

# AstroSat Proposers Guide

**Version 1.2**

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## **Revision History**

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G. C. Dewangan	0.2	24 May 2016	Revised and expanded
G. C. Dewangan	0.3	10 June 2016	Added Appendix A on “Mandatory checks to be done for UVIT observations” provided by C. S. Stalin. Revised for comments by S. N. Tandon and Seetha incorporated.
G. C. Dewangan	0.4	17 June 2016	Minor changes on number of targets in a given proposal

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G. C. Dewangan	0.6	24 June 2016	Appendix A replaced with the revised version provided by C. S. Stalin. Added the requirement on moon avoidance angle of minimum 10degrees for UVIT observations. Other minor changes.
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G. C. Dewangan	1.0	15 November 2016	Updated for enhancements in APPS, FUV/NUV integration mode removed. Appendix A replaced by updated document on UVIT mandatory checks provided by UVIT team included.
G.C. Dewangan S. N. Tandon	1.1	4 May 2017	A new section on "Observing efficiencies and exposure limitations for the UVIT partial fields" added. Appendix A on "Mandatory check to be done for UVIT observations" is removed, this document is available separately from ASSC and UVIT home.
G. C. Dewangan, S. N. Tandon, D. Bhattacharya, S. Seetha	1.2	16 January 2018	Revised for cycle A05, a new scheme for UVIT safety check for targets within +/-30 Galactic latitude and without Galex image, partial fields not available for UVIT/NUV, LAXPC3 not available.

Refer to this document as "AstroSat Proposers Guide", Version 1.2, January 2018 (AstroSat SSC)

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## Glossary

<b>Acronym</b>	<b>Explanation</b>
APPS	AstroSat Proposal Processing System
ATAC	AstroSat Time Allocation Committee
ATC	AstroSat Technical Committee
AToO	Anticipated Target of Opportunity
AO	Announcement of Opportunity
CAL	Calibration
CCD	Charge Couple Device
CZT	Cadmium Zink Telluride
CZTI	Cadmium Zink Telluride Imager
Co-I	Co-Investigator
DEC	Declination
EA	Event Analysis (Mode)
FC	Fast Counting (Mode)
FW	Fast Window (Mode)
FOV	Field of View

FUV	Far Ultra-Violet
GO	Guest Observer or General Observer
GT	Guaranteed Time
GUI	Graphical User Interface
LAXPC	Large Area X-ray Proportional Counter
MCAP	Mission Control and Proposals database
NUV	Near Ultra-Violet
PC	Photon Counting (Mode)
PCW	Photon Counting Window (Mode)
PI	Principal Investigator
PO	Primary Observer
POC	Payload Operation Centre
RA	Right Ascension
SSC	Science Support Cell (AstroSat)
SSM	Scanning Sky Monitor
SXT	Soft X-ray Telescope
TC	Time Constraint
ToO	Target of Opportunity
UI	User Interface
UVIT	Ultra-Violet Imaging Telescope
VIS	Visual

## 1. Introduction and Scope

AstroSat is a proposal-driven, multi-wavelength observatory operated by Indian Space Research Organization (ISRO). To facilitate the proposal-driven operation and participation of the scientific community, a web-based proposal processing software for the AstroSat mission known as the “AstroSat Proposal Processing System (APPS)” has been developed. It is available online only, it is not downloadable and cannot be used off-line.

This document assists the proposers with the AstroSat proposal preparation and submission using the APPS software, it also acts as the proposers’ manual for the APPS software. In addition to this document, proposers will need to read the AstroSat Handbook, AstroSat AO Procedures for policy on proposal and observing cycles and call for proposals for a specific cycle, and the guidelines for UVIT observations. These documents are available at the AstroSat Science Support website as mentioned below.

## 2. Useful links & Helpdesk

Detailed technical information on AstroSat can be found at the AstroSat home page accessible via <http://astrosat.iucaa.in/>.

All relevant information on AstroSat proposal preparation such as documentation, required tools, instrument response and background files, templates for scientific and technical justification, etc. is available at the AstroSat Science Support Cell (SSC) website accessible via <http://astrosat-ssc.iucaa.in/>

The AstroSat Proposal Processing System is available at ISSDC accessible via <https://apps.issdc.gov.in:8181/apps/auth/login.jsp>.

UVIT Home Page available at <http://uvit.iiap.res.in/> provides details on UVIT. Proposers of UVIT will need to ensure the safety of the instrument by performing certain mandatory checks as described in the document “Mandatory checks to be done for UVIT observations” prepared by UVIT team, and



available at the [UVIT home page](#), and the AstroSat SSC page for proposers (see [http://astrosat-ssc.iucaa.in/uploads/APPS/Guidelines\\_for\\_proposal\\_submission\\_6.pdf](http://astrosat-ssc.iucaa.in/uploads/APPS/Guidelines_for_proposal_submission_6.pdf))

A helpdesk for proposal-related queries is being made available. Proposers can write to [astrosathelp@iucaa.in](mailto:astrosathelp@iucaa.in) or [issdc@istrac.gov.in](mailto:issdc@istrac.gov.in) for any queries on APPS, proposal preparation and submission. Queries will be answered on best effort basis.

Users of AstroSat can write to [astrosathelp@iucaa.in](mailto:astrosathelp@iucaa.in) for any queries on AstroSat including instruments, observation, software and data analysis, etc. The queries will be forwarded to appropriate authorities who will then respond.

Proposers can get pre-approved the UVIT filter selection before the proposal submission by writing to the UVIT ATC member C. S. Stalin ([stalin@iiap.res.in](mailto:stalin@iiap.res.in)).

A list of Frequently Asked Questions (FAQ) on APPS issues/bugs and other proposal related issues is available at <http://astrosat-ssc.iucaa.in/?q=node/11>.

### 3. Structure of the Document

The document first familiarizes with the different observing cycles, proposal types. It also provides an overview of proposal review process and time allocation. This is followed by detailed description of APPS, and a general guidance on proposal preparation and submission. Finally, the document provides step-by-step guide on how to enter various fields in APPS, verify and submit a proposal.

### 4. Proposal/Observing Cycles

ISRO will release periodic calls for proposal submission. Scientists can submit AstroSat proposals in response to the proposal calls by ISRO and within the specified period. The following proposal cycles will be available for the AstroSat mission.

### (i) AO (Announcement of Opportunity) cycle

ISRO will periodically issue calls for proposals to the astronomy community. Each of these calls will be for a defined Announcement of Opportunity (AO) cycle. Submitted proposals will be reviewed by the AstroSat Time Allocation Committee (ATAC) and AstroSat Technical Committee (ATC).

### (ii) ToO (Target of Opportunity) cycle

To facilitate observations of unpredictable, sudden astronomical events e.g., outburst of a supernova or nova, observation of a new transient source or X-ray nova, major flares, state transitions in X-ray binaries, etc., AstroSat has a fast turn around observing cycle - the Target of Opportunity (ToO) cycle. The ToO cycle allows submission of proposals (type – regular pointing) requiring the immediate observation of a sudden and unexpected astronomical event. The proposal in this cycle will be subjected to fast-track review process which is different from normal procedure for AO proposals. The ToO cycle will be open throughout the AstroSat mission life. 5% AstroSat observing time is reserved for ToO proposals. AstroSat data resulting from a ToO proposal will be made public immediately after the observation and pipeline processing.

The ToO cycle is open for Indian proposers. Request for ToO observations through a proposal in the ToO cycle must be based on one or more observational evidence(s) (e.g., Astronomy Telegram) of an astronomical event taking place. A ToO proposal is similar to the regular proposals except that the scientific justification for a ToO proposal is short, upto 1000 words maximum, and is free-format. An abstract of length 150 words maximum should also be included in the scientific justification.

The ToO proposals are also invited for the purpose of UVIT safety check for science observations of unexplored UVIT fields in the AO cycle. Such ToO proposals can be created by selecting proposal type as “UVIT safety check” (see Sect. 16, this document).

### (iii) GT (Guaranteed Time) cycle

In this cycle, payload science teams can submit proposals utilizing their guaranteed time.

Certain amount of time is reserved for these proposals and would be subjected to a selection process different from the AO proposals. All GT cycle observations end in September 2018, hence GT cycle proposal opportunities are no longer available.

#### (iv) CAL (Calibration) cycle

In this cycle, only proposals aimed at calibration of the space craft / payloads and diagnosis of their health can be submitted by Payload Operation Centre (POC) team which includes the instrument PI. The proposals in this cycle would be subject to verification by a responsible scientist - Cal Scientist. This cycle will be open throughout the mission life.

## 5. Proposal Types

The AO and GTO cycles can have different proposal types depending on the policy.

#### (a) Regular pointing with or without any time constraints

These are proposals for one or more targets requesting one pointing per target. These proposals without any time constraints are the simplest possible proposals and easiest for mission operation. Hence, these type of proposals are easier to get accepted for AstroSat observations.

One or more of the targets in a regular proposal may be time-constrained requiring AstroSat observations to be performed in a specific time window. Such time constraints can arise due to a number of reasons e. g., coordinated observations with other observatories, observations of a binary system in a specific binary phase, etc.

Proposers need to specify one or more time windows in case of time-constrained targets. Since scheduling AstroSat observations in a specific time window is difficult, time constrained proposals will generally need stronger science justification than a regular proposal without any time-constraint. Proposer will need to clearly state the reasons for time constrained observations in the technical justification (see the template for the technical justification).

For each target in a proposal with time constraint, only one observation will be made. Multiple time constraints may be given only for the ease of scheduling.

In case of multiple observations are required, they should be submitted as separate proposals or as in monitoring proposals given below.

## (b) Monitoring proposals

These proposals request multiple observations of a single target with specified intervals between successive observations. All observations are identical i.e., exposure time and instrument configuration do not change from one observation to another observation. For this type of proposals, proposers need to specify the number of observations, duration between observations, and instrument configuration for a single observation. APPS will automatically calculate the total observing time by multiplying the exposure time for a single observation and the number of observations. Successive observations need not equally spaced i.e., the proposers have a choice to request monitoring observations with linearly, logarithmic or any arbitrary separations. As monitoring proposals put a lot of constraints on the mission operation, proposers should provide strong justification for the need for monitoring observations.

At present, the mission is performing monitoring observations with separations between consecutive observations of 15 days or more. A few monitoring proposals requiring shorter separations i.e., less than 15 days, may be considered if science and technical justification are very strong. Proposers are also recommended to propose only one target in a monitoring proposal.

