

Tender Reference No. AO/3-36(18)/20-21/2974

Dated: 25-02-2021

**Tender (E-Procurement Mode)**

**TENDER DOCUMENT**

**For**

**“Designing, Building/Fabrication, Supply, Installation, Testing, and Commissioning of High Resolution Spectrograph (HRS) For Use With ARIES 3.6 Meter Devasthal Optical Telescope (DOT) at Devasthal Campus, Near Jadapani, District: Nainital-263132, State: Uttarakhand; as per the specifications in the attached sheet.”**

**Website :** <https://www.aries.res.in/tenders>

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Tender Reference No. AO/3-36(18)/20-21/

Dated: 25-02-2021

Scope of the Work	Designing, Building/Fabrication, Supply, Installation, Testing, and Commissioning (DB/F-SITC) of High Resolution Spectrograph ( <b>HRS</b> ) For Use With ARIES 3.6 Meter Devasthal Optical Telescope (DOT) at Devasthal, Near Jadapani Dhanachuli, Okhalkanda Block Nainital-263132, Uttarakhand, India as per the specifications given with this document. The scope of the work also includes training of designated ARIES personnel in the operation, calibration, maintenance, and debugging of the hardware and software of the spectrograph.
Period of Work Completion	30 (thirty) months from the date of receipt of purchase order.
Name of the Purchaser	The Director
Address of the Purchaser	Aryabhata Research Institute of Observational Sciences (ARIES), Under Department of Science Technology (DST), Govt. of India Manora Peak, Nainital -263 001, Uttarakhand
Submission of Tender Document Online	e-procurement portal <a href="https://eprocure.gov.in/eprocure/app">https://eprocure.gov.in/eprocure/app</a>
Tender Security/Earnest Money Deposited (EMD) for the Tender	Rs. 40,00,000/- (Forty Lakh/Four Million)
Date of publishing on CPP Portal	25-02-2021
Document Download Start Date & Time	25-02-2021 (18:00 hrs.)
Clarification Start Date & Time	25-02-2021 (18:00 hrs.)
Tender Submission Start Date & Time	25-02-2021 (18:00 hrs.)
Document Download End Date & Time	06-04-2021 (15:00 hrs.)
Clarification End Date & Time	06-04-2021 (15:00 hrs.)
Tender Submission End Date & Time	06-04-2021 (15:00 hrs.)
Tender Opening Date & Time for opening of technical bids	07-04-2021 (16:00 hrs.)
Venue, Date and Time for opening of Financial/Price bid	Will be intimated through online CPPP to Technically Qualified Tenderer
Validity period of tenders	180 days from the date of opening.
Contact Person:	<b>For Administrative Queries</b> Registrar, Tel: +91-(5942) – 270729, e-mail: <a href="mailto:registrar@aries.res.in">registrar@aries.res.in</a> <b>For Scientific and Technical Queries (1)</b> Dr. Jeewan Chandra Pandey, Scientist- 'E' Tel: +91-(5942) – 270744, e-mail: <a href="mailto:jeewan@aries.res.in">jeewan@aries.res.in</a> <b>For Scientific and Technical Queries (2)</b> Er. Jayshreekar Pant, Engineer- 'D' Tel: +91-(5942) – 270768, e-mail: <a href="mailto:jay@aries.res.in">jay@aries.res.in</a>

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*Signature*

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## Section I

### Background

Aryabhata Research Institute of observational scienceES (acronym for ARIES; <http://www.aries.res.in>) is an autonomous research institute under the Department of Science and Technology (DST), Government of India. ARIES is located on a hilly terrain called Manora Peak, near the beautiful lake city of Nainital of Uttarakhand State in the Central Gangetic Himalayan region. The institute is carrying out fundamental research in the various fields of Atmospheric Science, Astronomy & Astrophysics and Solar physics.

ARIES has recently installed a 3.6-m optical telescope at Devasthal near Nainital (India). This telescope is the most sensitive Indian optical telescope for the study of celestial sources due to its large aperture size and active optics. Briefly, the DOT has a two mirror Ritchey-Chretien optical configuration with a primary diameter of 3.6 m and a secondary diameter of 0.9 m. The effective focal ratio of the telescope is  $f/9$ . The meniscus primary mirror is active and it is supported by pneumatic actuators. It has one axial and two side Cassegrain ports with a science field of view of  $30'$  and  $10'$ , respectively. The operational waveband of the telescope is 350-5000 nm. The DOT has an alt-azimuth mount. The azimuth axes system is equipped with hydrostatic bearings. The tracking accuracy of the DOT is  $< 0.1''$  root-mean-square in open loop for  $< 1$  minute and  $< 0.1''$  for about an hour in closed loop mode.

Devasthal is located at a longitude of  $79^{\circ}41'04''$  E, latitude of  $29^{\circ}21'40''$  N, and altitude of  $(2424 \pm 4)$  m above mean sea level. The ground level median seeing of the site is  $1.1''$  with a wind speed of  $< 3 \text{ m s}^{-1}$  for 75% of the time. For 35% of the time, the seeing is better than  $1.0''$ . The annual variation of the air temperature at the site is  $27^{\circ}\text{C}$  to  $-4.5^{\circ}\text{C}$  with a nightly temperature variation of  $\leq 2^{\circ}\text{C}$ . Annually, 80% of the total rain (2m) falls from June to September. A total of  $\sim 60\%$  and  $\sim 48\%$  nights in a year are found to be spectroscopic and photometric, respectively. The original atmospheric extinction studies at Devasthal resulted in average values of extinction in U, B, V, R, and I band as  $k_U = 0.49 \pm 0.09$ ,  $k_B = 0.32 \pm 0.06$ ,  $k_V = 0.21 \pm 0.05$ ,  $k_R = 0.13 \pm 0.04$ , and  $k_I = 0.08 \pm 0.04$  mag, respectively.

  
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## Section II

### Global Notice Inviting e-Tender (GNIT)

The Director, Aryabhata Research Institute of Observational Sciences (ARIES), Nainital, invites tenders in two tender (Technical and Financial) system from eligible Tenderers, for **“Designing, Building/Fabrication, Supply, Installation, Testing, and Commissioning (DB/F-SITC) of High Resolution Spectrograph (HRS) For Use With ARIES 3.6 Meter Devasthal Optical Telescope (DOT at Devasthal Campus, Near Jadapani, District: Nainital- 263132, State: Uttarakhand, India”**

- 2.1 Tender Availability:** Tender documents can be downloaded from Central Public Procurement Portal <https://eprocure.gov.in/eprocure/app>. **Aspiring Tenderers/Suppliers who have not enrolled/registered in e-procurement should enroll/register through the website <https://eprocure.gov.in/eprocure/app> before participating.**
- 2.2 Submission of the Tender:** The tender shall be submitted online at the website <http://eprocure.gov.in/cppp/> in two parts, viz., technical bid and price bid. The technical bid should consist of all technical details along with commercial terms and conditions. Price bid should indicate the price for the whole work as single unit.
- The scanned copy of the documents like tender document, EMD etc. along with the technical bid should be uploaded within the period of tender submission by the tenderer.
  - The original payment instrument like Demand Draft/wire transfer/Direct Transfer (RTGS/NEFT) /Fixed Deposit receipt/ Bank Guarantee of any scheduled bank against EMD as specified in this tender document has to be sent to the address: **The Director**, Aryabhata Research Institute of Observational Sciences, Department of Science Technology, Govt. of India, Manora Peak, Nainital-263 001, Uttarakhand. It, must reach at the address given below by 06.04.2021 at 15:00 hrs. Tenderers, however, have to attach scanned copies of EMD along with the Technical bid of their e-tender.
  - Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprise (MSMEs) or are registered with the Central Purchase Organization or Concerned Ministry or Department or Start-ups as recognized by Department of Industrial Policy and Promotion are exempted from TENDER SECURITY. Such tenderer needs to submit relevant certificate issued by competent authority along with technical bid of tender.



  
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- iv. If the Earnest Money Deposited (EMD) shall be furnished in the form of Band Guarantee as per the format given in **FORM-3 of Section VIII** of this document.
- v. Successful tenderer's earnest money will be returned without any interest, after receipt of performance security from that tenderer. Bid securities of the unsuccessful bidders shall be returned to them at the earliest after expiry of the final bid validity and latest on or before the 30<sup>th</sup> day after the award of the contract.
- vi. Earnest money of a tenderer will be forfeited, if the tenderer withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender. The successful tenderer's earnest money will be forfeited if it fails to furnish the required performance security within the specified period.
- vii. The details for payment are as follows:

Account Name: Director ARIES  
Account Bank Name: State Bank Of India  
Address: Hanning The, The Mall, Nainital, Uttarakhand- 263001, India  
Account Number: 10860840253  
IFSC Code: SBIN0000687  
SWIFT Code: SBININBB506



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## Section III

### General Instructions to Tenderers

#### 3.1 Important Note:

- 3.1.1** Tenderer can access tender documents on the website, fill them with all relevant information, and submit the completed tender document into electronic tender on the website <https://eprocure.gov.in/eprocure/app>.
- 3.1.2** Supporting documents should be uploaded through the e-procurement web site <https://eprocure.gov.in/eprocure/app>. **Hard copy** of the tender documents will not be accepted.
- 3.1.3** The intending tenderer carefully read the terms and condition. He/she should only submit the tender if he/she considers himself eligible and he/she is in possession of the entire document required.
- 3.1.4** Information and instructions for tenderers posted on the website shall form of tender document.
- 3.1.5** The tender document consisting of plans, specifications, and schedule of the quantities of various types of items to be executed. These terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from the website <https://eprocure.gov.in/eprocure/app> at free of the cost.
- 3.1.6** The tender can only be submitted **online** after uploading the mandatory scanned documents such as EMD as specified. Any queries relating to the process of online tender submission or queries relating to Central Public Procurement (CPP) Portal in general may be directed to the Registrar, ARIES, Manora Peak, Nainital, Uttarakhand -263001, India (e-mail: registrar@aries.res.in). The contact number +91 5942 270729 (Mobile No. +919654228330)
- 3.1.7 The intending tenderer must have valid digital signature with signing certificate to submit the tender.**
- 3.1.8** On the tender opening date, the contractor can login and see the tender opening process. After opening of the tenders, the tenderer will receive the competitor's tender sheet.
- 3.1.9** Tenderer can upload document in JPG and/or PDF format.
- 3.1.10** Tenderer must ensure to quote rate as per the **Section VII** in this document.
- 3.1.11** In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0". Therefore, if any cell is left blank and no rate is quoted by the tenderer, rate of such item shall be treated as "0" (ZERO).
- 3.1.12** The technical bid shall be opened online first on the due date and time as mentioned above. After evaluation of technical bids, the financial tender of the technically qualified Tenderer shall be opened on the due date and time as mentioned above.





- 3.1.13** ARIES will not enter into any financial negotiations. Negotiation if at all shall be held with the Lowest Tenderer.
- 3.1.14** Complete Tender will comprise of technical bid and price bid.
- 3.1.15** Online Tenders are received only on CPP Portal at the website <https://eprocure.gov.in/eprocure/app> in the Office of The Director, Aryabhatta Research Institute of Observational Sciences, Manora Peak, Nainital-263001, Uttarakhand (India) at the fixed time and the date indicated in the Tender Notification. The Tenderer will be at liberty to be present either in person or through an authorized representative at the time of opening of the technical bid with the tender acknowledgement receipt or they can view the tender opening event online at their remote end. Price bids of only those tenders shall be opened whose technical bids qualify, at a date, time and place as mentioned above. The technically qualified tenderer will be at liberty to be present either in person or through an authorized representative at the time of opening of the price bids with the tender acknowledgement receipt or they can view the tender opening event online at their remote end.
- 3.1.16** ARIES reserves the rights to accept any tender or reject any or all tenders.
- 3.1.17** Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the contact persons indicated in the tender.
- 3.1.18** ARIES may at any time prior to the deadline of submission of tenders, for any reason whether at their own initiative or in response to a clarification requested by a potential tenderer, modify the tender documents by issuance of addendum. They can be downloaded from the website.
- 3.1.19** In order to give the potential tenderer reasonable time to prepare their tenders as per the amendment the ARIES may, at its discretion extend the deadline for the submission of tenders and other allied time frames which are linked with the deadline.
- 3.1.20** This instrument will be used solely for non-commercial research purposes.
- 3.1.21** The tenderer, after submitting its tender, is permitted to alter / modify its tender so long as such alterations / modifications are done within the deadline for online submission of tenders. Any alteration/ modification in the tender thereafter are not permitted.
- 3.1.22** No tender can be withdrawn after the deadline for online submission of tender and before expiry of the tender validity period. If a tenderer withdraws the tender during this period, it will result in forfeiture of the earnest money furnished by the tenderer in its tender.
- 3.1.23** The Purchaser will open on-line the Technical bids as per above mentioned critical date. In case the specified date of tender opening falls on / is subsequently declared a holiday or closed day for the Purchaser, the tenders will be opened at the appointed time and place on the next working day.




- 3.1.24** The technical bids will be opened first. These tenders will be scrutinized and evaluated with reference to parameters prescribed in the tender document.
- 3.1.25** The price bids of only technically acceptable offers shall be opened and evaluated. All Tenderers whose technical proposals have been found acceptable will be informed about the time and date the opening of the Price bids.
- 3.1.26** If there is an error in a total price, which has been worked out through addition and/or subtraction of subtotals, the subtotals shall prevail and the total corrected.
- 3.1.27** If there is a discrepancy between the amount expressed in words and figures, the amount in words shall prevail.
- 3.1.28** If, as per the judgement of the Purchaser, there is any such arithmetical discrepancy in a tender, the same will be suitably conveyed to the tenderer by registered / speed post. If the tenderer does not agree to the observation of the Purchaser, the tender is liable to be ignored.
- 3.1.29** All quoted prices of the responsive tenderers will be converted to a single currency viz., Indian Rupees for the purpose of equitable comparison and evaluation. Releasing of the payment terms to foreign vendors will be as per Reserve Bank of India's Guidelines. On each occasion of stage payment, the amount will be released by opening of separate Letter of Credit (LC).

### 3.2 General Instructions for Technical Bid

The tenderer should have built and supplied similar spectrographs for use with preferably 2 meter or larger class of telescopes worldwide. A list of instruments built and installed along with the addresses and contact details of the persons responsible for the operation and calibration of these instruments must be provided in the technical bid. The technical bid in response to this tender should also have the following information:

- 3.2.1** Tender form i.e. **Form-1**, and other prescribed forms i.e. **Form-2, 3, 9, 11, 12, and 13** of **section VIII**.
- 3.2.2** Tender security as specified in the tender notification and GNIT.
- 3.2.3** Technical Specifications and Compliance Statement Form as per **Section-V** and **Annexure 1**.
- Note:** Technical bid must also contain the instrument concept in all aspect e.g. optical, mechanical, electronics, software, thermal & pressure controlled environment etc.
- 3.2.4** Technical data sheets, make/model, and test reports.
- 3.2.5** Enumeration of the instrument team and key members of the design and development teams.
- 3.2.6** Details of similar projects handled with references.
- 3.2.7** Description of the management plan which includes the schedule and breakdown of tasks.
- 3.2.8** Delivery and implementation schedule.



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### 3.2.9 Warranty details.

### 3.2.10 List of spare parts and tools.

### 3.2.11 Any other documents Tenderer wishes to attach to prove its competence and to support any information mentioned in the tender document.

**Note: The technical bid should not indicate the tender price directly or indirectly. If it is so indicated, the entire tender will be invalid.**

## 3.3 General instruction for Price bid

- 3.3.1** Price bid shall be as per proforma given in **Section VII** of the Tender document. It shall be ensured that Price bid is only submitted online.
- 3.3.2** A tenderer must not amend, erase or blot out anything on the price list. Any correction made by the tenderer shall be rewritten in figures and words, signed and stamped.
- 3.3.3** Unless stated otherwise, the price bid document is for the whole scope of the work as described in the tender document. The tenderer will not be permitted to add any items/costs later on. The total cost / tender amount indicated in the price bid will be deemed to be for the entire scope of work outlined / detailed in the tender document. The costs/rates/ amounts quoted by the tenderer in the price bid should allow for all costs including labour, materials, consumables, equipment, procurement, freight and installation, training, commissioning, transportation charge, customs duty, any other duties, taxes or charges, whatsoever payable on the components or the completed works and satisfactory performance of the tenderers obligations under the tender / agreement. Hence, levy of taxes over and above quoted rates, if any, like GST etc. as applicable should be specifically stated in the price bid with prevailing rates of such taxes to enable uniform comparison of the financial tenders of the various tenderers. In the absence of any such specific statement, along with rates, the quoted rates / amount will be presumed to be inclusive of taxes / duties / levies of all kinds, including service tax.
- 3.3.4** Non-compliance of tender terms, non-submission of required documents, lack of clarity of specifications, contradictions between tenderer specifications and supporting documents may lead to rejection of the tenders.
- 3.3.5** Prices should be quoted on F.O.R. Devasthal Campus (ARIES), Near Jadapani, District: Nainital - 263132, Uttarakhand, India basis only.

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### 3.3.6 Tender Currencies

- The price may be quoted in Indian rupees or in any freely convertible currency e.g. in USD. The prices should be quoted both in figures and in words, in such a way that interpolation is not possible.
- Commission for Indian Agent, if any payable by the tenderer, should be indicated in the price schedule in Indian Rupees only.
- Tenders, where prices are quoted in any other way or with terms and conditions shall be treated as unresponsive and rejected.

### 3.4 Other terms and conditions for the tender

**3.4.1 Delivery/completion period:** Within 30 (thirty) months from the date of receiving of the Purchase Order.

**3.4.2 Validity period of the tender:** 180 (One hundred eighty days) days from the date of opening of financial bid.

**3.4.3** In exceptional cases, the tenderer may be requested by the Purchaser to extend the validity of their tenders up to a specified period. Such request(s) and responses thereto shall be conveyed by e-mail followed by signed hard copy delivered by hand/post/courier. The tenderers, who agree to extend the tender validity, are to extend the same without any change or modification of their original tender and they are also to extend the validity period of the EMD accordingly.

**3.4.4** In case the day up to which the tenders are to remain valid falls on/ subsequently declared a holiday or closed day for the Purchaser, the tender validity shall automatically be extended up to the next working day

**3.4.5 Warranty Period:** Onsite performance warranty and maintenance for a minimum period of 02 years from the date of acceptance of the instrument by ARIES.

#### 3.4.6 Terms of Payment:


Milestone Deliverables	Payment (%)
Awarding the Contract	10
Final Design, after approval by ARIES	10
Material & Component Procurement and Manufacturing	15
Sub-system assembly and Testing	15
System integration, Training, & Testing	10
Factory acceptance testing	10
Packing and Shipping	10

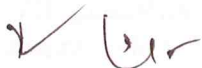
Installation at the site and final acceptance by ARIES	10
Last milestone payment will be released within 90 days on completion of warranty period of 24 months.	10

- 3.4.7 Insurance:** Transit insurance covering all risk for all the items is to be arranged and paid by the supplier.
- 3.4.8** All tenderers can be present at the time of opening of the tender. No separate intimation shall be communicated in this regard.
- 3.4.9** The opening of the tenders shall only be attended by an authorized representative of the firm whose name, designation, and address should be indicated in the offer of the firm. Tendering firm shall issue a letter of authority to such representative indicating the tender No., date, and due on for the item. In no case un-authorized person shall be allowed to enter tender opening room.
- 3.4.10** 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 Devasthal campus, Near Jadapani, ARIES, District: Nainital - 263132, Uttarakhand, India will be borne by the vendor.
- 3.4.11** Liquidated damage, as decided by ARIES will be charged, if the item(s) is/are not delivered within the stipulated time frame.
- 3.4.12** 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 10% of the order value. Part of the week shall be considered as full week.** ARIES reserves the right to terminate the contract at the risk and cost of the Supplier in case the delay is more than 3 (three) months from the scheduled date of supply with forfeiture of Security Deposit. 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 6 months may be condoned if ARIES is satisfied about its genuine nature.
- 3.4.13** The successful vendor shall be responsible to ensure the following:-
- Shipment of the items.
  - Insurance.
  - Custom clearance and handling of items at port of entry in India.
  - Transshipment of items.
  - Insurance for inland transportation and payment of duties / taxes if any
  - Delivery, installation, and commissioning of the equipment at site.
  - Maintenance/repair of the equipment during the warranty period.



