संख्या. पी-63013/111/05/2025/मोड–।/सीसुबल/3944-55

भारत सरकार, गृह मंत्रालय
महानिदेशालय सीमा सुरक्षा बल
(रसद निदेशालय: आधुनिकीकरण सैल)
(Email-comdtord@bsf.nic.in)
(Fax: 011-24367683)

ब्लाक संख्या . 10,
सीजीओ काम्पलैक्स,
लोधी रोड, नई दिल्ली–03
दिनांक 09 अक्टुबर 2025

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) – Revision"** उपकरण के संसोधित गुणात्मक आवश्यकता/परीक्षण निर्देशों को आपकी अग्रिम कार्यवाही हेतु प्रेषित किया जाता हैं।

संल्गन : उपरोक्तनुसार

आनन्द सिंह 9/10/25
(आनन्द सिंह तक्षक)
उप महानिरीक्षक (रसद)

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 जोकि गृह मंत्रालय की वैबसाईट (पुलिस आधुनिकीकरण संभाग) के गुणात्मक आवश्यकता पोर्टल में मशीनरी एवं उपकरण के साथ निगरानी उपकरण वर्ग के अर्न्तगत कमांक संख्या–**124** पर पहले से अपलोड है के स्थान इस पत्र के साथ संलग्न संशोधित गुणात्मक आवश्यकता/ परीक्षण निर्देशों को अपलोड करने का श्रम करें।
2. SO (IT), North Block, MHA
   (Through E-mail)
   (E-mail address**: soit@nic.in**)
   : कृपया उपरोक्तानुसार कार्यवाही करने का श्रम करें।
3. Sh. Samarth Sharma,
   Director Nodal Officer for MHA GeM,
   3rd Floor, Jeevan Bharti Building
   Conaught Lane, Janpath Cannaught Place, N/ Delhi-110001
   E-mail:directorcategory13@gem.gov.in
   For info with request to upload the approved QRs & TDs of **Long Range Reconnaissance and Observation System (LORROS) – Revision** on GeM Portal. Copy of QRs & TDs is attached with this letter.
4. तकनीकी विंग, सीमा सुरक्षा बल
   : कृपया उक्त उपकरण के गुणात्मक आवश्यकता/परीक्षण निर्देशों को सीमा सुरक्षा बल की वैबसाईट पर अपलोड करने का श्रम करें।
5. रसद निदेशालय (आयुद्ध अनुभाग)
   E-mail:scord@nsg.gov.in
   : आपके यूओ संख्या–3666–04 दिनांक 13 अगस्त 2025 के सन्दर्भ में अनुमोदित उपकरण के संसोधित गुणात्मक आवश्यकता/ परीक्षण निर्देशों को आपके सूचनार्थ एवं अग्रिम कार्यवाही हेतु प्रेषित जाता है।
6. फाईल।

Appendix-"A"

QRs AND TDs FOR LONG RANGE RECONNAISSANCE AND OBSERVATION SYSTEM (LORROS)- REVISION

S.No.	Revised QRs / Specification	Revised Trial Directives	Result expected / desired
1.	The LORROS must be rapidly deployable compact surveillance system, with modular design with facility to remove faulty modules/ accessories by technician and the equipment be tripod and mast mounted. (The equipment can be mounted on 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 modules/ accessories can be removed by the technician at the last stage of trial.	The System must be compact, with modular design, portable, 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 KM (i) For Human target: Human / Day / Night Detection / 10 Km (min) / 10 Km (min) Recognition / 05 Km (min) / 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 min ranges mentioned in the QRs.
	ii) For vehicle: Vehicle / Day / Night Detection / 20 Km (min) / 20 Km (min) Recognition / 10 Km (min) / 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 it 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.
3 (b)	RANGE FOR 40 KM (Optional- To be specified by the user department)		
	i) For Human target:	Place a group of men (3 to 4 person) each at the range of 20 Kms & 8 Kms and	Human target detection and recognition through day & night

