EoI for Fabrication & Supply of Highly polished, figured aspheric mirror substrates with /without light weighting & Opto-mechanical lens assemblies
INVITATION FOR EXPRESSION OF INTEREST [EOI] FOR FABRICATION & SUPPLY OF

1. HIGHLY POLISHED, FIGURED ASPHERIC MIRROR SUBSTRATES WITH /WITHOUT LIGHT WEIGHTING &

2. OPTO-MECHANICAL LENS ASSEMBLIES

LABORATORY FOR ELECTRO-OPTICS SYSTEMS (LEOS)
INDIAN SPACE RESEARCH ORGANISATION (ISRO)
A1-A6 PEENYA INDUSTRIAL ESTATE
BENGALURU – 560 058
February-2018

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**Modus Operandi:**

The Intending Vendor[s] are advised to read the EoI documents, Terms and Conditions and other details carefully relating to the work contemplated in the figured and polished aspheric mirror of size >300mm realization & associated activities/opto-mechanical lens assemblies and fully acquaint themselves as to all conditions and matters which may in anyway affect the work or cost thereof. The intending Vendor[s] shall mean Single Vendor or consortium of vendors. The Vendor[s] shall be deemed to have known the nature, scope and magnitude of the work. Vendor[s] should express the interest only if he is eligible and is in possession of all documents required as per the EoI. The Vendors are required to study EoI document and express interest after carefully examining all instructions, eligibility criteria, forms, terms, standards and specifications as per the EoI document with full understanding of its implications.

If the Vendor[s] is found ineligible after opening of the EoI, his EoI document shall become invalid *ipso facto*, and costs of the tender document and processing fees, as applicable shall be forfeited. EoIs which are not in compliance with our EoI conditions will be summarily rejected, without assigning any reasons thereof. Failure to furnish all requisite information or and/or documents shall result in repudiation of the EoI. Notwithstanding the foregoing, LEOS- Bengaluru reserves the right to assess the capability of the Vendor[s] to perform the Contract keeping in view the overall interest of LEOS. In the event, the Vendor[s] capability and capacity are found to be unsatisfactory, LEOS reserves the right to reject the EoI document without assigning any reasons thereof.

Any neglect or omission or failure on the part of the Vendor[s] in obtaining necessary information as stated above or in any other matter affecting the Vendor[s] shall not relieve him from any risks or liabilities or the entire responsibility for completion of the activities in accordance with the EoI Documents.

The requirements stated herein are a minimum and LEOS reserves the right to request for any additional information and also reserves the right to reject the EoI document of any Vendor[s], if in the opinion of LEOS, the qualification or data is incomplete or if the Vendor[s] is found not qualified to satisfactorily perform the Contract. The Vendor[s] shall bear all costs and expenses associated with preparation and submission of EoI document including post EoI clarifications, discussions, technical and other presentations and LEOS will in no case be responsible or liable for such costs, regardless of the outcome of the EoI process. The Vendor[s] shall also not be entitled to claim any costs, charges and expenses incidental to or incurred by him through or in connection with the submission of the EoI or its consideration by LEOS even though LEOS may elect to modify or withdraw the Invitation to EoI or not to accept the EoI.
Ref No: LEOS-AOA-ORLQ-FAMS-DOC-18-01-00

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At any time prior to the deadline for submission of EOI, LEOS may for any reason on its own initiative, modify the Eol document by issue of corrigendum. The corrigendum will be notified in writing or by fax or e-mail to the Vendor[s] or uploaded online on the website. LEOS shall bear no responsibility or liability arising out of non-receipt of the same in time or otherwise. Notwithstanding the above, LEOS may at its discretion extend the deadline for submission of Eoi in order to afford reasonable time to Vendor[s] to take into account the corrigendum in preparing the Eol.

All the EoI must be submitted before the time and date fixed for the receipt of Eoi as set forth in the Eoi document. LEOS will not be responsible for non-receipt of Eoi due to any postal delays/loss of Eoi documents in transit and delay due to customs/courier, etc. and it shall be the sole responsibility of the Vendor[s] to ensure delivery of the Eoi within the time fixed. LEOS reserves the right to accept or reject any of the Eoi in full or part without assigning any reason thereof. Eoi received after stipulated time and date will be rejected.

This EOI is issued as a “Pre-Bid Qualification”. Inadequate, incorrect or incomplete information will attract summary rejection. Mere compliance to the EOI terms does not guarantee further consideration for qualification.

