



INDIAN INSTITUTE OF ASTROPHYSICS
(DEPARTMENT OF SCIENCE AND TECHNOLOGY, GOVERNMENT OF INDIA)
KORAMANGALA, BANGALORE – 560034

REQUEST FOR EXPRESSION OF INTEREST FOR THE
“MANUFACTURING OF COMPONENTS/SUB-ASSEMBLIES/ASSEMBLIES OF
SEGMENT SUPPORT ASSEMBLY FOR INDIA-TMT PROJECT”

INDIA TMT COORDINATION CENTRE (ITCC)
INDIAN INSTITUTE OF ASTROPHYSICS (IIA)
2ND BLOCK, KORAMANGALA – 560 034
BENGALURU, INDIA

1. EXPRESSION OF INTEREST

IIA/ITCC is inviting submission of Expression of Interest (Eol) from suitable vendors based in India for “Manufacturing of Components/Sub-Assemblies of Segment Support Assembly”, for Thirty Meter Telescope project.

The details of the specification and other details can be found attached as Annexure A. If interested and capable bidders need to have a meeting with IIAITCC, Bangalore with respect to the Eol, to understand technical requirements before submission of EOI, a meeting request by mail need to be sent on or before 10 days prior to EOI submission date, with the company detail attached, to :

Mr. K.P. Vishnu Vardhan

The Stores & Purchase Officer, IIA

vishnu.vardhan@iiap.res.in

and a copy to,

Mr. P.K. Mahesh

Engineer E & Acting Head, System Engineering Group, IIA

pkmahesh@iiap.res.in

&

Shri Nikhil Naik,

Project Engineer – II, ITCC, IIA

nikhil.itcc@iiap.res.in

IIA/ITCC shall schedule and have the meetings with the requested bidders on or before 3 days prior to EOI submission end date. After submission of EOI and first level of screening as per the data provided in EOI, IIA/ITCC team may hold meetings and also visit the bidders manufacturing facility to assess the capability of the vendor to carry out developmental as well as production work. Those qualified in Eol alone shall be considered for the further stages of bidding/procurement. The interested and capable bidders shall submit their Eol proposals for Manufacturing of Components/Sub-Assemblies/Assemblies of Segment Support Assembly for India-TMT, on or before **28/01/2019 by 03:30 PM** in the prescribed format and other requirements as per Annexure B, C, and D, and E to IIA/ITCC at the following address:

The Director

Indian Institute of Astrophysics

Koramangala, II Block,

Bengaluru - 560 034, India

In the event of any of the above mentioned dates being declared as a holiday/closed day for IIA/ITCC, the Eols shall be received/opened on the next working day at the appointed time.

The Stores and Purchase Officer, IIA, on behalf of IIA/ITCC reserves the right to postpone the dates mentioned above without citing any reason. Any amendment to the Eol shall be published only in the IIA website: <https://www.iiap.res.in>. It is the responsibility of participating organization to visit the IIA website frequently to know about the latest updates / amendments / corrigendum / addendum / clarification, if any.

Eol in which any of the prescribed condition(s) is not fulfilled or the respondents put any condition, may get rejected.

- IIA/ITCC reserves the right to reject any or all the Eols without citing any reasons.
- IIA/ITCC reserves the right to invite fresh Eols in future to meet the project requirements.
- IIA/ITCC reserves the right to choose multiple vendors to place order for same components/sub-assemblies at differential pricing during the development and/or qualification phases, if necessitated to meet the technical and project requirements.
- No contractor shall have any cause of action or claim against IIA/ITCC for rejection of their Eol.
- IIA/ITCC reserves the right to go for additional qualification of New Contractors to meet the project requirements at any stage.
- The final decision on Developmental, Qualification and Production orders rests with IIA/ITCC and subject to review of the project, requirements and continued funding by the Government of India.

Mr. K.P. Vishnu Vardhan

The Stores & Purchase Officer,
Indian Institute of Astrophysics,
2nd Block, Koramangala,
Bangalore - 560034, India.
Tel: 080 2254 1244
Email: vishnu.vardhan@iiap.res.in

2. SUBMISSION OF PROPOSAL

Proposals are invited from companies in India with proven technical expertise, track record and experience in executing **precision fabrication to be of Space / Aerospace applications standard**. Experience in developing sub-systems for optical-infrared telescopes and/or executing large astronomical projects is desirable. Part and Fixture drawings are as per ASME Y14.5-2009 and are GD&T controlled. To meet the inspection and quality requirements, in-house CMM inspection facility with the manufacturer is a must for this Eol, Manufacturers in possession of in-house CMM inspection facility only are eligible to apply for this Eol. Any Eol submitted by bidder(s) without in-House CMM will be summarily rejected. The companies willing to submit proposals are invited to submit a letter of Expression of Interest as explained below:

2.1 STAGES OF Eol

Stage 1: Submission of a Letter of Expression of Interest (Eol)

The objective of the first stage of this Eol procurement process is to identify and shortlist public and private sector entities in India capable of Manufacturing Components/Sub-Assemblies/Assemblies of Segment Support Assembly and related tooling. In addition to the submission of letter of Expression of Interest, companies must register their details in the registration form given under this link https://tmt.iiap.res.in/TMT_VRF/ with the requisite information which marks the completion of submission.

