Ref. No. NCRA:WF061:2021:SKAO – EoI

Request for Expression of Interest (EoI)

regarding work for the

Construction Phase

of the

Indian contribution to Software Packages and Allied Services

of the

Square Kilometre Array (SKA) Telescope

SKAO

National Centre for Radio Astrophysics
Tata Institute of Fundamental Research
Savitribai Phule Pune University Campus
Post Bag 3, Ganeshkhind
Pune 411007

EoI Document Fee (Non-refundable) – Rs. 11,800/- by DD in favour of "TIFR" payable at Pune along with the EOI Response.

IMPORTANT DATES :

EoI Download start Date	29.09.2021	From 10.00 hrs.
EoI Download End Date	01.11.2021	Upto 06.00 hrs.
EoI Pre-submission meeting Date and Time	28.10.2021	14.30 hrs. at NCRA-TIFR Pune.
EoI Submission Date	09.11.2021	upto 18.00 hrs.
EoI Opening Date	10.11.2021	at 15.30 hrs.

ABOUT the BIDDER:

Name of the Firm / Company	
Address of the Firm / Company	
Authorised Representative's name(s)	
Email Id, Mobile Numbers	

Table of Contents

CHAPTER-I

A. <u>Definitions:</u>

Expression of Interest (EoI) is also referred to as Bid or Proposal

Company/Organisation is also referred to as Bidder

NCRA is also referred to as Centre [institute, client]

B. <u>Check list:</u>

Sr. No.	Particulars	Provide Details	Enclosed
1	Demand Draft towards EoI Fee enclosed (For Rs. 11,800/-)	D.D.No.… Dtd…….	Yes / No
2	Copies of Registration Certificates for Firm/Company/MSME etc. obtained from statutory authority and valid till date		Yes / No
3.	Copies of all relevant registrations such as MOA, PAN, TAN, GST, etc.		Yes / No
4.	Company Profile enclosed including history for the past seven years of business		Yes / No
5	Details of all works of similar Nature Of Assignment (Software development projects of large scale or complexity) Completed during the last Seven Years ending 31st March, 2021 in a list. Please attach Certified copies of all Work Orders/Orders and Certificates from Clients. Mentioned at Sr. No. 4 in the eligibility criteria.		Yes / No
6	Copies of work order supporting one project of scale or technical complexity similar to the requirement of this EoI, in the field of software development for scientific research applications carried out in India mentioned at Sr. No. 5 in the Eligibility Criteria.		Yes / No
7	Copies of details of team/Manpower meeting the required skill (mentioned in this EoI) and experience in domain area including number of required SAFes certified staff		Yes / No

Sr. No.	Particulars	Provide Details	Enclosed
8	Recently obtained Certificate from your CA firm, indicating Annual Turnover and Profit or Loss / Net worth for the past seven years. Also enclose certified copies of Balance Sheet and P&L statements / Net Worth, Copies of Audit Reports.		Yes / No
9	Solvency Certificate from the nationalised bank having your current account, recently obtained for a value not less than Rs. 20 Crores.		Yes / No
10	Hard copy of this EoI document duly signed and sealed, for accepting the terms and conditions, enclosed		Yes/No
11	Copy of GST registration certificate enclosed.		Yes/ No
12	Undertaking letter stating that the bidder has necessary in-house infrastructure, trained personnel and expertise for meeting technical requirements mentioned in this EoI. Also undertaking that no subcontracting will be done to carry out this job, if selected.		Yes / No
13	Copy of power of attorney to sign the EoI enclosed(Applicable for LLP / partnership company / PVT LTD / LTD Company)		Yes / No
14	Declaration stating that there is no legal action ongoing against the organisation for any cause. If any legal action exists, the bidder has to undertake that it does not affect its liability to deliver the EoI requirements. The bidder shall provide all the details of such action(s)		Yes / No
15.	Declaration-cum-Undertaking that your company/organisation has not been black-listed or debarred from participating in any procurement activities by any State or Central Government or any other government organisation in India or abroad.		Yes / No

Sr. No.	Particulars	Provide Details	Enclosed
16.	Copies of relevant certificates, reference documents from the respective clients certifying technical, delivery and execution capability of the bidder. These certificates should be signed by the clients with their names, contact details.		Yes / No
17.	Copies of required certificates with regard to quality of their internal processes and services delivered (e.g. ISO/QSO or equivalent)		Yes / No
18.	Any other documents / certificates, that bidder would like to submit		Yes / No

