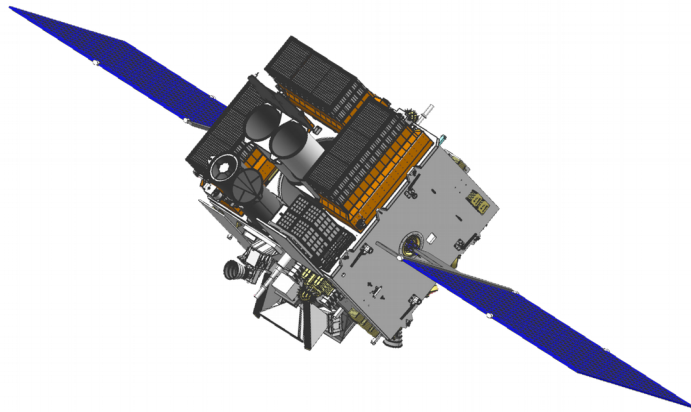




**Announcement of Opportunity  
for  
Utilizing AstroSat archival data**



**Space Science Program Office  
Indian Space Research Organisation  
Bangalore – 560 231**

06-12-2019



# 1 Description of the AO

AstroSat is India's first satellite dedicated for Astronomy. AstroSat is a multi-wavelength satellite capable of observing simultaneously from Optical/UV to hard X-rays though soft X-rays.

Indian Space Research Organisation (ISRO) declares an "Announcement of Opportunity" to carry out scientific research using AstroSat archival data. Data from four experiments onboard AstroSat viz., Ultra-Violet Imaging Telescope (UVIT), Soft X-ray Telescope (SXT), Large Area X-ray Proportional Counter (LAXPC) and Cadmium Zinc Telluride Imager (CZTi) is open to public. All the four payloads are co-aligned to simultaneously observe within the common field-of-view of cosmic sources. Data from the fifth payload Scanning Sky Monitor (SSM) on-board AstroSat was opened for public use since 2016.

UVIT yields highest spatial resolution images in near UV (NUV:  $\sim 1.4''$ ) and far UV (FUV:  $\sim 1.2''$ ) in different bands. LAXPC has the highest collecting area ( $\sim 10,800 \text{ cm}^2$ ) compared to any other detector of its kind and can yield wideband spectroscopy (3-60 keV) and fast timing data ( $\sim 10 \mu\text{s}$ ) while SXT and CZTi are capable of providing imaging, spectral and timing information in soft and hard X-ray bands respectively. Combining data from all the four payloads yields an unprecedented simultaneous broadband coverage all the way from UV to very high energy X-rays.

The data provided by AstroSat have already resulted in greater than 150 publications addressing several kinds of cosmic sources like accreting binaries, AGNs, star forming regions, GRBs, star burst galaxies, flaring stars, etc.

Data from the four payloads of AstroSat Observatory is made available to the scientific community as archival data after the proprietary period if any.

Proposals are hereby invited from Astronomy community of the nation for utilizing AstroSat archival data. This announcement of opportunity (AO) is open to Indian scientific community for submitting research proposals towards utilisation of data from any and/or all the experiments.

Information about sources observed by AstroSat, observation details and public release dates are available at Indian Space Science Data Center (ISSDC) at <https://astrobrowse.issdc.gov.in>. Users can also download the data from AstroBrowse.

A support Cell for supporting AstroSat observations and data utilization is established at IUCAA, Pune called AstroSat Support Cell (ASC). All the necessary software tools along with auxiliary data like calibration data are made available for download from ASC at <http://astrosat-ssc.iucaa.in>.

The final products are compatible with standard X-ray analysis software like heasoft and optical analysis software like IRAF. Documents with full detailed analysis instructions are also available at ASC. For any help with AstroSat data, analysis etc. users can contact ASC through [asc-help@iucaa.in](mailto:asc-help@iucaa.in).

