



दूरभाष Ph : 91-80-25530672-76  
फैक्स Fax : 91-80-25534043

भारतीय ताराभौतिकी संस्थान  
INDIAN INSTITUTE OF ASTROPHYSICS  
कोरमंगला / KORAMANGALA  
बेंगलूर / BANGALORE - 560 034.

No: PUR/IMP/UVIT-ISO/PUK/54/08-09.

November 3, 2008

M/s.

Dear Sirs,

The Director, Indian Institute of Astrophysics, Bangalore invites Sealed Tenders (**both Commercial Bid & Technical Bid**) for the “**Fabrication and Supply of Satellite Adapter – 2 Nos.**” detailed in the Tender Form hereto annexed. The terms and conditions are also enclosed may be noted and if you are in a position to quote for the supply in accordance with the requirement, please submit your quotation in the attached Tender Form. The Tender documents are available on IIA web site [www.iiap.res.in/tenders.htm](http://www.iiap.res.in/tenders.htm)

**The Tender bids must be in foreign currency or Rupee only.** Your completed Tender bids (**both Commercial Bid & Technical Bid**) must reach this office in sealed separate envelopes duly superscribed with the name of the supply and due date on or before **15.00 Hrs. latest by 10.11.2008.** The Technical bids will be opened in presence of the bidders or authorized representative at **15.30Hrs. on 10.11.2008.** Incomplete Technical Bids are liable for rejection. Commercial/Price bids will be considered only for the qualified Technical Bidders. Please note that the last date for opening the Tender bids was 03.11.2008, but the tender has been **extended from 03.11.2008 to 10.11.2008.** Those who are already quoted need not to Quote again.

Thanking you,

Yours faithfully,

Administrative Officer  
For Director

Encl.: as above.



**PUBLIC TENDER DOCUMENT NO: PUR/IMP/UVIT-ISO/PUK/54/08-09.**

**DT: 03.11.2008**

**TENDER FORM**

FROM:

TO

THE DIRECTOR,  
Indian Institute of Astrophysics.,  
Bangalore-560 034.

Sir,

I/We hereby offer to supply the Items/Equipment indicated below at the price hereunder quoted and agree to hold this office open till \_\_\_\_\_. I/We shall be bound to supply the Items/Equipment hereby offered upon the issue of the Purchase Order communicating to the acceptance thereof on or before the expiry of the last mentioned date. You are at liberty to accept any one or more of the items of such Items/Equipment. I/We notwithstanding that the offer in this tender has not been accepted in whole, shall be bound to supply such items and such portion or portions of one or more of the items as may be specified in the said Purchase Order communicating the acceptance.

<b>Sl. No.</b>	<b>Description of the item(s)</b>	<b>Qty.</b>	<b>Unit</b>	<b>Rate</b>	<b>Dely. Period</b>
01.	Fabrication and supply of "Satellite Adapter" as per the specification and drawings in Annexure B	2 Nos.			

**(Both Commercial and Technical bids must be  
submitted separately in a Separate sealed envelopes)**

**(Tender bids must be in Foreign currency or Rupee only)**



Place at which the Delivery is required : Indian Institute of Astrophysics  
Bangalore – 560 034.

Date by which the supplies are required : 4/8 weeks from the date of order.

2. I/We have understood the items of the tender annexed to the invitation to the Tender and have thoroughly examined the specifications/drawing and /or pattern quoted or referred to herein and/are fully aware of the nature of the items/Equipment required and my/our offer is to supply the items/Equipment strictly in accordance with the requirements subject to the terms and conditions contained in the Purchase Order communicating the acceptance of this tender either in whole or in part.

