भारत सरकार अंतरिक्ष विभाग
Government of India Department of Space
यू.आर. राव उपग्रह केन्द्र (यू.आर.एस.सी.)
U R Rao Satellite Centre (URSC)
एच.ए.एल. एयरपोर्ट रोड, विमानपुरा पोस्ट,
HAL Airport Road, Vimanapura Post,
बेंगलूरु Bengaluru - 560 017
भारत India

URSC/EoI/B/02/2026-27 **13-07-2026**

भारत के राष्ट्रपति की ओर से व. प्रधान, क्रय एवं भंडार, यू.आर. राव उपग्रह केन्द्र (यू.आर.एस.सी.) निम्नलिखित के लिए ईओआई आमंत्रित करते हैं । On behalf of the President of India, Sr. Head, Purchase & Stores, U R Rao Satellite Centre [URSC] invites EOI for the following.

सौर व्यूह पंख के आदि से अंत तक उत्पादन,परीक्षण तथा संयोजन।
END -to- END Realisation, Testing and Assembly of solar array wings.

ई ओ आई का मूल्यांकन बोलीकर्ताओं के अनुभव, कार्यक्षेत्र की जानकारी, सुविधा अवसंरचना, प्रस्तावित कार्यप्रणाली और कार्य योजना, कुशल जनशक्ति और उद्योग की वित्तीय ताकत के आधार पर किया जाएगा।
The EOI will be evaluated on the basis of bidder's experience, understanding of scope of work, facility infrastructure, proposed methodology and work plan, skilled manpower and the financial strength of the industry.

यूआरएससी आवश्यकता पड़ने पर ईओआई की प्रक्रिया को रद्द करने/पुनः जारी करने या और जानकारी/विवरण मांगने का अधिकार सुरक्षित 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 कोई कंपनी/फर्म किसी भ्रष्ट या धोखाधड़ीपूर्ण व्यवहार में लिप्त पाई जाती है, तो उसे निविदा प्रक्रिया में भाग लेने से रोक दिया जाएगा और उसके ईओआई दस्तावेज़ 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.

ईओआई प्रतिक्रिया को पूरा करना/Completion of the EOI Response:

a. कंपनी/फर्म को ईओआई दस्तावेजों के सभी अनुदेशों, निबंधन और शर्तों, प्रपत्रों, आवश्यकताओं और अन्य सूचनाओं का सावधानीपूर्वक अध्ययन करने की सलाह दी जाती है। ईओआई प्रस्तुत करना ईओआई दस्तावेजों के सावधानीपूर्वक अध्ययन और जांच के बाद किया गया माना जाएगा, जिसमें इसके निहितार्थों की पूरी समझ हो।
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 का जवाब सभी मामलों में पूर्ण और संपूर्ण होना चाहिए। ई ओ आई दस्तावेज द्वारा आवश्यक सभी जानकारी प्रस्तुत करने में विफलता या ईओआई दस्तावेजों के हर पहलू के प्रति पर्याप्त रूप से उत्तरदायी न होने वाला प्रस्ताव प्रस्तुत करना कंपनी/फर्म के जोखिम पर होगा और इसके परिणामस्वरूप दस्तावेज को अस्वीकार किया जा सकता 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 aspect will be at the risk of the Company/Firms and may result in rejection of the document.

c. प्रस्तुत किए गए ईओआई के सभी पृष्ठों पर क्रमांक होना चाहिए और अधिकृत हस्ताक्षरकर्ता द्वारा हस्ताक्षरित होना चाहिए।

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 वर्जित है और एजेंसी द्वारा प्रस्तुत किए गए ऐसे प्रचार किए गए ईओआई को अस्वीकार किया जा सकता है।

Canvassing in connection with the EOI be strictly prohibited and such canvassed EOI submitted by the Agency are liable to be rejected.

क्रियाकलापों को अच्छी तरह समझने और यदि कोई संदेह हो तो उसका निवारण करने हेतु यू आर राव उपग्रह केन्द्र द्वारा एक **पूर्व ई ओ आई बैठक** का आयोजन किया जाएगा। तदुपरांत, आर एफ पी में मांगे गए विवरण के साथ विक्रेताओं को इच्छा की अभिव्यक्ति की प्रतिक्रिया प्रस्तुत करना होगा।

A **Pre-EoI meeting** will be arranged by U.R. Rao Satellite Centre, Bengaluru in order to have a better understanding of the activities involved, clarify doubts, if any. Subsequently, the vendor(s) shall submit the response to Expression of Interest along with the details sought in RFP

सुरक्षा अनुमति की व्यवस्था करने हेतु इच्छुक विक्रेताओं को निर्दिष्ट प्राधिकार को सारणी -1 में विनिर्दिष्टानुसार नियत दिनांक से पहले पूर्व ई ओ आई प्रतिनिधियों का विवरण प्रदान करना है। विक्रेता के प्रतिनिधि, को पूर्व ई ओ आई बैठक में उपस्थित होने हेतु एक "प्राधिकार पत्र "लाना होगा। सदस्य प्रतिनिधियों की संख्या एक बोली कर्ता/कंपनी/संगठन से अधिकतम दो (2) होगी।

