भारतसरकार / Government of India
अंतरिक्षविभाग / Department of Space
यू.आर. रावउपग्रहकेंद्र / U.R.RAO SATELLITE CENTRE
एच.ए.एल. एयरपोर्टरोड, विमानापुराडाक / HAL Airport Road, Vimanapura Post,
बेंगलूरु/ BENGALURU – 560 017

संदर्भ सं. / Ref No.: URSC/PUR/ISIP2022058964/EoI/2023-24 22.12.2023

<u>उद्योग परिवेश में अंतरिक्षयान ए आई टी क्रियाकलापों को आऊटसोर्सिंग करने हेतु इच्छा की अभिव्यक्ति हेतु आमंत्रण (ई.ओ.आई)Invitation for Expression of Interest [EoI] for Outsourcing of Spacecraft AIT Activities at Industry Premises.</u>

यू.आर.राव उपग्रह केंद्र (यू.आर.एस.सी) (पूर्व इसरो उपग्रह केंद्र), भारत निर्मित सभी उपग्रहों के अभिकल्प, विकास, संविरचन तथा परीक्षण हेतु भारत सरकार के अंतरिक्ष विभाग के तहत भारतीय अंतरिक्ष अनुसंधान संगठन(इसरो) उत्तरदायी है।वर्तमान में यूआरएससी, उद्योग भागीदारों को, अपने परिवेश में दो लघु अंतरिक्षयान के समायोजन, समाकलन तथा परीक्षण (ए.आई.टी) क्रियाकलाप करने के लिए आमंत्रित करता है।
U.R. Rao Satellite Centre [URSC] (Formerly known as ISRO Satellite Centre), of Indian Space Research Organization [ISRO] under Department of Space, Government of India is responsible for Design, Development, Fabrication and Testing of all Indian made Satellites. URSC is currently inviting Industry Partners to carry out the Assembly, Integration and Testing(AIT) activities of two micro-spacecraft at their premises.

यू. आर. एस. सी, उद्योग को शुरु से अंत तक स्वतंत्र रूप से कार्य करने के लिए प्रवर्तित करना तथा आगे अंतरिक्षयान संबंधी क्रियाकलाप करने के लिए निजी अंतरिक्ष उद्योग में कुशल मानवशक्ति का विकास करने का इच्छुक है।
URSC is interested to enable the industry to carry out independently the end to end AIT activities and further to develop skilled manpower in the private space industries to carry out spacecraft related activities.

यह प्रस्ताव, उनके परिसर में स्थित भारतीय उद्योग जो तकनीकी अवसंरचना तथा बेंगलूरु जिले (शहरी एवं ग्रामीण) में अपने परिवेश पर दो माइक्रो-अंतरिक्षयान के समुच्चयन समाकलन तथा परीक्षण (ए.आई.टी) क्रियाकलाप करने की क्षमता रखता है, उनसे इच्छा की अभिव्यक्ति को आमंत्रित करते हेतु हैं।
The proposal is to invite Expression of Interest exclusively from Indian industries having technical infrastructure and capability to execute Assembly, Integration and Testing(AIT) activities of two Micro-spacecraft at their premises.

ई.ओ.आई.दस्तावेज को हमारे वेबसाइटwww.isro.gov.in से डाऊनलोड किया जा सकता है।
EOI documents can be downloaded from our website www.isro.gov.in
ईओआई को बोली लगानेवालों के अनुभव, सेवा के अवसर की जानकारी, सुविधा अवसंरचना, प्रस्तावित कार्यविधान तथा कार्य योजना, कुशल मानवशक्ति तथा उद्योग के वित्तीय बल के आधार पर मूल्यांकित किया जाता है।

The EOI will be evaluated on the basis of bidder's experience, its understanding of scope of services, facility infrastructure, proposed methodology and work plan, skilled manpower and the financial strength of the industry.

आवश्यकता पड़ने पर ई.ओ.आई.की प्रक्रिया को रद्द करने / पुन: जारी करने या सूचना/ब्यौरों को आगे प्राप्त करने के अधिकार को यू.आर.एस.सी आरक्षित रखता है।
URSC reserves the right to cancel/re-issue the process of EOI if the necessity so arises or to seek further information/details.

यदि कंपनी/फर्म को किसी भ्रष्ट या कपटपूर्ण प्रथाओं में भाग लेने के बारे में पाया जाए तो उन्हें निविदा प्रस्तुत करने की प्रक्रिया से बहिष्कृत किया जाएगा और उनके ई.ओ.आई दस्तावेज पर विचार नहीं किया जाएगा।
Companies/Firms, if found to have indulged in any corrupt or fraudulent practices, will be debarred taking part in the Tendering process and their EOI Document will not be taken up for consideration.

"इच्छा की अभिव्यक्ति" के साथ आपूर्तिकार/फर्मों को निम्नलिखित सूचना को विस्तृत रुप में उपलब्ध करना होगाः
Along with "Expression of Interest" Suppliers/ Firm[s]should furnish the following information also in detail:

1. कंपनी के पंजीकृत पते के साथ फोन, फैक्स, ई-मेल, वेब विवरण आदि
   Registered address of the Companies with Phone, Fax, Email, Web etc.
2. कंपनी/संगठन की स्थिति (स्वामित्व/भागीदारी/निजी/लोक लि. आदि) स्वामित्व,भागिदार, बोर्ड के निदेशक आदि का नाम व पता
   Company/Organization Status (Proprietary/Partnership/Private/Public Ltd. etc.) with Name and Address of Proprietor, Partners, Board of Directors, etc.
3. सहयोगी: (क) भारतीय (ख) विदेशी
   Associates: (a) Indian (b) Foreign.
4. पिछले तीन सालों में प्रमुख उपभोक्ताओं की सूची के साथ पूरा पता और उनके संपर्क व्यक्ति
   List of Major Customers during the last 3 Years with full address and their Contact Persons.
5. अवसंरचना सुविधा का स्वामित्व / उपलब्धता के ब्यौरे
   Details of Infrastructure Facilities owned / available.
6. कंपनी के प्रमुख शेयरधारी के नाम तथा पता और उनके शेयर पूँजी का प्रतिशत
   Names and addresses of the major Shareholders of the Company and the percentage of their share capital.
7. नवीनतम वार्षिक रिपोर्ट की प्रति के साथ पिछले तीन वित्तीय वर्षों की पूँजी तथा कुल बिक्री Capital and Turnover for the preceding 3 Financial Years with copy of latest Annual Report.
8. उपलब्ध वित्तीय क्षमता/ ऋण सुविधाएँ
   Financial Capacity/Credit facilities available.
9. बैंकरों के नाम और पता
   Name and Address of Bankers.
10. व्यापार संघ जिससे उद्योग संबंधित हैं
    Trade Association to which Industry/ies belong to.
11. स्थापना/ बिक्री/सेवाकर पंजीकरण संख्या
    Establishment/Sales/Service Tax Registration Number.

12. व्यवसाय का प्रकार
Nature of Business
13. अपने बैंकरों द्वारा जारी की गई फर्म का शोधन / वित्तीय क्षमता
Solvency/Financial capacity of the Firm issued by their Bankers.
14. कोई अन्य सूचना जो उद्योग संगत समझें
Any other information the Industry/ies consider relevant.
15. अपने सामर्थ्य और कमियों के क्षेत्रों को स्पष्टत: उल्लेख करते हुए कंपनियों का प्रोफाइल
The Profile of the Company/ies clearly bringing out the areas of Strength and Weaknesses.

16. ई.ओ.आई में भाग लेने हेतु तकनीकी और संगठनात्मक क्षमता का स्व-मूल्यांकन
Self-Assessment Technical and Organizational Competence to take part in the EOI.
17. ई.ओ.आई में यथा उल्लिखित प्रतिक्रिया प्रपत्र
Response forms as mentioned in the EOI.