<table>
<tr><th>S.No.</th><th>Revised QRs/ Specification</th><th>Revised Trial Directives</th><th>Result expected/ desired</th></tr>
<tr><td></td><td><table><tr><th>Human</th><th>Day</th><th>Night</th></tr><tr><td>Detection</td><td>20 Km (min)</td><td>20 Km (min)</td></tr><tr><td>Recognition</td><td>08 Km (min)</td><td>08 Km (min)</td></tr></table></td><td>move them. The B.O.O will physically Observe them for detection and Recognition at respective ranges.</td><td>camera must be achieved as per the minimum ranges mentioned in the QRs.</td></tr>
<tr><td></td><td>ii) <u>For vehicle:</u>
<table><tr><th>Vehicle</th><th>Day</th><th>Night</th></tr><tr><td>Detection</td><td>40 Km (min)</td><td>40 Km (min)</td></tr><tr><td>Recognition</td><td>15 Km (min)</td><td>15 Km (min)</td></tr></table></td><td>Place a vehicle size 4.3x 1.8x1.5m 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 it for detection & recognition at respective range.</td><td>The vehicle target detection and recognition through day & night camera must be achieved as per the minimum ranges mentioned in the QRs.</td></tr>
<tr><td>4</td><td><u>THERMAL IMAGER CAMERA (MWIR & SWIR) should have:-</u></td><td></td><td></td></tr>
<tr><td>4.1</td><td><u>MWIR</u></td><td></td><td></td></tr>
<tr><td>a</td><td>Advanced IR Detector having resolution 1280 x 1024 with 10 µm pitch or better for sharper Thermal Images.</td><td>Check the Detector (DDC) OEM certificate/ data sheet submitted by the firm in respect of detector resolution, Pitch and spectral range.</td><td>A certificate/ data sheet in this regard must be obtained from the firm.</td></tr>
<tr><td>b</td><td>Spectral range: 3 – 5 µm</td><td>Check the OEM certificate/ data sheet in respect of Spectral range.</td><td>A certificate/ data sheet in this regard must be obtained from the firm.</td></tr>
<tr><td>c</td><td>i) Narrow Field of View (NFOV) : ≤ 2^0 x 1.6^0 + 5%
(For 20 Kms)</td><td>To be physically checked by BOO at IRDE DRDO Dehradun/ any govt. Lab.</td><td>NFOV must be ≤ 2^0 x 1.6^0 +5% at fully zoom 'IN' condition.</td></tr>
<tr><td></td><td>ii) Optional (40Kms)- To be specified by the user department)
Narrow Field of View (NFOV) : ≤ 1.25^0 x 1^0 + 5%</td><td>ii) To be physically checked by BOO at IRDE DRDO Dehradun/ any govt. Lab.</td><td>NFOV must be ≤ 1.25^0 x 1^0 +5% at fully zoom 'IN' condition.</td></tr>
<tr><td>d</td><td>Optical zoom:
i) For 20 Km- Minimum 10X (continuous zoom) or better
ii) Optional) For 40 Km - Minimum 12X</td><td>To be physically checked by BOO at IRDE DRDO Dehradun/ any govt. Lab.</td><td>The zoom must be achieved optically and should be minimum 10X and 12X (optional) continuous or better.</td></tr>
</table>

S.No.	Revised QRs/Specification	Revised Trial Directives	Result expected/desired
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.	Firm to provide OEM certificate in respect of the same.	A certificate in this regard must be obtained from the firm.
h	Should have facility to connect external output through **HDMI/USB/ (HD/SD-SDI)/ Ethernet format.**	Connect the out-put video of the system with the TV monitor and external display through the HDMI/USB/ (HD/SD-SDI)/ 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 till the camera becomes fully operational.	The initialization time to ready must not be more than 10 minutes.
j	MTBF (Mean Time Between Failures) for detector minimum 10000 hours.	Firm to provide OEM certificate in respect of the same.	A certificate in this regard must be obtained from the firm.
4.2	**SWIR (Optional- To be specified by the user department)**		
a	Advanced Short wave Infra-Red Detector having resolution 1280 x 720 with 10 µm pitch or better for sharp Images (For 20 Kms).	Check the Detector OEM certificate/ data sheet submitted by the firm in respect of detector resolution, Pitch and spectral band.	A certificate/data sheet in this regard must be obtained from the firm.
b	Spectral range: SWIR (0.9 µm – 1.7 µm) (For 20 Kms)	Check the OEM certificate/data sheet in respect of Spectral range.	A certificate in this regard must be obtained from the firm.
c	**Narrow Field of View (NFOV):** $\leq 1.8^0 \times 1^0 + 5\%$ (For 20 Kms)	To be physically checked by BOO at IRDE DRDO Dehradun/ any govt. Lab.	NFOV must be $\leq 1.8^0 \times 1^0 + 5\%$ at fully zoom 'IN' condition.
d	**(Optional - To be specified by the user department)** **Narrow Field of View (NFOV):** $\leq 0.8^0 \times 0.5^0 + 5\%$ **(For 40Kms)**	To be physically checked by BOO at IRDE, DRDO Dehradun/ any govt. Lab.	NFOV must be $\leq 0.8^0 \times 0.5^0 + 5\%$ at fully zoom 'IN' condition.
e	Optical zoom :- Minimum 4X or better	To be physically checked by BOO at IRDE	The zoom must be minimum 4X or

