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भारत सरकार, गृह मंत्रालय
महानिदेशालय सीमा सुरक्षा बल
(रसद निदेशालय: आधुनिकीकरण सैल)
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ब्लाक संख्या . 10,
सीजीओ काम्पलैक्स,
लोधी रोड, नई दिल्ली-03

दिनांक 11 अक्टूबर 2022

सेवा में,

महानिदेशकः- आसाम राईफलस (through LOAR), केन्द्रीय ओद्यौगिक सुरक्षा बल, केन्द्रीय रिजर्व पुलिस बल, भारतीय-तिब्बत बोर्डर पुलिस, सशस्त्र सीमा बल, राष्ट्रीय सुरक्षा गार्ड एवं पुलिस अनुसन्धान एवं विकास ब्योरो

विषयः **अनुमोदित गुणात्मक आवश्यकता /परीक्षण निर्देशों का प्रेषण**

तकनीकी विशेषज्ञों के उप समूह द्वारा किए गये सूत्रीकरण एवं महानिदेशक सीमा सुरक्षा बल द्वारा अनुमोदित "Long Range Reconnaissance and Observation System (LORROS)" के संशोधित गुणात्मक आवश्यकता/परीक्षण निर्देशों को आपकी अग्रिम कार्यवाही हेतु प्रेषित किया जाता हैं।

संलग्न : उपरोक्तनुसार

(राकेश रंजन लाल)
उप महानिरीक्षक (वस्त्र)

प्रतिलिपि :-

1. **तकनीकी निदेशक**
   The Technical Director
   राष्ट्रीय सूचना-विज्ञान केन्द्र, नोर्थ ब्लाक, गृह मंत्रालय, नई दिल्ली
   NIC, North Block, MHA
   New Delhi
   (द्वारा ई-मेल)
   (ई-मेल पता : mpsugandhi@nic.in)
   : आपसे अनुरोध है कि उक्त उपकरण के गुणात्मक आवश्यकता /परीक्षण निर्देशों को गृह मंत्रालय की वैबसाईट (पुलिस आधुनिकीकरण विभाग- गुणात्मक आवश्यकता) पर अपलोड करने का श्रम करें।
2. SO (IT), North Block, MHA
   (Through E-mail)
   (E-mail address: soit@nic.in)
   : आपसे अनुरोध है कि उक्त उपकरण के गुणात्मक आवश्यकता /परीक्षण निर्देशों को गृह मंत्रालय की वैबसाईट (पुलिस आधुनिकीकरण विभाग- गुणात्मक आवश्यकता) पर अपलोड करने का श्रम करें।
3. तकनीकी विंग, सीमा सुरक्षा बल
   : आपसे अनुरोध है कि उक्त उपकरण के गुणात्मक आवश्यकता /परीक्षण निर्देशों को सीमा सुरक्षा बल की वैबसाईट पर अपलोड करने का श्रम करें।
4. रसद निदेशालय-आयुद्ध अनुभाग
   : उक्त उपकरण के अनुमोदित गुणात्मक आवश्यकता /परीक्षण निर्देश को आपके सूचनार्थ एवं अग्रिम कार्यावाही हेतु प्रेषित किया जा रहा है।
5. कार्यालय प्रति।

Appendix-'A'

REVISED QUALITATIVE REQUIREMENT AND TRIAL DIRECTIVE OF LONG RANGE RECONNAISSANCE AND OBSERVATION SYSTEM (LORROS)

S No.	Proposed specification by ITBP	Procedure suggested for trial for Board of Officers	Result expected / desired
(1)	(2)	(3)	(4)
1	The LORROS must be rapidly deployable compact surveillance system, **with modular design with facility to remove faulty parts by technician and the equipment be tripod and mast mounted. (The equipment can be mounted on either of fixed structure and static vehicle)**	Check the system physically for compactness, **with** modular design, and portability of the same on Tripod **and** on mast by installing it as per the requirement. **The B.O.O will check whether faulty parts can be removed by the technician at the last stage of trial.**	The System must be compact, **with** modular design, portable and tripod **and** mast mountable.
2	Installation and Dismantling of the system should be smooth and user friendly.	The B.O.O. will check the system deployment by installing and dismantling for smooth and user friendly features.	Installation and dismantling of the system must be smooth and user friendly.
3(a)	**Range For 20 Kms** **For Human target:** Detection - 10 Km (min) Recognition - 05 Km (min)	Place a group of men (3 to 4 person) each at the range of 10 Kms & 5 Kms and move them. The B.O.O. will physically observe them for detection and Recognition at respective ranges.	Human target detection and Recognition through day & night camera must be achieved as per the minimum ranges mentioned in the QRs Para 3.
	b) **For vehicle:** Detection - 20 Km (min) Recognition - 10 Km (min	Place a vehicle having size 4.3x1.8x1.5m target or better, in moving and stationary conditions, at side angle (for maximum surface area facing towards the camera) at a distance of 20 Kms & 10 Kms. The B.O.O. will physically observe them for detection and Recognition at respective ranges.	The vehicle target Detection and Recognition through day & night camera must be achieved as per the minimum ranges mentioned in the QRs Para 4.
3(b)	**Range for 40 Kms (Optional- To be specified by the user department)**		
	a) **For Human target:**	Place a group of men (3 to 4 person) each at the range of 20 Kms & 8 Kms and move them. The	Human target detection and Recognition through day & night

