भारतीय उष्णदेशीय मौसम विज्ञान संस्थान
INDIAN INSTITUTE OF TROPICAL METEOROLOGY
(पृथ्वी विज्ञान मंत्रालय, भारत सरकार का एक स्वायत्त संस्थान)
(An autonomous Institute under the Ministry of Earth Sciences, Govt. of India)
पाषाण, पुणे – 411 008
PASHAN, PUNE - 411008

निविदा सूचना शुद्धिपत्र / CORRIGENDUM TO TENDER NOTICE

निम्नलिखित तालिका में विनिर्दिष्ट समसंख्यक निविदा सूचना द्वारा प्रकाशित विवरण हेतु निविदा प्रस्तुत करने की निर्धारित तारीख को बढ़ाया जा रहा है|

The last date of submission of bids for purchase of "items / description" published vide even number of Tender Notice are extended as tabulated below

क्रम सं. Sr. No.	निविदा सूचना सं. Tender Notice No.	विवरण/Description	ऑनलाइन बोलियाँ प्रस्तुत करने की बढ़ाई गयी समय सीमा / Extended timeline for submission of bids online	
			के पास से From	तक To
01.	पीएस/128/18/2018 PS/128/18/2018	मुंबई महानगर क्षेत्र में लघु परास एक्स-बैंड ध्रुवणमितीय स्कैनिंग रडार नेटवर्क, मात्रा 04 सेट्स Short Range X-Band Polarimetric Scanning Radar Network in Mumbai Metropolitan Region Qty - 04 Sets.	23 जनवरी 2019 1500 बजे से / 23rd January, 2019 1500 hrs.	13 फ़रवरी 2019 1500 तक 13th February, 2019 1500 hrs.
02	पीएस/125/18/2018 PS/125/18/2018	सी-बैंड द्विध्रुवीय डॉप्लर मौसम रडार प्रणाली मात्रा - 01 सेट C-band Dual Polarized Doppler Weather Radar System Qty – 01 Set.	31 जनवरी 2019 1500 बजे से / 31st January, 2019 1500 hrs.	13 फ़रवरी 2019 1500 तक 13th February, 2019 1500 hrs.
उपरोक्त दोनों निविदाओं के लिए तकनीकी बोलियाँ **13 फरवरी, 2019** को **1530** बजे खोली जाएंगी। **Technical Bids for aforesaid both the tenders will be opened on 13th February, 2019 at 1530 hrs.**				

दिनांक 7 जनवरी, 2019 को हुई निविदा-पूर्व बैठक का अंतिम कार्यवृत्त नीचे विनिर्दिष्ट वेबसाइट पर उपलब्ध है| अन्य निबंधन एवं शर्तें यथावत रहेंगी। विस्तृत विवरण एवं बोलियों के प्रस्तुतीकरण हेतु कृपया वेबसाइट **http://www.mstcecommerce.com/eprochome/iitm** देखें। संभावित बोलीदाताओं की जानकारी के लिए, निविदा विवरण भी इस संस्थान की वेबसाइट **http://**www.tropmet.res.in एवं सरकार के सेंट्रल प्रोक्यूरमेंट पोर्टल (सीपीपी) http://www.eprocure.gov.in. पर भी उपलब्ध है।

Final minutes of Pre-Bid meeting held on 7th January, 2019 are available on websites as stated below. All other terms & condition shall remain unchanged. For details and submission of bids please visit website **http://www.mstcecommerce.com/eprochome/iitm.**For the information of the prospective bidders, the tender details are also available on this Institute's Website: **http://**www.tropmet.res.in and Government's Central Procurement Portal (CPP) http://www.eprocure.gov.in.

ह/Sd-
प्रशासनिक अधिकारी, कृते निदेशक
Administrative Officer, for Director
ईमेल/Email :psu.iitm@tropmet.res.in

Indian Institute of Tropical Meteorology, Pune – 411 008

PS/128/18/2018   23rd January, 2019

<u>**Sub: Final minutes of Pre-bid meeting held on 7th January, 2019 for purchase of Short Range X-Band Polarimetric Scanning Radar Network in Mumbai Metropolitan Region Qty – 04 Sets.**</u>

      The pre-bid meeting for the subject mentioned above held on 7th January, 2019 at 1500 hrs. at IITM, Pune.

      In response to our Tender Notice No. PS/128/18/2018, representatives of the following prospective bidders / firms / companies / OEM attended the meeting with their queries.

    i)   M/s. Data Patterns Pvt. Ltd. Chennai
    ii)   M/s. L & T Defense,
    iii)   M/s. Satcom Technologies, Hyderabad
    iv)   M/s. SGS Weather, New Delhi
    v)   M/s. BEL, Bangalore
    vi)   M/s. PEC, New Delhi
    vii)   M/s. Astra Microwave Products, Hyderabad

      Email queries received before and during the meeting from below companies were also considered by the Committee.

    i)   M/s. Mahindra Telephonics Integrated Systems Ltd, Palwal, Haryana
    ii)   M/s. MicroStep MIS India Pvt Ltd,
    iii)   M/s. SS Trading Corporation, New Delhi
    iv)   M/s. Ma Durga Enterprises,
    v)   M/s. SS Micro Electronics Technology (P) Ltd, Ghaziabad

      On 7th January, 2019, Committee decided to extend the timeline of inviting the queries for Pre-Bid up to 15th January, 2019 up to 1700 hrs. The decision of the committee was executed on the basis of approval of competent authority and a copy of **interim minutes** of the Pre-Bid Meeting was uploaded on MSTC E-Procurement portal and IITM Web portal.

      The queries received from all the participating bidders up to the extended timeline were referred to the Technical Evaluation Committee (TEC) of Radars. Committee discussed / deliberated thoroughly and the responses are prepared as per **Annexure-I**.

      In addition to the replies to the queries of the bidders, TEC and Pre-Bid Committee on detailed deliberation suggested some amendment to the original tender requirement. These amendments are incorporated in **Annexure-II**.

      The major change requests, clarifications agreed/recommended by the committee are as follows:

(1) **Submission of Bids:** Upon request from various bidders, the last date for submission of bids has been extended by next three weeks from the publication of **final minutes** of Pre-Bid Meeting.
(2) Corrigendum relating to the final Pre-Bid Minutes and extension of bid submission period may be given wide publicity as it was given for the original tender notice.

      Meeting ended with thanks to chair.

Response to Pre-Bid queries to Tender for Short Range X-Band Polarimetric Scanning Radar Network in Mumbai Metropolitan Region Qty - 04 Sets (PS/128/18/2018)

Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
			M/s. MA Durga Enterprises	
1			Please also consider to extend the bid submission closing date at least 04 weeks from the existing.	As per Pre-bid minutes
2	Appendix-1, Table-1	Range of Observation 60 km (typical)	Ok up to 120 Km.	Higher range coverage is okay, however, detection capability should be 20 dBZ at 60 km with 1 micro second pulse width and 2 RPM.
3	Appendix-1, Table-1	Range resolution 50 m or better	Ok (31.25m)	Higher resolution is okay.
4	Appendix-1, Table-1	Max. Unambiguous Range 60 km – -2 trip echo recovery necessary	-ok (150 km also on short pulse) - Not Ok only second trip removal not second trip recovery	Maximum unambiguous range mentioned should be free of 2nd trip/multiple echoes.
5	Appendix-1, Table-1	Unambiguous Velocity 40 m/s; dual PRF and staggered pulse repetition time techniques.	–Not Ok, +-31.8 m/s velocity range with 5/4 dual PRF	No Change. As per TENDER.
6	Appendix-1, Table-1	Detection capability 10dBZ or better at 60 km range –	Not OK 12.6dbZ at 60 Km	**Changed to:** Detection capability of 20 dBZ at 60 km with 1 micro second pulse width and 2 RPM.
7	Appendix-1, Table-1	Receiver sensitivity for single pulse -110dBm or better for 1 micro sec pulse width	Ok - <= -110 dB for 0.8 micros pulse width and more	No change. As per TENDER.
8	Appendix-1, Table-1	Polarization Horizontal and Vertical with Simultaneous transmit and simultaneous receive mode and alternate mode	Not Ok, only STAR mode is available, not alternate mode	In polarization configuration, we require two modes of transmission. One in LDR mode (H transmit and H & V receive). In second mode (STAR), simultaneous transmit and receive for dual-polarimetric measurements.
9	Appendix-1, Table-1	Transmitter Type Solid-state	NO OK We only have Magnetron Transmitter; no Solid State Available	No Change. As per TENDER.
10	Appendix-1, Table-1	Frequency Range Tunable from 9.2 GHz	NO OK our transmission frequency is FIXED	**Changed to:** Frequency Range