## (c) Anticipated ToO proposals

The Anticipated Target of Opportunity proposals request AstroSat observations of one or more targets for which an interesting astronomical event is foreseen but the exact timing of the event is unknown. Such situations may arise e.g., in the case of catching a state transition of a known X-ray binary. Proposers of anticipated ToO proposals will need to have an estimate of triggering probability and trigger duration, and provide relevant justification. As observation of Anticipated ToO events will disturb the planned scheduling of observation, only proposals with very strong scientific justification is likely to be accepted for observations. Anticipated ToO proposals cannot request for follow-up observations in the same proposal. If required, proposers may propose for normal or unanticipated ToO observations to follow-up the triggered Anticipated ToO targets.

For observations of an approved AToO target, the proposer will need to submit trigger request which will require to be approved by the ATAC chair. A proposer can submit trigger request by logging into APPS, and clicking the “Schedule” button available for approved AToO proposals only in the

“proposer” tab. The proposer will then need to enter trigger justification and trigger duration as per the original AToO proposal. The trigger justification should clearly state how the triggering criteria mentioned in the approved AToO proposal is met, and how the trigger duration has been estimated. ATAC chair will review the trigger request and, if found satisfactory, will accept the request. The target is then available for scheduling of observation within the trigger duration.

## 6. Proposal review process and time allocation

The submitted proposals in each cycle will be subjected to an evaluation process by the ATAC and ATC. Each cycle will have an ATAC and ATC. If a cycle is set to have a two level hierarchy, then members of the ATAC may chair subcommittees called Sub-TACs. The ATAC chairperson is the final authority. (S)he is assisted in the evaluation process by the members of the ATAC or sub-TACs, depending on the level of hierarchy (one or two). Note that only the AO cycle has the choice of operating in a single or a two level hierarchy. The following are the steps envisaged in the review process:

(v)

### (a) For a cycle having one level hierarchy

- ATAC chair will nominate external referees to review the proposals. Comments and ratings given by the referees are taken into account by the ATAC for the selection of proposals to which observation time is to be allotted.
- ATAC Chair with other ATAC members collects the feedback from external referees and technical comments from the ATC and takes the final call on which of the proposals are to be allotted time. Each target in the final set of selected proposals is given A, B or C priority. (Normally, A is considered the highest priority and C the lowest.)

### (b) For a cycle having two level hierarchy

- ATAC Chairperson categorizes proposals submitted (say based on the science category they fall in) and distributes them to different Sub-TACs.
- Sub-TAC chair will nominate external referees to review the proposals. (S)he along with other Sub-TAC members selects proposals from the lot allotted to them as candidates for allotting observing time. Comments and ratings given by the referees are taken into account by the Sub-TAC for this selection. Sub-TAC decides a rating and comments for each proposal.
- ATAC Chair with other ATAC members collects the feedback from Sub-TACs as well as technical comments from the ATC and makes the final decision on which of the Sub-TAC suggested

proposals are to be allotted time. Each target in the final set of selected proposals is given A, B or C priority.

When the observations are scheduled for observations, 'A' priority targets are given preference followed by 'B' priority targets. If any 'A' or 'B' priority targets cannot be scheduled in the ongoing cycle, they will be scheduled in the next cycle. 'C' priority targets which cannot be scheduled in the current cycle will be discarded.

## **7. Proposal Revision**

It is expected that a majority of successful proposals will be fully allocated AstroSat observing time. The ATAC may ask some proposers to reduce the observing time, the number of targets or to change the instrument configuration in a proposal. Such proposals will be made available to PIs for revision. The proposers will be able to submit a revised proposal before the set deadline only for changes recommended by the ATAC. Such partially allocated proposals, if not revised before the deadline, will be excluded from the list of successful proposal.

## **8. Configuring the leftover instruments – the piggyback revision by the instrument teams**

AstroSat is a multi-instrument mission and it is possible that a proposer may not configure all the instruments. If one or more of the secondary instruments are left unconfigured, such proposals will be made available to the concerned instrument team members. These members will be able to configure the leftover instruments. Proposers will have no right on the data from any secondary instrument which was not configured by the proposer. The data acquired by the instruments configured by the instrument team members will go to the concerned instrument teams.

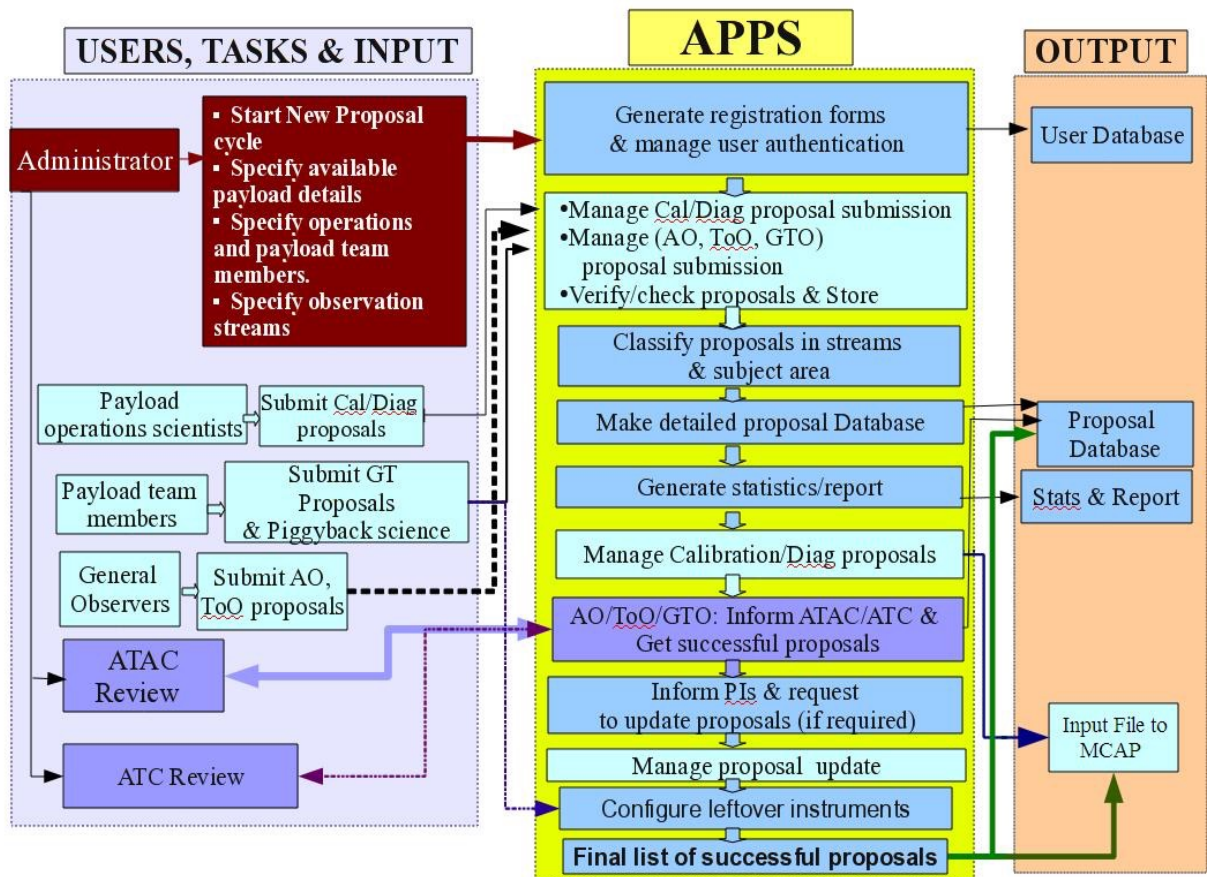
It is recommended that in case of any doubt on instrument configuration, proposers should discuss with the instrument teams (see ASSC website for contact details) or leave unconfigured if the proposed scientific objective can be achieved without the data from one or more of the secondary instruments.

## 9. Proposal Preparation & Submission

The software AstroSat Proposal Processing System (APPS) is designed to facilitate the proposal driven operation of the AstroSat mission. This software will assist scientists in proposal preparation, submission, review and selection process. APPS is a web-based tool which will cater to different types of users including the General or Guest Observers, Payload operation centre team members, Payload scientists and proposal reviewers. APPS will be able to validate submitted proposals including syntax checking, allowed parameter ranges and proposal completeness thus allowing proposers to detect errors. APPS will provide a complete and flexible interface for the users to specify instrument configurations appropriate to their science requirements. APPS will allow proposers to update accepted proposals with changes in requested observing time or number of targets as per recommendations of the technical and/or scientific peer-review processes. This will maximize the scientific output ensuring effective operation of the mission. The APPS will also extract important proposal/observational parameters which will be used for mission planning and scheduling of observations. An overview of the APPS architecture along with the flow of various kinds of information into and out of the APPS can be seen in the following flow diagram shown in Figure 1.

At the input end, APPS will interact with various types of users e.g., Proposers, Chairpersons, ATAC members, etc. The users are classified according to the role they play in the APPS. Relevant information will be collected from different classes of users which will help the ATAC in deciding which proposals merit allotment of observation time on the AstroSat satellite. In addition to proposal submission and acceptance, APPS will also serve as a common point of contact for the referees and the ATAC members and will facilitate evaluation of submitted proposals.

On the output side, output will be produced in the form of user and proposals database by APPS. In addition to this, APPS will also output information of proposals which are selected by ATAC in a format suitable to be ingested into Mission Control and Proposals (MCAP) database.



**FIGURE 1 APPS FLOW DIAGRAM**

## 10. Planning an AstroSat proposal

Proposals for observation with AstroSat can be submitted in response to announcement of observing opportunity by ISRO. Subject to the availability observing time for different types of proposals, proposers from all over the world are welcome to submit AstroSat proposals (see Table : AstroSat time share plan).



Depending on the scientific requirement, proposals to AstroSat can be submitted for observation with a single or more instruments. AstroSat proposals will require the following information at the minimum.

- Source coordinates, source angular size, V magnitude, 2-10 keV flux, estimated count rates for different instruments, exposure times
- Instrument configuration parameters (e.g., instrument mode, filter, etc.)
- Scientific and technical justification, details on UVIT bright sources, Astroviewer output in pdf format.