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	Detection - 20 Km (min) Recognition - 08 Km (min)	B.O.O. will physically observe them for detection and Recognition at respective ranges.	camera must be achieved as per the minimum ranges mentioned in the QRs.
	b) **For vehicle:** Detection - 40 Km (min) Recognition - 15 Km (min)	Place a vehicle size 4.3x1.8x1.5m target or better , in moving and stationary conditions, at side angle (for maximum surface area facing towards the camera) at a distance of 40 Kms & 15 Kms. The B.O.O. will physically observe them for detection and Recognition at respective ranges.	The vehicle target Detection and Recognition through day & night camera must be achieved as per the minimum ranges mentioned in the QRs.
4.	**Thermal Imager Camera (MWIR & SWIR) Should have :**		
	MWIR		
	a) Advanced IR Detector having resolution 1280X1024 with 10 micron meter or better for sharper Thermal Images.	Check the Detector (DDC) OEM certificate/data sheet submitted by the firm in respect of detector resolution, Pitch and spectral range.	The DDC OEM certificate/datasheet must confirm the same.
	b) Spectral range: MWIR	Check the OEM certificate/data sheet in respect of Spectral range.	Spectral response must be of MWIR and MWIR .
	C1) Narrowest optical Field of View: : 2^0x $1.3.^0$ or better (For 20 Kms)	Fix the equipment on ATS (Acceptance test station) available in SIW & observe the TI image only. Measure the FOV in full zoom in as per the testing procedure **by the BOO during field Trials.**	FOV must be : 2^0x 1.3^0 or better at fully zoom 'IN' condition.
	C2) (**Optional (40 Km)- To be specified by the user department**) Narrowest optical Field of View: : 1.25^0x 0.8^0 or better	Fix the equipment on ATS (Acceptance test station) available in SIW & observe the TI image only. Measure the **IFOV**/FOV in full zoon in as per the testing procedure. Check the National/ International accredited lab certificate/report submitted by the firm in respect of optical field of view.	FOV must be : 1.25^0x 0.82^0 or better at fully zoom 'IN' condition.
	d) Optical zoom: i) For 20 Km- Minimum 12x (continuous zoom) or better	Measure the optical zoom and check the facility to zoom in & out in continuous manner in the **field by BOO.**	The zoom must be achieved optically and should be minimum 12X and 20X (optional) continuous

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	ii) For 40 Km- Minimum 20x (Optional)		or better.
	e) Automatic and manual focusing facility.	Check the system for automatic and manual focusing facility.	The system must have manual as well as automatic focusing mechanism.
	f) Non Uniformity Calibration (NUC).	Check the system for NUC facilities.	The system must have NUC.
	g) Capture frame rate not less than 25 FPS.	Check the system frame rate captured by the camera physically. The firm representative has to show the same during demonstration.	Capture frame rate must not be less than 25 FPS.
	h) The external output in **HDMI, USB HD/SD-SDI, and Ethernet format.**	Connect the out-put video of the system with the TV monitor and external display unit in the **HDMI, USB HD/SD-SDI, and Ethernet** mode and check its format compatibility in the **field by BOO.**	The video must be free from any distortion in terms of vertical rolling, pixalization or sync/retrace bars on the display.
	i) The camera initialization time to ready should not be more than 10 minutes.	Switch 'ON' the thermal camera from switch 'OFF' position and note down the initialization time up to ready.	The initialization time to ready must not be more than 10 minutes.
	SWIR		
	a) Advanced Short Wave Infrared Detector having resolution of 640 x 512 pixels with 15um pitch or better for sharp images (For 20 Kms)	Check the detector OEM certificate/datasheet submitted by the firm in respect of detector resolution, pitch, spectral band.	The detector OEM certificate/datasheet must confirm the same
	b) Spectral range: SWIR (For 20 Kms)	Check the OEM certificate/datasheet in respect of spectral range	spectral response must be within SWIR band (0.9um to 2.5um)
	c) Narrowest optical Field of view: 0.8 deg. X 0.6 deg. (maximum) (For 20 Kms)	Fix the equipment on ATS (Acceptance Test Station) available in SIW and observe the SWIR image only. Measure the FOV in full zoom in as per testing procedure.	FOV must be 0.8 deg. X 0.6 deg. (maximum) in full zoom "IN" condition
	d) (Optional- To be specified by user department) Narrowest optical Field of view: 0.4 deg. X 0.3 deg. (maximum) (For 40 Kms)	Fix the equipment on ATS (Acceptance Test Station) available in SIW and observe the SWIR image only. Measure the FOV in full zoom in as per testing procedure.	FOV must be 0.4 deg. X 0.3 deg. (maximum) in full zoom "IN" condition