- 3.4.15** ARIES will provide suitable site for storage of the equipment before installation /commissioning.
- 3.4.16** 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 263001, Uttarakhand, 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 arbitration shall at Nainital, Uttarakhand (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.
- 3.4.17** 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, Uttarakhand (India). 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.
- 3.4.18** The Language of the tender proposal as prepared by the tenderers should be in English and all further correspondence with the office and all the documents pertaining to the tender proposal shall be in English.
- 3.4.19** The taxes/duty applicable to be indicated separately. If required, ARIES, Nainital will provide Good and Service Tax (GST)/Custom Duty (CD) exemption certificate.

  
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## Section IV

### Schedule of requirements and Expected Deliverables

#### 4.1 Scope of the work

##### 4.1.1 Development of ready-to-build opto-mechanical design of

- Complete spectrograph unit,
- Telescope interface unit (including guiding unit and optical fiber link),
- Calibration unit
- Exposure meter
- Temperature controlled housing and vacuum chamber etc.

as mentioned in detail under **S. No.1.**, of compliance matrix table in **Annexure 1**. Vendor will be responsible for the above design, which will be reviewed by ARIES before acceptance.

##### 4.1.2 Fabrication of

- Complete spectrograph unit,
- Telescope interface unit (including guiding unit and optical fiber link),
- Calibration unit
- Exposure meter
- Temperature controlled housing and vacuum chamber etc.

as mentioned in detail under **S.No.1.** of compliance matrix table in **Annexure1**.

**4.1.3** Vendor will be responsible for designing and building the electronic controls for spectrograph, interface unit, calibration, detectors etc.

**4.1.4** Vendor will provide software for spectrograph, interface unit, guiding unit, calibration unit etc. with ARIES participation. The software should preferably based on Linux operating system. Source code, any license for third party software should also be supplied by the vendor. ARIES will work in collaboration with vendor for software development on mutually agreed terms.

**4.1.5** Vendor is required to involve designated scientists and engineers of ARIES in the assembly, integration, and testing of the spectrograph.

**4.1.6 Acceptance test procedure (ATP):** Vendor shall provide a detailed document describing acceptance test plans, test procedures and expected result for the various systems and subsystems as well as that of the integrated instrument.

**4.1.7** Integration, detailed test and evaluation, and acceptance at the vendor's factory will be carried out as per the mutually agreeable ATP with the presence and participation of ARIES representatives. Vendor shall inform the proposed activities and schedules well in advance to ARIES to enable meaningful participation of ARIES personnel in these activities.

**4.1.8** Vendor will be responsible for transportation, installation, commissioning, and final user acceptance testing at ARIES site.

**4.1.9** Before transporting the system to ARIES site, the vendor shall furnish ARIES with test results showing the results for specifications that are reasonable to measure with the instrument off the telescope, the vendor shall provide documentation or test results showing that they are within acceptable limits.

**4.1.10 Instrument Testing with Telescope:** At ARIES site, the vendor will be responsible for the installation, testing, and demonstration of the instrument's performance with the telescope. The on-sky test results of the instrument should comply with all the technical specifications including RV stability, resolution, wavelength coverage, throughput as mentioned in detail under the **Annexure 1** of compliance matrix table.



**4.1.11** Vendor will also provide detailed and comprehensive training to the designated scientist and engineers of ARIES, at the vendor's factory and on-site on assembly, start-up, operation, maintenance, and testing & repair of the supplied system.

## **4.2 Expected Deliverables**

**4.2.1** Vendor will responsible to deliver the followings

- Complete spectrograph unit,
- Telescope interface unit (including guiding unit and optical fiber link),
- Calibration unit
- Exposure meter
- Temperature controlled housing and vacuum chamber etc.

as mentioned in detail under **S.No.1** of compliance matrix table in **Annexure 1**.

**4.2.2** Ready to build opto-mechanical design with a complete set of fabrication drawings.

**4.2.3** Electronics controls, networking, and software for spectrograph unit, interface unit, calibration unit, detectors, and temperature and pressure controlled enclosures etc. as mentioned under **S.No. 1** of **Annexure 1**.

**4.2.4** All essential tools and equipment necessary for alignment, operation, maintenance of the instrument.

**4.2.5** List of all spare parts along with the reliability factor. List of critical spare parts.


**4.2.6** All source code and necessary Application Programming Interfaces (APIs) should be provided for the CCD controller, Spectrograph control, GUI software, and other controllers employed in the system.

### **4.2.7 Documentation:**

Vendor should provide the documents to ARIES as and when they are generated.

- i. Design manuals of entire instrument system (Interface unit, spectrograph unit, spectrograph housing, electronics, and software etc.)
- ii. User/operational manuals of entire instrument system (Interface unit, spectrograph unit, spectrograph housing, electronics and software etc.)
- iii. Maintenance Manuals of entire instrument system (Interface unit, spectrograph unit, spectrograph housing, electronics, networking and software etc.)
- iv. Design and drawing – Optics (ZEMAX ray trace files), Mechanical (including FEA analysis), electronics (circuit diagrams, layouts, Gerber & design files, embedded codes etc.), software & network architecture, etc. This is valid for the parts and assemblies designed by the vendor. If the same is available for any bought out parts, should also be provided.
- v. Optics cleaning manual, alignment procedure, acceptance and performance test reports, list of tools and accessories required for maintenance, list of spare parts, etc.
- vi. Any other relevant document.

**4.3** The entire work will be completed within thirty months from the date of receipt of the purchase order.



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## Section V

### Technical Requirements

#### 5.1 Science Objectives

The important science objectives and the related technical requirements are given below in the table.

Science Program	Required Technical specifications			Limiting Mag (V)	SNR (1hr exposure)
	Spectral Resolution	Wavelength Coverage	RV Stability		
Asteroseismology	>50,000	400-850 nm	2 m/s	10	200
Doppler Tomography of the Stellar Surface	>60,000	400-850 nm	NA	12	>100
Abundances Studies	>80,000	380-850 nm	NA	12	>50
Spectroscopy and Ground-based Follow-up of Exoplanets	>80,000	500-850 nm	<2 m/s	10	>50
Study of Multiple Stellar Populations in Galactic Globular Clusters	>40,000	450-680 nm	NA	14	>50
Peculiar Eruptive Young Stellar Objects	40,000-80,000	450-850 nm	NA	14	>20
Supernovae	~40,000	500-800 nm	NA	16	>20

#### 5.2 Technical Specifications

A detailed compliance matrix is given in the **Annexure 1. Tenderer must fill the compliance matrix.** The brief technical specifications of the HRS are below

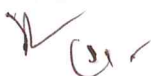
- The HRS should have two modes of spectral resolution; with pixel sampling of 3-4 pixels for high resolution mode
  - High Resolution Mode (HRM) : 80,000
  - Low Resolution Mode (LRM): 40,000
- The HRS must yield complete wavelength coverage in the optical domain from 380 to 850 nm.
- The HRS should be able to record simultaneously the spectra of an object and/or sky. Alternatively, it should have the possibility to interleave the object spectra and that of the calibration spectra.



- iv. The total throughput of the HRS should be more than 15% (without sky, detector, and telescope).
- v. The instrument should achieve the radial velocity stability of  $2 \text{ ms}^{-1}$  (peak-to-peak) over one observing night.
- vi. The instrument should have fully automated focusing, observing, and calibration functions. Manual provisions for the same should also be provided. The instrument should be supplied with industrial PC. This PC should be able to connect with other PC's at observatory via a wired link. The instrument functions should be operable in remote control following the hardware and software standards.
- vii. In inter order pixels, stray light should be less than 2% of total flux in the adjacent orders.
- viii. All the electronics and software required to operate the entire instrument should be part of the instrument.
- ix. HRS should be a bench mounted spectrograph and placed inside the telescope pier. The drawing of the pier is given in the annexure 4.
- x. Telescope interface unit/Cassegrain Unit: It should be mounted on the one of the side port of the telescope. Guiding unit, calibration unit, atmospheric dispersion corrector, and optical fiber link would be the part of this unit.
- xi. Guiding unit: It should contain guiding optics and guiding camera to image telescope focal plane. The purpose of this unit is to center the stellar source onto the fiber and send guiding correction to the telescope using on-axis guiding.
- xii. Calibration unit: It is required to project the calibration light from the calibration sources into fibers at the cassegrain unit.
- xiii. Atmospheric dispersion corrector: It is required to avoid light losses at fiber due to atmospheric refraction. It would be used up to zenith angle of 65 degree.
- xiv. Optical fiber link: This unit will inject the star and sky light to the respective fibers. The f/9 telescope beam needs to be converted to a fast beam (say  $\sim f/4$  beam) to minimize focal ratio degradation.
- xv. Focal ration adaptation optics: Purpose of this unit is to convert fast beam ( $\sim f/4$ ) exiting the fiber to a relatively slow beam ( $\sim f/10$ ); suitable to achieve the spectrograph specifications.
- xvi. Exposure meter: An exposure meter is required for continuous monitoring of flux for deciding the exposure time with the desired Signal-to-Noise ratio (SNR). The exact mean time of exposure is required to apply correction to the observed radial velocity.
- xvii. Temperature controlled housing and vacuum chamber enclosing the spectrograph is required to meet the required specifications of the spectrograph.
- xviii. The parts/components used in the entire instrument should be able to withstand the weather conditions as mentioned in the compliance matrix in **Annexure 1**.

### 5.3 Safety requirements

An Indian standard for electrical systems is adopted as prescribed by Bureau of Indian Standard (BIS) may be seen <http://www.bis.org.in>. The use of industrial grade PCs is required. Cables should be made up of materials that can withstand extreme weather conditions as mention in the compliance matrix in **Annexure 1**.




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## Section VI

### General Conditions of Contract (GCC)

#### 6.1 Issue of Contract

- 1- The chosen vendor is expected to enter into a contract with ARIES under the standard terms and conditions provided by the administration of ARIES.
- 2- Until the contract is signed, the notification of award shall constitute the conclusion of the contract.
- 3- If the successful tenderer fails to provide performance security within the specified time or fails to sign the contract, his EMD will be forfeited and further actions as deemed necessary by the Purchaser will be taken against him.

**6.2** The tenderer shall not, without the Purchaser's prior written consent, disclose the contract or any provision thereof including any specification, drawing, sample or any information furnished by or on behalf of the Purchaser in connection therewith, to any person other than the person(s) employed by the tenderer in the performance of the contract emanating from this tender enquiry document. Further, any such disclosure to any such employed person shall be made in confidence and only so far as necessary for the purposes of such performance for this contract.

**6.3** The tenderer shall not, without the Purchaser's prior written consent, make use of any document or information mentioned in 6.2 except for the sole purpose of performing this contract.

**6.4** Except the contract issued to the tenderer, each and every other document as mentioned in 6.2 shall remain the property of the Purchaser and, if advised by the Purchaser, all copies of all such documents shall be returned to the Purchaser on completion of the Supplier's performance and obligations under the contract.

**6.5** The Supplier shall, at all times, indemnify and keep indemnified the Purchaser, free of cost, against all claims which may arise in respect of goods & services to be provided by the Supplier under the contract for infringement of any right protected by patent, registration of designs or trademarks. In the event of any such claim in respect of alleged breach of patent, registered designs, trademarks etc. being made against the Purchaser, the Purchaser shall notify the Supplier of the same and the Supplier shall, at his own expenses take care of the same for settlement without any liability to the Purchaser.

**6.6** All goods and services to be supplied and provided under the contract shall have the origin in India or in the countries with which the Government of India has trade relations.

**6.7** The word "origin" incorporated in this clause means the place from where the goods are mined, cultivated, grown, manufactured, produced or processed or from where the services are arranged.

#### 6.8 Performance Security

**6.8.1** Within 21 (twenty one) days after the issue of notification of award by the Purchaser, the tenderer, shall furnish performance security to the Purchaser for an amount equal to 10 % (ten per cent) of the total value of the contract. This Security shall remain valid up to 90 days after the date of completion of all contractual obligations by the Supplier, including the expiry of warranty obligations.

**6.8.2** The Performance security shall be in the form of Bank Guarantee issued by a Scheduled bank in India, in the prescribed form as provided in **Form-4** of **Section VIII** of this document.

**6.8.3** If Tenderer fails to fulfil its obligations in terms of the contract, the amount of the performance security shall be payable to the Purchaser as compensation and the Purchaser can invoke the said Performance Bank Guarantee.

**6.8.4** If any amendment is issued to the contract, the Supplier shall, within 21 (twenty one) days of issue of the amendment, furnish the corresponding amendment to the Performance Security (as necessary), rendering the same valid in all respects in terms of the contract, as amended.

**6.8.5** Subject to sub-clause 6.8.4 above, the Purchaser will release the performance security without any interest to the Supplier on completion of the Supplier's all contractual obligations including the



warranty obligations.

## 6.9 Technical Specifications and Standards

**6.9.1** The Goods and Services to be provided by the Supplier under this contract shall conform to the scope of work, expected deliverables, technical specifications, and compliance matrix, as mentioned under **Sections IV, V and Annexure 1** of this document.

## 6.10 Packing and Marking

**6.10.1** The tenderer should pack the goods in strong and durable packing which can withstand, without limitation, the entire journey during transit including transshipment (if any), rough handling, open storage etc. without any damage, deterioration etc. As and if necessary, the size, weights and volumes of the packing cases shall also take into consideration, the remoteness of the final destination of the goods and availability or otherwise of transport and handling facilities at all points during transit up to final destination as per the contract.

## 6.11 Inspection and Quality Control

**6.11.1** The Purchaser and/ or its nominated representative(s) will inspect and/or test the ordered goods and the related services to confirm their conformity to the contract specifications and other details incorporated in the contract at the cost of the purchaser. The Purchaser shall inform the Supplier in advance, in writing, the Purchaser's programmer for such inspection and, also the identity of the officials to be deputed for this purpose.

**6.11.2** The Technical Specification and Quality Control Requirements incorporated in the contract specify the inspections and tests are to be carried out and, also, where and how they are to be conducted. If such inspections and tests are conducted in the premises of the tenderer or its subcontractor(s), all reasonable facilities and assistance, including access to relevant drawings, design details and production data, shall be furnished by the Supplier to the Purchaser's inspecting authorities at no charge to the Purchaser. The cost towards the transportation, boarding and lodging of the purchaser and/or its nominated representative (s) shall be borne by the purchaser.

**6.11.3** If during such inspections and tests the contracted goods fail to confirm to the required specifications and standards, the Purchaser's inspecting authorities may reject them and the Supplier shall either replace the rejected goods or make all alterations necessary to meet the specifications and standards, as required, free of cost to the Purchaser and resubmit the same to the Purchaser's inspector for conducting the inspections and tests again.

**6.11.4** The Supplier shall tenders the goods to the Purchaser's inspecting authorities for inspection which may carry out the inspection and complete the formalities beyond the contractual delivery period at the risk and expense of the Supplier. The fact that the goods have been inspected after the contractual delivery period will not have the effect of keeping the contract alive and this will be without any prejudice to the legal rights and remedies available to the Purchaser under the terms & conditions of the contract.

**6.11.5** The Purchaser's contractual right to inspect, test and, if necessary, reject the goods after the goods' arrival at the final destination shall have no bearing of the fact that the goods have previously been inspected and cleared by Purchaser's representatives during pre-dispatch inspection mentioned above.

**6.11.6** Goods accepted by the Purchaser and/or its Inspecting authorities at initial inspection and in final inspection in terms of the contract shall in no way dilute Purchaser's right to reject the same later, if found deficient in terms of the warranty clause of the contract, as incorporated under GCC, **Clause 6.17 Section- VI.**

**6.11.7** The equipment must fulfil all legal regulations on safety and health requirements (radiation, electrical, electro-magnetic, mechanical, etc.) and shall comply with the Electricity Acts, Rules, Codes & Standards as existing in India.



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## 6.12 Terms of Delivery

**6.12.1** Any loss or damage to the equipment due to mishandling, transportation, till such time the equipment is delivered at the site shall be to tenderer's account. The tenderer shall be responsible for preferring of all claims and make good for the damage of loss by way of repairs and/or replacement of the portion of equipment damaged or lost.

**6.12.2** Upkeep of the Equipment/ Instrument till the time of their commissioning and delivery shall be the responsibility of the tenderer. No extra cost for upkeep of machine shall be payable to the supplier if the installation & commissioning of the machine at particular destination(s) is delayed for reasons not attributable to the Govt.

**6.13 Transportation of Goods:** The Supplier will arrange transportation of the ordered goods as per its own procedure.

**6.14 Insurance:** The Supplier shall, in his own interest, insure the goods against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery. The Supplier shall be responsible till the entire stores contracted for arrive in good condition at destination. The transit risk in this respect shall be covered by the Supplier by getting the stores duly insured. The insurance cover shall be obtained by the Supplier in its own name and not in the name of the Purchaser or its Consignee.

## 6.15 Services

**6.15.1** Prices to be paid to the Supplier by the Purchaser for any of the required incidental services, if not already included in the contract price during the placement of the contract, shall be settled and decided in advance by the Purchaser and the Supplier. The Supplier shall certify in the invoice that the charged price do not exceed the contemporary rates charged by them to other customers for similar services.

**6.16 Clearance / Receipt of Goods:** The Supplier shall make his own arrangements for clearance of goods through customs and their receipt and onward dispatch for the site of installation.

## 6.17 Warranty

**6.17.1** The Supplier shall, by signing the contract, gives warranty that the goods supplied under the contract will be brand new, unused and in full accordance with the requirements of the enquiry specifications and incorporate state of art technology with all recent improvements in design and materials unless prescribed otherwise by the Purchaser in the contract. The Supplier further gives a warranty that the goods supplied under the contract shall have no defect arising from design, materials or workmanship or from any act or omission of the tenderer that may develop under normal use of the supplied goods under the conditions prevailing in India or at the place of Installation. The Supplier also gives warranty that the goods are not subject to any security, interest, lien or any other encumbrance.

**6.17.2** This warranty shall remain valid for 24 months after the goods have been delivered, installed and commissioned at the final destination and accepted by the Purchaser in terms of the contract.

**6.17.3** In case of any claim arising out of this warranty, the Purchaser shall promptly notify the same in writing to the Supplier.

**6.17.4** Upon receipt of such notice, the Supplier shall, with all reasonable speed, repair/replace the defective goods or parts thereof, free of cost, at the ultimate destination. The Supplier shall take over the replaced parts/goods after providing their replacements and no claim, whatsoever shall lie on the Purchaser for such replaced parts/goods thereafter.

