F.No.63013/16(HHLRF)/2011-Ord/BSF/MHA/Prov-I 385
Bharat Sarkar/Government of India
Griha Mantralaya/Ministry of Home Affairs
PM Division/Prov.I Desk

26, Man Singh Road, Jaisalmer House
New Delhi, Dated 17 **February, 2014**

To,

DsG: AR (through LOAR), BSF, CISF, CRPF, ITBP, SSB, NSG & BPR&D.

Subject: QRs and Trial Directive for Hand Held Laser Range Finder (HHLRF).

The QRs and Trial Directives in respect Hand Held Laser Range Finder (HHLRF) as per Annexure have been accepted by the Competent Authority in MHA.

2. The CAPFs concerned will be accountable for correctness of the QRs/Trial Directives.

3. Henceforth, all the CAPFs should procure the above item required by them strictly as per the laid down Technical Specifications/QRs.

Yours faithfully,

Encl: As above

(P.K. Srivastava)
Under Secretary to the Govt of India
Tel: 23381278

Copy forwarded for necessary action to :-

The Section Officer (IT), MHA: It is requested to host the QRs and Trial Directives (soft copy attached) on the MHA website (under the page of Organizational Set up- Police Modernization Division- Qualitative Requirement under Surveillance Equipment.

(R.K. Soni)
Section Officer (Prov-I)

Copy to: Director (Procurement), MHA.
Copy for information to : PS to JS (PM)

DIRECTORATE GENERAL BORDER SECURITY FORCE

The Sub-group of technical experts on surveillance equipment constituted by MHA vide their letter No. IV-17017/18/2001-Prov-I dated 05 Jul 2002 held its meeting at BSF HQ on 03 April, 27 April, 19 Oct, 21 Nov 2012, 06 Dec 2012 and 14 Feb 2013 to review the QRs of Hand Held Laser Range Finder as under:-

QUALITATIVE REQUIREMENTS OF HAND HELD LASER RANGE FINDER

Srl No.	PARAMETER OF QRs
PHYSICAL CHARACTERISTICS	
1.	The instrument should be Binocular, compact, hand held, easy to carry and user friendly.
2.	The system should have the following sub-units come in a single housing: i) LASER Range Finder ii) Thermal Imager for night time iii) Day Camera for day time iv) Global Positioning System (GPS) v) Digital Magnetic Compass (DMC). Each sub unit of the equipment should function independently.
3.	It should have standard connectors for analogue (CCIR-PAL System) & HDMI external video out-put.
4.	It should be light weight not more than 4 Kg with battery.
5.	Dioptre adjustment – Minus 4 to Plus 2 Dioptre. Should have arrangement to adjust Inter- Pupillary Distance (IPD). The mechanism should be reliable and user friendly.
6.	It should display the datas of Target Range, Azimuth, Elevation, Height Difference and Slope Distance with the lasing (through the use of LASER Beam).
7.	It should be provided with adjustable, non magnetic telescopic tripod. It should have the following features: i) Closed Tripod height: - not more than 70 cms. ii) Maximum height: - 180 cms. iii) Suitable leg locking mechanism should be provided to lock the legs firmly.