		– 9.7 GHz, please specify	(NOT TUNABLE) at 9410 MHz	Tunable from 9.35 GHz – 9.6 GHz, please specify
11	Appendix-1, Table-1	Peak output power 100 W or higher which will meet 10dBZ detection at 60 km range	Our Transmitter has a Peak Power of 25 KW (split in two channels) but the Technology is different (Magnetron) so this data is not comparable.	No change. As per tender. Solid-State Transmitter is required with the following additional criteria: i) Range/time sidelobes achieved should be better than 50dB, ii) Demonstrating a smooth closer MDS throughout the range of observation through multiple hetero pulse integration at the end meeting the minimum range resolution.
12	Appendix-1, Table-1	System Phase stability 0.1 degree please specify	This data is not available to us. It must be removed from the specs	Required to show stable phase of ≤0.4 degree
13	Appendix-1, Table-1	Antenna Prime focus parabolic antenna, please specify configuration; Diameter 1.2 m typical	NO OK we have only 90 cm. Antenna	Antenna of 1.2 m diameter or less would be okay, provided the other criteria of Beam Width, Pointing accuracy and steering is met.
14	Appendix-1, Table-1	Polarization Horizontal and Vertical with Simultaneous transmit and receive mode and alternate mode	NO OK: ONLY SIMULTANEOUS and NOT ALTERNATE	In polarization configuration, we require two modes of transmission. One in LDR mode (H transmit and H & V receive). In second mode (STAR), simultaneous transmit and receive for dual-polarimetric measurements.
15	Appendix-1, Table-1	Radome (1)Type: Random panel with non-hygroscopic coating; (2)Transmission Loss : two-way ≤ 0.2 dB	not Ok: two-way <=1dB	**Changed to:** Radome Transmission Loss: two-way ≤0.6 dB
16	Appendix-1, Table-1	Lightening Protection Lightening rod with dual ground wires.	we do not provide lightening system that must be provided by local agent	No Change. As per TENDER
17	Appendix-1, Table-1	LNA Noise Figure <1 dB	NOT OK: > 1dB	Requirement of LNA noise figure < 1 dB is removed, however, the entire system noise figure should be at 4dB or less
18	Appendix-1, Table-1	RADAR SIGNAL PROCESSOR Doppler processing mode: Pulse Pair and FFT/DFT	Pulse Pair OK; FFT/DFT Possible, we can include free of charge in case of purchase	No Change. As per TENDER

19	Appendix-1, Table-1	Clutter suppression Clutter Elimination for > 40dB. Specify filter technique (IIR, FIR). The system shall have provision for identifying and filtering nonmeteorological echoes based on polarimetric measurements.	NO OK Rejection rate in our Radar is 35 dB. No Polarimetric related filtering available	No Change. As per TENDER
20	Appendix-1, Table-1	Conventional and Polarimetric outputs Z, V, S, ZDR, KDP, Φ_{DP}, ρ_{HV}, LDR	Not OK: all available except LDR	No Change. As per TENDER
21	Appendix-1, Table-1	Calibration GUI based BITE (Built-In Test Equipment) (I) Provision shall be made for programmable and auto run for absolute internal calibration to ensure reliability of polarimetric parameters at frequent intervals and display the current values to maintain the system health and accuracy of the product. (II) An external calibration through standard external equipment and validation of receiver linearity and dynamic range using standard coherent source and standard measuring equipment. There should be a provision for automatic update of radar parameters. (III) The calibration set up should be of part of the deliverables. Script based execution	BITE is available. Automatic calibration is available only for noise correction. The two real-time correction named tx correction and rx correction are also available (tx correction compensate fluctuation of power transmitted in radar constant, rx correction compensate the gain fluctuation of radar receiver in radar constant). The instrumental check of general calibration is required each year.	GUI based internal and external calibrations facility is required.

		of such measurements and saving of results are expected as a part of such provision.		
22	Appendix-1, Table-1	Sun Calibration Sun calibration in both software driven and manual mode operation for pointing accuracy 0.1 degrees. The system shall be made to point towards sun for establishing the pointing accuracy of the antenna; stability and reliability of receiver chain using solar flux (sun) values known from other sources. Procedure shall be provided and to be demonstrated during SAT. Script based execution of such measurements and saving of results are expected as a part of such provision.	Not Ok - The sun antenna accuracy check and sun radar calibration are not available with this antenna type.	Sun Calibration/equivalent technique is essential to obtain antenna pointing accuracy of 0.1 degree and azimuth and elevation offsets of the antenna.
23	Appendix-1, Table-1	Display system: Display of radar data shall be available at site in real time. Display should also be available at IITM, Pune using available communication channels. One 55" (inches) UHD 4K LED display system.	Ok - Standards real-time display is a web based multiradar application and visualizing the radar products in continuously update movie-loop. Transmission to remote site must be based on existing Ethernet TCP/IP Channel (not supplied by ELDES)	IITM will provide the connectivity through ISP. Configuration and customization of end devices in meeting the requirement will be radar Suppliers responsibility. The firm shall indicate the bandwidth requirement.
24	Appendix-1, Table-1	Data Format: System should be capable of generating Radar Base data and products in MDV, NETCDF, BUFR, GRIB2, HDF5, CFRADIAL formats (Online & offline). Provision to record, store and playback of I & Q data.	Not Ok: We have not NetCDF, CFradial, GRIB2, converter. We can develop them for free in case of a significant Purchase Order	No Change. As per TENDER. GRIB2 data format is not required.
25	Appendix-1, Table-1	Application Software : Using volume scan	Not Ok - Non wenave not HWT, Rainfall	No Change. As per TENDER

		data, standard Met products such as PPI, RHI, CAPPI, Echo base and top, MAX, HMAX, VAD, VVP, HWT. Rainfall intensity by Z-R & Dual pol method, Hydrometeor Classification, wind shear detection, Support of single and multiple radar network, data correction (like rain attenuation, wet radome attenuation, beam blockage, non-uniform beam filling, Doppler velocity de-aliasing etc), dual Doppler analysis, data integration with rain gauges, disdrometer and satellite, correction of derived rainfall with rain gauge data. Provide a detailed documentation on these weather products and algorithms used. This will help the scientists to improve or modify the algorithm in future.	estimation with polarimetrics moments, and we have not the other multi sensor corrections to be eventually implemented in case of a significant purchase order.	
26	Appendix-1, Table-1	Computer Peripherals (a) Two Workstations with 32" (inches) color TFT monitor -- one as main and one as standby, for operation, control of the radar and product generation and display of the data. (b) Two Workstations with 32" (inches) color TFT monitor -- one as main and one as standby, for networking	OK: We can provide in principle these Workstations and Laptop with additional cost. Maybe the cheapest way would be to procure them in India directly by Local Agent (we can supply the minimal requirements). The same as above for the NAS.	**Changed to:** Instead of color TFT monitor, LED Full HD display is required with 32 inches. Other requirements remain same.

