nova Velorum 1999 *	1	70	C
New transients BHC	1	150	C
GRB afterglow (SAX trigger) +	12	700	PE
GRB afterglow (BATSE, XTE trigger) +	3	300	NA
GRB afterglow (IPN trigger)+	2	200	NA
Recurrent BH transients	1	150	NA
X-ray spectrum of X 1755-33	1	60	NA
Obs. of known SGRs	1	50	NA
Obs. of new SGRs	1	100	NA
The ms X-ray pulsar SAX J1808.4-3658	1	200	PE
Solving the mistery of XTEJ0421+560	1	170	NA
Study of SGR 1900+14 in outburst	1	150	NA
Cyg X-3: obs. during radio outburst	1	200	C
Bright BL Lacs	1	40	NA
Soft X-ray transients	1	150	C
Obs. of AGN in exceptional states	2	100	NA

A (active) : waiting trigger activation; C : program completed; PE : partially executed; (a): merged proposals

* Project TOO; + total ceiling for GRB programs: 800 Ksec.

Table 4: BeppoSAX AO4 CP and GOP and project TOO observations (as of Apr. 12 2001)

Class	Targets	Approved Exposure ksec	Status
GRB afterglow (SAX trigger)	12	1000	PE
GRB afterglow (BATSE, XTE trigger)	5	500	A
GRB afterglow (IPN trigger)	3	300	A
GRB afterglow (HETE-2 trigger)	4	320	A
GRB000926 *	1	30	C
Afterglows in x-ray flashes	4	400	A
Afterglows of Short GRBs	3	480	A
Recurrent BH transients	1	150	A
New transients BHC	2	360	PE
Known and unknown HXRT slow spinning	1	100	A
Fast spinning HXRT	1	200	C
Soft X-ray transients	1	200	C
X-ray bursters	2	90	C
Transients in WFC fields of Gal Bulge	3	120	PE
Flaring Blazars	2	100	C
Obs. of AGN in exceptional states	5	250	A
Centaurus A in high state	1	160	A
New Core Collapse Supernovae	3	300	A
Brightest Novae in Outburst	1	99	A
Spectrum of the BHC X 1755-33	1	60	A
Solving the mystery of XTE J0421+560	1	170	A
CygX-1 in High state	1	150	C
XTEJ1748-288 in outburst	1	250	A
A0535+26 in outburst	1	150	A
GROJ1655-40 in outburst	1	120	A
SAX J1819.3-2525 in Outburst	1	50	A
SGRs in Active State	2	240	PE

A (active) : waiting trigger activation; C : program completed; PE : partially executed; (a): merged proposals

* Project TOO.

of the AO, the Mission Scientist, in consultation with the TAC chairperson, and taking into account the schedule and the overall observing performances, can decide to increase the ceiling further.

TOO programs approved in AO4 will be performed only if the trigger condition compliant with the protocol is verified before the end of AO4 program (extended to June 15, 2001).

TOO programs approved but not (or partially) carried out in AO4 must be resubmitted. The proponents should specify, in such a case, that the program is to be considered a continuation of AO4.

In a TOO proposal, the scientific justification must be accompanied by detailed criteria for TOO validation (trigger condition) and for the observational strategy that should be followed after the TOO event. In the case of recurrent transients and of changes in persistent sources, it is expected that the TOO proposal might contain also the request of a monitoring program with BeppoSAX aimed at detecting and qualifying the event. In this case, it is mandatory for the proponents to submit a separate proposal covering the monitoring program too.

For the accepted proposals, the TAC could confirm or revise both trigger condition and the observational follow-up plan. To activate a TOO approved program in AO5 the PI must alert the Mission Scientist (saxsci@ias.rm.cnr.it). The PI will assist the TAC Chairman (or a TAC member appointed by the Chairman) and the Mission Scientist in the following responsibilities:

- supervising the implementation of the observing plan;
- dealing with any decision, exceptional with respect to the plan. For example, in some cases the follow up program can be performed only in part due to visibility constraints. In such a case the follow up observations will be carried out only if sufficient to achieve the scientific goals of the proposal, and the program will be then considered completed.

The PI of the TOO observations successfully carried out will also be the owner of the WFC data (on that particular target) that had triggered the program.

