



Airports Authority of India
GNSS Research Centre for Ionospheric Studies & Navigation Application
SVPI Airport
Ahmedabad - 380003. INDIA

Technical Specification Compliance Sheet

Name of Work: Supply & Installation of GNSS Ionospheric Monitoring Data Logging System at various Airports as per Technical Specifications

Name of the Vendor/ Firm:

Quotation Ref. No.:

NOTE: BIDDER TO ENSURE THAT NO PRICING ASPECT IS INDICATED IN THIS SHEET OR ANYWHERE IN THE TECHNICAL BID. IN CASE OF ANY PRICE INFORMATION PROVIDED IN TECHNICAL BID, EVEN IN THE FORM OF PDF, THE TECHNICAL BID WOULD NOT BE CONSIDERED FOR EVALUATION AND WILL BE REJECTED. PRICES SHOULD BE ENTERED ONLY IN PRICE BID (XLS FILE) on GeM portal.

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SL NO	REQUIREMENTS	Note: Do not put any pricing information in this sheet, else your offer will be disqualified	
		VENDOR COMPLIANCE (COMPLIANCE / NON COMPLIANCE)	TECHNICAL DETAILS SUCH AS QUOTED SPECIFICATIONS ALONG WITH DATSEHEETS, DRAWINGS / USER MANUALS ETC. (VENDOR TO INDICATE THE SAME)
A	Technical Specification of GNSS Receiver		
1	BRIEF DESCRIPTION OF THE SYSTEM: Ionosphere is the biggest challenge in implementing satellite based navigation system for providing navigation guidance to the aircraft especially in equatorial region like Indian subcontinent. GAGAN- an Indian Satellite Based Augmentation System (SBAS) is operational and commissioned for enroute and Precision approach services. As per International Civil Aviation Organization (ICAO), continous monitoring of ionosphere is mandatory for detecting any potential threat in ionospheric model used in SBAS. Hence Ionospheric monitoring system based on GNSS is required for upgrading the existing GAGAN-TEC network. It is composed of Reference grade GNSS receiver (with embedded firmware to output TEC and Scintillation parameters), GNSS Antenna, RF cable, PC for data logging and UPS as per specifications given below. The GNSS receiver, antenna and RF cable are to procured through buy-back mode. The existing old Receiver, antenna and cable will be traded against it.		
1.1	LIST OF ABBREVIATIONS		
	TEC	Total Electron Content	
	GNSS	GLOBAL NAVIGATION SATELLITE SYSTEMS	
	GPS	GLOBAL POSITIONING SYSTEM	
	IRNSS	INDIAN REGIONAL NAVIGATIONAL SATELLITE SYSTEM	
	GAGAN	GPS Aided GEO Augmented Navigation	
	SBAS	SATELLITE BASED AUGMENTATION SYSTEM	