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	e) Optical Zoom: minimum 3x (continuous zoom) or better. (For 20 Kms & 40 Kms)	Measure the optical zoom and check the facility for zoom in & out in continuous manner in the field	The zoom must be achieved optically and should be minimum 3x continuous or better
	f) Automatic and Manual Focusing facility.	Check the system for automatic and manual focusing facility	The system should have automatic and manual focusing mechanism
	g) Capture frame rate not less than 25 FPS.	Check the system frame rate captured by the camera physically. The firm representative has to show the same during demonstration	Capture frame rate must not be less than 25 FPS
5	**Colour Day light camera should have**		
	a) CCD/CMOS Camera.	Check the Camera OEM certificate/datasheet duly attested by the participating firm in respect of Type of camera (CMOS) and resolution.	The camera OEM certificate / datasheet must confirm the same.
	b) Optical zoom 30x (min) or better (for 20 Kms)	Measure the optical zoom as per the procedure in the **field by BOO.**	Optical zoom must be 30X (min).
	c) Narrowest Optical Field of View: 1°x 0.8° maximum. (for 20 Kms) **Resolution – 1920 x 1080 (minimum)**	Fix the equipment on ATS (Acceptance test station) available in SIW & observe the day camera image only. Measure the FOV in full zoom in as per the testing procedure.	FOV must be 1°x 0.8° maximum at fully zoom 'IN' condition.
	(**Optional- To be specified by the user department**) Optical zoom 50x (min) or better (for 40 Kms).	Measure the optical zoom as per the procedure in the **field by BOO.**	Optical zoom must be 50X (min).
	(**Optional- To be specified by the user department**) Narrowest Optical Field of View: 0.3°x 0.2° maximum **or better at full zoom** for 40 Km range **Resolution – 1920 x 1080 (minimum)**	Fix the equipment on ATS (Acceptance test station) available in SIW & observe the day camera image only. Measure the FOV in full zoom in as per the testing procedure. The **BOO will check during field trails.**	FOV must be 0.3°x 0.2° maximum at fully zoom 'IN' condition.
	d) Automatic and manual focusing facility.	Check the system for manual and automatic focusing facility in the field by BOO.	The system must have manual as well as automatic focusing mechanism.
	e) Capable to display colour and B & W picture	Check the system for the facility of B&W and colour picture on the screen.	The system Day camera must be capable to give colour and B&W

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			picture.
	f) Resolution: 2 Mega pixel (min) FHD or better.	Check the OEM data sheet.	Resolution should be 2 Mega pixel(min)FHD or better.
6.	**LRF** : a) Inbuilt eye safe for accurate range measurement from 100 meters to 20 Km for vehicle size 4.3x1.8x1.5m target with range Accuracy of 5 meters **or better.** b) Pulse/Sec-01 PPS **or better.** **Optional:** Preference will be given to better PPM rate.	In continuation of the test for QRs Para 3, range the human target and vehicle from the known distance of 100 meters, 2 Kms, 5 Kms, 10 Kms & 20 Kms ranges with the help of LRF and check the accuracy of the reading given by LRF and pulse / sec -1PPS **or better.** Check the National/International accredited lab certificate/report submitted by the firm in respect eye safe laser and Pulse/sec – 01 PPS **or better.**	The system must have the range accuracy of 5 meters at all ranges and Pulse /sec-1PPS **or better.** The National / International Accredited lab certificate/report should confirm the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.
7.	**Digital Magnetic Compass (DMC):** (a) Inbuilt DMC should be provided for auto Northing. It should not get affected if installed on ferrous platform.	Switch on the system and do auto northing. Note down the bearing of a point with the help of compass. Again check the bearing of that point through inbuilt DMC and then compare both the readings for accuracy and resolution.	The system must have inbuilt DMC for auto northing. DMC should not get affected if installed on ferrous platform.
	(b) System Accuracy : The system should have the facility to give co-ordinates of the detected target with azimuth and elevation accuracy of 1° (max).	Firms be allowed to calibrate their device in order to reduce the effect of ferrous platform. Place a target at a distance of more than 2 Kms whose co-ordinates with azimuth and elevation are known. Note down the co-ordinates from the system and compare the values of both co-ordinates for accuracy difference.	The system must have the facility to give co-ordinates of the detected target with azimuth and elevation accuracy of 1° (max).
8.	**GNSS Feature** : Inbuilt indigenous **NaVIC and GLONASS/GPS to** be integrated with the system to get own position during initialization. The accuracy of the **GNSS** should be less than 10 meters. **GNSS** should display the coordinates in Indian	Check the co-ordinates of own position through inbuilt **GNSS**. Check the own position co-ordinates of a point by other **GNSS** or method and compare it with the co-ordinates of the same point shown by the inbuilt	The system must have inbuilt **GNSS** to get own position and accuracy of the co-ordinates should be less than 10 meters. **NaVIC restricted services will be**

