THIRTY METER TELESCOPE

Expression of Interest

REQUEST FOR EXPRESSION OF INTEREST FOR THE
"TMT TELESCOPE CONTROL SYSTEM"

Inter-University Centre for Astronomy and Astrophysics
Meghnad Saha Road, Savitribai Phule Pune University Campus,
Ganeshkhind, Pune 411007, India

Copy of the NOTICE for EXPRESSION OF INTEREST

The Inter-University Centre for Astronomy and Astrophysics (IUCAA), Meghnad Saha Road, Savitribai Phule Pune University Campus, Ganeshkhind, Pune 411007, invites sealed "Expression of Interest (EoI) for TMT TELESCOPE CONTROL SYSTEM" from eligible and qualified public and private sector entities in India.

Important dates	
Date of this announcement	July, 22, 2015
Closing date and time for submission of questions for Pre-EoI meeting	August, 03, 2015 (1500 hrs IST)
Pre-EoI submission meeting at IUCAA	August, 07, 2015 (1500 hrs IST)
Closing date and time for submission of EoIs	August, 20, 2015 (1500 hrs IST)
Opening of EoIs in the presence of contractors	August, 20, 2015 (1600 hrs IST)
Intimation of results of EoI process	October, 1, 2015
Announcement of the tendering process to invite technical and commercial bids	October, 30, 2015

1) Respondents shall ensure that their EoI, complete in all respects, are dropped in the tender box located at the address given above on or before the closing date and time indicated as above, failing which the EoI will be treated as late and rejected. EoIs shall not be accepted by post/courier. Detailed instructions to prepare and submit the EoI are available at: http://www.iucaa.ernet.in/tenders.

2) In the event of any of the above mentioned dates being declared as a holiday/ closed day for IUCAA, the EoIs will be received/opened on the next working day at the appointed time. The Administrative Officer (Purchase), IUCAA, on behalf of IUCAA reserves the right to postpone the dates mentioned above without citing any reason.

3) Only contractors shortlisted through the EoI process will be eligible to submit the technical and price bids for the work to be contracted.

4) EoI in which any of the prescribed condition(s) is not fulfilled or the respondents put any condition including that of conditional rebate, shall be summarily rejected. However, the EoI with unconditional rebate will be acceptable.

5) IUCAA reserves the right to reject any or all of the EoIs without citing any reasons, and invite fresh EoIs at any stage of the process.

The Administrative Officer (Purchase),
IUCAA, Meghnad Saha Road,
Savitribai Phule Pune University Campus,
Ganeshkhind, Pune 411007, India.
Tel. +91 20 25604100 / 25691414
Email: purchase@iucaa.ernet.in

Copy of the Newspaper Advertisement

Expression of Interest
for
"Thirty Meter Telescope (TMT) Telescope Control System"

The Thirty Meter Telescope (TMT) will be the world's most advanced ground-based telescope operating at optical and infrared wavelengths. An international consortium of institutions in the USA, Canada, China, Japan and India is building the telescope. The telescope will be located on Mauna Kea, a dormant volcano with a peak altitude of 4205 m, in the state of Hawaii of the United States of America.

The Director, Inter-University Centre for Astronomy & Astrophysics (IUCAA), Meghnad Saha Road, Savitribai Phule Pune University Campus, Ganeshkhind, Pune 411007, India, invites Expression of Interest (EoI) for "TMT TELESCOPE CONTROL SYSTEM", from all public and private sector entities based in India.

The documents providing instructions for preparing and submitting the EoI can be downloaded from http://www.iucaa.ernet.in/tenders.

The closing date for the submission of EoIs is August, 20, 2015. The sealed EoIs should be dropped in the tender box at IUCAA on or before 1500 hrs and the same will be opened at 1600 hrs on the same day. EoIs shall not be accepted by post/ courier.

IUCAA reserves the right to reject any or all of the EoIs without assigning any reasons. No contractor shall have any cause of action or claim against IUCAA for rejection of their EoI.

Administrative Officer (Purchase)

Table of Contents

1 Introduction and Background

The Thirty Meter Telescope (TMT), a segmented mirror telescope with a 30-meter filled aperture, will be the world's most advanced ground-based telescope operating at optical and infrared telescope wavelengths. An international consortium of institutions in the USA, Canada, China, Japan and India is building the telescope. The telescope will be located on Mauna Kea, a dormant volcano with a peak altitude of 4205 m, in the state of Hawaii of the United States of America. The construction of the telescope started in 2014 and is scheduled to finish in 2024 at a total cost of USD 1.5 billion. The detailed information on TMT can be found at http://www.tmt.org/.

