भारत सरकार/GOVERNMENT OF INDIA
अंतरिक्ष विभाग/DEPARTMENT OF SPACE
इसरो दूरमिति अनुवर्तन तथा आदेश संचारजाल (इस्ट्रैक)
ISRO TELEMETRY TRACKING AND COMMAND NETWORK (ISTRAC)
प्लॉट सं/Plot No. 12 एवं/& 13, 3rd मेन/Main, 2nd फेज/Phase
पीण्या औद्योगिक क्षेत्र/PEENYA INDUSTRIAL AREA, बैंगलूर/BANGALORE –560 058

Ref: ISTRAC/PURC/2017E01061 **Date: 18.04.2017**

इच्छा की अभिव्यक्ति/EXPRESSION OF INTEREST

वरिष्ठ क्रय व भण्डार अधिकारी, इसरो दूरमिति अनुवर्तन तथा आदेश संचारजाल (इस्ट्रैक), बेंगलूर इस्ट्रैक/इसरो के लिए टर्न-की आधार पर ध्रुवणमापी डॉप्लर मौसम राडार की आपूर्ति, स्थापना व अभिचालन के लिए इच्छुक फर्मों से इच्छा की अभिव्यक्ति (ईओआई) आमंत्रित करते हैं । Sr. Purchase & Stores Officer, ISRO Telemetry Tracking and Command Network (ISTRAC), Bangalore invites Expression of Interest (EOI) from interested firms for Supply, Installation and Commissioning of the Polarimetric Doppler Weather Radars for ISTRAC/ISRO on a turn-key basis.

इसरो वेबसाइट www.isro.gov.in में परियोजना की अनुपालन तालिका सहित संक्षिप्त कार्यक्षेत्र उपलब्ध है, इसे वेबसाइट से डाउनलोड किया जा सकता है । कृपया अधोहस्ताक्षरी को मोहरबंद लिफाफे के ऊपर उपर्युक्त संदर्भ संख्या तथा देय दिनांक लिखते हुए देय दिनांक 12.05.2017 को 15.00 घंटे या इससे पहले विस्तृत प्रतिक्रिया भेजें । शुद्धिपत्र होने पर केवल हमारी वेबसाइट पर प्रकाशित किया जाएगा । A brief scope of the Project along with compliance table is available in ISRO website www.isro.gov.in, the same can be downloaded from the website. Please submit detailed response to the undersigned on or before due date and time i.e. 12.05.2017 at 15.00 Hrs. IST in a sealed cover super-scribing the above mentioned Reference No. and due date on the envelop. Corrigendum if any will be published in our website only.

Sd/-

दिनांक /Date: 18/04/2017 **व. क्रय एवं भण्डार अधिकारी** / Sr. Purchase & Stores Officer

Inviting Expression of Interest (EoI)
For Supply, Installation and Commissioning of the
Polarimetric Doppler Weather Radars

ISRO TELEMETRY TRACKING AND COMMAND NETWORK
INDIAN SPACE RESEARCH ORGANISATION
DEPARTMENT OF SPACE, GOVT. OF INDIA

BANGALORE -560058

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Abstract of EoI

Under the R&D programme of Indian Space Research Organization (ISRO) Radar Development Area ISTRAC has developed and matured the technology for the design and development of Doppler weather Radar (DWR) and atmospheric (wind profilers) Radar systems and deployed in number of places across India. These Radars operate at various frequencies starting from VHF to X-Band with different application requirements. The requirement of this kind of system is expected to increase many fold for improving advanced weather monitoring, weather forecasting, weather modeling, climatology, study on atmospheric dynamics, and large number of other applications support associated with weather and atmospheric parameters. These Radars will be deployed at different places in India as per the decision of ISRO/User agencies/Govt. of India. With the principal objective of capacity building, expanding the technology and developing & manufacturing large number of DWRs for the country, ISRO is planning to identify potential industry/manufactures capable of manufacturing as per the technical specification generated by Radar Development Area, ISTRAC/ISRO under the transfer of technology/technical guidance/consultancy.

The objective of this document is to solicit Expression of Interest (EoI) proposals from the interested manufacturers/developers for identification of the parties for participating in the techno-commercial bid process for the ***Supply, Installation and Commissioning of a state-of-the-art DWRs*** *for ISTRAC/,ISRO*, on a turn-key basis, for the above purpose.