CHAPTER - II

INTRODUCTION

The Square Kilometer Array (SKA) (see also www.skatelescope.org for more extensive information) is a next generation radio telescope to be constructed jointly by an international consortium that involves participants from both academia and industry. The SKA will be a revolutionary telescope, both in terms of expected science output as well as the engineering challenges in building it. The telescope will be located in radio quiet regions in South Africa and Australia, with operational headquarters near Manchester, UK. Construction of Phase 1 of the SKA, which is expected to start towards the end of 2021, has a total cost of about 2000 million Euros, spread out over a 10 year period (2021-2030) : 7-8 years of construction, followed by 2-3 years of commissioning, early science, and stabilisation towards routine operations. The construction of the SKA is being overseen by the SKA Observatory (SKAO), which is an intergovernmental organisation with individual countries as members.

India has worked extensively with the SKA project since its early years, including during the design phase (2014-2019), as well as during the ongoing prototyping and bridging phase (2019-2021). A proposal is currently under consideration by the Indian government for India to join the SKA organisation as a member country and to participate in the construction phase through the development and delivery of various software and hardware components. This request for Expression of Interest (EoI) is focussed on the Indian contribution to software based work packages of the SKA construction phase. A separate EoI will be issued for India's contributions to hardware work packages for the SKA construction.

During the detailed design phase of the SKA, which concluded about 2 years ago, the work done covered different technical aspects of the SKA, ranging from the receptors (e.g. dishes, dipole arrays) to the signal transport sub-system, the signal processing sub-system, data processing sub-system, infrastructure sub-systems etc. One such sub-system was the **Telescope Manager** which included the entire Monitoring and Control sub-system of the SKA telescope, in addition to a number of interfaces and links to other sub-systems. The detailed design of this Telescope Manager sub-system work package was executed by an international consortium led by NCRA, during 2014-2018. In addition, NCRA (and India) was also involved in the design of a few specific areas in other sub-systems, such as the Signal and Data Transport sub-system and the Central Signal Processing sub-system. Much of the design work was carried out in collaboration with industry, using funding provided to the NCRA from the Government of India.

The work on the Telescope Manager detailed design culminated in a critical design review (CDR) in 2018 by an international panel of experts. Post CDR, the Telescope Manager sub-system was redefined and renamed as the Observatory Management and Control (OMC) sub-system. Over the last two years (2019-2021), the Indian team continued its work on developing the OMC software, via delivery of early prototypes. During this bridging phase, work was carried out using an agile approach, following the Scaled Agile Framework (SAFe) methodology. Through the entire bridging phase, NCRA and its industry partners contributed one full SAFe team, in addition to a few experts on the Program management team and other specialist areas.

Construction of the SKA commenced in July 2021. Software is a critical component of the telescope and the OMC software is particularly important since it will be required for early testing and commissioning of the first set of receptor elements of the telescope.

Note that the Indian participation in the SKA project and contributions to the construction as described in this request for EoI are subject to continued funding support from the Government of India, for current and future phases of work.

CHAPTER – III

AIMS and OBJECTIVES

Through this EoI, NCRA would like to invite interested government, private and public sector organisations in India to indicate their interest and capability for participation during the construction phase of the SKA, for software oriented work packages. All such submissions will be evaluated by a technical committee and a final shortlist of organisations who meet the eligibility and evaluation requirements will be prepared. This shortlist can be used for competitive bidding for any software related work contract that is part of India's contribution to the SKA construction phase activities, by any other organisation in India that is contributing to such activities. Award of the actual work contracts will then be done via tenders floated amongst the shortlisted organisations.

CHAPTER - IV

SCOPE OF WORK - TECHNICAL DOCUMENT

4.1 The Square Kilometre Array (SKA)

The Square Kilometer Array (SKA) is a proposed next generation radio telescope to be constructed jointly by an international consortium that involves contributions from both academia and industry. This ambitious facility pushes the envelope in many areas of technology and is an unprecedented engineering challenge. Phase 1 of the telescope will be operational with its full capability by 2028, and will cost about 2 billion Euros to construct. The SKA will be built as two telescopes - the SKA-Mid in South Africa and the SKA-Low in Australia. At each site, hundreds to thousands of radio receptors located over ~ 100 km extent will be linked to create the most sensitive radio observatory to date. The SKA Phase 1 will operate at frequencies ranging from 70 MHz to 10 GHz (to be later extended to 30 GHz), achieved through dipole arrays (in Australia) and dish antennas (in South Africa). The telescopes are expected to answer fundamental questions in astrophysics about the nature of gravity, the role of magnetism, the formation of the first stars and galaxies, and possible extraterrestrial life.