	Grid reference system and standard Geo coordinate system. Note: Restricted NaVIC services will be preferred over foreign GNSS.	**GNSS.** Certificate from govt lab / agency for NaVIC GNSS accuracy will checked by BOO.	**preferred.** It must give co-ordinates in Indian Grid reference system and **standard Geo Coordinate format.**
9.	**Installation:** User will specify the requirement of Tripod or mast or both at the time of indent.		
	a) Tripod: Suitable Tripod with telescopic legs supporting the system offered with levelling bubble. There should be provision of levelling the tripod on a ground inclination up to ± 15°.	Check the tripod for telescopic legs and bubble for levelling. Mount the system on provided Tripod on an inclined ground having inclination up to ± 15° and check the compatibility & comforts in mounting. Check also the suitability of levelling adjustment mechanism provided.	The tripod must have telescopic legs with leveling bubble. It must have the suitable leveling provision to mount it on a ground inclination up to ± 15°.
	b) Mast: Telescopic mast driven through Pneumatic should be provided having minimum height of 10 meters in a fully expandable condition. It should have suitable and stable platform to hold system weight up to 50 Kgs. The base of the mast should be in commensuration with its height and load.	Check the mast provided for telescopic mechanism and pneumatic control to expand it up to a height of 10 meters. Mount the system on mast provided and check the compatibility, the area of base of the mast and measure the length of mast in fully expandable condition. Put a 50 Kgs load on the mast in fully expanded condition and check the stability of the system by monitoring the system performance in the console's display.	The mast must be telescopic, pneumatically driven and able to expand up to height of 10 meters. The mast must have compatible mechanism to interface with the LORROS. The mast platform must be suitable in commensuration with the height of 10 meters and stable enough to withstand the weight of 50 Kgs and vibrations/thrust of winds in fully expanded conditions. System must be electronically/ Gyro stabilized as per the requirement of the user. The best stabilization will be checked by BOO.
	c) In case mast/tripod is opted, the user, will have an option of choosing either electronic stabilisation or Gyro stabilisation. Same will be defined by the user at the time of tender. **Electronic & Gyro stabilization accuracy better than half of IFOV or**	Firm to produce OEM data sheet and certificate in respect of electronic stabilization. **Gyro Stabilization certification DRDO / Any Govt lab for stabilization & disturbances as per standard test procedure. The stabilization of feed should be physically checked**	

	better.	by BOO in the ground.	
10.	**Mil Std**: The system and its sub-systems/accessories must confirm to the latest Mil STD 810G or JSS 55555 in respect of applicable environmental parameters (low high temperature, humidity, vibration, shock, corrosion) and EMI & EMC in case user opts for wireless transmission.	Check the National/International accredited lab certificate/report submitted by the firm for Mil Std 810G or JSS 55555 in respect of applicable environmental parameters, ruggedness. Check the National/International accredited lab certificate/report submitted by the firm for EMI & EMC in case user opts for wireless transmission.	The national/ International accredited lab certificate/report must confirm the 810G or JSS 55555 in respect of applicable environmental parameters (low high temperature, humidity, vibration, shock) . The national/International accredited lab certificate/report must confirm the EMI & EMC in case user opts for wireless transmission. In case of any doubt in the test reports, the veracity of the same may be checked from the concerned lab.
11.	**Protection:** The system and its sub-systems/ accessories must conform to IP-65.	Check the National/International accredited lab certificate/report submitted by the firm for latest Mil Std in respect of IP-65.	The national/ International accredited lab certificate/report must confirm the Latest Mil Std in respect of IP-65. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.
12.	**Pan & Tilt unit**: The system should have pan & tilt facility. It should have Pan speed up-to **55°** per second or better. a) Azimuth - NX 360° (Should be continuous to take shorter route during seamless tracking and auto acquisition) b) Elevation – Min + 65^0 to -45^0 Scan speed should be variable.	Mount the system on tripod with Pan & Tilt unit and check the azimuth and elevation movement in degrees. Physically check the pan speed per second and the facility to adjust the Pan speed as per requirement.	Pan & Tilt unit must have the following: a) Azimuth - NX 360° (Should be continuous to take shorter route during seamless tracking and auto acquisition) b) Elevation - +65° to -45° Scan speed should be variable and up to **55°** per second or better.
13.	**Power Source** : Suitable AC/DC adaptor to be	BOO to physically check **equipment** through AC/DC	**The Equipment** should function