## 11. Observing efficiencies and exposure limitations for the UVIT partial fields

the four co-aligned payloads onboard astrosat have different operational constraints (see astrosat handbook). this results in different observing efficiencies for the four payloads. the average observing efficiencies achieved during the previous observing cycles are listed in the table below.

table 1 observing efficiencies for different payloads

payload	observing efficiency
uvit <sup>1</sup>	15% (for field sizes 250x250 or larger)  < 15% (for smaller fields, see table below)
sxt	25%
laxpc	45%
czti	45%

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<sup>1</sup> UVIT observing efficiency **depends on the window size** (see table 2 uvit fuv/nuv frame rate and the maximum exposure per orbit in the photon count mode)

table 2 uvit fuv/nuv frame rate and the maximum exposure per orbit in the photon count mode

fuv/nuv field size	frame rate	maximum exposure time per orbit (subjected to 15% observing efficiency)
100x100	640/sec	200 sec
150x150	300/sec	454 sec
200x200	180/sec	769 sec
250x250	115/sec	1162 sec
300x300	82/sec	1470 sec
400x400	61/sec	2500 sec
full field	29/sec	3571 sec

in the photon counting mode with partial fields or windows, the data rate can be very high as each frame carries an overhead of 4kbytes and the maximum data rate allowed for the total of fuv and nuv images is 10 gbits/orbit (**see section on “observing with partial fields” in the uvit chapter of astrosat handbook**). the requested exposures should respect this limit, i.e. for each orbit the total data for fuv and nuv images should be such that

the maximum exposure time listed in table 2 is purely due to the limitations in the data download rate per orbit and different amount of data generated in the partial uvit fuv/nuv fields. the maximum exposure time need to be subjected to the 15% observing efficiency. the achievable exposure time would be the lowest of the maximum exposure quoted in table 2 and 15% of the orbital period. uvit observations requiring fuv/nuv partial fields may result in long view period or stare time. since proposals are generally awarded based on “maximum science” and “minimum total view period” or stare time, proposers should exercise caution when choosing partial fuv/nuv

fields. *it should be noted that the default for nuv/fuv is the full field and the partial fields are only used if the source of interest is bright and can have > 0.5 counts/frame for full field. in such cases, largest possible partial fields should be used to get a rate about 0.5 counts/frame (certainly < 0.8 counts/frame).*

proposers will need to choose one of the instruments as the primary instrument depending on the scientific merit. depending on the observing efficiencies, the requested observing time (i.e., the sum of exposure time) for the primary instrument will result in different allowed observing time for the secondary instruments. for example, an sxt observing time of 10ks will result in a total stare time of 40ks, and the observing time of 6ks for uvit (full field), and 18ks for laxpc and czti. the astrosat proposal processing system software (see below) calculates the total stare time, and the allowed maximum observing time for the secondary instruments.

## 12. Proposal Preparation Tools

Proposers can use the following tools in order to prepare an AstroSat proposal.

### (i) Astroviewer

This is a web-based tool that proposers need to use in order to determine AstroSat visibility period for observations of a target of interest. Proposers can access the astroviewer tool at <http://issdc.gov.in/astroviewer/index.html>. Proposers can also use the command line version of astroviewer tool which is available at the SSC site [http://astrosat-ssc.iucaa.in/?q=proposal\\_preparation](http://astrosat-ssc.iucaa.in/?q=proposal_preparation) (see source visibility estimator).

Please note that the moon avoidance angle for UVIT is 15 degrees. If you plan to observe with any of the UVIT channels including the VIS channel for tracking purposes, please change the “Roll-moon vector angle” to 15 degrees before you run the Astroviewer tool.

### (ii) UVIT Exposure Time Calculator

Available at <http://uvit.iiap.res.in/Software/etc>, the UVIT Exposure Time Calculator (ETC) can be used to estimate required exposure time for an astronomical source (see <http://uvit.iiap.res.in/Software/etc/Help> for detailed help).

The ETC calculates the expected count rate from a source in various UVIT filters, followed by either (a) the signal-to-noise ratio (SNR) achieved for a given exposure time, or (b) the time required to

reach a given SNR. Users may choose from a range of astronomical sources such as a star, black-body, galaxy, power law, etc. or upload their own source spectrum.

### (iii) UVIT bright source warning tool (BSWT)

Available at <http://uvit.iiap.res.in/Software/bswt>, the BSWT gives a list of all the bright visible stars in the field of a given target. The data on visible magnitude and B-V colour of these stars can be used to select the visible filter. The count-rates for the UV-filters, based on modelling from visible magnitude and B-V colour, are only indicative and should not be used for drawing any inferences about exposures with the FUV and NUV filters. For the FUV and NUV channels, proposers need to perform mandatory checks as described in the document “Mandatory checks to be done for UVIT observations” (see Section 13 below).

### (iv) AstroSat WebPIMMS

See [http://astrosat-ssc.iucaa.in:8080/WebPIMMS\\_ASTRO/index.jsp](http://astrosat-ssc.iucaa.in:8080/WebPIMMS_ASTRO/index.jsp) for details.

### (v) Spectral simulation tools such as XSPEC and ISIS

Visit the XSPEC home page at <https://heasarc.gsfc.nasa.gov/xanadu/xspec/> and ISIS home page at <http://space.mit.edu/asc/isis/> for details. A multi-wavelength spectral simulator is available at the AstroSat SSC site [http://astrosat-ssc.iucaa.in/?q=proposal\\_preparation](http://astrosat-ssc.iucaa.in/?q=proposal_preparation).

## 13. Mandatory checks for successful observation with UVIT

The UVIT is not designed to observe very bright sources and the presence of a bright source in the UVIT field of observation can cause “Bright Object Trigger” in the hardware that would switch OFF all three detectors. In addition, the presence of an ultra-bright source near the UVIT field of view will scatter excessive radiation beyond the allowed limit. One of the UVIT channels, the VIS channel is primarily used for the spacecraft tracking. It is the proposers responsibility to ensure smooth tracking during their proposed observations. Hence the proposers need to exercise extra caution in preparing a proposal for UVIT observations. It is strongly recommended that the proposers follow the guidelines described in detail in the document “Mandatory checks to be done for UVIT observations” available at the UVIT home page at IIA and the Proposer’s page in the AstroSat SSC website. For observations of unexplored UVIT fields, please see Section 16 of this document.

*It should be noted that wrong selection of UVIT filters will lead to rejection of proposals. If required, proposers can get approved the filter selection by the UVIT ATC member before the proposal submission. Proposers can write to C. S. Stalin (email : stalin@iiap.res.in).*

*For observations with any of the UVIT channels including the VIS channel for tracking purposes, proposers need to set the moon avoidance angle to 15 degrees and then check the visibility period using the astroviewer tool (see section 12).*

## 14. Preparing an AstroSat proposal

Due to a number of instruments available and associated observing constraints and limitations, observers need to carefully plan their proposals. Proposers must first determine one or more suitable target for their science case, and ensure target visibility during the observing period. Proposers will need to determine if their science case requires a single pointing or multiple pointings, and if the observations need to be performed within a known or unknown specific time period, and accordingly determine the proposal type – regular (with or without time constraints), monitoring and Anticipated ToO. Proposers will need to estimate S/N, expected count rates for different instruments and determine required observing time. They should also perform imaging/spectral/timing simulations (as required) and demonstrate scientific feasibility of the proposal. If UVIT is to be used, proposers will additionally need to demonstrate suitability of the field by careful choice of the filters as described in the document “Mandatory checks for UVIT observations”. Proposers should clearly describe the scientific objective, scientific and technical feasibility using the templates available for downloads.

AstroSat is a multi-wavelength observatory, and a number of proposals are expected to be aimed at multi-wavelength science. The proposers of multi-wavelength proposals should exercise caution in choosing the primary instrument due to different observing efficiencies. The observing efficiency of UVIT is ~15% compared to that of X-ray instruments (SXT: ~31%, LAXPC: ~40% and CZTI~45%). Thus, if UVIT is the primary instrument, then the actual observing time available for X-ray instruments is more than that requested for UVIT. Current version of APPS does not allow the proposers to set the exposure times for secondary instruments to exceed the exposure time for the primary instrument. Proposers can, however, set the exposure time for the secondary instruments less than that for the primary instruments. It should be noted that due to a number of operational constraints, the available exposure times for the secondary instruments corresponding to the set exposure time of

the primary instrument are not exactly known before the scheduling of observations. The secondary instruments perform observations for the durations available for the requested exposure time for the primary instrument, and this is done irrespective of the exposure time set for the secondary instruments. Proposers should also note that UVIT observations may not be performed at all if the primary instrument is one of the X-ray instruments and requested exposure time is less than one orbital period or 98 minutes. Proposer should also note that observations are performed at the aim-point of the primary instrument according to the current observing policy.

If the science case requires multiple observations of a single target with the same exposure time, proposers must choose proposal type as “monitoring”. In this case, only one pointing need to be configured and the instrument configuration including the exposure time for additional pointings will exactly be the same. If a science case requires multiple pointings with different instrument configuration, proposers can define multiple targets with the same source name and specify time constraints for each of the targets/pointings. At present, mission cannot handle multiple observations of the same target i.e., the same RA/DEC if the interval between successive observations is less than 15 days. Please note that time constraints apply to targets and not to individual exposures. Thus one cannot define time constraints for individual exposures in the case of multiple exposure of a single target. This can be changed in a future cycle after the scheduling software is suitably modified to accept exposure-based time constraints.

AstroSat proposals must contain scientific and technical justifications and a large number of observing parameters such as the coordinates of the proposed targets, primary instrument, required total observing time, instrument configurations, etc. Only valid submitted proposals will be reviewed. The entry of necessary observing parameters is facilitated by APPS. It is mandatory to use APPS to prepare and submit AstroSat proposals. Proposers will need to register into the APPS before they can prepare proposals. There are four sections in APPS that proposers will need to complete in order to prepare a valid proposal.

## I. Cover Page

The cover page contains an overview of the proposal in the form of proposal type, title and abstract, scientific category, requested observing time, and personal information such as the names of proposers, contact information of the Principal Investigator (PI) or Primary Observer. If a PI is a

theoretician or wants to appoint a CO-Investigator (Co-I) as the primary contact person for any technical information on the proposal, the PI can assign one of the Co-Is as the PO. The cover page also contains fields for total observing time and total stare time. These fields will automatically be calculated from the exposure time requested for the primary instrument in the instrument configuration page (see below). In the AO cycle, proposers can choose one of the following three proposal types only.

- Regular proposals (with or without any time constraints)
- Monitoring proposals
- Anticipated ToO proposals

In APPS, there are two additional proposal types - tracking and scan mode proposals. These are yet to be tested and proposers should not create these proposal types. Such proposals will be treated invalid.

## II. Target list & Instrument configuration

The target list contains information about each proposed target such as Target name, coordinates, target angular size, variability, V magnitude and 2-10 keV X-ray flux. The observing time and stare time for the target will automatically be calculated from the exposure details for the primary instrument. Target names can be resolved with NED or Simbad and coordinates can be fetched from these servers. If there are more than one target, one can add targets by clicking "Add Source". In case of multiple targets, proposers should order the targets according to their priority which can be helpful to the reviewers if a subset of targets is accepted. The targets can be moved up and down in the list with the help of buttons given below the target list.