		/communication purpose. (c) A portable computer (laptop) of latest version/ configuration capable to be configured as any of (a) & (b) above. NAS storage catering space for 10 years of archival with search and retrieval		
27	Appendix-1, Table-1	Diesel Generator At least 15 KVA Suitable Diesel Generator Set with AMF panel for automatic turn ON when mains fails and capable to takes up the load (of all the essential components and accessories of the Radar system required for operation). The DG set should be silent with a separate canopy operatable in all weather conditions.	We do not supply Diesel Generator, it is more likely and cheap that it would be provided by local Agent.	Supplier is of liberty to provide Diesel Generator by themselves or from local agent.
28	Appendix-1, Table-1	All spares used during the warranty maintenance period shall be replaced by the supplier at his own cost. These spares may be kept with IITM so as to avoid any delay.	NO OK, we can sell the Customers a full spare parts set (for local depot) but not temporarily export there for the warranty period only	IITM has asked for the CAMC, the supplier will have to ensure the replacement of radar Spares in case of any hardware failure.
29	Appendix-1, Table-1	The supplier shall give an assurance for continued availability of spares and consumables for a period of 15 years from the date of commissioning of the system.	OK, in case original spares will not be available we would supply Fit Form Function equivalent spares.	If original spares are not available, the supplier can provide Fit Form Function equivalent spares for smooth function of radar.
30	Appendix-1, Table-1	Digital storage oscilloscope-Tektronics 4 channel + High voltage	We can supply but it is cheaper if the Local Agent will provide these instruments under our	Capacitive High voltage divider probe and Current probe are not required. Proposed Oscilloscope may

		oscilloscope probe or Capacitive High voltage divider probe (like Pearsons) + Current probe (AC/DC, 100A) to monitor Tx modulator pulse current like Pearsons or equivalent.	specification.	be of following made and model: Made: Rohde & Schwarz. Model No: R&S®RTB2000, Bandwidth 70 MHz to 300MHz Sample rate: up to 2.5 Gsample/s The supplier can also provide the equivalent equipment of other makes with similar technical capabilities.
31	Appendix-1, Table-1	Signal generator with narrow pulse modulation facility for X-band operation and measurements (Bench model) or similar.	We can supply but it is cheaper if the Local Agent will provide these instruments under our specification.	Proposed Signal generator may be of following made and model: Made: Rohde & Schwarz Model No: R&S®SMW200A Variant- R&S®SMW-B120 Frequency range- 100 kHz to 20 GHz The supplier can also provide the equivalent equipment of other makes with similar technical capabilities.
32	Appendix-1, Table-1	Power meter (Peak & Average) & Power sensor-Agilent or similar.	We can supply but it is cheaper if the Local Agent will provide these instruments under our specification.	Proposed Peak Power meter may be of following made and model: Made: Rohde & Schwarz. Model No: R&S®NRP2 Power Meter Level range: -67 dBm to +45 dBm Frequency range: DC to 110 GHz Proposed Peak Power sensor may be of following made and model: Made: Rohde & Schwarz Model No: R&S®NRP-Z221 Two-Path Diode Power Sensor Measurement range: -60 dBm to +20 dBm Frequency range: 10 MHz to 18 GHz The supplier can also provide the equivalent equipment of other makes with similar technical capabilities.
33	Appendix-	Digital multimeter (5	We can supply but it is	Proposed Digital Multi-

	1, Table-1	& ½ digit)-Fluke or similar	cheaper if the Local Agent will provide these instruments under our specification.	meter may be of following made and model: Made: Fluke Model No: Fluke 289 (with Industrial Test Lead)

M/s. S. S. Trading corporation, New Delhi

Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
1			What is the delivery period? 6 months from the date of clearance of critical design review or 9 months?	Delivery of all the radars will be within 6 Months from the date of clearance of critical design review. Installation and commissioning of all the radars shall be within three months after the supply.
2	Page 75	Radom, transmission loss: Two-way≤0.2dB	it is unable to achieve a transmission loss of two-way ≤0.2 dB so we request you to please generalize it as transmission loss of two-way ≤0.6 dB	**Changed to:** Radome Transmission Loss: two-way ≤0.6 dB
3	Page 75	Receiver: LNA noise figure: ＜1dB	It is unable to achieve a LNA noise figure of <1dB so we request you to please generalize it as LNA noise figure of ＜2dB	Requirement of LNA noise figure < 1 dB is removed, however, the entire system noise figure should be at 4dB or less
4	Page 75	detection capability: 10dBZ or better at 60km range.	In order to achieve the required detection capability, the antenna diameter should be 2m rather than 1.2m. But the relative costs of antenna, random, server could be increased. It is unable to achieve with 100W Peak output power and 1.2m diameter antenna. Please generalize it as 23dBZ@80km with 125W peak power and 1.2m diameter antenna or Equal to 21.5dBZ@60km with 100W Peak output power and 1.2m diameter antenna.	**Changed to:** Detection capability should be 20 dBZ at 60 km with 1 micro second pulse width with 2RPM
5	Page 76	Sun calibration	Sun calibration function can be achieved when antenna diameter is at	Sun Calibration/equivalent technique is essential to obtain antenna pointing

Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
		least 1.8m. In order to solve the above inconsistency, our suggestion is to revise detection capability to 16dBZ and delete sun calibration function or revise antenna size to 2m.		accuracy of 0.1 degree and azimuth and elevation offsets of the antenna.
6	Page 75	Frequency range, tuneable from 9.2GHz-9.7GHz.	The tuneable range from 9.2GHz-9.7GHz is too wide for to achieve and it nearly impossible to achieve this range so we request you to please generalize it as 9.3GHz – 9.5GHz	**Changed to:** Frequency Range Tunable from 9.35 GHz – 9.6 GHz, please specify

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M/s. Astra Microwave Products Ltd

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Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
1	Para 1.f	The configuration of the four radars should be set for the synchronous operation.	Need clarification	All the four radars should be time synchronous with GPS clock and they will be configured to have synchronous scan strategy.
2	Para 1.i	The system shall have user selectable Single polarization and Dual polarization mode of operation.	Need clarification	**Changed to:** The option of user selectable Single polarization mode of radar operation is not required. Dual polarization mode of operation is only required. In polarization configuration, we required two modes of transmission, one in LDR mode (H transmit and H & V receive). In second mode (STAR), simultaneous transmit and receive for dual-polarimetric measurements.
3	Para 5	Algorithms and references for all the products listed below and supplied should be provided.	clarification needed	For deriving the products (as mentioned in 5.1 to 5.3.3) from radar base data, the supplier should mention the algorithm used with appropriate references.
4	Table1/General/Point 5	Detection capability is specified as 10 dBz or better at 60 km range.	Please specify the corresponding RPM (antenna rotation rate)	Detection capability of 20 dBZ at 60 km with 1 micro second pulse width and 2 RPM
5	Table1/General/Point 7	Polarization: Horizontal and Vertical with	Need Clarification	In polarization configuration, we required two modes of transmission. One in LDR

		Simultaneous transmit and simultaneous receive mode and alternate mode.		mode (H transmit and H & V receive). In second mode (STAR), simultaneous transmit and receive for dual-polarimetric measurements.
6	Table1/Tx/Point 6	VSWR is specified as 1.25:1	Need clarification.	VSWR is Voltage Standing Wave Ratio.
7	Table1/Ant/Point 10	Radom Transmission Loss: two- way. 0.2 dB.	may be relaxed to one- way 0.4 dB	**Changed to:** Radome Transmission Loss: two-way ≤0.6 dB
8	Spares/Tools/Eqpt		Test equipment may be specified with model numbers and make so that all vendors are at the common platform. These items are missing in the deliverables format. Whether L1 is decided on this price?	List of the test equipment's is included in the deliverables. Cost of the test equipment's will be a considered for L1.
9	Digital data 4.1	a. System should be capable of archiving of raw data (I & Q) and generating Polarimetric Doppler Weather Radar Base data and products in BUFR, NETCDF, GRIB2, HDF5, KML, KMZ formats and NEXRAD- Level II formats.	GRIB2 data format to be provided	GRIB2 data format is not required.
10	Digital data 4.1	b. Stand- alone BUFR, NETCDF, HDF5, GRIB2, NexRAD- Level II encoding and decoding software on Licensed Linux/MSWINDOWS platform should be provided. The software should be able to convert the radar data to formats as per user requirements and IITM specifications mentioned at 4.1(a) above.	GRIB2 data format to be provided	GRIB2 data format is not required.
11	Digital data 4.1	e. The successful bidder shall provide all technical support during the concurrency of this contract as per IITM requirement for ingest of base product	To be clarified	This requirement will be removed.

Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
12	Digital data 4.1	g. The successful bidder shall provide Raw Data format as well as products conversion to ASCII.	Exact ASCII string format to be provided by IITM upon contract award.	IITM will provide the ASCII string format.
13	5.3.1 Velocity Products	e. Three- Dimensional Wind Field from Dual- Doppler Radar technique.	Please clarify	The radar application software will have a provision to estimate three-dimensional wind fields (u, v and w) based dual-Doppler technique.
14	5.3.1 Velocity Products	f. Retrieval of wind field by synthesizing Doppler velocities observed by the radars that belong to the network.	Please clarify this. Interpolation of Doppler velocities of the radars of the network?	The requirement is same as above.

M/s. Data Patterns

Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
1	Page 77, Para 1	Spares, Tools and Test Equipment's	Requesting to provide Make with Model number of test equipment's mentioned in points F to J	List of the test equipment's is included in deliverables.
2	Page 77	Enclosures	Kindly provide the dimension of enclosure and its type with Cooling mechanism and its quantity, same also reflect in Price bid also.	The standard 10 feet sea container (L=10 ft, Width 8 ft and H=8 ft) with AC cooling is required. And, is a part of deliverables.
3		Tender Submission Date:	Requesting to extend the tender submission date by 4 weeks extra (i.e Upto 23th Feb, 2019)	As per Pre-bid minutes
4		MSTC E-Commerce Event Transaction Fee	Requesting to exempt Transaction fee (i.e. INR 17,700) for Indian Bidders or allow them to submit techno-commercial proposal through CPPP portal/Website without any cost.	Not accepted
5	Page No. 8, Para 1.11.7	Custom Duty	a. Is 100% CDEC will be provided by the IITM, Pune b. Will Custom duty will be given to Indian	a) No change. As per Tender b) CDEC will be issued to Indian bidders willing to enter into High Sea Sales

			Manufactures for import components / Sub-modules / LRUs etc.	Agreement only for goods being imported.
6	Page 10, Para 1.15.7	EMD Exemption	a. Will EMD exempted for Medium Enterprises / Firms registered with MSME under MoMSME?

b. Please clarify, about EMD exemption clause for Indian Agents/Distributor of foreign OEMS, if any. | a) EMD is exempted for MSEs (Micro & Small Enterprises) with valid MSME / NSIC Certificate mentioning the status and name of item in the certificate for which the bidder is intended to bid.
b) As per Tender |
| 7 | | CAMC | Kindly provide Discounted Rate in percentage to calculate Net Present Value (NPV) for 7 year CAMC during L1 calculation process | No change, as per Tender |

M/s. SGS weather & environmental systems Pvt ltd

Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
1	Page 75,(2)	Transmitter-Frequency range tunable from 9.2 GHz – 9.7 GHz?	JRC has a Solid State Dual-Polarization Doppler Radar having Operating Frequency 9.35 - 9.70 MHz Please clarify this is acceptable with this tender requirement of 9.2 GHz – 9.7 GHz?	**Changed to:** Frequency Range Tunable from 9.35 GHz – 9.6 GHz, please specify
2	Page 75,(2)		In case of INR bid, please clarify if IITM will provide the frequency allocation and allotment letter from WPC	IITM will follow up with WPC to receive frequency allocation.
3	Page-75, Appedix-1, Table-1, Point 10	Radome - (1) Type: Random panel with non-hygroscopic coating; (2) Transmission Loss : two -way ≤ 0.2 dB	The transmission loss of radome mainly affects the maximum range and detection capabilities of Radar. If the Radar is capable of better range and detection capabilities, the transmission loss of Radome is not of great relevance. The different type of radome provide different transmission loss, thus it is requested that transmission loss may be specified as ≤ 0.3 dB	**Changed to:** Radome Transmission Loss: two-way ≤0.6 dB

			(one way, dry surface) without compromising the parameters of Radar detection.	
4	Range (Unambiguous)	@PW -60 km; 2nd trip echo recovery necessary	this requirement of 2nd trip echo recovery is quite difficult and should be removed	Maximum unambiguous range mentioned should be free of 2trip/multiple echoes
5	Sensitivity-Reflectivity		We have radar with Sensitivity-Reflectivity 80 km @ 23 dBz (1 mm/hr), 120 km @27.8 dBz. Please clarify this is compatible with this tender requirement?	**Changed to:** Detection capability of 20 dBZ at 60 km with 1 micro second pulse width when operated with 2 RPM.
6	Pulse Width		JRC has Short (P0N): 1.0μsec, Long (Q0N): 50μsec. Please clarify if this is acceptable by IITM?	Requirement is to have variable pulse widths to achieve variable range resolutions including 50 m resolution.
7			Servo Amplifier requirement of point mode sector should be removed.	The radar should scan in different types, such as, PPI, RHI, Volume, Point mode, Sector, Sector blanking, and Manual.
8	Radom Transmission	Loss (one way, dry surface) ≤ 0.2 dB	Two-way should be changed to ≤ 0.3 dB (one way, dry surface).	**Changed to:** Radome Transmission Loss: two-way ≤0.6 dB
9	Transmitter	Transmitting Peak Power	125 W or more (H) + 125 W or more (V) should be changed to 100 W or higher which will meet 10dBZ detection at 60 km range	Requirement is 100 W or higher which will meet 20dBZ detection at 60 km range at RPM
10	Receiver Noise Figure	4 dB or less, LNA Noise Figure: <1dB	Should be changed to ≤2.5dB	Requirement of LNA noise figure < 1 dB is removed, however, the entire system noise figure should be at 4dB or less
11	Page 10 - Para 1.15.7	Bid security / EMD is mandatory requirement and exemption is applicable to the firms registered with NSIC / MSME only for the manufacture of the tendered goods and not for selling products manufactured by other companies	The para needs to be clarified	Micro and Small Enterprises (MSE) must, along with their offer, provide proof of their registration as MSE (indicating the terminal validity date of their registration) for the item tendered.
12	Page 8 – Para 1.11.9	The quotation should be only in Indian Rupees for indigenous	Can an Indian Company bid in 2 currencies i.e. for Indian Components in	Yes. LC will be established in favour of foreign bidder / foreign counterpart only.

		items. In case of foreign quote, the vendors may quote their rates in Indian Rupees as well as in Foreign Currency.	Indian rupees and Foreign components in Foreign Currency? Will IITM open LC in favor of the OEM for foreign bid portion?	
13	Page 8 – Para 1.11.7	The Purchaser is exempted from payment of Custom Duty vide Govt. Of India Notification No.51/96-Customs dated 23rd July, 1996. The Purchaser is registered with Department of Scientific and Industrial Research (DSIR) for purposes of availing GST concession in terms of Notification No. 47/2017-Integrated Tax (Rate) dt. 14/11/2017, Notification No. 45/2017-Central Tax (Rate) dt. 14/11/2017 and Notification No. 45/2017-Union Territory Tax (Rate) dt. 14/11/2017. The maximum GST is applicable @ 5% only for goods procured for research purpose of the Institute.	- If bidder quotes the complete project including supply, installation and services in INR (Indian Rupees), Please clarify that IITM will be provide custom exemption certificate and GST certificate	CDEC will be provided for imported goods quoted in foreign currency. CDEC will also be provided for the goods quoted in INR currency subject to High Sea Sales Agreement to be executed for goods being imported. For indigenous goods, GST Concession Certificate will be issued as per Tender
14			Is High Sea Sales is acceptable for this tender requirement?	Yes. Bidders can enter into High Sea Sales Agreement, if they quote the prices in INR currency for the items being imported.