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2	DETAILED TECHNICAL SPECIFICATION OF GNSS RECEIVER (for Ionospheric monitoring)			
Sl.No	Parameter	Specification		
2.1	Type of Receiver	Reference Receiver (Base)		
2.2	Frequency	Multi-Frequency- L1, L2, L5 and preferably S and Multi-constellation - GPS, GLONASS, GALILEO , Beidou, QZSS, NAVIC. Receiver shall be capable of tracking SBAS signals including GAGAN: - GPS (L1CA, L1P, L2P, L2C, L5) - GLONASS (L1, L2, L3) - GALILEO (E1, E5ab, AltBoc, E6) - BEIDOU (B1, B2, B3) - SBAS (EGNOS, WAAS, GAGAN, MSAS, SDCM) (incl. L5 tracking) - IRNSS (L5), S band (Optional) - QZSS (L1, L2, L5)		
2.3	Channels	The receiver should have enough channels to simultaneously track all visible satellites of different constellations in the frequencies provided, including the primary systems and SBAS. Minimum 500 channels (Min 4 SBAS channels)		
2.4	Tracking Performance:	Up to 36 dBHz Acquisition or better Up to 20 dBHz tracking or better Receiver tracking shall be Robust during scintillation events.		
2.5	Update Rate:	TEC: 60 sec Scintillation (S4 and sigphi): Configurable from 1 Hz to at least 20 Hz Sampling rate: 100 Hz Position: 1 Hz SBAS: As per ICAO SARPS/RTCA-MOPS		
2.6	Ionospheric Measurement logs:	The Receiver shall be self-contained unit capable of computing and outputting required logs pertaining to ionospheric parameters. The receiver should be able to display and log Real Time output of TEC & scintillation indices with high precision, low noise measurements in ISMR format defined below: -ISMR (Ionospheric Scintillation Monitoring Record)- Time tagged TEC, delta TEC, S4 index, SigPhi, C/No, CCD, Sigma CCD, Elevation, azimuth, PRN, Lock-time etc. at 60 sec update rate. -Raw Scintillation measurement as per configured update rate. - Code and Carrier TEC in dual frequency combination for GPS, GLONASS, GALILEO, Beidou, SBAS, QZSS. -The receiver shall be able to mitigate the inter-frequency biases like C/A-P and P1-P2 DCBs including Receiver and Antenna biases and provide true calibrated TEC value. - Multipath mitigation/rejection technique including code and phase multipath mitigation		
2.7	Position Performance:	Code differential: Horizontal 0.4 m or better (RMS) / Vertical 0.6 m or better (RMS) Static Surveying: 3 mm horizontal, 3.5mm vertical		
2.8	Measurement Precision:	Pseudo range: 10 cm or better Carrier phase: 5 mm or better TEC: 1 TEC unit S4 index: 0.02		
2.9	Time to First Fix:	60 sec for GPS, 120 sec for IRNSS (cold start) 30 sec (warm start) <2 sec (re-acquisition)		

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2.10	File format:	RINEX Binary format with parsing tools ISMR (Ionospheric Scintillation Monitoring Record) BINEX NMEA Compliant to RTCM standard 10403.3 amendment 1 (including Navic L5) or latest The raw data logs shall contain SBAS messages, position logs in SBAS mode in addition to standard logs		
2.11	Clock:	Inbuilt Ultra-low noise oven-controlled crystal oscillators (OCXO)		
2.12	User Interface and Communication:	Data logging tools for file management Simple GUI Multiple options for communication interface like Ethernet, USB, serial Com, WiFi Web based interface for full control, Configuration and access management of receiver, Data retrieval and firmware upgrading HTTP/HTTPS/FTP server/FTP Push PPS out		
2.13	Internal Storage:	Min 16 GB internal memory or removable SD card		
2.14	Power Supply:	Power adaptor for Indian Standard AC supply voltage of 220 – 240 V AC		
2.15	Operating Environment:	Temperature Range: -40 to +65° C (operational) -40 to +85° C (storage) Humidity: 5 % to 95 % (non-condensing)		
2.16	Certification:	RohS, WEEE, CE FCC Class B Part 15, IP65		
2.17	Warranty	Min 3 years Onsite warranty		
3	DETAILED TECHNICAL SPECIFICATION OF GNSS ANTENNA			
Sl.No	Parameter	Specification		
3.1	Multipath mitigation/rejection technique			
3.2	Supports all L1/L2/L5 and preferably S band- L1, L2, L5, G1, G2, G3, E1, E5ab, E6, B1, B2, B3			
3.3	Phase centre Accuracy:	2 mm or better		
3.4	With compatible tripod and all accessories			
3.5	Warranty	Min 3 years Onsite warranty		