Interested Vendor[s] may please provide the details of the representative[s] taking part in the Pre-EoI meeting well in advance prior to dates specified in Table-1 to the Focal Point in order to arrange for Security clearance. Vendor[s] representative shall carry an "Authorization Letter" for attending the Pre-EoI meeting. Member Representative shall be limited to maximum of two (2) per bidder/company/organisation

विक्रेता द्वारा पूर्व- ए ई ओ आई पूछताछ पूर्व ई ओ आई बैठक के दिनांक से 05 दिन पहले यू आर एस सी ई मेल आई डी pso_b@ursc.gov.in. पर प्राप्त होना होगा। किसी भी परिस्थिति में ई ओ आई बैठक के दिनांक को पूर्वित करने/स्थगित करने के अनुरोध पर विचार नहीं किया जाएगा।

Pre-EOI Queries from vendor [s] shall reach URSC 5 days prior to date of Pre-EOI meeting to Mail ID: pso_b@ursc.gov.in. Please note that request for "Pre-ponement/postponement of Pre-EoI meeting" will not be entertained under any circumstances.

उपरोक्त सभी जानकारी के साथ इच्छा की अभिव्यक्ति नीचे दिए गए पते पर, उपरोक्त संदर्भ संख्या का उल्लेख करते हुए, नियत तिथि और समय तक पहुंच जानी 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 प्रधान, क्रय एवं भंडार/Sr. Head, Purchase & Stores
यू आर राव उपग्रह केंद्र/U R Rao Satellite Centre,
एचएएल एयर पोर्ट रोड/HAL Airport Road,
विमानपुरा पोस्ट, बेंगलूरु/ Vimanapura Post, Bengaluru 560 017,
कर्नाटक, भारत/Karnataka, India

कृपया ई ओ आई बैठक संख्या का उल्लेख करते हुए अपने स्पष्टीकरण ई-मेल पर भेजें: pso_b@ursc.gov.in पूर्व ई ओ आई बैठक में भाग लेने के लिए अनुरोध **20.07.2026** @16:00 Hrs IST या उससे पहले यहाँ उल्लिखित ई-मेल पर पहुँच जाना चाहिए। तथापि ई ओ आई का जवाब (हार्डकॉपी) केवल ऊपर उल्लिखित डाक पते पर भेजा जाएगा)। ईमेल और फैक्स कोटेशन स्वीकार्य नहीं हैं। नियत तिथि और समय के बाद प्राप्त कोटेशन स्वीकार्य नहीं हैं।
Please address your clarifications quoting the EOI number to E-mail: pso_b@ursc.gov.in. Request for participation in Pre-EoI meeting shall reach on or before **20.07.2026** @16:00 Hrs IST to the Email mentioned herein. However, response to EOI (hardcopy) shall be sent to above mentioned postal address only). E-mail & Fax quotations are not acceptable. Quotation received after due date & time are not acceptable.

तालिका 1Table 1:

ई ओ आई विवरण की प्रस्तुति Submission of EOI Details	
स्पष्टीकरण प्रस्तुत करने की अंतिम तिथि Last date of submission of clarification	**24.07.2026, 16.00 Hrs IST**
पूर्व-ईओआई बैठक (सम्मेलन कक्ष, यू आर एस सी में): Pre-EOI meeting (at Conference Hall, URSC)	**22.07.2026, 10:00 Hrs IST**
ईओआई प्रस्तुत करने की अंतिम तिथि Last date for submission of EOI	**06.08.2026, 17:00 Hrs IST**
ई ओ आई की खोलने की तिथि Opening date of EOI	**07.08.2026, 10:00 Hrs IST**

उपरोक्त सभी जानकारी के साथ इच्छा की अभिव्यक्ति **06.08.2026 @ 17:00 Hrs IST** बजे तक या उससे पहले उपरोक्त संदर्भ संख्या का उल्लेख करते हुए, नीचे अधोहस्ताक्षरी को पहुँच जानी चाहिए। यह प्रस्ताव पूर्व-ईओआई अर्हता के रूप में आरंभ किया गया है। यूआरएससी बिना कोई कारण बताए सभी या किसी भी इच्छा की अभिव्यक्ति को स्वीकार या अस्वीकार करने का अधिकार सुरक्षित रखता है।
"Expression of Interest" with all the above information shall reach the undersigned, Quoting above Reference Number on or before **06.08.2026 @17:00 Hrs IST**. 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.

हस्ता/sd-
वरिष्ठ प्रधान, क्रय एवं भंडार
Sr. Head, Purchase & Stores

Expression of Interest (EoI) for End-to-End Realisation, Testing and Assembly of Solar array wings

JUNE 2026

U R RAO SATELLITE CENTRE

BENGALURU

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Expression of Interest (EoI) for End-to-End Realisation, Testing and Assembly of Solar array wings

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1. INTRODUCTION

1.1. U. R. Rao Satellite Centre (URSC) is one of the leading centers of the Indian Space Research Organisation (ISRO), Department of Space (DOS), Government of India and is responsible for Design, Development, Assembly, Integration & Testing of Satellites for various Communication, Remote sensing, Scientific & Interplanetary missions. URSC is looking forward to scale up industry participation in satellite building activities and is planning to involve industries to take up End to End Realization of Solar Array activities.