<table>
<tr><td colspan="5" align="center">M/s. S. S. Micro Electronics Technology (P) Ltd</td></tr>
<tr><td>Sr. No.</td><td>TENDER Ref. No.</td><td>TENDER Description</td><td>Query</td><td>Response</td></tr>
<tr><td>1</td><td>Unambiguous Velocity</td><td>40 m/s; dual PRF and staggered pulse repetition time techniques.</td><td>To our best knowledge, it should be 60m/s Dual Frequency Technology (DPRF) retraction speed blur: In one radial direction, M pulse echo signals are first collected by PRF1 and M pulse echo signals are collected</td><td>Base requirement is indicated in TENDER</td></tr>
</table>

			by PRF2. The DPRF waveform can be divided into two parts, each of which is periodically sampled. When calculating the speed: the pulse pair of T1 interval is estimated to obtain the estimated value θ1, and the pulse pair of T2 interval is estimated to obtain the estimated value θ2 and the formula Vr=λx(θ2-1)/(4πx(T2-T1)). The double frequency ratio is 4:3 and the maximum unambiguous speed is 60m/s @ 60km.	
2	Receiver Noise figure	4 dB or less	LNA <4 dB, why? The receiver is composed of cascade individual unit circuits. The influence of internal noise is different. The closed to the front the greater the influence of noise figure and rated power gain on the total noise figure of the receiver. The impact is small and negligible. The LNA is located at the front end of the radar and the weight of the influence is large. If the noise figure of the LNA is less than 1 dB, the noise figure of the radar receiver can be within 3dB.	Requirement of LNA noise figure < 1 dB is removed, however, the entire system noise figure should be at 4dB or less
3	Clutter suppression	Clutter Elimination for > 40 dB. Specify filter technique (IIR, FIR). The system shall have provision for identifying and filtering nonmeteorological echoes based on polarimetric measurements.	Refers to Clutter suppression, Clutter Elimination for > 40 dB. It is not reasonable. It should be 50dB based on formula.	TENDER indicates of base requirements. Better values are OK
4		EMD for Rs. 50,00,000.00: It has been mentioned on page no. 10 that Bid	We are registered with MSME and NSIC as system integrator for installation,	No. Micro and Small Enterprises (MSE) must, along with their offer, provide proof of their

3		security / EMD is mandatory requirement and exemption is applicable to the firms registered with NSIC / MSME only for the manufacture of the tendered goods and not for selling products manufactured by other companies.	commissioning, after sale service and AMC of X band radars and also supply various parts after purchasing from India for integration. So, can we have the exemption for EMD being the prime bidder? However main radar will be quoted in USD by the OEM.	registration as MSE (indicating the terminal validity date of their registration) for the item tendered.
5			Is MIRA report is required for OEM only or both the OEM and Indian partner who will do installation commissioning and after sale service?	Please refer clause 2 (b) of Chapter 5 of the tender document.

M/s. MAHINDRA TELEPHONICS INTEGRATED SYSTEMS LIMITED				
Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
1	Appendix-1 General	The system shall have user selectable Single polarization and Dual polarization mode of operation.	Can you explain the necessity to have the option of user selectable Single polarization and Dual polarization? The operational X-band radar system is normally made as one mode, either simultaneous mode or alternate mode. Having both modes may require a complicated, expensive switch/control system. This may add the complicity of system and cost. More importantly, it is not necessary to do so, especially with solid-state X-bands.	**Changed to:** The option of user selectable Single polarization mode of radar operation is not required. Dual polarization mode of operation is only required. In polarization configuration, we required two modes of transmission. One in LDR mode (H transmit and H & V receive). In second mode (STAR), simultaneous transmit and receive for dual-polarimetric measurements.
2	4. DATA FORMATS	a) System should be capable of archiving of raw data (I & Q) and generating Polarimetric Doppler Weather Radar Base data and products in UF, BUFR, NETCDF, GRIB2, MDV, HDF5, KML, KMZ formats and NEXRAD-Level II formats.	GRIB2 is not a recognized standard for exchange of radar data (mainly for NWP data). Please verify if ALL formats are required OR as normally, widely supported in international standards such as ODIM HDF5 and NetCDF CF/Radial.	Other than GRIB2 data format all other data formats mentioned herein are required.
3	4. DATA	b. Stand-alone UF,	Please verify a stand-	Supplier is of liberty to use

	FORMATS	BUFR, NETCDF, HDF5, GRIB2, NexRAD-Level II encoding and decoding software on Licensed Linux/MS-WINDOWS platform should be provided. The software should be able to convert the radar data to formats as per user requirements and IITM specifications mentioned at 4.1(a) above.	alone converter, like RadxConvert from NCAR/UCAR (related to TITAN/LROSE) is a viable solution	any third party ware, provided all terms and condition related to third party ware is met, and periodic Upgradation and support licensing, etc caters throughout the life time of the system.
4	4. DATA FORMATS	f. Data format if proprietary should be disclosed at byte level with software codes.	Can a conversion utility to/from internationally recognized standard formats, along with an API that will permit the customer to access all details of the internal data structures, be used for proprietary data formats?	No Change. As per TENDER. If Data format is proprietary needs to be disclosed at byte level.
5	5.1 Base Products	h. Provision to have map of minimum detectable signal (MDS) to mitigate the situation of severe attenuation/extinction by particular radar.	Can you please clarify what is required?	While calculating composite precipitation of the four radars, the firm should have scientific procedures in identifying regions of non-reliable returns for appropriate corrections/filling/flagging. Demonstrating a smooth closer MDS throughout the range of observation through multiple hetero pulse integration at the end meeting the minimum range resolution.
6	5.3.1 Velocity Products	f. Retrieval of wind field by synthesizing Doppler velocities observed by the radars that belong to the network.	How is this different from 5.3.1 e. "Three-Dimensional Wind Field from Dual Doppler Radar technique."?	The radar application software will have a provision to estimate three-dimensional wind fields (u, v and w) based dual-Doppler technique. Both the requirement is same.
7	5.3.4 Warning and Forecasting Products	f. TITAN software running in real time should be available with appropriate data intake.	Can TITAN/LROSE be installed on a separate host that is accessible on the local network?	No Change. As per TENDER
8	Table 1,	2nd trip recovery	Comments - Firstly, short-	Maximum unambiguous

| | General Item 3 | necessary. | range X-band radars normally do not encounter 2nd trip echoes due to 1) the low power of the solid-state transmitter as well as the lower sensitivity as compared to higher-power S-band/C-band radars; 2) the relatively longer range for the 2nd trip echo; and 3) the possibility of higher elevation angle. The 2nd trip echo is generally at least beyond 125km for short-range X-band radars, The radar sensitivity is greatly reduced beyond 125km and normally cannot have strong returns even for the storm core. In addition, the system can have good observations of precipitation even with a higher elevation angle than the one (e.g., 0.5 degree) normally used in higher-power S-band/C-band radars. In practice, the short-range X-band radar can operate at 0.5~2 degrees and still can have a good measurement of low-level atmosphere within 60 km. The higher elevation can reduce the mitigation of clutters and possible blockage from nearby buildings/trees. Given above reason, our X-band radar systems do not experience issues caused by 2nd trip echoes. Secondly, the 2nd trip echo recovery normally uses the phase coding technique, which modifies the phase of transmitted pulses. The low-power solid-state X-band radar uses the pulse compression technique, which is based on the frequency modulation | range mentioned should be free of 2nd trip/multiple echoes |