With the signing of formal agreement between the Department of Science & Technology (DST), Government of India and the TMT International Observatory (TIO) on December, 2, 2014, India has become a full member of the collaboration with a 10% share in the project. TIO is the nonprofit limited liability company founded in May 2014 to carry out the construction and operation phases of the TMT project.

Within India, the TMT is set-up as a national project of the DST and the Department of Atomic Energy (DAE) of the Government of India. The project is anchored in the Indian Institute of Astrophysics (IIA) at Bengaluru, and is led by IIA, the Aryabhatta Research Institute for Observational Sciences (ARIES) at Nainital and the Inter-University Center for Astronomy and Astrophysics (IUCAA) at Pune. All the activities of India-TMT are coordinated by the India TMT Coordination Center (ITCC) setup by the DST, India.

About 70% of India's contribution to the construction of TMT will be in-kind. India's work share consists of both hardware and software. In software, India-TMT is responsible for delivering the Observatory Software (OSW) and Telescope Control System (TCS). The OSW is responsible for providing requirements, architecture and software essential for building and integrating the entire TMT software system. India-TMT's work share includes 49% of the OSW. The TCS is responsible for the coordination and control of various telescope subsystems. An overview of TCS, the subject of this EoI, is provided in Section 2. *A more detailed description of TMT and TCS is provided in the presentation accompanying this document.*

The purpose of this document is to invite public and private sector entities in India to submit ***Expression of Interests (EoIs)*** to participate in the software design and development of the Telescope Control System (TCS) for the TMT. An invitation to submit EoIs for OSW will be released subsequently.

The TMT Project Office (PO) completed the conceptual design for the TCS, which is a software-only system, in April, 2014. India-TMT is responsible for taking TCS through the subsequent phases i.e. (1) the Preliminary design phase, (2) the Final design phase, (3) the Code and Test phase, (4) the Integration and Test phase and, finally, (5) the Assembly, Integration and Verification at Mauna Kea.

The objective of this first i.e. EoI stage of the procurement process is to identify public and private sector entities in India capable of taking TCS through all the

project phases over 2015-2022. These shortlisted entities, hereafter referred to as contractors, will be invited to participate in the second stage i.e. *tendering process* through submission of detailed technical and price bids. In the third i.e. final *contract awarding* stage, the highest ranked bidder will be awarded the contract to execute an initial phase of the project lasting six to twelve months. The contract may be of two forms, (1) contract for specific deliverables and (2) contract for specific manpower needs. Although it is desired and intended to carry out the entire development of the TCS through a single contractor, the contracts for the subsequent phases will be awarded on the basis of past performance. IUCAA reserves the right to invite fresh EoIs at any stage of the project.

Further details of the procurement and proposal submission processes are provided in Section 3.

2 TMT and TCS Overview

2.1 System Overview

The Thirty Meter Telescope (TMT) is a ground-based telescope with a large segmented mirror under construction in Hawaii. It is designed for optical and infrared observing. In addition, its adaptive optics and laser systems will help correct for image blur caused by the atmosphere of the Earth, helping it to reach the potential of such a large mirror.