Contd..2/-

8.	It should have inbuilt (in single housing) Digital Clinometer, GPS, DMC and Day & Night (Cooled-Thermal) camera.
9.	The system should display the output video of the day and night camera simultaneously on a single screen by Digital Pixel Selective Fused Method.
10.	It should have OLED Display having minimum Resolution 640 x 480.
11. **POWER SOURCE:**	
	i) Battery – Rechargeable battery inside cover of main equipment. It should run the equipment at least two hours continuously on single charge. One spare battery will also be provided with each equipment.
	ii) External power source – AC adapter on 220 Volt 50 Hz mains supply
	iii) Battery charger operable on AC & DC to be provided.
12. **LASER RANGE FINDER:**	
	i) Range – Minimum 80 meter to 8,000 meter or more for target size - 2.3mtr x 2.3mtr.
	ii) Accuracy - ± 5 meters.
	iii) Measuring frequency- a) Normal- 1 Shot every 6 seconds. b) Best - Maximum 3 measurements within 6 seconds.
	iv) Multiple targets – Displays first and last target.
	v) Discrimination – 50 meters.
	vi) False alarm – Not more than 1 %.
	vii)Laser pulse – should be class-I eye safe, ocular hazard distance of Zero meter.
	viii) Reticule – Centre circle with Horizontal and Vertical scale.
13. **THERMAL CAMERA:**	
	The Thermal Camera should have : i) Cooled Thermal Imager. ii) FPA Resolution : 640 x 480 (Minimum) iii) Spectral Wave band in 3 to 5µm or 8 to 14µm or both. iv) Field Of View (FOV) : 6° X 5° (Minimum) v) Optical zoom of 6 X (min). vi) Range: Should have ability to differentiate between human beings and animals like horses and camels at a range of minimum 2.5 Kms and should have ability to detect presence of a vehicle of maximum overall length of 4010mm, maximum overall width of 1540mm and maximum overall height of 1875 mm at a range of minimum 8 Kms.

Contd..3/-

14.	**DAY CAMERA:**
	The day camera should have : i) High resolution colour CMOS camera. ii) Resolution should be 8 Mega Pixel minimum. iii) Field Of View (FOV): 6° X 5° (Minimum) iv) Optical zoom of 6 x (min).
15.	**GLOBAL POSITIONING SYSTEM (GPS)**
	i) It should give co-ordinates in Lat/Lon & Military GR system on Indian datum.
	ii) Accuracy - <10 meters
	iii) Acquisition - ≤20 second hot with update rate of 1 per second continuous.
16.	**DIGITAL MAGNETIC COMPASS:**
	i) DMC Resolution should be 1° or better. ii) Accuracy should be ≤1°. iii) Compass should work without GPS fix or under overhead cover.
17.	**ENVIRONMENTAL :**
	i) Operating temperature – Minus 30°C to Plus 55°C ii) Storage temperature - Minus 30°C to Plus 60°C
	iii) The equipment with all accessories should meet military standard 810-F or higher (The firm has to submit National / international accredited lab report / Certificate).
18.	**MISCELLANEOUS**
	i) Vendor to provide User's manual and Technical / Maintenance Manual.
	ii) Vendor to provide In Situ training for operation at user's site. Repair & maintenance training should also be conducted at OEM premises for at least 10 Technicians.
	iii) The equipment should be supplied with impervious water proof soft carrying case and rugged hard transportation box.
	iv) Electronic Support Package (ESP) should be provided by the OEM in consultation with the user.

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(S K Tyagi) DIG BSF

(Dinesh Kumar) IOA, SSB

(Gurbachan Singh) SSO CE) BPR&D

(R C Tayum) SI, SAG NSG

(R S Chandel) 2IC/Sqn Cdr, NSG

(Rajesh Luthra) AC, ITBP

(MANISH RAJ) SI(Tec), SIW BSF

(Sanjeev Singh) DC, CRPF

APPROVED / NOT APPROVED

8/4/17

(SUBHASH JOSHI) IPS
DIRECTOR GENERAL
BORDER SECURITY FORCE

Appendix 15

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TRIAL DIRECTIVE
FOR
HAND HELD LASER RANGE FINDER (HHLRF)

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INTRODUCTION:-

Hand Held LASER Range Finder (HHLRF) is a system which is used to range a target in day and night time. It consists of number of sensors integrated in one system. There is a Day colour camera to enable it for using in day time and Thermal imager camera used to operate during night time. The picture displayed on the screen is the fusion of both of the cameras digital output on pixel level which enhances the quality of the image.

In HHLRF, a reticule is provided to aim a detected target and fire the LASER. LASER beam goes to the target and a part of the beam energy is return back to the receiving window which in turn measures the distance travelled, calculate it and gives the range of the target. The technical advancement in this type of HHLRF is that it also stores the images of the detected target and gives the co-ordinates, range, azimuth, elevation and slope with the help of its software, inbuilt GPS, DMC & Clinometer. It is Tripod mounted and gives ranges of an object from the distance of 10,000 meters.