Until early this year, SKA development was coordinated by the SKA Organisation, a not-for-profit company located in Manchester, UK. India was a member of the SKA organisation. In early 2021, the SKA Organisation transitioned to an intergovernmental organisation known as the SKA Observatory (SKAO) which will take on the task of building and operating the SKA telescopes. A detailed proposal has been submitted to the Government of India for India to join the SKAO as a member country and to contribute to the construction of the telescope. A majority of the Indian contribution is expected to be in software development, particularly in the area of Observatory Management and Control. Indian scientists will participate in using the telescope for doing science, after the telescope construction is completed.

4.2 NCRA and development of the design of the Telescope Manager

The National Centre for Radio Astrophysics (NCRA), based in Pune, is a centre of the Tata Institute of Fundamental Research (TIFR). The NCRA has built and runs the Giant Metrewave Radio Telescope (GMRT), one of the largest radio telescopes at low radio frequencies. The NCRA has been associated with the SKA project since its inception. Since around 2010, NCRA scientists and engineers, along with some industry partners, have been working on various aspects of the Monitoring and Control System of the SKA. In January 2011, NCRA was designated as the lead institution for this activity, charged with delivering "concept design" documents that were formally reviewed by an international panel of experts.

Following the successful completion of the Concept Design review in October 2011, the Monitoring and Control was expanded in scope and renamed the Telescope Manager. NCRA formed an international consortium, under its lead, to work on the Telescope Manager element of the SKA. This consortium bid for the Telescope Manager work for the detailed design phase (2013-18) and was awarded the bid by the SKA Office.

On being awarded the bid for Telescope Manager, the consortium then contracted out different parts of this work to consortium members and external parties, including private industry

identified initially through an EoI in 2014. We also participated at a lower level of commitment in several other work packages such as Centre Signal Processor, Signal and Data Transport etc.

4.3   Requirements for OMC software development

The SKA OMC software development will be carried out with the following **"Shared Vision"**:

> We are a global collaboration committed to building and delivering a world-class software and computing ecosystem, enabling the SKAO community to achieve transformational science.
>
> Our culture of innovation, shared governance, and respect for diversity creates mutual value for all.

All organisations who intend to participate in the development of SKA software are expected to align well with this shared vision.

The present request for EoI is for participation of Indian industry in the Indian team for OMC, during the SKA Phase 1 construction. The main mode of participation from India will be in the form of members of 4 full SAFe teams. As per SAFe protocols, each team is expected to consist of 5-7 developers, one Scrum Master and one Product owner. In addition to the SAFe teams, India expects to contribute some of the members of the Program team in roles such as Release Train Engineer, Product Manager etc. The development will be carried out through regular program increments (PIs), with each program increment lasting 3 months, with a total of 22 to 26 PIs, covering a total span of about 6-7 years. The 4 SAFe team requirement will be in steady state; there will be a ramp-up period in the beginning and a ramp-down period towards the end. The exact requirement of personnel in different roles and at different levels of experience is also likely to evolve over the construction period. Team size and membership will need to adjust to these changing requirements. We will modify human resource requirements from the participating organisations accordingly.

Throughout, the Indian teams will work in close coordination with the Software and Computing team at the SKA Observatory and with other OMC software teams from other SKA member countries participating in the OMC work package. PI planning meetings will be held every 3 months which the teams may need to attend -- either via online mode or physically whenever the pandemic situation permits. The teams will attend meetings, demos and other such events online, on a regular basis.

The experience and skill set of members of each team will vary. We expect to hire people at four levels - Junior, Base, Senior and Principal levels. The training, experience and skill-sets required at each level is described below:

Junior Level

Staff offered must demonstrate:-
1. Graduate level training in software development, or the equivalent amount of experience.
2. An enthusiasm for agile techniques and team working.
3. Ability to solve technical problems under the guidance of more senior engineers, evaluating alternative courses of action and innovating where necessary.
4. Ability to communicate effectively in small teams and with a friendly audience of peers.
5. Self-motivated and a willingness to take responsibility where appropriate.
6. A desire to learn new systems and techniques.

It is anticipated that approximately 25% of all resources would be at this level.