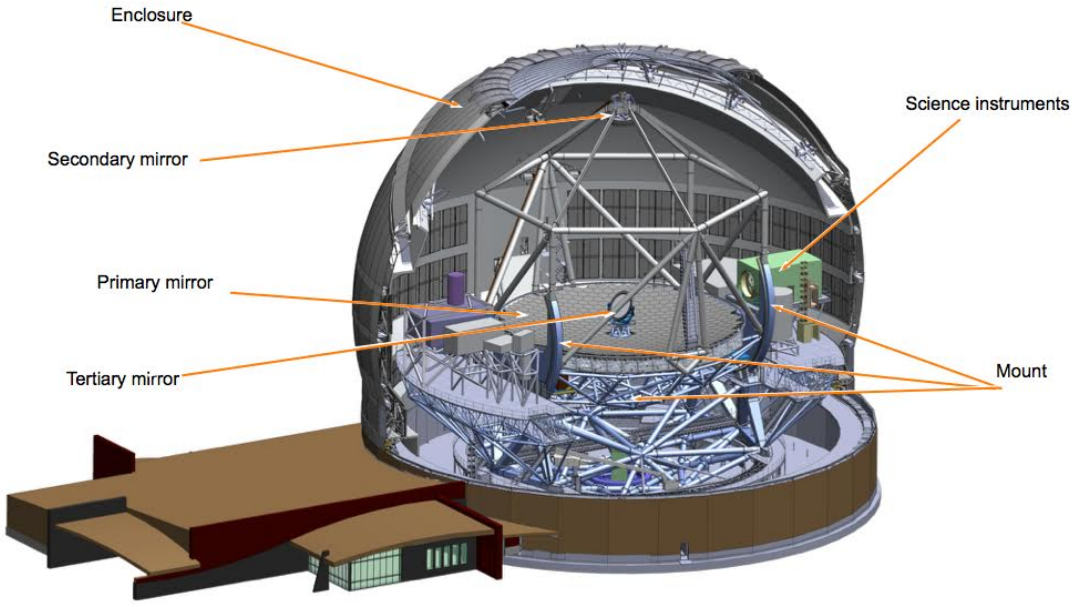

Figure 1 TMT Telescope

The telescope is to be a Ritchey-Chretien design with an altitude-azimuth mount and a 30-metre diameter primary mirror (M1). This mirror is segmented into much

smaller individual hexagonal mirrors. The shape of each segment, as well as its position relative to neighboring segments, will be actively controlled. A secondary mirror (M2) is used to focus light from the primary mirror to a flat tertiary mirror (M3), which directs the light path to science instruments mounted on the Nasmyth platforms.

In project terms, the telescope as a whole consists of:

1. the main structures of the telescope mount and optical support assemblies;
2. the mechanical systems for the mount (drives, brakes, bearings, encoders, limit switches, counterweights, elevators, cable wraps);
3. the optical elements that form the telescope image (the primary, secondary and tertiary mirrors);
4. the mechanical assemblies that support and position the mirrors;
5. the control systems, including control electronics and software;
6. the alignment and phasing system; and
7. distribution systems for utility services, data signals, and grounding lines.