1.2. The proposed end-to-end realization of solar array wing involves design, analysis, material procurement, manufacturing, assembly, testing, qualification and supply to URSC/ISITE/ URSC identified agency, assembly of solar panels on to spacecraft and further spacecraft level test activities. Supplied solar panels/solar arrays shall meet the specifications and requirements as specified by URSC.

1.3. ISRO/URSC is open to transfer the technology of solar panel realization to the qualified industries, if required.

1.4. The technical proposal for this EoI will be evaluated on the basis of vendor's experience, their understanding of scope of work, facility/infrastructure, skilled human resources and the financial strength of the industry.

1.5. URSC is looking for potential vendors/consortium of industries who can carry-out the end-to-end realization of solar arrays are only requested to participate in the EoI.

1.6. The EoI proposals from vendor / consortium of industries will be critically evaluated based on the compliance matrix as given in this document.

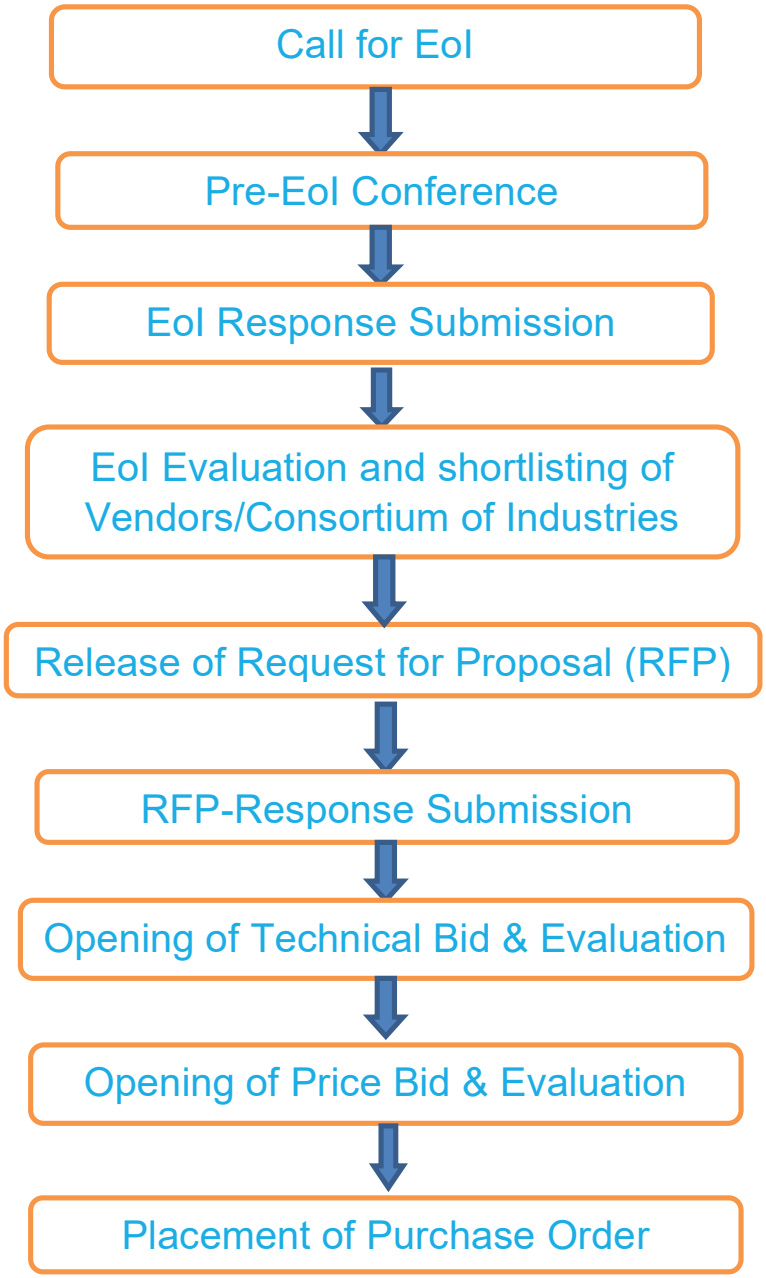
2. OBJECTIVE

2.1 The main objective of this EoI is to invite vendors/consortium of industries to carry out the design, realization, testing and assembly of solar array wings of approximately 300-400sq.m of different types and sizes. End-to-End realization involves design, analysis, material procurement, fabrication, assembly, testing, qualification, delivery to URSC/ISITE/URSC identified agency, assembly of solar panels on to spacecraft and further spacecraft level test activities. Delivered solar arrays shall meet the specifications and requirements as specified by URSC.

2.2 End-to-end realization is categorized as follows.

MODE-1 **(Build to Specification)**	End-to end realization of solar array wings **including design**
MODE-2 **(Build to Print)**	End-to end realization of solar array wings **excluding design**

3. PROCEDURE FOR FINALIZING CONTRACT



Note:

1. **Consortium shall be headed by single agency who will be focal point to URSC**
2. **Authorized team members from URSC/ISRO will visit vendor's facilities to ascertain the availability of facilities.**