Most of TOO targets suited to BeppoSAX capabilities should fall within approved AO programs. Nonetheless it is still possibile that unforseable events of exceptional scientific importance are not covered by any approved AO program. In such a case a **Project TOO** observation can be solicited any time of the year by sending a request to the Mission Scientist (saxsci@ias.rm.cnr.it). The request shall contain a scientific case demonstrating the uniqueness of the event and the relevance of BeppoSAX observations. It is stressed that these requests will be analyzed only if the event is not a part of a TOO-AO program, so interested scientists are invited to check the approved programs before sending any request. Project TOO data are property of the BeppoSAX team and are to be exploited under the responsibility of the Mission Scientist. Should the observation be approved, the proponent and her/his team will collaborate with BeppoSAX team scientists for a joint exploitation of the data.

3 Proposal Preparation

3.1 Executive Summary for Proposal Preparation

1. The first step is to understand whether the scientific objectives are matched to the scientific capabilities of the mission (SOH sect.2 and Addendum).

2. For time constrained observation a first evaluation on the visibility of a source taking into account solar panel constraints can be found in in SOH sect. 3.

   An on-line tool useful to estimate the visibility of a source is available at the following URLs:

   - http://www.asdc.asi.it/bepposax/viewing/
   - http://heasarc.gsfc.nasa.gov/Tools/Viewing.html

   Note however that the visibility window may be substantially restricted depending on the availability of guide stars for the gyroless mode. While a final assessment must await for on-board implementation, we warn that observation of a target at a specified time, even within the constraints allowed by the solar panels, may not be feasible.

3. The next step is the evaluation of the feasibility of the proposed program with the BeppoSAX instruments. This is discussed in SOH sect. 4 (BeppoSAX Instruments) and Addendum.

   Using the expected target properties (X-ray flux, spectral shape, variability, etc.), the observer must estimate whether the scientific objectives of his/her proposal (e.g. determination of spectral shape, variability, measurement of spectral features) can be achieved and should estimate the exposure time necessary to fulfill that purpose.

   Such an assessment can be done using the tools available from the BeppoSAX SDC Web pages.

   The ASDC Web Event Simulator and On-line Analysis Service

   - http://www.asdc.asi.it/simulator/

   This tool allows proposers to simulate observations with the imaging instruments of BeppoSAX (and several other satellites). The simulated field can include both pointlike and extended sources with source positions, spectra etc. input by the user or automatically retrieved from a catalog of ROSAT sources. The output is a FITS/OGIP event file that can be analysed using standard X-ray analysis software or directly over the web using the ASDC interactive archive system.

   A WWW **tool for count-rate estimation** (based on the HEASARC PIMMS) is available at the following URLs:

   - http://www.asdc.asi.it/bepposax/pimms/
     http://heasarc.gsfc.nasa.gov/Tools/w3pimms.html

Detailed **spectral simulations** can be performed using XSPEC, as illustrated at the following URL:

- http://www.asdc.asi.it/bepposax/sdc_simulations.html

In the same URL XSPEC macros are available to ease the (sometime complex) simulation procedure.

A new **Web interface to XSPEC** developed by HEASARC is available at

- http://heasarc.gsfc.nasa.gov/webspec

4. Next step is the selection of acquisition modes for each instrument. **For sources fainter than about 0.3 Crab (or $\approx 10^{-8}$ erg cm^{-2} s^{-1}, 2-10 keV), the telemetry is sufficient to support full direct modes (i.e each event is transmitted with full information) for all instruments**. For such sources the proponents are encouraged to adopt the default (direct) modes. For sources brighter than 0.3 Crab the observer should find a trade-off solution, choosing the information more relevant to the scientific goal (e.g temporal vs. imaging vs. energy information), by selecting different modes or allocating the telemetry to a subset of instruments. **Note that in AO5 the use of High Bit rate speed will be limited in order to reduce the stress on the Tape Recorder Unit**

5. The proponents can then fill out the proposal form (see Sect. 6) retrievable via network as explained in sect. 3.2.2) following the instructions given in Sect. 3.2 and submit it according to the rules given in Sect. 4.