ई.ओ.आई.प्रतिक्रिया का समापन/Completion of the EOI Response:

a. कंपनी / फर्मों को सलाह दी जाती है कि वे ई.ओ.आई. दस्तावेजों में निहित सभी अनुदेश; नियम व शर्तें; फॉर्मस; आवश्यकताएं तथा अन्य सूचनाओं को ध्यानपूर्वक पढें। ऐसा माना जाता है कि ई.ओ.आई की प्रस्तुति को उसके आशय को पूरी तरह समझने के साथ ई.ओ.आई दस्तावेजों का ध्यानपूर्वक अध्ययन तथा परीक्षा के उपरांत ही किया गया है।
The Company/Firms are advised to study all the instructions; Terms and Conditions; Forms; Requirements and other information in the EOI documents carefully. The submission of EOI shall be deemed to have been done after a careful study and examination of the EOI documents with full understanding of its implications.

b. इस ई.ओ.आई के लिए प्रतिक्रिया, संपूर्ण तथा सभी पहलुओं में परिपूर्ण होना चाहिए। ई.ओ.आई. दस्तावेज द्वारा आवश्यक सूचनाओं को न प्रस्तुत करने या सभी तरह से ई.ओ.आई. दस्तावेजों को पूरी तरह प्रतिक्रियात्मक न होते हुए प्रस्तुत करना कंपनी/फर्मो के जोखिम पर होगा तथा इससे दस्तावेज की अस्वीकृति भी हो सकती है।
The response to this EOI should be full and complete in all respect. Failure to furnish all the information required by the EOI document or submission of proposal not substantially responsive to the EOI documents to every respect will be at the risk of the Company/Firms and may result in rejection of the document.

c. प्रस्तुत ई.ओ.आई के सभी पृष्ठों पर संख्या लिखना है तथा प्राधिकृत हस्ताक्षरी द्वारा हस्ताक्षरित होना है।
All the pages of the EOI submitted must be numbered and signed by the authorized signatory.

d. ई.ओ.आई के संबंध में प्रचार करना सख्त मना है तथा एजेंसी द्वारा प्रस्तुत ऐसे प्रचारित ई.ओ.आई की अस्वीकृति की संभाव्यता होगी।
Canvassing in connection with the EOI be strictly prohibited and such canvassed EOI submitted by the Agency are liable to be rejected.

उपरोक्त सभी सूचना सहित "इच्छा की अभिव्यक्ति" अधोहस्ताक्षरी को उपरोक्त संदर्भ संख्या को उद्धृत करते हुए निर्धारित दिनांक व समय तक पहुँचना चाहिए।

"Expression of Interest" with all the above information shall reach the address given below, quoting the above Reference Number on or before the due date & time.

वरिष्ठ , क्रय व भंडार/Sr. Head, Purchase & Stores
यू आर राव उपग्रह केंद्र/U R Rao Satellite Centre,
एचएएल एयरपोर्ट रोड/HAL Airport Road,
विमानपुरा डाक/Vimanapura Post,बेंगलूरु/ Bengaluru – 560017,
कर्नाटक/Karnataka, भारत/India

E-mail: pso_e@ursc.gov.in (कृपया नोट करें, किसी भी स्पष्टीकरण हेतु उल्लिखित ई मेलपर भेजें। फर भी, ईओआई के लिए प्रतिक्रिया को केवल उपरोक्त डाक पते पर ही भेजें/Please note that, any clarifications shall be sent to Email mentioned herein. However, response to EOI has to be sent to above mentioned postal address only)

स्पष्टीकरण प्रस्तुति करने की अंतिम तिथि
Last date of submission of clarification : 05.01.2024 10:00 Hrs IST.

ई.ओ.आई- पूर्व बैठक
(सम्मेलन कक्ष, स्वागत कक्ष, यूआरएससी)
Pre-EOI meeting (at Conference Hall, Reception, URSC) : 11.01.2024 13:30 Hrs IST.

ई.ओ.आई.प्रस्तुति की अंतिम तिथि व समय
Last date for submission of EOI : **29.01.2024 10:00 Hrs IST.**

ई.ओ.आई.खोलने की तिथि
Opening date of EOI : **30.01.2024 11:00 Hrs IST.**

उपरोक्त सभी सूचना सहित इच्छा की अभिव्यक्ति, अधोहस्ताक्षरी को उपरोक्त संदर्भ संख्या को उद्धृत करते हुए **29/01/2024** तक पहुँचना चाहिए। बिना कारण बताए इच्छा की अभिव्यक्ति को स्वीकार या अस्वीकार करने का अधिकार यू.आर.एस.सी आरक्षित रखता है।

"Expression of Interest" with all the above information shall reach the undersigned, Quoting above Reference Number on or before **29/01/2024**. This proposal is initiated as a Pre-EOI Qualification. URSC reserves the right to accept or reject all or any such "Expression of Interest" without assigning any reasons what so ever.

[SD]

वरिष्ठ प्रधान, क्रय व भंडार/Sr. Head, Purchase & Stores

Expression of Interest (EoI) for ‘End to End Spacecraft Assembly, Integration & Testing (AIT) of ISRO Spacecraft at Vendor premises’

DECEMBER 2023

U R RAO SATELLITE CENTRE

BENGALURU

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Expression of Interest (EoI) for ‘End to End Spacecraft Assembly, Integration & Testing (AIT) of ISRO Spacecraft at Vendor premises’

CONTENTS

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ACRONYMS

MSMEs – Micro, Small Medium Enterprises.

ISRO – Indian Space Research Organisation

URSC – U. R. Rao Satellite Centre

EoI – Expression of Interest

AIT – Assembly, Integration and Testing

IST – Integrated Spacecraft Test

EGSE – Electrical Ground Support Equipment

MGSE – Mechanical Ground Support Equipment

FIM – Free Issue Material

QA – Quality Assurance

QC – Quality Control

EMI-EMC – Electromagnetic Interference - Electromagnetic Compatibility

TVAC – Thermo-vacuum

S/C – Spacecraft

S/S - Subsystem

ICD – Interface control Drawing

ILD – Insert layout Drawing

TEC - Technical Evaluation Committee

PC – Personal Computer

RF – Radio Frequency

ESD – Electro Static Discharge

HEPA – High Efficiency Particulate Absorbing

ULPA – Ultra Low Particulate Air

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1. Introduction

1.1. Space Programme in India has been developed over a period of more than five decades with a strong focus on application driven programmes and bringing space to the services of the common man. In the process, ISRO has become one of the leading space agencies in the world. ISRO maintains one of the largest fleets of communication spacecraft and remote sensing spacecraft, that cater to the ever-growing demand for fast and reliable communication and earth observation respectively.

1.2. Considering the growing demand for satellite building, URSC has outsourced design, fabrication and testing of various sub-systems realization till date.

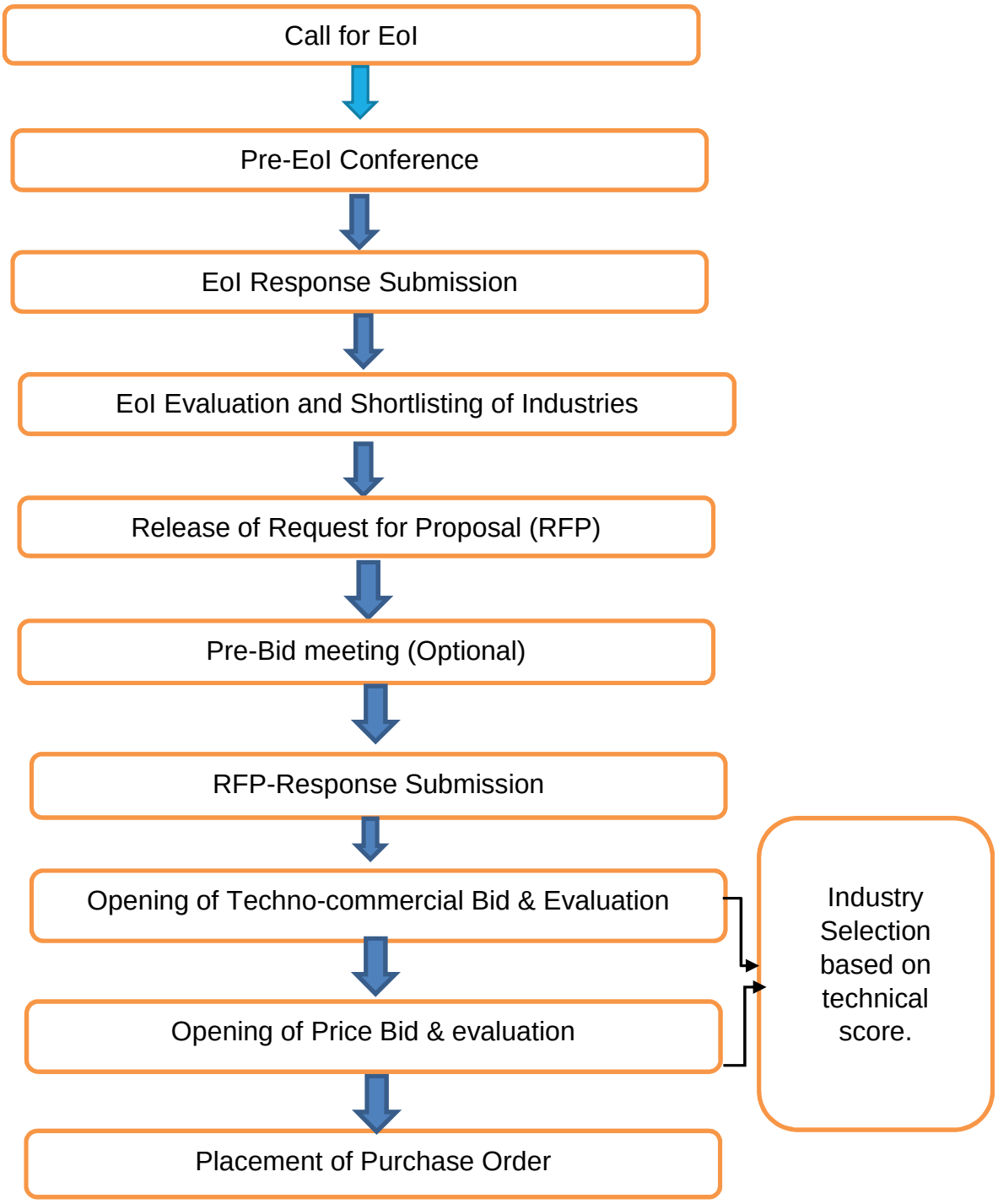
1.3. Taking into account the ever-increasing demand in this field and also considering the limited resources available at URSC, further outsourcing of Assembly, Integration and Testing Activities may help delivering projects in a time bound manner.

