

Letter No. AO/EOI/2022-2023/01/3014

Dated: 10-02-2023

Request for Expression of Interest (EOI)

For

**Supply of optical tube assembly with integrated large format imager for the existing
English equatorial telescope mount at
ARIES, Manora Peak Campus, Nainital, 263001,
State: Uttarakhand, India**

Critical Date Sheet

1.	Published Date	27.02.2023	10:00
2.	EOI Document Download	27.02.2023	15:00
3.	Seek Clarification Start Date	28.02.2023	15:00
4.	Seek Clarification End Date	21.03.2023	15:00
5.	EOI Submission Start Date	20.03.2023	16:00
6.	EOI Submission End Date	29.03.2023	15:00
7.	EOI Opening Date	30.03.2023	15:00



रविन्द्र कुमार
Ravinder Kumar
रजिस्ट्रार
Registrar

आर्यभट्ट प्रेक्षण विज्ञान शोध संस्थान (आरि)
Manora Peak, Nainital-263001, Uttarakhand, India

Manora Peak, Nainital-263001, Uttarakhand, India
Tel: +91 05942-235136 270700 | Fax: +91 05942-233439 | directoraries@aries.res.in | www.aries.res.in



Scope of the Work	Supply of optical tube assembly with integrated large format imager for the existing English equatorial telescope mount
Name of the Purchaser	The Director
Address of the Purchaser	Aryabhata Research Institute of Observational Sciences, Under Department of Science Technology (DST), Govt. of India Manora Peak, Nainital -263 001, Uttarakhand
Bid Security/Earnest Money Deposited (EMD)	Amount of bid security should ordinarily range between two percent to five percent of the estimated value of the goods. EMD EXEMPTION: The bidder seeking EMD exemption, must submit the valid supporting document for the relevant category. Under MSME category, only manufacturers for goods and Service Providers for Services are eligible for exemption from EMD. Traders are excluded from the purview of this Policy.
Performance Security	The Successful Bidder shall be required to furnish Performance Security either in the form of Security Deposit or Bank Guarantee issued by a Nationalized /Scheduled Commercial Bank for an amount equivalent to 10% of Contract value having validity of warranty period in favour of "The Director, ARIES" to be submitted within 15 days of the receipt of the Letter of Intent/ Purchase Order/ Contract. If successful Tenderer does not pay the Performance Security Deposit in the prescribed time limit or does not execute the Agreement within prescribed time, his earnest money deposit will be forfeited by ARIES.
Validity period of bids	180 days from the date of opening
Contact	For Administrative Queries Registrar, ARIES, Manora Peak, Nainital - 263 001, Uttarakhand, India Tel: +91-(5942) – 270729, e-mail: registrar@aries.res.in For Technical Queries (1) Dr. T.S.Kumar, Engineer - 'F' ARIES Manora Peak, Nainital - 263 001, Uttarakhand, India Tel: +91-(5942)-270791, e-mail: kumar@aries.res.in For Technical Queries (2) Er. Jayshreekar Pant, Engineer- 'E' ARIES Manora Peak, Nainital - 263 001, Uttarakhand, India Tel: +91-(5942) – 270768, e-mail: jay@aries.res.in
Send the EOI documents and E-mail	The Director, Aryabhata Research Institute of observational sciences (ARIES), Manora Peak, Nainital - 263 001(India) E-mail to directoraries@aries.res.in
Website:	Website: https://www.aries.res.in/tenders

Executive Summary

Aryabhata Research Institute of Observational Sciences (ARIES) is a premier national Institute in the country dedicated to research in the field of Astronomy, Astrophysics and Atmospheric Sciences. ARIES is refurbishing a 50/80 cm small optical telescope which is installed at Manora Peak (29.22N, 79.69 E, 1950 m above MSL) near Nainital. The current telescope has a 50/80 cm Baker Nunn Schmidt telescope tube weighing > 300 kg supported on an off-axis English equatorial mount. We are interested in replacing the tube with a new wide field optical tube assembly with 60 cm or larger aperture weighing < 200 kg. The same English equatorial off-axis mount housed inside a rotating dome with a maximum slit width of 100 cm would be utilized.