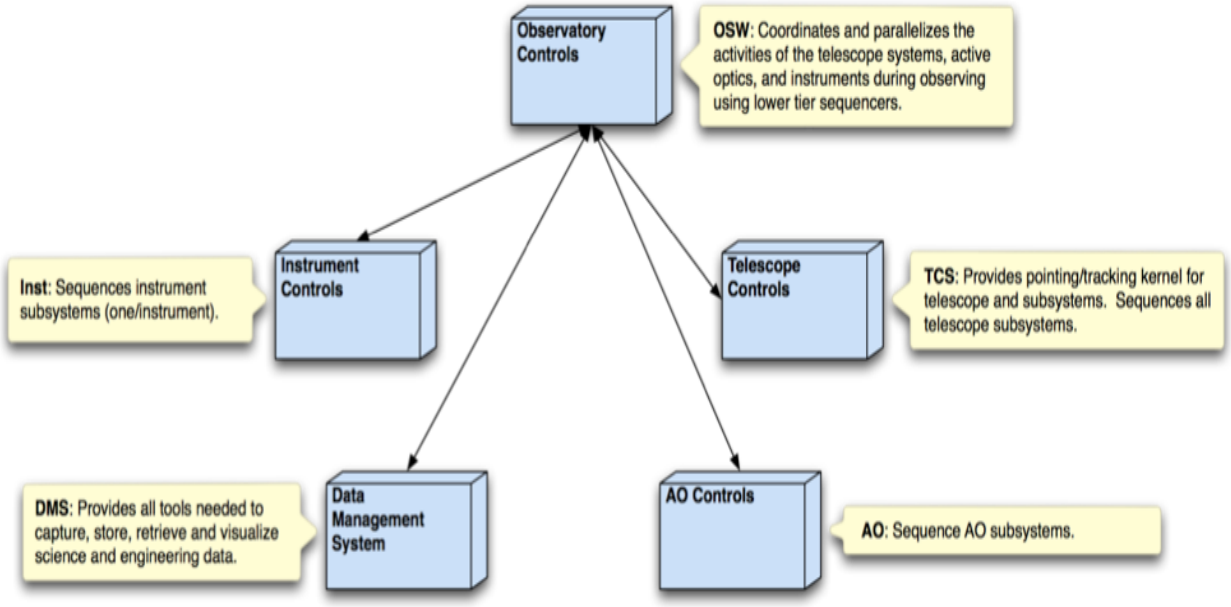

Figure 2: TMT Principal Software Systems

At the highest level, as shown in Fig. 2, TMT software is modeled as 5 principal systems. Each principal system is focused on specific functionality. The principal systems are an abstraction; each is made up of several concrete subsystems. This view shows that the communication is hierarchical and flows down from Observatory Controls to the other principal systems. This command communication is low-bandwidth by design; any high-speed communication should occur only within a single principal system. Each principal system is decomposed into subsystems.

TCS is responsible for the coordination and control of various subsystems that make up the Telescope Controls (see accompanying slides for details), responding to commands

received from the observatory control system and from expert user interfaces. It consists of:

1. A sequencer and status/alarm monitor
    - Provides high-level control of the mount, the primary, secondary and tertiary mirrors, and the enclosure.
2. A pointing kernel
    - Converts target positions (right ascension and declination) into pointing and tracking demands in the appropriate coordinate systems for the telescope mount, instrument rotators, atmospheric dispersion correctors, instrument and adaptive optics system wave front sensor probes, and the enclosure cap and base.
3. A correction module
    - Responsible for the creation and management of the look-up tables that control the position and shape of the primary, secondary and tertiary mirrors as a function of zenith angle and temperature. It will also process data from the telescope global metrology system and provide appropriate position information to the other control systems.
4. Several adaptors (Hardware Control Daemons)
    - Provide an abstraction and interface point to the various TCS subsystems such as the mount and enclosure. Hardware Control Daemons (HCDs) are the way external systems and hardware are integrated into the TMT software system.

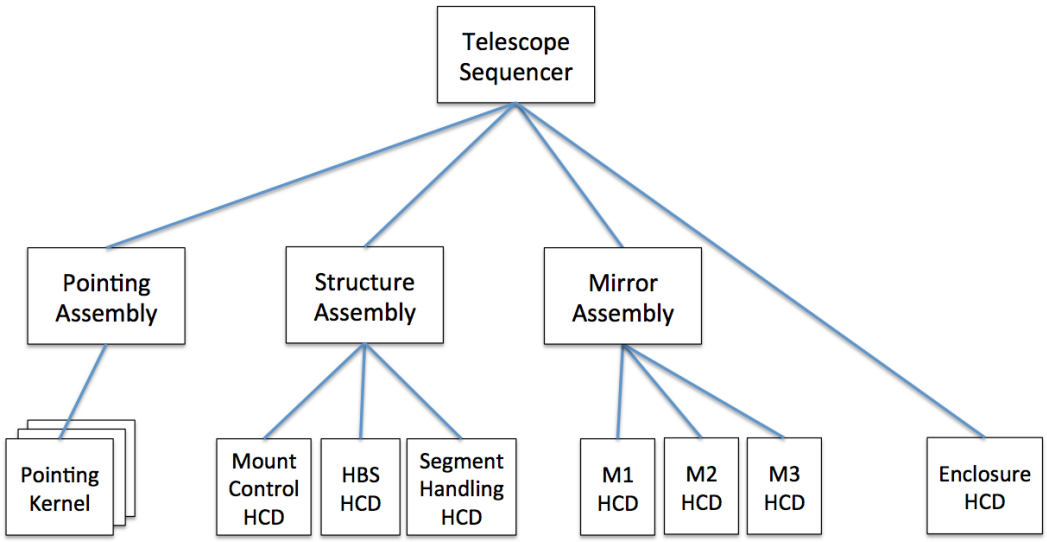

Figure 3 An illustration of how TCS may be deployed

TCS primarily consists of software and the associated off the shelf computer hardware necessary to support its deployment. All hardware is abstracted at the Hardware Control layer through the use of HCDs. Figure 3 shows an example of how TCS might ultimately be realized utilizing the TMT architecture. This is for illustration

only and should not be taken as the final or full design. Sitting above the hardware and at the lowest level for the software the TCS contains adapters, described as HCDs above, to encapsulate the hardware specifics of the various subsystems and vendors, and present a common interface to the higher-level software. For the most part, working at the level of TCS will require knowledge and appreciation for distributed control, motion control and real-time concerns.