Based on the manufacturing facility and available technical expertise, IIA/ITCC team will evaluate and shortlist the eligible Eol applicants and the list of parts that can be offered to each eligible Eol applicant for Developmental orders. The list of parts that can be offered shall be decided by IIA/ITCC at its sole discretion. Eol applicants who don't meet the requirements will not be considered for offering Developmental orders.

Stage 2: Fabrication (Manufacturing) and Inspection Development

The shortlisted entities from the first stage, hereinafter referred to as contractors, shall be invited to participate in the second stage i.e. Tendering process through submission of detailed Technical and Price bids, for identified Developmental quantity for fabrication and inspection as per the schedule defined by IIA/ITCC.

On the techno commercial evaluation, IIA/ITCC will place order on successful bidders (multiple contractors may be chosen to place developmental order for same components/sub-assemblies at differential pricing). All the aspects of manufacturing, inspection, technical expertise, communication, quality, schedule, cost overall management and financial stability, etc. of the Contractors will be evaluated and contractors meeting the above evaluation criteria only will be selected for next stage of participation/bidding.

Stage 3: Production Contract (PQP cum Production Program)

The contractor, who are successfully qualify in Stage-2 and also the contractors who have qualified to manufacture through development orders from IIA/ITCC prior to this process of qualification, will be offered to bid for Production Contract which will have PQP (Production Qualification Program) and Production Program with an exit clause after PQP. Successful, capable, and multiple contractors meeting the competitive bidding criteria(s) and schedule shall be selected to produce the identified total production quantity of parts.

3. BACKGROUND INFORMATION

The Thirty Meter Telescope (TMT) International Observatory (TIO) is a joint venture of scientific institutions in Canada, China, India, Japan and the US to build a 30m diameter optical–infra-red telescope. As part of India's contribution to TIO, the India-TMT Coordination Centre (ITCC) intends to develop various sub-systems needed for the telescope within the country which can then be delivered to the observatory.

In pursuance of the above, Indian Institute of Astrophysics (IIA)/ITCC invites proposal for the manufacture of the Primary Mirror (M1) Segment Support Assembly (SSA) components for the 30m telescope.

The primary mirror (“M1”) of the Thirty Meter Telescope (TMT) is comprised of 492 segments. Each segment is actively controlled by three actuators and passively controlled by the Segment Support Assemblies (SSA). The SSA consists of a Polished Mirror Assembly (PMA) Kit and Subcell. The total number of PMA Kits required is 580. The total number of Subcells required is 500 (which includes 8 spares). IIA/ITCC intends to produce sizable quantity of these through part production from different industries.

IIA/ITCC intends to engage with industrial vendors in the execution of the work of SSA Production Qualification Programme (PQP) and subsequent Production phases. IIA/ITCC shall provide drawings and CAD models, making this primarily a build-to-print effort. Multiple vendors may be given the opportunity to manufacture, inspect, assemble and test SSA parts. Details of the SSA are provided in Annexure A.

4. TENTATIVE SCHEDULE

| S.No | Milestone Activity | Stage | Duration |
|------|---|--------|-----------------------|
| 1 | Date of this Announcement | FIRST | T0 |
| 2 | Deadline for receiving Expressions of Interest and website registration | | T0+1 Month |
| 3 | Opening of EoI | | T0+1 Month |
| 4 | Vendor assessment, Short-listing and intimation to Companies | | T0+3 Months (i.e. T1) |
| 5 | Release of RFP(s) to the Shortlisted Companies | SECOND | T1+1 Month |
| 6 | Deadline for receiving price Bids | | T1+2.5 Months |
| 7 | Opening of Bids | | T1+2.5 Months |
| 8 | Award of the PO | | T1+4 Months |
| 9 | Fabrication, inspection and vendor performance evaluation | | T1+7 months |
| 10 | Intimation of qualification to participate for PQP | | T1+7.5 months |
| 11 | Release of RFP for PQP cum Production to qualified vendor(s) | THIRD | TBD |
| 12 | PQP bids | | TBD |
| 13 | Award of PQP Contract | | TBD |
| 14 | Delivery | | TBD |
| 15 | Initial Qualification for Production | | TBD |
| 16 | Production Contract | | TBD |

Note: The schedule may be revised by IIA/ITCC by notification on its website when applicable.