An optical tube assembly consisting of a primary mirror of 60 cm aperture or larger with an f ratio in the range f/2.1 to f/2.3 providing a widefield with corrected FOV of 70 cm or larger along with a scientific CMOS or CCD detector based imaging system are to be supplied which will be integrated with the existing mount at ARIES Manora Peak.

The OTA and scientific CMOS/CCD imager shall meet the following brief technical specification:

OTA specifications:

1. OTA with low CTE (0.06×10^{-6} /K or lower at 273 K) primary mirror with diameter in the range 600 mm to 700 mm with 59% or higher throughput to be used with a detector 60mm x 60 mm area or better to cover more than 2.5 deg FOV and a large broad-band color glass filter. The tube should be supplied with two types of filter holders. a) A motorized filter wheel mechanism with three or more filters which (i.e. the entire mechanism) can be removed when not required to reduce vignetting. b) A single filter holder for manually placing a filter during single filter observation.
2. Wavelength range 400 to 950 nm with peak at 630 nm.
3. The RMS WFE of the system for the transmitted wavefront @632 nm should be less than 100 nm. (peak to valley and rms errors to be specified)
4. f number 2.1 to 2.3 to achieve a plate scale of 1" or finer (i.e. less than 1") with 6.5 μ m pixel and 1.6" or finer with 10 μ m pixel scientific cameras. This requirement is defined by the site seeing conditions, science cases and detector pixel size.
5. Corrected FOV > 70 mm
6. More than 80% encircled energy in < or = 2" after mounting the OTA on the mount for the entire FOV for the temperature range of -10 to +30 degC and elevation angle from 0 to 30 deg from zenith. EE80 degradation below 30 deg and upto 85 deg to be provided. For this purpose, the existing mount details will be provided. The firm should in-turn provide the interface requirements for integrating the tube with the mount for maintaining the quality in the elevation range.
7. Detector mounting plate, single easily replaceable filter mounting plate. A covered window on the tube for replacing the detector and filter during the night to be provided. The weight bearing capacity of the detector mount should be atleast 15 kg.
8. The overall vignetting or obstruction with detector and filters should not be more than 18% for the OTA.
9. The optics should be stable during tracking rate from 15"/sec to 2 deg/sec for non-sidereal objects with acceleration/deceleration 2deg/sec².
10. Motorized focus adjustment +/-25 mm (or one inch) from the center (optimized backfocal distance) with a step size or resolution of 5 μ m or finer.
11. Focussing system is to be operated via hand pendant as well as remote software. Hence, interface details are to be provided to integrate with the user software.




12. Mirror coating: standard aluminium with protective coating with reflectivity from 400 to 950 nm range should be greater than or equal 85%.
13. Relative humidity of the site goes upto 100% during monsoon. During observations the humidity could be from 20% to as high as 85%. Hence, the lens and mirror coatings should be stable for this range and long lasting.
14. FEM and thermal analysis of the tube to be provided for mounting the tube with the existing mount.
15. Optics diagram and analysis to be provided.
16. Test certificates and interferograms to be provided
17. Mirror cleaning and washing procedure to be provided.
18. Stepwise procedure for unmounting the mirrors for recoating to be provided
19. Assembly, disassembly and integration instructions to be provided
20. Maintenance manuals and BOM to be provided.
21. Two years comprehensive warranty for both OTA and detector.

Detector specifications:

- a) The detector system will be mounted inside the optical telescope and has to operate continuously at fast exposure time, 10 hrs each day, and offer vacuum seal guarantee for at least 5 years. Thus, the cooling specifications should remain same for this duration and should not degrade. A certificate of the same should be attached. There should not be any condensation during detector operation.
Note: In case of vacuum failure before 5 yrs the firm would bear all the cost of repair including transportation and insurance pick up from and deliver up to ARIES.
- b) The detector should be monochrome and back-illuminated with 6k x 6k, 10 um pixels. ARIES has a 4kx4k, 6.5 um pixel detector, which will be mounted when required for specific observatory requirements, image quality analysis at higher sampling etc. during which the supplied 6k x 6k camera would be unmounted.
- c) Mechanical shutter to be provided even for sCMOS detectors which is required for acquiring dark and bias frames.
- d) In case of sCMOS the detector would be operated in rolling shutter mode after acquiring dark and bias frames. During this period the mechanical shutter needs to be always kept open.
- e) Cooling upto 45 deg below ambient (-25 deg C at an ambient of 20 deg C). Both liquid and fan cooling options are to be provided. The fan should be software switchable i.e. turned ON or OFF when needed via remote software.
- f) Cooling setpoint should be software selectable and is to be stable within 0.1 deg C.
- g) Liquid cooling unit and pipelines to be provided with the detectors system.
- h) The defect specifications of the complete area of detector should be better than that specified by scientific grade 1 CCD. a
- i) Full well 1,00,000 e- with adjustable gain. Gain of 1e-/ADU, 2e-/ADU and 5e-/ADU are required.
- j) Frame rate of 20 fps.
- k) Read noise < 4 e-
- l) Dark at -25 deg C < 0.2 e-/pixel/s
- m) ADC 16 bit
- n) Linearity > 99.5 %
- o) QE: peak > 90 % between 550 to 650 nm.



Dr. Anurag Kumar
Director



SNo	Wavelength (nm)	Preferred quantum efficiency (%)
1	350	>30
2	400	>55
3	450	>75
4	500	>85
5	550	>90
6	600	>90
7	650	>90
8	700	>80
9	750	>70
10	800	>60
11	850	>50
12	900	>30
13	950	>20

- p) Weight and dimensions of the detector is to be mentioned.
 - q) Mechanical drawings, focal plane distances, mounting details are to be provided.
 - r) Operation and maintenance manuals to be provided.
 - s) Interface USB 3.0 (compatible with USB 2.0 with reduced frame rates). Additional USB cable to be provided as spare.
 - t) DC supply voltage to the camera housing to be provided via AC to DC supply adapter.
 - u) Additional supply adapter to be provided as a spare.
 - v) Complete camera operation GUI software to be provided.
 - w) SDK compatible with Windows, Linux using C/C++, LabView and Matlab to be provided.
 - x) Warranty: One year comprehensive warranty on all the parts.
 - y) Guarantee: Atleast five years guarantee on vacuum.
- Note: Complete repair cost including all components like pickup ARIES from site, delivery to ARIES site, packing, transportation, customs, insurance, installation, coordinating with the factory etc. is to be borne by the supplier in case of any warranty or guarantee issues during this period.

Background Information

The 50/80 cm Schmidt Telescope was developed and installed at ARIES in 2010. The primary mirror and the three element Schmidt corrector optics were taken from an old Baker-Nunn satellite tracking camera telescope of early 70's. ARIES has redeveloped a new tube with these optics and developed an off-axis English equatorial mount along with a rotating dome enclosure. The mount is capable of taking a tube of slightly more than 350 kg. Since, the corrector element has degraded and the optics throughput has drastically reduced, a new OTA with wide field optics would be procured and integrated in the existing observatory system.

Scope of the Work for the supplier

- a) Supply of OTA along with detector as per above specifications
- b) The detector and liquid cooling unit should be unmounted from the OTA and packed separately during shipment.
- c) Provide integration drawing and details of detector and liquid cooling unit.

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- d) Provide FEM analysis of OTA
- e) Provide interface drawings for OTA
- f) Provide flexure table of the OTA
- g) All cost of delivery upto the ARIES, Manora Peak, Nainital site is to be borne by the supplier.
- h) Vendor should be present on-site during assembly of OTA along with the detector on the mount and assess the required performance.

Scope of ARIES

- a) Share the details of the existing mount structure etc.
- b) Modify the mount interface for accommodating the new OTA
- c) Integration of OTA with the existing mount

Qualification of Vendor

The vendor should have built and supplied similar optical tube assembly or complete telescope with 50 cm or larger aperture for astronomy research worldwide. A list of such instruments built and installed along with the addresses and contact details of the persons responsible for the operation and calibration of these instruments should be provided with the technical bid. The Bidder should also have sufficient experience in Astronomical Instrumentation. The vendor should also have knowledge in Observational Astronomy.

Expected Time Schedule

The expected time schedule for the completion of the instrument is about 9 months from the date of award of the contract.