S.No.	Revised QRs / Specification	Revised Trial Directives	Result expected / desired
	(For 20Kms & 40 Kms)	DRDO Dehradun/ any govt. Lab.	better.
f	Automatic and manual focusing facility.	Check the system for automatic and manual focusing facility.	The system must have automatic and manual focusing mechanism.
g	Capture frame rate not less than 25 FPS.	Firm to provide OEM certificate in respect of the same.	A certificate in this regard must be obtained from the firm.
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 (CCD/CMOS) and resolution.	A certificate/datasheet in this regard must be obtained from the firm.
b	Optical zoom 30x (min) or better (for 20 Kms)	To be physically checked by BOO at IRDE DRDO Dehradun/ any govt. Lab.	Optical zoom must be 30X (min).
c	**Narrow Field of View (NFOV)** : ≤ 1° x 0.5° + 5% (for 20 Kms) **Resolution – 1920 x 1080 (minimum)**	NFOV to be physically checked by BOO at IRDE DRDO Dehradun/ any govt. Lab. Firm to provide OEM certificate in respect of resolution.	NFOV must be ≤ 1° x 0.5° + 5% at fully zoom 'IN' condition. OEM certificate in respect of resolution must be obtained from the firm.
	(Optional- To be specified by the user department) Optical zoom 50x (min) or better (for 40 Kms)	To be physically checked by BOO at IRDE DRDO Dehradun/ any govt. Lab.	Optical zoom must be 50X (min).
	(Optional- To be specified by the user department) **Narrow Field of View (NFOV):**≤ 0.3°x 0.2°+ 5% (for 40 Km) **Resolution- 1920X1080 (minimum)**	NFOV to be physically checked by BOO at IRDE DRDO Dehradun/ any govt. Lab. Firm to provide OEM certificate in respect of resolution.	NFOV must be ≤ 0.3°x 0.2° + 5% at fully zoom 'IN' condition. OEM certificate in respect of resolution must be obtained from the firm.
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 coloured and B & W picture	Check the system for the facility of coloured and B&W picture on the screen.	The system Day camera must be capable to give coloured and B & W picture.

S.No.	Revised QRs/ Specification	Revised Trial Directives	Result expected/ desired
f	Resolution: 2 Mega pixel (min) FHD or better.	Firm to provide OEM data sheet.	A data sheet in this regard must be obtained from the firm.
6.	LRF : a) Inbuilt eye safe for accurate range measurement from 100 meters to 20 Kms 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 PPS rate.	In continuation of the test for QRs Para 3, range the 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. Firm to provide OEM Certificate in respect of 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.** OEM certificate should confirm the same. BOO to check the certificate.
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, GPS and GALILEO/ GLONASS/ QZSS to be integrated with the system to get own position during initialization. The accuracy of the GNSS	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	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 preferred.