AIM:-

To frame trial directives to facilitate BOOs to carry out physical evaluation of Tender sample of Hand Held LASER Range Finder (HHLRF) at the time of procurement.

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GENERAL INSTRUCTIONS-

1. This trial directive is issued to assist and guide the evaluation committee. Nothing in this trial directive absolves the BOOs from their responsibility to ensure that the evaluation is carried out strictly as per the specifications in every respect.
2. The Evaluation committee may carry out additional test which they consider necessary after seeking approval of competent authority, to verify the quality of the tender sample with the specifications.
3. The Evaluation committee should ensure proper safety of man and equipment during evaluation to avoid any damage.
4. Trial / evaluation will be conducted in presence of firm representative only.

COMPOSITION OF THE BOARD:-

The physical evaluation of the tender samples of Hand Held LASER Range Finder (HHLRF) will be carried out by the Board of Officers detailed by the competent authority as per the value of the total stores.

GENERAL REQUIREMENT:

Following test instruments should be available during the trial:

(a) Standard Television and one HDMI Television or monitor.
(b) Weighing Machine
(c) Measuring Tape
(d) Multimeter
(e) Dioptre measuring apparatus (at SIW BSF Lab).
(f) Hot & Cold chamber (at SIW BSF Lab).
(g) Instrument Testing Scale (at SIW BSF Lab).
(h) Acceptance Test Station for FOV (at SIW BSF Lab).
(i) Integrated Test Equipment (at SIW BSF Lab)

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TRIAL DIRECTIVE FOR HAND HELD LASER RANGE FINDER (HHLRF)

S No.	PARAMETER	SPECIFICATION	Procedure suggested for trial	Result expected / desired	Complied / Not Complied
PHYSICAL CHARACTERSTICS					
1.	The system should be Binocular, compact, hand held, easy to carry and operate.		Check the system for Binocular version, compact , hand held and easy to carry & operate	The system must be Binocular, Compact, Hand Held, easy to carry and operate.	
2.	The system should have the following sub-units integrated in a single housing: i) LASER Range Finder ii) Thermal Imager for night time iii) Colour Camera for day time iv) Global Positioning System (GPS) v) Digital Magnetic Compass (DMC) Each sub unit of the equipment should function independently.		Check the system for the Sub-units mentioned at QRs Para 2 and integrated in a single housing. Also check independent functioning of each Sub-unit of the equipment.	The system must have the mentioned Sub-units integrated in a single housing. Failure of one Sub-unit should not hamper the functioning of remaining Sub-units.	
3.	It should have standard connectors for analogue (CCIR-PAL System) & HDMI external video out-put.		Check the video out-put (CCIR-PAL system) for analogue and HDMI o/p by interfacing it to normal monitor and HDMI monitor.	The system must have analogue & HDMI external video out through standard connectors so that out-put can easily be interfaced with analogue & HDMI monitors for observation.	
4.	It should be light weight not more than 4 Kg with battery.		Measure the weight of the system including battery with the help of weighing machine.	The weight of the system must not more than 4 Kgs with battery.	
5.	Dioptre adjustment – Minus 4 to Plus 2 Dioptre. It Should have arrangement to adjust Inter-		• Check the Eye-piece for Dioptre adjustment limits with the dioptre apparatus	• The Dioptre adjustment range must be from -4 to +2 dioptre.	