Base Level

Staff offered must demonstrate:-
1. Significant experience (typically 5 years full-time) in professional software development, or the equivalent, with a good understanding of software development processes, common design patterns and testing techniques.
2. Demonstrated experience of working using Agile and DevOps processes in a rapidly changing environment where change is embraced. Sensitive to down-stream waste and impact.
3. "T-shaped" skills with a depth of expertise in a particular area, and an ability to collaborate across disciplines with experts in other areas and to apply knowledge in areas of expertise other than their own. Self-motivated and a willingness to take responsibility and work without direct supervision. Ability to solve technical problems, evaluating alternative courses of action and innovating where necessary.
4. Ability to communicate effectively to a wide audience and in small teams.
5. An understanding of staff mentoring and support.
6. Ability to reliably estimate and plan developments with moderate (multi-month) time horizons.

It is anticipated that approximately 30% of all resources would be at this level.

Senior Level

Staff offered must demonstrate:-
1. Extensive experience (typically 10 years full-time) in the software design and/or programming of relevant systems, with a good understanding of architectural concepts and the relationship between architecture and system quality.
2. A deep understanding of agile methodologies and DevOps processes, including the importance of customer focus, servant/leadership and minimising waste in all areas of the system development process.
3. "E-shaped" skills, with a depth of expertise in multiple areas, and experience across many areas. Proven execution and delivery ability, highly innovative and able to solve highly complex technical problems.
4. Ability to communicate effectively to a wide audience and a wide range of stakeholders, gathering information and distilling information and tailoring it appropriately for the target audience.

5. Ability to provide technical leadership to a development team, mentoring team members and motivating them when necessary.
6. Ability to reliably estimate and plan large developments with long (multi-year) time horizons.
7. A good understanding of the domain issues of Radio Astronomy and the SKA in their skill set areas.

It is anticipated that approximately 30% of all resources would be at this level.

Principal Level

Staff offered must demonstrate:-
1. Extensive experience (typically 15 years full-time, much of it in a leadership role) in the software design and/or programming of relevant systems, a deep understanding of architectural concepts and the relationship between architecture and system quality.
2. A deep understanding of scaled agile methodologies and DevOps processes, including the importance of customer focus, servant/leadership and minimising waste in all areas of the system development process.
3. "E-shaped" skills, with a depth of expertise in multiple areas, and experience across many areas. Proven execution and delivery ability, highly innovative and able to solve highly complex technical problems.
4. Ability to communicate effectively to a wide audience and a wide range of stakeholders, gathering information and distilling information and tailoring it appropriately for the target audience.
5. Ability to develop and convey a technical vision to both stakeholders and a team of development teams, working mentoring team members and motivating them when necessary.
6. Ability to reliably estimate and plan large developments with long (multi-year) time horizons.
7. An excellent understanding of the domain issues of Radio Astronomy and the SKA in their skill set areas.

It is anticipated that approximately 15% of all resources would be at this level.

The specific experience and skills expected of all team members in a developer role include the following:

Developer:

Essential:
- Experience of Agile development processes,
- Experience of the Git distributed version control system,
- Experience with the Python programming language,
- Experience in test automation and continuous integration,
- Experience of Test Driven Development,
- Excellent communication skills, ability to work effectively as part of a team.
- Ability to travel to international planning meetings 2-4 times/year (after the
- pandemic has passed)..

Desirable:
- Experience in C/C++ development
- Knowledge of Behaviour Driven Development and Gherkin
- Experience with modern container and orchestration frameworks such as Docker and Kubernetes.

Web and Business Systems Developer:

Essential:
- Experience of software and systems engineering applied to the development of Web applications and services.
- Experience of software development in JavaScript and Python/Flask.
- Experience in developing and integration with REST and GraphQL APIs.
- Experience of software development with JavaScript based frameworks (e.g. React, TypeScript and/or AngularJS).

Desirable:
- Experience with SQL databases such as MariaDB, MySQL and Postgres
- Experience with noSQL databases like MongoDB.
- Experience with development of distributed information systems.
- Practical experience of configuring instrumentation and commissioning control systems and parts of scientific instruments.
- Experience or understanding of interferometry techniques
- Experience or understanding of observatory operations, or similar large science operations

User Experience Developer

Essential
- Experience of software and systems engineering applied to the development of Web applications and services.
- Experience of creating visually pleasing graphic designs for web applications and pages.
- Experience of testing and analysing user behaviour using a variety of methods to improve the user experience.
- Experience of using lean principles in user interface design.
- Experience of software development with JavaScript based frameworks (e.g. React /TypeScript and/or AngularJS).
- Experience of communicating with a wide variety of stakeholders in diverse roles to understand their requirements.