Vendor[s] can procure the Eoi Documents from Laboratory for electro-optics systems (LEOS), Peenya Industrial Estate, 1st cross, 1st street, Peenya, Bangalore-58 on all working days between 10.00 Hrs to 16.00 Hrs IST on payment of prescribed Tender Fee by way of Demand Draft/Bank Draft. The Contact Phone No. is (080) 28396470 for the Purchase of Eoi Documents. Eoi documents will also be uploaded on ISRO website i.e. www.isro.gov.in. Interested Vendor[s] may download the Eoi document from website and submit their response to Eoi along with prescribed Tender Fee (in the form of Demand Draft/Bank Draft) as per details mentioned in the Tender Notification.

Tender fee of Rs.590/- shall be payable in the form of Demand Draft [DD] or Bank Draft drawn in favor of Accounts officer, LEOS, Bengaluru. No other mode of payment for tender fee is acceptable. Vendor[s] Name/Firm’s Name and Tender/Eoi Number shall be indicated on the reverse side of the Demand Draft/Bank Draft. The Demand Draft/Bank Draft drawn in favor of LEOS towards Tender Fee shall not be dated prior to the date of publication of Tender Notification. In the event the Demand Draft or Bank Draft has been issued prior to the date of publication of Tender Notification, such offer[s] shall be deemed invalid and will be rejected.

INFORMATION PROPRIETARY TO LEOS
In the event Vendor[s] request for EoI Documents by post, the postal envelope must be marked as “Request for EoI Documents”.

If the EoI opening date happens to be on an unidentified Holiday due to any reason, including Force Majeure, tender(s) shall be opened on the next working day.

Vendor[s] shall submit EoI document only in sealed envelopes, super-scribing the Tender Number and the due date of opening of the Tender. The EoI shall be complete in respect of all technical specifications, instructions, drawings, pamphlets and catalogues, as per the EoI document. Failure to furnish all information as per the requirements of the EoI document and submission of EoI not substantially responsive to the EoI document shall render the EoI/Vendor liable for rejection. Any/all EoI submission by way of fax/e-mail shall not be accepted.

The Vendor should provide along with his EoI document the Name of his Bankers, if required by LEOS, Bengaluru.

*The Suppliers need to get enrolled in the e-tender portal to access tender and submit their offer online during RFP stage. Vendor[s] need to have Digital Signature Certificate as detailed on ISRO e-portal and corporate e-mail ID to register on the above portal.*
1. **EoI Objective:**

Driven with the mandate of realizing payload optics in large quantities per annum and considering the increased requirements, LEOS is planning to outsource the following activities to external vendors:

a) Realization and supply of highly polished and figured Aspherical/Spherical mirror substrates with or without light-weighting (including procurement of raw material).

b) Realization and supply of opto-mechanical lens assemblies (including procurement of optical and mechanical raw materials).

The purpose of this EoI is to invite proposals from the potential vendors to carry out the above mentioned activities.

On successful completion of EoI and RFP stage, depending on the response of vendors and their capability to establish the infrastructure required, single/multiple vendors shall be selected with parallel rate contracts. In case of large volume requirements, workload will be distributed among the selected vendors during the tenure of the contract as per vendor performance and capacity.

The Tenure of the Contract is planned for a period of three years and based on additional requirements, may be extended by two years, subject to satisfactory performance of the vendors and on mutual agreement between LEOS and Vendors.

**Eligible Vendor can provide EOI to both or one of the activities.**

2. **Introduction:**

2.1 LEOS, ISRO has the heritage of end-to-end development of polished and figured aspherical/Spherical mirrors of sizes ranging from 50mm to 1400mm in diameter and has established the required infrastructure for various ISRO missions. The technical expertise involves fabrication, testing and qualification of individual components.

Considering the ongoing and future project requirements, it is envisaged that LEOS would require in the period of next 3 years the following optical components:

1) MIR-Type A: Diameter 50mm to 200mm - Min. 50no.
2) MIR-Type B: Diameter 200mm to 500mm - Min. 50no.
3) MIR-Type C: Diameter 500mm to 1000mm - Min. 25no.
4) MIR-Type D: Diameter 1000mm to 1400mm - Min. 15no.
To meet the schedule of realizing production of the above quantities in 3 years time frame, it is being planned in two phases.

In phase-1, the vendor personnel shall be required to work along with LEOS personnel with the facilities available at LEOS for one set comprising of a small and medium size aspheric mirrors. Complete training is provided during this first set fabrication at LEOS. The expected time period for completion of the phase-1 activity is about 6 months. In parallel, during this period of training, the vendor has to establish the necessary infrastructure at the vendor’s site in order to meet the production requirements. Upon completion of the training and establishment of the required infrastructure, the vendor will be certified by LEOS for mirror fabrication activities.