4. SCOPE OF WORK

S.No.	Scope of work
1.	Design of yokes, solar panel substrates, harness and deployment mechanisms as per Mode-1.
2.	Realization (Sandwich machining, Post bonding, Non-Destructive Testing (NDT), Dimensional inspection and load test) of yoke and solar panel substrates, deployable mechanisms and harness as per Mode-1/Mode-2.
3.	Identification and establishment of required facilities. • Clean room with 1,00,000 class • Autoclave • Cold storage facility • Laminar flow table for class 100 • Zero-g test system • Thermo-vac testing facility • Vibration Shaker • Acoustic test facility
4.	Procurement of raw materials and standard parts, harness, connectors, equipment/machines/ tools/ instruments/Jigs/fixtures/consumables etc. However, space grade solar cell assemblies shall be supplied by URSC as Free Issue of Material(FIM).
5.	Solar Cell to Solar Cell welding, Bonding and Wiring on panels. Realisation of inter panel harness. Conduct of Electrical performance checks of solar panels.
6	Environmental testing such as vibration, acoustic, thermovac of solar panel substrates/panels/assembled wing.
7.	Realization, assembly and testing of deployment mechanisms.
8.	Thermal implementation, surface treatments and temperature sensors.
9.	Integration of deployment mechanism to solar panel and yoke. Realization of associated harness and integration of harness to the array. Conduct of deployment test at simulator level.
10.	Integration of solar array onto the spacecraft.
11	Spacecraft level tests like pre and post dynamic deployment test and associated mechanical & electrical performance tests and verifications

5. TRANSFER OF TECHNOLOGY

ISRO has launched many satellites for various applications viz., Communication, Remote sensing, Scientific & Interplanetary missions. URSC is responsible for realization of satellites. As part of satellite realization, all solar array wings are developed and fabricated by URSC and has enough space heritage. The on orbit performance of solar arrays found to be nominal and as expected. The flight solar panel realization is a vital, critical and crucial process activity and susceptible to environmental conditions. In this regard, URSC / ISRO is open to transfer the technology which involves process related activities like solar cell bonding, solar cell welding and test and evaluation, etc., The technology will be transferred to only qualified vendor as per URSC procedures, terms & conditions. However, URSC reserves the right to transfer the technology to qualified vendors.

6. QUANTUM OF WORK

It is envisaged that requirement of nearly 300-400sq-m solar panels for about 5 years' period to meet the demand. The solar panels of various sizes to be realized using multijunction solar cells from various vendors. Similarly, different type of mechanisms is to be realized for various satellites.

7. RESOURCES

In order to carry out the above scope of work, the vendor is expected to have qualified, experienced and trained human resources. The vendor shall have adequate engineering, supervisory and artisan level for design, fabrication and testing of yoke, solar panel substrates, solar panels, harness, mechanisms, assembly and integration activities.

8. RESPONSIBILITY MATRIX

S.No.	Activities	Vendor/Consortium of Industries	URSC
1.	Design of solar panel substrates, solar panels, yoke, deployment mechanism elements, harness and associated components	Prime responsibility - It is not applicable to MODE-2-	Review and approval
2.	Procurement of raw materials and standard parts, harness, connectors, equipment/ machines/ tools/ instruments/ Jigs/fixtures/consumables etc.	Prime responsibility	Review and approval
3.	Supply of space grade solar cell assemblies	----------	Prime responsibility
4.	Solar panel substrate realization	Prime responsibility	Review and approval
5.	Solar panel bare substrate level thermal cycling	Prime responsibility	Review and approval

S.No.	Activities	Vendor/Consortium of Industries	URSC
6.	Solar cells visual inspection, electrical evaluation, Solar cell module welding, Solar panel circuit bonding and wiring, wiring activities, Visual inspection, Electrical evaluation thermal implementation activities, Interpanel harness fabrication and testing activities.	Prime responsibility	Review and approval
7.	Loading / Unloading of solar panels into thermo-vac chamber for Thermo-vac Cycles as per temp. profiles. Pre and post thermo-vac visual evaluation, Electrical evaluation, repair cell activities.	Prime responsibility	Review and approval
8.	Thermal implementation activities on solar panels, Interpanel harness fabrication and testing activities.	Prime responsibility	Review and approval
9.	Yoke fabrication, testing.	Prime responsibility	Review and approval
10.	Mechanism hardware fabrication, secondary treatment, testing, assembly.	Prime responsibility	Conducting of Mandatory Inspection Points (MIPs) and clearance approval
11.	Simulator level solar array deployment test at vendor premises.	Prime responsibility	Review and approval
12.	Integration of solar array wings on spacecraft.	Prime responsibility	Review and approval
13.	Harness assembly.	Prime responsibility	Review and approval
14.	Pre-dynamic solar array deployment test at ISITE/URSC.	Prime responsibility	Review and approval
15.	Stowing of solar array for dynamic test.	Prime responsibility	Review and approval
16.	Post dynamic solar array deployment test at ISITE/URSC	Prime responsibility	Review and approval
17.	Final stowing of solar array wing	Prime responsibility	Review by URSC

9. TECHNICAL EVALUATION MATRIX

The technical evaluation matrix is prepared considering the expertise available with respect, Design, Fabrication and testing of Flight solar panel substrates, Flight solar panels, realization of deployments mechanisms & assembly, harness fabrication activities and availability of infrastructure and environmental test facilities. As per the scope of the EoI, industries are expected to carry out the end-to-end realization of solar array wings for mode-1 and mode-2.