Database Developer

Essential:
- Experience of software engineering to support and develop Relational Databases and associated services.
- Experience with SQL databases such as MariaDB, MySQL and Postgres.
- Experience with No-SQL or document oriented databases such as Elasticsearch (Solr, Lucene, ElasticStack), and Redis

- Experience with time-series databases such as OpenTSDB, InfluxDB, and Prometheus
- Ability to write SQL queries, stored procedures, and perform basic database development leveraging SQL database standard.
- Experience with developing database web-APIs in Python or PHP.
- Experience in configuring and operating distributed data storage systems.

Team members for the OMC teams are also expected to be proficient in:

Essential:
- Experience of software and systems engineering applied to the development of Supervisory Control and Data Acquisition (SCADA) systems.

Desirable:
- Familiarity with and experience of the TANGO toolkit, including TANGO device development, and TANGO client-side tools.
- Practical experience of configuring instrumentation and commissioning control systems and parts of scientific instruments.
- Experience in web and business systems development
- Experience in database development
- Experience or understanding of radio astronomy interferometry techniques

Team members in non-developer roles such as Scrum Master and Product Owner will also be expected to possess specific knowledge, skills and experience as described below:

Product Owner / Product Manager:

Essential:
- Extensive experience in a relevant domain (e.g. Astronomy, Web, SCADA or data analysis systems) or a closely related field.
- Experience of software development in a scientific environment, or equivalent.
- Experience with the operation of radio observatories.
- The ability to manage workloads and targets in a dynamic and collaborative environment.
- Ability to work effectively with engineers and scientists from a variety of cultures.
- Excellent communication skills in English both upwards and downwards and with highly specialised project teams.

Desirable:
- The ability to influence people in widely differing parts of a complex organisation.
- Experience in a similar role within a Software Development Project in a Scientific/Astronomical environment.
- Agile certification (Scaled Agile Program Consultant, BCS Agile Practitioner certification or similar).
- Project management experience in a software development environment.
- Experience of working with teams across multiple time zones.

Agile Coach / Scrum Master:

Essential:
- Experience as Scrum Master or Agile Coach in an agile environment.
- Experience/understanding of the domain/scope of the development team.

Desirable:
- The ability to influence people in widely differing parts of a complex organisation.
- Experience in a similar role within a Software Development Project in a Scientific/Astronomical environment.
- Agile certification (Scaled Agile Program Consultant, Scaled Agile Scrum Master,
- BCS Agile Practitioner certification or similar).
- Project management experience in a software development environment.
- Experience of working with teams across multiple time zones.

4.4 Systems other than the Observatory management and control

Though India is the major SKAO contributor in the OMC area, close contact will be maintained by India with the software work in other domains. NCRA will also be involved directly, though at a lower level of participation, in other areas of software development. Hence, responses are invited about interests in these other domains as well. For example, India will contribute in realizing the hardware, firmware and software needed to search for pulsars using the SKA-Low and SKA-Mid telescopes. The work here involves building a real-time pulsar search software pipeline with high-performance signal processing algorithms following the Safe/Agile and DevOps methodologies. For more information, please see the key documents referred to below.

In addition to these projected requirements, it is possible that additional opportunities in software development, open up within the SKA project. As and when this happens, we will seek additional resources from the selected organisations, to service these opportunities. Such resources will also be expected to follow the SAFe work methodology.

4.5 Additional information

The SKA Observatory has published a number of **key documents** at the following URL:
https://www.skatelescope.org/key-documents/

These include a high level executive summary, the SKA Phase 1 construction proposal and the observatory establishment and delivery plan. A number of other key design documents describing the telescope in great detail are also available at the same URL.

For the software development work, a further set of documents described below will be very useful. They provide detailed background on the work to be done in software development, the processes and standards to be followed and the tools and technologies to be used during development, testing and commissioning of SKA software. .