In phase-2, for realization of required quantities of each type of mirror substrate components, the entire activity of mirror realization shall be carried out by the Vendor at his site independently. LEOS requires that the prospective vendor should establish a full fledged quality control team for on-line monitoring at each stage of fabrication/production.

LEOS looks forward for a competent establishment or industry who shall undertake the overall responsibility for realization and supply of above type of mirror substrate components within the proposed time frame.

2.2 LEOS, ISRO has the heritage of end-to-end development of multi-element opto-mechanical lens assemblies of diameter sizes ranging from 20mm to 200mm, length ranging from 40mm to 250mm and number of optical elements ranging from 2 to 10 elements and has established the required infrastructure for various ISRO missions. The technical expertise involves fabrication, testing and qualification of individual components as well as opto-mechanical lens assemblies.
Considering the ongoing and future project requirements, it is envisaged that LEOS would require in the period of next 3 years the following optical components and assemblies:

1) The number of optical components of size ranging from diameter 20mm to 200mm would be about 1200. The minimum number of opto-mechanical assemblies (two elements to multi element assemblies) expected to be
   
   LENS ASY - Type A: Lens Dia 20mm to 50mm - 100no.
   LENS ASY- Type-B : Lens dia 50mm to 140mm - 50no.
   LENS ASY – Type C- Lens dia 140 mm to 200mm - 5no.

To meet the schedule of realizing production of the above quantities in 3 years time frame, it is being planned in two phases.
In the phase-1, the **vendor personnel** shall be required to work along with **LEOS personnel** with the facilities available at **LEOS** for realizing one opto-mechanical assembly with multi-elements (typically of size 20 to 75mm). Complete training is provided during this first set fabrication at **LEOS**. The expected time period for completion of the phase-1 activity is about 4 months. In parallel, during this period of training, the vendor is expected to establish the necessary infrastructure at the vendor site in order to meet the production requirements. Upon completion of the training and establishment of the required infrastructure, the vendor will be certified by **LEOS** for multi-element opto-mechanical lens assembly fabrication activities.

In phase-2, for realization of required quantities of each type of opto-mechanical assembly, the entire activity shall be carried out by the Vendor at his site independently. **LEOS** requires that the prospective vendor should establish a full fledged quality control team for on-line monitoring at each stage of fabrication/production.

**LEOS looks forward for a competent establishment or industry who shall undertake the overall responsibility for realization and supply of above type of multi-element opto-mechanical assemblies within the proposed time frame.**

**3.0 SCOPE OF WORK:**

**3.1 Aspheric mirror substrate realization:**

There are different types of highly polished, figured and light-weighted aspheric mirror substrates envisaged for vendor outsourcing and categorized as **TYPE A, B, C, D** along with the necessary accessories for testing and realization.

1) **MIR-Type A:** Diameter 50mm to 200mm - Min. 50no.
2) **MIR-Type B:** Diameter 200mm to 500mm - Min. 50no.
3) **MIR-Type C:** Diameter 500mm to 1000mm - Min. 25no.
4) **MIR-Type D:** Diameter 1000mm to 1400mm - Min. 15no.

The mirrors are spherical/aspherical in nature and the typical aspherical profiles are parabola, hyperbola or elliptical in nature with or without higher order coefficients. Depending on the type of aspherical curvature, null lenses/Hindle sphere are designed, fabricated and assembled for testing the aspherics. **LEOS** will provide the necessary null lens design along with the design of mechanical housing and cells. Typically for concave aspherical surfaces, null lenses are being used. It can be a two element or three element null lens system. In case, if it is a convex aspherical surface, Hindle sphere (spherical mirror with the center core) is to be fabricated.
3.1.1 The typical flow of activity for mirror realization is as follows:

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Activity</th>
<th>Tools Required</th>
<th>Machine Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Procurement of Raw blank and Blank preparation including curve generation and shaping.</td>
<td>Impregnated diamond cup wheels.</td>
<td>5 axis CNC milling machine</td>
</tr>
<tr>
<td>02</td>
<td>Procurement of Matrix glass (supporting tool made of Pyrex glass as shown in Fig 1) and fixing with mirror blank</td>
<td>Glass matrix, wax, necessary handling gloves etc.</td>
<td>Hot oven of required size</td>
</tr>
<tr>
<td>03</td>
<td>Light-weighting</td>
<td>Impregnated Diamond tools</td>
<td>5 axis CNC milling machine (Fig. 1)</td>
</tr>
<tr>
<td>04</td>
<td>Polariscopy test</td>
<td></td>
<td>Polaris copy set up</td>
</tr>
<tr>
<td>05</td>
<td>Stress-relieving by acid etching</td>
<td>HF and HCL acids</td>
<td>Acid etching tank with disposal scheme</td>
</tr>
<tr>
<td>06</td>
<td>Polariscopy test</td>
<td></td>
<td>Polariscopy set up</td>
</tr>
<tr>
<td>07</td>
<td>Metrology measurement</td>
<td></td>
<td>3D CMM</td>
</tr>
<tr>
<td>08</td>
<td>Back surface grinding, wedge and thickness control</td>
<td>Grinding tools (Full tool/sub size tools)</td>
<td>CNC Aspheric grinding/polishing machine (Fig 2)</td>
</tr>
<tr>
<td>09</td>
<td>Back surface polishing</td>
<td>Polishing tools(Full size/sub size tools)</td>
<td>CNC Aspheric grinding/polishing machine</td>
</tr>
<tr>
<td>10</td>
<td>Front surface spherical grinding and thickness control</td>
<td>Grinding tool (Full tool/sub size tools)</td>
<td>CNC Aspheric grinding/polishing machine</td>
</tr>
<tr>
<td>11</td>
<td>Aspherical grinding</td>
<td>Bar spherometers / 3D CMM</td>
<td>CNC Aspheric grinding/polishing machine</td>
</tr>
<tr>
<td>12</td>
<td>Aspherical polishing</td>
<td>Interferometric test bench/(Fig. 3)</td>
<td>CNC Aspheric grinding/polishing machine</td>
</tr>
<tr>
<td>13</td>
<td>Aspheric figuring</td>
<td>Small size pitch tools</td>
<td>Robotic machine (Fig.4)/MRF polisher/Ion beam polisher.</td>
</tr>
<tr>
<td>14</td>
<td>Matrix fixing</td>
<td>Matrix mirror, wax etc</td>
<td>Handling tools</td>
</tr>
<tr>
<td>15</td>
<td>Centre core trepanning/segmentation and final shaping</td>
<td>Trepanning tools</td>
<td>Five-axes CNC milling machine</td>
</tr>
<tr>
<td>16</td>
<td>Matrix removal</td>
<td>Hand gloves, fixtures etc</td>
<td>Hot oven</td>
</tr>
</tbody>
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| 17 | Final correction | Polishing tools | Robotic machine (Fig. 4) /MRF polisher/Ion beam polisher |

The machine hours for each of the above activity would vary based on the following important factors:
1. Diameter of the mirror
2. R/D ratio (Radius of curvature/ diameter).
3. Percentage of light weighting.
4. The other factors that would be affecting the time and manufacturing

- Test set ups establishment for a particular type of configuration of mirrors including null lens, heavy duty gimbals, test tower, whiffle tree, handling tools calibration invar rods and the necessary consumables.

All the details related to the above will be provided in RFP.

Fig 1. Light weighting  Fig 2. Grinding and Polishing  Fig 3. Interferometric Test

Typical Major Facilities to be available at the vendor’s site / or to be established at the vendor’s site for carrying out spherical/aspheric mirror substrate fabrication activity:
1) 5 axis CNC milling machine/machines suitable for meeting the above requirements
2) Acid etching facility with disposal system
3) Polariscope test set up
4) 3D CMM facility
5) CNC aspheric grinder/polisher for size up to 500mm
EoI for Fabrication & Supply of Highly polished, figured aspheric mirror substrates with /without light weighting & Opto-mechanical lens assemblies

6) CNC aspheric grinder/polisher for size up to 1000mm
7) Computer/NC controlled aspheric grinder/polisher for size up to 1400mm
8) Correction polisher (Robot/MRF) for size up to 800mm
9) Correction polisher (Robot/MRF) for size up to 1400mm
10) AC clean room environment - class 1 lakh

The following activities can be realized by the vendors within their own premises or through their subcontractors within India.

1. Lens manufacturing
2. Mechanical component fabrication
3. Centering the null lenses as well as finishing of cells, barrels and related components
4. Assembly of centered cells in the mechanical housing

3.2 Opto-Mechanical Assemblies Realisation:
There are different types of multi element lens assemblies with or without optical filters and it can be classified as follows with minimum expected quantities:

- LENS ASY -Type A : 20mm to 50mm - 100no.
- LENS ASY -Type B : 50mm to 140mm - 50no.
- LENS ASY -Type C : 140mm to 200mm - 5 no.