5. CONTACTS:

5.1 TECHNICAL CLARIFICATIONS:

Shri P.K.Mahesh,

Engineer E & Acting Head, System Engineering Group
Indian Institute of Astrophysics,
Koramangala, Bengaluru 560034,
(pkmahesh@iiap.res.in)

Shri Nikhil Naik,

Project Engineer – II
India TMT Coordination Centre,
Indian Institute of Astrophysics,
Koramangala, Bengaluru 560034,
(nikhil.itcc@iiap.res.in)

5.2 ADMINISTRATIVE CLARIFICATIONS:

Shri K.P.Vishnu Vardhan,

Stores and Purchase Officer
Indian Institute of Astrophysics,
Koramangala, Bengaluru 560034,
(vishnu.vardhan@iiap.res.in)

Shri C.H.Basavaraju,

Consultant (Administration)
India TMT Co-Ordination Centre,
Indian Institute of Astrophysics,
Koramangala, Bengaluru 560034
(basavaraju@iiap.res.in)

6. SEGMENT SUPPORT ASSEMBLY (SSA)

The 492 mirror segments of the TMT primary mirror are required to function as a single mirror with the required specifications at any given time. Therefore, each mirror segment will interface with the mirror cell (primary truss) through the Segment Support Assembly (SSA). This SSA will support each mirror segment in the axial (piston, tip, and tilt) and lateral (two in-plane directions and clocking) degrees of freedom in such a way that the segments position is maintained within the required accuracy. They also help to maintain vibration mode frequencies above specified levels, thereby minimizing gravity-induced distortions and distortions from other external sources such as wind as well as elevation angle changes.

FIG. 1 Primary Mirror Assembly

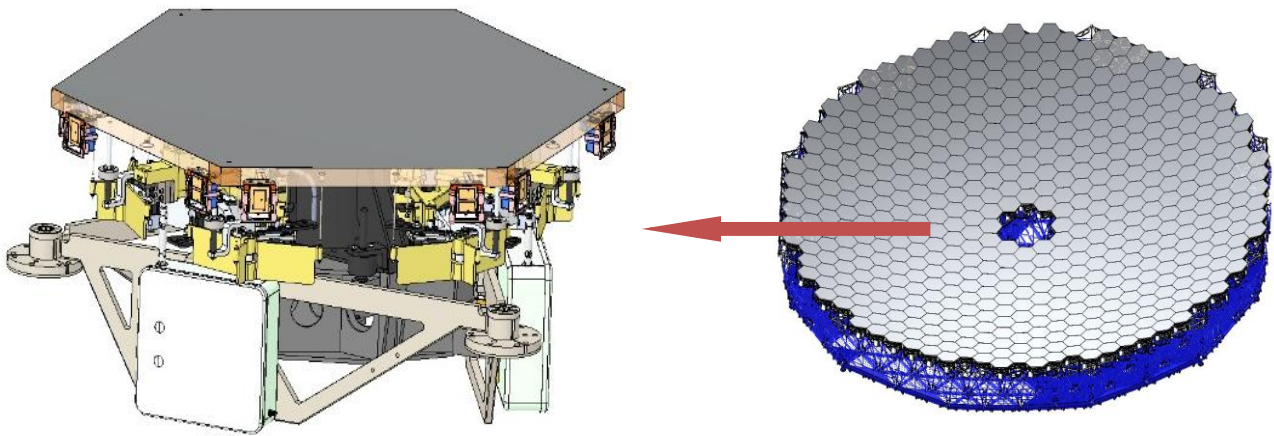
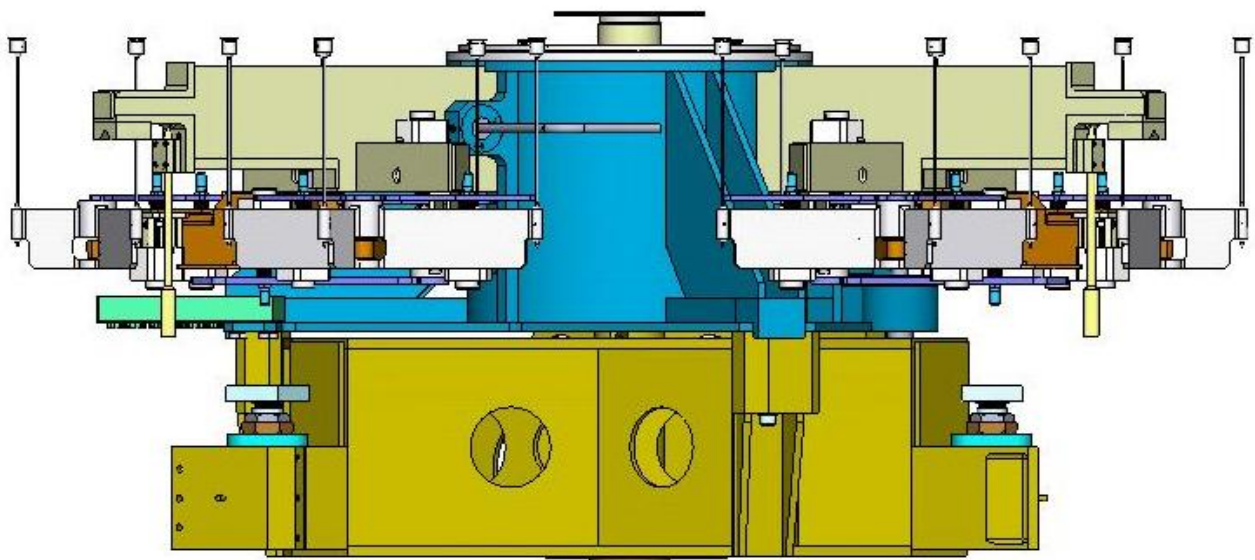