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	provided for running **equipment through main AC (180 to 270 V) & DC (24 volt / 48 Volt)** maintenance free battery.	adaptor on AC mains (180 to 270 V) nd on 24/48 volt sealed maintenance free battery.	properly through AC (180 to 270 V) & DC 24/48 volt sealed maintenance free battery.
14.	**Video Recording Capability** : Inbuilt min 2 TB (SSD) storage memory for video recording in the console. The system should have facility to retrieve the stored data. The system should have the facility to record either of the camera video (day or TI) or both the channels simultaneously at a time as per requirement. The following facility in console in r/o video recording: i. **Video forward / backward by time entry.** ii. **Video Streaming facility** iii. **Transcripting of event** iv. **Short Clipping facility as per user need.** v. **Automatic Time Stamp of video** vi. **Recorded video export facility in standard video formats.**	a) Check the system for the facility of video recording and record the video of day & night camera individually and simultaneously for a total time period of 2 hours minimum. b) Check the storage capacity in the system. c) Check the system for the facility to retrieve and **export** the stored data in interoperable formats. **BOO to check all features.**	a) The facility of video recording of day and night camera individually and simultaneously at the same time must be provided in the system. b) The total storage capacity must be min 2 TB (SSD). The facility to retrieve the stored data must be provided in the system.
15.	**Online UPS: It should have**		
	a) Out Put Power : 2 KVA (min) or sufficient to run the equipment	Firm to produce OEM certificate. Also B.O.O. TO check physically also.	Out Put Power should be : 2KVA (min) or sufficient to run the equipment.
	b) In-put voltage range from 90 to 270 volt, 46-54 Hz AC mains supply.	Connect the UPS with variable AC mains supply (Dimmer state) and check the output voltage stability by varying in-put voltage from 90 to 270 volt, 46-54 Hz AC main supply.	The out-put of the UPS must not be effected on varying the AC in-put voltage from 90 to 270 Volt, 46-54 Hz mains supply.
	c) Power backup is required at both sites with full load i.e. camera site and remotely placed console	Charge the UPS batteries fully and then connect it with the full load of LORROS.	Power backup must as per the requirement mentioned in the QRs.

	site.		
	d) Single phase.	Measure the UPS out-put with the help of multimeter and functioning on single phase mains supply.	The UPS must be functional on single phase mains supply and out-put voltage from the UPS be 220 volt ±10%.
	e) Out-put 220 volt ±10%		
	f) In-put cable length of 25 meters with standard 3 pin plug.	Measure the in-put cable length and check the 3 pin plug attached with it.	In-put cable length must be 25 meters with standard 3 pin plug.
	g) Minimum three 15 & 5 Amp combination sockets for Out-put.	Check the facility of combination of 15 & 5 Amp sockets provided in the UPS for out-put.	UPS must have minimum three combo sockets (15 & 5 amp socket i.e. 6 pin socket) provided for out-put.
	h) It should be provided with an all-weather enclosure for keeping the UPS and its batteries safe in rain and snow.	Check the UPS enclosure for keeping it with batteries safe in rain & snow.	UPS and its batteries must be provided in an all-weather proof enclosure to keep it safe in rain & snow.
16.	**Battery/Power Source:** Should have rechargeable battery with battery bank to operate the LORROS in the entire operating range of temp mentioned in QRs at Para 22 (a) (i). The battery should have battery status indication to get the charge status of the battery. Should have separated power source. (**Optional- To be decided by the user department at the time of indent**)	a) Check the National/International Accredited lab certificate/report submitted by the firm in respect of type of battery and operating temperature range I.e. -30°C to 55°C. Check the battery for battery charge status indication.	a. The National / International Accredited lab certificate/ report should confirm the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab. The battery must have battery charge status indication.
17.	**Battery Performance**: The battery (s) should be able to run the system for 24 hrs in operational mode on single charge. **Battery Performance**: **(Optional- to be specified by the user department)** The battery (s) should be able to run the system for 48 Hrs in operational mode on single charge.	Switch 'ON' the system with fully charged battery (s) provided and check the endurance time of the system mounted on Tripod on single charge in mentioned conditions.	A fully charged battery (s) must run the system in operational mode for 24 Hrs on single charge.