The lens material is glass material either crown or flint glass of NH2 TYPE or better quality supplied by M/S SCHOTT or OHARA or HERAEUS.

3.2.1 Opto-mechanical assembly activity consists of following main activities:

I. Fabrication of optical components with coating (including procurement of optical raw Material).
II. Fabrication of mechanical components which includes procurement of raw material.
III. Gluing of mechanical and optical components. (Fig.6)
IV. Barrel assembly (Fig.7) activity including Cell centering of glued cell for optical and Mechanical axis alignment, the dummy barrel assembly of the same with spacers and Locknuts, optimization of the opto-mechanical assembly for performance and final barrel assembly etc.
V. Test and evaluation
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The typical lay-out of the optical assembly is given below.

![Typical optical layout of lens assembly](image)

**Fig 5 : Typical optical layout of lens assembly**

![Cell level assembly](image)

**Fig 6 : Cell level assembly**

![Barrel level assembly](image)

**Fig 7: Barrel level assembly**

### 3.2.2 The typical flow of activity for fabrication of lens assemblies:

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Activity</th>
<th>Machine Required</th>
<th>Tools Required.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Raw blank procurement</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>Lenses Fabrication including ARC coating</td>
<td>Small size Curve generator/grinder/polisher (optics manufacturing machines)/coating plant</td>
<td>Necessary tools and consumables</td>
</tr>
<tr>
<td>3</td>
<td>Mechanical component fabrication</td>
<td>3 blade cells and barrels</td>
<td>suitable tools</td>
</tr>
<tr>
<td>4</td>
<td>Gluing of optical component with mechanical component.</td>
<td>manual</td>
<td>Glue and fixtures</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Activity Number</th>
<th>Description</th>
<th>Equipment</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Cell level Lens assembly centering</td>
<td>Ultra precision cell centering machine (Fig 8)</td>
<td>Necessary tools</td>
</tr>
<tr>
<td>6</td>
<td>Dummy Barrel assembly</td>
<td>manual</td>
<td>------</td>
</tr>
<tr>
<td>7</td>
<td>Optical performance testing and optimization, radiometric testing</td>
<td>MTF bench (Fig. 9), transmission test bench (Fig. 10)</td>
<td>Test fixtures</td>
</tr>
<tr>
<td>8</td>
<td>Final barrel assembly</td>
<td>Assembly bench</td>
<td>Assembly fixtures</td>
</tr>
<tr>
<td>9</td>
<td>Initial bench test MTF Transmission Veiling glare Collinearity</td>
<td>MTF (Fig.9), Transmission (Fig.10), veiling glare (Fig.11), Collinearity (Fig.12) test benches</td>
<td>Test fixtures</td>
</tr>
<tr>
<td>10</td>
<td>Environmental tests including thermo-vacuum, thermal cycling, storage and vibration tests</td>
<td>Thermo-vacuum chambers and vibration shakers, humidity and thermal shock chambers</td>
<td>Mounting fixtures</td>
</tr>
<tr>
<td>11</td>
<td>Final bench test</td>
<td>MTF (Fig.9), Transmission (Fig.10), veiling glare (Fig.11), Collinearity (Fig.12) test benches</td>
<td>Mounting fixtures</td>
</tr>
</tbody>
</table>

The duration for completion of each of the above activity would vary based on the following factors:

1. Geometrical parameter of the lenses, lens assemblies and its tolerances
2. Optical parameters such as collinearity, image format matching and MTF at required Spatial frequency etc.,
3. The other factors would be affecting the time and manufacturing
   - Test set ups establishment for a particular type of configuration of opto-mechanical assembly
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All the details related to the above will be provided in RFP.

Fig 8: ultra precision cell centering Fig 9. MTF test bench.

Fig 10. Transmission bench
Fig 11. Veiling glare
Fig 12: Collinearity test bench

3.2.3 Typical Major Facilities to be available at the vendor’s site / or to be established at the vendor’s site for carrying out opto mechanical assemblies’ realization:

01. Cell centering facility for centering the glued lenses as well as finishing of cells and Barrels etc.
02. Barrel assembly set up for lens assembly
03. Interferometric test bench with accessories
04. 3D CMM equipment for metrology
05. MTF test bench
06. Transmission test bench
07. Veiling glare test bench
08. Collinearity test bench

The following activities can be realized by the vendors within their own premises or through their subcontractors within India.

01. Lenses fabrication
02. Mechanical component fabrication
03. Environmental test (with facilities such as hot and cold chamber, thermo-vac facility and vibration shaker, humidity chamber and thermal shock chamber, etc.)
3.3 Modality or Contract Execution Plan:

3.3.1 Aspheric Mirror Substrate Realisation:
It is proposed to carry out realization of aspheric mirror substrates from Vendor at his premises. The entire contract will be executed in 2 different phases as follows.