3.2 Filling the BeppoSAX Proposal Form

The BeppoSAX **primary time** proposal is composed of five different parts, each corresponding to one or more forms. The first four parts include information that will be used by the BeppoSAX team for observation planning. The fifth part will be used by the Time Allocation Committee for the proposals selection. The proposal form is arranged in a tree structure as follows:

```
General Information Form
    Pointing Form #1
        Instrument Form #1 for pointing #1
        Instrument Form #2 for pointing #1
        ....
        Instrument Form #n for pointing #1
                Additional Information Form for pointing #1
    ....
    Pointing Form #m
        Instrument Form #1 for pointing #m
        Instrument Form #2 for pointing #m
```

```
        ....
        Instrument Form #n for pointing #m
                Additional Information Form for pointing #m

Scientific Justification Form
```

1. the first part consists of the **General Information Form**, including Investigator's information, Proposal's title and abstract.

2. The second part is composed of one or more **Pointing Information Forms**, containing target coordinates, time constraints.

3. For each **Pointing Information Form** there must be one or more **Instrument Information Forms**, defining the configuration of each instrument per pointing and the observing time. The proposal should include as many Instrument Information Forms as are the instruments to be used. There is a limited possibility of changing the instrument setting during a pointing. In this case the different instrument settings must be specified in two different Instrument information forms.

   All the instrument forms related to a pointing form must come immediately next to it.

4. **Additional Information Forms**. These are optional in case of STANDARD proposals and can be used to provide further details, in particular on time constraints. For the case of TOO proposals **it is mandatory to fill this form with the criteria needed to identify the TOO event and to plan the follow up observations**.

5. The last part, the **Scientific Justification Form**, should contain the scientific case, observational strategy (including a priority list, if deemed useful) and technical feasibility. It should not be longer than 4 pages (including figures) with character size not smaller than 10 points.

A proposal template for the first four forms is shown in Sect. 6. It is a simple ascii file that can be compiled using a normal text editor or with the help of a WWW tool available at the following URL:

- http://www.asdc.asi.it/bepposax/spass/

The proposal form can also be retrieved via network, as explained in Sect. 3.2.2, compiled with any editor and sent to BeppoSAX SDC as explained in Sect. 4.

The present section is intended to provide guidance in filling the forms, with particular regard to those entries **that are not self explanatory**. More details on the format of the electronic form are given in the next section.

3.2.1 The forms content

3.2.1.1 General Form

PI Name
In the order: first name, middle name (initials), last name.

Co-I's name, institute, country, phone number, e-mail
The first name of the list should be that of a coinvestigator who can act as an alternate contact in case the PI is unavailable. Communications between the scheduling and operations teams and the PI, or his designated contact, may be necessary prior to an observation to check coordinates or to redefine the observation modes.
Designation of a contact CoI is mandatory for TOO proposals. The proposal template has been prepared for a maximum of 10 CoI's. It is however possible to add more CoI's if necessary.

Observation Program Reference
GOP for Guest Observer Program.

Proposal Subject Category
Write the identificator of the item that best describes the requested observation.
1 = Stars
2 = Compact Galactic Sources
3 = Supernova Remnants
4 = Normal Galaxies
5 = Active Galactic Nuclei
6 = Clusters of Galaxies
7 = Other

Proposal Type
STANDARD or **TOO**. The proposal cannot be of mixed type, that is a STANDARD proposal cannot contain TOO targets and vice. This is due to the fact that TOO proposals are "incomplete", in that some information (coordinates, time windows) necessary for the schedule generation is missing. Only after the TOO event, when the necessary information will be available, the proposal data will be processed in the scheduling procedure. In the case of recurrent transients and of changes in persistent sources, the TOO proposal might contain the request of a monitoring program with BeppoSAX aiming at catching and qualifying the event. In this case, it is mandatory to submit, also and separately, a standard proposal describing the monitor program. In case of a TOO proposal the proponents must specify in the scientific justification and in the additional information if the program is a continuation of an approved AO4 TOO proposal.

Proposal Abstract
Please keep the abstract brief ($\approx$ 600 characters).

Total Observing Time

Give the *total* amount of time requested in the proposal in units of **ksec**.

Note that the exposure time refers to the MECS instruments, and that **the exposure times of ALL NFI instruments must be set equal to the MECS exposure.**

Media Type
Select one of the following:
DAT, Digital Audio tape;

Media Density
select **COMPRESSED**.

Institution Authority Endorsing the Proposal
Authority that guarantees availability of adequate funding and facilities for data exploitation.

3.2.1.2 Pointing Form

Target Name
Use commonly accepted names for objects so that coordinate checks are facilitated.