The target list table for Monitoring proposals requires two additional fields to be filled compared to a regular pointing proposal.

(i) Number of observations

(ii) Interval between successive observations (in days).

Please note that the number of entries for field “Interval between successive observations (in days)” is one less than the number of observations. The duration between successive observations need not be the same.

Proposers of “Anticipated ToO” proposals will need to fill the following three additional fields in the target table.

- (i) Triggering criteria (e. g, the source flux crosses certain threshold or a black X-ray binary makes a transition to a particular state, etc.)
- (ii) Estimated probability of occurrence (between 0 and 1)
- (iii) Expected duration of the event (in hours)

For each target in the list, proposers need to configure instruments by clicking the “configure” button. A new window will open which allows the proposer to select the primary instrument from a drop-down menu. Proposers should carefully select the primary instrument to suit the scientific objective of their proposal. The primary instrument can be configured by clicking on the “configure” button and adding exposures in a new window. Proposers could also select other instruments and configure all of them. Proposers can independently configure individual LAXPC units or they can copy configuration parameters of LAXPC1 with a click of a button. The same mechanism is implemented for the four CZTI detectors.

Please refer to AstroSat Handbook for information on configuration parameters such as mode, filter, window size etc. of individual instruments. Proposers will also need to fill the estimated count rates for the selected instruments. The count rates can be estimated by the tools such as UVIT exposure time calculator for FUV, NUV and VIS channels or spectral simulation tools such as XSPEC/ISIS/Sherpa along with the instrument responses for X-ray instruments. The count rates for X-ray instruments can also be estimated using the PIMMS tool. Please refer to AstroSat SSC website.



### III. Time Constraints

A proposed target may be time constrained i.e., available for observations during one or more limited periods for a number of reasons e.g., coordinated observation with other observatories, observations during a particular phase of a binary system, etc. If a proposed observation of a target is constrained in time, proposers need to mention this and enter start and end date and time for the observations of their proposed targets. One can enter multiple time constraints. It is recommended that proposers enter the most suitable e.g., the one with the longest duration as the first time constraint. It should be noted that any time constraints entered for a target in a monitoring proposal will apply to the first pointing only, the successive pointings are determined by two parameters – number of pointings and duration between pointings.

### IV. Attachments

The following files in pdf format must be attached to complete an AstroSat proposal.

#### **(i) Scientific Justification**

A pdf file describing scientific background and motivation for the proposed observation, scientific objectives, selection of targets, and demonstrating scientific feasibility with estimates of signal-to-noise, simulations of expected results, and the justification of requested observing time. Proposers are strongly recommended to provide spectral and/or temporal simulations to demonstrate the scientific feasibility of their proposed observations. These simulations are very useful to ATAC and increase the chances of proposal selection. A latex template for the scientific justification is available for download. Proposers are strongly encouraged to use the template. The scientific justification should not exceed the 4 page limit.

#### **(ii) Technical Justification**

A 2-page long pdf file providing information on technical aspects such as target visibility, details of bright VIS and UV sources in the field of UVIT and near the field as per the list of mandatory checks (see [http://astrosat-ssc.iucaa.in/uploads/APPS/Guidelines\\_for\\_proposal\\_submission\\_6.pdf](http://astrosat-ssc.iucaa.in/uploads/APPS/Guidelines_for_proposal_submission_6.pdf), selection of filters, S/N for the requested exposure (after accounting for source counts, background, point spread function, nearby source), safety concerns, details on time constraints, coordinated observations with other observatories, etc. In case of monitoring proposals, proposers should provide acceptable durations within which the individual observations need to be performed. Such information may ease the scheduling of observations and hence the chance of proposal selection. A latex template is available and proposers must use this template.

### **(iii) Checks for UVIT Bright Sources**

A pdf document with details on UVIT Bright Sources within and near the UVIT field of view as per the document on “Mandatory checks to be done for UVIT observations” (see [http://astrosat-ssc.iucaa.in/uploads/APPS/Guidelines\\_for\\_proposal\\_submission\\_6.pdf](http://astrosat-ssc.iucaa.in/uploads/APPS/Guidelines_for_proposal_submission_6.pdf) or visit UVIT home page <http://uvit.iiap.res.in/Observing>).

### **(iv) Astroviewer output**

Proposers must ensure that the proposed targets are visible to AstroSat during the observing period. The astroviewer tool can be used to generate the visibility durations. The output of the astroviewer tool in the pdf format should be attached with the proposal. The visibility of targets should be clearly mentioned in the technical justification. For proposals with UVIT configuration, visibility during eclipse should also to be included.

## **V. Supplementary Information (Optional)**

Proposers can provide supplementary information e.g., any special requirement.

## **VI. Proposal verification and submission**

Proposers can validate their proposals for completeness by clicking the “Verify and Submit” tab. Note that this action does not submit the proposals, instead it outputs missing or incomplete entries in various sections. Proposers can edit different section to complete any missing field. The proposal submission button appears only after the verification is successful.

## **15. APPS step-by-step instructions**

### **A. Registration/login**

(i) All proposers including Co-Is need to create an account in APPS by registering in the system.

Proposers can register in the login page of APPS. Please visit APPS website and click “Create Account” and enter the required details. In the registration page, if your University/Institute is not

listed, please select “Other” and submit the registration form. You will receive an email with a link which you will need to click to complete your registration. Once you have created your account, you can login, add your institute in the “Change Profile” page if you selected “Other” in the registration page.

## Astrosat Proposal Processing System (v0.8)(i)


### Information for proposal authors

- [Announcement of Opportunity](#)
- [Instrument Hand book](#)
- [APPSHelp](#)
- [Help Desk](#)
- [More Info](#)

### Sign In

User ID:

Password:

Text Verification: 

*Enter characters seen in the image/picture below.  
If you are unable to view the image/picture, please click on refresh button.*

\*

[Create Account](#)   [Reset User ID/Password](#)

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FIGURE 2 APPS LOGIN PAGE

## Astrosat Proposal Processing System

[Home](#)[Proposer](#)[ATAC Member](#)[Piggyback Team Member](#)[Validator](#)[Information](#)[Change Profile](#)

### Information

**Welcome Gulab!!**

**Information for proposal authors**

[Announcement of Opportunity](#)

[Instrument Hand book](#)

[APPSHelp](#)

[Help Desk](#)

[More Info](#)

**Pending Actions**

Proposals [T01\\_063](#), [T01\\_117](#), [T01\\_118](#) are due submission.

**FIGURE 3 APPS USER HOME**

(i) To login into APPS, enter your user ID and password and the Captcha text verification, and then click on the “Login” button. You will see the home page. All users will see the “Home” and “Proposer” tabs. However, depending on the privileges assigned to your user accounts, you may also see other tabs, according to the roles you are performing in the AstroSat Proposal Processing System.

(i) Click on the “Proposer” Tab. You will see the links “List Proposal” and “Create Proposal”. Default navigation is to “List Proposal”. You can view all proposals or select a subset of proposals based on cycle, proposal status, PI or Co-I.

**Astrosat Proposal Processing System**

Home **Proposer** ATAC Member Piggyback Team Member Validator

[List Proposals](#) | [Create Proposal](#)

List Proposals

Cycle: All  List proposals for which I am PI

Status: All  List proposals for which I am Co-Investigator (not PI)

<< first < prev 1 [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) next > last >>

Proposal ID	Title	PI	Status		
T01_113	CZTI PV Proposal 3.6: Observation of crowded field near galactic centre region	Santosh Vadawale	Accepted: full allocation	<a href="#">View</a>	
T01_106	Multi Wavelength Observations of a Blazar: PKS1510-089	KP Singh	Accepted: full allocation	<a href="#">View</a>	
T01_104	Multi Wavelength Observations of a Blazar: PKS1510-089	KP Singh	Submitted	<a href="#">View</a>	
T01_103	Probing UV/Hard X-ray connection with Astrosat monitoring observations of NGC 4151	Dipankar Bhattacharya	Accepted: full allocation	<a href="#">View</a>	
T01_069	Probing UV/Hard X-ray connection with Astrosat monitoring observations of NGC 4151	Dipankar Bhattacharya	Submitted	<a href="#">View</a>	

<< first < prev 1 [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) next > last >>

**FIGURE 4 LIST OF PROPOSAL PAGE**

## B. Proposal Creation, Preparation and Submission

To create a new proposal, click the link “Create Proposal” button. This will list available cycles open for submission of proposals. To create a new proposals click on the link of the proposal cycle

to which you wish to submit a proposal, listed under “Choose a proposal type”. This will lead you to a new subpage titled “Create New Proposal”. For successful submission of proposal you will need to complete the following five steps:

“Cover Page”, “Target List & Instrument Configurations”, “Attachments”, “Supplementary Info” and “Verify & Submit”.

## Astrosat Proposal Processing System

[Home](#)[Proposer](#)[ATAC Member](#)[Piggyback Team Member](#)[List Proposals](#) | [Create Proposal](#)

### Create Proposal

Choose a proposal type.

1. Create an [AO proposal](#) for observation in Cycle A01. To create an AO proposal using the data from an older proposal [click here](#)

The last date for submission is May 11, 2016

(or)

2. Create a [GTO proposal](#) for observation in Cycle G06. To create a GTO proposal using the data from an older proposal [click here](#)

The last date for submission is May 11, 2016

(or)

3. Create a [ToO proposal](#) for observation in Cycle T01.

(or)

4. Create a [CAL proposal](#) for observation in Cycle C01.

There is no cycle open for PV proposal submission.

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### FIGURE 5 PROPOSAL CREATION PAGE

These five steps are listed in the form of 5 tabs/links in the proposal editing subpage. It is recommended that proposers complete the five steps in sequence though the flow for these steps is not necessarily sequential, and one can navigate back and forth as required. It is useful to note the following points while filling the proposal form.

- The mandatory fields are indicated with an asterisk “\*”.
- Proposers can view a short description of input headings in blue color such as “Proposal Type”, “Title”, “Quota” etc. by clicking on them which will open a new page without destroying the proposal form.
- It is advisable to select the Proposal Type before you proceed to further pages of proposal editing, as changing the proposal type at a later stage can alter other fields in the proposal, and require you to re-enter information in other steps.

- It is also advisable to click on the “Save Draft” button periodically, to save the updated information you enter as your proposal creation progresses. Also, saving draft allows you to logout and resume editing the proposal when you login at a later time.
- Navigating away from the Edit Proposal subpage without clicking on “Save Draft” will cause all information entered since the last saved draft to be lost. This kind of navigation includes:
  - A. clicking on the “Logout” button
  - B. clicking on the “Home”, “Proposer” or any other tabs visible in your interface
  - A. clicking on the “List Proposals” or “Create Proposal” links

Complete the five steps of proposal preparation as follows.