Submission of EOI

Following items are required with the EOI

- a) Proposal of OTA for the existing mount
- b) Past experience in the designing and building telescopes, with proof of successful commissioning in an observatory, or OTA for astronomy with aperture equal to greater than 50 cm with encircled energy of greater than 80% within 2" (or better specifications).
- c) Estimated cost of OTA to meet the specifications and timeframe.

Expression of interest together with the profile of the company including its past experience in design and fabrication of OTA or entire telescope as mentioned above may be sent to:

The Director,

Aryabhata Research Institute of observational sciences (ARIES), Manora Peak,
Nainital - 263 001(India)

E-mail to directoraries@aries.res.in



Registrar

Registrar

आर्यभट्ट प्रेक्षण विज्ञान शोध संस्थान (ARIES)
Aryabhata Research Institute of Observational Sciences
Manora Peak, Nainital-263 002

Manora Peak, Nainital-263001, Uttarakhand, India

Tel +91 05942-235136, 270700 | Fax +91 05942-233439 | directoraries@aries.res.in | www.aries.res.in

General Terms & Conditions:-

1. Specifications and make for each item should necessarily be mentioned.
2. All cost of delivery upto the ARIES, Manora Peak, Nainital site is to be borne by the supplier.
3. **Validity period of the bid:** 180 days from the date of opening of financial bid.
4. **Warranty Period:** Onsite performance warranty and comprehensive for a minimum 02 years from the date of acceptance of the instrument by ARIES.
5. **Terms of Payment:**

Milestone Deliverables	Payment (%)
Awarding the Contract	..
Final Design	5
Material & Component Procurement and Manufacturing	15
Sub-system assembly and Testing	15
System integration, Training, & Testing	15
Factory acceptance testing	15
Packing and Shipping	10
Installation at the site and final acceptance test	15
After completion of warranty period	10

6. **Insurance:** Transit insurance covering all risk for all the items is to be arranged & paid by the supplier.
7. EMD of disqualified bidder will be returned within 45 days without any interest after opening of commercial bid.
8. If any item is found to have any defect or malfunction during the warranty period, the replacement or servicing of such items shall be done by the vendor at own cost. Transportation and other charges from supplier's site to ARIES, Manora Peak, , District: Nainital -263132 , will be borne by the vendor.
9. Liquidated damage, as decided by ARIES will be charged, if the item(s) is/are not delivered within the stipulated time frame.
ARIES reserves the right to levy a penalty for delay in delivery of material or providing of services and /or for delay in successful supply/installation/commissioning/ integration of system as stipulated in the document. **This penalty shall be @ of 0.5 % of purchase order value per week of delay in deliveries/ execution of the order successfully, subject to maximum of 5% of the order value. Part of the week shall be considered as full week.** If the delay happens due to any natural calamity or unanticipated reason beyond control of the vendor, such delay up to a maximum period of 3 months may be condoned if ARIES is satisfied about its genuine nature. ARIES will be free to purchase the material at the risk & cost of supplier & cancel the order in case the delay is more than 3 weeks with forfeiture of EMD/Security Deposit.
10. ARIES will provide suitable site for storage of the equipment before installation /commissioning.
11. In the event of any disputes or differences between the parties here to, such disputes or differences shall be resolved amicably by mutual consultation. If such resolution is not possible, then the unresolved disputes or differences shall be referred to arbitration of the sole arbitrator to be appointed by the Director, ARIES, Manora Peak, Nainital. Department of Science and Technology (DST), Government of India. The provisions of arbitration and conciliation act, 1996 (No 26 of 1996) or any statutory modification or re-enactment thereof and the rules framed there under and for the time being in force shall be applicable to the arbitration proceedings under this clause. The venue of such

[Signature]

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arbitration shall at Nainital-263001 (India) or any other place as decided by the arbitrator. The language of arbitration proceedings shall be English. The award of the arbitrator shall be final and binding on the parties. The cost of arbitration shall be shared equally.