18.	**Battery Charger:** A smart and Intelligent Charger operating from 90 volt to 270 volts 50 Hz AC Mains along with DC Charging facility from 12 volt to 48 volt DC (on entire range) to charge the battery should be provided. It should have "charge On" and "charge complete" indications during the charging of battery. The charger should be capable to charge the battery fully in ≤ 10 hours.	a) Connect the battery charger on AC mains supply and vary the in-put supply from 90 to 270 volt. Check the out-put voltage stability on varying In-put voltage. b) Connect the battery charger input with 12 to 48 volt variable DC power supply. Check the out-put voltage stability on varying In-put voltage. c) Check the battery charger for the indication of 'Charge On' and "Charge Complete" status. Charge a fully discharged battery on AC mains supply and note down the charging time till the battery gets fully charged.	a) The out-put of the battery charger must not be effected on varying the AC in-put voltage from 90 to 270 Volt, 50 Hz mains supply and DC in-put from 12 to 48 volt. b) The out-put of the battery charger must not be effected on varying the DC in-put from 12 to 48 volt. c) The charger must have "charge On" and "charge complete" indications during the charging of battery. A fully discharged battery must be charged fully with the battery charger in ≤ 10 hours.
19.	**Operator Console Unit:**		
	a) Console should be able to operate and control the equipment from a distance of 100 meters minimum through wire and OFC. Note:- OFC with accessories will be provided by the user department for distance **beyond** 100 Mtr for testing. **Optional facility (Indenter to define the requirement at the time of indent): To stream video streaming, remote control of console (limited features or full) over digital wireless link (500**	a) Install the system with console unit which is 100 meters away from the cameras. Check all the functions and controls of the system from the console and measure the distance between console & tripod. Check the video on the display received from the video receiver, transmitted by the video transmitter. The distance between Rx & Tx will be kept 500 meters (min) in NLOS and 10 Kms (min) in LOS.	a) The console must be able to control all the functions of the day, night, pan& Tilt mechanism, LRF etc. from a distance of 100 meters minimum through wire link. In case of digital wireless link for imagery, the transmitter & receiver must be able to establish noiseless and continuous imagery wireless link up-to 500 meters (min) in NLOS and 5Kms (min) in LOS. Repeaters may be incorporated in the system

	meters minimum NLOS and 10 Km minimum LOS).		for better and guaranteed reception.
	(Optional- to be specified by the User Department) i) Console should be able to operate and control the equipment from a distance of 100 meters minimum through wire, 20 Kms through OFC and 20 Kms using Microwave. *Optional facility (Indenter to define the requirement at the time of indent): **To stream video streaming, remote control of console (limited features or full) over digital wireless link** (500 meters minimum NLOS and 10 Kms minimum LOS) ii) Facility to integrate the Console with integrated border surveillance & management projects by open format complied feed output. iii) **Standard application to control the Eqpt remotely from Command Centre with rights to over ride console operator commands.**	i) Install the system with console unit which is 100 meters away from the cameras. Check all the functions and controls of the system from the console and measure the distance between console & LORROS, same procedure should also be followed for testing of 20 Km OFC. Check the video on the display received from the video receiver, transmitted by the video transmitter, the resolution of the recorded video should be the same as recorded by the Camera. The distance between Rx & Tx will be kept 500 meters (min) in NLOS and 10 Kms (min) in LOS. (ii) & (iii) BOO to physically check these features also check the National/International accredited lab certificate/report submitted by the firm.	Specification must be as per mentioned in the QRs.
	b) Should have a ruggedized LED colour display with sunlight and backlit feature of size 19" (min) HD or better.	**The Display certificate in respect of ruggedized LED colour display with sunlight and backlit feature of size 19" (min) HD or better** check the National/International accredited lab certificate/report submitted by the firm.	**The display must have a ruggedized LED colour display with sunlight and backlit feature of size 19" (min) HD or better.**
	c) The console should have facility to display map view, panoramic view with the FOV / IFOV scene display, day camera and night camera view individually and simultaneously on one screen as per the requirement of user during surveillance.	Check the console for the display of following: a) Day camera video. b) TI camera video. c) Panoramic view with the FOV/ IFOV scene display.	The console must have facility to display map view, panoramic view with the FOV scene display, day camera and night camera view individually and simultaneously on