FIG.2 Segment Support Assembly



The SSA consists of the PMA Kit and Subcell, as shown in Fig. 3.

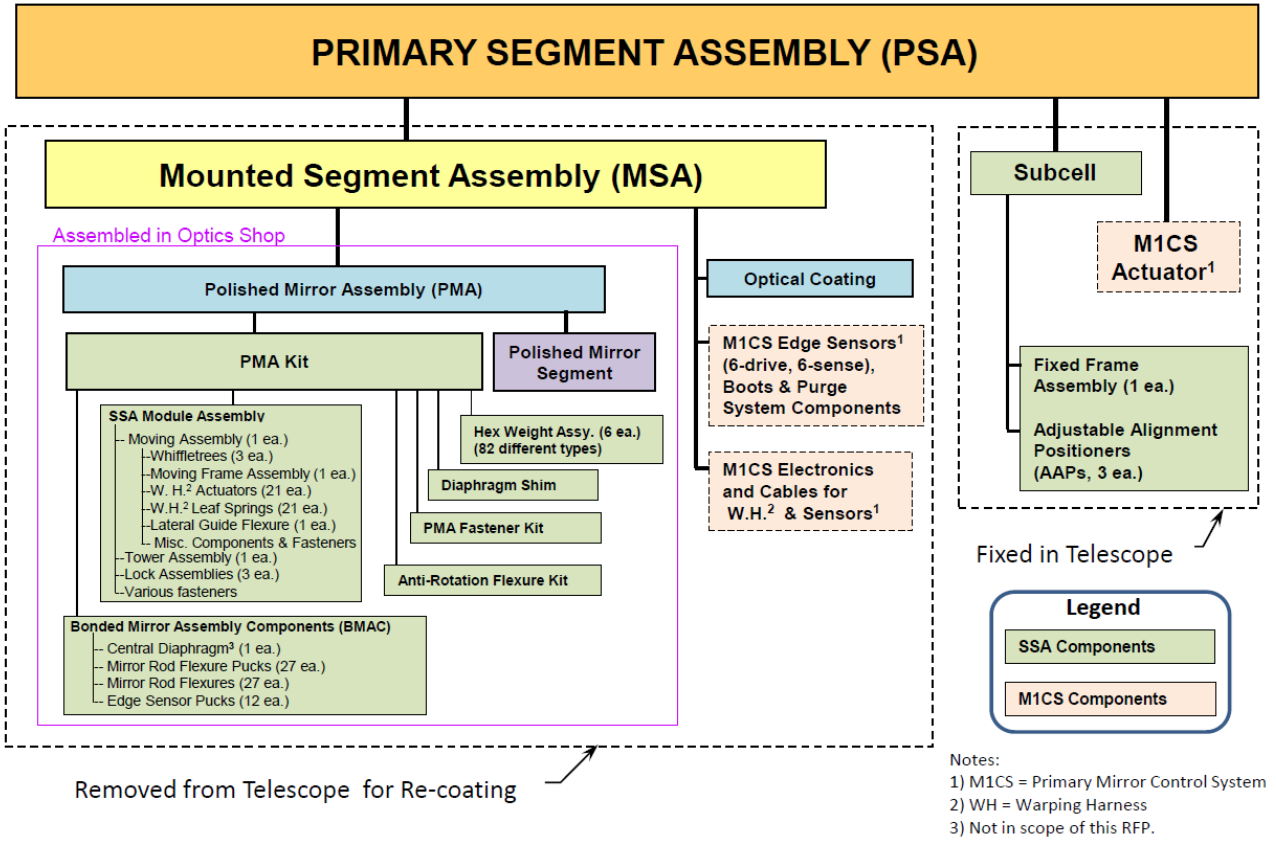
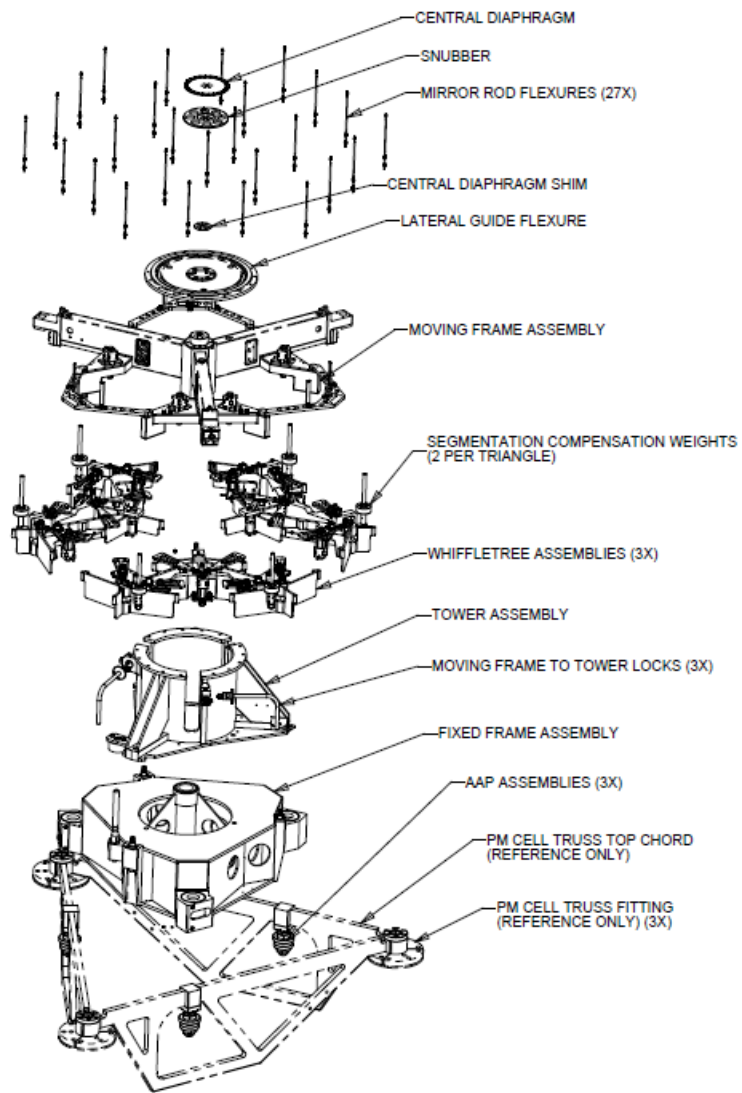