**6.17.5** If any defect is rectified or defective goods are replaced during the warranty period, the warranty for the rectified/replaced goods shall be extended to a further period of 24 (twenty four) months from the date of completion of its repair / replacement and the systems starts functioning to the satisfaction of the Purchaser.

**6.17.6** If the Supplier, having been notified, fails to rectify/replace the defect(s) within a reasonable period



the Purchaser may proceed to take such remedial action(s) as deemed fit by the Purchaser, at the risk and expense of the Supplier and without prejudice to other contractual rights and remedies, which the Purchaser may have against the Supplier.

**6.18 Assignment:** The Supplier shall not assign to anyone, either in whole or in part, its contractual duties, responsibilities and obligations to perform the contract, except with the Purchaser's prior written permission.

#### **6.19 Modification of contract**

**6.19.1** If necessary, the Purchaser may, by a written order given to the Supplier at any time during the period of the contract, amend the contract by making alterations and modifications within the general scope of contract in any one or more of the following:

- Specifications, drawings, design etc. where goods to be supplied under the contract are to be specially manufactured for the Purchaser;
- Additions in scope of services to be provided by the tenderer;
- Any other area(s) of the contract, as felt necessary by the Purchaser depending on the merits of the case.

**6.19.2** In the event of any such modification/alteration causing increase or decrease in the cost of goods and services to be supplied and provided, or in the time required by the Supplier to perform any obligation under the contract, an equitable adjustment shall be made in the contract price and/or contract delivery schedule, as the case may be, and the contract amended accordingly. If the Supplier doesn't agree to the adjustment made by the Purchaser, the Supplier shall convey its views to the Purchaser within 21 (twenty one) days from the date of the Supplier's receipt of the Purchaser's amendment / modification of the contract.

#### **6.20 Delay in the Supplier's performance**

**6.20.1** The Supplier shall deliver the goods and perform the services under the contract within the time schedule specified by the Purchaser in the Schedule of Requirements and as incorporated in the contract.

**6.20.2** Subject to the Force Majeure provision under **clause 6.24** of this section, any unexcused delay by the Supplier in maintaining its contractual obligations towards delivery of goods and performance of services shall render the Supplier liable to any or all of the following sanctions:

- Imposition of liquidated damages,
- Forfeiture of its performance security and
- Termination of the contract for default.

**6.20.3** If at any time during the currency of the contract, the Supplier encounters conditions hindering timely delivery of the goods and performance of services, the Supplier shall promptly inform the Purchaser in writing about the same and its likely duration and make a request to the Purchaser for extension of the delivery schedule accordingly. On receiving the Supplier's communication, the Purchaser shall examine the situation as soon as possible and, at its discretion, may agree to extend the delivery schedule, with or without liquidated damages for completion of Supplier's contractual obligations by issuing an amendment to the contract.

**6.20.4** When the period of delivery is extended due to unexcused delay by the Supplier, the amendment letter extending the delivery period shall, inter alia contain the following conditions:

- The Purchaser shall recover from the Supplier, under the provisions of the **clause 6.21** of the General Conditions of Contract, liquidated damages on the goods and services, which the Supplier has failed



to deliver within the delivery period stipulated in the contract.

- b. That no increase in price on account of any ground, whatsoever, including any stipulation in the contract for increase in price on any other ground and, also including statutory increase in or fresh imposition of customs duty, excise duty, sales tax or on account of any other tax or duty which may be levied in respect of the goods and services specified in the contract, which takes place after the date of delivery stipulated in the contract shall be admissible on such of the said goods and services as are delivered and performed after the date of the delivery stipulated in the contract.
- c. But nevertheless, the Purchaser shall be entitled to the benefit of any decrease in price on account of reduction in or remission of customs duty, excise duty, sales tax or any other duty or tax or levy or on account of any other grounds, which takes place after the expiry of the date of delivery stipulated in the contract.

**6.20.5** The Supplier shall not dispatch the goods after expiry of the delivery period. The Supplier is required to apply to the Purchaser for extension of delivery period and obtain the same before dispatch. In case the Supplier dispatches the goods without obtaining an extension, it would be doing so at its own risk and no claim for payment for such supply and / or any other expense related to such supply shall lie against the Purchaser.

#### **6.21 Liquidated damages**

**6.21.1** Subject to **Clause 6.24** of this Section (Force Majeure), if the Supplier fails to complete the installation and commissioning of the equipment within the time fixed under the contract, the Purchaser shall without prejudice to any other rights and / or remedy as may be available to the Purchaser under the Contract, shall deduct from the Contract price as an agreed Liquidated damages amount @ 0.5 % of value of undelivered goods per week or part thereof until actual delivery or performance, subject to a maximum of 10% of the contract price.

**6.21.2** ARIES reserves the right to terminate the contract at the risk and cost of the Supplier in case the delay is more than 3 (three) months from the scheduled date of supply with forfeiture of Security Deposit. 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 6 months may be condoned if ARIES is satisfied about its genuine nature.

**6.21.3** The amount of Liquidated damages may be adjusted or set-off against any sum payable to the Supplier under this or any other contract with the Purchaser.

#### **6.22 Termination for default**

**6.22.1** The Purchaser may, without prejudice to any other contractual rights and remedies available to it (the Purchaser), by written notice of default sent to the Supplier, terminate the contract in whole or in part, if the Supplier fails to deliver any or all of the goods or fails to perform any other contractual obligation(s) within the time period specified in the contract, or within any extension thereof granted by the Purchaser under **sub-clauses 6.20.3 and 6.20.4** of this Section.

**6.22.2** In the event of the Purchaser terminates the contract in whole or in part, pursuant to GCC **sub clause 6.22.1** above, the Purchaser may procure goods and/or services similar to those cancelled, with such terms and conditions and in such manner as it deems fit and the Supplier shall be liable to the Purchaser for the extra expenditure, if any, incurred by the Purchaser for arranging such procurement.

**6.22.3** Unless otherwise instructed by the Purchaser, the Supplier shall continue to perform the contract to the extent not terminated.

#### **6.23 Termination for insolvency**

**6.23.1** If the Supplier becomes bankrupt or otherwise insolvent, the Purchaser reserves the right to terminate



the contract at any time, by serving written notice to the Supplier without any compensation, whatsoever, to the Supplier, subject to further condition that such termination will not prejudice or affect the rights and remedies which have accrued and / or will accrue thereafter to the Purchaser

#### 6.24 Force Majeure

- 6.24.1** Notwithstanding the provisions contained in GCC **clauses 6.21, 6.22 and 6.23**, the Supplier shall not be liable for imposition of any such sanction so long the delay and/or failure of the Supplier in fulfilling its obligations under the contract is the result of an event of Force Majeure.
- 6.24.2** For purposes of this clause, Force Majeure means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not brought about at the instance of the Supplier claiming to be affected by such event or which if anticipated or foreseeable, could not be avoided or provided for and which has caused the non-performance or delay in performance. Such events may include, but are not restricted to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, hostility, acts of public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes and lockouts (not restricted to the establishment of the affected party) and freight embargoes but shall not include the unavailability of funds.
- 6.24.3** If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof within twenty one days of occurrence of such event. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the contract as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
- 6.24.4** If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of Force Majeure for a period exceeding sixty days, either party may at its option terminate the contract without any financial repercussion on either side.
- 6.24.5** In case due to a Force Majeure event the Purchaser is unable to fulfil its contractual commitment and responsibility, the Purchaser will notify the Supplier accordingly and subsequent actions taken on similar lines described in above sub-paragraphs.

#### 6.25 Termination for convenience

- 6.25.1** The Purchaser reserves the right to terminate the contract, in whole or in part for its (Purchaser's) convenience, by serving written notice on the Supplier at any time during the contract. The notice shall specify that the termination is for the convenience of the Purchaser. The notice shall also indicate inter alia, the extent to which the Supplier's performance under the contract is terminated, and the date with effect from which such termination will become effective.
- 6.25.2** The goods and services which are complete and ready in terms of the contract for delivery and performance within thirty days after the Supplier's receipt of the notice of termination shall be accepted by the Purchaser following the contract terms, conditions and prices. For the remaining goods and services, the Purchaser may decide:
- To get any portion of the balance completed and delivered at the contract terms, conditions and prices; and / or
  - To cancel the remaining portion of the goods and services and compensate the Supplier by paying an agreed amount for the cost incurred by the Supplier towards the remaining portion of the goods and services.

**6.26 Governing language:** The contract as well as all correspondence and other documents pertaining to the contract, which the parties exchange, shall be in English language.

#### 6.27 Notices



**6.27.1** Notice, if any, relating to the contract given by one party to the other, shall be sent by e-mail and confirmed through a signed hard copy delivered by hand/post/courier. The sender shall retain proof of receipt of the notice by the receiver. The addresses of the parties for exchanging such notices will be the addresses as incorporated in the contract.

**6.27.2** Any and all notices and communications in connection with this Contract shall be in English and shall be addressed as follows, unless and until otherwise advised to the Purchaser at: The Director, ARIES, Manora Peak, Nainital-263001, Uttarakhand, India.

**6.27.3** The effective date of a notice shall be either the date when delivered to the recipient or the effective date specifically mentioned in the notice, whichever is later.

#### **6.28 Resolution of disputes**

**6.28.1** In the event of any dispute or difference between the parties hereto, such disputes or differences shall be resolved amicably by mutual consultation. If such resolution is not possible, then the unresolved dispute or difference shall be referred to arbitration of the sole arbitrator to be appointed by the Director, ARIES on the recommendation of the Director, ARIES, Nainital-263001, Uttarakhand, India. The provisions of Arbitration and Conciliation Act, 1996 (No.26 of 1996) shall be applicable to the arbitration. The venue of such arbitration shall be at Nainital or any other place, as may be decided by the arbitrator. The language of arbitration proceedings shall be English. The arbitrator shall make a reasoned award (the "Award"), which shall be final and binding on the parties. The cost of the arbitration shall be shared equally by the parties to the agreement. However, expenses incurred by each party in connection with the preparation, presentation shall be borne by the party itself.

**6.28.2** Pending the submission of and/or decision on a dispute, difference or claim or until the arbitral award is published; the Parties shall continue to perform all of their obligations under this Agreement without prejudice to a final adjustment in accordance with such award.

**6.29 Applicable Law and Jurisdiction:** The contract shall be governed by the laws of India for the time being in force. Subject to clause 6.28 above (Resolution of disputes), the Courts of Nainital, Uttarakhand shall have exclusive jurisdiction in all matters or disputes arising under or in respect of this contract.

#### **6.30 General / Miscellaneous**

**6.30.1** Any failure or delay on the part of any Party to exercise right or power under this Contract shall not operate as waiver thereof.

**6.30.2** The Supplier shall notify the Government of India of any material change in their status or that of its Guarantor, in particular, where such change would impact on performance of the obligations under the Contract or the Guarantee(s).

**6.30.3** Each member / constituent of the Supplier, in case of a consortium, shall be jointly and severally liable to and responsible for all obligations towards the Government for performance of contract / services including that of its Associates / Sub-Contractors under the Contract.

**6.30.4** The Supplier shall, at all times indemnify and keep indemnified the Purchaser or an officer or an agent of Purchaser against any claims in respect of any damages or compensation payable in consequences of any accident or injury sustained or suffered by its employees or agents or by any other third Party resulting from or by any action, omission or operation conducted by or on behalf of the Supplier / its Associate / affiliate etc. or for failure or neglect. If any action in court is brought against the Purchaser or an officer or agent of the Purchaser for the failure or neglect on the part of the Supplier to perform any acts, matters, covenants or things under the Contract, the Supplier shall in all such cases indemnify and keep the Purchaser and/or his representative, harmless from all losses damages expenses or decrees arising out of such action.

**6.30.5** All claims regarding indemnity shall survive the termination or expiry of the Contract.





### 6.31 Preference to “Make In India”

ARIES complies with Public Procurement Policy (Make in India) vide order No.P-45021/2/2017-PP (BE-II) dated 16 Sept 2020, issued by Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Govt. of India. Purchase preference shall be given to local suppliers in all procurements undertaken by ARIES in the manner specified in the above-mentioned O.M. Further, the guidelines mentioned below shall be followed:

#### Verification of Local Content-

- a. This ‘Class -I local supplier’/ ‘Class-II local supplier’ at the time of tender, bidding or solicitation shall be required to indicate percentage of local content and provide self-certification that the item offered meets the local content requirement for ‘Class-I local supplier’/ ‘Class-II local supplier’ as the case may be. They shall also give details of the location(s) at which the local value addition is made.

#### Definitions:

‘Local content’ means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

- Class –I local supplier’ means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under this order.
- ‘Class–II local supplier’ means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 20% but less than 50%.
- ‘Non -local supplier’ means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than 20%.

### 6.32 PREFERENCE TO “MSME”:

ARIES complies with Public Procurement Policy **Micro and Small Enterprises (MSEs) Order, 2012** as notified under **section 11** of MSME Act, 2006. Purchase preference shall be given to MSEs in all procurements undertaken by ARIES in the manner specified as below:

- In case of splitable or dividable, etc., MSMEs quoting price within price band L-1 + 15%, when L1 is from someone other than MSMEs, shall be allowed to supply at least 20% of tendered value at L-1 subject to lowering of price by MSMEs to L-1.
- In case of non-splitable or non-dividable etc., MSEs quoting price within price band L-1 + 15% may be awarded for full/complete supply of total tendered value to MSME, considering spirit of policy for enhancing the Govt. Procurement from MSME.



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# Section - VII

## Item Wise BoQ

Validate Print Help

Tender Inviting Authority: <Aryabhata Research Institute of Observation Sciences (ARIES), Manora Peak, Nainital-263001>

Name of Work: < Designing, Building/Fabrication, Testing, Installation, and Commissioning of High Resolution Spectrograph (HRS) For Use With ARIES 3.6 Meter Devasthal Optical Telescope (DOT) at Devasthal Campus, Near Jadapani, District: Nainital- 263132, State: Uttarakhand; as per the specifications in the attached sheet. >

Contract No: <05942-270744,05942-270723,05942-27025,05942270729>

PRICE SCHEDULE																		
(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only )																		
NUMBER #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #	TEXT #
Sl. No.	Item Description	Item Code / Make	NUMBER #	Quantity	Units	Estimated Rate in Rs.	NUMBER #	TEXT #	Currency Conversion against each item	Quoted Currency in INR / Other Currency	BASIC RATE in Figures To be entered by the Bidder in	NUMBER #	Any Other Taxes/Duties/Levies in	TOTAL AMOUNT, it will be converted	TOTAL TAXES it will be converted only if you choose Full Conversion, Until it will be treated as INR	TOTAL AMOUNT in Words		
1	2	3	4	5	6	11	12	13	14	15	16	17	18	19	20	21	22	23
1	Designing, Building/Fabrication, Supply, Installation, Testing, and Commissioning (DB/F-SITC) of High Resolution Spectrograph (HRS) For Use With ARIES 3.6 Meter Devasthal Optical Telescope (DOT) at Devasthal, Near Jadapani Dhanachuli, Okhalkanda Block Nainital-263132, Uttarakhand, India as per the specifications given with this document.	Item1	1	No.	180000000.00	Full Conversion	INR								0.00	0.00	INR Zero Only	17
2	CCD Detectors	Item2	2	No.	24000000.00	Full Conversion	INR								0.00	0.00	INR Zero Only	
Total in Figures																		
Quoted Rate in Words																		
INR,USD,JPY,EUR Zero Only																		

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## Section - VIII

### **Form - 1 (TENDER FORM)**

**(The technical bid should be as per this form)**

***Please read the following INSTRUCTIONS carefully before filling up the form.***

1. The tenderer should obtain and/or download and carefully examine the above Tender Notice and all its tender enquiry documents (TED), including amendments, if any and unconditionally agree to all the terms and conditions indicated in the tender enquiry documents and subsequent amendments.
2. The copy of the TED and amendments retained in the records of the AREIS will be deemed authentic in case of any dispute at any stage.
3. The tenderer should fill in all columns of this Tender Form and enclose supporting documents. The e-tendering process may permit replacement of shortfall documents, e.g., a document which is not legible but no additional documents can be submitted after the tenders are opened. Tenderers should therefore submit whatever documents they wish, in support of their tender along with the tender itself.
4. The following tenders shall be ignored:
  - a) Tenders submitted by those who do not meet the qualification criteria;
  - b) Tenders sent by fax/telex/cable/email/post/personally delivered;
  - c) Tenders that do not meet the basic requirements;
  - d) Tenders which have any shortfall documents and the tenderer does not make up the shortfall within the time specified by the Purchaser;
  - e) Tenders where, in the opinion of the Purchaser, there is an arithmetical inaccuracy in the price bid and the tenderer does not agree with the Purchaser;
  - f) Incomplete tenders;
  - g) Tenders received without the EMD fee.
5. Any tender may be rejected if:
  - a) The tender price is directly or indirectly indicated in the technical bid;
  - b) Tenderer fails to provide required information or provide incorrect information or gives evasive reply to the Purchaser's queries or modify/improve the tender;
  - c) Tenderer fails to comply with the instructions in the Tender Document;
  - d) The prices are not quoted in the manner indicated in the Tender Document;
  - e) Tender validity is for less than 180 days from the date of opening of tenders as indicated in the Tender Document;
  - f) On verification, the data/credentials furnished by the tenderer are found to be incorrect or any adverse report on requisite qualification criteria has come to the knowledge of the Purchaser;
  - g) Tenderer attempts to influence the Purchaser's decision during scrutiny, comparison and evaluation of tenders and award of contract;
  - h) Tenderer is disqualified on the grounds of national security or public interest.
6. The Purchaser is not bound to accept the lowest or any tender that may be received against the above-referred tender



enquiry.

7. The Purchaser may accept any tender at any time before the date of expiry of its validity indicated in the tender form or any date up to which its validity is further extended by the tenderer.
8. Until a contract is signed, this tender form submitted by the tenderer read with its acceptance by the Purchaser constitutes a binding contract between them.

Having carefully gone through the above instructions and the TED, we, M/s. \_\_\_\_\_, the tenderer, agree to all the terms and conditions mentioned in them and hereby, make the following offer to supply goods and perform services as per the Schedule requirements, delivery schedule and in conformity with all other conditions in the TED and amendments. We will arrange for demonstration of models of the Equipment/ Instrument being offered, within India as per the convenience of the Purchaser.

#### Tenderer

1. Name of the tenderer \_\_\_\_\_
2. Address \_\_\_\_\_
3. Email \_\_\_\_\_
4. Phone \_\_\_\_\_
5. Income Tax Permanent Account Number (PAN): \_\_\_\_\_
6. Name and complete address of the Tenderer's bankers \_\_\_\_\_
  - a) \_\_\_\_\_
  - b) \_\_\_\_\_
7. Name and designation of the person digitally signing and submitting the tender \_\_\_\_\_
8. Is the person digitally signing and submitting the tender authorized by the tenderer? (Yes/No)  
(Please enclose scanned copy of the Board's resolution authorizing the person to submit the tenders without which the tender will be rejected)
9. Whether business dealings with the tenderer currently stand suspended/ banned by any Ministry/ Department of Govt. of India or any State Govt. (Yes/No)

#### Qualification

10. Is the tenderer an OEM of the goods being offered? Yes/No  
(If yes, please enclose documents showing terms of transfer of technical know-how or scope of collaboration)
11. Is the tenderer an authorized agency / representative duly nominated by the OEM? (Yes/No)

(If yes, please enclose required documents as mentioned in qualification criteria)

12. Turnover of the tenderer during the past three financial years

2017-2018 \_\_\_\_\_

2018-2019 \_\_\_\_\_

2019-2020 \_\_\_\_\_

Average \_\_\_\_\_

(Please enclose certified published annual reports. If the accounts are maintained in some other currency, please give the figures in that currency as well as its conversion at the exchange rate on the date of filling up this form. If the accounts are managed calendar year wise, please provide figures for 2017, 2018 and 2019.)