S.No.	Revised QRs/ Specification	Revised Trial Directives	Result expected/ desired
	should be less than 10 meters. **GNSS** should display the coordinates in Indian Grid reference system and standard Geo coordinate system. **Note:- Restricted NaVIC services will be preferred over foreign GNSS. Subject to access grant by ISRO.**	same point shown by the inbuilt GNSS. Firm to provide OEM Certificate and data sheet in respect of NaVIC GNSS accuracy. Firm to prove undertaking certificate regarding "restricted NaVIC services" after access grant by ISRO.	It must give co-ordinates in Indian Grid reference system and standard Geo Co- ordinate format. Undertaking certificate in respect of restricted NaVIC services must be obtained from the firm.
9.	**Installation: (i) Tripod (Mandatory)** **(ii) Mast (Optional- To be decided by the user department at the time of indent)**		
a	**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 /Hydraulic system should be provided having minimum height of 10 meters in a fully expandable condition with adjustable height mechanism. It should have suitable, stable platform and be able to withstand the weight of complete LORROS system. The base of the mast should be in commensuration with its height and load.	Check the mast provided for telescopic mechanism and Pneumatic /Hydraulic system 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. Install complete LORROS system on fully extended mast in filed conditions and check the stability of the system by monitoring the system performance in the console's display.	The mast must be telescopic and Pneumatic /Hydraulic system 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, stable and be able to withstand the weight of complete LORROS system in filed conditions in fully extended conditions.

S.No.	Revised QRs/ Specification	Revised Trial Directives	Result expected/ desired
c	<u>Stabilization:-</u> Tripod and in case mast is opted, the system should have:- i) Electronic stabilisation **OR** ii) Gyro stabilisation **OR** iii) Electronic and Gyro Stabilization **(hybrid).** **Stabilization accuracy upto 50 µrad at 20 km. (To be specified by the user department at the time of procurement)**	To be physically checked by BOO at IRDE DRDO Dehradun.	The System must be electronic/ Gyro stabilized / Electronic and Gyro Stabilization **(hybrid).** Stabilization **accuracy upto 50 µrad at 20 km.**
10.	<u>Mil Std</u>: The system and its sub-systems/accessories must confirm to the latest Mil STD 810G or JSS 55555/ JSS 5855 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/ JSS 5855 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.	BOO to check the certificates. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.
11.	<u>Protection:</u> The system and its sub-systems/ accessories must conform to IP-65 except for chargers of battery & console /adopters.	Check the National/International accredited lab certificate/report submitted by the firm for latest Mil Std in respect of IP-65.	BOO to check the certificates. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.
12.	<u>Pan & Tilt unit</u>: The system should have pan & tilt facility. It should have Pan speed up-to 50° per second or better. a) Azimuth - NX 360° (Should be continuous to take shorter route during seamless tracking and auto acquisition) b) Elevation – Minimum + 65^0 to -45^0 Scan	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 – Minimum +65° to -45°.

S.No.	Revised QRs/Specification	Revised Trial Directives	Result expected/desired
	speed should be variable or better.		Scan speed should be variable and up to 50° per second or better.
13.	**Power Source:** Suitable AC/DC adaptor to be provided for running **equipment through main AC&DC (24 volt/ 36 volt/ 48 Volt)** maintenance free battery.	BOO to physically check **equipment** through AC/DC adaptor on AC mains (170 to 270 V) and on 24/36/48 volt sealed maintenance free battery.	**The Equipment** should function properly through AC (170 to 270- V) & DC 24/36/48 volt sealed maintenance free battery.
14.	<u>Video Recording Capability</u> : 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) BOO to 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) BOO to check the storage capacity in the system. c) BOO to 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.	Out Put Power should be: 2KVA (min) or sufficient to run the equipment.
b	In-put voltage range from 170 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 170 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 170 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	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.

S.No.	Revised QRs / Specification	Revised Trial Directives	Result expected / desired
	console site. UPS should be able to run the system for at least 30 minutes.	It must run the LORROS in operational mode for at least 30 minutes.	
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%	To be physically checked by BOO.	
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.	Firm to provide under taking in respect of all-weather enclosure for keeping the UPS and its batteries safe in rain and snow. To be physically checked by BOO.	UPS and its batteries must be provided in an all-weather enclosure for keeping the UPS and its batteries safe in rain and snow.
16	**(i) 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 21 (a) (i). The battery should have battery status indication to get the charge status of the battery. **(ii) Hybrid power source (Optional- To be decided by the user department at the time of indent):-** Should have hybrid power source (i.e. wind/ solar /fuel system) to operate the LORROS in the entire operating range of temp mentioned in QRs at Para 21 (a) (i).	a) Firm to provide OEM and BIS certificate in respect of type of battery. b) Check the National/International Accredited lab certificate/report submitted by the firm in respect of operating temperature range -20°C to 55°C. Check the battery for battery charge status indication. Firm to be provide OEM certificate in respect of operating temperature range -30°C to 55°C.	a) A certificate in this regard must be obtained from the firm. b) BOO to check the certificate. 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. An OEM certificate regarding hybrid power source run mentioned operating temperature range must be obtained from the firm.
17	**(i) Battery Performance:**	Switch 'ON' the system with fully	A fully charged battery (s) must run