FIG. 3 M1 Primary Segment Components

The PMA Kit consists of:

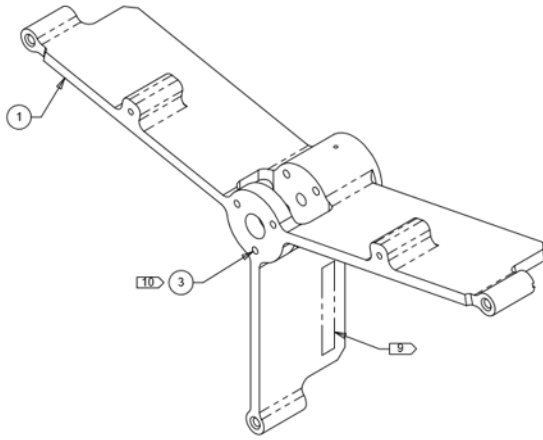
1. SSA Module Assembly (M1S-100-01200)
2. Bonded Mirror Assembly Components (M1S-100-01121, 01111, 01112, 01131)
3. Hex Weight Assembly (M1S-100-01116, 01117, 01118)
4. Diaphragm Shim set (M1S-100-0001)
5. Anti-Rotation Flexure Kit (M1S-100-00002, 00003)
6. PMA Fastener Kit (as required for item 2-5)

FIG. 4 SSA Exploded View

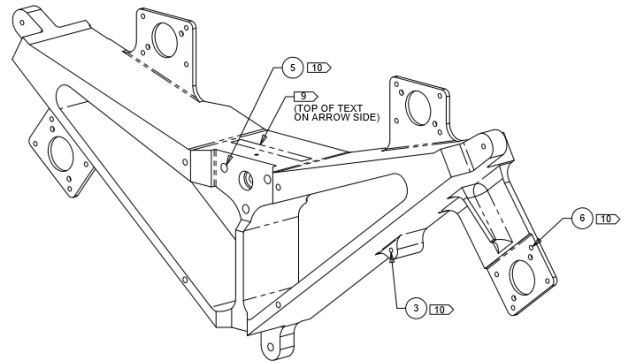


EXPLODED VIEW

FIG. 5 Triangles (Construction: 6061-T6 AL alloy)