Position
Use J2000.0 coordinates given as *hh mm ss.s* ,± *dd mm ss.*

Instrument Class
Specify **NFI** or **WFC**.

WFC Maximum Pointing Offset
This field is relevant only if the Instrument Class is WFC and specifies the maximum acceptable offset angle of the target from the center of the field. Default is 10 degrees.

Time Constraint
Seven types of time constraints are supported:
None;
Fully Constrained;
Partially Constrained;
Periodically Repeated;
Aperiodically Repeated;
Phase Dependent

For a Fully Constrained pointing the observer must specify *one* Time Window.

For a Partially Constrained pointing the observer can specify up to 5 different alternative Time Windows.

For a Periodically Repeated series of pointings the observer must specify the **Period** and the **Period Tolerance**, as a % of the Period.

For an Aperiodically Repeated series of pointings the observer can specify up to 10 **Time Spacings** and one **Time Spacing Tolerance**, units of days.

For Phase Dependent pointings the observer must specify the **Phase**, the **Phase Tolerance**, as a % of the Phase, and the **Binary Period** and the **Epoch Of Zero Phase** (as close as possible to the start of the AO phase). Note that due to the uncertainty on the satellite position along the orbit on time scales longer than a month (basically due to atmospheric drag) **phase dependent observations cannot be planned if the duration of the phase window lasts less than the earth occultation time of the source**. It is intended that the exposure will be *centered* at the requested **Phase**. For simultaneous and phase dependant observations please note that the best accurancy of the scheduling is of the order of one day.

Period
For Periodically Repeated series of observations, in units of DD HH:MM:SS.ss

Period Tolerance
For Periodically Repeated series of observations, as a percentage of "Period".

Time Spacing
For Aperiodically Repeated series of observations, in units of days.

Time Spacing Tolerance
For Periodically Repeated series of observations, as a percentage of "Time Spacing".

Phase For Phase Dependent observations, range 0.0-1.0.

Phase Tolerance
For Phase Dependent observations, as a percentage of "Phase".

Binary Period
For Phase Dependent observations, binary period in units of DD HH:MM:SS.ss.

Epoch of Zero Phase
For Phase Dependent observations, epoch of zero phase, in units of DD-MMM-YYYY HH:MM:SS.ss.

Time Windows
For a time constrained pointing it is possible to specify up to 5 different alternative time windows during which the pointing could be performed. Keep the time windows as wide as possible to allow some flexibility in the scheduling.

Number Of Pointings
Requested number of pointings for a given target in the Periodic or Aperiodic modes.

TRU speed
Tape recorder speed. **D** = default, corresponding to a bit rate available to instruments of 60 Kbit/s. In this case data over the entire orbit will be available. If tape speed = **H**, telemetry available to instruments is 95 Kbit/s, allowing only 55 min of continuous data stream per orbit (see section 4.9 of the handbook). Selection of high TRU speed can be

considered for bright sources (brighter than about 0.3 Crab), but the use of this option will be limited to few cases to avoid stressing the TRU: the proponent is invited to look for alternative solutions. For sources fainter than this value, TRU speed=D gives enough telemetry to allocate all the instruments in the default direct modes.

3.2.1.3 Instrument Form

Instrument Code

If NFI has been selected in the Instrument Class field of the Pointing Information Form select one of the following:

LECS, MECS, HPGSPC, PDS

and fill a separate Instrument Information Form for each of the NFI's necessary for the observation. For example, to use all the NFI, fill 4 forms, one for LECS, one for MECS (note that MECS identify the complete set of 2 units), one for HPGSPC and one for PDS. It will be possible to change the instrument configuration during the same pointing by giving the details in the Additional Information form. Note that the HPGSPC will normally be operated only for targets brighter than approximately 10 mCrabs.

If the Instrument Class field = WFC, then **WFC** must be selected.

Observation Duration

Duration of the observation (exposure time) with the selected instrument in **ksec**. Note that the LECS efficiency compared to MECS is on average 40% and that exposure times are based on MECS. **To avoid confusion calculate the MECS exposure and use this number for all NFI instruments.**

Collimator Law

For PDS and HPGSPC only. Select a numerical value as explained in the SOH sect. 4 (currently the only value allowed for HPGSPC is 3; 1 to 22 for PDS)

Collimator Law Stay Time

For PDS and HPGSPC only. Dwelling time of the collimator on and off-axis (SOH sect.4 on HPGSPC and PDS). Default=96 sec for PDS only. Default (and currently the only allowed value)=2047 for HPGSPC

Count Rate

The source expected count rate, which can be estimated by using the flux to count rate conversion factors is Sect. 4.10 of SOH, or using PIMMS, see Sect. 3.1 above. For sources brighter than about 0.3 Crab (or $\approx 10^{-8}$ erg cm^{-2} s^{-1}, 2-10 keV) the investigator should also compute the telemetry bit rate, in order to select the appropriate Data Collecting Mode.