1.4. The Technical proposal for this EoI will be evaluated on the basis of bidder's experience, its understanding of scope of services, facility infrastructure, proposed methodology and work plan, skilled manpower and the financial strength of the industry.

2. Objective

2.1 The main objective of this EoI is to invite industry partners to carry out the assembly, integration and testing activities of two Microsat Spacecraft at their premises.

3. Procedure for finalizing Contract:



4. Scope of contract

It is proposed to carry out the Assembly, Integration and testing activities of two Microsat Spacecraft **(Microsat-A & Microsat-B Spacecraft)** of ISRO by the prospective industries at their premises. The entire activity is planned to be carried out in three phases as follows

- **Phase-1:** Orientation Programme comprising of two-three weeks training on AIT activities of the ISRO Standard bus spacecraft by URSC, inclusive of on the job training for the selected industry.
- **Phase-2**: Execution of AIT activities for Microsat Spacecraft at selected industry premises from receipt of hardware, integration of packages, disassembled mode test, panel closure, closed mode IST phase and preparation of Thermovac Test.
- **Phase-3**: Execution of subsequent AIT activities by the Industry at URSC premises, making use of the readily available facilities for AIT activities till pre-shipment IST and containerization. This include Thermo-vacuum tests, appendages deployment, dynamic tests (Vibration & Acoustic), EMI-EMC tests and post dynamic IST.

The details of the above three phases is given below:

Orientation Programme (Phase-1)

- Orientation Programme aims at providing exposure and awareness for activities under AIT.
- Boardroom training programme conducted by URSC at URSC-campus, covers theoretical aspects of spacecraft subsystems, system assembly, integration and test process, system handling, quality aspects, documentation and report generation etc.
- The duration of orientation programme is for 2-3 weeks
- During this phase, the Industry team would be provided with hands on experience/on-the-job training on Spacecraft AIT activities by URSC team.
- It will be followed by an evaluation process of the technical team provided by vendor. Out of 70 technical team undergoing orientation programme, only 56 will be selected to execute AIT activities, based on evaluation by respective committee.

Execution of AIT activities for Microsat Spacecraft at industry premises (Phase-2):

- Phase 2 is defined as AIT by Industry and during this phase, the Industry team has to independently carry out the execution of 2 Microsat Spacecraft AIT activities as per the terms and condition of the work order.

- For these Microsat Spacecraft (Microsat-A & Microsat-B modules), URSC is responsible for realisation of flight hardware. Planning and execution of Spacecraft AIT realisation, upon receiving above mentioned flight hardware is the major responsibility of the industry, at their premises.
- Spacecraft AIT activities shall be carried out at Industry place, from Subsystem integration phase till the Closed mode IST phase.
- The AIT activities shall undergo parallelly, by deploying two separate teams for Microsat Spacecraft, comprising of Microsat-A & Microsat-B modules, inside single clean room. Auditing of activities log and System level test results shall be conducted by Spacecraft QA team (URSC).
- In-house developed hardware and software, complex EGSEs & MGSEs used for Integration & checkout activities shall be supplied by URSC with suitable provisions as per the terms and condition of the work order. However, Standard test measurement instruments, consumables and Tools shall be made available by the industry (refer Annexure-1 attached).
- The Industry is responsible for generation of documentation during Phase-2 as per the guidelines provided by URSC.
- URSC resident team, comprising of 3 Engineers, shall provide necessary support during execution of AIT activities. However, expert team for concerned AIT operations shall be visiting vendor site, as per requirement. Vendor shall arrange logistic requirements for the team.

Execution of Subsequent AIT activities for Microsat Spacecraft at URSC premises (Phase-3):

- Phase 3 is defined as subsequent AIT activities by Industry at URSC premises making use of available infrastructure such as TVAC, appendages assembly & deployment, Dynamic test, EMI-EMC facilities. During this phase, the Industry team has to independently carry out the execution of Microsat Spacecraft AIT activities as per the terms and condition of the work order.
- The responsibility of URSC & industry during Phase-2 and Phase-3 are summarized below in Table 1.

5. Tenure of Contract

Industry has to complete AIT activities within the 8 months period from *T0 Where, *T0 refers to release of work order (after Purchase Order) and availability of First Flight hardware, associated EGSE/MGSEs at industry site, whichever is later.

6. Responsibility Matrix

Activities	URSC	Industry
Spacecraft Subsystem Readiness & delivery for AIT	Prime responsibility	Receipt of Flight hardware from URSC premises and safe transport to their premises, with approved procedures. AIT preparation Documentation
Spacecraft Assembly, Integration & Testing activities	Monitoring by URSC resident team & domain experts. Data pack: S/C & S/S configuration docs, ICDs/ILDs, CAD 3D Models Test plans, Test Procedure Templates	Prime responsibility Test procedures & Test results generation Documentation
Spacecraft Testing – Facilities including EGSEs/MGSEs	Loaning of customised EGSEs/MGSEs, Offering environmental test facilities of URSC	Documentation Transportation of EGSEs & MGSEs from URSC to industry site, and vice versa. Spacecraft Containerisation, Safe and secured mode of Transportation of S/C from industry site to URSC after closed mode IST.
Project Management	Overall responsibility	Prime Responsibility – AIT activities Documentation, presentation to Review committees.
Quality Management	Quality Assurance is prime responsibility	Quality control & online QC - during Assembly, Integration & Testing, implementation activities. Documentation

Table 1: Responsibility Matrix

- The responsibility of handling and safe transportation of the FIM (free issue materials) flight hardware including spacecraft, EGSEs, MGSEs, etc from URSC till industry premises or Vice versa lies with the industry.

7. Statement of Work

Assembly Integration and Testing activities will be carried out by Vendor on Microsat Spacecraft projects consisting of **Microsat-A & Microsat-B** Spacecraft modules. The subsystem wise AIT Activities of Microsat-A & Microsat-B Spacecraft will be almost identical. A brief description about subsystem wise AIT Activities are given below.

Salient features of Microsat Spacecraft:

Structure	Built on Microsat Bus Mass of Microsat-A: ~200 kg Mass of Microsat-B: ~200kg Cuboid of overall dimension ~ 800mm(Roll) x 800 (Yaw) x 1000mm (Pitch). The structure consists of the following elements: Horizontal decks – Bottom deck, Intermediate deck and Top deck 4 -Vertical decks & 4 no. of cross-ribs are connected to each other, vertical decks, bottom deck and intermediate deck.
Propulsion System	Propellant Tank: 7.5 litres volume – 1 No Fill & Drain/Vent valves Pressure Transducers

	Latch Valve 1N. Thrusters – 9 Nos
Power	Battery: Li-ion cells pack, Capacity:26 Ah Solar Array: Two panels on each wing: Each Panel is of size ~ 800x 750 mm Power generation- ~ 500W Power Electronics with Distribution package
Attitude& Orbit Control System	**Sensors**: Sensors – 6no. for station keeping 7 Nos Sensors for – Mission Specific applications Magnetometer- 1 Nos Inertial Reference Units **Actuators**: Reaction Wheel with integrated electronics –4 no Magnetorquers-3 Nos Thruster-9 Nos
On-board computer Data handling	OBC Onboard Computer -TM &TC, Processing Unit, Actuators & Thruster Drivers, Mechanism Motor Drivers. Solid State Recorder and Baseband Data Handling Package Strain Gauge Input Processing package. Gyro Electronics Thermistor Processing.
RF	S band TM/TC with ranging functionality Satellite Positioning System Antennae & Passive Elements Data relay transponder
Mechanism	Solar Panel Deployment mechanism Motor driven mechanisms, Tilt Mechanisms -Mission Specific applications