S.No.	Revised QRs/ Specification	Revised Trial Directives	Result expected/ desired
	The battery (s) should be able to run the complete system for 6 hrs in operational mode on single charge. **(ii) Hybrid power source (Optional- To be decided by the user department at the time of indent):-** Hybrid power source (i.e. wind/ solar /fuel system) should be able to run the complete system for 24 Hrs in operational mode.	charged battery (s) provided and check the endurance time of the system mounted on Tripod on single charge in mentioned conditions. Switch 'ON' the system with hybrid power source provided and check the endurance time of the system mounted on Tripod in operational mode.	the complete system in operational mode for 6 Hrs on single charge. The complete system with hybrid power source must run 24 hrs in operational mode.
18	**Battery Charger:** A smart and Intelligent Charger operating from 170 volt to 270 volts 50 Hz AC Mains 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 170 to 270 volt. Check the out-put voltage stability on varying In-put voltage. b) 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 170 to 270 Volt, 50 Hz mains supply. b) 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 firm for distance of 100 Mtr for testing.** **Optional facility (Indenter to define the**	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. b) Check the video on the display	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

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	requirement at the time of indent): To stream imagery over digital wireless link (500 meters minimum NLOS and 10 Km minimum LOS with encryption).	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. Firm to provide OEM certificate for encryption.	must be able to establish noiseless and continuous imagery wireless link up-to 500 meters (min) in NLOS and 10 Kms (min) in LOS with encryption. Repeaters may be incorporated in the system 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 with encryption. 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 override console operator commands. **Note:- OFC with accessories will be provided by the user department for distance of 20 km for testing.**	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. Firm to provide OEM certificate for data encryption transmitted via microwave radio wave. (ii) & (iii) Firm to provide OEM certificate for the same.	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.**	**i)** LED colour display with sunlight & backlit feature and size 19" Minimum to be physically checked by BOO. ii) BOO to check the National/	The display must have a ruggedized LED colour display with sunlight and backlit feature of size 19" (min) HD or better. A certificate regarding ruggedization must be obtained from the firm.

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		International accredited lab certificate/report submitted by the firm for MIL 810 G or JSS 55555 in respect of ruggedization.	
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.	BOO to 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. d) Map view. Day & TI camera video simultaneously.	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 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.	BOO to 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.	BOO to 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.	BOO to 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.	BOO to 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	BOO to check the system console by operating all the functions of day & night camera, LRF and Pan & Tilt mechanism	The console must have the facility to control the operation of day & night camera, LRF, Pan & Tilt sub-systems

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	via track ball.	through soft keys, track ball or whatever the facility provided by the manufacturer in the console.	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. BOO to 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).	BOO to 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 Indian GR system as selected by the user) and range of a selected target.	BOO to check the system for the facility to show and store the positional co-ordinates of a selected target whenever required. Check also the range of a selected target by firing Laser through built in LRF.	The system must have the facility to display & store the positional co-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.	BOO to 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.	BOO to 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 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).	BOO to 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.	BOO to check the system for the interface port for HDMI, USB, HD/SD-SDI and	The console must have interface port for HDMI, USB, HD/SD-SDI and

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		Ethernet by BOO on TV Display and external Display unit.	Ethernet Ports digital video out-put.
20	**Transportation case:** Should have a ruggedized shock proof container along with pressure equalizer valve compliant to IP-65 and Mil Std. 810H.	BOO to 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**	BOO to check the certificate. 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: -20°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.	BOO to check the National/International accredited lab certificate/report submitted by the firm in respect of operation and storage temperature.	BOO to check the certificate. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.
	b) Altitude: Complete system must be suitable for use and storage at heights 5000 meters or above from sea level at their full rated performance. c) Optional: User may specify additional altitude requirement during tender.	BOO to 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.	BOO to check the certificate. 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 - 4 Nos (one on system and three additional set). c) Tripod -01 No (mandatory) and mast 1 No (As opted by the user) d) Additional one set of cables with connector to be provided. e) Transportation case.	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 (f).