Data Collecting Mode

Data Collecting Mode, used for all instruments. More details on supported modes are given in Sect. 4 of SOH. Direct modes are already recommended in the proposal form template and are the default choice. For sources brighter than 0.3 Crab see sect. 4.9 of SOH.

Spectrum Accumulation Time

Default=blank

To be specified for HPGSPC and PDS only, in case an indirect mode is chosen. See sect. 4 of SOH on HPGSPC and PDS.

TP Bin Accumulation Time

Default=blank

To be specified for HPGSPC and PDS only, in case an indirect mode is chosen. See sect. 4 of SOH on HPGSPC and PDS.

MECS active Units

For MECS only.

Identify the number of MECS active units. Accepted value: 2

Additional Information

This field (text with a maximum length 1 A4 page) can contain any additional information the user wishes to provide to specify constraints or requirements not included in the standard forms. Primary purpose of this field is:

1. **Further details on time constrained observations.**

   The proponent can add details, not specified in the pointing form that can simplify the scheduling process.

2. **TOO identification criteria and follow up plan (mandatory)**

   The proponent should first give the identification criteria to classify an event as a specific TOO (e.g. flux thresholds, rise time, spectral shape, etc). This information should allow the BeppoSAX team to take appropriate and quick decisions about the follow up observation of the target.

   The proponent must also give the minimum acquisition time to the target to comply with the scientific requirements. It should be considered that operational constraints impose a minimum of about 30 hours to acquire the target. Then the follow up observing plan must be specified, giving the observing window times in days after the discovery of the event and the pointing duration (in ksec), as follows:

   ```
   1st observation window start=   window end=          pointing duration=
   2nd observation window start=   window end=          pointing duration=
   ....
   ```

   The proponent must also fill in the Instrument configuration and Data Collection Modes (DCM) on the basis of the expected count rate. This will allow to plan the TOO observation. The observer can provide updated values of DCM in the TOO request.

   The scientific motivations leading to the proposed observational strategy must be provided in the Scientific Justification form, in the "Observational Strategy" section. On

the basis of this information the TAC will know the validation criteria and follow-up plan and will establish a "protocol" specifying procedures to be followed at the Scientific Operation Centre (SOC) and SDC for implementing the TOO observing plan.

3.2.1.4 Scientific Justification

Maximum 4 pages including feasibility and figures. The scientific justification is to be structured as follows:

- *Scientific Justification*

  Illustrate the scientific problem to be addressed, with relevant scientific background and references to previous works. Show how the proposed observations are expected to address the issue and improve on previous results.

- *Observational Strategy*

  In case of complex programs illustrate and justify the observational strategy to be followed to achieve the proposed goal. Typical information is: number and duration of observations per source and list of priorities.

  In case of TOO give and justify the identification criteria (e.g. flux thresholds, rise time, spectral shape,..) and the follow up observation plan.

- *Technical Feasibility*

  Demonstrate the feasibility of the proposed objective within the required time. List clearly assumptions about source characteristics (flux, spectrum,..). Estimates of count rates are required as a minimum (Flux to count rate conversion factors are given in instrument sections of SOH; a WWW interface to PIMMS is available at BeppoSAX SDC WWW pages; The use of XSPEC or other equivalent simulation software is encouraged, see Sect. 3.1 for details).