13. How many Equipment/ Instrument, being offered, has the tenderer supplied during the past three years in India or abroad? \_\_\_\_\_ (Please enclose documentary proof)

14. How many similar Equipment/ Instrument has the tenderer maintained under warranty during the past two years in India? \_\_\_\_\_ (Please enclose documentary proof)

Original Equipment Manufacturer (if different from the tenderer)

15. Name of the OEM manufacturing the Equipment/ Instruments \_\_\_\_\_

16. Address of the OEM \_\_\_\_\_

17. Phone \_\_\_\_\_

18. Email \_\_\_\_\_

Manufacturing company (whether tenderer or another OEM)

19. Does the company manufacturing the offered Equipment/ Instrument have ISO certification for manufacturing such Equipment/ Instrument? \_\_\_\_\_ (Please enclose copy)

20. Does the company manufacturing the offered Equipment/ Instrument have ISO certification for servicing such Equipment/ Instrument? \_\_\_\_\_ (Please enclose copy)

Offer

21. The tender is valid up to \_\_\_\_\_

22. Make & Model Number of the Equipment/ Instrument offered \_\_\_\_\_

Technical documents to be enclosed

23. Clause-wise response/compliance to requirements specified in Section-IV, Section-V, and Annexure-I of Tender Document. You may furnish additional information/ clarifications, documents, etc., in support of your offer.





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ARIES, Manora Peak



### Warranty and post-warranty maintenance

24. Do you have your own set up in India to provide the maintenance during warranty period  
(Yes/No)

25. If yes, please provide details (in 100 words) including experienced manpower & resources details and enclose relevant documents.

---

26. If answer to question at 24 above is no, do you have any agreement with any other manufacturer or reputed agency to act as Maintenance contractor to provide maintenance during warranty? (Yes/No)

27. If yes, please provide details (in 100 words) and enclose a copy of the agreement, including previous experience and manpower details of the proposed agency in maintenance of similar type of equipment/ instruments.

### Documents to be enclosed

28. Have you submitted the EMD? (Yes/No)

29. Have you enclosed the following documents? (Yes/No)

- Scanned copy of the Bank Guarantee of Earnest money deposit (EMD)(Yes/No)
- Documentary evidence to show your eligibility, qualification and capability to provide the goods and services required as per this Tender Document including the establishment to carry out site works & services, installation & commissioning, maintenance and product support. (Yes/No)
- Documents and relevant details to establish that the goods and the allied services offered conform to the requirement of the tender documents.(Yes/No)
- Power of Attorney of firm / resolution of Board of Directors of company for person or persons authorized to sign the Tender ;(Yes/No)
- Power of Attorney / Authorization letter by the Manufacturer to Indian company/ firm/ representative to represent the Manufacturer in India; (Yes/No).
- Copies of documents defining constitution and legal status of the tenderer;(Yes/No)
- Documents indicating arrangements with the OEM (in the event of a collaborator Tendering); (Yes/No)
- Documents indicating the arrangements between the tenderer and the Maintenance contractor, along with the details of experience & resources the Maintenance



contractor possess ;(Yes/No)

- i. An undertaking to the effect that the Price tender does not contain any conditions whatsoever of the price demanded for sale. (Yes/No)
- j. Certified published annual reports showing the turnover and financial results. (Yes/No)
- k. Documents indicating the past supplies of the offered equipment / instruments. (Yes/No)
- l. Performance certificates for the offered equipment/ instruments from existing users in India.
- m. Any other documents/ technical literature that you consider necessary to strengthen your tender. (Yes/No/None required)

.....  
(Signature with date)

.....  
..... (Name and  
designation)

Duly authorised to sign tender for and on behalf of

\*\*\*\*\*



Registrar  
ARIES, Manora Peak  
Nainital





**Form - 2**

**MANUFACTURER'S AUTHORISATION FORM**

To

.....

(Name and address of the Purchaser)

Dear Sirs,

**Ref.** Your Tender Enquiry Document/Tender Reference No....., dated .....

We ....., who are proven and reputable manufacturers of..... (name and description of the goods offered in the tender) having factories at....., hereby authorize Messrs. (name and address of the agent) to submit a tender, process the same further and enter into a contract with you against your requirement as contained in the above referred tender enquiry documents for the above goods manufactured by us.

We further confirm that no Supplier or firm or individual other than Messrs .....(name and address of the above agent) is authorised to submit a tender, process the same further and enter into a contract with you against your requirement as contained in the above referred tender enquiry documents for the above goods manufactured by us.

We also hereby extend our full warranty, as applicable as per clause 6.17 of the General Conditions of Contract, for the goods and services offered for supply by the above firm against this tender enquiry document.

Yours faithfully,

[Signature with date, name and designation]

for and on behalf of Messrs .....

[Name & address of the manufacturers]

Note : This letter of authorisation should be on the letter head of the manufacturing firm and should be signed by a person competent and having the power of attorney to legally bind the manufacturer.

\*\*\*\*\*

Form – 3

To,

**BANK GUARANTEE FORM FOR EMD**

Whereas ..... (hereinafter called the “Tenderer”) has submitted its quotation dated..... for the supply of ..... (hereinafter called the “tender”) against the Purchaser’s tender enquiry No. .... Know all persons by these presents that we .....of ..... (hereinafter called the “Bank”) having our registered office at are bound unto ----- (hereinafter called the “Purchaser”) in the sum of for which payment will and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this..... day of ..... 20..... The conditions of this obligation are —

- (1) If the Tenderer withdraws or amends, impairs or derogates from the tender in any respect within the period of validity of this tender.
- (2) If the Tenderer having been notified of the acceptance of his tender by the Purchaser during the period of its validity:-
  - a) fails or refuses to furnish the performance security for the due performance of the contract or
  - b) fails or refuses to accept or execute the contract.

We hereby irrevocably and absolutely undertake to pay immediately the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or both the two conditions, specifying the occurred condition(s).

This guarantee will remain in force for a period of forty five days after the period of tender validity and any demand in respect thereof should reach the Bank not later than the above date.

This guarantee will not be discharged due to change in the constitution of the bank or the Tenderer.

.....  
(Signature of the authorised officer of the Bank)

.....  
Name and designation of the officer

.....  
Seal, name & address of the Bank and address of the Branch

\*\*\*\*\*





Page 33 of 61



Form - 4

**BANK GUARANTEE FORM FOR PERFORMANCE SECURITY/BALANCE 10%  
PAYMENT**

To,

-----

WHEREAS ..... (name and address of the Supplier) (hereinafter called “the Supplier”) has undertaken, in pursuance of contract no..... dated to supply (description of goods and services) (herein after called “the contract”).

AND WHEREAS it has been stipulated by you in the said contract that the Supplier shall furnish you with a bank guarantee by a scheduled commercial bank recognised by you for the sum specified therein as security for compliance with its obligations in accordance with and due performance of the contract;

AND WHEREAS we have agreed to give the Supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the Supplier, up to a total of .....(amount of the guarantee in words and figures), and we hereby irrevocably and absolutely undertake to pay you immediately, upon your first written demand declaring the Supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Supplier before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed thereunder or of any of the contract documents which may be made between you and the Supplier shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

The Bank guarantee shall be interpreted in accordance with the laws of India.





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The Guarantor Bank represents that this Bank Guarantee has been established in such form and with such content that is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

The Bank Guarantee shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank or the Supplier.

The Bank further undertakes not to revoke this Guarantee during its currency except with the previous express consent of the Purchaser in writing.

The Bank declares that it has power to issue this Guarantee and discharge the obligations contemplated herein, the undersigned is duly authorized and has full power to execute this Guarantee for an on behalf of the Bank.

This guarantee shall be valid upto and including the ..... day of ....., 20.....

.....  
..... (Signature with date of the authorised officer  
of the Bank)

.....  
Name and designation of the officer

.....  
..... Seal, name & address of the Bank and address of  
the Branch

\*\*\*\*\*



  
Registrar  
ARIES, Manora Peak  
Nainital.



**Form - 5**

**CONTRACT FORM**

- Contract for “Designing, Building/Fabrication, Testing, Installation, and Commissioning of High Resolution Spectrograph (HRS) For Use With ARIES 3.6 Meter Devasthal Optical Telescope (DOT) at Devasthal Campus, Near Jadapani, District: Nainital- 263132,

Contract No. \_\_\_\_\_ dated \_\_\_\_\_

This contract for \_\_\_\_\_ is made on this \_\_\_\_ day of \_\_\_\_ 20\_\_ between

\_\_\_\_\_ [hereinafter referred to as “Supplier”] on the one part and the President of India acting through the Director , ARIES, Manora Peak, Nainital -263001 ( Uttarakhand) (hereafter referred to as the “Purchaser” which shall include his successors in the office and assigns) on the other part.

- Whereas the Purchaser had floated a Tender Reference No. AO/ ----- dated ----- and the Supplier had submitted a tender in response and has been awarded the contract vide Notification of award F.No. \_\_\_\_ dated \_\_, it is hereby, agreed that the Supplier will supply, install, at Devasthal, Near Jadapani, Devasthal Campus, Distt:- Naintial commission Equipment / Instruments as per NIT AO/ ----- dated ----- on turnkey basis and maintain it during the 2 years warranty period on the terms and conditions mentioned hereunder and for a price indicated in price bid of this contract which the Purchaser will pay as per the terms of payment indicated in payment terms of this contract.
- The following documents shall be deemed to form and be read and construed as part of this contract:
  - Purchaser’s Tender Enquiry Document No. \_\_ dated \_\_\_\_.
  - Tenderer’s Technical bid dated \_\_\_\_\_
  - Price bid of the Tenderer
  - General Instructions of the Contract, General Conditions of Contract, Schedule of Requirements, Technical Specifications, Quality Control Requirements, Qualification Criteria as mentioned in NIT AO/ ----- dated -----
  - Manufacturers’ Authorization Form furnished by the Tenderer in its tender
  - Purchaser’s Notification of Award F.No. \_\_\_\_\_ dated \_\_\_\_\_
  - Clarification issued by the Purchaser and replies/queries submitted by the Tenderer during evaluation of tenders.
- In addition to above documents, following shall also be deemed to form and be read and construed as part of this contract:
  - Supplier’s letter No. \_\_\_\_\_ dated \_\_\_\_\_
  - Purchaser’s letter F.No. \_\_\_\_\_ dated \_\_\_\_\_
  - \_\_\_\_\_

(Reference of all correspondence made with the Supplier with respect to this procurement)

*Handwritten signature*

*Handwritten signature*

## 5. Delivery schedule

Commissioning / handing over of \_\_\_\_ Equipment/Instruments shall be completed within \_\_\_\_ months from the date of Letter of award of the Contract and would be governed as per the GNIT No. AO/ ----- dated ----- and clarification issued thereafter on (if any).

## 6. Performance Security

The Supplier will furnish Performance Security within 21 days after the issue of Notification of award by the Purchaser as per the GNIT AO/ ----- dated -----

## 7. Technical Specification

Technical specification of the Equipment/Instruments shall be as per the GNIT AO/ ----- dated ----- and clarifications issued thereafter on (if any).

## 8. Transportation and Insurance

Transportation and Insurance of the Equipment/Instruments shall be as per the GNIT No. AO/ ----- dated ----- .

## 9. Quality Control

The quality control, inspection, tests and trials shall be carried out as per terms & conditions mentioned in the GNIT No. AO/ ----- dated ----- .

## 10. Installation & Commissioning

Installation & Commissioning of the Equipment/Instruments will be carried out as per the GNIT No. AO/ ----- dated -----.

## 11. Warranty

The 2 years warranty of Equipment/Instruments shall be as per the GNIT No. AO/ ----- dated ----- .

## 12. Payment Terms

The term and mode of payment, as per the GNIT No. AO/ ----- dated ----- shall be as under:

Milestone Deliverables	Payment (%)
Awarding the Contract	10
Final Design, after approval by ARIES	10
Material & Component Procurement and Manufacturing	15



Sub-system assembly and Testing	15
System integration, Training, & Testing	10
Factory acceptance testing	10
Packing and Shipping	10
Installation at the site and final acceptance by ARIES	10
Last milestone payment will be released after 60 days on completion of warranty period of 24 months.	10

**Note:** Basic cost of the machine will include cost of Equipment/Instruments, Designing, Building/Fabrication, Testing, Installation, and Commissioning of High Resolution Spectrograph (HRS) For Use With ARIES 3.6 Meter Devasthal Optical Telescope (DOT) at Devasthal Campus, Near Jadapani, District: Nainital- 263132.

The payment shall be made in \_\_\_\_\_. The Supplier shall send its claim for payment in writing, when contractually due, along with relevant documents etc., duly signed with date, as specified. While claiming payment, the Supplier shall certify on the bill that the payment being claimed is strictly in terms of the contract and all the obligations on the part of the Supplier for claiming that payment have been fulfilled as required under the contract. While claiming reimbursement of duties, taxes etc. (like sales tax, excise duty, custom duty) from the Purchaser, as and if permitted under the contract, the Supplier shall also certify that, in case it gets any refund out of such taxes and duties from the concerned authorities at a later date, it (the Supplier) shall refund to the Purchaser, the Purchaser's share out of such refund received by the Supplier. The Supplier shall also refund the applicable amount to the Purchaser immediately on receiving the same from the concerned authorities. The Bank Guarantee submitted against release of balance 10% payment shall remain valid till 90 days after the expiry of warranty period. In case the machine is not attended to in respect to any defect developing during the warranty period and made functional, 10% Performance security deposit and Bank Guarantee submitted against the release of 10% balance payment shall be forfeited.

### 13. Liquidated Damages

If the Supplier fails to complete the installation and commissioning of the equipment within the time fixed under the contract, the Purchaser shall deduct Liquidated Damages as per GNIT No. AO/ ----- dated -----

### 14. Termination of Contract

The Contract can be terminated in accordance with GNIT No. AO/ ----- dated -----

### 15. Resolution of Disputes

In the event of any dispute or difference arise between the Purchaser and Supplier in connection with or relating to the contract, the parties shall resolve their disputes or differences as per GNIT No. AO/----- dated -----.

### 16. Indemnity

The Supplier shall, at all times, indemnify and keep indemnified the Purchaser, free of cost, against all claims which may arise in respect of goods & services to be provided by the Supplier under the contract as per GNIT No. AO/----- dated -----.

### 17. Training

The training of the staff shall be carried out as per GNIT No. AO/----- dated -----

### 18. Modification of Contract

If necessary, the Purchaser may, by a written order given to the Supplier at any time during the currency of the contract, amend this contract as per GNIT No. AO/----- dated -----

### 19. Miscellaneous

Other issues, not mentioned in the contract, shall be governed as per the GNIT/TED/TR No. AO/----- dated ----- and documents mentioned above.

### Received and accepted this contract.

(\_\_\_\_\_)

M/s\_\_\_\_\_

(Sign & Stamp of  
Supplier) Date: \_\_\_\_\_

Place: \_\_\_\_\_

WITNESSES:

(\_\_\_\_\_)

Director, ARIES\_\_\_\_\_

Manora Peak, Nainital

\*\*\*\*\*





Registrar  
ARIES, Manora Peak  
Nainital



Form-6

**MODEL CERTIFICATE OF INSTALLATION**

F.No. \_\_\_\_\_ Dated \_\_\_\_\_

1. Reference Contract No. \_\_\_\_\_ date \_\_\_\_\_
2. It is certified that
  - a) M/s \_\_\_\_\_ have delivered the system on \_\_\_\_\_  
(date) and completed Installation and Site Acceptance Test of EQUIPMENT /  
INSTRUMENTS Model \_\_\_\_\_ Serial No. \_\_\_\_\_ to the satisfaction of the  
Purchaser and user Director, ARIES, Nainital -263132 at the designated site Devasthal,  
Near Jadapani, Devsthal Campus, Distt- Nainital \_\_\_\_\_ on \_\_\_\_\_ (date).
  - b) Records of SAT is annexed to this Certificate.
  - c) Software in USB/CD media, Instruction Manual & Technical Manual etc. have been  
taken over (all documents required to be delivered at the time of SAT) and the same  
are listed in the Annexure enclosed.

For Contractor

For Purchaser

Witness:

Witness:

Signature

Signature

Name

Name

Designation

Designation

Address

Address

Date

Date

\*\*\*\*\*

  
Registrar  
ARIES, Manora Peak  
Nainital.

FORM - 7

**MODEL CERTIFICATE OF DELIVERY AND ACCEPTANCE**

F.No. \_\_\_\_\_ Dated \_\_\_\_\_

1. Reference Contract No. \_\_\_\_\_ date \_\_\_\_\_
2. It is certified that
  - (a) M/s \_\_\_\_\_ have completed the delivery of the EQUIPMENT / INSTRUMENTS Model \_\_\_\_\_ Serial No. \_\_\_\_\_ on \_\_\_\_\_ (date) at designated site \_\_\_\_\_ (name of the site).
  - b) The process of handing / taking over of the aforesaid system, accessories and services specified in the Contract to the satisfaction of the Purchaser, has been completed on \_\_\_\_\_ (date).
  - c) The aforementioned EQUIPMENT / INSTRUMENTS worked satisfactorily during the trial period of 15 days starting w.e.f. \_\_\_\_\_ (date) to \_\_\_\_\_ (date).

For Contractor

For Purchaser

Witness:

Witness:

Signature

Signature

Name

Name

Designation

Designation

Address

Address

Date

Date

\*\*\*\*\*



  
Registrar  
ARIES, Manora Peak  
Nainital.



Form - 8

**CLAIM OF PAYMENT BY THE SUPPLIER**

*(To be typed and printed on the Supplier's official  
letterhead)*

Date.....

To,

The Director,

ARIES, Manora

Peak, Nainital

Sir/ Madam,

We claim the following amounts as per contract ..... entered into pursuant to NIT  
..... and have enclosed necessary billing documents.

S. No.	Stage	Amount and currency	Payment	Billing documents enclosed

2. We certify that:

- the above payments are claimed strictly in terms of the contract and all our obligations under the contract for claiming them have been fulfilled;
- of such taxes and duties claimed, if we get any refund from the tax authorities we will refund the same to you.

Yours sincerely,

(.....)