### **1.1 Scope of AO:**

Proposals received under this AO are screened and reviewed by an expert committee. The selected project proposals through this AO will be provided limited financial support towards meeting the salary of a research student, computational facility, contingencies and limited domestic travel to attend conferences, project meetings and workshops.

The project duration will initially be for a period of three years. Hence, the research student in the project should be appointed either in the first year (preferably) or during the second year. Duration of projects can be extended to max 4 years in case of PhD. registration, depending on progress of work, status of Ph.D work of student etc. on case by case basis.

### **1.2 Who can submit a Proposal?**

Proposals could be submitted by scientists from universities and educational/research institutions in India. Only those having a minimum remaining service of four years before superannuation are eligible to lead the project as Principal Investigator (PI). The proposals must be forwarded through the Head of the Institution, with appropriate assurance for providing necessary facilities for carrying out the project under AstroSat AO programme (Please see Annexure 3).

## 2 Evaluation of Proposals

With the overall AstroSat mission objectives as given in AstroSat handbook (<https://astrobrowse.issdc.gov.in/docs/as1/AstroSat-Handbook-v1.10.pdf>), this Announcement of Opportunity (AO) for potential Principal Investigators (PIs) is aimed towards stimulating research in Astronomy and Astrophysics and to encourage development of new and relevant analysis techniques by utilising AstroSat data, development of relevant, innovative analysis tools to address new astrophysical science using AstroSat data. Towards this, the proposals received in response to this AO will be evaluated considering primarily the scientific/technical merits. A committee will evaluate the merits of the proposals. The principal criteria considered in selecting the proposals, among other things, would be:

- The overall, scientific or technical merit of the proposal, uniqueness and innovative methods, approaches or concepts planned to be demonstrated.
- Potential for contributing to innovative science by making synergistic use of AstroSat and other international data sets.
- The competence and relevant experience of the PIs and/or co-investigators to achieve proposed objectives.

It is generally not envisaged to select multiple projects addressing similar investigations.

**Preference will be given to proposals from Universities and educational institutions.**

## 3 GUIDELINES FOR PROPOSAL PREPARATION

The potential PI should submit the proposal in the format described in the following sections. The format for the cover page is given in **Annexure - 1**. The format for the detailed proposal is given in **Annexure - 2**.

The format for proposal includes a Declaration to be signed by the Principal Investigator and the Head of the Institution.

### 3.1 Instructions for Submitting a Proposal

Proposals should be limited to around 10 pages in length on standard A4 size paper, typed double-spaced and in the prescribed format. Two copies of the proposal prepared in the formats given in **Annexure - 1** and **Annexure - 2** should be mailed to:

Program Manager (Astronomy), SSPO  
Coordinator, AstroSat data utilisation AO,  
ISRO Headquarters, New BEL Road  
Bangalore 560 231  
Telephone : +91 - 80 – 2217 2070, E-mail : [sspo@isro.gov.in](mailto:sspo@isro.gov.in)

### 3.2 Description of the Proposal

The main part of the proposal should contain a summary (briefing the objectives, methodology, major milestones of the project and the time schedule), followed by a detailed description of the objectives and the scientific rationale being addressed. The data requirement and analysis methods should be highlighted. The methodology or approach to be followed and the expected results from the work of the project to be summarized. Targeted schedule for various stages of the project must be indicated including the completion date.

#### 3.2.1 Data Requirements

As described in section 3.2, the proposal should identify and utilize primarily AstroSat data for the proposed study. The project proposal should clearly indicate field of study and the data sets required. Details of data acquired by AstroSat can be obtained from website of ISSDC at <http://www.issdc.gov.in/astrosat> and can be downloaded from ISSDC, Bangalore using AstroBrowse. Users are required to register before accessing the search/browse capabilities of AstroBrowse.