3.2.2 How to compile the Proposal Form

The Proposal Form can be compiled using any text editor or using a tool made available by the BeppoSAX SDC at the following URL:

- http://www.asdc.asi.it/bepposax/spass/

A help page for the usage of this tool is located at the following URL:

- http://www.asdc.asi.it/bepposax/spass/help.html

The template (ASCII file) for e-mail submission can also be retrieved from the BeppoSAX SDC anonymous ftp:

- ftp sax.sdc.asi.it

  and then

  cd pub/sax/doc/ao5

  get proposal_nfi.txt

  or

  get proposal_nfi_notimeconstraint.txt

  or

  get proposal_wfc.txt

  or

  get proposal.txt

  or

- ftp legacy.gsfc.nasa.gov

  cd sax/ao_info/ao5

  get proposal_nfi.txt

  or

  get proposal_nfi_notimeconstraint.txt

  or

  get proposal_wfc.txt

  or

  get proposal.txt

  The template can also be obtained by sending an e-mail to *majordomo@sax.sdc.asi.it* with the following text:

  get saxpi proposal_nfi.txt

  or

  get saxpi proposal_wfc.txt

  or

  get saxpi proposal_nfi_notimeconstraint.txt

3.2.3 The Electronic Proposal Form

In this section we give the data format of each field. Optional fields are in brackets or are marked as "optional".

Table 5: GENERAL_INFO

Keyword	Format, Value, Range, Units	Notes
PI Name	Alphanumeric max 32 char.	First, Middle, Last
Laboratory Institute	Alphanumeric max 32 char.	
Country	Alphanumeric max 24 char.	
Zonal Code	Alphanumeric 6 char.	
City	Alphanumeric 24 char.	
Street	Alphanumeric 24 char.	
Street Number	Alphanumeric 5 char.	optional
Telephone Number	Alphanumeric 20 char.	
Telefax Number	Alphanumeric 20 char.	optional
Email Address	Alphanumeric 50 char.	
COI1 Name	Alphanumeric 32 char.	essential if TOO proposal
COI1 Laboratory Institute	Alphanumeric 32 char.	essential if TOO proposal
COI1 Country	Alphanumeric 24 char.	essential if TOO proposal
COI1 Telephone Number	Alphanumeric 20 char.	essential if TOO proposal
COI1 Telefax Number	Alphanumeric 20 char.	optional
COI1 Email Address	Alphanumeric 50 char.	essential if TOO proposal
COI2 Name	Alphanumeric 32 char.	for each Co.I.
COI2 Laboratory Institute	Alphanumeric 32 char.	for each Co.I.
COI2 Country	Alphanumeric 24 char.	for each Co.I.
Announcement Of Opportunity Reference	Alphanumeric 3 char.	default AO5
Observation Program Reference	Alphanumeric max 3 char.	GOP
Proposal Title	Alphanumeric max 48 char.	
Proposal Abstract	Alphanumeric max 600 char.	
Proposal Subject Category	Numeric 1 char. 1 = Stars 2 = Compact Galactic Sources 3 = SNR 4 = Normal galaxies 5 = AGN 6 = Cluster of Galaxies 7 = Other	

Table 6: GENERAL_INFO, continues

Keyword	Format, Value, Range, Units,	Notes
Proposal Type	Alphanumeric 8 char.	STANDARD or TOO
Total Observing Time	Integer max 4 digits	units=ksec
Proposal Date	Alphanumeric	
	DD-MMM-YYYY	(HH:MM:SS.ss)
Type Of Media	Alphanumeric 7 char.	DAT
Media Density	Alphanumeric	COMPRESSED
Institution Authority Endorsing the Proposal	Alphanumeric 32 char.	

Table 7: POINTING_INFO

Keyword	Format, Value, Range, Units,	Notes
Target Name	Alphanumeric max 16 char.	optional for TOO proposals
Pointing Alpha Coordinate	Alphanumeric	optional for TOO proposals
	hh mm ss.s range 0,24	J2000 coordinate
Pointing Delta Coordinate	Alphanumeric	optional for TOO proposals
	+/-dd mm ss range -90,+90	J2000 coordinate
Instrument Class	Alphanumeric	NFI, WFC
WFC Maximum Pointing Offset	Real Number range 0,15	only if WFC
Time Constraint	Alphanumeric	
	None	
	Fully Constrained	specify 1 Time Window
	Partially Constrained	specify up to 5 Time Windows
	Periodically Repeated	
	Aperiodically Repeated	
	Phase Dependent	
	Special Cases	details in ADDITIONAL_INFO
Number Of Pointings	Integer <100	