\*\*\*\*\*

Form - 9

**INFORMATION IN RESPECT OF PREVIOUS SUPPLIES BY TENDERER**

**Part-I: Summary**

Year/Month	No of Equipment/ Instruments	Clients

**Part-II: Details of each Supply mentioned in Part- I**

1.0	Brief description of equipment/ instrument supplied	
2.0	Location where installation done	
	<ul style="list-style-type: none"> <li>• Country</li> <li>• Town(s)</li> </ul>	
3.0	Address of the client	
	<ul style="list-style-type: none"> <li>• Contact Address</li> <li>• Physical Address</li> <li>• Tel Nos., Fax Nos.&amp; E-mail ID</li> </ul>	
4.0	Client's key contact person(s)	
	<ul style="list-style-type: none"> <li>• Name(s)</li> <li>• Designation</li> <li>• Telephone &amp; E-mail ID</li> </ul>	
5.0	Project schedule	
	<ul style="list-style-type: none"> <li>• Commencement date</li> <li>• Completion date</li> <li>• Reasons for delay, if any</li> </ul>	
6.0	Project cost	
7.0	Third party firm(s) involved with project	

*[Handwritten signature]*

*[Handwritten signature]*



	<ul style="list-style-type: none"> <li>• Name(s)</li> <li>• Roles and responsibility of the firm</li> <li>• Contact Address</li> <li>• Physical Address</li> <li>• Tel Nos., Fax Nos. &amp; E-mail ID</li> </ul>	
8.0	Scope of supply/service (equipment, site works, maintenance or otherwise, software upgrades, long-term warranty, etc.)	
9.0	Attach performance certificate from the existing users in India	
10.0	State any challenges or problems experienced by yourselves during project implementation or do you have any suggestion to make	

*(Signature)*

ARIES, Manora Peak  
Nainital

**Form - 10**

**PRE - CONTRACT INTEGRITY PACT**

**GENERAL**

The pre-tender pre-contract Agreement (hereinafter called the Integrity Pact) is made on day of the month of \_\_\_\_\_ 2021, between, The Director ARIES, Manora Peak, Nainital (hereinafter called the "Purchaser", which expression shall mean and include, unless the context otherwise requires, his successors in office and assigns) of the First Part and M/s \_\_\_\_\_ represented by Dr./Shri/Smt. \_\_\_\_\_ (Designation) (hereinafter called the "Tenderer" which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second Part.

WHEREAS the Purchaser proposes to procure \_\_\_\_\_ units of Equipment/ Instruments (to be named later) and the Tenderer is willing to offer/has offered the stores, and,

WHEREAS the Tenderer is a private company/public company/Government undertaking/partnership/registered import-export agency, constituted in accordance with the relevant law in the matter and the Purchaser is a Autonomous Institute of the Government of India, performing its functions on behalf of the President of India,

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:

Enabling the Purchaser to obtain the desired said stores/equipment at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling Tenderers to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the Purchaser will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:

**1. Commitments of Purchaser**

1.1 The Purchaser undertakes that no official of the Purchaser, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the Tenderer, either for themselves or for any person, organisation or third party related to the contract in exchange for an advantage in the tendering process, tender evaluation, contracting or implementation process related to the contract.

1.2 The Purchaser will, during the pre-contract stage, treat all Tenderers alike, and will provide to all Tenderers the same information and will not provide any such information to any particular Tenderer which could afford an advantage to that particular Tenderer in comparison to other Tenderers.

1.3 All the officials of the Purchaser will report to the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.

2. In case any such preceding misconduct on the part of such official(s) is reported by the Tender to the Purchaser with full and verifiable facts and the same is prima facie found to be correct by the Purchaser, necessary disciplinary proceedings, or any other action as deemed fit,



including criminal proceedings may be initiated by the Purchaser and such a person shall be debarred from further dealing related to the contract process. In such a case while an enquiry is being conducted by the Purchaser the proceedings under the contract would not be stalled.

### **3. Commitments of Tenderers**

3.1 The Tenderer commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its tender or during any pre-Contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commit itself to the following:-

3.2 The Tenderer will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Purchaser, connected directly or indirectly with the tendering process, or to any person, organisation or third party related to the contract in exchange for any advantage in the tendering, evaluation, contracting and implementation of the contract.

3.3 The Tenderer further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Purchaser or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other contract with the Government for showing or forbearing to show favour or disfavour to any person in relation to the contract or any other contract with the Government.

3.4 Foreign Tenderers shall disclose the name and address of agents and representatives and Indian Tenderers shall disclose their foreign principals or associates.

3.5 Tenderers shall disclose the payments to be made by them to agents/brokers or any other intermediary, in connection with this tender/ contract.

3.6 Tenderer further confirms and declares to the Purchaser that the Tenderer is the original manufacturer/integrator/authorised government sponsored export entity of the defence stores and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the Purchaser or any of its functionaries, whether officially or unofficially to the award of the contract to the Tenderer, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

3.7 The Tenderer, either while presenting the tender or during pre-contract negotiations or before signing the contract, shall disclose any payments he has made, is committed to or intends to make to officials of the Purchaser or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

3.8 The Tenderer will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the tendering process, tender evaluation, contracting and implementation of the contract.

3.9 The Tenderer will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

3.10 The Tenderer shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the Purchaser as part of the business relationship, regarding plans, technical proposals and business details, including information contained in



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any electronic data carrier. The Tenderer also undertakes to exercise due and adequate care lest any such information is divulged.

3.11 The Tenderer commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.

3.12 The Tenderer shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.

3.13 If the Tenderer or any employee of the Tenderer or any person acting on behalf of the Tenderer, either directly or indirectly, is a relative of any of the officers of the Purchaser, or alternatively, if any relative of an officer of the Purchaser has financial interest/stake in the Tenderer's firm, the same shall be disclosed by the Tenderer at the time of filling of tender. The term 'relative' for this purpose would be as defined in Section 6 of the Companies Act 1956.

3.14 The Tenderer shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the Purchaser.

#### **4. Previous Transgression**

4.1 The Tenderer declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify Tenderer's exclusion from the tender process.

4.2 The Tenderer agrees that if it makes incorrect statement on this subject, Tenderer can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

#### **5. Earnest Money (Security Deposit)**

5.1 While submitting the tender, the Tenderer shall deposit Earnest Money/Security Deposit, with the Purchaser in the form of RTGS/NEFT/SWIFT/DD/FD/Bank Guarantee as per proforma given in tender document.

5.2 In case of the successful Tenderer, a clause would also be incorporated in the Article pertaining to Performance Bond in the Purchase Contract that the provisions of Sanctions for Violation shall be applicable for forfeiture of Performance Bond in case of a decision by the Purchaser to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

5.3 No interest shall be payable by the Purchaser to the Tenderer on Earnest Money/Security Deposit for the period of its currency.

#### **6. Sanctions for Violations**

6.1 Any breach of the aforesaid provisions by the Tenderer or any one employed by it or acting on its behalf (whether with or without the knowledge of the Tenderer) shall entitle the Purchaser to take all or any one of the following actions, wherever required:-

- I. To immediately call off the pre contract negotiations without assigning any reason or giving any compensation to the Tenderer. However, the proceedings with the other Tenderer(s) would continue.
- II. The Earnest Money Deposit (in pre-contract stage) and /or Security Deposit/Performance Bond (after the contract is signed) shall stand forfeited either fully or partially, as decided by the Purchaser and Purchaser shall not be required to assign any reason therefore.
- III. To immediately cancel the contract, if already signed, without giving any compensation to the Tenderer.







- IV. To recover all sums already paid by the Purchaser, and in case of an Indian Tenderer with interest thereon at 2% higher than the prevailing Prime Lending Rate of State Bank of India, while in case of a Tenderer from a country other than India with interest thereon at 2% higher than the LIBOR (London Inter Bank Official Exchange Rate). If any outstanding payment is due to the Tenderer from the Purchaser in connection with any other contract for any other stores, such outstanding payment could also be utilised to recover the aforesaid sum and interest.
- V. To encash the advance bank guarantee and performance bond/warranty bond, if furnished by the Tenderer, in order to recover the payments, already made by the Purchaser, along with interest.
- VI. To cancel all or any other Contracts with the Tenderer. The Tenderer shall be liable to pay compensation for any loss or damage to the Purchaser resulting from such cancellation/rescission and the Purchaser shall be entitled to deduct the amount so payable from the money (s) due to the Tenderer.
- VII. In cases where irrevocable Letters of credit have been received in respect of any contract signed by the Purchaser with the Tenderer, the same shall not be opened.
- VIII. Forfeiture of Performance Bond in case of a decision by the Purchaser to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

6.2 The Purchaser will be entitled to take all or any of the actions mentioned at para 6.1 (i) to (x) of this Pact also on the Commission by the Tenderer or any one employed by it or acting on its behalf (whether with or without the knowledge of the Tenderer), of an offence as defined in Chapter IX of the Indian Penal Code, 1860 or Prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.

6.3 The decision of the Purchaser to the effect that a breach of the provisions of this Pact has been committed by the Tenderer shall be final and conclusive on the Tenderer. However, the Tenderer can approach the Independent Monitor(s) appointed for the purpose of this Pact.

## **7. Fall Clause**

7.1 The Tenderer undertakes that it has not supplied/is not supplying similar product/systems or sub systems at a price lower than that offered in the present tender in respect of any other Ministry/department of the Government of India or PSU and if it is found at any stage that similar product/systems or sub systems was supplied by the Tenderer to any Ministry/Department of the Government of India or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the Tenderer to the Purchaser, if the contract has already been concluded.

## **8. Independent Monitors**

8.1 The Purchaser shall have a monitoring team of Scientist/ Engineer.

8.2 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.

8.3 The monitor shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.

8.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.

8.5 As soon as the Monitor notices, or has reason to believe, a violation of this pact, he will so inform the Authority designated by the Purchaser.

8.6 The Tenderer(s) accepts that the Monitor has the right to access without restriction to all



Project documentation of the Purchaser including that provided by the Tenderer. The Tenderer will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the Tenderer/Subcontractor(s) with confidentiality.

8.7 The Purchaser will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such meetings.

8.8 The Monitor will submit a written report to the designated Authority of Purchaser/Secretary in the Department within 8 to 10 weeks from the date of reference or intimation to him by the Purchaser/Tenderer and, should the occasion arise, submit proposals for correcting problematic situations.

### 9. Facilitation of Investigation

In case of any allegation of violation of any provisions of this Pact or payment of commission, the Purchaser or its agencies shall be entitled to examine all the documents including the

Books of Accounts of the Tenderer and the Tenderer shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

### 10. Law and Place of jurisdiction

The Pact is subject to Indian law. The place of performance and jurisdiction is the seat of the Purchaser.

### 11. Other Legal Actions

The actions stipulated in this Integrity pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extent law in force relating to any civil or criminal proceedings.

### 12. Validity

12.1 The validity of this Integrity Pact shall be from date of its signing and extend upto 5 years or the complete execution of the contract to the satisfaction of both Purchaser and the Tenderer, including warranty period, whichever is later. In case Tenderer is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

12.2 Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

13. The parties hereby sign this Integrity Pact at \_\_\_\_\_ on \_\_\_\_\_  
Purchaser \_\_\_\_\_ Tenderer \_\_\_\_\_  
Name of the Officer \_\_\_\_\_ Designation of person signing \_\_\_\_\_  
Designation \_\_\_\_\_ on behalf of Company \_\_\_\_\_  
Deptt./Ministry \_\_\_\_\_

Witness:

1. \_\_\_\_\_

Witness:

1. \_\_\_\_\_

*[Handwritten signature]*

*[Handwritten signature]*

Registrar

ARIES, Manora Peak

Manora Peak



**Form - 11**

**TENDER ACCEPTANCE LETTER**

**(To be given on Company Letter Head)**

**Date:**

**To,**

**The Director,**

**ARIES, Manora Peak,**

**Nainital -263001**

**Sub: Acceptance of Terms & Conditions of Tender.**

**Tender Reference No:** \_\_\_\_\_

**Name of Tender / Work: -**

Dear Sir,

1. I/ We have submitted online tender document(s) for the above mentioned Tender/Work' from the web site(s) namely:

\_\_\_\_\_ as per your advertisement, given in the above mentioned website(s).

2. I / We hereby certify that I / we have read the entire terms and conditions of the tender documents from Page No. \_\_\_\_\_ to \_\_\_\_\_ (including all documents like annexure(s), schedule(s), etc. .), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.
3. The corrigendum(s) issued from time to time by your department/ organizations too have also been taken into consideration, while submitting this acceptance letter.
4. I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety.
5. I / We do hereby declare that our Firm has not been blacklisted/ debarred by any Govt. Department/Public sector undertaking.
6. I / We certify that all information furnished by the our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/ organization shall without giving any notice or reason therefore or summarily reject the tender or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.

Yours Faithfully,

**(Signature of the Tenderer, with Official**

**Seal)**

*[Handwritten signature]*

*[Handwritten signature]*

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**Form - 12**

**UNDERTAKING REGARDING BLACKLISTING**

**(To be given on Company Letter Head)**

**Date:**

**To,**

**The Director,  
ARIES, Manora Peak,  
Nainital -263001**

**Sub: Undertaking Regarding Blacklisting**

**Tender Reference No: \_\_\_\_\_**


**Name of Tender / Work: -**  
\_\_\_\_\_

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

For -----Authorised Signatory

**Date:**



  
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Form - 13

**Format for Self-Certificate for Local Content**

(TO BE SUBMITTED AS A PART OF TECHNICAL BID)

To

The Director

Aryabhata Research Institute of observational sciences (ARIES),

Manora Peak, Tallital Sub PO,

Nainital 263001, Uttarakhand, INDIA

**Sub:** Self-Certificate for Local Content

**Tender Ref. No.** \_\_\_\_\_

**Tender ID:** \_\_\_\_\_

\* I / We .....(Name of the Tenderer) 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 Vide Govt Order No. P-45021/2/2017-PP (BE-II) dated 16 Sept 2020.

**OR**

\*\* I / We .....(Name of the Tenderer) 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 Tenderer) 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 Tenderer)

Name and Designation of Authorized Signatory:

Name of Firm/Company:

Place:

Date:

  
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## **Appendix-I**

### **INSTRUCTIONS FOR ONLINE TENDER SUBMISSION**

As per the directives of Department of Expenditure, this tender document has been published on the Central Public Procurement Portal (URL: <http://eprocure.gov.in>). The tenderers are required to submit soft copies of their tenders electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the tenderers in registering on the CPP Portal, prepare their tenders in accordance with the requirements and submitting their tenders online on the CPP Portal.

More information useful for submitting online tenders on the CPP Portal may be obtained at: <https://eprocure.gov.in/eprocure/app>.

#### **REGISTRATION**

- 1) Tenderers are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL: <https://eprocure.gov.in/eprocure/app>) by clicking on the link "Click here to Enroll" on the CPP Portal is free of charge.
- 2) As part of the enrolment process, the tenderers will be required to choose a unique username and assign a password for their accounts.
- 3) Tenderers are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- 4) Upon enrolment, the tenderers will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.
- 5) Only one valid DSC should be registered by a tenderer. Please note that the tenderers are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
- 6) Tenderer then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / e-Token.

#### **SEARCHING FOR TENDER DOCUMENTS**

- 1) There are various search options built in the CPP Portal, to facilitate tenderers to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the tenderers may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender published on the CPP Portal.
- 2) Once the tenderers have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the tenderers through SMS / e-mail in case there is any corrigendum issued to the tender document.
- 3) The tenderer should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

#### **PREPARATION OF TENDERS**

- 1) Tenderer should take into account any corrigendum published on the tender document before submitting their tenders.
- 2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the tender.





Please note the number of covers in which the tender documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the tender. Tenderer, in advance, should get ready the tender documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF formats. Tender documents may be scanned with 100 dpi with black and white option.

- 3) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every tender, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the tenderers. Tenderers can use "My Space" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a tender, and need not be uploaded again and again. This will lead to a reduction in the time required for tender submission process.

#### SUBMISSION OF TENDERS

- 1) Tenderer should log into the site well in advance for tender submission so that he/she upload the tender in time i.e. on or before the tender submission time. Tenderer will be responsible for any delay due to other issues.
- 2) The tenderer has to digitally sign and upload the required tender documents one by one as indicated in the tender document.
- 3) Tenderer has to select the payment option as "offline" to pay the tender fee / EMD as applicable and enter details of the instrument.
- 4) Tenderer should prepare the EMD as per the instructions specified in the tender document. The original EMD should be submitted to Director, ARIES, payable at Nainital. The details of the EMD physically sent, should tally with the details available in the scanned copy and the data entered during tender submission time. Otherwise the uploaded tender will be rejected.
- 5) A standard price bid schedule format has been provided with the tender document to be filled by all the tenderers. If the price bid file is found to be modified by the tenderer, the tender will be rejected.
- 6) The serve time (which is displayed on the tenderers' dashboard) will be considered as the standard time for referencing the deadlines for submission of the tenders by the tenderers, opening of tenders etc. The tenderers should follow this time during tender submission.
- 7) All the documents being submitted by the tenderers would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of tender opening. The confidentiality of the tenders is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done.
- 8) The uploaded tender documents become readable only after the tender opening by the authorized tender openers.
- 9) Upon the successful and timely submission of tenders, the portal will give a successful tender submission message & a tender summary will be displayed with the tender no. and the date & time of submission of the tender with all other relevant details.
- 10) The tender summary has to be printed and kept as an acknowledgement of the submission of the tender. This acknowledgement may be used as an entry pass for any tender opening meetings.

## ASSISTANCE TO TENDERERS

- 1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
- 2) Any queries relating to the process of online tender submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact number for the helpdesk is 1800 233 7315.

\*\*\*\*\*



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## Annexure 1. Compliance Matrix

C: Compliant, NC: Non-Compliant, PC: Partially Compliant

S.No.	Technical Specifications/ Requirements of Spectrograph	C, PC, NC	Remarks
1.	<b>Spectrograph &amp; telescope interface unit:</b>		
1.a	Wavelength coverage : 380-850 nm		
1.b	Spectral resolution modes : High Resolution (HR) - 80,000 Low Resolution (LR) - 40,000		
1.c	Pixel Sampling : 3 to 4 pixels for HR mode		
1.d	Radial velocity stability: 2 m/sec Over an observing night.		
1.e	High resolution fiber should be optimised to be used for 1" (arcseconds) seeing.		
1.f	Two fibers for each resolution mode are required to enable simultaneous observation of star + sky or star + calibration sources.		
1.g	Spectrograph throughput (without detector and telescope): Throughput should be around with the following values at 380 nm – >0.15                      at 600 nm – >0.30 at 400 nm – >0.20                      at 700 nm – >0.25 at 500 nm – >0.30                      at 850 nm – >0.20		
1.h	Telescope interface unit: It should be mounted on side port of the telescope. Guiding unit, calibration unit, atmospheric dispersion corrector and optical fiber link would be the part of this unit.		
1.i	Guiding unit: It should contain guiding optics and guiding camera to image telescope focal plane. The purpose of this unit is to center the stellar source onto the fiber and send guiding correction to the telescope using on-axis guiding.		
1.j	Calibration unit: It is required to project the calibration light from the calibration sources into the fibers at the cassegrain unit		
1.k	Atmospheric dispersion corrector: It is required to avoid light losses at fiber due to atmospheric refraction. It would be used up to zenith angle of 65 degree.		
1.l	Optical fiber link: This unit will inject the star and sky light to the respective fibers. The f/9 telescope		



	beam needs to be converted to a fast beam (say $\sim f/4$ beam) to minimize focal ratio degradation.		
1.m	Focal ration adaptation optics: Purpose of this unit is to convert fast beam ( $\sim f/4$ ) exiting the fiber to a relatively slow beam ( $\sim f/10$ ); suitable to achieve the spectrograph specifications.		
1.n	An image slicer or pupil slicer may be used to achieve the specified resolution, but the performance of the spectrograph should not be compromised.		
1.o	Spectrograph Optics: We recommend the use of off axis parabolic mirror as collimators and R4 reflective echelle grating. Cross disperser should be included to separate the overlapping echelle orders. Dioptric camera optics should be used to image the cross dispersed spectrum on to the detector.		
1.p	Back-illuminated CCD detector of appropriate size should be chosen to cover the required spectral orders with interleaved spectra without any vignetting. Grade 0 or 1 chip with no columns defects. Also the number of hot pixels/white spots should be at minimum. Dark current: $<0.02$ electrons/pixel/sec @ $-120^{\circ}\text{C}$ Readout noise (rms value): $< 3.5$ electrons @ 100kHz to $< 7$ electrons @ 1MHz Quantum efficiency: Peak quantum efficiency should be more than 90%. @ 380nm, $\sim 80\%$ @ 400nm, $\sim 90\%$ @ 550nm, $\sim 90\%$ @ 650nm, $\sim 80\%$ @ 750nm, $\sim 60\%$ @ 850nm		
1.q	In inter order pixels, stray light should be less than 2% of total flux in the adjacent orders.		
1.r	Exposure meter: An exposure meter is required for continuous monitoring of flux for deciding the exposure time with the desired SNR. The exact mean time of exposure is required to apply correction to the observed radial velocity.		
1.s	Temperature controlled housing and vacuum chamber enclosing the spectrograph is required to meet the required specifications of the spectrograph.		
2.	<b>Optics error budget:</b>		
2.a	80% encircled energy within 23 micron over the detector for both the resolution modes and over specified spectral range.		
2.b	Echelle grating: Wavefront distortion (rms) $< \lambda/8$		



2.c	Mirrors: (a) Wavefront distortion(rms) $< \lambda/15$ (b) Micro roughness $< 2$ nm We require 'state-of-the-art' polishing with no high-frequency ripple or periodical structure visible in the wavefront figure, even if rms and PtV surface quality values stay within the specifications.		
2.d	Optical Ghost $< 0.1\%$ of the intensity of the parent order		
2.e	Coating: (a) Good quality broad band antireflection coating should be applied to all lenses/refractive optics. AR coatings should qualify the relevant MIL/ISO standard. (b) Protected reflective coating should be applied on mirrors.		
2.f	Glass specification: - variation in refractive index and abbe number from catalogue value $< \pm 0.0003$ and $\pm 0.5\%$ -high homogenous glass blank corresponding to $\Delta n = \pm 1 \times 10^{-6}$ -thermal expansion coefficients of glass should be in the range of $3-10 \times 10^{-6}/^{\circ}\text{K}$ for $-30^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ . -minimum stress birefringence -All glasses used should be environmentally safe.		
3.	<b>Mechanical</b>		
3.a	The spectrograph should be mounted on vibration isolation optical bench.		
3.b	Vendor should take special care on the thermal stability of all the opto-mechanical components.		
4.	<b>Electronics and Networking:</b>		
4.a	Electronics will be required to control and operate the entire instrument.		
4.b	Cooling system should be designed to dissipate the heat of the system (Spectrograph, ADC, guiding unit, calibration unit fiber unit etc.) out.		
4.c	Spectrograph system should communicate with the PC over either optical fiber bus or standard Ethernet. For detector the image transfers from controller to PC are to be either implemented through optical fibers or through any other standard modern industrial communication bus and protocol. Complete operation including power up/down, startup/shutdown etc. are to be remote controlled. For example through remote switches controlled over LAN.		


