No. P-63013/19/2013-Ord/BSF 1667-75 308
Government of India Ministry of Home Affairs
Directorate General Border Security Force
(Prov Dte: Mod Cell)
(Fax: 011-24367683)

Block No.10, CGO Complex,
Lodhi Road, New Delhi-03

Dated, the 16th June 2018

To,

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

Sub: **Forwarding of Qrs and Trial Directives of Hand Held Thermal Imaging Binocular System Equivalent to N-CROS with Five Sensors in One**

I have been directed to forward herewith QRs and Trial Directives of "Hand Held Thermal Imaging Binocular System Equivalent to N-CROS with Five Sensors in One" as per appendix 'A' and 'B' duly formulated & finalized by Sub group of technical experts and approved by DG BSF for your information and necessary action please.

Encl : As above

16/6/18

(J K RUDOLA)
Dy. Inspector General (Prov)

Copy to :-

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1. SO (IT), North Block MHA, New Delhi : You are requested to host the above QRs and TDs on MHA website please.

2. IT Cell FHQ BSF, New Delhi : You are requested to host the above QRs and TDs on BSF website please.

Appendix –'A'

DIRECTOR GENERAL BORDER SECURITY FORCE
(PROVISIONING DIRECTORATE (MOD CELL)

The Sub-group of Technical Experts constituted by MHA vide their letter No. IV-24011/12/2011-Prov-I dated 13 Jun 2012, No. IV-24011/12/2011-Prov-I dated 28 Dec 2012 & UO No. IV-24011/12/2011-Prov-I- 350 dated 27 Jun 2013 and held its meeting at BSF Headquarters on 02nd Dec 2013 and on subsequent dates to formulate the Qualitative Requirement of **'Hand Held Thermal Imaging Binocular System Equivalent to N-Cros with Five Sensors in One'**

After detailed deliberations the referred Sub-Group has finalized the QRs of 'Hand Held Thermal Imaging Binocular System Equivalent to N-Cros with Five Sensors which are as under :-

QUALITATIVE REQUIREMENT OF HAND HELD THERMAL IMAGING BINOCULAR SYSTEM EQUIVALENT TO N-CROS WITH FIVE SENSORS IN ONE

S/ No	SPECIFICATION			
1	**General Description** Multifunctional Hand Held Thermal Imaging Binocular System Equivalent to N-CROS with five sensors in One. **Note**: - N-CROS should not be misunderstood with the a similarly named equipment of any particular firm. N-CROS, as authorised to CRPF, stands for Night-Day Common Reconnaissance and Observation System.			
	(a)	Un-Cooled Thermal Imager.		
	(b)	Colour CCD/CMOS Camera.		
	(c)	Global Positioning System.		
	(d)	Digital Magnetic Compass.		
	(e)	Laser Range Finder.		
2	Dioptre adjustment: Dioptre adjustment: -4 D to + 4 D (Manual/ Automatic)or the equipment should be compatible with the personal corrective eye glasses.			
3	The image should be sharp from 50 m to infinity.			
4	**Physical Characteristics**			
	(a)	Weight.	Weight<=3.5 Kg with Battery.	
	(b)	Quickly deployable	Start-up time for complete system <= 1 minutes.	
	(c)	Should be Hand Held with arrangement of mounting on Tripod.	Telescopic suitable Tripod, so provided should be non-magnetic.	
	(d)	Environmental Characteristics.		
		(i)	Ruggedized	The system should be ruggedized as per MIL STD 810F or better/ JSS 55555 as applicable.
		(ii)	Operating Temperature	- 20° C to + 50 °C.
		(iii)	Storage Temperature	- 25° C to + 60°C.
		(iv)	The system should comply with IP-65 or better.	
5	**Operational characteristics:-**			
	(a)	**Un-Cooled Thermal Imager**		
		(i)	Waveband	8 to 12 µm or 3 to 5 µm or both