Table 8: POINTING_INFO, continues

Keyword	Format, Value, Range, Units,	Notes
Time Window 1 Start	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 1 End	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 2 Start	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 2 End	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 3 Start	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 3 End	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 4 Start	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 4 End	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 5 Start	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
Time Window 5 End	Alphanumeric DD-MMM-YYYY	(HH:MM:SS.ss)
	For Periodically Repeated	
Period	Alphanumeric DD (HH:MM:SS.ss)	
Period Tolerance	Real % range $> 0{,}100$	
	For Aperiodically Repeated	
Time Spacing 1	days (integer)	
Time Spacing 2	days (integer)	
Time Spacing 3	days (integer)	
Time Spacing 4	days (integer)	
Time Spacing 5	days (integer)	
Time Spacing 6	days (integer)	
Time Spacing 7	days (integer)	
Time Spacing 8	days (integer)	
Time Spacing 9	days (integer)	
Time Spacing 10	days (integer)	
Time Spacing Tolerance	Real % range $>0{,}100$	
	For Phase Dependent	
Phase	Real range 0.0,1.0	
Phase Tolerance	Real % range $>0{,}100$	
Binary Period	Alphanumeric DD (HH:MM:SS.ss)	
Epoch Of Zero Phase	Alphanumeric DD-MMM-YYY	HH:MM:SS.ss
TRU Speed	Alphanumeric 1 char.	Default is D, other possibility is H

Table 9: INSTRUMENT_INFO

Keyword	Format, Value, Range, Units,	Notes
Instrument Code	Alphanumeric max 6 char.	
	LECS	if Instrument Class = NFI
	MECS	if Instrument Class = NFI
	PDS	if Instrument Class = NFI
	HPGSPC	if Instrument Class = NFI
	WFC	if Instrument Class = WFC
Observation Duration	Integer max 5 digits	units=ksec
Data Collecting Mode	Alphanumeric max 25 char.	see SOH
Collimator Law	Integer max 2 digits fixed to 3 for HPGSPC range 1-22 for PDS	if HPGSPC or PDS
Collimator Law Stay Time	Integer max 4 digits range 50, 2047, in seconds	if PDS
Count Rate	Real, range > 0	optional
Spectrum Accumulation Time	Real	if HPGSPC or PDS the value range depends on the chosen (indirect) DCM
TP Bin Accumulation Time	Real	if HPGSPC or PDS the value range depends on the chosen (indirect) DCM
MECS Active Units	Real, 2 (fixed value)	if MECS

4 How to Submit the Proposal

Submission of the proposal via e-mail is mandatory.

The proposal for AO5 GOP (Guest Observers' Program, Primary Time)

must be sent no later than May 21, 2001

.

For AO5 the submission of the Scientific Justification in postscript (.pdf, .doc or .sdw) format (deposited in the SDC ftp server as described below, **before the dead-line**) is mandatory.

4.1 E-mail Proposal Form Submission

The proposal forms (**without the Scientific Justification**) must be sent via e-mail to:

saxao5@sax.sdc.asi.it

to arrive no later than May 21, 2001 .

The Scientific Justification in postscript (.pdf, .doc or .sdw) format must be deposited at the BeppoSAX SDC ftp server as follows:

```
ftp sax.sdc.asi.it
Name : ftpao5
Password: SAXAO5
ftp> mkdir dirname
```

(Create a directory with name constructed using the first five letters of the PI's last name followed by _ and a number to distinguish between different proposals sent by the same PI; e.g. the first proposal sent by a PI named Einstein should be stored into a directory named einst_1)

```
ftp> cd dirname
ftp> bin
ftp> put your_file.ps.gz
(or your_file.[ps.Z/pdf/doc/sdw])
ftp> quit
```

to arrive no later than May 21, 2001.

5 Proposal Review and Implementation

Proposals will be reviewed and selected on the basis of their scientific merit, their feasibility and their relevance to the BeppoSAX mission by a peer committee, the Time Allocation Committee (TAC).

The results of the selection of AO5 proposals will be communicated before the end of June 2001.

5.1 Schedule for AO5

- Issue of AO5 : April 20, 2001
- Proposals due : May 21, 2001
- Release of approved pointing list: before the end June, 2001.
- Beginning of AO5 observing period: June 2001

5.2 Data Rights

Investigators whose proposals are selected will have proprietary use of their data for 1 year after receipt of the data.