Phase-1: Vendor participation and training for the processes like light weighting, spherical grinding, aspherical grinding and polishing at LEOS premises for a period of 6 months typically for ongoing small and medium type of mirror fabrication activity. (On single shift/ extended hour working basis).

Phase-2: Execution of light weighting, spherical grinding, aspherical grinding and polishing at VENDOR premises within the delivery schedule. Vendor will independently carry out mirror realization as per the scope of the work and LEOS standard process & quality guidelines. All the Mirror related activities listed in table shall be inspected by Online QC from Vendor team as per LEOS requirement.
Phase-2 activities for the selected vendor will be awarded in a phased manner depending upon LEOS requirements. LEOS will reserve the rights to decide on the quantity of mirrors to be fabricated among the competent vendors for which the vendors shall not have any objection or any Legal remedy.

4. Resource Allocation & Skill Set Requirements:
Vendor should ensure that they have the requisite man power skilled in optical and mechanical engineering along with skilled technicians in order to be deployed for training during phase -1 and to carry out the execution of actual work during phase-2.

5. Tenure of Contract:
The tenure of contract is for a period of 3 years from the date of placement of contract and it is extendable for further period of two years on mutually agreeable basis.

6. Procedure for finalizing Contract:
Execution of contract for mirror substrate/ opto-mechanical assembly realization:
Vendor can provide EOI either for both the activities (or) for any one of the activity.
The entire exercise of selecting a viable industry partner for fabrication of complex mirror realization and associated activity is carried out in two stages (i.e.) Expression of Interest (EOI) stage and Request for Proposal (RFP) Stage. The following is the flow chart depicting the structure process flow that would be adopted in the vendor selection process.
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Fig 6.1a: Steps for Outsourcing:

1. Call for Expression of Interest
2. Pre-EoI clarification meeting *
3. EoI Submission
4. EoI clarification/ Evaluation & Short listing of Vendors
5. RFP Tender Floating
6. Pre-Bid Meeting for RFP clarification
7. Technical Evaluation
8. Opening of Price Bid
9. Selection of Vendor(s)
10. Placing Purchase Order to the selected

*Pre-EoI clarification meeting is tentatively planned by 26th or 27th March 2018. Confirmation of participation shall be communicated by email to purchase@leos.gov.in

INFORMATION PROPRIETARY TO LEOS
7.0 Terms and Conditions:

7.1 Organisation Portfolio:

7.1.1 Interested Vendor may be a Proprietorship, Registered Partnership Firm, One Person Company (OPC), Indian Company/Domestic Company-Private or Public Company-Listed or Unlisted. Vendor shall accordingly complete the response sheet and submit the EOI.

7.1.2 An Indian Company would be deemed to be owned by Indian Citizen and by an Indian Company if more than 51 percent of equity interest in the company is beneficially owned by Resident Indian Citizens and Indian Companies that are, in turn, ultimately owned and controlled by Resident Indian Citizens.

7.1.3 The applicant must be registered in India as required by law with minimum three years of continuous operation up to the date of publication of this EOI.

7.1.4 Vendor should have manufacturing and/or operations set up in India (with at least three years of infrastructure)

7.1.5 The vendor should also have a valid GST registration. The Vendor should submit Self-attested copy (ies) of the Certificates of Incorporation and other certificates that are legally required for carrying out its business activities.

7.1.6 The certificates should be valid at the time of EOI submission and should be certified by an authorized signatory. A copy of PAN Card should also be submitted.

7.1.7 Industries/Vendors in this EOI means who have realized optical systems, qualified and successfully tested to meet the Design requirements for ISRO Centers/units, DRDO Centers/Units, Aircraft or Defense Projects/systems as well as manufacturer of commercial optical systems.

7.1.8 A copy of the Income Tax Return, Audited Balance Sheet and Profit & Loss Account for the preceding three financial years shall be submitted.

7.1.9 An undertaking stating that the Organization hasn’t been blacklisted by any Central/ State Government Department/ Central Government funded organizations/ State Government funded organizations/World Bank, or other World Bank organizations and is not under any illegal expression by Government of India has to be submitted.

7.1.10 The vendor, should not have, during the last five years, either failed to perform on any agreement, or been expelled from any project or agreement or have any agreement terminated for breach by the applicant.
EoI for Fabrication & Supply of Highly polished, figured aspheric mirror substrates with /without light weighting & Opto-mechanical lens assemblies

7.1.11 Persons who are individually or institutionally, in any manner, involved with the selection/screening process of the EOI and employees of ISRO are ineligible for applying.