- SKAO development processes:
  - https://developer.skao.int
- Primary SKAO Software and Computing standards, plans and policies:
  - Fundamental SKA Software & Hardware Description Language Standards:
    - https://developer.skao.int/en/latest/policies/fundamental-sw-requirements.html
  - SKA Software Product Quality Assurance Plan:
    - https://developer.skao.int/en/latest/policies/sw-quality-assurance.html
  - SKA ISMS Software Development Security Policy:
    - https://drive.google.com/file/d/1mNIeiy_h7p2z9kDPZZfewlwHy5SYwabE
- Scaled Agile Framework:
  - https://www.scaledagileframework.com/

For further technical clarifications please write to:

- Prof. Yashwant Gupta (ygupta@ncra.tifr.res.in), NCRA-TIFR, Pune
- Prof. Yogesh Wadadekar (yogesh@ncra.tifr.res.in), NCRA-TIFR, Pune

For clarifications on administrative and procedural matters please write to:

- Dr. J. K. Solanki (solanki@ncra.tifr.res.in), NCRA-TIFR, Pune

Postal Address:

The Centre Director,
National Centre for Radio Astrophysics (NCRA)
Tata Institute of Fundamental Research (TIFR)
Savitribai Phule Pune University Campus,
Post Bag 3, Ganeshkhind,
Pune 411007

Tel - 020 2571 9000/9111

CHAPTER – V

Eligibility Criteria:

Table of Eligibility Criteria is as follows

Sr. No.	Eligibility Criterion	Supporting documents to be supplied
1.	Bidder must be a Firm / Company / MSME registered under the Indian Company Acts OR a Society registered under Societies Act, 1860 OR a PSU / Autonomous bodies or any other venture not covered above, registered under the relevant Government Statute and authorised to carry out the services / business. Joint Ventures and Consortia are not permitted.	Valid Registration Certificate(s)
2.	Bidder must have all relevant registrations such as Incorporation Certificate, MOA, PAN, TAN, and GST, Tax etc.	Copies of all certificates with current validity
3.	Bidder must have been in the business for past **Seven** years prior to this advertisement.	Documentary proof of being in the relevant business for 7 years
4.	The Bidder should have executed software development projects of sufficiently large scale or complexity. In particular, the bidder should have executed at least one of the following, during the last seven years : (i) a single large project of total value of 100 Cr or more with a single client (ii) two projects, each of total value of 80 Cr. or more, with same or different clients or (iii) three projects, each of total value of 60 Cr or more, with same or different clients.	Certified copies of work orders / POs and Certificates from clients.
5.	Bidder should have executed at least one project of scale or technical complexity similar to the requirements of this EoI, in the field of software development for scientific research applications, carried out in India.	Relevant PO/Work order copy and certification from client.
6.	Bidder should have the required manpower of qualified personnel with the required skill sets and experience in the domain area of the work, as specified in Chapter IV, including required number of SAFe certified staff members.	Details about numbers of manpower meeting the required skill set and experience, including at different levels of SAFe certification.
7.	Bidder must submit relevant reference documents, information and certificates from the respective clients certifying technical, delivery & execution capability of the bidder, signed by the client; and the contact names & numbers of all such clients (including those in Sr. No. 4 & Sr. No. 5 above).	Relevant certificates, letters, declaration, etc. along with contact details of the clients.

Sr. No.	Eligibility Criterion	Supporting documents to be supplied
8.	The bidder should have annual turnover of at least Rs. 30 Cr (Rupees thirty crores) during each of the last five financial years (2020-21, 2019-20, 2018-19, 2017-18, and 2016-17) from similar services. The Balance Sheet, P&L statements of the company for the last five years should be positive.	Annual Turnover Certificate from the authorised CA Firm for the relevant period.
9.	Bidder must submit a Solvency Certificate from a Scheduled Bank from India where the Bidder has a working current account, for at least Rs. 20 Cr.	Solvency Certificate from Scheduled Bank obtained for this purpose only.
10.	Bidder must have the necessary in-house infrastructure, trained personnel and expertise for meeting the technical requirements in Chapter IV. No sub-contracting will be allowed.	Documents/Undertaking supporting all these requirements.
11.	The Bidder should have the required certifications with regard to quality of their internal processes and services delivered (e.g. ISO / QSO or equivalent).	Certifications / Relevant Documents
12.	Bidder's firm should not have been black-listed / or debarred from participating in any procurement activities by any State or Central Government or any other government organization in India or abroad.	Undertaking to this effect on official letter head.
13.	The bidder must warrant that there is no legal action ongoing against it for any cause in any legal jurisdiction. If such an action exists and the bidder considers that it does not affect its ability to deliver the EOI requirements, it shall provide details of the action(s).	Declaration to this effect on official letter head.