			(e.g., linear frequency modulation or non-linear frequency modulation) and also needs to modify the phases of transmitter pulse. It will have un-expected mutual effect if both techniques are combined in the system. Furthermore, the combined approaches will make pulse transmission and signal processing more complicated and increase the risk of malfunction. Bottom line: 2nd trip echoes are not a concern for lower-powered solid-state X-band radars that use pulse compression technology and should not be required for this tender.	
9	Table 1, General Item 3	Maximum Unambiguous Range of 60km	Comments - Unambiguous range should be changed to 125 km. The X-band radar sensitivity supports good observations within 60km range. The maximum unambiguous range only depends on the pulse repetition frequency (PRF) used for the radar sampling. The higher the PRF, the shorter the maximum unambiguous range. However, the maximum unambiguous velocity also depends on PRF. The higher the PRF, the higher the maximum unambiguous velocity. In order to meet the unambiguous velocity requirement, the PRF needs to be ~1200Hz. Therefore, the maximum unambiguous range is about 125km.	The requirement of maximum unambiguous velocity of 40 m/s and maximum unambiguous range of 60 km, can be achieved with dual/staggered PRF technique.
10	Table 1, General Item 5	Detection capability = 10 dBz or better at 60km	The sensitivity is calculated based on transmitting 100 micro-seconds pulse with peak power 100W, and the	**Changed to:** Detection capability of 20 dBZ at 60 km with 1 micro second pulse width and 2 RPM

			small antenna (1.2m). The original requirement of 10dBZ@60km requires a larger antenna system (higher gain) or a more powerful transmitter (e.g., 500W. This requirement should be changed to 18 dBz at 16km.	
11	Table 1, Transmitter Item 7 System Phase Stability	0.1 degrees	0.1 degree is very high standard, even for high-power S-band/C-band radar systems. It normally requires expensive components used in the signal path. For short-range X-band radar, the 0.5 degree phase stability is good enough to ensure the good data quality within range of 60 km. Recommend this be changed to 0.5 degrees.	Required to show stable phase of ≤0.4 degree
12	14. Documentation	d. Detailed documentation of all the proprietary data formats, bit-by-bit information on the header and data patterns should be provided. Free updates made to firmware, processing software and clarifications should also be supplied with relevant documentation during the period of warranty and CAMC thereof.	Data formats and network protocol formats change from version to version. Is it possible to provide an API that will remain consistent between SW versions?	No Change. As per TENDER
13	Table 1 Transmitter 7 System Phase stability	0.1 degree please specify	0.1 degree phase stability requires clutter suppression of 55 dB or better. Is it possible to reduce the requirement to 0.3 (or 0.2) degree phase stability, which only requires 45 dB (or 50dB) clutter suppression.	Required to show stable phase of ≤0.4 degree
14	Table 1 Receiver	3. LNA Noise Figure= <1dB	Please verify <1dB NF. This seems to be an extremely stringent requirement. (Note – the very best cryo cooled LNA's for X-Band barely achieve 1dB NF)	Requirement of LNA noise figure < 1 dB is removed, however, the entire system noise figure should be at 4dB or less

15	Calibration, display and data format	5. Data Format – System should be capable of generating Radar Base data and products in MDV, NETCDF, BUFR, GRIB2, HDF5, CFRADIAL formats (online & offline). Provision to record, store and playback of I & Q data.	Same as Appendix 1, 4. DATA FORMATS a); GRIB2 is not a recognized standard for exchange of radar data (mainly for NWP data). Is it necessary to generate Polarimetric Doppler Weather Radar Base data and products in ALL formats?	Other than GRIB2 data format, all other data formats mentioned herein are required.
16	Spares, Tools and Test Equipment's	1f. Digital storage oscilloscope- Tektronics 4 channel + High voltage oscilloscope probe or Capacitive High voltage divider probe (like Pearsons) + Current probe (AC/DC, 100A) to monitor Tx modulator pulse current like Pearsons or equivalent	A high voltage divider only applies to a Magnetron based system. Request this requirement be removed.	Capacitive High voltage divider probe and Current probe are not required. Oscilloscope is required of following made and model: Made: Rohde & Schwarz. Model No: R&S®RTB2000, Bandwidth 70 MHz to 300MHz Sample rate: up to 2.5 Gsample/s
17	General Query		There is no mention of other existing radars to be used for mosaic and dual-doppler products, which would require multiple radars. Can it be assumed that the several X-band and C-band radars supplied in the 2 IITM tenders would constitute the entire radar network? If not, we request a list of any other radars that will be part of the network - including manufacturer and available export formats- and Sample volume data	There will be four X-band radars in the proposed network.

			M/s. Bharat Electronics Limited		
Sr. No.		TENDER Description	Query	Response
1	General 1(c)	Suitable 3-phase voltage stabilizer with Diesel Generator (DG) of 15 KVA which is suitable to take up the load of all the essential components and	Actual power consumed by the Equipment may be less than 10 KVA. Please confirm whether suitable stabilizer and DG can be supplied instead of 15 KVA rating.	**Changed to:** Suitable 3-phase voltage stabilizer with Diesel Generator (DG) of 10 KVA which is suitable to take up the load of all the essential components and accessories of the Radar automatically

		accessories of the Radar automatically when utility power fails. DG should have Auto ON & OFF facility along with at least 100 L capacity fuel Tank		when utility power fails. DG should have Auto ON & OFF facility.
2	General 1(d)	Suitable 10 KVA online UPS along with batteries for at least 30 minutes power back-up	Actual power consumed by the Equipment may be less than 10KVA. Please confirm whether suitable UPS with required power back up can be supplied instead of 10KVA rating.	Requirement of 10 KVA online UPS along with batteries for at least 30 minutes power back-up is essential to support radar operation and other peripherals
3	General 1(o)	The firm has to clearly specify the way of achieving the sensitivity & detection capability (in ref. OVERALL SYSTEM REQUIREMENTS) with supportive documents of claim and appropriate calculations for both types of transmitters	Please clarify "both types of transmitters"	The word "both types of transmitters" is removed. Solid-state transmitter is required.
4	General 1(j)	Latest state of art computer system shall be used for the generation of data and its processing. The entire operation of the System shall be fully computer controlled and remotely manageable.	Please specify the likely distance between the Radar and computer configuration.	The remote operation and control of the radar network (in Mumbai) will be from IITM, Pune. However, the individual radar site will have the capability of independent radar operation.
5	General 5(e)	Setup of communication channels	Please explain	IITM will arrange suitable network link through a ISP. The supplier may specify the bandwidth requirement. The internal components in Radar sites and Control center its configuration is to be provided by supplier.
6	General 5(i)	Automatic transmission of warnings (visual and text) to users via communication channels.	Please explain	The radar application software should have provision to issue automatic warnings (text) through SMS/Mobile apps/Email. This warning shall be based on threshold of hydrological products mentioned in