A detailed overview of TCS, its responsibilities and interfaces with various telescope subsystems is provided in the presentation accompanying this document. The presentation also provides a summary of TCS work breakdown structure (WBS). We encourage respondents to go through this presentation to familiarize themselves with the TMT and its TCS.

2.2 Development Process

TMT defines system engineering and software development processes and provides support through various system engineering and architecture documents, templates and reviews. These apply to all TMT work including the TCS software development. TCS will be developed as part of the overall TMT Software System, namely, Observatory Software architecture.

The TCS software development, inspired by Agile development methodology, is to be based on:

- Frequent Iterations and Releases
- Feature-Driven Development
- Distributed Configuration Management
- Automated Testing and Continuous Integration

The TMT plan includes a Software Test and Integration Laboratory (STIL) and staff at the TMT Project Office in Pasadena, USA, during construction to support software testing and the integration of software from the vendors. The STIL staff will be a resource for all development teams and will provide standards, tools, support, and testing fixtures to help the software teams do their jobs. The STIL will have computing equipment to allow the integration and testing of the software throughout construction prior to delivery at the site. The STIL will maintain the project source code repository and other software tools to monitor and coordinate progress. All software-related deliverables will be delivered to the project through the STIL. The STIL will create the TMT project software releases and will be responsible for ensuring that the software system builds as a single system.

The TCS software development process shall be consistent with the TMT software development process. TMT requires a Unix-like operating system. The standard operating system for software execution, at this point of time, is taken to be Linux CentOS for all applications, including TCS. Linux is a solid TMT choice, but specific Linux distributions and versions for deployment are an area that is changing rapidly and will possibly evolve significantly during the project.

The standard for programming languages acceptable for developing TMT software that interacts with the TMT infrastructure are JVM-based languages: Scala and Java. It is expected and accepted that hardware specific constraints or specific, necessary code libraries may require that C/C++ also be used in some instances. For example, this will be the case for the TCS pointing kernel. The current choice for scripting is JPython, the JVM implementation of Python. Scala is also acceptable.

The TCS must be designed and developed so that it adheres to the TMT Observatory Software architecture and Common Services framework. Specific details in the form of guideline documents will be provided. Part of architecture reuse is implementing TCS system components using TMT Common Software (CSW) services.

Choice	Description
Time Service	Provides synchronized, accurate and precise time to components based on IEEE-1588.
Event Services	Publish-subscribe communication system used to distribute information between distributed components.
Location Service	Allows one component to locate another based on a component description.
Connection and Command Service	Allows one component to command another and to track completion of commands based on Command Action Model.
Database Service	A relational database to be used by applications requiring a relational data model.
Configuration Service	A service that allows components to store and retrieve versioned configuration files.
Single Sign-on Service	A centralized service for user authentication and authorization.
Logging Service	Provides components with local and centralized, shared logging messages.
Container	Hosts one or more architecture software components.
GUI Technology	Browser-based applications using JavaScript and a set of supporting libraries.
Operating System	Standard Unix-like operation system is CentOS with Redhat MRG as a real-time kernel.

Table 1 List of standard TMT Common Software services

The TCS will be developed in phases. These phases have been defined by system engineering and each phase has a well defined set of deliverables and an associated review. A brief overview of the objectives of various phases is given below.

1. **Conceptual Design (CoD Phase):** Define requirements, identify critical technologies, identify problem areas and risks. Develop initial cost estimate and schedule. *TCS successfully completed the conceptual design phase in April 2014.*

2. **Preliminary Design (PD Phase):** Development of design to show that requirements are met, interfaces defined, enabling technologies developed, and major risks retired. Determine bottom-up cost estimate. Develop schedule for Code and Test, and Integration and Test phases.

3. **Final Design (FD Phase):** Development of production ready design and work scopes for subcontracts and procurements. Key technologies industrialized. Show compliance with requirements and interfaces and develop plans for test and verification, quality, safety, hazard/risk assessment, operations and maintenance plans. Develop refined cost estimate and schedule.

4. **Code and Test:** Development of the actual software based on the architectural, functional and operational inputs derived from the Final Design phase, and unit and acceptance testing. These activities will be carried out at the software vendor's location. The outcome of this phase will be independently testable software modules in line with feature driven development and iterative development aspects of agile development methodology.