The proposal should be submitted as an Expression of Interest (EoI), clearly indicating the expertise of the party in the design, development, installation, testing, and commissioning of Radar Systems and their involvement and realization in similar projects in the past and status of these projects at present. Company profile of the bidder, areas of expertise and previous experience in other projects should be included. The completed compliance table in the specified format should be submitted along with the other required details.

1. Introduction & Main Objectives

1.1 Indian Space Research Organisation (ISRO), Department of Space (DOS), Government of India (GoI) is the premier organization in India responsible for space research and development of space-based systems comprising launch vehicles, satellites and ground segment facilities to meet the country's application requirements in communication, broadcasting, meteorology and remote sensing.

1.2 ISRO Telemetry Tracking and Command Network (ISTRAC) is a leading institution under the Indian Space Research Organisation (ISRO), Department of Space (DOS) primarily responsible for the research and development of Satellite Ground stations.

1.3 Radar Development Area (RDA), a Area under ISTRAC, is one of the leading institution dedicated for research activities in the frontier areas of Tracking and weather Radars for national requirements.

1.4 The objective of this document is to solicit Expression of Interest (EoI) proposals from the interested manufacturers/developers for identification of the parties for participating in the bid process for the Design, Development, installation, Testing and Commissioning of a state-of-the-art DWR systems of X and C band frequencies for ISTARC/ISRO, on a turn-key basis.

1.5 The requirement of large number of atmospheric and weather radars manufacturing, spare parts for all systems with the objective of uninterrupted operation by 24x7, opportunity to build and operate the radar systems under the operational guidance of ISRO/user agencies, entering in to Annual Maintenance Contract (AMC) offers major business opportunity to the industry/manufacturer/vendor.

1.6 DWR System provides the most effective means of obtaining continuous Rainfall estimation with sufficient temporal and spatial resolutions. The main scientific objectives of the proposed DWR System is to provide 24/7 weather surveillance.

The requirement of this kind of system is expected to increase many fold for improving advanced weather monitoring, weather forecasting, weather modeling, climatology, study on atmospheric dynamics, and large number of other applications support associated with weather and atmospheric parameters. These DWRs will be deployed at different places in India as per the decision of ISRO/User agencies/Govt. of

India. With the principal of objective of capacity building, expanding the technology and developing & manufacturing large number of Radars for the country.

2. Requirements and Nominal Technical specifications:

The proposed DWR System should be capable of providing weather surveillance upto 400Km based on frequency of operation. The system should be rugged enough for daily continuous operations for 24/7. The system requirements are given in Table-1. Nominal technical specifications of the system have been arrived at on the basis of the scientific requirements and are detailed in Table-1 and Secs. 2.1 & 2.2. It may be noted that the technical specifications stated here are nominal.

The bidder may also submit any viable, superior and proven alternate methods/specifications for improved and cost-effective performance of the system and realization of the objectives, technical requirements and deliverables stated in Table-1.

2.1. General Specifications and Requirements:

2.1.1. The *Weather Radar System* should be rugged enough to operate remotely and unmanned for 24/7 continuous operations with minimum complexity to cater to the scientific and operational needs.

2.1.2. The final design should be supported by detailed simulations of the Radar signal for the proposed configurations, clearly ascertaining feasibility of the proposed design to realize the requirements.