Note: Eligibility Criteria mentioned at Sr.No. 7 to 10 and 12 to 13 above, will be relaxed for PSUs / Autonomous Bodies of Government of India, if they are otherwise eligible.

CHAPTER - VI

EVALUATION PROCESS:

1. The objective of the evaluation process is to evaluate the bids (EoIs) to select suitable organisations for engagement for the projects mentioned in the scope of work (technical) in Chapter-IV.
2. The evaluation will be undertaken by a Technical Evaluation Committee (TEC) formed by the appropriate competent authority / Centre Director, NCRA. The TEC would have external experts and officials of the Centre.
3. Only bids from Bidders meeting the eligibility criteria as per Chapter-V and submitting complete and responsive bids will be processed for evaluation.
4. The Centre and TEC will carry out the initial scrutiny to ascertain compliance with the Eligibility criteria listed under Chapter-V, and elimination of those bidders who do not meet the required eligibility criteria. Proposals not conforming to the eligibility criteria will be rejected.
5. The TEC will evaluate the EOI responses from the eligible bidders (as determined form item #s 3 & 4 above) and short list only those who demonstrate competence and capability to deliver specified services as per the evaluation process. The decision of the Centre is final and binding on all the bidders.
6. The evaluation criteria shall be based on the requirements, stated elsewhere in this document : evaluation table (given later in this chapter) and general terms and conditions (Chapter-VII). The evaluation will also take into consideration the supporting documents.
7. TEC and the Centre are authorised to interact with the Bidders for discussions, clarifications etc. during the evaluation process. The TEC can seek more documents and information from the bidders. The responses and outcome from these will also be taken into consideration in the evaluation process.
8. Eligible Bidders would be invited by the Centre to make exclusive presentations to the TEC detailing their response to the EoI. The Bidder(s) would be required to present details of their experience and expertise in handling similar projects which would be evaluated by the TEC. It is expected that the Bidder provides the details for each of the implementations separately, covering the complete scope of work. The Bidder(s) would be required to present details of the proposed team profile as detailed elsewhere in this document (Chapter-IV), as well as demonstrate commitment, technical competence / capability to provide the services required, over the entire duration of the project as defined in Chapter-IV.
9. The decision of the TEC as approved by the Competent Authority of the Centre shall be considered final.
10. The Centre at its discretion or recommendation of the TEC, may reject the proposal of a Bidder without giving any reason whatsoever, if in the Centre's opinion, the Bidder could not present itself as detailed in the proposal / submission.
11. The Centre reserves the right to change the evaluation criteria and evaluation process for this EoI, till the date before the "Date of submission of EoI". Bidders are advised to keep checking of any changes, at the website link : http://www.ncra.tifr.res.in/ncra/ncra1/public-tenders-1
12. The Centre reserves the right to suspend or cancel the entire process, reject one or all bids, without assigning any reasons. The Centre may stop any of activities / processes of this EoI, for reasons beyond its control.
13. Dispute arising out of this EoI or related aspects: For any dispute arising out of this EoI submission and evaluation process, it should be the intention of both the parties to settle the matter amicably without referring it to the Court of Law. For any unresolved dispute, the matter will be referred to the competent higher authority in TIFR, whose decision will be final and binding on both the parties.
14. Jurisdiction : in Pune courts only, if required.

Evaluation Table (including, but not limited to the following) -- to be used by the TEC for evaluating each of the bids received, alongwith the detailed Technical Evaluation Report, for making the final decisions (NOT TO BE FILLED BY THE BIDDER) :

Sr.No.	Evaluation criterion	Criterion met or not (to be evaluated by the TEC)
1.	Bidder has submitted all the documents as per the eligibility criteria table in Chapter-V, and the same have been reverified by TEC.	YES / NO
2.	Bidder has demonstrated technical competence and capability, as per item #4 in the eligibility criteria table in Chapter-V	YES / NO
3.	Bidder has demonstrated technical competence and required experience, as per item #5 in the eligibility criteria table in Chapter-V	YES / NO
4.	Bidder has satisfied the requirements as per item #6 of the eligibility criteria table in Chapter-V	YES / NO
5.	Bidder has satisfied the requirements as per item #7 of the eligibility criteria table in Chapter-V	YES / NO
6.	Bidder has quality certifications with regard to quality of their internal processes and services delivered	YES / NO
7.	Bidder has the team of professionals having domain knowledge and experience – meeting the Centre's requirements	YES / NO
8.	Bidder has carried out the software development project of similar scale and complexity	YES / NO
9.	The presentation made by the bidder satisfies that the bidder will be able to carry out software development work under the scope of this EOI which aligned with the Shared Vision of SKA software development	YES / NO
10.	Bidder is ready to depute their representative for face-to-face meeting as and when required, to sort out any issues	YES / NO
11.	Bidder is aware that the Centre may add or delete some of the activities by giving a notice and the Bidder is ready for the same	YES / NO
12.	Bidder has responded to any additional inputs or information sought by the TEC	YES / NO