**(a) Filling the Cover Page**

Default navigation after proposals creation is to the Cover Page. The Cover Page contains the basic proposal information (such as Proposal Type, Title, Abstract, Proposer’s details, Contact Information, and Scientific Category) and the Investigator list. The allowed word limits and on-the-fly word count for certain fields such as “Title” and “Abstract” are also shown. Complete the Cover Page as follows.

(i) Select one of the following proposal type - “Regular Pointing”, “Monitoring” or “Anticipated ToO”. There may be other proposal types available, do not select “Scan Mode” and “Tracking” even if the software allows. These proposal types are not gone through performance and verification, and may be made available in a future cycle.

(ii) Quota: Select “India” if the PI of the proposal is affiliated to an Indian institute or university. Otherwise select “International”.

(iii) Populated “Title” and fields “Abstract” within the indicated word limits. If you have submitted an AstroSat proposal in a previous cycle, please provide proposal ID.

(iv) Proposers Table: The PI of the proposal is automatically listed as the creator of the proposal. You can add a Co-I (Co-Investigator) for the proposal by clicking on the “Add Co-I” button of the proposer table. Once you click on the “Add Co-I” button, you will get a search dialog box which enables you to search the Co-I by their name or email id. The dialog will display details of registered members from the database that match your search criteria and you can select the correct entry and

click on “Add” button. The selected member is then added to the Proposers table as a Co-I. If you cannot find one or more of your Co-Is in APPS, please ask them to register into the system. It is not possible to make a non-registered user as a Co-I.

- (v) Scientific Category: Select an appropriate scientific category.
- (i) The “Total Observing Time” which is the sum of the requested exposure time for the primary instrument and “Total Staring Time” (i.e. the total view period calculated from the total requested observing time and the observing efficiency of the primary instruments) fields will automatically be filled after instrument configuration is set.
- (ii) Click on “Save Draft” and go to the next step by clicking the Tab “Target List & Instrument Configuration”.



Astrosat Proposal Processing System

[Home](#) | [Proposer](#) | [ATAC Member](#) | [Piggyback Team Member](#) | [Validator](#)

[List Proposals](#) | [Create Proposal](#)

Edit Proposal: T01\_119

[Cover Page](#) | [Target List & Instrument Configurations](#) | [Attachments](#) | [Supplementary Info](#) | [Verify & Submit](#)

[Save Draft](#)

**NOTE:** Fields marked with  symbol are editable.

**NOTE:** Please note that Proposals can be prepared and submitted only by the PI or by the Primary Observer.

**NOTE:** Latex commands can be used in Title and Abstract fields. To do so please start the text with %*latex*% in the respective input text boxes.

**Proposal Type:**




**NOTE:** If you change the proposal type after adding the sources, the previously added sources will be removed. You will have to enter the sources again.

**Title:** (Max words allowed: 20 Word Count: 0) \*

**Related previous APPS Proposal Ids:** (use comma as separator)

**Abstract:** (Max words allowed: 150, Word Count: 0) \*

**Proposers:** \*

Proposer	Institution 	Email 	Primary Observer 
GULAB CHAND DEWANGAN	IUCAA	gulabd@iucaa.in	Yes

[Add Co-I](#) | [Move selected rows UP](#) | [Move selected rows DOWN](#) | If your institute is not listed, you may [add it to the list](#).

**NOTE:** If your co-I is not registered, ask him to register. In case of emergency create an account on his behalf.

**Primary Observer Contact details:**

Address:  \*

City:  \*

State:

Country:  \*

Telephone 1:  \*

Telephone 2:

Fax:

**Scientific Category:** (Select one that applies) \*

- Solar System
- SN, SNR and Isolated NS
- Surveys
- Other
- Stars & Stellar Systems
- Diffuse Emission - Galactic and Extra Galactic
- Galaxies
- Compact Objects In Binaries
- AGN and Quasars
- Cosmology

**Time requested:** (Calculated automatically from source list)

Total Observing Time Required :  secs

Total Stare Time Required :  secs

[Save Draft](#)

FIGURE 6 PROPOSAL COVER PAGE

**(b) Target List and Instrument Configuration - Adding Targets**

The “Target List and Instrument Configuration” page shows the Target list Table with the inputs for source properties (see Figure 7 for a regular proposal). The target ID is automatically

generated by the software. The observation time is automatically calculated as the sum of exposure times for all exposures defined for the primary instrument (see below). The stare time is total view duration required to achieve the requested exposure time for the primary instrument (see page 17). The monitoring and anticipated proposals will have additional columns in the target list as described in the section on “Proposal Types”. One can add new targets by clicking on “Add Source” and fill the editable fields by clicking on the corresponding table columns, as shown in the screen below. One can directly fetch the source coordinates by clicking the buttons “NED” or “Simbad”. If your source is not listed in NED/Simbad, you will need to enter the coordinates manually. Proposers can add targets/sources as per your requirements by clicking on “Add source” button. One can also provide comments on the target list such as the priority order that may be useful for the review committee.

The regular proposals can have multiple targets. However, it is strongly recommended that proposers should not enter more than one target in a monitoring. It is also recommended that the total observing time per target should not be below 1000 seconds.

## Astrosat Proposal Processing System

Home | **Proposer** | ATAC Member | Piggyback Team Member | Validator

List Proposals | [Create Proposal](#)

### Create New Proposal








Cover Page | **Target List & Instrument Configurations** | Attachments | Supplementary Info | Verify & Submit

[Save Draft](#)

**NOTE:** Fields marked with  symbol are editable.

[Source list:](#) \*

- For point sources, set source size "0.001".
- Observation Time and Stare Time for the Primary Instrument will be automatically filled in after the exposures are defined in the instrument configuration page.

	Target ID	Source Name 	RA J2000 (hh mm ss.ss) 	DEC J2000 ([+/-]dd mm ss.ss) 	Variable? 	Source Size (arc min) 	Observation Time Primary Instrument (secs)	Stare Time Primary Instrument (secs)	V Mag 	2-10 KeV Flux (erg/cm <sup>2</sup> -s) 	Instrument Settings
<input type="checkbox"/>	T01	NGC4051	12 3 9.686	44 31 52.540	Unknown	0.001	0	0			<a href="#">Configure</a> <a href="#">Delete</a>

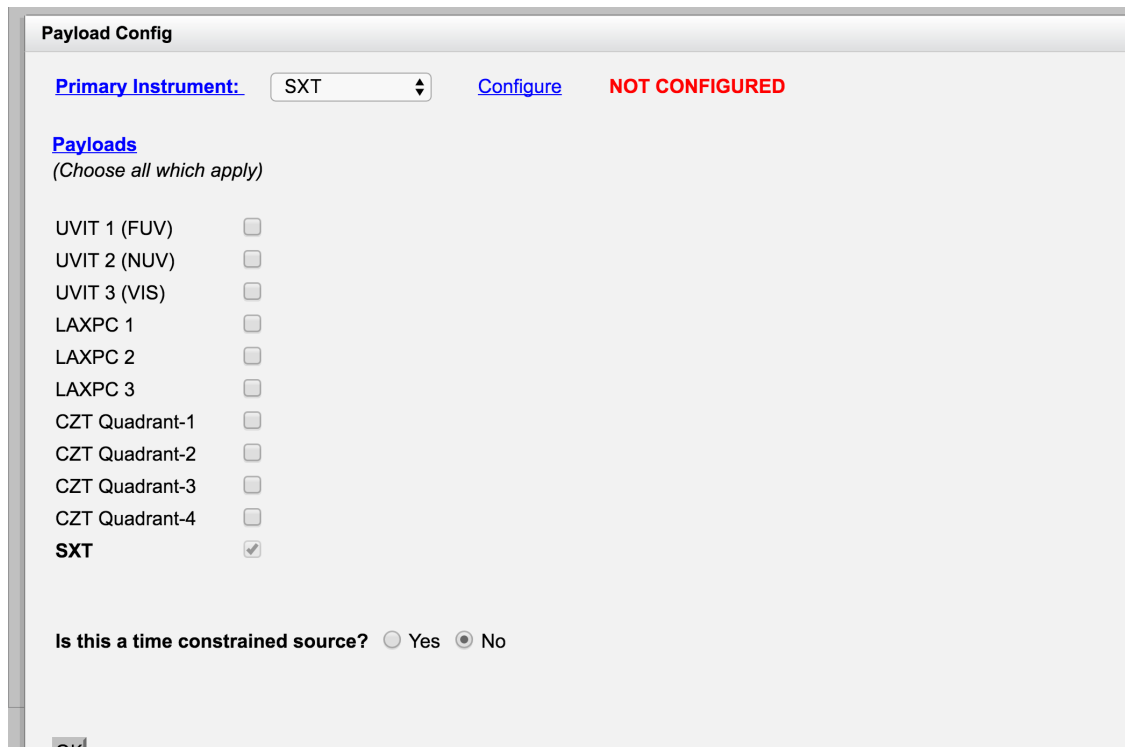
[Add Source](#) [Move selected source\(s\) UP](#) [Move selected source\(s\) DOWN](#)

Resolve sources using [NED](#) [Simbad](#) (You can select the source by clicking on the checkbox in the table)

[Comments related to sourcelist:](#)

[Save Draft](#)

**FIGURE 7 TARGET LIST PAGE**



**FIGURE 8 SELECTION OF PRIMARY INSTRUMENT**

**(c) Configuring Instruments**

Once a target is entered, proposers can configure instruments and create exposures for any of the AstroSat instruments. For each target you can configure instruments as per your need. Under the Instrument Settings column in the Target list Table, there is a “Configure” link for each target row. Click on the link, and a “**Payload Config**” dialog box will appear as shown in the screenshot below.

Now you can select the Primary Instrument from drop down menu. A “Configure” link will appear next to it (see the screenshot in Fig. 8). Clicking this will open the “**Instrument Configs**” dialog, with the Instrument Configuration default settings for the Proposal Cycle. After configuring the primary instrument, proposers can select and configure secondary instruments listed under “Payloads” as shown in Figure 9. Due to the different observing efficiencies, the exposure time for secondary instruments can be different. Proposers can enter exposure time for secondary instruments up to the maximum possible value. The observing efficiencies set in APPS are 15% for UVIT, 25% for SXT, and 45% for CZTI and LAXPC. Thus, if one specifies 900sec exposure for UVIT as the primary instrument, maximum exposures available for the secondary instruments are 1500sec for SXT, and 2700sec for LAXPC and CZTI. APPS will complain and not accept if a longer exposure is entered for the secondary instruments.