2.1.3. The design of the Weather Radar System should be versatile and provide scope for future augmentations.

Table-1: Technical Requirements

Radar1: SSPA based C-Band Polarimetric Doppler Weather Radar	
System Features	
Dual polarization and Doppler function	
Fully Solid State Technology	
Higher reliability and performance and low maintenance cost	
Fully Automatic and Un Manned Operations	
Observation interval: 1 to 5 minute	
System Specifications	
Operating Frequency	5.60-5.65 GHz
System Bandwidth	5MHz
Pulse Width	0.2 to 200µsec
Pulse Repetition Frequency (PRF)	100 Hz to 8000 Hz
Staggered PRF Ratio	Non, 3:2, 4:3 or 5:4 (selectable)
Modulation	Pulse Modulation, Phase Coding, LFM
Observation Range	450 km
Range Resolution	30m to 300m (depend on PW)
Sensitivity - Reflectivity	Maximum 400 km @ 23 dBz
Reflectivity Accuracy	2dB @200Km, 23dBz
Maximum Doppler Velocity	60 m/s (depend on PRF) with 1m/s Accuracy
SSPA Peak Power for H & V Ch	4KW in each channel
SSPA Duty Ratio	10%
Azimuth & Elevation Beam Width	1deg
Azimuth	0-360 deg with 0.1deg step and accuracy
Elevation	-2 to 95 deg with 0.1deg step and accuracy
Base Data Products	Received Signal Power (Pr)
	Radar Reflectivity (Zh & Zv)
	Doppler Velocity (Vh)
	Spectral Width (Wh)
Polarization Data Products	Differential Reflectivity (ZDR) Differential Phase (ΦDP) Specific Differential Phase (KDP) Correlation Coefficient (ρhv) Liner Depolarization Ratio (LDRvh/hv)

Radar2: SSPA based X-Band Polarimetric Doppler Weather Radar	
System Features	
Dual polarization and Doppler function	
Fully Solid State Technology	
Higher reliability and performance and low maintenance cost	
Fully Automatic and Un Manned Operations	
Observation interval: 1 to 5 minute	
System Specifications	
Operating Frequency	9.30 - 9.80 GHz
System Bandwidth	5MHz
Pulse Width	0.2 to 100µsec
Pulse Repetition Frequency (PRF)	100 Hz to 8000 Hz
Staggered PRF Ratio	Non, 3:2, 4:3 or 5:4 (selectable)
Modulation	Pulse Modulation, Phase Coding, LFM
Observation Range	150Km
Range Resolution	30m to 300m (depend on PW)
Sensitivity - Reflectivity	80 km @ 23 dBz, 120 km @ 27.8 dBz
Reflectivity Accuracy	2dB @100Km, 23dBz
Maximum Doppler Velocity	60 m/s (depend on PRF) with 1m/s Accuracy
SSPA Peak Power for H & V Ch	200W in each channel
SSPA Duty Ratio	10%
Azimuth & Elevation Beam Width	1deg
Azimuth	0-360 deg with 0.1deg step and accuracy
Elevation	-2 to 95 deg with 0.1deg step and accuracy
Basic Data Output	Received Signal Power (Pr)
	Radar Reflectivity (Zh & Zv)
	Doppler Velocity (Vh)
	Spectral Width (Wh)
Polarization Data Output	Differential Reflectivity (ZDR) Differential Phase (ΦDP) Specific Differential Phase (KDP) Correlation Coefficient (ρhv) Liner Depolarization Ratio (LDRvh/hv)

Radar3: X-Band Polarimetric Doppler Weather Radar Up-gradation	
System Features	
Dual polarization and Doppler function	
Fully Solid State Technology	
Higher reliability and performance and low maintenance cost	
Fully Automatic and Un Manned Operations	
Observation interval: 1 to 5 minute	
System Specifications	
Operating Frequency	9.30 - 9.80 GHz
System Bandwidth	5MHz
Pulse Width	0.2 to 100µsec
Pulse Repetition Frequency (PRF)	100 Hz to 8000 Hz
Staggered PRF Ratio	Non, 3:2, 4:3 or 5:4 (selectable)
Modulation	Pulse Modulation, Phase Coding, LFM
Observation Range	150Km
Range Resolution	30m to 300m (depend on PW)
Sensitivity - Reflectivity	80 km @ 23 dBz, 120 km @ 27.8 dBz
Reflectivity Accuracy	2dB @100Km, 23dBz
Maximum Doppler Velocity	60 m/s (depend on PRF) with 1m/s Accuracy
SSPA Peak Power for H & V Ch	200W in each channel
SSPA Duty Ratio	10%
Azimuth & Elevation Beam Width	1deg
Azimuth	0-360 deg with 0.1deg step and accuracy
Elevation	-2 to 95 deg with 0.1deg step and accuracy
Basic Data Output	Received Signal Power (Pr)
	Radar Reflectivity (Zh & Zv)
	Doppler Velocity (Vh)
	Spectral Width (Wh)
Polarization Data Output	Differential Reflectivity (ZDR) Differential Phase (ΦDP) Specific Differential Phase (KDP) Correlation Coefficient (ρhv) Liner Depolarization Ratio (LDRvh/hv)

2.2. Other Specifications/Requirements

2.2.1. ISTRAC reserves the right to witness the tests and review the progress of work at various milestones of the program at any point of time during the contract tenure.