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		d) Map view. Day & TI camera video simultaneously.	one screen as per the requirement of user during surveillance.
	d) The display should preferably be on graded background so as to facilitate correlation between displayed data and map features.	Check the correlation between features on map and displayed data on screen.	The displayed data/features on screen must be correlated with the map features/data.
	e) Screen should be capable to display area picture with selected target range, azimuth, elevation and co-ordinates.	Check the system for the display of area picture, selected target range, azimuth, elevation and its co-ordinates.	Console must be capable to display area picture with selected target range, azimuth, elevation and co-ordinates.
	f) A suitable facility of the control keys and joystick should be provided to operate the system remotely with comfort.	Check the system for the facility provided to control the functions through keys and joystick remotely.	Console must have control keys and joystick to control all the functions of system efficiently.
	g) The console recovery option should be provided in the system itself to cater for software corruption.	Check the facility provided to recover the console software (OS and application software) in terms of CDs/DVDs/Bootable recovery stick/ one touch key (for recovery to factory setting) in the console.	There must be facility to recover the console software to cater for software corruption.
	h) The console should have the facility to control the operation of day & night camera, LRF and Pan & Tilt sub systems through soft keys and via track ball.	Check the system console by operating all the functions of day & night camera, LRF and Pan & Tilt mechanism through soft keys, track ball or whatever the facility provided by the manufacturer in the console.	The console must have the facility to control the operation of day & night camera, LRF, Pan & Tilt sub-systems through soft keys and via track ball.
	i) The system should have scan around the target and track while scan facility, automatically whenever required.	Put the LORROS system in the scan mode by feeding azimuth & elevation angle or co-ordinates of required target/limits. Check the system for the facility of track while scan by selecting a detected target for tracking.	The system must have scan around the target and track while scan facility, automatically whenever required.
	j) The system must incorporate built in test equipment (BITE).	Check the facility of BITE in the system to verify the system health.	The console must have BITE facility.
	k) The system should have the facility to display & store the positional co-ordinates (Lat/Lon and	Check the system for the facility to show and store the positional co-ordinates of a selected target	The system must have the facility to display & store the positional co-

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	Indian GR system as selected by the user) and range of a selected target.	whenever required. Check also the range of a selected target by firing Laser through built in LRF.	ordinates and range of a selected target.
	l) The system should have the ability to generate the custom bookmarks during recording and Go-to specific bookmarks during playback.	Check the system for generating the bookmark during recording whenever required and playback the same track by addressing the bookmark.	The console must have the facility to create bookmarks during recording for day & night channel as and when required. The facility to Playback the specific bookmarked video must also be provided.
	m) There should have facility to capture image snapshot and video short clip whenever required.	Check the facility in the system console to capture the snapshot of an image and video short clip whenever required.	The console must have facility to capture the snapshot of an image and video short clip whenever required.
	n) There should be facility to store/mark pre-defined locations co-ordinates up to 100 points (min).	Check the system for the facility by storing co-ordinates of up to 100 locations.	The facility to store/mark locations co-ordinates up to 100 points (min).
	o) There should have interface port for HDMI, USB, HD/SD-SDI and Ethernet port.	**Check the system for the interface port for HDMI, USB, HD/SD-SDI and Ethernet port by BOO on TV Display and external Display unit.**	**The console must have interface port for HDMI, USB, HD/SD-SDI and Ethernet port.**
20.	**Transportation case:** Should have a ruggedized shock proof container along with pressure equalizer valve compliant to IP-65 and Mil Std. 810**H.**	Check The National/International Accredited Lab Certificate/Report Submitted By The Firm In Respect of Ruggedized Shock Proof Container With Pressure Equalizer Valve Compliant To IP-65 And Mil Std **810H**	The National/International accredited lab certificate/report submitted by the firm must confirm the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.
21.	**Environmental Specification:** a) **Temperature:** i) operation: -30°C to 55°C ii) Storage : -40° C to 70°C **Note: Operating temperature be defined by the user at the time of indent as per the requirement.**	Check the National/International accredited lab certificate/report submitted by the firm in respect of operation and storage temperature.	The National/International accredited lab certificate/report submitted by the firm must confirm the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.