Date:

Signature and Seal of Supplier



**Annexure -A**

**INSTRUCTIONS TO SUPPLIERS**

1. Tenders should be sent in sealed and superscribed envelopes with mention of Tender No. date and date of opening. Only one Tender should be sent in each envelope.
2. Late and Delayed Tender will not considered at all.
3. Duties, Taxes where legally leviable and intended to be claimed should be distinctly shown separately in the Tender.
4. a) Your quotation should be valid for 90-120 days from the date. of opening of Tender  
  
b) Prices are required to be quoted accordingly to the units indicated in the annexed tender form. When quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished.
5. a) All available Technical Literature(s), Catalogue(s) and other data in support of the specifications and details of the item(s) should be furnished along with the offer.  
  
b) Approximate net and gross weight of the items offered shall be indicated in your offer. If dimensional details are available the same should indicated in your offer.  
  
c) Air freight/sea freight charges up to Bangalore Airport may be sent along with the offer.



d) SPECIFICATIONS:

Items/Equipment offered should strictly conform to our specifications. Deviation, if any should be clearly indicated by the Supplier in their quotation. The Supplier should also indicate the Make/type No. of the stores offered and provide catalogue(s), Technical literature(s) and sample(s), wherever necessary along with the quotations. Test certificates wherever necessary should be forwarded along with the supplies. Whenever options are called for in our specifications, the Supplier should address all such options. Wherever specifically mentioned by us the Supplier could suggest changes to specifications with appropriate response for the same.

1. Corrections, if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amounts quoted in words and figures, amount quoted in words shall prevail.
2. The Supplier should supply along with the tender, the Banking information for payment or any other purpose
3. A complete set of instruction and operation manual should be supplied.
4. Final performance should be guaranteed.



## **TERMS AND CONDITIONS OF CONTRACT**

### 1. **DEFINITIONS:**

- a). The terms 'Purchaser' shall mean the Director, Indian Institute of Astrophysics, Bangalore-560 034.
- b). The term 'Supplier' shall mean, the person, firm or company with whom or with which the order for the supply of Items/Equipment is placed.
- c). The terms 'Purchase Order' shall mean the communication signed on behalf of the Purchaser by an officer duly authorized intimating the acceptance on behalf the Purchaser on the terms and conditions mentioned or referred to in the said communications accepting the tender or offer of the supplier for supply of Items/Equipment.

### 2. **PRICES:**

The price may please be indicated on unit basis only.

#### **Duty Exemption:**

Please note that we may issue "Customs duty Exemption Certificate", if acceptable under the Govt. of India notification No. 51/96 valid till 2011.

### 3. **GUARANTEE AND REPLACEMENT:**

The Supplier shall guarantee that the Items/Equipment supplied shall comply fully with the specifications laid down, for material workmanship and performance. The Guarantee should be for a period of one year minimum from the date of supply.



4. **PACKING, FORWARDING AND INSURANCE:**

The Contractor will be held responsible for the stores being sufficiently and properly packed for transport by air, to withstand transit hazards and ensure safe arrival at the destination. The packing and marking of packing shall be done by and at the expenses of the contractor. The Purchaser will not pay separately for transit insurance, all risks in transit being exclusively of the Supplier and the Purchaser shall pay only for such Items/Equipment as are actually received in good condition, in accordance with contract.

5. **TEST CERTIFICATE:**

Wherever required Test Certificate should be sent before dispatch of the Items.

6. **ACCEPTANCE OF ITEMS/EQUIPMENT:**

a) It is expressly agreed that the acceptance of Items/Equipment, for is subject to final approval by the Purchaser, whose decision shall be final.

7. **DELIVERY PERIOD:**

Delivery is the essence of the contract. The supplier should adhered to delivery schedule as indicated in the Purchase order.

8. **EXTENTION OF DELIVERY TIME:**

As soon as it is apparent that Supplier dates cannot be adhered to, an application shall be sent by the Supplier to the Purchaser. If failure, on the part of the Supplier to deliver the Items/Equipment in proper time shall have arisen from any cause which the Purchaser may admit as reasonable ground for an extension of the time (and his decision shall be final he may allow such additional time as he considers it to be justified by the circumstances of the case) . In case of Letter of Credit the banking charges for the LOC amendment will be on suppliers account.



9. **PAYMENT:**

Preference will be given to the supplier whose payment terms is on Site Draft.

10. **SECURITY FOR PAYMENT:**

Successful Supplier will have to furnish in the form of a Bank Guarantee or any other form as called for by the Purchaser towards any payments before supply of Items/Equipment. In case of payment through Letter of Credit the banking charges out side India and Inside India will be on suppliers account.