6 The Electronic Proposal Template File

The following is a very general BeppoSAX AO5 proposal form. It contains all accepted keywords. Note however that:

- a NFI proposal template should contain NFI keywords only (i.e. the proposer should cut from the following proposal template the fields concerning the WFC);
- the proposal form should include the keywords necessary to the chosen Time Constraint only, see Sect 3.2.1.2;
- the proposal form may contain more than four NFI INSTRUMENT_INFO forms, see Sect 3.2.1.3;

```
SAX AO5 PROPOSAL FORM

BEGIN GENERAL_INFO
PI Name =
Laboratory Institute =
Country =
Zonal Code =
City =
Street =
Street Number =
Telephone Number =
Telefax Number =
Email Address =
BEGIN ADDITIONAL_INFO
COI1 Name =
COI1 Laboratory Institute =
COI1 Country =
COI1 Telephone Number =
COI1 Telefax Number =
COI1 Email Address =
COI2 Name =
COI2 Laboratory Institute =
COI2 Country =
COI3 Name =
COI3 Laboratory Institute =
COI3 Country =
COI4 Name =
COI4 Laboratory Institute =
COI4 Country =
COI5 Name =
COI5 Laboratory Institute =
```

```
COI5 Country =
COI6 Name =
COI6 Laboratory Institute =
COI6 Country =
COI7 Name =
COI7 Laboratory Institute =
COI7 Country =
COI8 Name =
COI8 Laboratory Institute =
COI8 Country =
COI9 Name =
COI9 Laboratory Institute =
COI9 Country =
COI10 Name =
COI10 Laboratory Institute =
COI10 Country =
END ADDITIONAL_INFO
Announcement Of Opportunity Reference = AO5
Observation Programme Reference = GOP
Proposal Title =
Proposal Abstract = Begin
Write here your abstract up to 600 characters.....
....
end_text
Proposal Subject Category =
Proposal Type =
Total Observing Time =
Proposal Date =
Type Of Media =
Media Density =
Institution Authority Endorsing the Proposal =
END GENERAL_INFO


BEGIN POINTING_INFO
Target Name =
Pointing Alpha Coordinate =
Pointing Delta Coordinate =
Instrument Class =
Time Constraint =
Time Window 1 Start =
Time Window 1 End =
Time Window 2 Start =
Time Window 2 End =
Time Window 3 Start =
```

```
Time Window 3 End =
Time Window 4 Start =
Time Window 4 End =
Time Window 5 Start =
Time Window 5 End =
Number Of Pointings =
Period =
Period Tolerance =
Time Spacing 1 =
Time Spacing 2 =
Time Spacing 3 =
Time Spacing 4 =
Time Spacing 5 =
Time Spacing 6 =
Time Spacing 7 =
Time Spacing 8 =
Time Spacing 9 =
Time Spacing 10 =
Time Spacing Tolerance =
Phase =
Phase Tolerance =
Binary Period =
Epoch Of Zero Phase =
WFC Maximum Pointing Offset =
TRU Speed = D
BEGIN ADDITIONAL_INFO

END ADDITIONAL_INFO
END POINTING_INFO


BEGIN INSTRUMENT_INFO
Instrument Code = LECS
Observation Duration =
Count Rate =
Data Collecting Mode = LE_DIR_FTP
END INSTRUMENT_INFO

BEGIN INSTRUMENT_INFO
Instrument Code = MECS
Observation Duration =
Data Collecting Mode = ME_DIR2
Count Rate =
MECS Active Units = 2
END INSTRUMENT_INFO
```

```
BEGIN INSTRUMENT_INFO
Instrument Code = HPGSPC
Observation Duration =
Data Collecting Mode = HP_DSC1
Collimator Law = 3
Collimator Law Stay Time = 2047
Count Rate =
Spectrum Accumulation Time =
TP Bin Accumulation Time =
END INSTRUMENT_INFO

BEGIN INSTRUMENT_INFO
Instrument Code = PDS
Observation Duration =
Data Collecting Mode = PD_DIR3
Collimator Law = 1
Collimator Law Stay Time = 96
Count Rate =
Spectrum Accumulation Time =
TP Bin Accumulation Time =
END INSTRUMENT_INFO
-----------------  CUT if proposal is for NFI observations ----------
BEGIN INSTRUMENT_INFO
Instrument Code = WFC
Observation Duration =
Data Collecting Mode = WFC_NOR
Count Rate =
END INSTRUMENT_INFO
-----------------  CUT if proposal is for NFI observations ----------

SAX AO5 PROPOSAL FORM END
```