S. No.	Criteria	Marks	Response form vendor
1.	**Experience in design, realization, assembly of solar array wings and space flight heritage**	40	Form A, B, C • Proof of end to end including design (Proof like working of skilled design engineers, design and analysis software like CAD/CAE etc. • Purchase order with a certification for successful completion and supply of space qualified solar panels. • Specify the space programme in which it has flown.
	a) Design and analysis experience (5 marks)		
	b) Fabrication of solar panel substrates(bare substrate without solar cells), test and evaluation (5 marks)		
	c) Fabrication of solar panel (including solar cells), test and evaluation (10 marks)		
	d) Experience of wing level assembly and deployment mechanism (5 marks)		
	e) Purchase order and hardware delivered (5 marks)		
	f) Space flight heritage (10 marks)		
	Remarks: **Minimum qualifying marks of 25 out of 40.**		

<table>
<tr><th>S. No.</th><th>Criteria</th><th>Marks</th><th>Response form vendor</th></tr>
<tr><td rowspan="3">2.</td><td>Facility Infrastructure</td><td rowspan="3">30</td><td rowspan="3">Form D
• 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, if reqd.</td></tr>
<tr><td>a) Clean room of class 1,00,000 or better (minimum area 200sq-m with height of 4m or better) with Environment control with RH 55±5% and temperature 22±2deg C. (20 marks).</td></tr>
<tr><td>b) Availability of autoclave facility for composites for curing activities. (10 marks)
<u>Remarks</u>:
Minimum qualifying marks : 20 out of 30.</td></tr>
<tr><td>3.</td><td>Technical Manpower:
The following technical man power with at least 1year experience with technical background as on date of submission of EOI.
<table>
<tr><th>S.No.</th><th>Discipline</th><th>Experience</th><th>Marking scheme</th></tr>
<tr><td rowspan="3">1.</td><td rowspan="3">ITI</td><td>Between 1 to 2 years</td><td>2 marks</td></tr>
<tr><td>Between 2 to 3 years</td><td>3 marks</td></tr>
<tr><td>More than 3 years</td><td>4 marks</td></tr>
<tr><td rowspan="3">2.</td><td rowspan="3">Diploma</td><td>Between 1 to 2 years</td><td>3 marks</td></tr>
<tr><td>Between 2 to 3 years</td><td>4 marks</td></tr>
<tr><td>More than 3 years</td><td>6 marks</td></tr>
<tr><td rowspan="3">3.</td><td rowspan="3">BE/ B.Tech</td><td>Between 1 to 2 years</td><td>5 marks</td></tr>
<tr><td>Less than 2 years</td><td>7 marks</td></tr>
<tr><td>More than 3 years</td><td>10 marks</td></tr>
</table>
<u>Remarks</u>: Minimum qualifying marks - 10 out of 20.</td><td>20</td><td>Form E, F and G

Proportionate marks shall be awarded</td></tr>
<tr><td>4.</td><td>Financial Strength of the industry:
Revenue from operations – minimum Rs.10Crores per year.
<u>Note</u>: Average revenue of past 3 years shall be considered for evaluation
<u>Remarks</u>: It is mandatory and qualifying marks - 10</td><td>10</td><td>Form H, I and J

Proportionate marks shall be awarded</td></tr>
<tr><td></td><td>TOTAL MARKS</td><td>100</td><td></td></tr>
</table>

- **To qualify in the EOI, vendor has to pass minimum qualifying marks as indicated in the above four sections.**
- **Also, vendor has to score minimum overall qualifying marks of 65.**

<u>NOTE</u>: Vendor should provide complete details and compliance to the technical specifications & requirements as per the EOI. Mere 'YES' as compliance is not acceptable for technical specifications. Incomplete details shall be considered as non-compliance and is liable for rejection.

10. ELIGIBILITY AND EVALUATION CRITERIA

The vendor selection criteria to ensure only vendor/consortium of industries with the capability to design and realize solar panel substrate, yoke, mechanisms, harness fabrication, solar cell welding, bonding, testing, electrical evaluation checks, assembly and testing at simulator level and spacecraft level activities.

A detailed list of the vendor qualification criterion is provided in Technical Evaluation matrix. The interested vendor/consortium of industries shall produce necessary documentary evidence to prove their capability to design/execute the above hardware at the time of EoI submission. These responses will be evaluated and eligible vendors selected by URSC based on the details provided.

- **It may be noted that, EoI responded vendor /consortium of industries only are eligible to participate in RFP.**
- **Vendor shall submit following compliance matrix with supported documentary evidence as asked without fail.**
- **In case of EoI with consortium, shall clearly identify the lead of consortium and further correspondence will be entertained only with the lead vendor.**

Eligibility Criteria:

a) The EoI responded vendor /consortium of industries should be a company registered under Indian Companies Act 1956 or a firm registered under Limited Liability Partnership (registered under LLP Act, 2008). The vendor /consortium of industries should have been in existence for a minimum period of Three (3) years in India.

b) The EoI responded vendor /consortium of industries 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.

Evaluation Process:

a) URSC will constitute a Technical Evaluation Committee (TEC) to evaluate the responses received against EoI.

b) The TEC shall also evaluate all supporting documents & documentary evidence. If EoI responded vendor /consortium of industries does not 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 according to the eligibility criteria, technical evaluation forms and the supporting documents specified in this document.