## Annexure –B

### Technical specification for Fabrication and Supply of “Satellite Adapter”

#### **1. Introduction:**

Indian Institute of Astrophysics (IIA) is developing an Ultraviolet Imaging Telescope (UVIT) system. In this connection we need Titanium alloy satellite adapters meeting the following specifications. The satellite adapter establishes coupling between the payload, Ultra Violet Imaging Telescope (UVIT) and the Satellite bus. This hardware is to be realized out of titanium alloy Ti6Al4V, ASTM Grade-5 annealed and shall comply fully with the mechanical properties and other specifications given under section 6.

#### **1. Deliverables:**

- Fabrication and Supply of Satellite Adapters made of Titanium alloy Ti 6Al 4V as per the technical specifications referred above and the 2D / 3D drawings enclosed herewith. Quantity: **Two numbers**.
- One set of documentation including the inspection and test reports on the metrology/ CMM measurements, X-Ray tests on the cone, tensile tests on coupons, carried out at identified stages of manufacture like the hot forming and the electron beam welding, along with any other data required to demonstrate that the supplied adapters conform to the product specifications / requirements and are free from defects.
- The tensile test coupons and electron beam weld test coupons along with reports for verification at IIA.
- Report on testing of raw material with X-ray and Ultrasonic
- Report on testing of formed cone before final machining with X-ray and Ultrasonic.

#### **2. Overall Requirements:**

- 2D and 3D drawings of the satellite adapter required are enclosed. The 2D drawings enclosed have been provided for a general reference. For finalizing the manufacturing drawings of the satellite adapter the vendors shall refer the 3D model supplied with this RFP.
- Any hot/cold forming processes on the satellite adapter parts and also the annealing / heat treatment processes shall be done under inert/ neutral environment.



- The vendors shall ensure that the satellite adapters supplied have no oxidation / contamination layer left over, on the surfaces.
- Any welding shall be by Electron Beam Welding.
- The dimensional stability is a very important requirement. The vendors shall provide all the relevant information to support / prove that the satellite adapters supplied would be dimensionally stable comparable to the tolerance class.
- The vendors shall carefully consider and address all the above aspects and reflect them in their technical proposal. The technical proposal shall include the 2D and 3D drawings of the satellite adapters actually being offered against this RFP, along with detailed process plan and product assurance plan.

### 3. The scope of work:

- Understanding of the drawing supplied by IIA and generation of manufacturing drawings.
- Design & development of tools and jigs.
- Manufacture of different elements of the adapter through hot/cold forming under inert/neutral environment, machining them to size & electron beam welding and final machining to drawing specifications and heat treatments at appropriate stages.
- X – Ray inspection/Ultrasonic inspection and Dimensional inspections at identified stages.
- Mechanical testing of coupons from flow formed and welded regions.
- Mechanical testing of coupons from EBW coupons.
- Packaging and transporting.

### 4. Material specifications:

**Material:** Titanium Alloy Ti 6Al 4V, ASTM Grade 5, Annealed, Satellite adapters conforming to ASTM B381-06a standard specifications or equivalent.

#### Composition:

Component	Wt. %
Al	6
Fe	0.25 max
O	0.20 max
Ti	90
V	4



**Mechanical properties:**

Tensile strength, Ultimate	950 MPa.
Tensile strength, Yield	880 MPa.
Modulus of Elasticity	113.8 GPa
Compressive Yield Strength	970 MPa
Notched Tensile Strength	1450 MPa
Poisson's ratio	0.342
Fatigue Strength	510 MPa

Since the components go through hot forming process etc. strength properties finally achievable could be lower than the above. The supplier shall clearly indicate the minimum assured properties.