**Note-** Instrument Configurations are dynamic, and can vary from one Proposal Cycle to other. Additionally, each instrument will have a different Instrument Configuration setup. The screenshot shown below are only a representative image of example Instrument Configuration pages.

**Payload Config**

**Primary Instrument:** SXT [Configure](#) **CONFIGURED**

**Payloads**  
(Choose all which apply)

UVIT 1 (FUV)	<input checked="" type="checkbox"/>	<a href="#">Configure</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
UVIT 2 (NUV)	<input checked="" type="checkbox"/>	<a href="#">Configure</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
UVIT 3 (VIS)	<input type="checkbox"/>			
LAXPC 1	<input checked="" type="checkbox"/>	<a href="#">Configure</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
LAXPC 2	<input checked="" type="checkbox"/>	<a href="#">Configure</a> <a href="#">Copy from LAXPC 1</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
LAXPC 3	<input checked="" type="checkbox"/>	<a href="#">Configure</a> <a href="#">Copy from LAXPC 1</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
CZT Quadrant-1	<input checked="" type="checkbox"/>	<a href="#">Configure</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
CZT Quadrant-2	<input checked="" type="checkbox"/>	<a href="#">Configure</a> <a href="#">Copy from CZT Q-1</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
CZT Quadrant-3	<input checked="" type="checkbox"/>	<a href="#">Configure</a> <a href="#">Copy from CZT Q-1</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
CZT Quadrant-4	<input checked="" type="checkbox"/>	<a href="#">Configure</a> <a href="#">Copy from CZT Q-1</a>	<b>NOT CONFIGURED</b>	Total obs. time = 0 secs
<b>SXT</b>	<input checked="" type="checkbox"/>			

**LAXPC Payload Configuration:**

Expected Standard mode count rate: 0.0 counts/sec

**FIGURE 9 SELECTION OF SECONDARY INSTRUMENTS**

The instrument configuration consists of parameters at three levels.

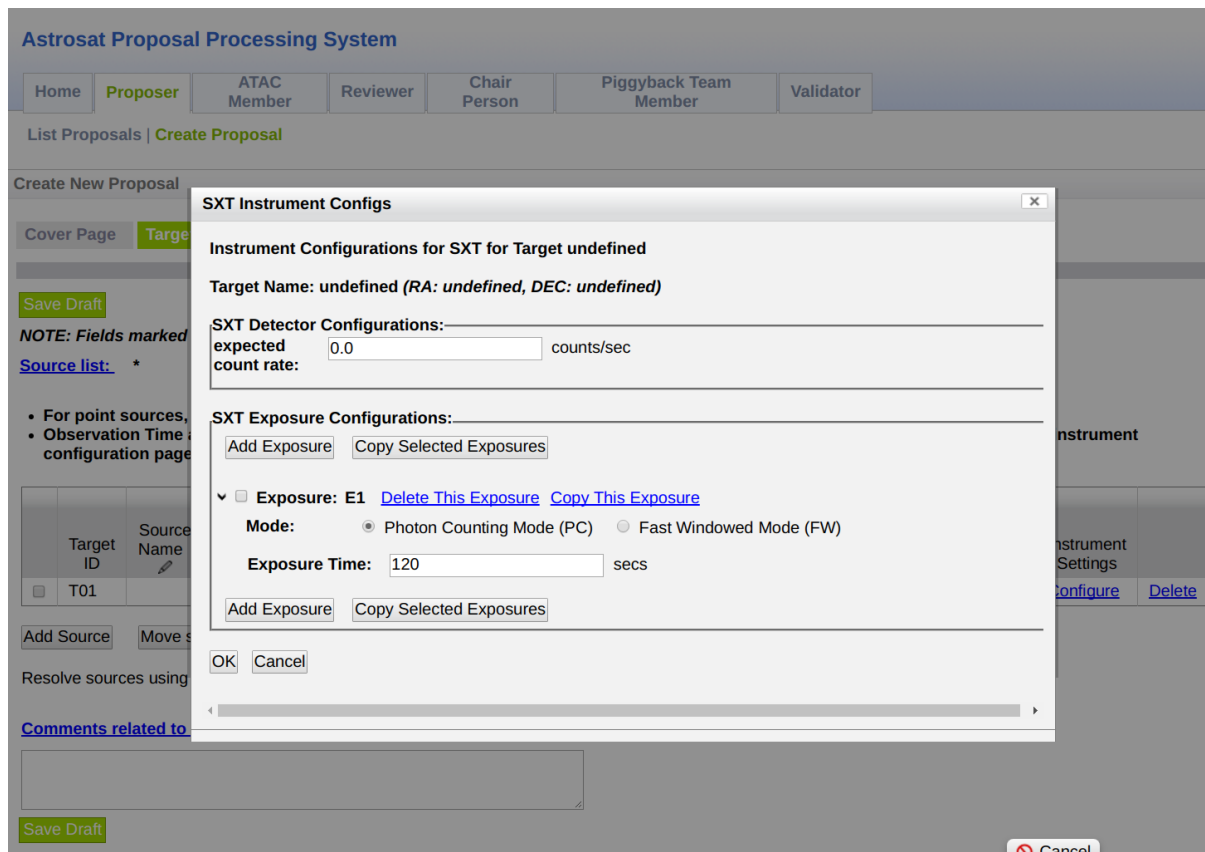
*Payload configuration:* Parameters specified here apply to all detectors of a payload e.g., STBG bin time is the LAXPC payload level parameter and applies to all three LAXPC detectors. This parameter should generally be left at the default value.

*Detector Configuration:* Parameters at this level apply to individual detectors e.g., estimated count rate for UVIT1.

*Exposure configuration:* A particular detector can have multiple exposures and the parameters listed under exposure configuration apply to individual exposures.

On selection, an instrument under “Payload”, the payload configuration parameters appear below the payload list. The “Configure” that appears after selecting an instrument opens the “Detector

Configurations” and “Exposure Configurations. For exposure parameters, you will need to click “Add Exposure”. It will display the default settings. You can edit/choose the parameter values as per your observational requirements. Please note that there may not be any parameters for an instrument at the payload or detector level but all instruments have exposure level parameters.



**FIGURE 10 CONFIGURING SXT**

On completing the Detector and Exposure Configurations, click the “**OK**” button, and it will lead you back to the parent Payload Config dialog.

**Note-** Scroll within the dialog box if “**OK**” button is not visible.

Similarly, you can configure other payloads i.e. secondary instruments, in addition to the Primary Instrument, in the Payload Config dialog. This can be done by checking the check-boxes next to the payload names. A “Configure” link will appear for each checked payload, allowing you to specify the settings by the same procedure as above. One can define multiple exposures by adding a new

exposures by clicking “Add Exposure” or selecting an existing exposure and copying by clicking the “Copy Selected Exposure” button. Please note the total exposure time for a secondary instrument cannot exceed the exposure time set for the primary instrument.

### SXT Configuration

The screenshots of SXT configuration pages can be seen in Figure 10.

- (i) Enter expected SXT count rate for your target. The count rate can be estimated using PIMMS or spectral simulations with XSPEC/ISIS/Sherpa.

Choose SXT operating mode – Photon Counting (PC) or fast window mode. Please refer to AstroSat handbook for more details on the operating modes of SXT. The FW mode should be used if the target is brighter than 0.5 Crab. The PCW mode available in earlier cycles has now been removed.

- (ii) Enter Exposure Time in seconds.
- (iii) Click “OK”. If you click on “Add exposure”, it will open another exposure configuration.

LAXPC 1 Instrument Configs

Instrument Configurations for LAXPC-1 for Target T01

Target Name: NGC4051 (RA: 12 3 9.686, DEC: 44 31 52.540)

LAXPC-1 Detector Configurations:

LAXPC-1 Exposure Configurations:

Add Exposure Copy Selected Exposures

▼  Exposure: E1 [Delete This Exposure](#) [Copy This Exposure](#)

Mode:  Event Analysis (EA) Mode  Fast Counter (FC) Mode **NOTE: EA Mode is the combination of br**

Exposure Time: 120 secs

Add Exposure Copy Selected Exposures

OK Cancel

Figure 11 LAXPC1 configuration

### **LAXPC configuration**

Figure 11 shows the screenshot for LAXPC1 configuration. Proposers can use only LAXPC1 and LAXPC2, LAXPC3 is no longer available for scientific observations starting from cycle A05.

- (i) On selecting any of the LAXPC units, two payload parameters appear in the Payload Config page.
- (ii) Enter total expected count rate in the EA mode for two LAXPCs. The count rate can be estimated using PIMMS or spectral simulation software such as XSPEC/ISIS/Sherpa and response files.
- (iii) Chose STBG BIN time among the available options from 16 to 2048msec. It is recommended not to change this parameter.
- (iv) First configure LAXPC1 by clicking the “Configure” button after selecting LAXPC1. In the exposure configuration, choose operating mode – Event Analysis (EA) or Fast Counter (FC) mode. EA mode is a combination of event mode and broadband counting mode. FC mode is appropriate for the brightest targets. Please refer to AstroSat handbook for more details.
- (v) Enter exposure time in seconds.
- (vi) Copy the LAXPC1 configuration for LAXPC2 . One can also configure LAXPC2 independent of LAXPC1.

### **CZTI Configuration**

CZTI has the simplest configuration (see the screenshot in Figure 12). The four units operate independently. Only the “Normal” operating mode is available. To configure CZTI, select CZT quadrant-1, enter expected total count rate for the CZTI payload. Click the configure button and add exposure. Enter exposure time, and press OK. Copy the configuration for CZT quadrant-1 for other three quadrants.