4.d	All the cables, tools, tackles, AC power supplies (as per Indian standard), DC power sources, power conditioning and distribution modules, etc. should be provided.		
4.e	The electrical/ electronic and their interconnections should be commercially available, and wherever any custom-made components/parts are used then their full technical specification alongwith their source of manufacturer's should be provided.		
4.f	Industrial grade PC should be provided with the instrument. Another spare PC with identical configuration should also be provided.		
4.g	All the electronics should be provided with in-line surge protection and over-voltage protections. The provision for instrument grounding is also required.		
<b>5.</b>	<b>Software:</b>		
5.a	Spectrograph operational & control software		
5.b	Spectrograph Guide channel operational & control software		
5.c	Telescope interface unit (ADC, fiber link etc) operational & control software		
5.d	Calibration unit operational & control software		
5.e	Software for monitoring and controlling the temperature and pressure		
5.f	Science data channel software		
5.g	All the software should be user-friendly, easily upgradable, and should be able to interface to the telescope control system specified in the telescope documents		
5.h	Customizable FITS header: There should be provision to include additional telescope parameters to image FITS header. Additionally, FITS header should include all temperatures and pressure information as well.		
5.i	Application software should preferably be open sourced and platform independent.		
5.j	Scripting and macros		
5.k	Quick-look software to perform the science data viewer and quick data analysis functions.		
5.l	The provided software should be equipped with the function of monitoring, logging, and alarming the		

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	status of the entire system. It should also include debug and diagnostic application programs.		
5.m	Socket interface for remote operations from external application		
6.	<b>Environmental condition:</b> The general environmental conditions of Devasthal site are mentioned below. The instrument should survive and perform as per specifications at these conditions.		
6.a	<p><b>Temperature:</b></p> <p>Jan-March – 6.8°C (-5.0 – 22.8°C)</p> <p>April-June – 16.1°C (4.8 – 30.0°C)</p> <p>July-September – 16.0°C (11.0 – 25.3°C)</p> <p>October-December – 9.2°C (-3.0 – 20.9°C)</p> <p>[Values given here are the average values whereas the values in parenthesis are range of minimum and maximum values.]</p> <p><b>Relative Humidity:</b></p> <p>Jan-March 63.8% (38.3 – 86.3%)</p> <p>April-June 62.6% (42.5 – 80.6%)</p> <p>July-September 94.8% (82.2 – 99.0%)</p> <p>October – December 56.0% (31.1 – 80.8%)</p> <p>[Values given here are the average values whereas the values in parenthesis are range of average minimum and average maximum values.]</p> <p><b>Atmospheric Pressure</b></p> <p>768.6 (764.8 – 772.9) hPa</p>		
6b.	<p><b>Night time temperature variation</b></p> <p>Jan-March – 2.5°C</p> <p>April-June – 2.8°C</p> <p>July-September – 2.0°C</p> <p>October - December – 2.3°C</p>		
7.	<b>Instrument space:</b>		
7.a	<p>Instrument Space for side port: Telescope interface unit needs to be mounted with the telescope flange within the available space at side port.</p> <p>Total weight of side port instrument : 250 kg</p> <p>Available space 0.5 m X 0.5 m X 0.7m (H X W X L)</p> <p>Distance between telescope flange to focus : 10 cm</p> <p>Distance between telescope flange and center-of-gravity of instrument : 62cm</p>		
7.b	Available space for spectrograph: Spectrograph will be mounted inside the telescope pier within the available space.		

	Pier dimension: Inner diameter: 5.0 m, outer diameter: 7.0m Pier entrance Gate (No door): Width: 0.75 m height: 1.86 m; Wall thickness: 1.0 m		
<b>8.</b>	<b>General</b>		
8.a	Time schedule: All works of designing, fabrication, testing, installation, commissioning and handing over of the instrument should be completed within 30 months.		
8.b	Telescope Pier has a limitation of entrance gate as mentioned under S.No. 7.b. This parameter needs to be taken care of while planning assembly and integration of spectrograph inside the telescope pier.		
8.c	Vendor will liaise with ARIES on the requirements of fiber routing, length of fiber etc. from telescope side port focus to spectrograph room.		
8.d	Vendor will specify all the pre install requirements, including Civil, Electrical power/UPS requirements, etc. to ARIES well in advance, to avoid any unnecessary delay.		
8.e	Vendor will provide all necessary design, operation & maintenance manuals (both for hardware & software), drawing, test reports, bill of materials, etc. to ARIES.		
8.f	Vendor will liaise with ARIES on the requirements for a thermally insulated and controlled room within the pier to house the spectrograph		
8.g	Vendor will liaise with ARIES on the requirements for a housing adjacent to the telescope pier and associated power requirements. The housing will contain the PC server rack.		
8.h	Vendor will liaise with ARIES on the requirements for the cabling requirements from the PC server rack to the System Control PC operator's room		
8.i	Vendor will liaise with ARIES on the requirements of optical fiber routing from telescope interface unit to spectrograph room.		
<b>9.</b>	<b>Reporting Requirement</b>		
9.a	The vendor will be expected to submit monthly email updates to ARIES that report progress in all the disciplines.		






## The 3.6 m Indo-Belgian Devasthal Optical Telescope: Performance results on site

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India

### ABSTRACT

AMOS SA has been awarded of the contract for the design, manufacturing, assembly, tests and on site installation (Devasthal, Nainital in central Himalayan region) of the 3.6 m Indo-Belgian Devasthal Optical Telescope (IDOT).

The telescope has Ritchey-Chrétien optical configuration with one axial and two side Cassegrain ports. The meniscus primary mirror is active and it is supported by pneumatic actuators. The azimuth axis system is equipped with hydrostatic bearing.

After successful factory acceptance at AMOS SA, the telescope has been dismounted, packed, transported, and re-mounted on site. This paper provides the final performances (i.e. image quality, pointing and tracking) measured during sky tests at Devasthal Observatory.

**Keywords:** telescope tests, active optics, image quality, pointing, tracking, IDOT

### 1. INTRODUCTION

After telescope design<sup>(1)</sup>, AIV and factory acceptance tests<sup>(2)</sup> performed in AMOS assembly hall, IDOT was dismounted and packed to be sent to its site, Devasthal in India. End of 2014, the building was ready for telescope remounting and commissioning. Few months later, first light, and fine tuning could start. And finally, performance and acceptance tests were conducted end of 2015.

After a short telescope overview and requirement discussion, some acceptance test results are presented.

### 2. TELESCOPE OVERVIEW

The main characteristics of the telescope are summarized in Table 1. As shown in Figure 1, the optical combination is a Ritchey-Chrétien type with a Cassegrain focus where the light beam can be directed toward a main port designed for interfacing an instrument with a mass up to 2 tons or toward two side ports for smaller instruments. The mount type is an alt-azimuth. The telescope weights 150 tons. It rotates around the azimuth axis thanks to an hydraulic track<sup>(3)</sup>. The telescope is equipped with an active optic system<sup>(4)</sup> (AOS) that controls the primary mirror figure and the secondary mirror positioning to keep the telescope wavefront error in the specification for any operational conditions. The primary mirror is a meniscus 165 mm thick, 3700 mm diameter supported by 69 axial actuators and 24 lateral astatic levers. While an Acquisition and Guiding Unit (AGU) aligned on a guide star at the edge of the telescope field of view measures the wavefront and tracking errors, the set of forces applied by the actuators to the mirror is adjusted continuously. In parallel, the Telescope Control System<sup>(5)</sup> (TCS) computes the telescope trajectory taking into account of the weather conditions, the pointing model of the telescope and the tracking errors measured by the AGU.

Ground-based and Airborne Telescopes VI, edited by Helen J. Hall, Roberto Gilmozzi, Heather K. Marshall,  
Proc. of SPIE Vol. 9906, 99064E · © 2016 SPIE · CCC code: 0277-786X/16/\$18 · doi: 10.1117/12.2232775

Proc. of SPIE Vol. 9906 99064E-1

Figure 2 shows pictures of the telescope on site. The telescope sizes are: height 13 m, width 7 m and total weight 150 tons.

The telescope is installed at Devasthal, North of India, at an altitude of 2540 m. A picture of the dome is in Figure 3; it is a rotating cylinder equipped with as large slit and a wind screen. Large fans all around enable the venting and limit the dome seeing.

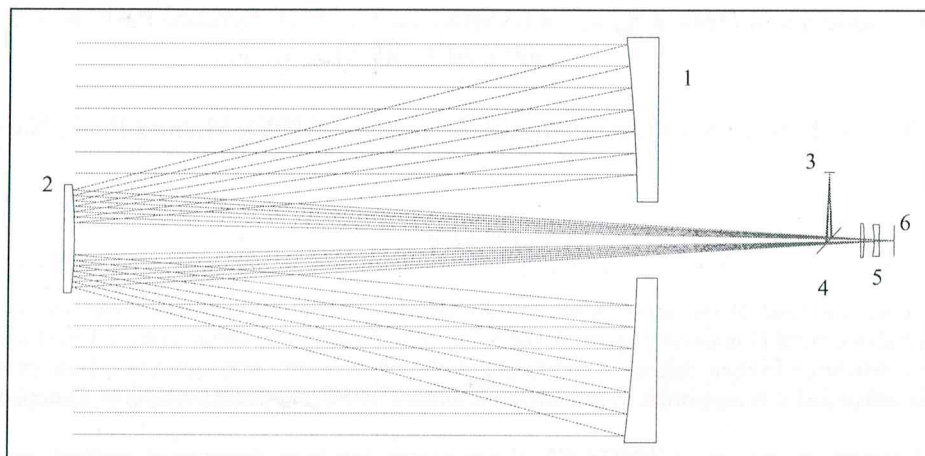


Figure 1: ARIES telescope and ray tracing showing the side port and axial port optical path; with 1) the primary mirror, 2) the secondary, 3) the side port focal plane, 4) the side port folding mirror, 5) the field corrector and 6) the axial focal plane.

Type:	Ritchey - Chrétien
Focal length:	32.4 m (telescope F#/9 with M1 F#/2)
Aperture stop:	3.6 m on M1
2 focal plane configurations:	Side Port and Axial Port
Field of View:	10 arcmin on side ports, 30 arcmin on axial port, (35 arcmin for the AGU)
Operational waveband:	350 nm to 5000 nm
M1 characteristics:	R = 14638.87 mm CC K = -1.03296 Optical $\Phi$ = 3600 mm, mechanical $\Phi$ = 3700 mm
M2 characteristics:	R = -4675.30 mm CX K = -2.79561 Optical $\Phi$ = 952 mm, mechanical $\Phi$ = 980 mm
Distance M1-M2:	5.51 m
Back focal length:	2.5 m
Focal plane Radius of curvature:	1935.78 mm
Scale plate:	157 $\mu\text{m}$ / arcsec (0.006 arcsec/ $\mu\text{m}$ )

Table 1: Summary of the telescope characteristics

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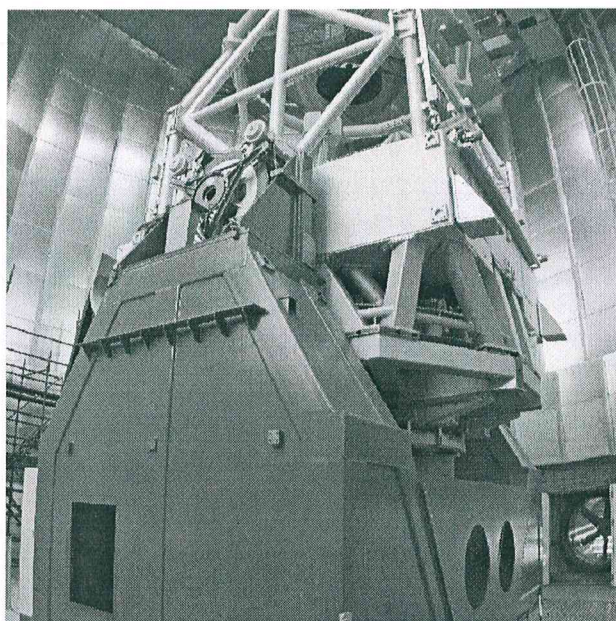


Figure 2: IDOT on site

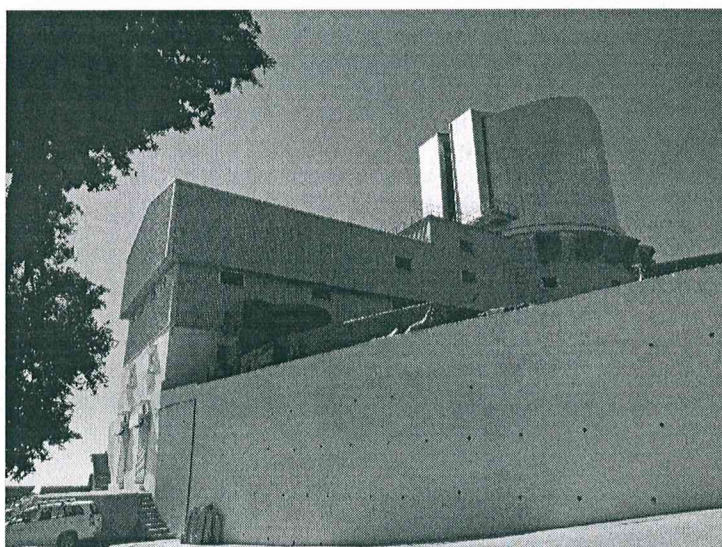


Figure 3: IDOT building

### 3. REQUIREMENTS AND REQUIREMENT VERIFICATIONS

Table 2 summarizes the main performance requirements specified for 3.6 m IDOT.

Optical main requirements	
Image quality	<ul style="list-style-type: none"> <li>- Encircled Energy 50% &lt; 0.3 arcsec,</li> <li>- Encircled Energy 80% &lt; 0.45 arcsec,</li> <li>- Encircled Energy 90% &lt; 0.6 arcsec,</li> </ul> For the waveband 350 nm to 1500 nm; without corrector for 10 arcmin FOV.

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Mechanical main requirements	
Sky coverage (elevation range)	15 to 87.5°
Pointing accuracy	< 2 arcsec RMS
Tracking accuracy	< 0.1 arcsec RMS for 1 minute in open loop, < 0.1 arcsec RMS for 1 hour in close loop, < 0.5 arcsec Peak for 15 minutes in open loop.

Table 2: Main telescope requirements

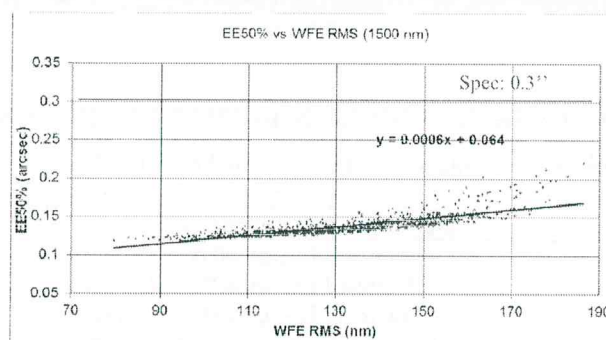
The telescope requirements are defined to get an image quality degradation very small comparing to the contribution of the seeing. Moreover the seeing is variable in time, depends of the pointing direction and cannot be measured directly at telescope level. The image quality requirements thus cannot be directly verified in pointing stars. Instead of measuring directly the star image, a wavefront sensor is installed in the focal plane of the telescope. In adjusting the integration time of the wavefront sensor camera the seeing is averaged and the wavefront error can be measured. A relationship between the measured WFE and the encircled energy requirements shall thus be identified.

A Monte-Carlo analysis considering a large panel of wavefront error sources determined the relationship of the WFE and the encircled energy at  $\lambda = 1500$  nm. Figure 4 shows the results for of 50%, 80% and 90% encircled energy respectively. The criteria  $EE80\% < 0.45$  arcsec for  $\lambda = 1500$  nm is reached for WFE < 210 nm; the criteria  $EE50\% < 0.3$  arcsec is less constraining than  $EE80\% < 0.45$  arcsec and is reached for a WFE RMS up to 257 nm. Criteria  $EE90\%$  is difficult to work with because it is reached in integrating energy that is in the foot of the PSF and is very dependent of the spatial frequency of the WFE; this criterion can thus not be verified by test.

Tracking accuracy can be critical for faint object observations that need long integration time. The movement of the image at telescope focus while integrating will enlarge the image and decrease the telescope resolution. As for the image quality, the effect of the seeing that will produce a high temporal frequency tip/tilt of the image will make the tracking requirements very difficult to demonstrate. Temporal integration is needed to suppress the seeing but by the same time could also hide image jitter produced by the telescope itself. But prior to testing the tracking on the sky, factory tests<sup>(2)</sup> were performed for measuring the axis control following errors that are recorded at 200 hz. In exploring the telescope field of regard with the corresponding axis speeds and accelerations; no vibration appeared.