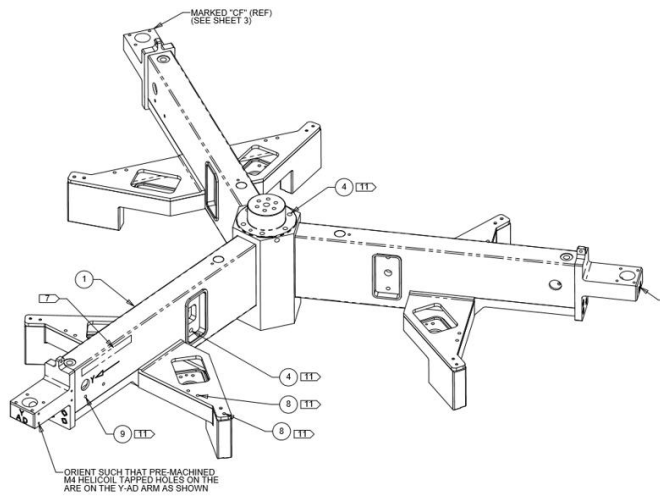


Envelope Size: 380x140x110 mm (Outer)
330x170x80 mm (Inner)

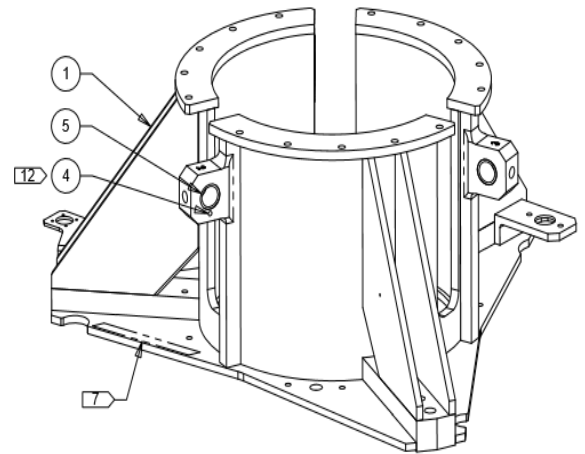


Envelope Size: 700x250x110 mm (Middle)

FIG. 6 Weldments (Construction: 6061-T651 Aluminium weldment)



Envelope Size: \varnothing 1200x220 mm



Envelope Size: \varnothing 900x300 mm

FIG. 7 Turning Components

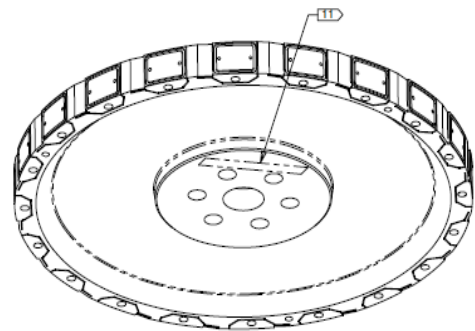
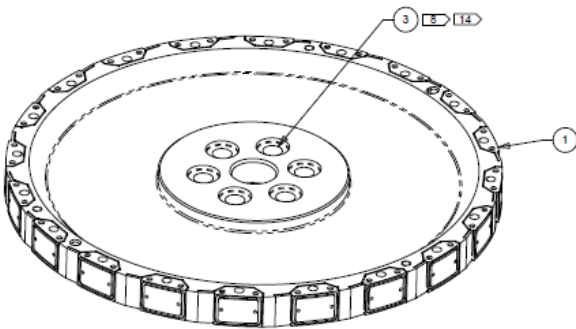