2.2.2. Adequate test points should be provided in the system for the health monitoring and speedy trouble shooting. These aspects should be explicitly stated in the maintenance/trouble shooting manual.

2.2.3. Report on the detailed simulations for different Radar configurations and the methods and assumptions involved, and the optimum Radar configuration arrived at should be included as part of the detailed design document.

2.2.4. All the sub-systems and components used in the Weather Radar should be of high quality and reliability to support long-term and continuous operation of the system. They should be of long-operational life and should be from highly reliable and reputed manufacturers with proven track-record. Make, model numbers and detailed technical specifications of all the sub-systems and components should be provided during the bidding stage.

2.2.5. Critical sub-systems and components that may fail over long period operation should be stated explicitly. Adequate spares should be supplied along with the Radar system for trouble-free operation for 10 years.

2.2.6. All the sub-systems/components should meet or be better than the technical specifications provided in tender document.

2.2.7. The source code of application software/firmware and development tools should be supplied with ISRO standard documentation.

2.2.8. Should provide three sets of operational manuals, detailed technical manuals, service and maintenance manuals, troubleshooting manuals, etc. The documentation shall cover layout diagrams of all sub-systems and components for systematic fault diagnostic. These copies should also be provided in softcopy version.

2.3 ISTRAC/ISRO PREROGATIVE

2.3.1. MOU will be signed with prospective party/parties for the development of radar systems as per the technical specification generated by ISRO.

2.3.2. ISRO may engage with the parties for partial development of radar system/systems at its convenience.

2.3.3. The ownership of complete radar system and its technology ownership lies with ISRO and parties don't have right to sell the radar system without the prior permission/approval from ISRO.

2.3.4. Parties cannot transfer the knowhow or technology of complete radar system to third party without the prior permission/knowledge of ISRO.

2.3.5. ISRO may charge a royalty fee as and when decided for each radar system manufactured by the party.

2.3.6. Since ISRO supports the technological guidance, all system/ subsystem/documents should have ISRO logo.

2.3.7. Complete technical details, design document, software, third party device drivers and other blueprints about the system/subsystem shall be handed over to ISTRAC/ISRO under non-disclosure agreement to the third party.

2.3.8. ISRO has the right to use or develop new subsystems as and when required for keeping the system healthy and operational.

2.3.9. ISRO may change any subsystem with new technology design, as it feels, without prior notice to party for the betterment of system and weather observation.

3. General Instructions for the submission of Expression of Interest (EoI)

3.1 The proposal should be submitted as an Expression of Interest (EoI), clearly indicating the expertise in the design, development, installation, testing and commissioning of the Polarimetric Doppler Weather Radar(PDWR), their involvement and realization in similar projects in the past and status of these projects at present. Company profile of the bidder including the facilities and manpower available, areas of expertise and previous experience in other projects should be included.

3.2 If required, the Party responding to the EoI may be invited for further discussions at ISTRAC for assessment of the capabilities stated in the EoI and for providing any clarifications.

3.3 The EoI is not an offer and is issued with no commitment. ISTRAC reserves the right to withdraw the EoI and change or vary any part thereof at any stage, if it determines that such action is in the best interest of the Government of India. ISTRAC also reserves the right to disqualify any bidder, should it be so necessary at any stage.

3.4 The parties shortlisted (based on EoI and assessment of their potential to carry out the proposed work) would be issued formal tender inquiry / Request for Proposal, inviting their technical and commercial bids at a later date.

3.5 The EoI should contain the details requested below and a completed compliance matrix

3.6 The parties submitting their proposals should be manufactures/developers of Weather Radar systems or their major systems, having good infrastructure and technical expertise for undertaking the activities proposed in this document on a turn-key basis.

3.7 The Party should have at least 5 years of experience and proven track-record in all or most of the following:

(i) Design, development, installation and testing of Radar systems.