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	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.		
23	**Operating Software, User Manual and Operation Instructions:** 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.	An assurance certificate in this regard must be obtained from the firm.
24	**(Optional- to be specified by the User Department)** a) GNSS services of GPS/GLONASS/GALILEO/QZSS etc. in additional to mandatory service of indigenous NaVIC (Restricted services will be preferred) under make in India. **Subject to access grant by ISRO.** 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 vehicle, medium, vehicle, heavy vehicle, Aircraft, Heli, Boat, 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	a) Firm to provide OEM certificate in respect of certificate for GNSS accuracy parameters of foreign GNSS in Indian subcontinent. Also firm to provide undertaking certificate regarding "restricted NaVIC services" after access grant by ISRO. b) BOO to be physically check the telemetry data and accuracy. c, d & e) Firm to provide OEM certificate in respect of same. The firm will train the data for (d) within 180 days of the deployment of the device. Undertaking certificate on the same by firm.	Specification must be as per mentioned in the QRs.

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	used for processing, transmission, multiplexing of HD video 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) The system should be supportive for **"AI/ML based algorithms for smart analysis over captioned date, time, feed by giving summary of detection and filter options by type of target"** in future. i) Preloaded indigenous (SOI standards) with boundary layer up to district level OSM Map **(Map to be provided by user department during trial).** j) External Map uploading facility in format .tilt, .shp and .jpg. k) Panorama creation and export feature l) Auto video cut facility at every 20 minutes of storage for ease of export. **m)** The system should have audible /visual alarm indication for moving target (Human, light/medium/ heavy vehicle, heli, boat, animals etc.) detection at recognition range **(recognition range mentioned in para 3)** within field of view.	**f)** Firm to provide OEM certificate/report for indienounization of key / algorithms. **g)** Firm to provide OEM certificate for the software. h) Firm to provide OEM certificate for the same. **i)** OEM/ Reputed Map agency certification. **j)** OEM/ Reputed Map agency certification. **k)** To be physically checked by BOO. l) To be physically checked by BOO. m) To be physically checked by BOO.	

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25.	**Operator and Repair & Maintenance level training:-**		
a	Firm should provide operator training to 05 persons @ each system for 01 week 1st year at consignee location.	Firm to provide undertaking certificate in this regard. BOO to check the certificate.	An undertaking in this regard must be obtained from the firm.
b	Firm will provide repair & maintenance training to 15 persons for 02 weeks at firm premises.	Firm to provide undertaking certificate in this regard. BOO to check the certificate.	An undertaking in this regard must be obtained from the firm.
c	(Optional-to be specified by the User department):- Firm will also provide additional operator & maintenance training every year till 5th year to 10 people for 01 week at consignee location.	Firm to provide undertaking certificate in this regard. BOO to check the certificate.	An undertaking in this regard must be obtained from the firm.
d	(Optional-to be specified by the User department):- If need arises, Operator & maintenance training will be enhanced further by 01 week.	Firm to provide undertaking certificate in this regard. BOO to check the certificate.	An undertaking in this regard must be obtained from the firm.
26.	**Warranty :**		
a	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 03 years from the date of commissioning of the system. Firm to pick up/attend the defective system during warranty period from **user specified locations at the time of indent.**	Firm to provide undertaking certificate in this regard. BOO to check the certificate.	An undertaking in this regard must be obtained from the firm.
b	(Optional- to be specified by the user department) Additional warranty for 02 years should also be provided.	Firm to provide undertaking certificate in this regard. BOO to check the certificate.	An undertaking in this regard must be obtained from the firm.
27.	a) Spare parts support for 07 years after expiry	Firm to provide undertaking certificate in	An undertaking in this regard must be

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	of 03 year warranty period.	this regard. BOO to check the certificate.	obtained from the firm.
	b) **Spare part list** – Illustrated spare part list along with photograph and cat part number to be provided.	Firm to provide undertaking certificate in this regard. BOO to check the certificate.	An undertaking in this regard must be obtained from the firm.
	c) **Technical literature** - Operational manual and Technical manual to be provided.	Firm to provide undertaking certificate in this regard. BOO to check the certificate.	An undertaking in this regard must be obtained from the firm.

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Approved /Not Approved

Director General
Border Security Force