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	Pupillary Distance (IPD). The mechanism should be reliable and user friendly.	in the SIW optical Lab. • Check the system for adjustment of Inter-pupillary distance and its adjustment for smooth functioning.	• It must have inter-pupillary adjustment facility, reliable and user friendly.	
6.	It should display the data's of Target Range, Azimuth, Elevation, Height Difference and Slope Distance with the lasing (Through the use of LASER Beam).	Switch 'ON' the system, aim targets at a distance of 1 KM with different terrain/ground like plan, height & slope and laze / fire the LASER. Check the information about the aimed target on the screen.	Screen must display range, azimuth, elevation, height difference and slop distance of the aimed targets.	
7.	It should be provided adjustable, non magnetic telescopic tripod. It should have the following features; (i) Closed Tripod height: - not more than 70 cms. (ii) Maximum height:- 180 cms. (iii) Suitable leg locking mechanism should be provided to lock the legs firmly.	• Check the Tripod for telescopic type with adjustable legs and suitably interfaced with the system. • Check the Tripod made of non magnetic material with the help of magnet. • Check the Tripod height in fully closed and opened condition with the help of measuring tape. • Open the Tripod and check the legs locking mechanism for its suitability and smooth	• The Tripod must be provided with telescopic type with adjustable legs. • The Tripod must be made of non magnetic material. • The Height of the Tripod in fully closed condition must be not more than 70 cms and 180 cms maximum in case of fully opened condition. • Tripod must be provided with suitable leg locking mechanism to lock the legs firmly.	

		functioning.		
8.	It should have inbuilt (in single housing) Digital Clinometer, GPS, DMC and Day & Night (Cooled-Thermal) camera.	Check the equipment for inbuilt GPS, digital clinometers, DMC, day & night camera by switching it 'ON' and varify the area on screen & on screen display of the co-ordinates, slope angle etc. of ranging target.	The equipment must have inbuilt (in single housing) digital clinometers, GPS, DMC and Day & Night camera.	
9.	The system should display the output video of the day and night camera simultaneously on a single screen by Digital Pixel Selective Fused Method.	Check the out-put of both the cameras on OLED screen in the form of one image by fusion technology.	The out-put of the day & night camera must be digitally fused through pixel level and appears on the screen in one image. It must not be mixed by overlapping of both the images.	
10.	It should have OLED Display having minimum Resolution 640 x 480.	Check the system for display type and its resolution. The firm should submit National / international accredited lab report / certificate in r/o the same.	The National / International accredited Lab test report/certificate submitted by the firm must confirm the type of display used and its resolution. 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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11.	POWER SOURCE:			
	i) Battery – Rechargeable battery inside cover of main equipment. It should run the equipment at least two hours continuously on single charge. One spare battery will also be provided with each equipment.	Switch 'ON' the system, aim a target at a distance of 1 KM and lase / fire the LASER. ➢ Check the system for storage of the images automatically. ➢ Check the Provision to view & delete the stored images manually.	➢ The system must have facility to store the aimed target image with On-screen data automatically. The system must have the provision to view & delete the stored images manually.	
	ii) External power source – AC adapter on 220 Volt 50 Hz mains supply			
	iii) Battery charger operable on AC & DC to be provided.	➢ Check the system for storage capacity to store 1500 images.	➢ It must store more than 1500 images in the system.	
LASER RANGE FINDER:				
12.	i) Range – Minimum 80 meter to 8,000 meter or more for target size -2.3mtr x 2.3mtr.	Switch 'ON' the system and check the range of targets at 80 meters and 10 Km away by firing the LASER.	The system must be capable to range a target from a distance of minimum 80 meters and 10 Kms.	
	ii) Accuracy - ± 5 meters.			
	iii) Measuring frequency- a) Normal- 1 Shot every 6 seconds. b) Best - Maximum 3 measurements within 6 seconds.			
	iv) Multiple targets – Displays first and last target.			
	v) Discrimination – 50 meters.			
	vi) False alarm – Not more than 1 %.			
	vii) Laser pulse – should be class-I eye safe, ocular hazard distance of Zero meter.			
	viii) Reticule – Centre circle with			