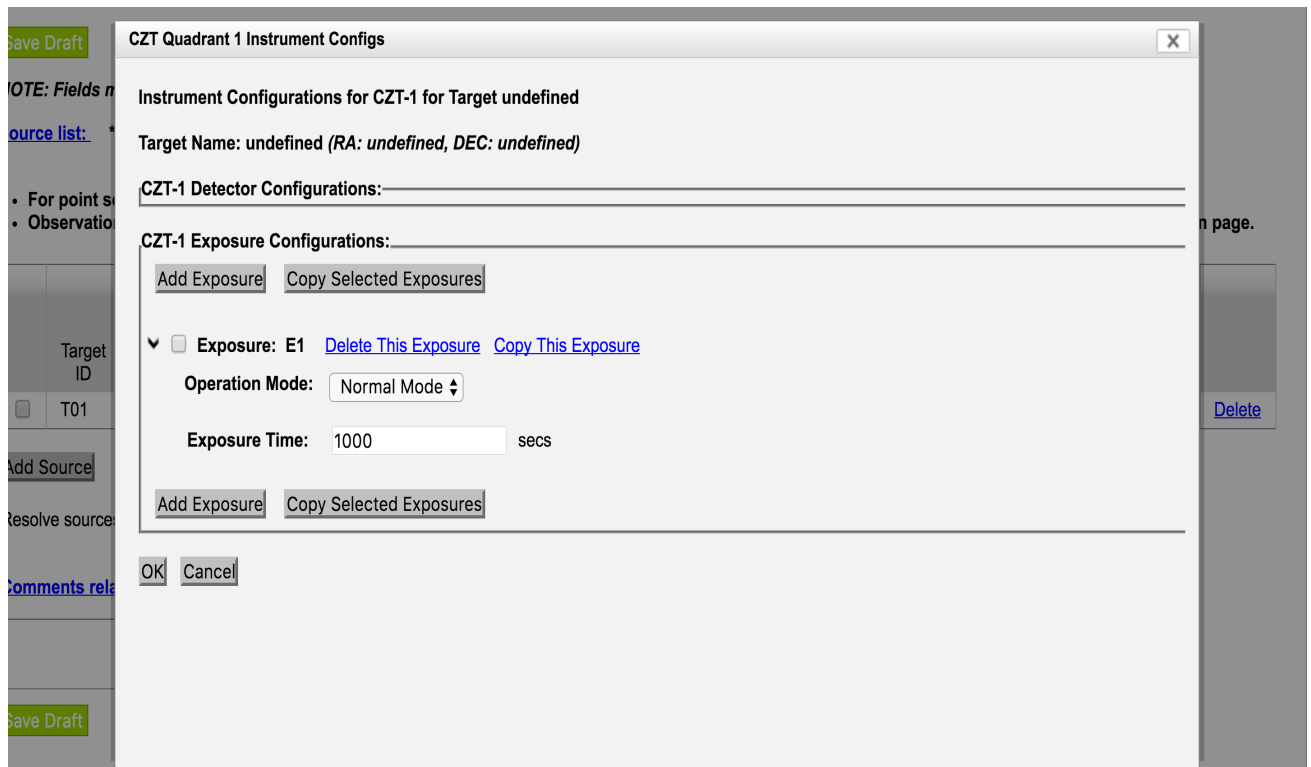


FIGURE 12 CZTI CONFIGURATION PAGE

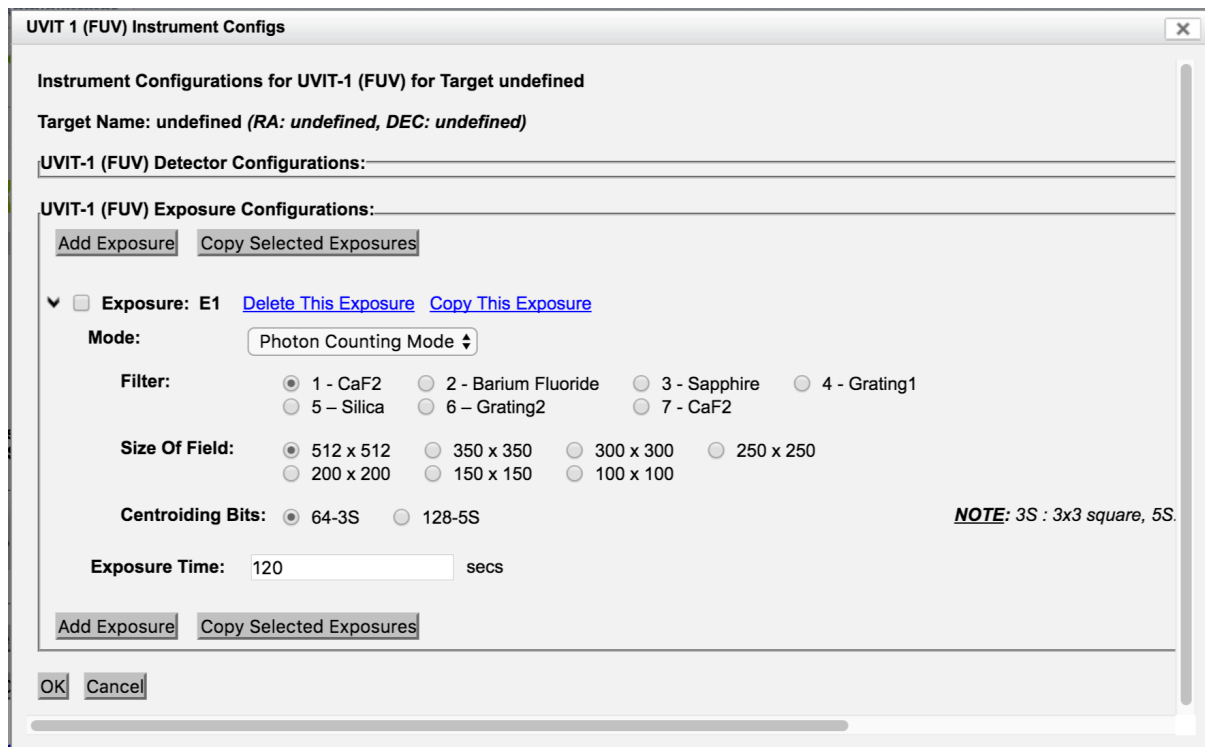


Figure 13 Configuring FUV channel

## UVIT configuration

The three UVIT units FUV, NUV and VIS channels operate independently and need to be configured separately. Configuring UVIT for your science requirements while ensuring safe operation of the payload is not easy. Proposers are strongly recommended to read the guidelines for UVIT proposals and perform mandatory checks for UVIT observation. It is the proposers responsibility to ensure that the “Bright Object Trigger” is not activated by the presence of bright sources in the field of view. In case of “Bright Object Trigger”, UVIT goes into the OFF mode and no data are available.

The VIS channel is used for tracking purposes and the proposers should ensure that the tracking capability is not compromised.

UVIT 2 (NUV) Instrument Configs

Instrument Configurations for UVIT-2 (NUV) for Target undefined

Target Name: undefined (RA: undefined, DEC: undefined)

UVIT-2 (NUV) Detector Configurations:

UVIT-2 (NUV) Exposure Configurations:

Add Exposure Copy Selected Exposures

▼  Exposure: E1 [Delete This Exposure](#) [Copy This Exposure](#)

Mode: Photon Counting Mode

Filter:  1 - Silica  2 - NUV15  3 - NUV13  4 - Grating  
 5 - NUVB4  6 - NUVN2  7 - Silica

Size of Field:  512 x 512  350 x 350  300 x 300  250 x 250  
 200 x 200  150 x 150  100 x 100

Centroiding Bits:  64-3S  128-5S **NOTE: 3S : 3x3 square, 5S: 5x5 squ**

Exposure Time: 120 secs

Add Exposure Copy Selected Exposures

OK Cancel

Figure 14 Configuring NUV channel

Once the mandatory checks are performed, the UVIT channels can be configured as follows (see the screenshots in Figure 13 and 14 for configuration of FUV and NUV channel).

- (i) Enter expected count rates for the target and the full field in the CaF2 filter (FUV), Silica (NUV) or VIS3 (VIS). Use the UVIT exposure time tool to estimate the count rates.

Add exposure, and select the operating mode, filter, size of the field from the available options. Note that smaller field sizes require longer stare time due to the different amount of data generated depending on the partial field chosen and the limitation on the data download rate per orbit (see the section on “Observing with partial fields in the UVIT chapter of handbook). Please also note that only full field (512x512) is available for NUV, and partial fields for FUV can be used only with certain combination of NUV/FUV filters. While configuring partial fields for FUV, proposers can configure NUV (full field) and FUV (partial field) in one of the following two ways. (i) Use NUV B13 N245 M (slot 3) filter for full field NUV and either BaF2 or Sapphire or Silica for the partial field of FUV, or (ii) use NUV B15 M219 M (slot 2) filter for full field NUV and Silica for partial field of FUV.

(ii) For the photon counting mode available for FUV and NUV additionally choose the centroiding bits 3S (3x3 square pixels) or 5S (5x5 square pixels).

(iii) Enter the exposure time in seconds. Please note that the UVIT observing efficiency is

**Payload Config**

**CZT Payload Configuration:**  
expected count rate:  counts/sec

**LAXPC Payload Configuration:**  
Expected Standard mode count rate:  counts/sec  
STBG BIN Time:  milli-sec **NOTE:** This is the BIN time for the Broad Band Counting mode

Is this a time constrained source?  Yes  No

**Time Constraints**

Sr.No.	Start Time (DD/MM/YYYY HH:MM:SS)	End Time (DD/MM/YYYY HH:MM:SS)	
TC1	20/11/2016 00:00:00	05/02/2017 12:00:00	<a href="#">Delete</a>

**Comments On Time Constraints:**

**FIGURE 15 SPECIFYING TIME CONSTRAINTS FOR A TARGET**

~15% and pointing is unlikely to be changing within one orbit. Hence, a single short exposure say 120s for a target will lead to very inefficient use of UVIT.

**Warning :** It should be noted that wrong selection of UVIT filters will lead to rejection of proposals. As mentioned above, special attention is required when using the partial fields for FUV. If required, proposers can get approved the filter selection by the UVIT ATC member before the proposal submission. Proposers can write to C. S. Stalin (email : stalin@iiap.res.in).

The Payload Config dialog also allows you to specify time constraints for the targets, by selecting the “Yes” radio button in response to the question “Is this a time constrained source?”(Scroll within dialog box, if not visible). A table will appear allowing you to specify one or more time constraints, as depicted in Figure 15.

Once you are done with the configuration, click on the “**OK**” button at the bottom of the Payload Config dialog (scroll within dialog, if not visible). The focus will return to the parent “**Target List & Instruments Configuration**” page. Click “Save Draft” after adding targets, before moving to further steps.

#### **(a) Attachment page**

Next, click on the link “**Attachments**”, and the subpage shown in Figure 16 will be displayed. Attach the required files by clicking on “Browse” buttons for Scientific Justification and Technical Justification, and selecting files from your local filesystem. For UVIT Bright Source List and Astroviewer Output, you will be allowed to add one file for every target in your proposal, using the “**Add Another ..**” buttons respectively. See below screenshot for reference.

## Astrosat Proposal Processing System

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### Create New Proposal

[Cover Page](#)[Target List & Instrument Configurations](#)[Attachments](#)[Supplementary Info](#)[Verify & Submit](#)[Upload](#)

**NOTE: Attachments should be ONLY in PDF format.**

Please attach a self-contained "SCIENTIFIC JUSTIFICATION" as per the guidelines. A brief status report on each previous APPS proposal should be appended to the scientific justification.