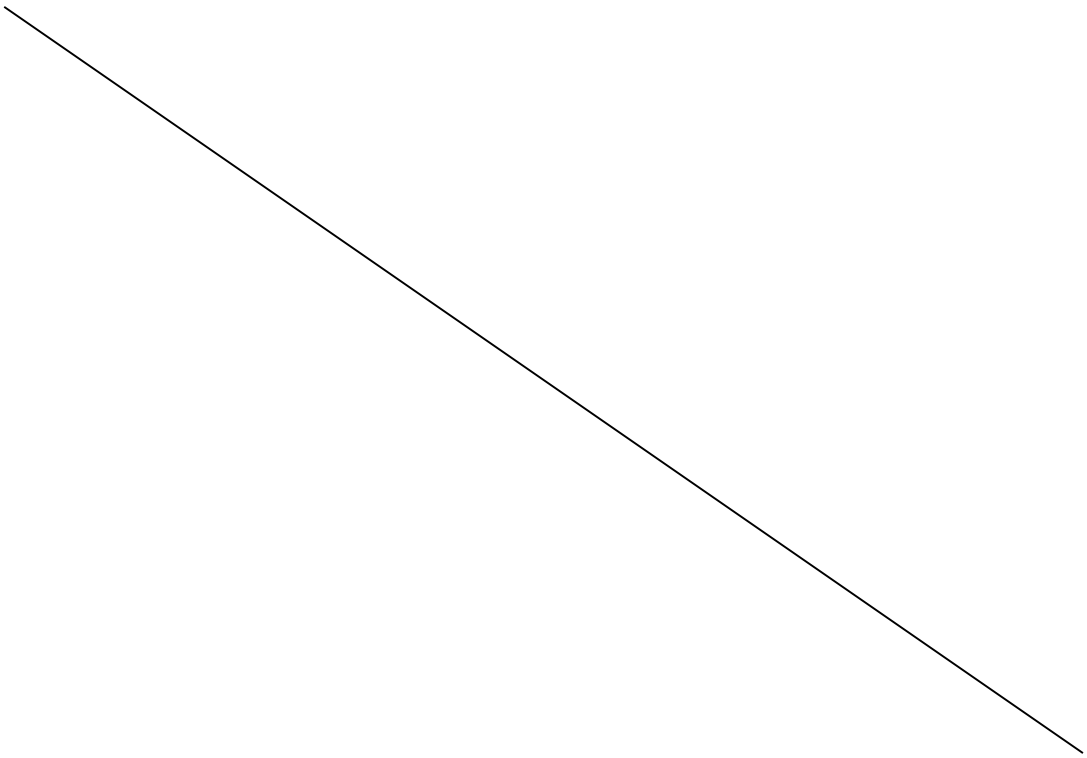
d) The decision of the TEC in the evaluation shall be FINAL. NO correspondence will be entertained outside the evaluation process of the Committee.

e) As part of evaluation of EoI proposals, Authorized team from URSC/ISRO will visit the vendor facilities to confirm the availability of facilities with a prior notice. The evaluation of vendors will be based on response forms and verification of the same during the industry visit.

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

g) The Technical proposal will be evaluated on the basis of vendor'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 EoI responded vendor / consortium of industries whose minimum technical score is required to pass is 65 out of 100 as per technical evaluation matrix. Those responses are only declared as qualified for further evaluation. Responses securing less than 65 marks shall be rejected.**

h) A Request for Proposal (RFP) will be issued to the short- listed (technically qualified) **EoI responded vendor /consortium of industries** from this EoI and asked to submit their detailed technical proposal and price (Two-part bid).



11. RESPONSE FORMS

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 URSC/ISRO 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 onwards in Solar panels realization, composites structures, harness fabrication, solar array wing level assembly to provide the details in the specified format for each work order.

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 in the above table format.

Purchase order -1 (use above table format)

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)

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

S. 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)

Form D: Infrastructure Capabilities

List of major infrastructures presently available to carry out solar panel realization activities

S.No.	Name of Infrastructure/ Facility	Year of Commissioning	Brief Specifications	Utilization Status (Operational status)
1	Clean room of class 1,00,000 or better (minimum area 200sq-m with height of 4m or better) Environment control with RH 55±5% and temperature 22±2deg C.			
2	Availability of autoclave facility for composite parts curing.			

Form E: Technical manpower details

S.No	Streams/discipline	Engineering	Diploma	ITI
1.	Mechanical			
2.	Electronics and Communications			
3.	Others			
	Total			

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

Form G: Whether the Industry has the similar experience of providing technical/skilled manpower support to any Government/Public sector Industry (Aerospace Sector). If yes provide the following details.

S.No.	Name of the organization supported	Scope of work	No. of people deployed	Remark

Form H - Financial Details

Financial information of Industry /Lead Industry in case of consortium

Heads	FY 2023-24	FY 2024-25	FY 2025-26
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 I - Provide the Shareholding Pattern of the Industry of the given format

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

Form J: Mandatory supporting documents

Auditor certified statements for the last three years, FY 2023-24, FY 2024-25 and FY 2025-26 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 2025-26 (in case auditor certified statement for 2025-26 is not available).

Certification by the company auditors supporting the revenue beak up.