Payloads	PAN Camera Multispectral Camera Radiation environment monitor
Thermal System	Passive control Systems – Multi Layer Insulation, Optical Solar Reflectors, Heat Pipes Active control Systems – Heaters and Temperature sensors

Spacecraft Mechanisms: The Mechanisms activities are done in two phases – at simulator fixture level and at spacecraft level. The deployment of the solar array will have to be done under zero 'g' condition. This is simulated by counter balancing the weight of the hardware by using special zero 'g' fixtures. The major activities include,

- Simulator level mechanisms activities
- Spacecraft level activities at clean room (post thermo-vacuum test)
- Spacecraft level activities during vibration and acoustic tests
- Post dynamic test deployments and final stowing:
- Compilation of test results

Spacecraft Thermal Control System: The function of spacecraft thermal control system is to keep the temperature of the payloads and subsystems housed in the spacecraft within the specified limits throughout the mission. Thermal management is done through thermal control elements employing passive and active thermal elements. Passive thermal elements such as optical solar reflectors (OSR); multi-layer insulation (MLI) blankets; thermal tapes; temperature sensors; paints; thermal grease; thermal coatings and treatments; etc. are used. Active thermal elements are heaters. The thermal control system design and implementation plan will be provided by URSC. The various Thermal control systems hardware fabrication and implementation works which are to be carried out are:

- Multi-layer insulation blankets fabrication and assembly
- Fabrication of heat shields and assembly
- Bonding of rigid and flexible optical solar reflectors
- Fixing of tape heaters and foil heaters
- Bonding of temperature sensors and thermal tapes
- Thermal grease application

Spacecraft Propulsion System: The major activities involved in propulsion system integration include.

- Integration of various components and tubing (plumb lines)
- System level test
  - Feed system testing
  - Propellant tank testing
- Consolidated data sheet preparation
- Simulant fluid loading and unloading

Spacecraft Assembly and Integration: The hardware pertaining to all subsystems will arrive at the clean room. Such hardware, be it mechanical and structural elements or electronic packages, will have to be assembled to the satellite, integrated and tested at system level. Thus, Assembly, Integration and Testing at subsystem / satellite level is an involved process demanding multi-disciplinary expertise. The major activities are listed below

- EGSE and MGSE readiness with Certification
- Receive inspection of incoming flight hardware.
- Flight wire harness installation and Subsystem package assembly.
- Test Setup readiness for S/C Integration activities
- Planning and execution of subsystem Integration activities
- Spacecraft Physical parameters measurements, Alignment activities
- S/C preparation and completion of Integrated Spacecraft Tests(IST)
  - ✓ Dis Assembled IST
  - ✓ Panel Assembly and Assembled IST
  - ✓ Loading of S/C in Thermovacuum facility and IST
  - ✓ EMI-EMC tests
  - ✓ S/C preparation for Dynamic Tests and IST
  - ✓ Post dynamic tests IST
- Non-Conformance Management
- S/C containerization and shipment activities

Spacecraft Checkout Systems: The Satellite needs to be tested at system level to check whether it is performing / functioning as designed. The electrical functioning of the satellite is completely evaluated using Spacecraft Checkout systems. Checkout activity on a satellite broadly involves the following:

- Testing the satellite and its subsystems as per approved procedures at various phases and in all modes
- Generation of test reports and declaring the flight worthiness of the spacecraft.

Spacecraft Check-out Systems (SCS) required to be setup for various phases of Integrated tests (like Disassembled mode, Assembled mode in Clean room, TVAC, vibration facility, acoustic facility, etc.). At each of these test locations SCS will be located in a lab with controlled environment. At the beginning of every test phase, a detailed Test and Evaluation (T & E) will have to be conducted on the entire SCS. The results of this T & E will be reviewed and cleared by respective committee for use of SCS with the satellite. Generation of documents for SCS, IST, T & E are also a major checkout activity.

Work Share and Deliverables Responsibility

The detailed work share and deliverable responsibilities of URSC-ISRO and Vendor are as follows:

Work Share: URSC

- The vendor team will be provided with required training in satellite AIT activities during Phase-1.
- Handling and operation of various special test facilities throughout the contract including; Thermovac test facility, Vibration shakers, Acoustic test facility, Physical property measurement systems, EMI-EMC & RF radiation test facility, Propulsion related test stations, Mechanism system test facility etc;
- Review and clearance of vendor generated documents
- The list of responsibilities from URSC are as shown in the table below:

List of URSC Responsibilities/deliverables	
Sl. No	**Responsibilities**
1.	Delivery of independently integratable spacecraft subsystems and systems
2.	Cleanroom for spacecraft assembly including all the support facilities for post Closed mode IST activities
3.	AIT Implementation design plan, engineering drawings, operational procedure documents and logbooks etc
4.	On-board wire harness segments
5.	Test plans, test procedure templates and associated documents for Test procedure preparations

List of URSC Responsibilities/deliverables	
Sl. No	**Responsibilities**
6.	Special signal simulation consoles, data acquisition systems, test and measurement equipment - EGSE
7.	Spacecraft handling special purpose fixtures – MGSE
8.	Spacecraft checkout computers, simulators and firmware
9.	Interfacing cables between satellite, checkout and other systems for testing activities
10.	Thermovac test facility
11.	Physical Parameter Measurement system
12.	Deployment Mechanisms test fixtures
13.	Spacecraft Vibration Test facility and Acoustic test facility
14.	RF Test Chambers – EMI/EMC/Radiation Pattern measurements
15.	Propulsion system Integration tools, test consoles, loading cart other safety accessories etc
16.	Clean room operating personnel apparels and accessories during activities at URSC clean room
17.	Desktop PCs, peripherals, printers including necessary stationery for documentation at URSC.

Work Share: Vendor

- Operating team for AIT to get trained during Phase-1
- Independent execution of AIT activity on Microsat Spacecraft during phase-2 & Phase-3 under the supervision of URSC Personnel/Team
- Preparation of Test plan, test procedure, test result documents.
- Participation in all the review deliberations related to AIT test plans, test results and observed non-conformances. The respective team member (s) working in specific domains of AIT will be responsible for data presentation during AIT reviews.
- Generation of documents during Phase-2 and Phase-3
- The list of responsibilities from Vendor are as shown in the table below:

List of Vendor's Responsibilities/deliverables	
Sl. No	**Responsibilities**
1.	1,00,000 class Cleanroom facility, Spacecraft Checkout Lab, for spacecraft assembly integration and testing, including all the support facilities till completion of Closed Mode IST
2.	Receipt of incoming Flight Hardware at URSC, Safe transportation to vendor cleanroom, Storage and associated documentation
3.	Receipt of EGSEs, MGSEs, Spacecraft Checkout Systems and associated documentation, Safe transportation to vendor cleanroom and Storage and associated documentation
4.	Electrical test accessories and consumables for Spacecraft AIT
5.	Mechanical Tools for assembly and consumables for Spacecraft AIT
6.	Generation of Test plans, procedure documents for assembly, integration, satellite checkout including plans documents for environmental tests and special tests, covering all the phases of AIT
7.	Checklist document for execution of various activities of AIT including environmental tests, special tests etc.,
8.	Subsystem Assembly Integration and Testing of Subsystems as per the approved test plans and test procedures.
9.	Test results compilation, performance report generation
10.	Compilation document of observations and anomalies during difference phases of AIT.
11.	Presentation material preparation and documentation, covering test results and test observations
12.	As planned and As Executed activity details – compilation document for entire AIT build.
13.	Implementation of Propulsion elements, plumbing, Thermal elements & Mechanisms related wiring activities on Spacecraft structure, equipment panels and decks, in Clean room.

List of Vendor's Responsibilities/deliverables	
Sl. No	**Responsibilities**
14.	Completion of Dis-assembled mode IST, Panel closure and Closed mode IST at vendor site
15.	Transportation of S/C from vendor site to URSC for further ISTs
16.	Preparation & execution of Microsat-A & Microsat-B Spacecraft for Environmental Tests like TVAC, Vibration & Acoustic, EMI-EMC tests at URSC facilities.
17.	Clean room operating personnel apparels and accessories during activities at Vendor's clean room
18.	Desktop PCs, peripherals, printers including necessary stationery for documentation, Necessary Office Equipment

- Required details to be assimilated during training stages by the vendor team and all the documents as listed have to be systematically generated.
- During independent execution of AIT by the vendor under Phase-2 & 3, generation of all the documents for plans/procedures/records of non-conformances and close outs etc are mandatory, which provides an assessment of 'as built' satellite. URSC reserves the right to scrutinize the deliverables by the vendor team under this category. The deliverables by the vendor team under this category will be proprietary of URSC with no claim from the vendor team.