Name of the Vendor/ Firm:				
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4	DETAILED TECHNICAL SPECIFICATION OF RF Cable			
Sl.No	Parameter	Specification		
4.1	Lossless RF cable of 30-meter length with compatible connectors			
4.2	Warranty	Min 3 years Onsite warranty		
5	DETAILED TECHNICAL SPECIFICATION OF PC			
Sl.No	Parameter	Description		
5.1	Processor	Latest Gen Intel core i7, 3 GHz or above, 6 MB Cache or higher		
5.2	Memory	Min RAM 16 GB expandable to 32 GB		
5.3	Hard Disk Drive	2x1 TB 7200/10000 RPM SATA or higher capacity		
5.4	Optical Drive	CD/DVD Read Write, 8X or better		
5.5	Expansion Slots	PCIe X 1 slot – Min 1 no. free slot PCIe X 16 slot- Min 1 no. free slot		
5.6	Graphics	Integrated		
5.7	Networking	Integrated Dual NIC - (10/100/1000) and WiFi		
5.8	Form factor	Tower/ Mini tower		
5.9	IO Ports	Min One Serial COM Port Four or more USB Ports (Minimum two nos 3.0 USB port) Min Two RJ-45 port Min One HDMI/DVI/DVI-D/VGA port		
5.10	Power Supply	230 V ± 10 %, 50 Hz		
5.11	Monitor	LED monitor 17" inch min with HD display		
5.12	Keyboard	Standard keyboard		
5.13	Mouse	Optical Scroll Mouse with mouse pad		
5.14	Operating System	Microsoft Windows 10 professional (64-bit) with license from OEM		

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5.15	Recovery/Resource CDs	Restore / Recovery CD must contain software for restoring OS & drivers/data.		
5.16	Compliance and certification	RoHS, TCO (for monitor)		
5.17	Warranty	Minimum Five years on-site warranty		
6	DETAILED TECHNICAL SPECIFICATION OF UPS			
6.1	1 KVA UPS with 30 min backup along with required batteries			
6.2	Warranty	Minimum Two years on-site warranty year warranty for batteries) (1		
7	LIST OF ITEMS TO BE DELIVERED			
Sl. No.	Items to be Delivered	Qty		
7.1	GNSS Receiver for ionospheric monitoring under buy-back	28 No.		
7.2	GNSS Antenna with tripod and accessories under buy-back	28 No.		
7.3	RF Cable 30 meter under buy-back	28 No.		
7.4	Personal Computer with monitor	25 No.		
7.5	1KVA UPS	25 No.		
7.6	Conversion/Processing Software	1		
7.7	Operating manual/User Guide Manual with details incorporating Configuration, Testing and Maintenance (SOFT COPY)	28		
7.8	On-site acceptance, Installation & Commissioning of Receivers including training	01		
8	LIST OF STATIONS/AIRPORTS FOR DELIVERY			
Sl. No.	Delivery locations	Qty		
8.1	SVPI Airport, Ahmedabad, Gujarat	4 No.		
8.2	Shimla Airport, Himachal Pradesh	1 No.		
8.3	GAGAN Complex, Nangloi, New Delhi	1 No.		

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8.4	Jodhpur Airport, Rajasthan	1 No.		
8.5	Khajuraho Airport, Madhya Pradesh	1 No.		
8.6	Gaya Airport, Bihar	1 No.		
8.7	Bagdogra Airport, West Bengal	1 No.		
8.8	Guwahati Airport, Assam	1 No.		
8.9	Lengpui Airport (Aizwal), Mizoram	1 No.		
8.10	Bhopal Airport, Madhya Pradesh	1 No.		
8.11	Raipur Airport, Chhatisgarh	1 No.		
8.12	Kolkata Airport, West Bengal	1 No.		
8.13	Lucknow Airport, Uttar Pradesh	1 No.		
8.14	Mumbai Airport, Maharashtra	1 No.		
8.15	Nagpur Airport, Maharashtra	1 No.		
8.16	Bhubaneshwar Airport, Orissa	1 No.		
8.17	Aurangabad Airport, Maharashtra	1 No.		
8.18	Vishakhapatnam Airport, Andhra Pradesh	1 No.		
8.19	Begumpet Airport, Hyderabad, Telangana	1 No.		
8.20	Hubli Airport, Karnataka	1 No.		
8.21	GAGAN Complex, Bangalore, Karnataka	1 No.		
8.22	Madurai Airport, Tamil Nadu	1 No.		
8.23	Trivandrum Airport, Kerala	1 No.		
8.24	Agatti Airport, Lakshadweep	1 No.		
8.25	Portblair Airport, Andaman & Nicobar	1 No.		