12. Any disputes, legal action/matters, arising out of/ resulting from/related or incident to the tender /quotation/Purchase order/invoices/delivery/payments shall be subject to exclusive jurisdiction of Nainital -263001. Laws of India shall govern this tender as well as any or all transactions /documents/deeds/actions/purchase order arising out of/ resulting from this tender subject to the resolution of the dispute clause.
13. The Language of the bid proposal as prepared by the bidders should be in English and all further correspondence with the office and all the documents pertaining to the bid proposal shall be in English.
14. **FORCE MAJEURE:** - If the performance of the obligation of either party is rendered commercially impossible by any of the events hereinafter mentioned the same party shall give notice of 15 days from the date of such an event in writing to the others party. a) Government Regulation, b) Legislation, c) Natural disasters, d) Strike, e) Lock out, and f) Act of God.
15. Estimated Prices should be quoted on F.O.R. ARIES, Manora Peak, District: Nainital basis only.
16. ARIES reserves the rights to accept any tender or reject any or all tenders.



रविन्द्र कुमार
Ravinder Kumar
रजिस्ट्रार
Registrar

प्रेक्षण विज्ञान शोध संस्थान, नैनीताल
Aryabhatta Research Institute of Observational Sciences
पैक, नैनीताल-263001
उत्तराखण्ड, भारत 226 22



TECHNICAL BID FORM

Subject: Expression of Interest (Eoi) for Supply of optical tube assembly with integrated large format imager for the existing English equatorial telescope mount.

Please supply the following information along with documentary evidence wherever possible, ONLY in this format (each page should be signed by the authorized representative of the consultant/firm). However, if the space provided for any entry is insufficient, the information may be given on additional sheets as appendices and indicate the number of respective appendices attached at the appropriate place. All appendices must also be signed.

1. Name of the Agency:
2. (a) Communication Address:
Telephone/Mobile No. of the Agency:
Fax No. of the Agency:
e-mail address of the Agency:
Website address, if any:

(b) Permanent Address:
(c) Name of owner if company is Ltd.:
Memorandum of Article (MOA)
(d) Name of the contact person(s) with address:
Telephone No.
Fax No.:
Mobile No. :
e-mail ID:

(e) Name, Designation and address of the person(s) authorized to sign on behalf of and responsible to the bidding agency (herein after referred to as the bidder):
(f) Pan Card No.(Attach attested Copy)
(g) GST Registration Certificate (Attach attested copy)
(h) Detail of the Banker of Company/ Firm/agency
Name of the Bank :-
Address of the Bank :-
Account Type :-
Account No :-
IFSC Code :-

3. (a) Location of the headquarter of the Agency:
 - Date of its establishment:
 - Total experience (in years) in manufacturing similar work:

[Handwritten signature]
7/5

- Profile and detailed set-up of the Agency: (Attach also the brochure, booklet etc. of the company if available)
- Annual Financial Turnover: Copies of balance sheets duly certified by Chartered Accountant are to be submitted for the last three years.

Year	Amount (in INR Lacs)
2019-2020	_____
2020-2021	_____
2021-2022	_____

6. Address with telephone numbers of the nearest Regional Offices of the Agency, if any.

7. Details of similar work completed during last 5 years ending last day of month previous to one in which EOT is invited of the similar works - (documentary evidence must be annexed)

Sl.No	Name of work	Client details with address, Telephone, Fax, e-mail	Contract amount (INR)	Date of Start	Date of Completion
1.					
2.					
3.					
4.					
5.					

8. Details of similar works currently in hand (documentary evidence must be annexed):

Sl.No	Name of work	Client details with address, Telephone, Fax, e-mail	Contract amount (INR)	Date of Commencement	Tentative date of Completion
1.					
2.					
3.					
4.					
5.					

9. Any other information (current/past) highlighting the technical and professional worthiness.

Signature of Bidder with Seal



Ravinder Kumar

Manora Peak, Nainital-263001, Uttarakhand, India
Tel +91 05942-235136, 270700 | Fax +91 05942-233439 | directoraries@aries.res.in | www.aries.res.in

आर्यभट्ट प्रेक्षण विज्ञान शोध संस्थान
Aryabhatta Research Institute of Observational Sciences
मनोरा पीक, नैनीताल-
263001, Nainital

Declaration

I _____ (Designation) _____ of (name of the Agency) _____ hereby, declare to accept the Terms & Conditions as given in the Expression of Interest for Supply of optical tube assembly with integrated large format imager for the existing English equatorial telescope mount.