7.1.12 An undertaking stating that there has been no outstanding bankruptcy, judgment or pending legal action that could impair operating as a going Concern has to be submitted. In addition, the Vendor must be legally solvent.

7.2 Terms & Conditions: General

7.2.1 This EoI is not an offer and is issued with no commitment. LEOS reserves the right to withdraw the EoI or change or vary any part thereof at any stage. LEOS also reserves the right to disqualify any vendor/proposal, should it be so necessary at any stage without assigning any reasons.

7.2.2 Timing and sequence of events resulting from this EoI shall ultimately be determined by LEOS.

7.2.3 By submitting a proposal, each vendor shall be deemed to have acknowledged that it has carefully read all chapters of this EoI, and has fully informed himself as to all existing terms and conditions.

7.2.4 The proposal and all correspondence and documents shall be written in English.

7.2.5 The vendor shall not subcontract the work encompassing entire activity related to mirror substrates or opto-mechanical assemblies to any other third party.

7.2.6 Vendor shall compulsorily fill up the EoI Response format and compliance matrix (Part- I & Part- II) as given in Section 9 of the EoI

7.2.7 Participation of Vendors for Pre-EoI Meeting: A Pre-EoI Meeting will be arranged at LEOS, Bengaluru in order to have a better understanding of the EoI document with regard to Technical and Commercial aspects, clarify doubts if any, and other allied technical details.

7.3 Non Disclosure Agreement:

7.3.1 The vendor must not use any of the information provided in the EoI in any publications or to any of their customers without explicit permission from LEOS and adhere to strict confidentiality.
7.4 Termination and Short closing of Contract:

7.4.1 Under the normal circumstance, Termination/Short Closing of the Contract are not foreseen. However, LEOS reserves the right to terminate the contract in whole or part by giving 30 Days prior notice in the following circumstances.

7.4.2 Due to repeated non-performance in the execution of Contract

7.4.3 If the contractor fails to deliver/meet the requirements of opto-mechanical assemblies/mirror substrate realization & associated services within the stipulated delivery schedule or any extension thereof, granted by LEOS.

7.4.4 If the contractor fails to honor the whole or any part of the contract including failure to deliver/meet the requirements of MIRROR SUBSTRATE / OPTOMECHANICAL ASSEMBLY realization & associated services within the stipulated time in the contract.

7.4.5 If the contractor is found to have made any false or fraudulent declaration or statement to obtain the contract or he is found to be indulging in unethical or unfair trade practices.

7.4.6 When both the parties agree mutually.

8.0 GST Registration:

**Important Notice to Vendor[s]**

Government of India has implemented Goods and Services Tax [GST w.e.f 01.07.2017. The Vendor[s] should mandatorily posses a valid GSTIN along with the GST Registration Certificate. Please take note of this aspect.
9.0 EOI Response Format

############ Cover Letter

(Company letterhead)
[Date]
To

Purchase & Stores Officer,
Laboratory for Electro-Optics Systems (LEOS)
Indian Space research organization (ISRO)
1st Phase, 1st Cross, Peenya industrial estate,
Bangalore -560058
Karnataka

Dear Sir,

Ref: Expression of Interest for “Highly polished, figured aspheric mirror substrates with/without light weighting & Opto-mechanical lens assemblies”.

Having examined the Expression of Interest (EoI), the receipt of which is hereby duly acknowledged, we, the undersigned, intend to submit a proposal in response to the Expression of Interest (EoI). We attach hereto the response as required by the EOI, which constitutes our proposal. Primary and Secondary contacts for our company are:

<table>
<thead>
<tr>
<th>Primary Contact</th>
<th>Secondary Contact</th>
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<tbody>
<tr>
<td>Name:</td>
<td></td>
</tr>
<tr>
<td>Title:</td>
<td></td>
</tr>
<tr>
<td>Company Name:</td>
<td></td>
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</table>

INFORMATION PROPRIETARY TO LEOS
EoI for Fabrication & Supply of
Highly polished, figured aspheric
mirror substrates with /without
light weighting & Opto-mechanical
lens assemblies

<table>
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<tr>
<th>Primary Contact</th>
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<tr>
<td>Address:</td>
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<td>Phone :</td>
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<tr>
<td>Mobile:</td>
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<td>Fax :</td>
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<td>E-mail :</td>
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We confirm that the information contained in this response or any part thereof, including its exhibits, and other documents and instruments delivered or to be delivered to LEOS is true, accurate, verifiable and complete. This response includes all information necessary to ensure that the statements therein do not in whole or in part mislead LEOS in its short-listing process.