8. Project Management Reporting Structure

This contract envisages different categories of workforce viz. Engineers, Supervisors and Technicians as per the requirement of the satellite bus platform. The details of various educational qualification requirements of the Vendor Workforce for the different categories are mentioned as below:

Educational Qualification Requirement		
Sl. No	**Designation**	**Qualification and Work Experience**
1	Engineers	i. B.E/B.Tech.,/Equivalent first class in the relevant engineering discipline (Mechanical,

Educational Qualification Requirement		
Sl. No	**Designation**	**Qualification and Work Experience**
		Electrical/Electronics and Computer science) with min. of 60% of marks or equivalent CGPA Grade ii. Graduates with at least 3 years of relevant industry experience only will be considered.
2	Supervisors	i. Diploma pass in the relevant engineering discipline (Mechanical, Electrical/Electronics) with min. of 60% marks of marks or equivalent CGPA Grade ii. Diploma holders with at least 3 years of relevant industry experience only will be considered.
3	Technicians	i. ITI in the relevant trade (Mechanical, Electrical/Electronics) with min. of 60% marks of marks or equivalent CGPA Grade. ii. IPC-WHMA-620 certification for fabricators iii. ITI holders with at least 3 years of relevant industry experience only will be considered.

9. Technical Evaluation Matrix

The technical evaluation matrix is prepared considering the expertise available w with respect to complex ground support equipment and environmental test facilities. The weightage for such parameters in the evaluation matrix are kept minimum. As per the scope of the EoI, industries are expected to carry out the AIT in the industries premise and URSC will support the industries in terms of offering these complex systems such as ground system equipment, environmental test facilities etc for carrying out the end-to-end AIT activities. However, in the long-term industries are expected to gain the expertise towards development of complex ground support systems, test equipment and environmental test facilities to enable industry to do the end- to end spacecraft building independently. In the future contracts these parameters would have higher weightage while finalizing the contract.

Sl. No	**Criteria**	**Marks**	**Response form**
1	**Facility Infrastructure**	**55**	**Form H**

Sl. No	Criteria	Marks	Response form
A	**1,00,000 Class Clean** room with minimum dimensions of 14m (L) x 10m (B) x 5.2m (H) (for 2 Spacecraft). 1 Ton crane facility. Where, Height (H) dimension is minimum crane hook point from floor. Door height minimum 3m (W) x 4.0m (H) between airlock and Cleanroom. Environment control with Rh 55±5% and temperature 22±2deg C.	30	*All the points in this section are of prime importance and proportionate marking will not be awarded for Sl. No. A.* *Photographic evidence to be provided as part of bid submission. The evidence provided as part of the bid will be verified at the vendor premise.* *Full marks will be awarded if all the mentioned pre-requisites are met for Sl. No. A.* .
	Transit area (airlock) with controlled environment (Rh 55±5% and temperature 22±2deg C.) having dimension - 12m (L) x 6m (B) x 6.5m (H). with 10 Ton crane for handling transportation container. Where Height (H) dimension is minimum crane hook point from floor. **(OR) Transit area (airlock)** with controlled environment (Rh 55±5% and temperature 22±2deg C.) should be compatible to receive Spacecraft container having dimension 4m dia with 4m height with suitable unloading platform (mobile crane) adjacent to airlock room/door. Door height at the entry of Airlock should have compatible dimension to position the container inside, for both cases.		
	Inside the clean room the following are required: 3Phase supply 40A, interface with BCH 2kW & 15A wall sockets 4x15A Raw power 2 Nos - 0.3kW 4x15A UPS power 4 No - 0.25kW 32A ELMCB outlet 1 No - 2kW		
	ESD work tables with minimum dimensions 1.5m (L), 0.75m (W), 0.8m (H)] with 15A & 5A UPS supply - 04Nos per bay/Spacecraft, with proper Earthing facility.		
	HEPA/ULPA filter for particle control environment		

Sl. No	Criteria	Marks	Response form
	Particle count monitor, humidity & temperature monitor equipment for measuring the environment inside clean room / air lock room		
	Air shower entry for Clean room		
	ESD floor throughout the clean room / air lock room, ESD garments & footwear for all entering the clean room (Max 30 at a time)		
	Continuous LN2 (liquid Nitrogen) supply & compressed Air supply		
	Spacecraft Checkout Lab: minimum dimension 10m x 8m x 3m, work tables - 10Nos with Air conditioned, having UPS Power supply (1.5kW) with cutler hammer (20Nos) and 15Amp sockets -8Nos & LAN.		
B	All areas at clean room / air lock where spacecraft will be handled to be covered with below requirements. • Site Security - (1 mark) • Access Control with CCTV Surveillance system - (1 mark) • Fire Safety systems - (1 mark)	3	Form Q Proportionate marks shall be awarded. Each point carries 1 mark. 1*3 = 3 marks
C	**MGSEs Required** for Spacecraft testing - refer Annexure-2 for dimensions and images which are indicative only. • Spacecraft/Panel Integration fixture - (1 mark) • Spacecraft handling System - (1 mark) • Spacecraft Transportation container - (1 mark)	3	Form Q Proportionate marks shall be awarded Each point carries 1 mark. 1*3 = 3 marks
D	**Electronics Lab** having work benches • Soldering Station - (1 mark) • Fabrication Tools - crimping tool - (0.5 mark) - Magnifier tool (10x) - (0.5 mark) • PC based Continuity tester - (1 mark)	3	Form Q Proportionate marks shall be awarded Each point carries 1 mark. 1*3 = 3 marks
E	**Mechanical fitting lab** with		Form Q

Sl. No	Criteria	Marks	Response form
	• Bench drilling machine - (1 mark) • Milling machine - (1 mark) • Heli coil tool for reworks. - (1 mark)	3	Proportionate marks shall be awarded Each point carries 1 mark. 1*3 = 3 marks
F	**EGSEs Required for Spacecraft testing** • Data Acquisition Systems - min 16kbps – (0.5 mark) • DC Power supplies (Transformer isolated power supply with 5V, ±15V, 2A) – (0.5 mark) • Digital Storage Oscilloscopes – minimum 100MHz – (0.5 mark) • Voltage Calibrators ±5V, resolution 1mV. – (0.5 mark) • Breakout boxes - 50 pin with online monitoring points. – (0.5 mark) • RF Cables – low loss flexible cables – (0.5 mark)	**3**	Form Q Proportionate marks shall be awarded. Each point carries 0.5marks. 0.5*6 = 3 marks
G	**Spacecraft Checkout System**: • Battery Simulator - having programmable power supply minimum 1kW, sink-source capability & load regulation. - (1 mark) • Power Control Unit - Embedded system with remote interface for control and monitoring of electrical signals (1 mark) • MIL-STD-1553B test system for Bus monitor, Remote Terminal simulation feature - (1 mark) • Computer Server Systems – minimum 1TB capacity, 8-core processor, 16GB RAM (1 mark) • RF Power meter– frequency range from 10 KHz to 18GHz, -70dBm to +20dBm- (1 mark) • Spectrum Analyzer - frequency range	6	Form Q Proportionate marks shall be awarded Each point carries 1 marks. 1*6 = 6 marks

Sl. No	Criteria	Marks	Response form
	from 50Hz to 18 GHz (1 mark)		
H	**Test Facilities:** • **Harness Fabrication facility** – controlled environment lab with minimum 5m x10m x 4m having associated tools, work tables. - (1 mark) • **Thermovac** – 1m Chamber with 10^{-5} Torr or higher - (1 mark) • **Vibration** - shaker capacity 2T and above - (1 mark) • **EMI-EMC Lab** - controlled environment lab with minimum 5m x 3m x 3m having shielding effectiveness greater than 100dB from 14kHz to 18GHz - (1 mark)	4	Form Q Proportionate marks shall be awarded Each point carries 1 mark. 1*4 = 4 marks
2	**Technical Manpower:** • Mechanical/Aerospace Engineers with 3 years of experience - 15 to 20 Engineers (2 marks) - 21 and above Engineers (4 marks) • Mechanical/Aerospace Diploma with 3 years of experience. - 10 to 15 Diploma holders (2marks) - 16 and above Diploma holders (3 marks) • Mechanical ITI (Industrial Training Institute) trade certificate holders with 3 years of experience - 10 to 15 ITI holders (2 marks) - 16 and above ITI holders (3 marks) • Electrical/Avionics/Electronics Engineers with 3 years of experience - 15 to 20 Engineers (2 marks) - 21 and above Engineers (4 marks) • Electrical/Electronics Diploma with 3 years of experience - 10 to 15 Diploma holders (2marks) - 16 and above Diploma holders (3 marks) • Electrical/Electronics ITI (Industrial	**20**	Form D, E, F and G Proportionate marks shall be awarded