S/ No	SPECIFICATION			
		(ii)	Sensor Resolution	640 X 480, 17 µm pitch or better.
		(iii)	FOV	9.5^0 x 7^0 (Max) at full zoom.
		(iv)	Zoom /Magnification	2x,4x or better electronic or 3x or better optical.
		(v)	Human DRI range	Detection : 2000 meters or better. Recognition: 1000 meters or better. Identification: 400 meters or better.
	(b)	**Colour CCD/ CMOS Camera**		
		(i)	Resolution	720x576 Pixels or better.
		(iv)	Human DRI range	Detection: 2000 meters or better. Recognition: 1000 meters or better. Identification: 400 meters or better.
	(c)	Global Positioning System.		
		(i)	Should have an integrated GPS with its own inbuilt antennas, which should be able to give co-ordinates in latitude/ longitude and IGRS system on the display.	
		(ii)	The system accuracy should be ± 10 Mtrs	
	(d)	Digital Magnetic Compass.		
		(i)	Angular Range Azimuth	360°.
		(ii)	Angular Range Elevation	±30° or higher.
		(iii)	Accuracy	1° or lower in both directions.
	(e)	**Laser Range Finder.**		
		(i)	Laser should be Class 1 Eye Safe.	
		(ii)	Ranging Distance	2000 Meters.
		(iii)	Accuracy	±5 Meters or better.
	(f)	**Fusion Modes** The equipment should provide following real time pixel level sensor fusion video between Thermal Imaging Channel and CCD/CMOS Camera Channel for use in urban/built-up areas. **Note: Fusion mode requirement is optional being force specific and should be defined by the user at the time of indent.**		
	(g)	**Image Processing, Data Processing and Storage.**		
		(i)	Software based Image Stabilization.	
		(ii)	Target Range, Target co-ordinates in term +of Lat/Lon and IGRS information on the display as per the requirement.	
		(iii)	Should have the provision to save images and video along with metadata on board the equipment and also on external USB device/ SD Card. External storage device of minimum 24 hours of video recording to be provided.	
		(iv)	Necessary cables for image and video storage and any software if required be provided.	
	(h)	**Power** The equipment should be able to run on 90 to 270V, 50 Hz AC mains supply and batteries. Suitable connectors to be provided.		
		(i)	Battery	Lithium based (rechargeable).
		(ii)	Endurance	4 hours or higher.
		(iii)	Battery Charger	90 to 270 V, 50 Hz AC mains supply.
		(iv)	Two Spare Batteries to be provided.	
	(j)	**Ports and Connectors** Analog and Digital I/O ports should be there and suitable connectors should		

S/ No	SPECIFICATION
	be provided for video output to a TV or a DVR.
6	**Portability and Storage** The equipment to be provided in suitable soft carrying case and hardened, ruggedized box for transportation.
7	**Literature** Operating and Technical literature for each discrete components of system should be in English language.

APPROVED/ NOT APPROVED

(K K SHARMA) IPS
DIRECTOR GENERAL
BORDER SECURITY FORCE

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Appendix – 'B'

TRIAL DIRECTIVE FOR HAND HELD THERMAL IMAGING BINOCULAR SYSTEM EQUIVALENT TO N-CROS WITH FIVE SENSORS IN ONE

S No	PARAMETERS	Procedure suggested for trial	Result expected / desired
1.	**General Description** Multifunctional Hand Held Thermal Imaging Binocular System Equivalent to N-CROS with five sensors in One. **Note**: - N-CROS should not be misunderstood with the similarly named equipment of any particular firm. N-CROS, as authorised to CRPF, stands for Night-Day Common Reconnaissance and Observation System.		
	(a) Un-Cooled Thermal Imager	To be checked by BOO physically	Thermal Imaging camera must be un-cooled.
	(b) Colour CCD/CMOS Camera	To be checked by BOO physically	CCD/ CMOS camera must be colour.
	(c) Global Positioning System	To be checked by BOO physically	The system must have Global Positioning System.
	(d) Digital Magnetic Compass	To be checked by BOO physically	The system must have Digital Magnetic Compass
	(e) Laser Range Finder	To be checked by BOO physically	The System must have Laser Range Finder
2.	Dioptre adjustment: Dioptre adjustment: -4 D to + 4 D (manual/ automatic) or the equipment should be compatible with the personal corrective eye glasses.	To be checked by BOO physically	After putting the diopter value of ± 4d target must be seen clearly by the user. For testing the equipment compatible with the personal corrective eye glasses, get the equipment checked by a person using corrective eye glasses. The target must be seen clearly by the user.
3.	The image should be sharp from 50 m to infinity.	To be checked by BOO physically	The image of target be sharp and clear
4.	**Physical Characteristics**		
	(a) Weight<= 3.5 Kg with Battery.	To be physically checked by the BOO. Measure the weight of the HHTI with battery with the help of weighing machine.	Weight of HHTI must be 3.5 kg or less with battery.
	(b) Quickly deployable - Start up time for complete system < = 1 minute.	Switch ON the EQPT and note down the time for system ready.	The system must start up in ≤1 minute.
	(c) Should be Hand Held with arrangement of mounting on Tripod:- Telescopic suitable Tripod, so provided should be non-magnetic.	Physically check the system for Hand Held operation and for the provision provided to mount on Tripod. Check the tripod (if defined by the user in the TE) for telescopic type and non-magnetic property physically.	System must be hand held with option of mounting on tripod. The Tripod (if defined by the user in TE) provided must be telescopic and non-magnetic.