The tracking errors were measured in recording the images of a star with a camera at one of the foci of the telescope. The image centroids are computed and the associated statistics. In parallel axis following errors are also recorded.

Pointing accuracy specification is large enough compared to the seeing and is thus easier to verify. The centroids of star images are simply recorded while pointing the telescope toward stars covering the field of regard. The dispersion of the centroids gives then the pointing error.





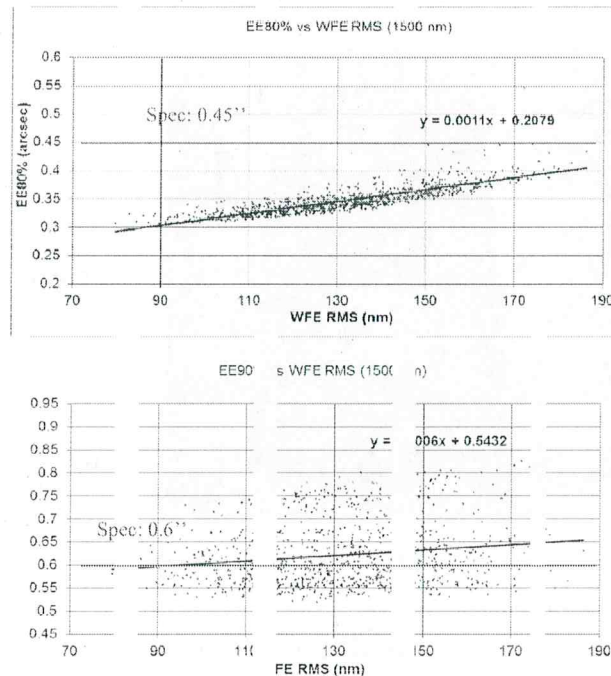


Figure 4: Monte-Carlo analysis results; EE50%, EE80% and EE90% vs WFE

#### 4. IMAGE QUALITY TESTS

A pick-off mirror mounted on a moving arm can select a guide star in the telescope field of view up to a diameter of 35 arcminutes. The guide star beam is then split in two wave ranges feeding a guider camera and the AGU wavefront sensor. The measurements given by the AGU WFS will drive the active optic system. The wavefront error is processed to get de-rotated Zernike polynomials cleaned from field of view contributors. Focus and Coma terms are corrected in moving the secondary mirror thanks to a hexapod. Astigmatism and spherical aberration are cancelled in adjusting the forces of the actuators supporting the primary mirror. A good image quality will then be obtained only if i) the telescope is preliminary well aligned; ii) the field of view contributors in the wavefront measurement are accurately quantified; iii) the hexapod and the actuators are driven correctly.

The AGU WFS sensor gets an 11 X 11 lenslet array that is a low spatial sampling but is optimized for working with faint guide stars.

The test WFS that is installed at telescope main focus is equipped with a 30 X 30 lenslet array that gives a better spatial resolution. Figure 5 gives a picture of the test WFS in telescope focal plane.

The image quality measurements were performed for several testing configurations; with and without field corrector, in the center or in the field of view and for many telescope elevation angles. Most of the time, the seeing while measuring was between 0.7 and 1.5 arcsec. As far as local seeing in the dome was reduced using fans and WFS integration times properly adjusted, few minutes after closing the active system loop the wavefront requirement was reached. Figure 6 shows a typical plot of the WFE measurements acquired with AGU WFS and Test WFS simultaneously vs time. The wavefront error measured with AGU WFS on which the active optic is driven converges quickly around 75 nm RMS while Test WFS stabilizes around 125 nm RMS. The small difference between those results comes mainly by the accuracy of the AGU data processing and by the finer sampling of Test WFS. Figure 7 presents a typical measurement of the telescope image quality. The spot pattern on the WFS camera, the computed WFE and the corresponding Zernike polynomials measured in the focal plane of the telescope at the center of the FoV without corrector are given. The WFE RMS is 88 nm. WFE's down to 90 nm RMS were regularly achieved in good seeing conditions.

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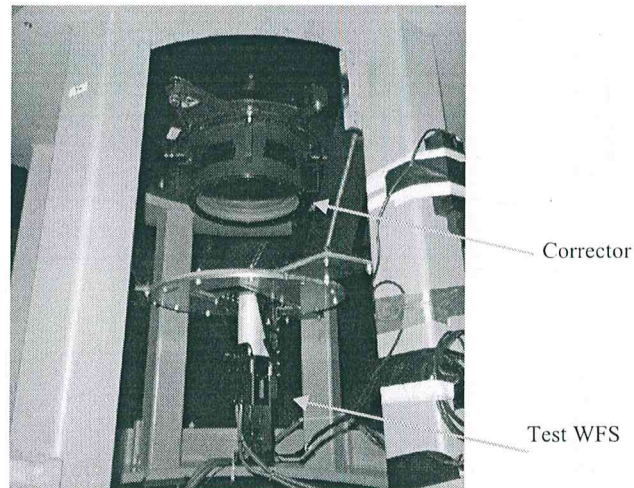


Figure 5: Test WFS mounted in telescope focal plane

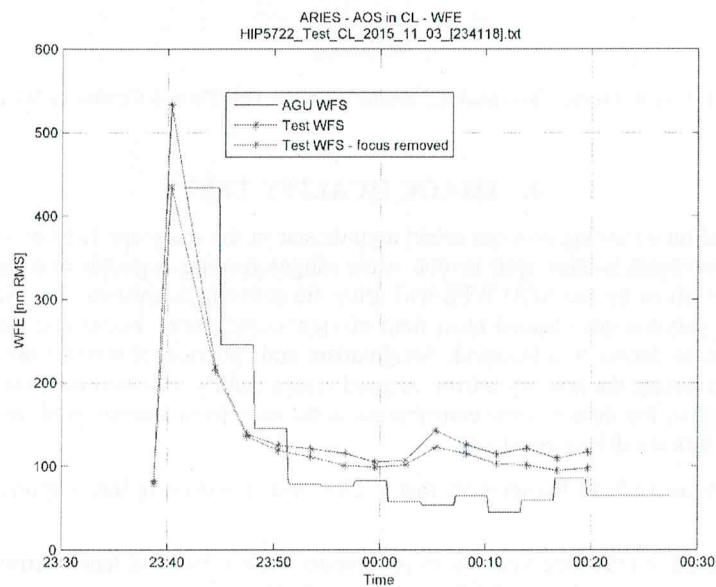


Figure 6: Telescope WFE at the start of the closing of the active loop

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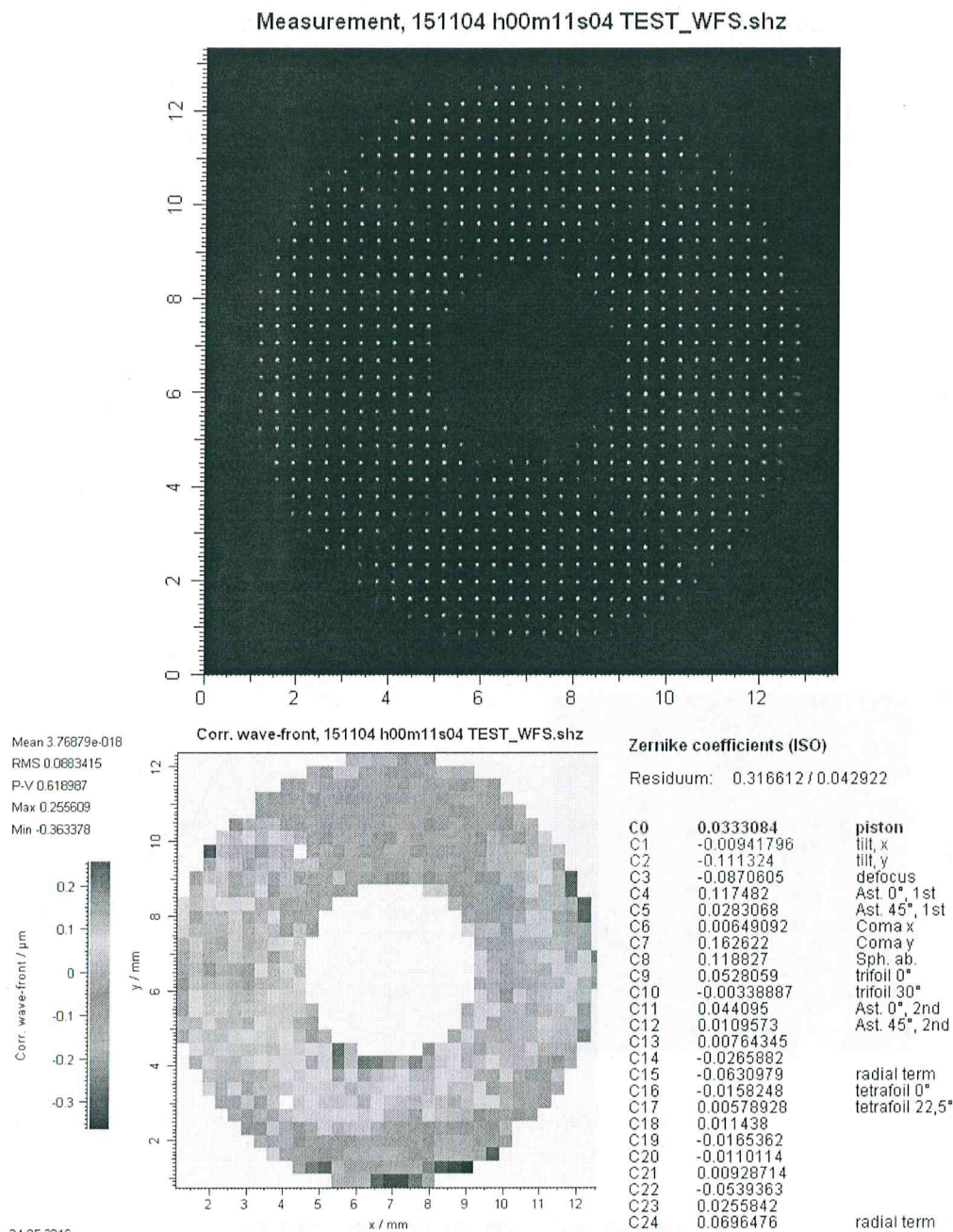


Figure 7: Telescope WFE: WFS spot pattern, WFE map and Zernike coefficients (in  $\mu\text{m}$ ).

To cross-check the excellent results, images of double stars were recorded to verify the accordance of the measured WFE and the telescope resolution that can be achieved during good seeing nights. Figure 8 shows a picture of the double star HIP117695 separated by 1.2 arcsec, pointed at an altitude angle of  $60^\circ$  above horizon with an exposure time of 4 seconds. Figure 9, double star HIP117646 separated by 0.6 arcsec, exposure time 1.5 seconds at an altitude angle of  $45^\circ$ . It has to be noticed that the spot elongation comes from the air wavelength dispersion (no narrow bandpass filter was used). The figures show that 0.6 arcsec is clearly resolved despite of the seeing (which was good that day).

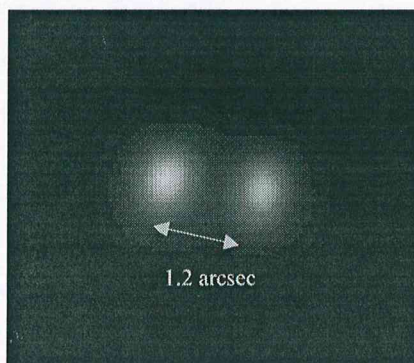


Figure 8: Double star HIP117695 recorded with IDOT

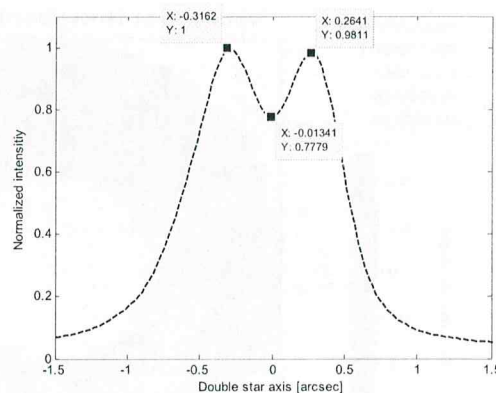
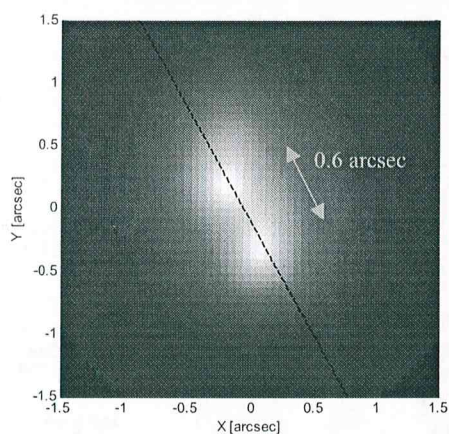


Figure 9: Double star HIP117646 recorded with IDOT: picture and intensity profile.

## 5. POINTING AND TRACKING TESTS

For the pointing tests, images of 30 stars spread all over the field of regard are recorded. The telescope uses its pointing model to drive the axes towards the selected stars. For this test no pointing correction is applied before recording the star images. The centroids of these stars are computed. The centroids dispersion in root mean square gives the pointing error. The main port pointing test result is given in Figure 10. The pointing axes of the star sample and the dispersion of the centroids are shown. The pointing error RMS is  $< 1.2$  arcsec RMS for a requirement of 2 arcsec RMS.

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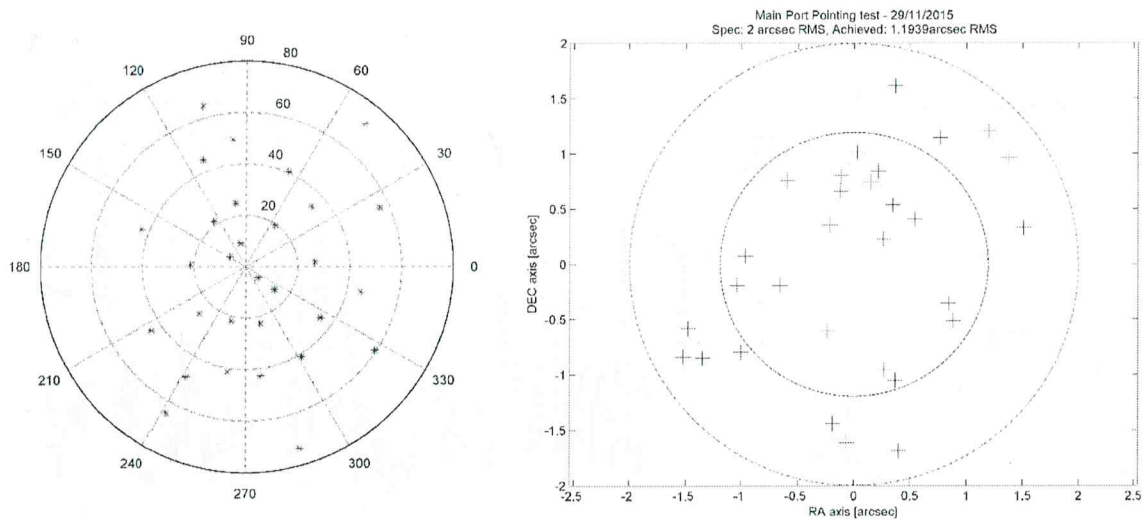


Figure 10: Main port pointing test; at the left the star sample in the telescope field of regard, at the right the dispersion of the star centroids while sighting them with the telescope.

The tracking error is specified in open and closed loop of the guider. The tracking error is measured in recording the star image on a CCD camera in the telescope focal plane while tracking. The statistics on the movements of the centroids give the tracking error. Centroid positioning were measured with integration time of 30 sec. The measurements were repeated several times for covering the particular axis movements that appear in the field of regard of the telescope. Close to zenith, azimuth and rotator axes accelerate and rotate larger angles in a given lapse of time; close to Polaris the axes are nearly still or can change their moving direction. Close to horizon the seeing becomes worst, good measurements are then difficult to catch. Except for measurements close to horizon the tracking requirements were met. The discrepancy at horizon is obviously due to the higher seeing present there. Typical test results in open and close loop tracking are given in figure 11 and 12.

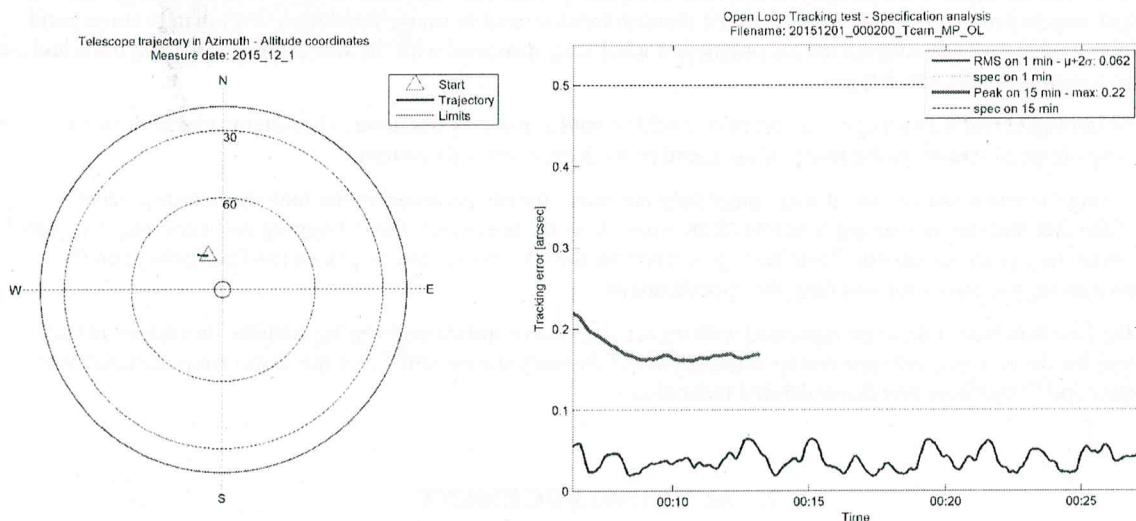


Figure 11: Open loop tracking test; the star trajectory while measuring at the left, at the right the plot in blue gives the RMS error for data acquired during 1 minute, the plot in green is the peak deviation of the centroid for sliding elapsed time of 15 minutes.

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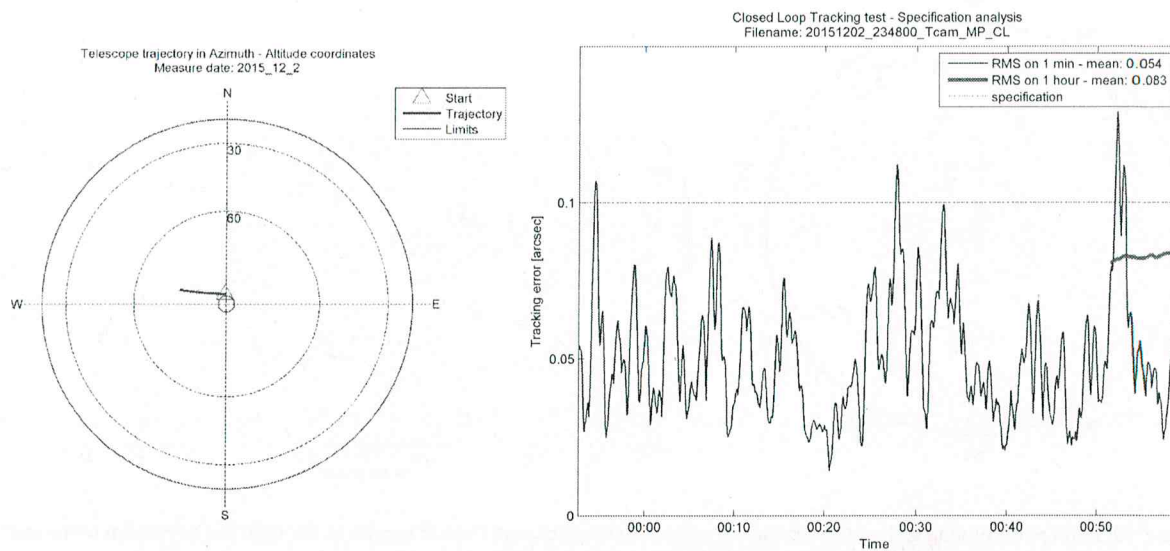


Figure 12: Close loop tracking test; the star trajectory while measuring at the left, at the right the plot in blue gives the RMS error for data acquired during 1 minute, the plot in green is the RMS deviation of the centroid for sliding elapsed time of 1 hour.