Sl. No	Criteria	Marks	Response form
	Training Institute) trade certificate holders with 3 years of experience. - 10 to 15 ITI holders (2 marks) - 16 and above ITI holders (3 marks)		
3	**Past experience of skilled manpower involved in Spacecraft Integration and testing activities**	**10**	Form A and B
A	**Spacecraft Assembly Integration & Testing Realisation Activities** – (Workorder copies to be provided) • AIT Realisation of 1 Spacecraft - (1 mark) • AIT Realisation of 2 Spacecraft - (3 marks) • AIT Realisation of 3 and above Spacecraft - (5 marks)	5	Proportionate marks shall be awarded
B	No of various **Subsystem Realisation** - (Workorder copies to be provided). • Power Electronics Systems - (1 mark) • Digital Systems - (1 mark) • RF Systems - (1 mark)	3	Proportionate marks shall be awarded Each point carries 1 mark. 1*3 = 3 marks
C	**Design guidelines:** documents to be provided in Aerospace/Space systems • EMI-EMC considerations - (1 mark) • ESD considerations - (1 mark)	2	Proportionate marks shall be awarded Each point carries 1 mark. 1*2 = 2 marks
4	**Financial Strength of the industry:** • Revenue from operations - 50cr to upto 100cr - (2 marks) • Revenue from operations - above 100cr to upto 300cr - (3 marks) • Revenue from operations - above 300cr - (5 marks) *Note: Average revenue of past 3 years shall be considered for evaluation*	**5**	Form J, K and L Proportionate marks shall be awarded

Sl. No	Criteria	Marks	Response form
5	**Quality Management Standards** • Aerospace Systems development document - 1 to upto 3 numbers (1 mark) - 4 numbers and above (2 marks) • Aerospace Systems Design review minutes - 1 to upto 3 numbers (1 mark) - 4 numbers and above (2 marks) • Test and evaluation documents for Aerospace systems. - 1 to upto 3 numbers (1 mark) - 4 numbers and above (2 marks) • Anomaly/Observation review board minutes of the meeting for Aerospace systems. - 1 to upto 3 numbers (1 mark) - 4 numbers and above (2 marks) • IPC-WHMA-620 or equivalent certified technicians/operators for fabrication activities - 1 to upto 5 numbers (1 mark) - 6 numbers and above (2 marks)	**10**	Form N Proportionate marks shall be awarded
		100	

10. Manpower Estimate for Microsat AIT Operations

Microsat (for one Spacecraft)	Engineers (Man-days)	Diplomas (Man-days)	Technicians (Man-days)	Schedule (months)
	2496	**1248**	**2080**	**8**
- This skilled team to cater for activities across Electrical & Mechanical Integration, QA - Elec & Mech, Spacecraft Checkout, Thermal, Mechanisms & Propulsion aspects during various phases of Spacecraft AIT activities. Typically, it estimates to team size of 12 Engineers, 6 Diploma and 10 Technicians.				

Table 2: Manpower Estimate

11. Eligibility and Evaluation criteria

Eligibility Criteria:

a) The Bidder should be a company registered under Indian Companies Act 1956 or a firm registered under Limited Liability Partnership (registered underLLP Act, 2008). The industry should have been in existence for a minimum of Five (5) years in India.

b) The bidder should not have been blacklisted by any Central/State Government institution. A signed declaration to this effect must be submitted along with the techno-commercial bids.

c) Request for utilization of URSC/ISRO cleanrooms for AIT activities under any agreement shall not be entertained for this contract.

Evaluation Process:

a) URSC will constitute a Technical Evaluation Committee (TEC) to evaluate the responses of the bidders.

b) The TEC constituted by URSC shall evaluate the responses to the EoI and all supporting documents & documentary evidence. Inability to submit requisite supporting documents or documentary evidence, may lead to rejection of the EoI proposal.

c) Each of the responses shall be evaluated to validate compliance of the bidders according to the eligibility criteria, technical evaluation Forms and thesupporting documents specified in this document.

d) The decision of the TEC in the evaluation of responses to the EoI shall be final. No correspondence will be entertained outside the evaluation processof the Committee.

e) To evaluate the proposals, URSC reserves the right to visit the premises of industries participated in EoI, with a notice of 48 hours. The evaluation of vendors will be based on response forms and verification of the same during the industry visit.

f) Along with the bid / response form, a detailed presentation on their proposals in the form of soft copy to be submitted.

g) The TEC may ask for presentation / meetings / clarifications with the bidders to evaluate its suitability for the Project.

h) The TEC reserves the right to reject any or all proposals.

i) The Technical proposal will be evaluated on the basis of bidder's experience, its understanding of scope of services, facility infrastructure,

proposed methodology and work plan, skilled manpower and the financial strength of the industry. Only those bids whose technical score (TS) as per the technical evaluation criteria mentioned in Technical Evaluation Matrix (Page no 14) of this EoI is 75 or more out of 100 shall be declared as qualified for further evaluation. Bids securing less than 75 marks shall be rejected.

j) A Request for Proposal (RFP) will be issued to the short- listed (technically qualified) agencies from this EoI and asked to submit their detailed proposal and price (Two-part bid).

k) Work order will be awarded to Indian industry having technical infrastructure and capability to execute Assembly, Integration and Testing (AIT) activities of two Microsat spacecraft at their premises.

l) The industry shall suitably address safety measures taken for assurance of the flight hardware and support accessories (FIM) approx. 100Cr Rupees, supplied by URSC.

m) The industry is responsible for Safe and Secured transportation of Free Issue Material (FIM) and assembled Spacecraft. The cost incurred for the shipment of Free Issue Material (FIM) and Spacecraft transportation using special container, to and from URSC and industry premise, shall be borne by the industry.

12. Modalities of Contract Execution

Spacecraft Assembly, Integration and Testing (AIT) is a significant phase of Spacecraft realization process. It is a complex activity carried out by a team of multidisciplinary domain experts as per the configuration of a satellite for a scheduled period using highly sophisticated tools, equipment and facilities in accordance with approved set of documents and reviews. The detail sequences of Spacecraft AIT Activities with milestones are given in the table below:

Sequence of Spacecraft AIT Activities & Milestones	
Milestones	**List of Activities**
Phase-1	**Orientation Program & on job training**
Milestone-1 (Phase-2)	▪ Incoming Inspection and Clearance of Structure ▪ Positioning of structure on fixture ▪ Related Thermal Implementation **Completion of Milestone 1**
Milestone-2 (Phase-2)	▪ Incoming Inspection of Equipment panel, Subsystem ▪ Electrical Mainframe System Integration & testing ▪ Incoming Inspection of Payload Deck/Panel ▪ Payload Integration & testing of for both Microsat-A & Microsat-B S/C ▪ Dis-Assembled Mode IST **Completion of Milestone 2**
Milestone-3 (Phase-2)	▪ Preparation for Panel Closure for both Microsat-A & Microsat-B spacecraft ▪ Propulsion activities ▪ Panel Closure ▪ Assembled Mode IST ▪ Pre-shipment Review Phase-2 ▪ Spacecraft Transportation to URSC **Completion of Milestone 3**
Milestone-4 (Phase-3)	▪ Preparation for Spacecraft Thermovac Test for both Microsat-A & Microsat-B spacecraft ▪ Special Tests – Mission specific ▪ Spacecraft Thermovac Test ▪ Propulsion System Integration-Part-2 ▪ Appendages Integration & testing ▪ Alignment test ▪ End-to end polarity test

Sequence of Spacecraft AIT Activities & Milestones	
Milestones	**List of Activities**
	▪ Physical Parameter Measurement ▪ Satellite fit check with Launch Vehicle adaptor ▪ Preparation for Satellite Dynamic Test ▪ EMI/EMC test ▪ Vibration test ▪ Acoustic Test **Completion of Milestone 4**
Milestone-5 (Phase-3)	▪ Pre-shipment Review (PSR) ▪ Pre-shipment IST for both Microsat-A & Microsat-B Spacecraft ▪ Spacecraft Preparations for Shipment & containerisation **Completion of Milestone 5**

13. Response Forms and Annexures

From – A: General details of the industry

1	Name of the Industry	
2	Year of Establishment	
3	Core capabilities of the industry	Type brief profile of the industry not more than 2 pages (Any other report/s can be provided as Annexure)
4	Head office location and address with contract number & email id:	
5	Local address in Bangalore, if any, with contact number & email id:	
6	Addresses of manufacturing and/or operational setup in India (highlight the address where ISAC representative will visit for audit)	1. 2. 3
7	Corporate website URL:	

Form B - Experience in Aerospace sector: in case the industry is having/had any Purchase order/work order/contract (not more than 6 Purchase orders) from June 01, 2013 onwards in Skilled manpower engaged for Spacecraft Integration and Testing activities, provide the details in the specified format for each work order.