**5. The proposal shall include the following information as a minimum:-**

1. Manufacturing process plan with details of equipments that will be used.
2. Information about the company with customer and product profile with a listing of experience in fabricating similar aerospace components in Titanium.
3. Information about the subcontractors proposed to be used if any and tasks subcontracted.
4. Details of heat treatment procedures that will be followed.
5. Product assurance plan including the Metrology plans and mechanical property checks on co-processed coupons.
6. Time schedules for the total activity and its break up, like:-
  - a) Tooling
  - b) Prototyping and delivery
  - c) Testing.
  - d) Delivery period.
7. Reviews planned, like Preliminary Design Review, Pre shipment Review with details/ content of the documentation provided under these reviews. Typically for the PDR the following are to be included
  - a. Export license
  - b. Detailed fabrication drawings
  - c. Detailed manufacturing process plans
  - d. Heat treatment process plans
  - e. Metrology plans
  - f. Raw material specifications
  - g. Detailed delivery schedule (PERT chart)
  - h. Implementation plans
  - i. Sub, sub vendors details if any
  - j. Tooling and fixture plans
  - k. Packing and delivery plans
8. The vendor shall include plans for participation of IIA personal at manufacturer's



site for the final inspection and acceptance of the adapters

9. Vendor shall also identify and list the important milestones in this manufacturing program from ordering till delivery.

#### **6. Manufacture:**

- Standard / proven processes shall be used for the manufacturing /satellite adapter. General guidelines shall be followed, like good handling practices, plant layout to minimize the number of reheats and minimizing the contamination during satellite adapter.
- Any forming/ bending shall be in inert/neutral atmosphere and the formed stock of the satellite adapters shall be sized to provide for machining off the oxidized / contaminated layers, if any, completely as mentioned earlier.
- All the welds done in realizing the adapters shall be by EBW (Electron Beam Welding). Offer also shall mention the standards that these welding processes comply with.
- The satellite adapters shall be sized to provide for the required test coupons also. This is done to ensure that the test coupons obtained have gone through exactly the same processes in the same sequence as that of the satellite adapter. The coupons taken after forming process and before final machining shall be tested for their mechanical properties and cleared. Test results/reports shall be sent to IIA for verification.
- Heat treatments for stress relieving, annealing, aging etc shall be carried out on the satellite adapters in an inert /neutral atmosphere as per standards and the detailed plans shall be clearly mentioned in the technical offer.
- Product assurance and quality control practices shall be strictly followed and complete traceability of materials and processes shall be in place during the manufacture.

#### **8. Testing / Inspection:**

- All the raw materials used shall be inspected 100 % to ensure that they are free from any defects /flaws as per standard practices. The supplier shall clearly mention these tests and the applicable standards.
- The supplier shall also provide the additional cost for the conduct of 100 percent ultrasonic testing to AA class on the raw materials separately.
- After the hot forming, X-ray tests shall be done on the adapter. Also mechanical testing on co-processed coupons shall be done for checking the properties. The tests shall be tensile tests as per ASTM E-8 and shall indicate the post forming properties of the material. Test coupons along with certificates shall be sent to IIA for verification.
- Similarly test coupons of the electron beam weld joints also shall go through tensile tests. Test coupons along with certificates shall be given to IIA for verification.



- Dimensional inspections/CMM inspections at identified stages of processes.
- The finished satellite adapters shall be subjected to 100% X-ray testing.
- The supplier shall also provide the additional cost for the conduct of 100 percent ultrasonic testing to AA class on the finished adapters separately.
- Any non-conformances and deviations noted during manufacturing and testing shall be recorded and reported to IIA immediately on their occurrence along with the corrective plan / disposition. Only after getting a clearance for these from IIA, the vendor shall proceed with further processes.

#### **8. General/ terms and conditions:**

- Dimensions and tolerances to be achieved as per specs in drawing.
- Fabrication drawings shall be given to IIA for approval; these drawings should be editable and not just images.
- The vendor shall provide the details of the overall process steps / plans proposed to realize the satellite adapters in their proposal. The overall manufacturing drawings shall be given to IIA for approval before proceeding with manufacture.
- Small changes in the drawing after placing the order, to be accepted by the vendor without any extra charges.
- The offer shall be in two parts, put in separate sealed envelopes as given below.  
**A) Technical offer with all technical details, delivery schedules etc.**  
**B) Cost/Price bid.**
- IIA reserves accessibility to vendor site as and when required. Information like, sub-contractor info, material test reports, product test report need to be provided to IIA, during all stages of the contract.
- Any changes to the above shall be made by mutual agreement between IIA and vendor.