(ii) Demonstrated expertise in the development of Radar Systems

(iii)Expertise and technical capabilities for high power Transmitters (Klystron/Magnetron), Solid state transmitters, Antenna Systems, Data acquisition& signal processing and Radar controller & Display systems. Details of the expertise in the above activities and documented proof for the demonstrated capabilities should be attached along with the EoI. This should clearly state the following aspects of the Radar

systems already developed, supplied and commissioned, if any, by the party, including the year of development and present operational status.

- Complete technical specifications and major features of such systems, Exact role and actual contribution of the Party in the development of the above Radar systems/sub- systems should be explicitly stated.
- After-sales services being provided by the party, including the undertaking of annual maintenance contracts (AMCs) for Radar systems.
- Details of the end user
- Present operational status of Radar systems or sub-systems designed and developed by them and reliability of these systems for providing research quality data.
- Copies of the contracts/work orders handled by them for the manufacturing/ development of Radar systems or major sub-systems including those supplied to Institutions in India and abroad.

3.8 Details to be submitted with EoI:

a) Profile of the Party (containing the following details) :

(i) Their products and areas of expertise,

(ii) Manufacturing facilities and capabilities,

(iii) Engineering systems available for developmental activities,

(iv) Actual facilities available for the development of Radar subsystems such as High power Transmitter lab /Antenna lab/workshops,

(v) Capabilities in design and development of Radar systems

(vi) Capabilities in Radar signal processing for atmospheric studies

(vii) Radar design software developed / being used(design / simulation software used in Radar signal simulation). State whether it has been developed in-house.

(viii) Software for Radar signal/data processing for atmospheric studies developed/ being used. State whether it has been developed in-house.

(ix) Technical manpower (separately provide consolidated numbers of Scientists, Engineers and Technical staff)

(x) Technical manpower actually involved in the development of Radars related activities at present.

(xi) Annual turn-over

b) Copies of the contracts/work orders handled by the Party for Radar systems for atmospheric studies, including the list of customers in India/ abroad. The bid should explicitly mention the actual contribution of the Party in the development of such systems (including the specific items developed/supplied).

d) Details regarding heritage, availability of facilities for fabrication and testing of atmospheric Radars and experience of the company to handle the type of work envisaged in this document.

e) Parties should have undertaken a single work order of more than Rs. 5 Crore in the past.

f) Annual turnover of the party should be more than Rs. 50 Crore.

g) Duly filled compliance sheet, as per the format attached (Section 5).

3.9 Please note that the EoI should contain all the relevant details and supporting documents (including proof) requested above. The potential parties, having the required capabilities, experience and infrastructure for the proposed work will be identified based on the EoI and the documents submitted along with it.

3.10 Pre-bid Meeting: If required by ISTRAC, a pre-bid meeting between ISTRAC officials and the parties submitting the EoI may be held at ISTRAC, Bangalore on a later date as decided by ISTRAC.

3.11 Details of the scientific and technical requirements and other details of the Weather Radar System are given in the following sections. This is provided only to enable the parties for understanding the overall requirements. ISTRAC reserves the right to modify any of the scientific and technical specifications or other details or requirements given here, before inviting the 2-part tender from the short-listed parties.

3.12 The EoI proposals should be addressed to:

The Senior Purchase & Stores officer,
ISTRAC/ISRO
Peenya Industrial Area, Bangalore-560058
Karnataka, India.

4. COMPLIANCE TABLE (To be submitted along with the EoI)

Sl. No.	Description	Compliance	Supporting Documents attached?	Remarks
1	ISTRAC proposes to realize the Weather Radar System for on a turn-key basis. The vendor should have demonstrable capability to take up such a project. Have you undertaken any such project in past ? Provide details.			
2	The design, development, installation, testing and commissioning of the system will be reviewed by an expert committee at all stages and any suggestion by the committee should be incorporated. Whether this condition acceptable to you?			
3	Any deviation in the design, material, and configuration will be subjected to the review and approval of the ISTRAC expert committee. Whether this condition acceptable to you?			
4	All documents and correspondence pertaining to this contract should be in English language. Whether this condition acceptable to you?			
5	Technical documents of capital and minor equipments (in English) should be supplied by the Party to ISTRAC. These documents should be self-explanatory and should be prepared after discussions with ISTRAC. All supplied software should be such that ISTRAC users would be able to modify the source code if needed. Whether this condition acceptable to you?			
6	At any point of time, if ISTRAC requires the Party to do any additional work related to the project work beyond what is mentioned in the scope of work, the Party should undertake the work on existing terms and conditions and additional remuneration, as mutually agreed			