When your proposal is scheduled, the contents of the cover sheets become public information. Any supporting pages are for refereeing purpose only.

**File upload size limit is 10 MB per attachment.**

[Scientific Justification:](#)

 test1.pdf

\*

[Technical Justification:](#)

 test2.pdf

\*

[UVIT Bright Source List \(one file per target\):](#)

 ↓ No file chosen

\*

[Astroviewer Output \(one file per target\):](#)

 ↓ No file chosen

\*

[Proposers have been allotted time in Astrosat before](#)

[Upload](#)

Figure 16 The attachment page

Once the files have been attached, click the **“Upload”** button. This process might take anywhere between a few seconds to a few minutes depending on the file sizes and connection bandwidth. Once the files have been successfully uploaded, you will get a **“Save successful”** message as shown below.

**Note-** It is NOT compulsory to upload all the files at once. You can upload one file at a time, or in batches. Every time you upload, the draft is saved as well.

**(a) Supplementary Information page**

Next, click on **“Supplementary Information”** link and you will navigate to a subpage that provides a text area where any special requirements can be specified (see the screenshot in Figure 17). This info is not mandatory for completion of the proposal. Click **“Save Draft”** once done.

## Astrosat Proposal Processing System

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### Create New Proposal

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---

[Save Draft](#)

**Any special requirements :**

[Save Draft](#)

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**FIGURE 17 FILLING IN SUPPLEMENTARY INFORMATION (OPTIONAL)**

**(b) Verify and Submit page, generation of pdf version of the proposal**

In the last steps of proposal editing process, click on the link “Verify & Submit”. If any of the mandatory fields in the proposal have not been filled, a message will be displayed here corresponding to each of incomplete information, as shown in the screenshot in Figure 18. The messages are grouped section wise and you can navigate back to those sections and fill in the required fields.



# Astrosat Proposal Processing System

Home

**Proposer**

ATAC Member

Piggyback Team Member

Validator

[List Proposals](#) | [Create Proposal](#)

## Create New Proposal

Cover Page

Target List & Instrument Configurations

Attachments

Supplementary Info

**Verify &**

**Submit**

The following mandatory fields are missing. The proposal cannot be submitted until they are filled.

### Cover Page:

Proposal Title

Abstract

Scientific Category

### Target List and Instrument Configurations:

Add at least one source to observe

### Attachments:

Attach Scientific Justification

Add file of Technical Justification

### Supplementary Info:

\* **Refresh**

**FIGURE 18 PROPOSAL VERIFICATION PAGE**

Finally, once all mandatory fields have been filled, the Verify & Submit screen will appear as shown in Figure 19. Here you can suggest a referee by clicking on the “**Suggest A Referee**” button. You can preview your proposal by clicking the Preview button which will open a new window with links for pdf files of the proposal to download. In order to submit your proposal, you will be required to enter your password and Captcha text verification. Once entered, click “**Submit**” to complete the proposal submission. The pdf version of the proposal can also be downloaded from the “List Proposal” page by clicking the “View” button at any point of time after the proposal preparation is over.

On successful submission of the proposal, you will be greeted with the message as shown in Figure 20.

Cover Page Target List & Instrument Configurations Attachments Supplementary Info **Verify & Submit**

All mandatory fields are now filled in.

If you wish, you can suggest the names and email-addresses of possible referees below

Referee Name  Email address

Click button below to add an entry for suggesting a referee.

*NOTE: Please note that once you have submitted the proposal, it can no longer be revised. You can however 'Withdraw' the proposal before the proposal submission date.*

Password:

**Text Verification**  
Enter the text and symbols seen in the image.  
If the image has not loaded properly or if the text in the image is not readable, click on the refresh button besides the image.

Figure 19 Proposal preview and submission page after verification

## Astrosat Proposal Processing System

[Home](#) [Proposer](#)

[List Proposals](#) | [Create Proposal](#)

Create Proposal

**You have successfully submitted the proposal A06\_005 !!**

You can view the submitted proposal from 'List Proposals' page. Please note that you cannot edit the proposal.

*Figure 20 Successful proposal submission message.*

### C. List, Edit and Withdraw Proposals

If you click on “List Proposal” under the “Proposer” tab, or click on the Proposer tab itself, you will navigate to the page as shown in Figure 21.

Proposers can filter the listed proposals by selecting the proposal cycle from the “Cycle” drop down menu and the proposal state from the “Status” drop down menu.

The listed proposal will have the following links.

All proposals will have a “View” link which will allow you to view a PDF coversheet of the proposal, as well as attachments uploaded as part of the proposal.

Proposals which are in the draft state will have an “Edit” link which allows you to continue editing a saved draft of the proposal, by the same steps as listed in the Create Proposal section.

All proposals will also have a “Withdraw” link. For proposals in the Submitted status, this will withdraw the proposal submission. For proposals in the Draft state, this will delete the draft from the database.

## Astrosat Proposal Processing System

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 [ATAC Member](#) | 
 [Piggyback Team Member](#)

[List Proposals](#) | 
 [Create Proposal](#)

**List Proposals**

**Cycle:** 
**List proposals for which I am PI**   
**Status:** 
**List proposals for which I am Co-Investigator (not PI)**

<< first < prev 1 2 3 4 5 6 7 8 9 10 next > last >>

Proposal ID	Title	PI	Status			
T01_115		Gulab Chand Dewangan	Draft	<a href="#">View</a>	<a href="#">Edit</a>	<a href="#">Withdraw</a>
T01_113	CZTI PV Proposal 3.6: Observation of crowded field near galactic centre region	Santosh Vadawale	Accepted: full allocation	<a href="#">View</a>		
T01_106	Multi Wavelength Observations of a Blazar: PKS1510-089	KP Singh	Accepted: full allocation	<a href="#">View</a>		
T01_104	Multi Wavelength Observations of a Blazar: PKS1510-089	KP Singh	Submitted	<a href="#">View</a>		
T01_103	Probing UV/Hard X-ray connection with Astrosat monitoring observations of NGC 4151	Dipankar Bhattacharya	Accepted: full allocation	<a href="#">View</a>		

<< first < prev 1 2 3 4 5 6 7 8 9 10 next > last >>

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Figure 21 List proposal page with proposal status and withdrawal option.

## 16. ToO+AToO proposals for unexplored UVIT fields

It is mandatory to establish UVIT safety for all targets requiring UVIT observations as recommended in the safety check document “[http://astrosat-ssc.iucaa.in/uploads/APPS/Guidelines\\_for\\_proposal\\_submission\\_7.pdf](http://astrosat-ssc.iucaa.in/uploads/APPS/Guidelines_for_proposal_submission_7.pdf)” available at the ASSC page. A new scheme for UVIT safety check is being introduced for targets within +/- 30 degrees Galactic latitude and without Galex images. To observe such targets with AstroSat, proposers will need to submit a ToO proposal for short UVIT exposures and an AToO proposal for the main science observations. Proposers may submit ToO proposals ahead of the deadline for submission of AToO proposals. The selection of such an AToO proposal may depend on the status of the corresponding ToO proposal for UVIT safety check. Based on the outcome of ToO observations and after establishing UVIT safety, proposers will be able to trigger the approved AToO proposal for the AstroSat observation. The safety check needs to be done in a larger field to provide a safety margin for possible pointing offsets. Hence, proposers of ToO proposal for UVIT safety check will need to request 9 UVIT pointings around the target to cover the larger field. A python script is available at the ASSC webpage which the proposers can use to generate the required 9 pointings, given the coordinates of the desired science target. To avoid possible BOD triggers, proposers will need to choose narrowest NUV/FUV filters i.e. Silica in FUV and NUV-N2 in NUV channel, in their ToO proposal. Once the UVIT safety in narrow band filters are established, proposers can investigate safety of any of the broadband filters suitable for their science observation. However, since the safety of UVIT filters for main science observations will not be known in advance at the time of submission of AToO proposal, proposers would need to configure different sets of filters for the same target and enter them as different targets in the AToO proposal. If some of these combinations are deemed safe after the ToO observation, then the proposers may trigger one among them that best suits their science requirement. It should be noted that an AToO proposal will allow to trigger/observe only one target. If the proposers need monitoring observations of a target through ToO+AToO proposals, they will need to submit multiple AToO proposals for the same target and trigger them based on the safety check using the ToO proposal. The following steps may be followed to create ToO+AToO proposals.

- i. Create a ToO proposal in the available ToO cycle (T01 or T02), and select proposal type “UVIT safety check”. Note that the proposal type “regular pointing” is for true ToO proposals and cannot accommodate observations meant for UVIT safety checks.
- ii. Use proposal title “Special ToO for unexplored UVIT fields:” followed by further title the proposer would like to give.
- iii. Using the python script available at ASSC page, create 9 pointings for your target. Enter each of these 9 pointings as a target. If NGC4051 is your target of interest, the nine targets in the ToO proposal can be NGC4051\_1, NGC4051\_2, ..., NGC4051\_9. Configure each of the nine targets with the narrowest NUV/FUV filters i.e., Silica for FUV and NUV-N2 for NUV. For each channel, create one exposure of 120s (not more!).
- iv. Populate other fields and attach scientific/technical justification as per the ToO proposal requirements, and submit the ToO proposal.
- v. Create AToO proposal in AO cycle, and fill the proposal. Enter ToO proposal number in the box “Related proposals”. Enter target name, and configure for the desired filters. As the safe filters will be known only after the ToO observations are performed and the data analysed, proposers may configure different set of filters by entering different target ids (T01, T02, upto 6 target ids) for the same target. Only one of these entered targets can be triggered based on the safety check. In the target list of the AToO proposal, proposers should enter the triggering criterion as “based on the outcome of safety check using ToO Proposal proposal\_id”, where proposal\_id is the proposal number. As the AToO proposal is not really for time critical observations, the trigger duration may be entered as the visibility duration.
- vi. On approval of a ToO proposal for UVIT safety check and completion of the 9 pointing ToO observations, proposers in consultation with UVOT POC at IIA (email: stalin@iiap.res.in), Bangalore need to perform the following steps and trigger approved AToO observations accordingly.
  - a. Generate FUV/NUV images using level2 pipeline.
  - b. Perform photometry on brightest few point sources.
  - c. Estimate the spectral slope between NUV and FUV, and apply multiplicative factor between the safety filter (used in ToO observation) and the science filters (used in AToO proposal).
  - d. Check the expected count rate in each of the science filters, and conclude if the filter is SAFE for science observations.
- vii. Trigger the AToO target with the safe filter. A summary of the above steps need to be provided in APPS as the justification for trigger.