5. **Integration and Test (INT):** Integration and testing of independently testable software modules shipped by the contractor is done at the TMT Project Office. The Software Test and Integration Lab (STIL) support staff in TMT Project Office will be a resource available to the software contractor during this phase and will provide the necessary standards, tools, support, and testing fixtures.

6. **Assembly, Integration, Verification (AIV):** On-site Integration and testing of software in the telescope environment on real observatory equipment and hardware. The software contractor personnel will assist TMT personnel in the integration and verification activities at Mauna Kea, Hawaii, during this phase.

Project phase	Period
Design Phase • Preliminary Design Phase • Final Design Phase	 Q4 2015 – March, 2018 April, 2018 – May, 2019
Code and Test	June, 2019 – January, 2021
Integration and Test	February, 2021 – February, 2022
Assembly, Integration and Verification	March, 2022 – April, 2022

Table 2 TCS Project Phases

Please note that there are integration activities in both the INT and AIV phases. Integration activities that take place in the laboratory come under INT, and the integration activities that take place on-site come under AIV.

3 EoI Submission and Evaluation Process

Any public or private entity with proven technical expertise, track record and experience in design, development and integration of complex heterogeneous distributed control systems can apply. Experience in astronomy projects will be an advantage.

The EoIs shall be submitted according to the guidelines provided in the Section 3.2. A pre-EoI submission meeting to provide an overview of TMT TCS and clarifications on the submission and evaluation process will be organized at IUCAA on August, 7, 2015 at 1500 hrs IST. The questions for the Pre-EoI meeting can be emailed to purchase@iucaa.ernet.in.

The deadline for EoI submission is August, 20, 2015 at 1500 hrs IST. The EoIs will be opened in the presence of contractors on August, 20, 2015 at 1600 hrs IST. If the number of responses received is insufficient, IUCAA reserves the right to extend the deadline.

An Expert Committee constituted by ITCC will evaluate the EoIs and shortlist the contractors eligible to participate in the tendering process. The evaluation criteria to be used for evaluation are described in Section 3.1. The evaluation process will also involve presentations from contractors. The date(s) for the presentations and site-visits, if required, will be decided later and communicated to the contractor. The results of the EoI process will be announced on October, 1, 2015. IUCAA will then invite the shortlisted organizations to participate in the tendering process for the work to be contracted. The contract may be of two forms, (1) contract for specific deliverables and (2) contract for specific manpower needs. The details of the tendering process will be announced on October, 30, 2015.

3.1 Evaluation Criteria

The expert committee to evaluate the submitted proposals shall use the following criteria. Nominally these criteria will be weighted equally during the evaluation process.

1. Contractor's experience, financial stability and core technical competencies
2. Technical compatibility to TCS
3. Contractor's project management capabilities
4. Contractor's experience in integrating seamlessly into a customer's team
5. Contractor's ability to acquire further domain experience as needed

Additional insights into the criteria listed above are as following:

The TCS work is non-trivial and requires defining and realizing a large number of interfaces across various subsystems. The subsystem teams are geographically separated and the subsystems themselves will be implemented using distributed software developed under a formal set of software processes. TCS deployment will be on Linux and the software developed in a combination of C/C++, Java and Scala. In addition to technical skills, successful implementation of the TCS will require domain specific knowledge that is generally unique to astronomical observatories or certain scientific institutions. This requires a set of experiences and skills that may

not be available with organizations. Because of these concerns, the following expertise and experience need to be demonstrated as part of the EOI.

Contractor's experience, financial stability and core technical competencies

In case of private sector entities, the contractor should be in business for at least 5 years, and have a minimum average annual turnover of Rs. 50 crores during the last 5 years with a solvency of at least 30 crores**.** In general, the respondent must have significant experience and depth in the development and integration of software for complex heterogeneous distributed control systems that include a significant number of custom complex hardware systems. The contractor should have experience with rigorous software system engineering processes and modern tools for software system design and configuration control. The contractor must have experience over the full software design, development, test, deployment and support life cycle.

Technical compatibility to TCS

The contractor should demonstrate that the appropriate level of technical staff can be applied to the work. The senior technical staff member(s) that are assigned to the TCS effort should have a minimum of eight years' experience in the development and delivery of complex distributed software control systems. Technical staff assigned to the TCS effort should have experience in object orientated software development, the use of open source based software, experience with Linux, Java/Scala and C /C++, experience in executing large projects in an agile manner, and experience with rigorous system engineering processes. Communication skills, motivation, experience with the formal review process, and knowledge of the complete design, development, test, deployment, and support software life cycle process are necessary.