Notes :

(i) Outcome of the evaluation process will be communicated to all the bidding parties.

(ii) Only the selected bidders/organisations will be empanelled for further course of action such as submitting technical bids for specific work proposed based on the requirements. During

these processes, the Centre may ask the empanelled bidders to provide more information about their financial terms and conditions, including rate charts.

(iii) The list of the empanelled bidders will be valid for the period for which India is contributing to the SKA project OR earlier. In case of any bidder becoming technically or otherwise disqualified / ineligible at any point of time, such bidders will be removed from the list of empanelled bidders.

CHAPTER - VII

GENERAL TERMS AND CONDITIONS

1. Language of Bids: All Bids and supporting documentation shall be submitted in English. The proposal should be prepared in English in PDF format.
2. Adherence to terms and conditions: The bidders who wish to submit responses to this EoI should note that they should abide by all the terms and conditions contained in the EoI. If the responses contain any extraneous conditions put in by the respondents, such responses will be disqualified and will not be considered for the selection process.
3. The Centre reserves the right to:
   a. Reject any and all responses received in response to the EoI without assigning any reason whatsoever
   b. Cancel the EoI/Tender at any stage, without assigning any reason whatsoever
   c. Waive or Change any formalities, irregularities, or inconsistencies in this proposal (format and delivery). Such a change/waiver would be duly and publicly notified in the Centre's website before the closure of the bid submission date
   d. Extend the time for submission of all proposals and such an extension would be duly and publicly notified in the Centre's website.
   e. Share the information/ clarifications provided in response to EoI by any bidder, with all other bidder(s) /others, in the same form as clarified to the bidder raising the query.
4. Confidentiality: Information relating to the examination, clarification and comparison of the Proposals shall not be disclosed to any Respondents or any other persons not officially concerned with such process until the identification process is over. The undue use by any Respondent of confidential information related to the process may result in rejection of its Proposal. During the execution of the project except with the prior written consent of the Centre, the Consultant and its personnel shall not at any time communicate to any person or entity any confidential information acquired in the course of the Contract.
5. DISCLAIMER : The Centre and/or its officers, employees disclaim all liability from any loss or damage, whether foreseeable or not, suffered by any bidder/consultant/person acting on or refraining from acting because of any information including statements, information, forecasts, estimates or projections contained in this document or conduct ancillary to it whether or not the loss or damage arises in connection with any omission, negligence, default, lack of care or misrepresentation on the part of Corporation and/or any of its officers, employees.
6. Should the bidder have additional information to submit that cannot be encompassed by the current table of contents, additional sections may be added at the end or additional papers may be added.
7. The bidder has to submit the response in hard copy and soft copy (by CD or pen drive) at the address given on the cover page. All items submitted should be neatly labelled and should also include the name of the bidder.
8. For any clarification with respect to this EOI, following officials, nominated point of contacts, may be contacted by way of following communication means: -
   a. Prof. Yogesh Wadadekar yogesh@ncra.tifr.res.in , 020 25719238
   b. Prof. Yashwant Gupta ygupta@ncra.tifr.res.in , 020 25719242
   c. Dr. J. K. Solanki solanki@ncra.tifr.res.in, 020 25719223

9. It may be noted that all queries, clarifications, questions etc., relating to this EoI, technical or otherwise, must be only in writing or email, and should be addressed to the nominated point of contact.
10. Requests for clarification may be submitted to the Centre at least 2 days prior to Pre-bid meeting and clarifications for such queries shall be provided by the Centre or its representative in the pre-bid meeting.
11. Bidders should provide their email address in their queries without fail since replies from Centre will be by emails only. The email address and phone/fax numbers of the bidder should also be indicated on the sealed cover.
12. Please Note: This is not a Request for proposal (RFP) and commercials are not to be submitted with this "Expression of Interest".