Envelope Size: $\varnothing 5 \times 100$ mm



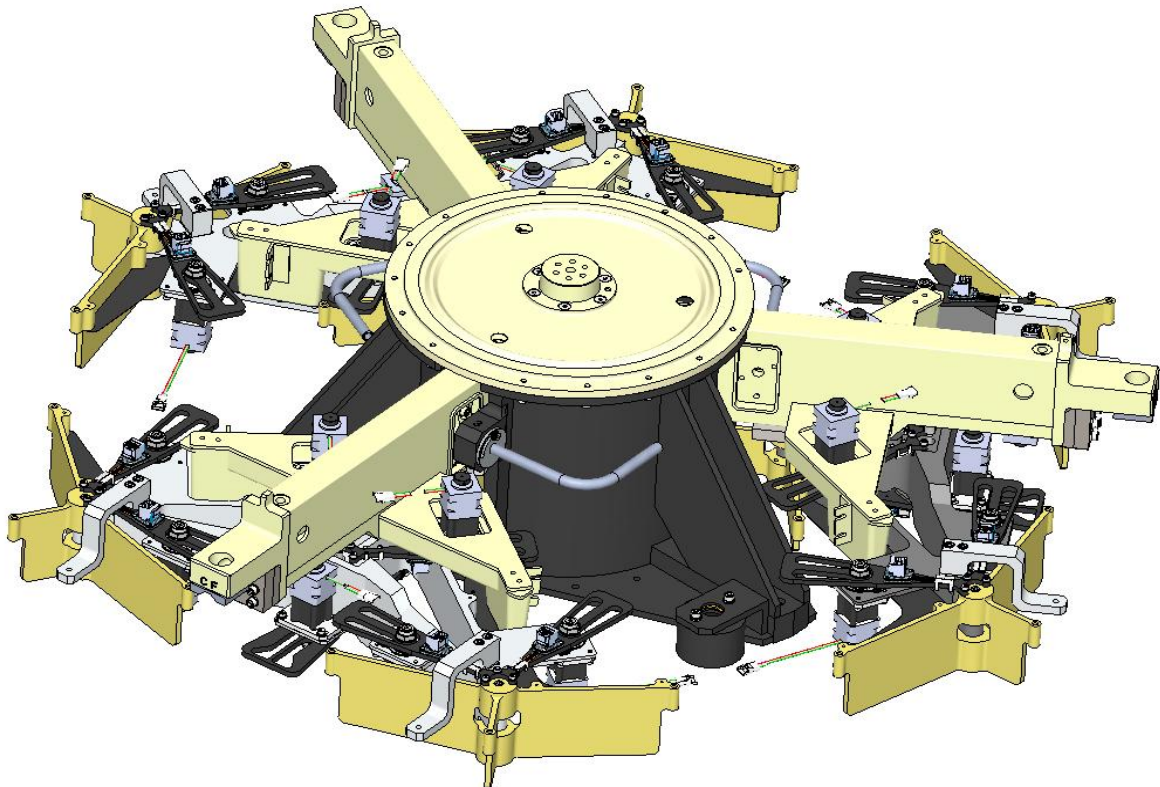
Envelope Size: $\varnothing 5 \times 210$ mm

FIG. 8 Invar Central Diaphragm



Envelope Size: $\varnothing 155.5 \times 11$ mm

FIG. 9 SSA Module Assembly



The Subcell consists of:

1. Fixed Frame Assembly ACE type (M1S-100-2020) (Fig. 5) or BDF type (M1S-100-2030)
2. Adjustable Alignment Positioners Assembly (AAPs) (M1S-100-2010, 3 nos per Subcell)