Purchase Order-1

Name of the Aerospace Industry	
Scope of work	
PO Details	
Present Status of the PO	

Type of System*	
Application **	
In any part of the above work subcontracted to other industries? If yes provide the details	
Name of the sub-contracts	Description of activity outsourced to sub-contractors

*Indicate whether it is electronics/electrical/mechanical/ propulsion/ software or any other system

** mention if the system is for on-board or ground or any other use

Purchase order -2 (use above table format)

Purchase order -3 (use above table format)

Purchase order -4 (use above table format)

Purchase order -5 (use above table format)

Purchase order -6 (use above table format)

Note: the copies of above six purchase orders to be enclosed as Annexure

Form C: Are you an offset Partner/Subcontractor to any foreign industry (Prime contractor of any major Aerospace sector related contracts from India?)

If yes provide the details in the given format

Sl No	**Name of the Foreign Industry with Address**	**Name of the project (specify total contract value)**	**Responsibility of Prime Contractor**	**Responsibility of offset partner (your firm) (specify total sub-contract value)**

Industry Expert Manpower

Form D: Manpower Strength (on the rolls of industry /lead industry in case of consortium) in the following Streams/Disciplines as on April 01, 2023.

Sl No.	**Streams/discipline**	**Engineering**	**Diploma**	**ITI**
1.	Mechanical			
2.	Electronics and Communications			
3.	Computer Science			
4.	Others			
5.	**Total**			

Form E: Mention the levels of technical hierarchical structure (from entry level to highest cadre) of your organization.

Form F: Whether the Industry has the similar experience of providing technical/skilled manpower support (from June 01, 2013 onwards) to any Government/Public sector Industry (Aerospace Sector). If yes provide the following details

Sl No	**Name of the organization supported**	**Scope of work**	**No. of manpower deployed**	**Remark**

Form G: Provide the following details about the minimum % of marks for joining your company and average salary for entry level

Sl. No	Category of employees	Minimum % of marks for joining the company	Average salary per year per employee (in Rs)
1.	Engineer		
2.	Diploma		
3.	ITI		

Form H: Infrastructure Capabilities

List of major infrastructures presently available to build systems/subsystem related to aerospace sector established in India.

Sl.NO.	Name of Infrastructure/ Facility	Year of Commissioning	Brief specifications*	Utilization factor (%)**
1.	Clean Room			
2.	Air Lock			
3.	Checkout test facility			
4.	Electronics Fabrication Facility			
5.	Environment Test Facilities - Vibration			
6.	Environment Test Facilities - acoustic			
7.	Environment Test Facilities – indoor RF anechoic			

8.	Environment Test Facilities – Thermal			
9.	Environment Test Facilities – Thermal vacuum			
10.	Alignment Facility			
11.	Zero g fixture for solar panel testing			
12.	Harness fabrication and testing facility			
13.	Thermal fabrication and testing			
14.	Inspection and testing facility			

**kindly specify dimension, cleanliness level, temperature range, ultimate pressure, working volume, frequency Range, Max. force, power range as application.*

Form Q:

Sl.NO.	**Name & Model number of Infrastructure/ Facility/Instrument**	**Year of Procurement**	**Applicable Project**	**Utilization factor (%)****

Photographs/brochure of above listed facilities may be provided as Annexure.

*** no of days utilized/year*

All these facilities will be visited and evaluated as part of technical evaluation process. Industries need to cooperate in showing their facilities, failing to which they would be disqualified.

Any testing facility (except clean room) required for AIT activities which the industry is not having can be taken on charged basis from URSC. However, this needs to be

accounted in the total cost. The transportation and safety of the package during this phase is industry's responsibility.

During the pre-bid meeting, a detailed presentation would be given from URSC on the facilities required for AIT activities. In case industry wants support of test facility from URSC, the same needs to be indicated and per day cost for usage of the facility will be provided to the industry.

Form I - Consortium

In order to meet the scope of this contract, whether the Industry has formed a Consortium or equivalent association with any other India agency? Yes/No

if yes provide the following details of the consortium partners

Agreement copy to be provided

Parameter	**Consortium partners**				
	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5
Name & address					
Brief description of major work executed for URSCC/ISRO Centres since April 01, 2014 onwards (mention any one)					
Date of Consortium Agreement					
Technology association of partner					
Infrastructure association of partner					
Manpower/ Workforce support of partner					
Financial support of partner					

Form J - Financial Details

Financial information of Industry /Lead Industry in case of consortium

Heads	**FY 2020-21**	**FY 2021-22**	**FY 2022-23**
Revenue from operations (in INR Crores)			
EBTD (Earnings Before Tax and Depreciation)			
% of Revenue from Aerospace Segment/Unit			
Net Worth			
Share capital			
% of shareholding by Indian			
% of Shareholding by Foreign			

Form K - Provide the Shareholding Pattern of the Industry of the given format

Sl No	**Category of Shareholder**	**No. of Shareholders**	**% of shareholding**
Total			**100%**

Form L: Mandatory supporting documents

I. Auditor certified statements for the last three years, FY 2020-21, FY 2021-22 and FY 2022-23 as Annexure (please provide the profit and loss statement and balance sheet)

II. Unaudited certified statements certified by the company auditors for the latest year 2022-23 (in case auditor certified statement for 2022-23 is not available). Certification by the company auditors supporting the revenue beak up.

Form M: Acceptance of Compliance Matrix – to be filled by industry

Compliance Matrix			
Refer Chapter No	Description	Compliance (yes/no)	Remarks
1.	Acceptance to EoI objectives		
2.	Acceptance of understanding of Spacecraft Subsystems Introduction		
3.	Acceptance to scope of work		
4.	Acceptance to Resource Allocation & Skill set requirements		
5.	Acceptance of Tenure of Contract		
6.	Acceptance to Procedure for finalizing contract		
7.	Acceptance to Terms & Conditions		
7.1	Acceptance to Terms & Conditions: Organization Portfolio		
7.2	Acceptance to Terms & conditions: General		
8.	EoI Response Format duly filled		

Form N: Quality Management:

1	State the quality policy of the industry (max in 200 words)	(type overall quality management system and mention about quality department reporting, non-conformance management system, quality control practices, records maintenance, onsite activity QMS, internal review mechanism)	
2	Quality standards / certification obtained by the Industry [Tick the appropriate box]		AS9100Rev C
			Applicable as per ISO 9001 standard
			Others (if others kindly mention)

Annexure -1

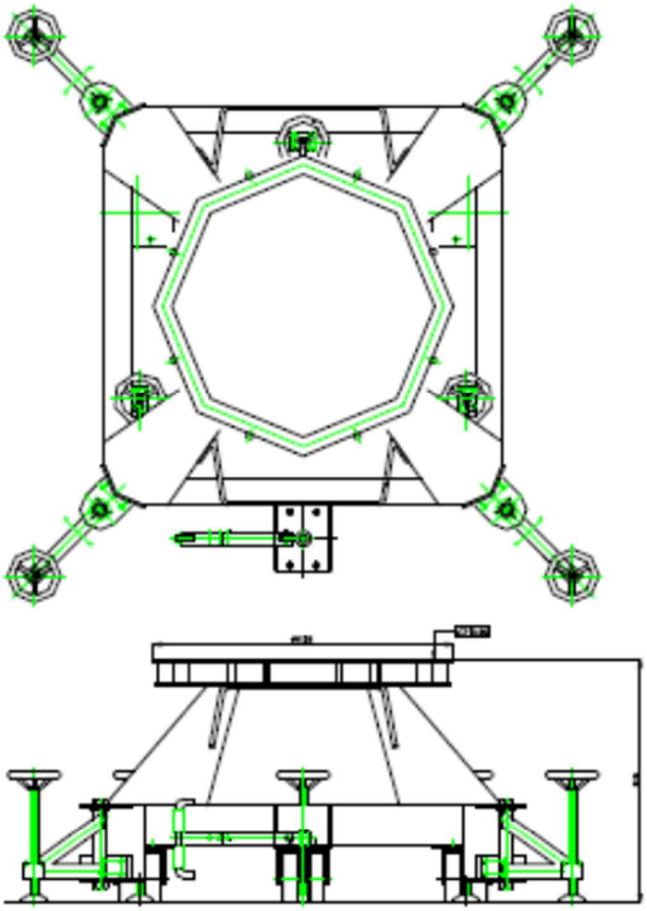
Standard Test & Measurement Equipments/ Instruments & Consumables	
1.	Digital Oscilloscopes
2.	Digital Multi Meters (Handheld, bench top)
3.	Current Probe
4.	Clip-on Current meter
5.	Voltage calibrators
6.	DC Power Supplies (upto 50V)
7.	Signal Generators
8.	Spectrum Analysers
9.	High Resistance meter
10.	Solder Stations
11.	Cable tie wraps, Anchoring Betas
12.	Lacing thread
13.	Kapton Tapes, Paper Tapes
14.	Protective Sleeves
15.	ESD covers/ESD storage containers

Tools (non-magnetic, ESD safe)	
1.	Screwdrivers
2.	Cutters
3.	Torque wrenches types– upto 500kgf-cm
4.	Allen key sets, T handles, Extension bits

5.	Feeler gauges
6.	Scissors
7.	Ratchets
8.	Spanners
9.	Mallets
10.	Measuring tools - Weighing Machines, Vernier, Screw gauges, Steel Rulers, knife edge.
11.	Workshop tools
12.	Crane weighing Scale

Annexure -2

Indicative drawings/images of MGSEs provided as below.