Contractor's experience in integrating seamlessly into a customer's team

Experience with, and the ability to, travel internationally (6 to 8 trips/year) and integrating into remote technical teams and communicate effectively, are necessary. Given the duration of the TMT project continuity of key personnel will be extremely important.

Contractor's project management capabilities

The contractor shall have demonstrated experience in project management. This includes development, maintenance, and use of schedules, budgets, resource allocation, and risk management. The contractor must be able to assign a Project Manager to the TCS effort who has experience in managing projects of similar size and complexity. Ideally, a single person can fill the needs for both management and technical leadership.

The successful Contractor shall also have a history and mature processes for supporting and integrating into large, geographically dispersed, multi-national projects.

Contractor's ability to acquire further domain experience as needed

The successful delivery of the TCS will require domain experience related to the control of modern optical telescopes and observatories in addition to solid software engineering skills. Telescope domain experience is not a common skill set nonetheless the contractor will need to fill this position either directly or in-directly. TMT will provide support to the contractor for identifying methods to fill this need but the final responsibility rests with the contractor. Any prior domain experience will be an advantage.

The required domain expertise includes either knowledge or familiarity with telescope pointing and modeling, astrometric conversions, engineering and operational requirements to achieve science goals, optical consequences of M1, M2 and M3 adjustments, acquisition, guiding, and wave front sensing; and observing modes and use cases.

3.2 EoI format and submission process

The EoI shall be printed on the organization's stationary and consist of following documents:

1. Filled-in cover letter and undertaking. The formats are specified in Form-I (Appendix A1) and Form-II (Appendix A2).
2. Profile of the contractor demonstrating its *experience, financial stability and core technical competencies*. Following supporting documents shall be included *as applicable*:
    a. Audited balance sheets for last five years.
    b. Solvency certificates (not older than 12 months) issued by nationalized bank with which the contractor holds their current account.
    c. Copy of Registration LST/CST/WCT No., PAN No., and TIN No. allotted by concerned authorities.
    d. Information on certifications and appraisals to demonstrate how well organization's processes compare to international best practices and standards.
3. Details of past experience in executing work of similar nature and scale. In particular, the respondent shall address each of the following concerns ***in the order*** as described below:
    a. ***Contractor experience and core technical competencies***
    Contractor shall provide a brief overview of past and present projects that have similar technical and/or programmatic characteristics to the TCS project. Focus should be given to the role played in each of these efforts and in identifying which aspects were similar to the TCS project.
    b. ***Technical compatibility to TCS***
    Contractor should provide a brief overview to show how the technical needs of TCS can be met. It is important that the overview be specific to the actual group or development unit that would ultimately be involved in the TCS work. This response should include an indication of:

- The number of years of experience in developing and deploying on Linux
- A summary of the number of people potentially available to the project, their programming languages and the years of experience using them.
- Any experience with distributed control systems, open source solutions, soft real-time systems and globally distributed projects should be included.

c. ***Contractor's project management capabilities***

Provide a description of how the respondent handles Software Project Management for efforts of similar size to that of the TCS. Include a description of tools and processes used for scheduling, resource allocation, budget, risk management, and brainstorming. Also include a list of tools and processes used to manage and communicate across a geographically and culturally diverse project with multiple stakeholders.

d. ***Contractor's experience integrating seamlessly into a customer's team***

Provide one or more past examples of how the Contractors team integrated into a customer's team creating one seamless team. Describe the engagement model(s) that the Contractor has used in the past. Describe any tools used to enable integration of geographically dispersed teams.

Provide examples of where team members have travelled outside of India to participate in global projects. If possible, include the frequency and duration of these trips.

e. Contractor's ability to obtain the required domain experience

The successful delivery of the TCS will require, in addition to proficient software engineering, specific domain experience in Telescope Control System software design. Describe the depth of internal TCS related experience available and ideas as to how gaps in the internal experience would be augmented if necessary.

4. Appreciation letters from clients and their contact information.

The EoIs in a sealed envelope bearing the heading "Expression of Interest for TMT Telescope Control System" and the name and address of the respondent, should be dropped in the tender box located at IUCAA. The envelope should be addressed to:

The Administrative Officer (Purchase),
Inter-University Centre for Astronomy and Astrophysics,
Meghnad Saha Road,
Savitribai Phule Pune University Campus,
Ganeshkhind, Pune 411 007, India.