				Appendix-1, section 5.3.2.
7	General 5(n)	Simultaneous display of data having more than one Parameter	Please explain	Provision to map more than one products or variables in different windows.
8	General 5.1(g)	The data of radars that belong to the same area need to be interpolated (user defined resolution) and create a composite (Mosaic) map.	Please clarify whether composite mosaic map facility to be made available at both Radar station and Central location	Yes, we required composite mosaic map facility to be made available at both Radar station and Central location
9	General 5.1(h)	Provision to have map of minimum detectable signal (MDS) to mitigate the situation of sever attenuation/extinction by particular radar.	Explanation requested	While calculating composite precipitation of the four radars, the firm should have scientific procedures in identifying regions of non-reliable returns for appropriate corrections/filling/flagging. Demonstrating a smooth closer MDS throughout the range of observation through multiple hetero pulse integration at the end meeting the minimum range resolution.
10	General 5.3.1(f)	Three-Dimensional Wind Field from Dual-Doppler Radar technique.	Explanation requested	The radar application software will have a provision to estimate three-dimensional wind fields (u, v and w) based dual-Doppler technique.
11	General 5.3.2(m)	Google Earth integration of gridded rainfall products.	Explanation requested	Provision to generate and display the Gridded rainfall at desirable vertical level and overlay on the Google Earth. The supplier will have to provide license for the Google Earth.
12	General 5.3.2(n)	Provision for generation of composite maps of rainfall from radar network (Mosaic).	Rainfall related products are SRI, RIH, RFA, PAC etc., Please indicate the products for which composite to be generated?	Provision to estimate rainfall intensity and accumulation at different time scales (e.g., hourly, daily, weekly and monthly).
13	General 7	Provision shall be made with suitable communication hardware & software for real time transfer	The following queries may be answered, 1. Location of state server?	**Changed to:** Provision shall be made with suitable communication hardware & software for real time transfer of digital radar

		of digital radar data and images through networking to control and monitoring centre in respective state and central server System installed at IITM, Pune. All networking components required at radar site as well as command and control centre shall be provided by the supplier. Necessary interface shall be provided for sending radar data through GSM, VPN and internet. The centre should be able to monitor and control the functions of the radar. Data from radar under each centre will be utilized for real time display facility for monitoring the health parameters as well as the weather data acquired by radars in operational mode. The communication link will be provided by IITM. The supplier shall specify the bandwidth requirement.	2. Functions of state server may please be explained? Underlined statement indicates the requirement of Hardware & Software at state centre and control centre (IITM, Pune). The list of deliverables does not reflect this requirement. Please clarify.	data and images through networking to control and monitoring central server System at IITM, Pune. The internet connectivity will be provided by IITM. Necessary interface shall be provided for sending radar data through internet. The central server at IITM should able to monitor and control the functions of the radar. Data from radar will be utilized for near real time display facility (at IITM server) for monitoring the health parameters as well as the weather data acquired by radar in operational mode. The communication link will be provided by IITM. The supplier shall specify the bandwidth requirement.
14	Technical Specifications General 7	Polarization : Horizontal and Vertical with Simultaneous transmit and simultaneous receive mode and alternate mode	Please explain 'alternate mode'.	In polarization configuration, we required two modes of transmission. One in LDR mode (H transmit and H & V receive). In second mode (STAR), simultaneous transmit and receive for dual-polarimetric measurements.
15	Technical Specifications Transmitter 2	Frequency range: Tunable from 9.2 GHz- 9.7 GHz, please specify	Generally available X Band components in market are up to 9.6 GHz max. Beyond this it becomes special X Band components.	**Changed to:** Frequency Range Tunable from 9.35 GHz – 9.6 GHz, please specify

			Revision of frequency range on higher side to 9.6GHz may please be considered	
16	Technical Specifications Transmitter 3	Peak output power: 100 W or higher which will meet 10 dBz detection at 60 km range	100 watt power is suitable for short range DWR. 10 dBZ@60 km is a tight specification, detection point of view. To meet the sensitivity specification, SSPA power has to be increased to have a fair advantage. The efficiency of SSP As being 30 to 40%, heat dissipation, prime power consumption, weight and cost also increases. Globally available short range radars indicate a specification of 18dBZ@ 60 Km. Sensitivity specification may be considered for a revision to at least 15dBz@60 Km.	**Changed to:** Detection capability of 20 dBZ at 60 km with 1 micro second pulse width and 2 RPM, with power of 100 W or higher
17	Technical Specifications Transmitter 5	Pulse width: Variable pulse widths to meet variable range resolution including 50 range resolution.	Variable range resolution can be met by range averaging. Please confirm.	Requirement is to have variable pulse widths to achieve variable range resolutions including 50 m resolution.
18	Antenna and Radome 1	Prime focus parabolic antenna, please specify configuration: Diameter 1.2 m typical	Are other feed configuration acceptable, please confirm?	Other antenna feed configuration is acceptable, however the other antenna specifications of TENDER are to be met
19	Antenna and Radome 10(2)	Transmission Loss : two way ≤0.2 dB	For X-band frequencies, Radome available globally indicates minimum of 0.3 dB loss (dry/ one way). Specification may be revised to 0.6 dB two-way. Please confirm.	**Changed to:** Radome Transmission Loss: two-way ≤0.6 dB
20	Receiver 2,3	LNA Noise Figure < 1 dB	4 dB of noise figure as specified in sl no. 2 is achievable using LNA with NF of the order of 1dB. Separate LNA noise figure specification mentioned in sl no. 3 may please be considered for deletion.	Requirement of LNA noise figure < 1 dB is removed, however, the entire system noise figure should be at 4dB or less
21	Receiver 5	Minimum Discernible	Revision of specification	No Change.

		Signal: 110dBm @1 us pulse width (i.e. 1 MHz bandwidth)	requested under sl no.16 may be considered for achieving this specification.	As per TENDER
22	Radar Workstations (a),(b)	Computer Peripherals: Two Workstations with 32" (inches) colour TFT monitor-- one as main and one as standby, for operation, control of the radar and product generation and display of the data.	TFT monitor are rarely available presently. Confirmation is required for proposing LCD I LED monitor.	**Changed to:** Instead of color TFT monitor, LED Full HD display is required with 32 inches. Other requirements remain same.
23	Spares, Tools and Test Equipment's 1.f	Digital storage oscilloscope- Tektronics 4 channel+ High voltage oscilloscope probe or capacitive High voltage divider probe (like Pearsons) + Current probe (AC/DC100A) to monitor Tx modulator pulse current like Pearsons or equivalent	Since the required Radar system is SSPA based, High voltage probes are not required for testing purposes. Confirmation that these items need not be supplied requested.	Capacitive High voltage divider probe and Current probe are not required. Oscilloscope is required of following made and model: Made: Rohde & Schwarz. Model No: R&S®RTB2000, Bandwidth 70 MHz to 300MHz Sample rate: up to 2.5 Gsample/s
24	Deliverables as per Annexure-1 1.6	Work Stations with Displays Servers for GIS- 4 sets	Please confirm that GIS Server is required at every Radar station also?	Yes, the GIS Server is required at every Radar station.
25	Deliverables as per Annexure-1 7	Any other units /sub units/items not listed above, but required for functioning of DWR shall also be included.	Required to include 1 set of networking component and Work station/Server for remote operation of the Radar and display of Data Products with GIS at IITM. Confirmation required.	The requirement of radar application and operating software which will be installed on the servers at 4 sites and also at IITM.