#### 3.2.2 Personnel

The project may involve joint efforts involving many individuals from the concerned institution(s). However, only one PI will be recognized. Other participants could be designated as "Co-Investigators". PI/Co-Investigator shall provide brief (one page) Curriculum Vitae referring to educational qualifications, the work carried out in the related areas and **FIVE** relevant publications. The PI is responsible for ensuring timely completion of the project. The assurance of necessary administrative and financial spending support to PI and Co-Investigators from Head of the Institution(s) is essential.

### **3.2.3 Facilities and Equipment**

Describe available computer facilities, analysis software tools/packages and other equipment in the home institution or in sister concerns that are accessible for the project.

### **3.2.4 Project Evaluation**

It is proposed that a meeting will be conducted at the end of every year for the purpose of reviewing the progress of the AO projects and sharing the results with astronomy community. PIs of each project are expected to attend these workshops and brief about the progress of the respective project. Funds for the 3<sup>rd</sup> year will be subject to scientific progress at the end of the second year.

## **4 TERMS AND CONDITIONS**

- ISRO reserves the right to revoke in part or in whole its support for a project at any time without assigning any reason.
- Ownership and copyright of the data lies with ISRO. Also, this data is supplied free of cost purely for scientific research and it should not be used for any commercial purposes. Commercial use is defined as that involving the sale or resale of data, as well as data derived there from, for more than the cost of reproduction.
- New methodologies developed, complete/validated software tools specifically funded by this project with documentation shall be made available to the user community.
- The user will make available to the scientific community the salient results of the AO projects through publication in appropriate journals or other established channels.
- Acknowledgment of ISRO support must be made in all reports and publications arising out of the AO projects. Copies of all publications resulting from these research projects must be submitted to ISRO. ISRO reserves the right to use the published results in its reports and publications with due reference to the publication.

- In all publications resulting from this financial grant should be acknowledged as,  
“The author(s) acknowledge the financial support of ISRO under AstroSat archival Data utilization program. This publication uses data from the AstroSat mission of the Indian Space Research Organisation (ISRO), archived at the Indian Space Science Data Centre (ISSDC)”
- The PI is required to submit progress report every six months during the duration of the project. A detailed report is to be submitted during the mid-term and final reviews in soft copy form.

**The declaration contained in the proposal format must be signed by the PI and Head of the Institution (Annexure 3). Otherwise the proposal will not be considered valid and is liable to be rejected.**

## **5 Overview of AstroSat**

For an overview of AstroSat mission, payloads and other details, the proposers are referred to the AstroSat instrument handbook available at

**<https://astrobrowse.issdc.gov.in/astro.html>**



**Cover Page of the Proposal**

Title of the Proposal

Name and Designation of PI

Telephone and E-mail Address

Name of Institution with full Address

Announcement of Opportunity (AO) proposal submitted to Indian Space Research Organisation (ISRO) on

Signature of PI with Name and Designation

Signature of Head of Institution with Name and Designation

Seal of Head of Institution

**Format of the Proposal**

1. Title of the Proposal:
  
2. Name of the Principal Investigator:  
  
Institution;  
Telephone:  
E-mail:  
Mailing Address:  
NGO Darpan Registration No/Unique ID\*\* :  
PAN Number \*\* :
  
3. Summary of the proposed work
  
4. Details on the preliminary work done/background experience, if any
  
5. List of Publications in the related field
  
6. Description of the project
  - Theme
  - Objectives
  - Milestones
  - Expected results
  
7. Name of Co-investigator(s) in the AO project (please include bio-data of all Investigators)
  
8. Available facilities and equipment at your institution

\*\* - Only if applicable. PAN number of the institution to be provided

**Annexure -3**

**Format for Declaration**

**Declaration**

We have carefully read the terms and conditions of Announcement of Opportunity (AO) programme for utilisation of data of AstroSat and agree to abide by them.

It is certified that if the AO proposal is accepted and supported by Indian Space Research Organisation (ISRO), the facilities as identified in the proposal and administrative support available at our institution and needed to execute the project will be extended to the Principal Investigator and other Co-investigators.