## 6. CONCLUSION

IDOT commissioning and acceptance test campaign happened successfully despite of the difficult context. Indeed, the specifications of the telescope are written such that the performance is limited by the seeing and the customer is willing an end to end acceptance test. The first difficulty is to transform theoretical specifications into measurable parameters in observing conditions. These parameters have to be sufficiently reliable despite of the seeing and in accordance with the customer final need. The image quality requirements expressed in Encircled Energy was transformed in wavefront error specification. The customer who are astronomers are not used to work with this criteria and would like to get an independent way to prove the image quality with a measurement related to image resolution. Fortunately some good seeing nights enabled to demonstrate the accordance of what was measured with the wavefront sensor and the telescope quality in acquiring double star images.

It has to be reminded that a telescope is a complex machine with some very accurate sub-systems and with finely tuned controls. The obtained quality is the result of an attentive work on every sub-system.

Before sending the telescope on site, it was completely mounted, tuned and tested in the factory integration hall<sup>(2)</sup>. Despite of the fact that the hall seeing was bad (2 arc seconds in the best case), the debugging and experience acquired at that time were very precious on site. Time was spared and all the attention could be put on the fine tuning and the alignments that are necessary for reaching the specifications.

IDOT is the first 4-m class telescope equipped with an active primary mirror realized by AMOS; its success is very encouraging for the new projects granted to AMOS; DKIST Primary mirror cell<sup>(6)</sup> and the Doğu Anadolu Gözlemevi (DAG) telescope<sup>(7)</sup> that uses this demonstrated technology.

## 7. ACKNOWLEDGEMENT

This work has been performed under ARIES contract reference 1985-14-02. AMOS is very grateful towards ARIES team for having put their confidence in AMOS team for the design and manufacturing of the 3.6 m telescope.

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At the end of the commissioning and test campaign, ARIES large field camera was installed at the focus of the telescope. This gave us (ARIES and AMOS team) the opportunity to acquire a first "astronomic" image. Thanks for having spent this moment together. The image is presented in Figure 13 and was acquired during the first working night of the telescope Imager instrument (which was thus not tuned nor aligned at that time). Seeing during this night was quite bad ( $\sim 1.5$  arcsec).

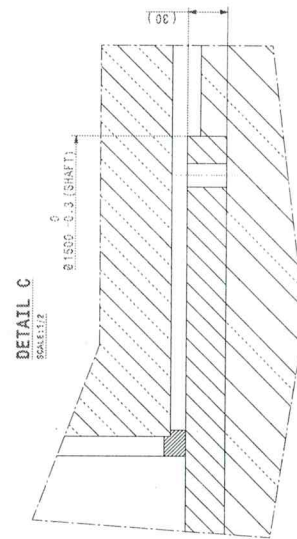
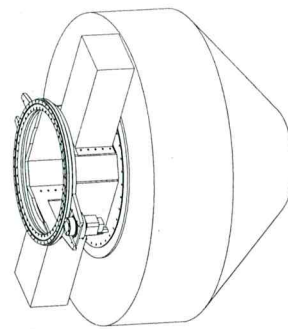
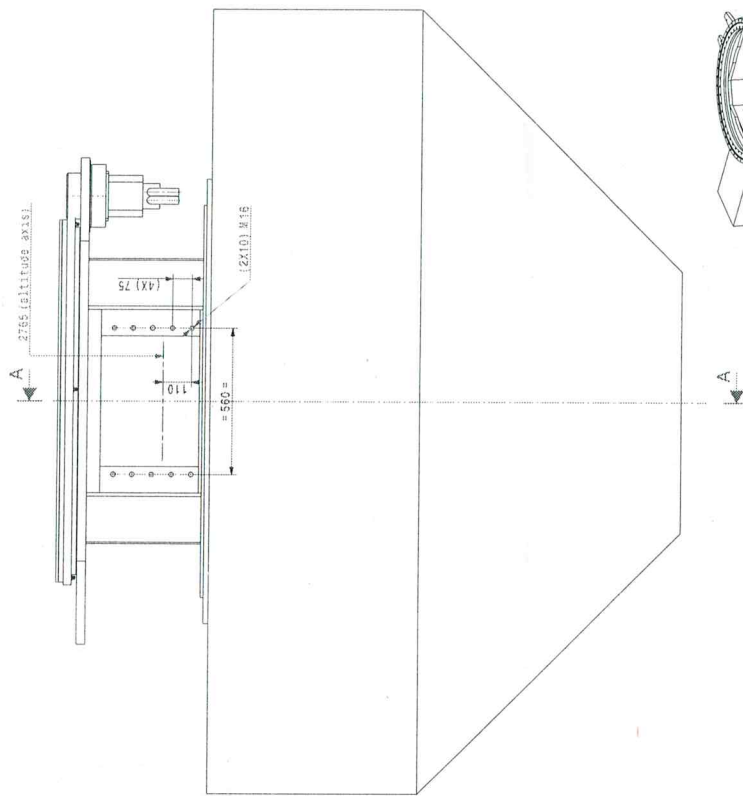
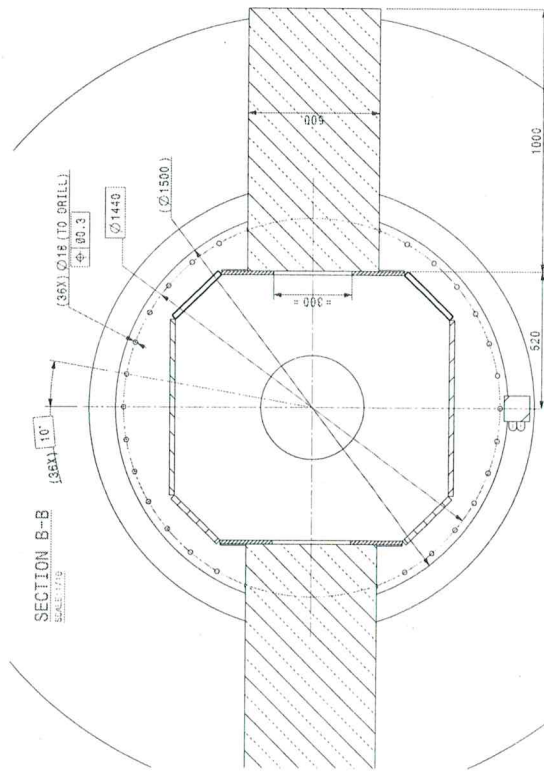
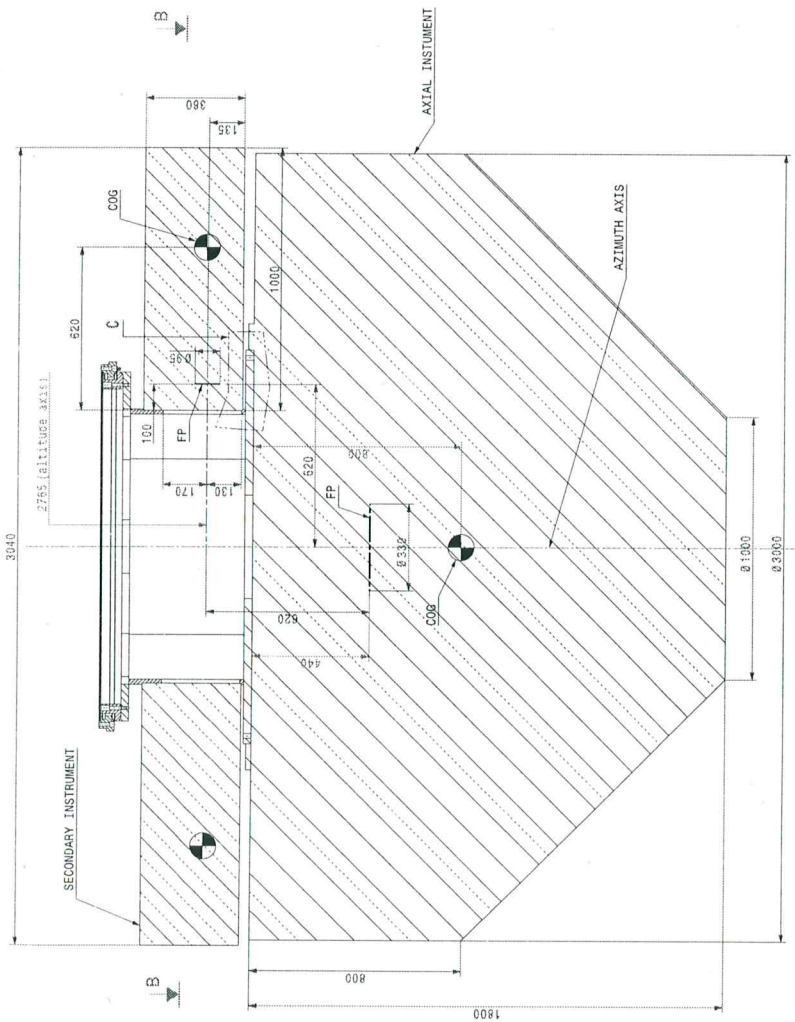


Figure 13: Crab Nebula; composition of 2 images (R and V bands); acquired with IDOT and ARIES large field camera.



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DETAIL C  
SCALE: 1/2"

Reg.	May / Ets	Name	ASE	Alt-Title	Drawing - Remarks - Material
APL Approved for Lay-out		CFA: Certified for Application	ASE	Alt-Title	FN Final - to be Archived
		Drawings: 02 A1	Project Code: 1985 - ARIES 3.6M - TELESCOPE 		
Telescopes: 1000mm 30" / 762 mm 10" / 254 mm 8" / 203 mm		Part: Secondary or Sub-Primary or Main Optical Tube Assembly or Main Optical Tube Assembly	TELESCOPE INTERFACES WITH INSTRUMENTS		
Other:	2000	10" / 254 mm	Scale: 1/10		
Other:	2000	10" / 254 mm	Scale: 1/10		
Rev: 0010 [A] 1985-ARIES-ARI-090-AMP-0002 (extended) 1985-5700-AMIES-1 (modified) 2009-04/ENR-1865-0700-001		Sheet: 1/1		Date: 09/	



- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETERS & ALL UNITS ARE IN MPa.
  2. DO NOT SCALE THE DIMENSIONS FOLLOWING DIMENSIONS.
  3. BLOCKS INDICATED BY CIRCLES IN THE DRAWING SHALL BE USED FOR ALL DIMENSIONS.

### KEY PLAN

RS = ROLLING SHUTTER  
 FFL = FINISHED FLOOR LEVEL  
 TOS = TOP OF STEEL  
 CGL = FINISHED GROUND LEVEL

[illegible]

INSTRUCTION NOTES:

FOR TENDER PURPOSE  
NOT FOR CONSTRUCTION

[illegible]

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ARYABHATTA RESEARCH  
INSTITUTE OF OBSERVATIONAL  
SCIENCES (ARIES)

PROJECT NAME  
3.6M Ø TELESCOPE PROJECT,  
DEVASTHAL

TELESCOPE BUILDING PLANS  
18.50M DIA.)

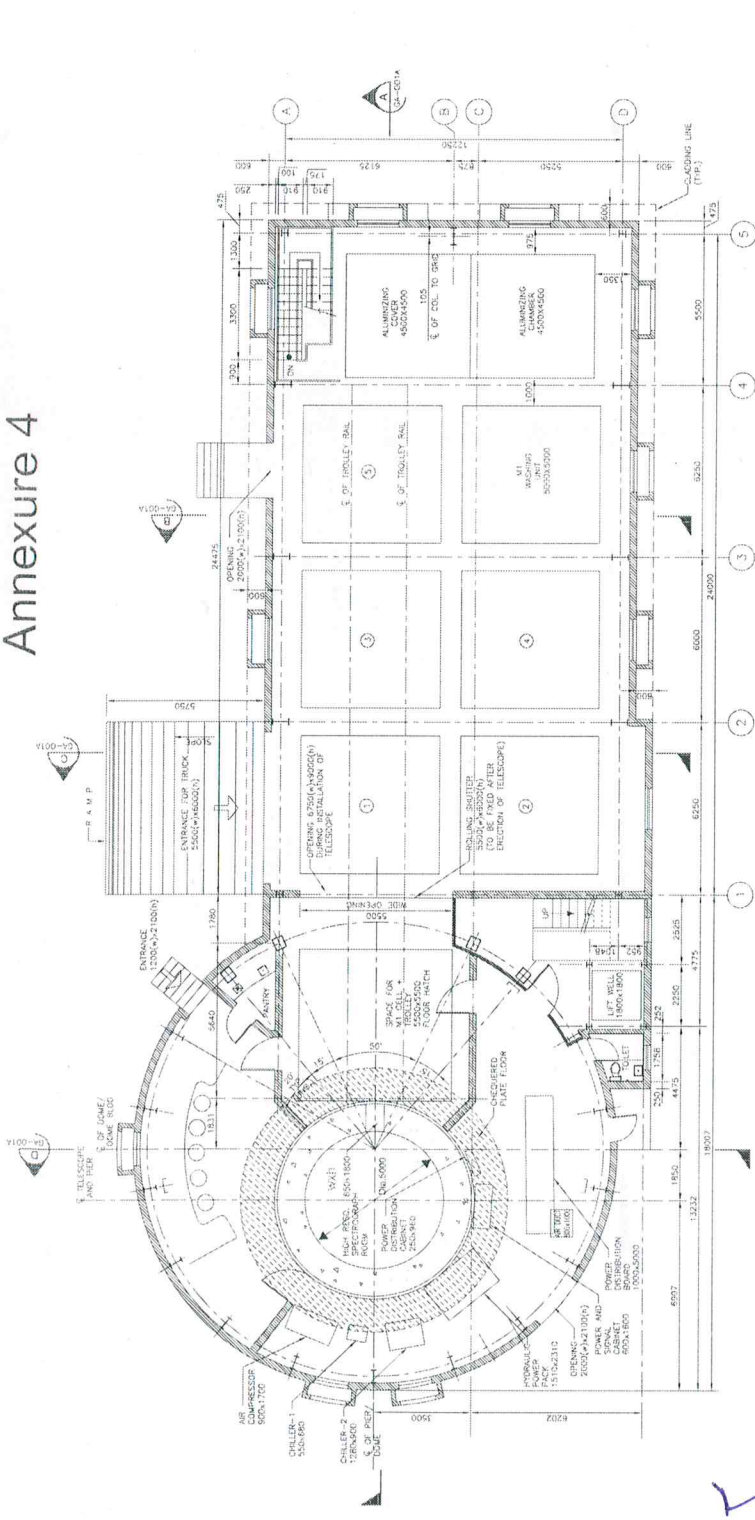
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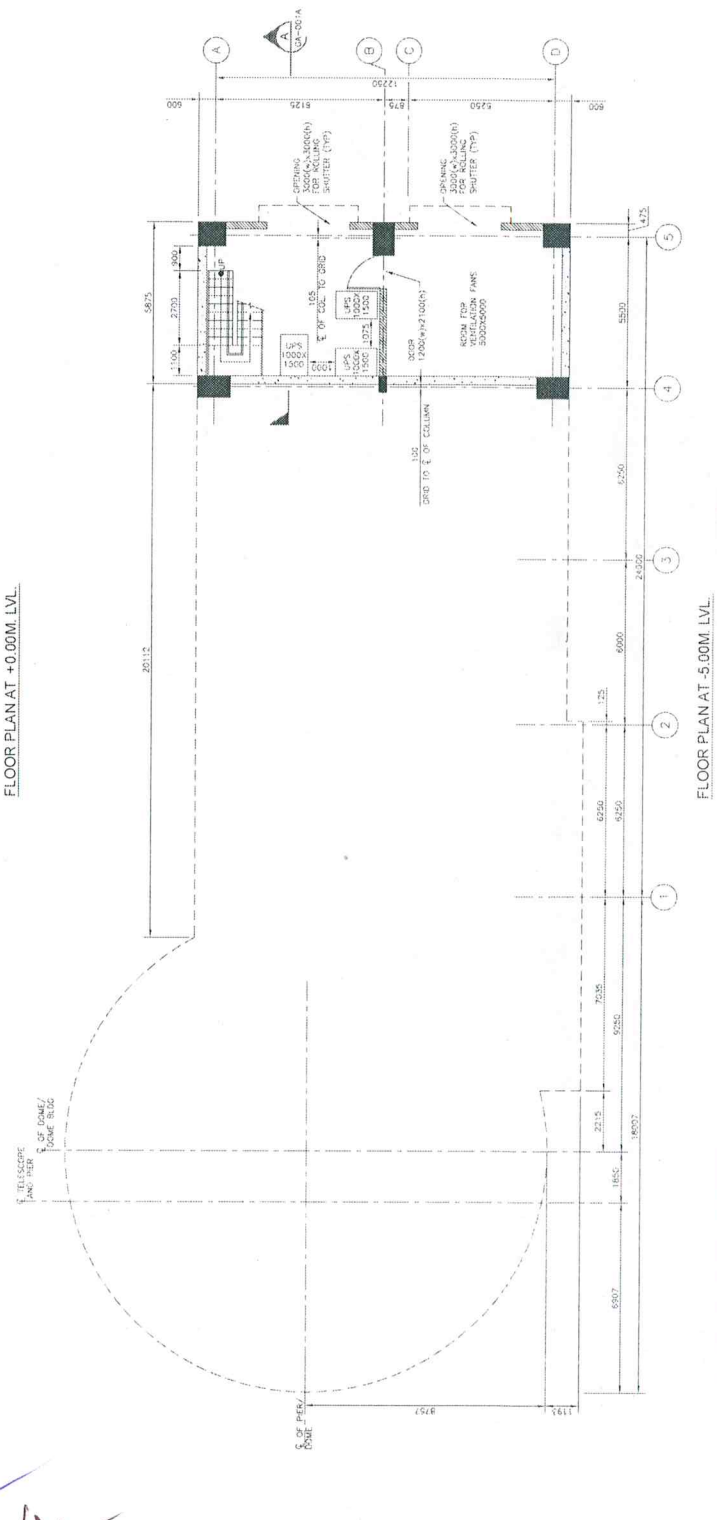
DATE: 10-03-08	APPROVED BY:
CHECKED BY:	BY:
DATE: 10-03-08	APPROVED BY:

[illegible]

**NOTE:**  
ELEVATION 0.000 CORRESPONDS TO  
REDUCED LEVEL 93.75CM FROM  
TEMPORARY SENSITIVITY MARK ELEVATION



FLOOR PLAN AT +0.00M. LVL.



FLOOR PLAN AT -5.00M LEVEL