		M/s. Microcomm India Ltd		
Sr. No.	**TENDER Ref. No.**	**TENDER Description**	**Query**	**Response**
1	Page 34, Para 4.2		Please specify exact spares required	IITM has asked for the CAMC, the supplier will have to ensure the replacement of radar Spares in case of any hardware failure.
2			Since IITM has asked for CMC and the same includes spares to be	IITM has asked for the CAMC, the supplier will have to ensure the

Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
			supplied by the vendor, please confirm that spares are still a mandatory requirement. Will cost of spares be included in determining the L1 vendor?	replacement of radar Spares in case of any hardware failure. L1 will be decided on the basis of total cost including cost of all the deliverables as per tender document which includes CAMC as well.
3	Page 34, Para 4.3		Will IITM follow an acceptance test procedure for inspection and acceptance of goods?	IITM will follow the standard acceptance test procedure for inspection and acceptance of goods
4	Page 36, Para 4.5		Request time to attend in case of failure be increased to 4 days instead of 24 hours.	**Changed to:** Down-time call attendance (offline/online) should be within 48 hrs in the working day
5	Page 71	Networking and communication system	Please specify the details of the communication link that will be provided by IITM?	IITM will arrange suitable network link through a ISP. The supplier may specify the bandwidth requirement. The internal components in Radar sites and Control center its configuration is to be provided by supplier
6	Page 73, Para h		The penalty Clause is very harsh. Request penalty may be changed to 0.2% of the equipment cost per week subject to a maximum ceiling of 5%.	No change, as per Tender
7	Page 80, para 7		Clause regarding downtime penalty in CAMC may be changed to 0.2% per week with a ceiling of maximum 5%.	No change, as per Tender
8	Page 36, Para 4.5		The warranty can be given for the system in full and not individually on parts for costing purposes. Request 3 year warranty on full system including all parts be accepted.	No change, as per Tender

M/s. MicroStep Monitoring Information Systems India Pvt Ltd, Bengaluru

Sr. No.	TENDER Ref. No.	TENDER Description	Query	Response
1	Page no-37, Chapter-5, Clause-4, (b)		We are manufacturing mini dual "X-band" radar & but we supplied & installed only horizontal	The supplier must have manufactured, tested and supplied at least TWO similar polarimetric Doppler

			polarized radars. Is this experience is considerable for this tender. Please clarify.	weathers during the last five years. The supplied radars should be in successful operation continuously at the date of opening of bids.

Amendments made to Tender for Short Range X-Band Polarimetric Scanning Radar Network in Mumbai Metropolitan Region Qty - 04 Sets (PS/128/18/2018)

Owing to the prevailing technology, market availability and based on the pre-bid requests & survey, the following amendments to the X-band Radar Tender (vide PS/128/18/2018) are made by the committee. Note that the other terms and conditions of the Tender would remain same.

Page 36, CHAPTER-4

a. **4.5: Incidental Services:** Down-time call attendance (offline/online) should be within 48 hrs in the working day.

Page 37, CHAPTER-5

a. **4(b) Experience and technical Capacity:** The bidder (OEM/Direct Distributor/Dealer) should have supplied and installed during past 5 years, at least two similar equipments / systems as mentioned in Chapter-4. The Bidder should furnish the information on all past supplies and satisfactory performance during past 5 years in the Performance Statement Form (Chapter-8, Annexure D). Bidders shall invariably furnish documentary evidence (Client's certificate) in support of the satisfactory operation of the equipment / system.

Page 65, APPENDIX-1

a. **General 1(c):** Suitable 3-phase voltage stabilizer with Diesel Generator (DG) of 10 KVA which is suitable to take up the load of all the essential components and accessories of the Radar automatically when utility power fails. DG should have Auto ON & OFF facility.

b. **General 1(i):** The option of user selectable Single polarization mode of radar operation is not required. Dual polarization mode of operation is only required.

c. **General 1(o):** Only Solid-State Transmitter is required with the following additional criteria: i) Range/time sidelobes achieved should be better than 50dB, ii) Demonstrating a smooth closer MDS throughout the range of observation through multiple hetero pulse integration at the end meeting the minimum range resolution.

Page 67, APPENDIX-1: 4. DATA FORMATS

a. **4.1a Digital data:** GRIB2 data format is not required.

b. **4.1b Digital data:** GRIB2 data format is not required.

c. **4.1e Digital data:** This requirement is removed.

Page 70, APPENDIX-1: 5. PRODUCT GENERATION

a. **5(n):** Provision to map more than one products or variables in different windows.

b. **5.1(a) Base Products:** The I & Q data archival and playback facility to generate base products.

Page 71, APPENDIX-1: 7. PROVISION FOR NETWORKING & COMMUNICATION SYSTEM FOR DATA TRANSFER TO CENTRAL LOCATION

Provision shall be made with suitable communication hardware & software for real time transfer of digital radar data and images through networking to control and monitoring central server System at IITM, Pune. The internet connectivity will be provided by IITM. Necessary interface shall be provided for sending radar data through internet. The central server at IITM should able to monitor and control the functions of the radar. Data from radar will be utilized for near real time display facility (at IITM server) for monitoring the health parameters as well as the weather data acquired by radar in operational mode. The communication link will be provided by IITM. The supplier shall specify the bandwidth requirement.

Page 74, APPENDIX-1: 17. VENDOR QUALIFICATION CRITERIA

17a. The supplier must have manufactured, tested & supplied at least TWO similar equipments/systems as mentioned in Chapter-4 during the past 5 years, and the system should be in successful operation continuously as on date of opening of bid. The bidder shall submit a certificate from the user indicating the successful operation of the radar, with contact details of user in case IITM needs to get the information as deemed necessary for the bidding process.

Page 75, APPENDIX-1, Table-1

a. **General 1: Max. Unambiguous Range:** Maximum unambiguous range mentioned should be free of 2nd trip echoes.
b. **General 5: Detection capability:** Detection capability of 20 dBZ at 60 km with 1 micro second pulse width and 2 RPM.
c. **General 7: Polarization:** In polarization configuration, we require two modes of transmission. One in LDR mode (H transmit and H & V receive). In second mode (STAR), simultaneous transmit and receive for dual-polarimetric measurements.
d. **Transmitter 2: Frequency Range:** Tunable from 9.35 GHz – 9.6 GHz, please specify
e. **Transmitter 7: System phase stability:** Phase stability ≤0.4 degree
f. **Antenna and Radome 1: Antenna:** Other antenna feed configuration is acceptable; however the other antenna specifications of tender are to be met.
g. **Antenna and Radome 10: Radome:** (1) Type: Random panel with non-hygroscopic coating; (2)Transmission Loss : two-way ≤ 0.6 dB
h. **Receiver: LNA Noise Figure:** Requirement of LNA noise figure < 1 dB is removed, however, the entire system noise figure should be at 4dB or less
i. **Radar Workstation: Computer Peripherals:** Requirement of color TFT monitor is changed to LED Full HD display. Other requirements remain same.
j. **Spares, Tools and Test Equipment's:** Capacitive High voltage divider probe and Current probe are not required. Below is the list of test equipment's needed:

Sr. No.	Equipment	Make	Model
		List of test Equipment's	
1	Oscilloscope	Rohde & Schwarz	R&S®RTB2000 Bandwidth 70 MHz to300MHz Sample rate: up to 2.5 Gsample/s
2	Handheld Spectrum analyzer	Rohde & Schwarz	R&S® FSH13 model-23 Frequency range- 9 kHz to 13.6 GHz
3	Peak Power meter	Rohde & Schwarz	R&S®NRP2 Power Meter Level range: -67 dBm to +45 dBm Frequency range: DC to 110 GHz
4	Peak Power sensor	Rohde & Schwarz	R&S®NRP-Z221 Two-Path Diode Power Sensor Measurement range: -60 dBm to +20 dBm Frequency range: 10 MHz to 18 GHz
5	Vector signal generator	Rohde & Schwarz	R&S®SMW200A Variant- R&S®SMW-B120 Frequency range- 100 kHz to 20 GHz
6	Digital Multi-meter	Fluke	Fluke 289 (with Industrial Test Lead)