Form K – 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**
Name & address				
Brief description of major work executed for URSC/ISRO Centres or any other space industry (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 L: Acceptance of Compliance Matrix – to be filled by industry

Compliance Matrix			
Refer Chapter No.	**Description**	**Compliance (yes/no)**	**Remarks**
1	Acceptance of understanding solar array wings introduction		
2	Acceptance to EoI objectives		
3	Acceptance to Procedure for finalizing contract		
4	Acceptance of understanding of Scope of work		
5	Acceptance of Quantum of work and Tenure		
6	Acceptance to Resources allocation		
7	Acceptance to Responsibility matrix		
8	Acceptance to Technical evaluation matrix		
9	Acceptance to Eligibility and evaluation criteria		
10	EoI Response Forms duly filled		
Organisation shall sign a Non-Disclosure Agreement (NDA) with URSC, if order is awarded			

TECHNICAL ANNEXURE

INTRODUCTION TO SOLAR ARRAY WING

This section gives a brief introduction regarding the end-to-end realization of functional aspects of solar array wings for understanding purpose only. A typical (indicative for understanding) Solar Array wing consists of three panels each of size 1.9m x 2.8mx20mm thick interconnected by inter panel hinges and connected to the Satellite through a Yoke and a Solar Array Drive Assembly (SADA). The three-panel array in the deployed configuration is as shown in Fig-1

1) Solar panel substrates
2) Solar panels
3) Yoke
4) Deployment mechanisms

The Solar Array Drive Assembly (SADA), the yoke and the three panels are inter connected by four pairs of hinges which allow them to be stacked for launch configuration and deploy and lock on their release.

1. SOLAR PANEL SUBSTRATES

It is a CFRP based aluminium honey comb sandwich structure. It is a light weight structure.

2. SOLAR PANELS

The solar panels convert solar energy into electrical energy by photovoltaic conversion. When the spacecraft is in the sunlight, the solar cells convert sunlight to electrical power to operate the spacecraft electrical loads and charge the battery. The solar panels are the primary source of power generation to support the load requirement of satellite. Wherein, the space grade solar cells are connected in series and parallel combination to meet the power generation requirements. The space grade solar cells are welded in module form and bonded to CFRP face skin as per standard and qualified procedure. Subsequently, harness can be formed into strings. It comprises diodes, wires and other associated elements.

3. YOKE

Yoke is the connecting link between Solar Array Drive Assembly (SADA) and solar array and also provides support to electrical cable harness coming from the solar panels. It interfaces with SADA hinge on one side and solar panel hinge on the other side.

4. SOLAR ARRAY DEPLOYMENT MECHANISMS

The Solar Array Deployment Mechanisms (SADM) is one of the mission critical systems in the satellite. The payload area available inside the heat shield of the launch vehicle will not be sufficient to keep these appendages in deployed state. These appendages are fragile/ flexible in nature and cannot withstand the launch vibrations if kept deployed during launch. Hence it is essential to stow these appendages on to the satellite body during launch and to deploy them once the satellite is in orbit by a ground command, thus mechanisms are required.

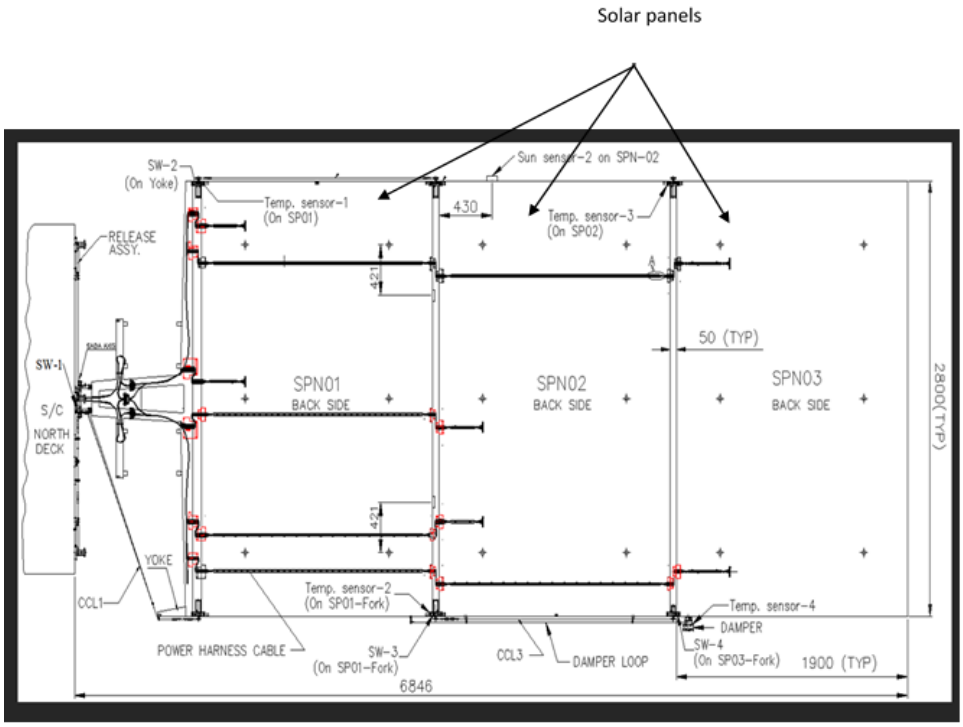


Fig-1: Typical Solar array wing

5. ENVIRONMENTAL TESTING OF SOLAR PANELS

Like any other subsystems of satellites, solar panels will undergo rigorous environmental testing process before it is declared for use on particular spacecraft mission. The following environmental tests are normally carried out on solar panels and its associated elements during its various stages of realization.