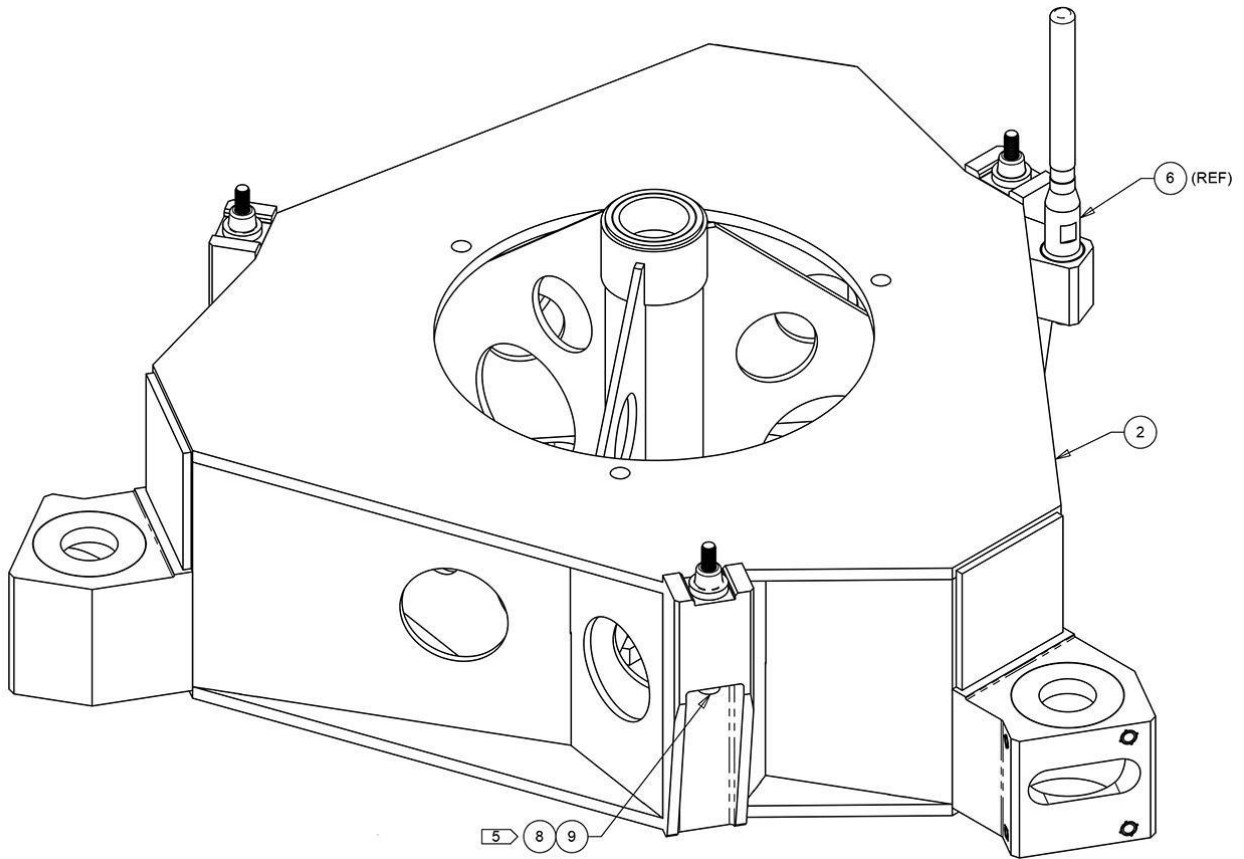


FIG. 10 Subcell Type ACE

ANNEXURE-B

Invitation to submit Expression of Interest (Eol) for Manufacturing of TMT primary mirror segment support assembly.

| | | |
|----|--|--|
| a) | Name of Company proposed for participation for process development | |
| b) | Whether it is Govt / public / private sector / Partnership / proprietary firm | |
| c) | Address with phone/fax numbers | |
| d) | Company web site | |
| e) | Name of the contact person: Name: Designation Telephone No. Mobile No. Email Id | |
| f) | Annual Turnover for the previous three years | 1. 2017-18 2. 2016-17 3. 2015-16 |
| g) | Brief Profile of the Company/Vendor | |
| h) | No. of years of experience in manufacturing and handling of precision aerospace components. Attach sample pictures: | |
| i) | Details of current infrastructure and its availability for production as per this Eol | |
| j) | Date when the visit to IIA/ITCC was done for technical discussion | |
| k) | Additional information, if any, | |

ANNEXURE-C

Record of having participated in technical discussion/clarification with IIA/ITCC.

| | |
|--|--|
| Name of the person | |
| Designation | |
| Phone No. & Mobile No. | |
| E-Mail ID | |
| Company name | |
| Address | |
| Date of participation for technical discussion/clarification | |
| Signature | |
| Countersigned by IIA/ITCC Official | |

This should be submitted along with the EoI document

ANNEXURE D

EoI SUBMISSION FORMAT

| S.No. | List of documents to be enclosed | |
|--------------|---|--|
| 1. | Cover letter illustrating the Authorized official's signature | |
| 2. | Annexure B & C duly filled in and signed | |
| 3. | Copies of the Registration/Incorporation certificate PAN No/Income Tax returns for proceeding three years. GSTIN | |
| 4. | Copies of certified audited statement of accounts or separate audited certificates confirming the turnover for the last three years | |
| 5. | Details of Organization structure | |
| 6. | List of relevant experience and capacity (Purchase order/sanction letter & certificate of completion of works | |
| 7. | CVs of Experts and professionals within organization | |
| 8. | Brief report with complete technical details for this EoI | |
| 9. | Any other documents relevant for Assessment and Evaluation | |

ANNEXURE-E

Eol Eligibility Criteria

As almost all the parts are GD&T controlled and require CMM inspection as per ASME Y14.5-2009, in-house CMM inspection facility is a must requirement. Without CMM in-house facility Eol application will not be considered.

| Criteria | Weightage |
|---|-----------------------|
| In house CMM facility with controlled environment | A must requirement |
| Relevant ISO / AS / TS Certification | A must requirement |
| AWS Certification (for welders) | Must for Welding Jobs |
| Experience of the firm in manufacturing and handling of precision manufacturing (Space / Aerospace application Standard). | 20 |
| Manufacturing facility and capabilities | 20 |
| Inspection facility, Quality accreditations, licensing requirements | 20 |
| Project Management capabilities, communication and meeting facilities | 15 |
| Financial stability of the company | 15 |
| Experts & Professionals | 10 |