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	b) **Altitude**: Complete system must be suitable for use and storage at heights up to 5000 meters above mean sea level at their full rated performance. **c) Optional : User may specify additional altitude requirement during tender.**	Check the National/International accredited lab certificate/report submitted by the firm in respect of functioning at mentioned altitude **and also physically checked by BOO/User department**.	The National/International accredited lab certificate/report submitted by the firm must confirm the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.
22.	**A Single LORROS must comprise of following accessories** : a) Uninterruptible 24x7 Power Source - 1 No. each with sensor and control Unit site. b) Rechargeable battery set – 2 no's (one on system and one additional set). c) Tripod / mast-1 no. or tripod and mast 1 no each. (As opted by the user) d) Additional one set of cables with connector to be provided. e) Transportation case. **f)** Water proof carrying case. **(optional requirement. To be specified by the user at the time of indent)** Battery charger having provision of charging two batteries at a time.	The firm has to submit an assurance certificate for the accessories as mentioned in Para 22.	Assurance certificate must confirm the accessories as mentioned at QRs Para 22 (a) to (g).
23.	**Operating Software, User Manual, and Operation Instructions:** Soft & hard copy of Operating Software and Soft & hard copy of detailed instructions technical literature, maintenance manual, operational and Inspection standards be provided with the equipment.	The firm has to submit an assurance certificate for Operating Software, User Manual, and Operation Instructions.	Assurance certificate must confirm for Operating Software, User manual, and Operation Instructions.

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24.	**(Optional- to be specified by the User Department)** a) GNSS services of GPS/GLONASS/ GALILEO etc in additional to mandatory service of indigenous NaVIC (Restricted services will be preferred) under make in India. b) Availability of telemetry data output and relay of feed over any COTS. c) Open Geospatial Consortium (OGC) complied data input & output. d) Feature Identification for Human, light vehicles, medium, vehicles, heavy vehicles, Aircrafts, Heli, Boats, Animals etc. with option of summary in time frame. The training of data will be done by user with the help of OEM **on premises.** The OEM / Supplier will not have any right on such data sets, library and algorithms. e) Suitable data compression standard must be used for processing, transmission, multiplexing of HD video and audio for relay of output over selectable bandwidth (**2/4/8/16 Mbps – user selectable mode).** f) 256 bit AES encryption facility between sensor and central console with user selectable key changing facility. g) Software enabled auto target locking, tracking and identification facility with audio/visual alarm generation for each entity with specific sounds/visual signature. h) AI/ML based algorithms for smart analysis over captioned date, time, feed by giving summary of detection and filter options by type of target. i) **Preloaded indigenous (SOI standards) with**	a) **Govt. lab / agency certificate for GNSS accuracy with clear mentioning of denial of accuracy (DoA) parameters of foreign GNSS in Indian subcontinent.** b) BOO to physically check the telemetry data and accuracy. c, d & e) Check the National/International accredited lab certificate/report submitted by the firm. The firm will train the data for (d) within 180 days of the deployment of the device. Undertaking certificate on the same by firm. **f) Firm should submit Govt. lab/ Govt. R & D organization certificate/report for indigenounization of key/algorithms.** **G & h) – Govt. lab/ Reputed IIT/Firm certification for the software** **g) OEM/Reputed Map agency certification.** **h) OEM/ Reputed Map agency certification.**	Specification must be as per mentioned in the QRs.

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	boundary layer upto district level OSM Map. **(j) External Map uploading facility in format .tilt, .shp and .jpg.** **(k) Panorama creation and export feature** **(l) Auto video cut facility at every 500 Mb of storage for ease of export.**	**BOO will check all features during time of field trials.**	
25.	**(Optional-to be specified by the User department):-** i) Firm should provide operator training to 10 people for 03 to 05 days for 1st year at consignee location. ii) Firm will provide maintenance training to 10 people for 03 to 05 days for 1st year at firm premises. iii) Firm will also provide additional operator & maintenance training every year till 5th year to 10 people for 03 days at consignee location. iv) If need arises, Operator & maintenance training will be enhanced further by 01 week.	-	NA
26.	**(Optional- to be specified by the user department)** i) The stores supplied against the order should cover under free warranty repair/replacement of components which are established as being defective due to improper design, defective materials or poor workmanship standard for a period 02 years from the date of commissioning of the system at consignee's place. ii) Additional warranty for 03 years should also be provided. iii) For optimum performance of the LORROS, the firm/OEM has to install adequate prefab structure &	(iii) **Applicable govt. / NABL certification for pre fab structure & fixtures at time of delivery and**	NA

fixtures for 02-03 operators at the control unit site. (The size of the structure & fixtures to be specified by the user department in tender and same will **not be part of trial.**	**hand over of structure.**	

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APPROVED / NOT APPROVED

DIRECTOR GENERAL
BORDER SECURITY FORCE