SIGNATURE OF BIDDER _____

NAME OF BIDDER _____

DESIGNATION OF THE BIDDER OFFICIAL SEAL _____

ADDRESS: _____

DATE:

PLACE:

UNDERTAKING BY THE BIDDER

I/We undertake that my/our firm M/s. has not been black listed by any Government department / Public Sector Undertaking / Autonomous Body.

2. I, Son/ Daughter/ Wife of
Shri..... Proprietor/ Partner/ Director/
Authorized signatory of M/s. am competent to sign
this declaration and execute this tender document.

3. I/We have carefully read and understood all the term and conditions of the tender and undertake to abide by them.

4. The information / documents furnished along with the above application are true and correct to the best of my knowledge and belief. I/We, am/are well aware, of the fact that furnishing of any false information / fabricated document would lead to rejection of my tender at any stage besides liabilities towards prosecution under appropriate law.

5. I/We understand that in case any deviation is found in the above statement at any Stage, my/our concern/firm/co. shall be blacklisted and shall not have any dealing with the Department in future.

Date :

Place :

Signature of the Authorized
Signatory of the
firm/Company/Organization

Office Stamp / Seal



राजेश कुमार
Rajesh Kumar
रजिस्ट्रार

आर्यभट्ट प्रेक्षण विज्ञान शोध संस्थान
Aryabhatta Research Institute of
Observational Sciences
Manora Peak, Nainital

FORMAT FOR SELF-CERTIFICATE FOR LOCAL CONTENT

(TO BE SUBMITTED AS A PART OF TECHNICAL BID ON COMPANY LETTER
HEAD)

To,

The Director,
ARIES, Manora Peak,
Nainital -263001

Sub: Self-Certificate for Local Content

Tender EOI Ref. No. _____

* I / We(Name of the Bidder) hereby confirm in respect of quoted item(s) that Local Content is equal to or more than 50% and come under 'Class-I Local Supplier' Category. As being 'Class-I Local Supplier', we are eligible for Purchase Preference under 'Make in India' Policy order No.P-45021/2/2017-PP (BE-II) dated 16 Sept 2020 and Vide order No. P-45020/102/2019-BE-II-Part (I) (E-50310) Dated: 04-03-2021.

OR

** I / We(Name of the Bidder) hereby confirm in respect of quoted item(s) that Local Content is equal to or more than 20% but less than 50% and come under 'Class -II Local Supplier' Category.

OR

*** I / We(Name of the Bidder) hereby confirm in respect of quoted item(s) that Local Content is less than 20% and come under 'Non-local supplier' Category.

The details of the location(s) at which the local value addition made is/are as under:

- 1.....
- 2.....
- 3.....

- *Applicable for 'Class-I Local Supplier' Category
- ** Applicable for 'Class-II Local Supplier' Category
- *** Applicable for 'Non-local supplier' Category

Yours faithfully,

(Signature & Seal of the Authorized Signatory of Bidder)

Name and Designation of Authorized Signatory:

Name of Firm/Company:

Place:

Date:



Dr. Ravi Kumar
Director



UNDERTAKING REGARDING BLACKLISTING
(TO BE SUBMITTED AS A PART OF TECHNICAL BID ON COMPANY
LETTERHEAD)

To,

The Director,
ARIES, Manora Peak,
Nainital -263001

Sub: Undertaking regarding Blacklisting.

Tender/ EOI Ref. No. _____

Dear Sir,

We hereby confirm and declare that we, M/s _____, is not blacklisted/ De-registered/ debarred by any Government department/Public Sector Undertaking/ Private Sector/ or any other agency for which we have Executed/ Undertaken the works/ Services.

(Signature of Authorized Person)

Name:

Designation:

Name & seal of Firm/Company/Agency:

Date:

Place:



रविन्द्र कुमार
Ravinder Kumar

रजिस्ट्रार
Registrar

आर्यभट्ट प्रेक्षण विज्ञान शोध संस्थान, नैनीताल
Aryabhatta Research Institute of Observational Sciences, Nainital
Uttarakhand, India