	upon. Whether this condition is acceptable to you?			
7	Are you a manufacturer of Radar systems having good infrastructure and technical expertise? Please attach details and supporting documents.			
8	Have you designed, developed, installed, tested, and commissioned any Radar systems or their critical sub-systems for atmospheric applications. Please provide the details of all such activities, including specific contributions and addresses of the end users.			
9	Do you have more than five years of experience in the design, development, commissioning, and maintenance of high power, state-of-the-art Radar Systems, or critical subsystems? Please attach details and supporting documents.			
10	Do you have more than five years of experience in High power transmitters, Antenna systems and signal processing techniques? Please attach details and supporting documents.			
11	Do you have an arrangement for scheduled and unscheduled maintenance/warranty support etc.			
12	Design and development of the subsystems of the proposed DWR System should meet all the scientific and operational requirements stated. Extensive simulations should be carried out before finalizing the detailed design. The results should be submitted to ISTRAC and presented before the ISTRAC review committee. Any modifications suggested by the ISTRAC expert committee should also be carried out and presented. Whether this condition is acceptable to you?			
13	The EoI should contain documentary evidences of previous contract / work orders handled by the Party for Radar systems, including the list of customers for these Radar systems.			

14	The EoI should contain details regarding the heritage, availability of facilities for design, fabrication and testing, and experience of the Party to handle similar type of work.			
15	Parties submitting the EoI or those shortlisted may be called for a pre-bid meeting at the ISTRAC, if required. Will you be able to come to ISTRAC?			
16	The Party should provide 3 years of Warranty. This should include all defects in materials, equipments, components and workmanship after the commissioning and acceptance of the item as well as all defects observed during the operation of the system. Based on request by the ISTRAC, the Party will have to visit ISTRAC and replace the defective system at no extra cost. Is it acceptable?			
17	Contract for Annual Maintenance of the system after the warranty period should be provided for a minimum period of 10 years.Whether this condition acceptable to you?			
18	Availability of all the components/subsystems should be ensured by the party for at least 10 years after the commissioning and acceptance by ISTRAC. Is this condition acceptable to you?			
19	The right to use previously made intellectual property owned by ISTRAC and its collaborative institutes and used by the Party in the DWR System cannot be used by the Party for other purposes without written consent from ISTRAC. Do you agree for this condition			
20	Balance Sheet for the previous 3 financial years and the details of Income Tax returns filed should be submitted along with the EoI.			
21	Performance report of the Radar systems already established so far should be submitted.			
22	Whether all the documents and proofs as required in Sec. 3 are attached.			

5. Broad terms and conditions

The terms and conditions given below may be the part of the Tender Enquiry to be sent to the parties selected on the basis of the EoI. This is subjected to change and is provided here only for the overall awareness of the requirements.

5.1 The design, development, installation, testing and commissioning of the system will be reviewed by an expert committee of ISTRAC at all stages and any suggestion by the committee should be incorporated.

5.2 Any deviation in the design, material, configuration, component, etc. from the approved proposal/design will be subject to the approval of the ISTRAC expert committee.

5.3 Test results of the sub-systems to final stage should be recorded and provided to ISTRAC during the developmental phase. The material certificate should be provided.

5.4 ISTRAC reserves the right to witness the tests and review the progress of work at various milestones of the program at any point of time during the developmental phase.

5.5 Integration of system at site and the test results: The developed system should be integrated at ISTRAC identified site and test runs as per the Acceptance Test procedure (ATP) should be carried out at the site in the presence of experts and Scientists/Engineers appointed by ISTRAC. The system performance should meet all the technical requirements stated in Table 1.

5.6 Acceptance Test Procedure (ATP): The system will be accepted only after obtaining successful base data products that meet all the scientific and technical requirements stated in Sec.2. A mutually agreeable acceptance document shall be prepared and used for acceptance tests. The DWR-derived data products will be validated with the available dataset (time of the day and weather conditions). The system should be operated continuously for 24/7 period without any performance degradation. Any interruption during the test run will offset the required period to the full period stated above.