We fully understand and agree to comply that on verification, if any of the information provided here is found to be misleading the short listing process, we are liable to be dismissed from the selection process or termination of the contract during the execution of the contract.

We agree for unconditional acceptance of all the terms and conditions set out in the EoI document.

It is hereby confirmed that I / We are entitled to act on behalf of our company/ corporation/ firm / organization and empowered to sign this document as well as such other documents, which may be required in this connection.

INFORMATION PROPRIETARY TO LEOS
Ref No: LEOS-AOA-ORLD-FAMS-DOC-18-01-00

<table>
<thead>
<tr>
<th>EoI for Fabrication &amp; Supply of Highly polished, figured aspheric mirror substrates with / without light weighting &amp; Opto-mechanical lens assemblies</th>
</tr>
</thead>
</table>

Dated this (Signature) (In the capacity of) (Name) Duly authorized to sign the EoI Response for and on behalf of: (Name and Address of Company) Seal / Stamp of Vendor

Witness Signature: Witness Name: Witness Address:

CERTIFICATE AS TO AUTHORIZED SIGNATORIES
I, ......................................................, the Company Secretary of ......................................................, certify that ...................................................... Who signed the above EoI is authorized to do so and bind the company by authority of its board / governing body.

Date: Signature:
(Company Seal)

Part-I

9.1 General Details of the Vendor

<table>
<thead>
<tr>
<th>Name of the Vendor</th>
<th>Year of Establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core capabilities of the Vendor</td>
<td>Type brief profile of the Vendor in Annexure A (without referring to attachment of any report/s)</td>
</tr>
</tbody>
</table>

(Tick ✓ the appropriate box from the following)

Aerospace sector

Others
| Head office location and address with contact number & email id: |
| Local address in Bangalore if any with contact number & email id: |
| Addresses of manufacturing and/or operational setup in India (Highlight the address where LEOS representative will visit for audit) |
| Corporate website URL: |

State the Quality Policy of the Vendor (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)

Quality Standards / certifications obtained by the Vendor (Tick ✓ the appropriate box (provide certification copy in Annexure-B)

| AS9100Rev C |
| ISO 9001:2008 |
| Others (if others kindly mention) |

9.2 Quality Management:

9.2.1 Experience in commercial / custom built optical systems (supplied to space/ Defense projects):
In case the Vendor is having/had any Purchase order/work order/Contract value greater than or equal to Rs.100 Lakhs (Cumulative) from April 01, 2015 onwards in commercial/custom built optical systems, provide the details in the specified format for each work order.

**Purchase Order-1**

| Name of the Industry |
| Scope of Work |
| PO Date |
| Present Status of the PO |
| Type of System* |
**EoI for Fabrication & Supply of Highly polished, figured aspheric mirror substrates with /without light weighting & Opto- mechanical lens assemblies**

**Application**

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

9.2.4 Are you an offset Partner/subcontractor to any foreign Industry (Prime contractor) of any major sector related contracts from India? If yes provide the details in the given format

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Foreign Industry with Address</th>
<th>Name of the project (specify total contract value)</th>
<th>Responsibility of Prime Contractor</th>
<th>Responsibility of offset partner (your firm) (specify total sub-contract value)</th>
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9.3 Vendor Expert Manpower:
Manpower Strength (on the rolls of vendor/lead vendor in case of consortium) in the following Streams/Discipline as on date of submission of EoI.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Streams/Discipline</th>
<th>Engineers</th>
<th>ITI /DIPLoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>MECHANICAL/OPTICAL or Equivalent</td>
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<td>2.</td>
<td>Others</td>
<td></td>
<td></td>
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<tr>
<td>3.</td>
<td>Total</td>
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</tr>
</tbody>
</table>

9.3.1 Mention the levels of technical hierarchical structure (from entry level to highest cadre) of your organization.
9.4 Infrastructure Capabilities:

9.4.1 List of major infrastructure presently available to build OPTICAL COMPONENTS /ASSEMBLIES

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name of Infrastructure/Facility</th>
<th>Year of commissioning</th>
<th>Brief specifications*</th>
<th>Utilization Factor (%) **</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CNC milling machine for light weighting</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2.</td>
<td>Grinding and polishing machines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>others</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*kindly specify dimension, cleanliness level of working area as applicable. Photographs/Brochure of above listed facilities may be given.

**no of days utilized/year