	Horizontal and Vertical scale.			
13.	THERMAL CAMERA:			
	The Thermal Camera should have : i) Cooled Thermal Imager. ii) FPA Resolution : 640 x 480 (Minimum) iii) Spectral Wave band in 3 to 5µm or 8 to 14µm or both. iv) Field Of View (FOV) : 6° X 5° (Minimum) v) Optical zoom of 6 X (min). Range: Should have ability to differentiate between human beings and animals like horses and camels at a range of minimum 2.5 Kms and should have ability to detect presence of a vehicle of maximum overall length of 4010mm, maximum overall width of 1540mm and maximum overall height of 1875 mm at a range of minimum 8 Kms.	Switch 'ON' the system and check the range of targets (whose distance known) at 80 meters, 500mtrs, 5 Km and 10 Km away by firing the LASER.	The accuracy of the range shown must be ± 5 meters.	
14.	DAY CAMERA:			
	The day camera should have : i) High resolution colour CMOS camera. ii) Resolution should be 8 Mega Pixel minimum. iii) Field Of View (FOV): 6° X 5° (Minimum) Optical zoom of 6 x (min).	(a) Switch 'ON' the system and fire a LASER on a target and note down the time from 'firing' to 'range displayed' with the help of stop watch. (b) Fire the LASER repeatedly on completing the ranging process each time, on a aimed target in 6 seconds and count the number of ranging processes from 'ready' to	(a) The system must be capable to get the range of a aimed target in 1 shot every 6 seconds normally. (b) The system must be capable to get the 3 range measurements within 6 seconds in any of the session.	

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		'range display'.		
15.	GLOBA L POSITIONING SYSTEM:			
	i) It should give co-ordinates in Lat/Lon & Military GR system on Indian datum.	Fire a LASER on a target along the single line of axis having multiple targets in between.	The system must be capable to display first and last target among multiple targets in the same line of axis.	
	ii) Accuracy - <10 meters			
	iii) Acquisition - ≤20 second hot with update rate of 1 per second continuous.			
16.	DIGITAL MAGNETIC COMPASS:			
	i) DMC Resolution should be 1° or better. ii) Accuracy should be ≤1°. Compass should work without GPS fix or under overhead cover.	Choose two targets at the range of 2 Km and should apart 50 meters with each other in azimuth direction. Now aim the targets one by one and note the ranges.	The equipment must show two different ranges for both the targets.	
17.	ENVIRONMENTAL			
	i) Operating temperature – Minus 30°C to Plus 55°C ii) Storage temperature - Minus 30°C to Plus 60°C			
	iii) The equipment with all accessories should meet military standard 810-F or higher (The firm has to submit National / international accredited lab report / Certificate).	Check the National / international accredited lab report / certificate in respect of the zero meter hazardous distance, Class-I, eye safe LASER pulse.	The LRF must have LASER pulse, eye safe, class-I and ocular hazard distance of zero meters. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.	
18.	MISCELLANEOUS:			
	i) Vendor to provide User's manual and	Check the reticule provided for	A centre circle Reticule must be	

	Technical / Maintenance Manual.	the shape and scale.	provided with horizontal and vertical scale.	
	ii) Vendor to provide In Situ training for operation at user's site. Repair & maintenance training should also be conducted at OEM premises for at least 10 Technicians.			
	iii) The equipment should be supplied with impervious water proof soft carrying case and rugged hard transportation box.			
	iv) Electronic Support Package (ESP) should be provided by the OEM in consultation with the user.			

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19.	Rechargeable battery should be provided with the main equipment along with one additional spare battery. Battery should have back up time of 2 hours on single charge.	➢ Check the battery provided for the rechargeable feature and the quantity. ➢ Switch 'ON' the system on fully charged battery and observe the continuous operation on single charge.	➢ The battery must be rechargeable along with one additional spare battery. ➢ A fully charged battery must run the equipment continuously for 2 hours.	
20.	External power source – AC adapter on 220 Volt 50 Hz mains supply	Check the AC adapter by connecting it to the system directly on 220 Volt AC mains supply as an external power source.	The system must operate on 220 volt 50 Hz AC mains supply through AC adapter.	
21.	Battery charger should have facility to charge the battery within 3 hours from 220 volt AC mains supply and 24 volt to 48 volt DC supply.	Put a fully discharged battery with the battery charger on AC mains supply and observe it to charge fully. Put a fully discharged battery with the battery charger on 24 volt to 48 volt DC supply and observe it to charge fully.	Battery charger must have the facility to charge the battery within 3 hours from 220 volt AC mains supply and 24 to 48 volt DC supply.	
ENVIRONMENTAL :				
22.	Operating temperature – Minus 20°C to Plus 55°C	Put the equipment in Hot & Cold chamber (at SIW BSF) on Minus 20°C to Plus 55°C for the dwell time of 30 minutes each in operating condition	The equipment must work satisfactory in the temperature range of Minus 20°C to Plus 55°C.	