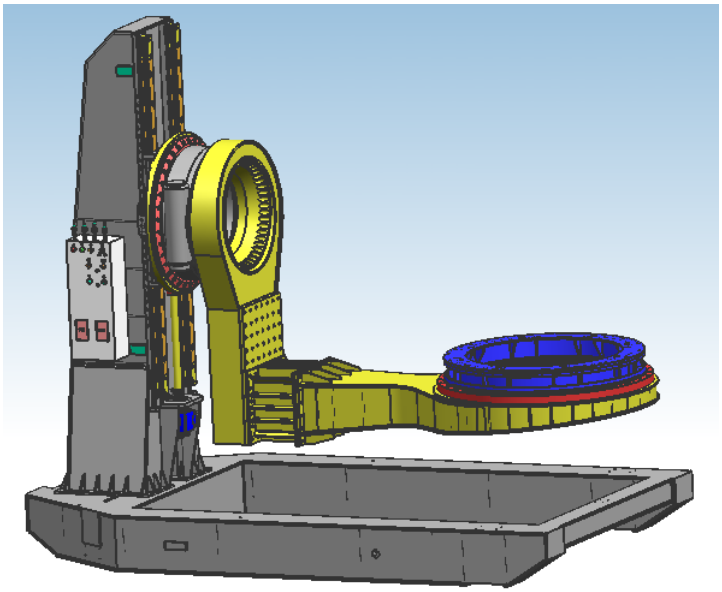


LOW LEVEL PLATFORM

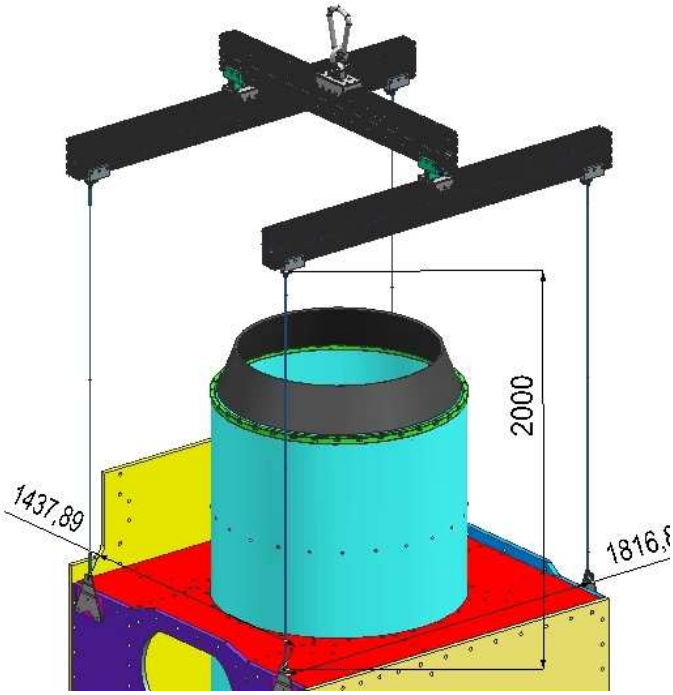
ACITY : 2000 KG

, WIDTH : 2228 MM , HEIGHT : 915 MM

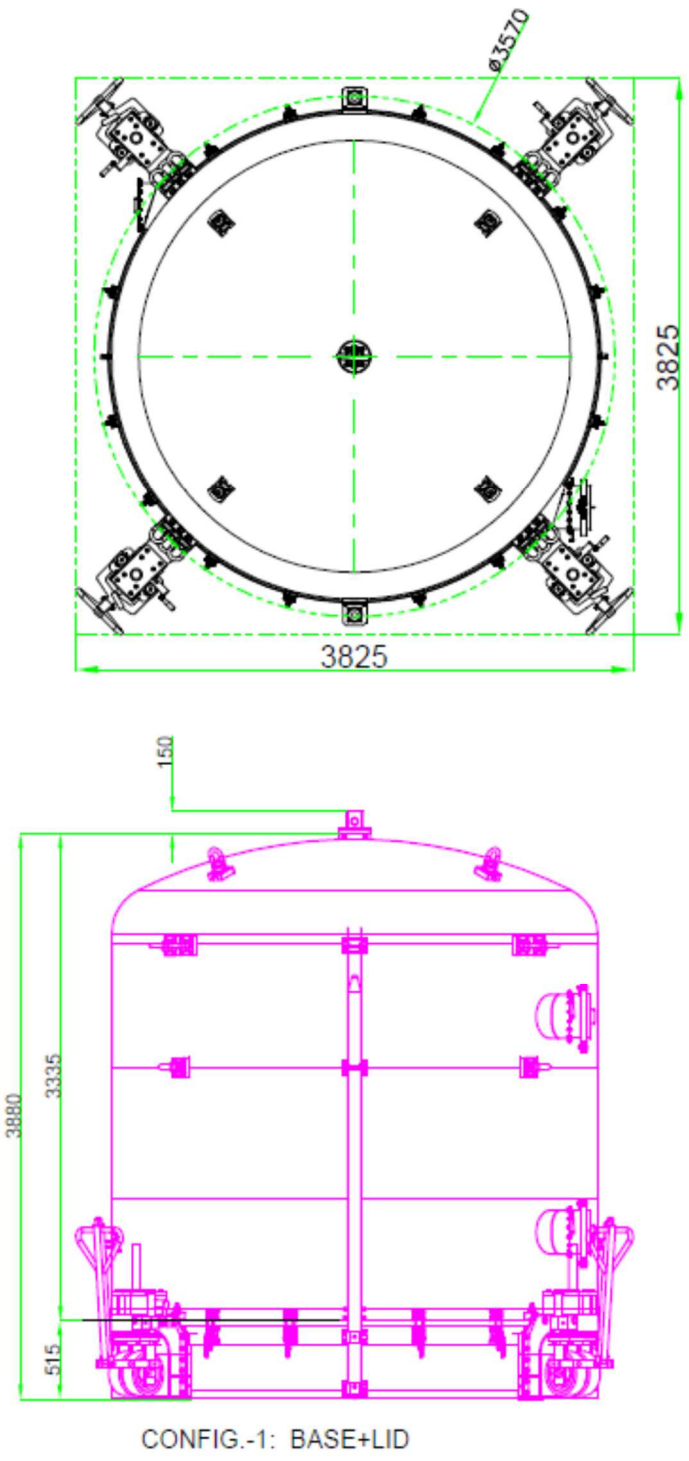
Spacecraft Integration fixture: Type-1



Spacecraft Integration fixture – Type-2

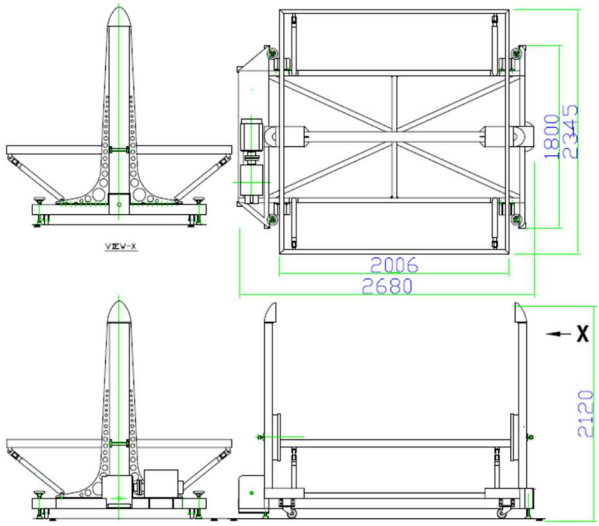


Spacecraft Handling system



Spacecraft Transportation Container

Panel Integration Fixture: The equipment panel integration fixture provides a stable horizontal base for the equipment panels of spacecraft and enables to assemble the electronic sub-systems to these vertically and carry out integration and disassembled mode electrical tests of systems.



Panel Integration Fixture