5.1 Thermal shock test
5.2 Thermal vacuum baking/cycling test
5.3 Vibration test
5.4 Acoustic test etc.,

Model philosophy description

These tests are conducted as part of acceptance or qualification criteria.

a) Mode-1 (including design)

In order to qualify the development of solar arrays, it needs full qualification. As part of it, the first hardware shall undergo above mentioned tests.

b) Mode-2 (excluding design)

Hardware shall be realised as per the design provided by URSC. In order to qualify the realisation related to workmanship and process issues, it needs acceptance/qualification tests.

5.1 Thermal shock test:

Thermal shock tests are conducted on coupon level by subjecting them to the required low and high temperatures which are predicted based on the on-orbit conditions.

Fig-2: Pictorial view of Vertical type thermal shock chamber used for solar coupon testing

Fig-3: Pictorial view of Horizontal type thermal shock chamber used for solar coupon testing

5.2 Thermal vacuum baking/cycling test:

Thermal vacuum baking/cycling test are conducted on substrate level and fully fabricated panel with cell bonding by subjecting them to required vacuum and temperature levels for a thermal cycle. This test has the combined objective of carrying out high temperature vacuum curing and revealing the workmanship related defects under the simulated conditions of vacuum and temperatures.

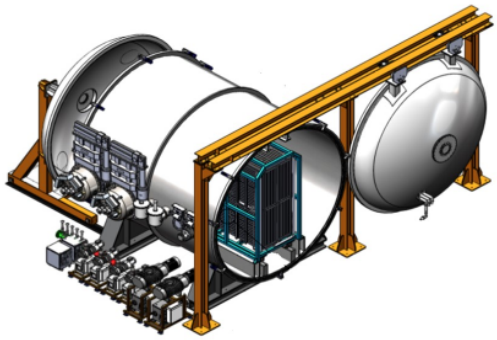


Fig-4: Representation of Thermovac chamber integrated with Box type thermal shroud facility for solar panel testing

5.3 Vibration tests:

As part of qualification process, the solar panels are subjected to vibration tests. The vibration tests are conducted by using electro dynamic shaker. The vibration tests are closed loop tests and vibration control system and data acquisition systems are coupled during tests. Accelerometers are mounted on to the test article for monitoring/controlling the vibration levels. It may be noted here that the vibration test facility is generally a clean room class facility. In order to handle larger dimension solar panel, load bearing platforms (LBP) are used for mounting the solar panels.

Fig-6: Typical electrodynamic shaker

5.4 Acoustic tests:

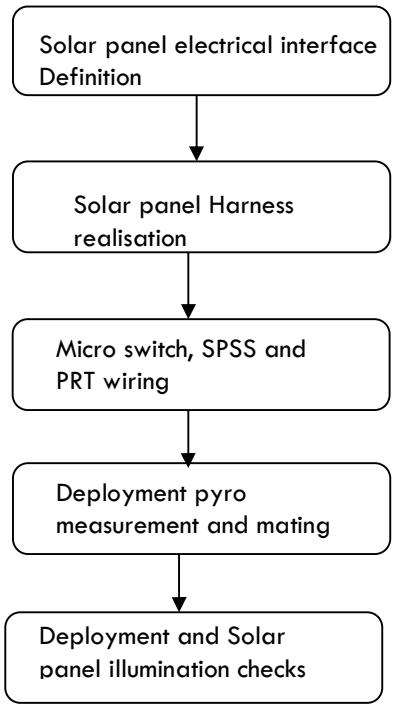
As part of qualification process the solar panels are subjected to acoustic tests. The acoustic tests are conducted in a reverberation acoustic chamber (RAC). Generally gaseous Nitrogen is used as the acoustic medium for generating required sound pressure level. The acoustic tests make use of acoustic control system and data acquisition systems during tests.

Fig-7: Acoustic Reverberation Chamber

6. FABRICATION OF SOLAR PANEL HARNESS AND INTEGRATION WITH SPACECRAFT

Solar panel harness is a unique, flat harness made to accommodate on the solar panel to electrically interface solar array strings to the power system package through SADA mechanism.

Integration of solar panel, deployment and solar panel illumination checks are the important activities in the spacecraft integration and testing process which is carried out in the phased manner. Solar panel also accommodates the SPSS (Solar panel Sun sensors), Micro switches for deployment confirmation, and PRT (Platinum Resistor Temperature) sensors for monitoring the solar panel temperature. These sensors are to be mounted, routed and wired as per the electrical interface definition for the particular project.



6.1 Solar panel harness ESD protection measures:

All solar panel harness is wrapped with non-adhesive kapton tape, over that aluminized kapton tape and provision for grounding of tapes are provided. Grounding is connected through wire to spacecraft body during integration with spacecraft.

6.2 Integration and deployment of solar panel with spacecraft:

After simulator level deployment test of panel and wiring completion, solar panels are ready to be integrated with spacecraft. Deployment and solar panel illumination checks shall be carried out in two phases viz. Pre dynamic test and post dynamic test deployment.

For both the phases, check list and solar panel illumination and deployment test procedure is followed. All the sequence is captured in the procedure and to be strictly followed.