		and observe the performance without fire the LASER. The output will be connected with the external monitor.		
23.	The equipment should meet military standard 810-F or higher (The firm has to submit National / international accredited lab report / Certificate)	Check the certificate submitted by the firm in r/o the same.	The National / international accredited lab report / certificate must certify the Mil std 810-F for the equipment. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.	
THERMAL CAMERA:				
24.	The Thermal Camera should have : i) Cooled Thermal Imager. ii) FPA Resolution : 640 x 480 (Minimum) iii) Spectral Wave band in 3 to 5µm or 8 to 14µm or 3 to 14 µm. iv) Field Of View (FOV) : 6° X 5° (Minimum). v) Optical zoom of 6 X (minimum).	i) A National/international accredited lab report / certificate should be submitted by the firm in r/o QRs Para 25 (i) to (iii). ii) Check the FOV in the SIW Lab on ATS and note down the measurements. iii) Fix the equipment on Instrument Testing Scale (ITS) and measure the Optical zoom on integrated test equipment.	i) Certificate must confirm the QRs Para 25 (i) to (iii). In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab. ii) FOV must be 6° X 5° (Minimum) iii) Optical zoom must be 6 X minimum.	

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DAY CAMERA:				
25.	The day camera should have : i) High resolution colour CMOS camera. ii) Resolution should be 8 Mega Pixel minimum. iii) Field Of View (FOV): 6° X 5° (Minimum) iv) Optical zoom of 6 X (minimum).	i) The firm should submit National /International accredited lab report / certificate in r/o QRs Para 26 (i) to (ii). ii) Check the FOV in the SIW Lab on ATS and note down the measurements. iii) Fix the equipment on Instrument Testing Scale (ITS) and measure the Optical zoom on integrated test equipment.	i) Certificate must confirm the QRs Para 26 (i) to (ii). In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab. ii) FOV must be 6° X 5° (Minimum) iii) Optical zoom must be 6 X minimum.	
GLOBAL POSITIONING SYSTEM (GPS)				
26.	It should be inbuilt and give co-ordinates in Lat/Lon & Military GR system based on Indian map datum.	Check the equipment for inbuilt GPS, co-ordinates and map Datum.	GPS must be inbuilt. The co-ordinates must be optional between Lat/Lon & Indian GR systems and based on Indian map datum.	
DIGITAL MAGNETIC COMPASS:				
27.	i) DMC Resolution should be 1°. ii) Accuracy should be ≤1°. iii) Compass should work without GPS fix or under overhead cover.	i) Check the equipment bearing by changing the position in circular angle up to 1° and observe the reading on the screen.	i) DMC Resolution should be 1°.	

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		ii) Check the bearing of an object (whose bearing is known) and compare with the bearing displayed in the system. iii) Check the compass for its working by using it under concrete roof or without GPS fix and observe the operation.	ii) Accuracy should be ≤1°. iii) Compass should work without GPS fix or under overhead cover.	
MISCELLANEOUS				
28.	Vendor to provide User's Manual and Technical / Maintenance Manual.	Not applicable at the time of technical evaluation.	An undertaking may be provided by the firm for the same.	
29.	Vendor to provide In Situ training for operation at user's site. Base level repair & maintenance training should be conducted at OEM premises for at least 10 Technicians.	Not applicable at the time of technical evaluation.	An undertaking may be provided by the firm for the same.	