I / We certify that I / We have not received any grant-in-aid for the same purpose from any other Department of the Central Government / State Government / Public Sector Enterprise during the period to which the grant relates.

Signature of PI with Name and Designation

Signature of Head of Institution with Name and Designation

Date:

Seal of Head of Institution

## **Terms and Conditions of ISRO Research Grants**

1. The approved funds should be utilized solely for the purpose for which they have been granted unless ISRO agrees otherwise. A Certification that the funds have been so used should be produced by the grantee Institution after the end of each of the support.
2. Due acknowledgment to ISRO should be made in all reports and publications arising out of the part of the work supported by ISRO.
3. Two copies of all the publications resulting from the research conducted with the aid of the grant should be submitted to ISRO.
4. Any intellectual property rights or such information/knowledge being able to sustain or create or any such right arising out of the projects sponsored by ISRO will be held jointly by the Academic Institution/R & D institution and ISRO as per RESPOND norms. Academic Institute/R & D institution and ISRO shall inform each other before filing for any protection of any Intellectual Property Rights resulting from any of the project sponsored by ISRO. Academic institute/R & D institution and ISRO will ensure appropriate protection of Intellectual Property Rights generated from cooperation, consistent with laws, rules and regulations of India. The expenses for filling the Patent protection in India and abroad shall be borne equally between Institute and ISRO. Any/all financial accruals due to any commercial exploitation, of this patent shall be shared equally between them, on 50:50 basis. However any of the parties is free to utilize the IPR for their own use on non commercial basis.
5. The principal Investigator is required to submit two copies of yearly reports indicating the progress of the work accomplished. He is also required to submit two copies of a detailed technical report on the results of the research/development after the completion of the project. The reports will become the property of ISRO.
6. In addition, ISRO may designate Scientists/specialists to visit the Institution periodically for reviewing the progress of the work.
7. An inventory of items purchased from ISRO funds should be sent to ISRO, giving the description of equipment, cost in rupees, date of purchase and name of the supplier along with a purchase certificate from the Administration of the Institution. All items of equipment and consumable items costing more than Rs. 5,000/- shall remain the property of ISRO and ISRO reserves the right to transfer them or dispose of them on the termination of the project as ISRO may deem fit.
8. The accounts of the expenses incurred out of ISRO funds should be properly maintained and should be authenticated by an approved auditor. The final accounts statement in duplicate duly audit should be sent to the pay & Accounts Officer, DOS/Senior Accounts Officer, ISRO Headquarters, as the case may be, at the end of each financial year of support.
9. If the total amount sanctioned is not spent during the period of support, the remainder amount should be surrendered to the Pay & Accounts Officer, ISRO Headquarters, as the case may be, within one month after the completion of the project.
10. The assets acquired wholly or substantially out of the ISRO grant should not, without its prior sanction, be disposed off, encumbered or utilized for purposes other than that for which the grant is sanctioned.
11. A register of assets permanent and semi-permanent should be maintained by the grantee Institution, which should be available for scrutiny by Audit.
12. The grantee institution should not divert the grants-in-aid for utilization of the same for similar objects of another institution if it is not in a position to execute or complete the assignment. The entire amount of the grant should then be immediately refunded to ISRO by the institution.
13. The terms and condition of ISRO research grants are subject to change from time to time, but the funding of any project will be governed by the terms and conditions existing on the date of starting of the project with ISRO funds.

### **List of Abbreviations**

- AO - Announcement of Opportunity
- CZTi - Cadmium Zinc Telluride Imager
- DOS - Department of Space
- ISRO - Indian Space Research Organisation
- LAXPC – Large Area X-ray Proportional Counter
- SSM - Scanning Sky Monitor
- SSPO – Space Science Programme Office
- SXT - Soft X-ray Telescope
- UVIT - Ultra-violet Imaging Telescope
- PI - Principal Investigator
- PSLV - Polar Satellite Launch Vehicle