Please note that EoIs shall not be accepted by post/courier.

3.3 Important dates

Important dates	
Date of this announcement	July, 22, 2015
Closing date and time for submission of questions for Pre-EoI meeting	August, 03, 2015 (1500 hrs IST)
Pre-EoI submission meeting at IUCAA	August, 07, 2015 (1500 hrs IST)
Closing date and time for submission of EoIs	August, 20, 2015 (1500 hrs IST)
Opening of EoIs in the presence of contractors	August, 20, 2015 (1600 hrs IST)
Intimation of the results of EoI process	October, 1, 2015
Announcement of the tendering process to invite technical and price bids	October, 30, 2015

In the event of any of the above mentioned dates being declared as a holiday/ closed day for IUCAA, the event will take place on the next working day at the appointed time. The Administrative Officer (Purchase), IUCAA, on behalf of IUCAA reserves the right to postpone the dates mentioned above without citing any reason.

3.4 Contact details

For clarifications, please contact:

The Administrative Officer (Purchase),
Inter-University Centre for Astronomy and Astrophysics,
Meghnad Saha Road,
Savitribai Phule Pune University Campus,
Ganeshkhind, Pune 411 007, India.
Tel. +91 20 25604100 / 25691414
Email: purchase@iucaa.ernet.in

The email or postal enquiries should clearly mention “Enquiry for the TMT Telescope Control System EoI” in the subject line or on the top of the envelope, respectively.

A1. Format of the Cover Letter

FORM – I
(Format of the Cover Letter)
(To be printed on the organization's letterhead)

Expression of Interest for the TMT Telescope Control System

The Director,
Inter-University Centre for Astronomy and Astrophysics,
Meghnad Saha Road,
Savitribai Phule Pune University Campus,
Ganeshkhind, Pune 411 007, India

Dear Sir,

In response to the request for Expression of Interests (EoIs) for the "TMT Telescope Control System", we are submitting herewith our EoI.

We have carefully read all the terms and conditions of the EoI and undertake to abide by them. The information/documents furnished as part of the EoI are true to the best of our knowledge and belief. We are not involved in any major litigation that may have an impact affecting or compromising the delivery of services as required under this EoI. We are not blacklisted by any Central/ State Government/ Public Sector undertaking in India.

We are well aware of the fact that furnishing of any false information/ fabricated documents would lead to the rejection of EoI.

Place: **Authorized Signatory**

Date **Signature and seal**

Contact details of the signatory
(Provide postal and email addresses and phone numbers)

A2. Format of the Undertaking

FORM – II

(Format of the Undertaking)

(To be printed on the organization's letterhead)

UNDERTAKING

1. I, _____ son/daughter/wife of _____ Proprietor / Director / authorized signatory of the Company / Organization mentioned above, am competent to sign this declaration and execute this EoI document.

2. I have carefully read and understood all the terms and conditions of the EoI and undertake to abide by them.

3. The information/documents furnished along with the above EoI form are true and authentic to the best of my knowledge and belief. I am well aware of the fact that furnishing of any false information/ fabricated documents would lead to the rejection of my EoI at any stage, besides liabilities towards prosecution under appropriate law.

Place : **Authorised Signatory**

Date **Sign and seal**

Contact details of the signatory

(Provide postal and email addresses and phone numbers)

A3. Checklist for Submission of Documents

FORM – III

Format of the Checklist for Submission of Documents

(To be printed on the organization's letterhead)

(Please choose 'Y' or 'N' as applicable).

Document	Submitted
1. Cover letter (see Form - I)	Y/N
2. Undertaking (see Form - II)	Y/N
3. Checklist (i.e. this form)	Y/N
4. Profile of the contractor as described in Section 3.2. Provide following supporting documents *as applicable*: (i) audited balance sheets for last 5 years, (ii) solvency certificates, and (iii) copy of registeration LST/CST/WCT No., PAN No. and TIN No. allotted by concerned authorities.	Y/N
5. Details of past experience of the organisation in executing work of similar nature and scale. Please address the concerns described in Section 3.2.	Y/N
6. Appreciation letters from clients as well as their contact information.	Y/N
7. Any other supporting documents (give details)	Y/N

Place : **Authorised Signatory**

Date **Sign and seal**