5.7 Training: The System End users and Scientists/Engineers at ISTRAC should be trained for 2 weeks on all the technical details of the system, regular operation and maintenance including changing any components and sub-systems, if required.

5.8 When requested, the potential parties short listed by ISTRAC based on EoI will have to submit their offers as Two-Part bids (technical and commercial). The offers should contain the preliminary design, configuration, schematic diagrams and all the necessary

technical details of all the sub-systems and major components, and the cost of all items/activities, including design, development, installation, testing, commissioning, and training.

5.9 The quotation must include all the technical/commercial aspects of the main and sub-systems, components and software to be used in the DWR System. Details of the spares and any other item essential for the long-term (over 10 years) operation of the system should be provided. Details and cost for the design, development, installation, testing and commissioning of the system, training imparted, and terms for warranty and AMC should be provided. However, the structural design, detailed engineering drawings and numerical simulations of the Radar signals can be part of the detailed design document, which need to be submitted by the Party after the purchase order is awarded. This design will be reviewed at ISTRAC and any suggestions (including any further simulations suggested) should be incorporated in the revised design document. The committee must be satisfied with the simulations and design before they are accepted.

5.10 Offers submitted during the two-part bidding process must be valid for at least 210 days from the corresponding tender opening date.

6. Documents, software and Hardware to be supplied by Manufacturer

Detailed design document containing the structural design, detailed engineering drawings and numerical simulations of the Radar signals, and technical documents of all capital and minor equipments and sub-systems should be supplied by the Party. The party should provide three sets of operational manuals, detailed technical manuals, service and maintenance manuals, troubleshooting manuals, etc. The documentation shall cover layout diagrams of all sub-systems and components and software (including source code) for Radar control and the online and offline data processing. Documents on the software should also include algorithms and flow charts. These copies should also be provided in softcopy version. These documents should be sufficiently explainable and should be prepared after discussions with ISTRAC. All supplied software should be such that ISTRAC users should be able to develop and modify, if needed. Hardware design & Fabrication files (PCB design files and Gerber files) to be supplied by the party.

7. Bidding Process

Prospective manufactures allowed bidding for the development and deployment of DWR systems as per the technical specification generated by ISTRAC/ISRO along with other terms and conditions.

If large number of DWR systems requirement arises at various operating frequency bands, ISRO may consider multiple parties agreeing to accept the price bid of the lowest quoted party with same terms and conditions. However, the lowest quoted party will be awarded with bigger order value by evaluating their manufacturing capability to develop the DWR system in stipulated frame work of time. Number of units awarding to each party will be decided by a committee constituted by ISTRAC/ISRO. All parties shall adhere to the standards specified by ISRO for the requirement of interoperability of the radar system in a network.

All documents pertaining to this contract including specifications, schedule notice, correspondence, operation and maintenance drawings or any other writing should be written in English language.

8. Performance Guarantee

The company shall guarantee for faithful execution of the contract and successful and satisfactory performance/operation of the DWR Systems and its parts under the condition and for the services specified. The performance guarantee shall cover the following:

8.1 Faithful execution of the contract.

8.2 The successful and satisfactory supply of the complete DWR system and its parts covered under this contract (including all the hardware, software, documents) under the condition and for the services specified.

8.3 Warranties against any and all defects in materials/components/sub-systems and workmanship during the operation of the system at specified site. Upon notice from ISTRAC, the Party has to replace the defective supply of system at no extra cost.

8.4 In case of emergency/system failure, it should be attended to within 3 days at vendors cost. Minimum shutdown period of the system should not exceed 15days continuously and in a year should not cross 30days.

9. Intellectual Property Rights

The right to use previously made intellectual property owned by ISTRAC and its collaborative institutes and used by the Party in the DWR System cannot be used by the Party for any other purpose without written consent from ISTRAC.

10. Amendments

The terms and conditions of the agreement may be amended by mutual consent. Each amendment shall be in writing and shall identify the provisions to be changed and the changes to be made. Duly authorized representative of each of the parties shall sign amendments of the Document.