	(d)	Environmental Characteristics (i) Ruggedized- The system should be ruggedized as per MIL STD 810F or better/JSS 55555 as applicable.	The firm should provide National / international accredited Lab certificate/report in respect of ruggedness as per mentioned Mil STD or JSS 55555.	A National / international accredited Lab certificate/report submitted by the firm must confirm the same. In case of doubt in the veracity of the report, the same may be checked from the concerned lab.
		(ii) Operating Temperature— -20° C to + 50 °C.	The firm should provide National / International accredited Lab certificate in respect of operating temperature.	A National / international accredited Lab certificate/report submitted by the firm must confirm the same. In case of doubt in the veracity of the report, the same may be checked from the concerned lab.
		(iii) Storage Temperature -25° C to + 60°C.	The firm should provide National / International accredited Lab certificate in respect of operating temperature.	A National / international accredited Lab certificate/report submitted by the firm must confirm the same. In case of doubt in the veracity of the report, the same may be checked from the concerned lab.
		(iv) The system should comply with IP-65 or better.	The firm should provide National / International accredited Lab certificate in respect of operating temperature.	A National / international accredited Lab certificate/report submitted by the firm must confirm the same. In case of doubt in the veracity of the report, the same may be checked from the concerned lab.
5)	**Operational characteristics:-**			
	a)	**Un-cooled Thermal Imager**		
	(i)	**Waveband**: 8 to 12 µm or 3 to 5 µm or both.	The firm should provide FPA OEM datasheet or certificate in respect of spectral response range duly attested by the participating firm.	A FPA OEM certificate/datasheet submitted by the firm must confirm the same. . In case of doubt in the veracity of the certificate/datasheet, the same may be checked/ verified from the concerned OEM.
	(ii)	**Sensor Resolution**- 640 x 480, 17 µm pitch or better.	The firm should provide FPA OEM datasheet or certificate in respect of FPA resolution and Pitch of one sensor duly attested by the participating firm.	A FPA OEM certificate/datasheet submitted by the firm must confirm the same. . In case of doubt in the veracity of the certificate/datasheet, the same may be checked/ verified from the concerned OEM.
	(iii)	**FOV** 9.5^0 x 7^0 (Max) at full zoom.	Switch ON the system and mount on the ATS (Acceptance Test Station). Measure the FOV at full zoom.	The FOV must be 9.5^0 x 7^0 (Max) at full zoom.
	(iv)	Zoom - 2x ,4x or better electronic or 3x or better optical	To be checked by BOO Switch ON the system and mount on the ATS (Acceptance Test Station). Select a	Target size must be 2x ,4x or better electronic or 3x or better optical.

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			target and see through the eyepiece/ external monitor and measure the target size with help of measuring tool. After that press the key of digital zoom for 2x and 4x and then see the target size and measure size of the target. For 3x optical, check the magnification of the system in the lab and its linearity in zoom.	
	(v)	**Human DRI Range**: Detection: 2000 meters or better Recognition: 1000 meters or better Identification range-400 meters or better.	a) Place one jawan in camouflage uniform at the range of 2000 meters. Then move the jawan horizontally and check the detection of jawan. b) Place one jawan in camouflage uniform at the range of 1000 meters. Then move the jawan horizontally and check the recognition of jawan. c) At the range of 400 Meter the target must be identified as friend or Foe. Which means a person with weapon or without weapon can be easily identified	Human target must be detected, recognized and identified as per the trial mythology at the ranges mentioned at QRs Para 5 (a) (v).
(b)	**Colour Camera CCD/CMOS**			
	(i)	**Resolution**: 720 x 576 Pixels or better.	The firm should provide OEM datasheet or certificate in respect of resolution duly attested by the participating firm.	A OEM certificate/ datasheet submitted by the firm must confirm the same. In case of doubt in the veracity of the certificate/ datasheet, the same may be checked/ verified from the concerned OEM.
	(ii)	**Human DRI range** Detection: 2000 meters or better. Recognition: 1000 meters or better. Identification: 400 meters or better.	a) Place one jawan in camouflage uniform at the range of 2000 meters. Then move the jawan horizontally and check the detection of jawan. b) Place one jawan in camouflage uniform at the range of 1000 meters. Then move the jawan horizontally and check the recognition of jawan. c) Place one jawan in camouflage uniform at the range of 400 meters. Then move the jawan horizontally and check the identification of jawan.	Human target must be detected, recognized and identified at the ranges mentioned at QRs Para 5 (b) (iv).

(c)	**Global Positioning System**			
	(i)	Should have an integrated GPS with its own antennas, which should be able to give co- ordinates in latitude / longitude and IGRS system on the display.	a) Check the system for integrated GPS physically. b) Check the Lat/Lon value of a known target from the System display and check the accuracy of co-ordinates shown.	The system must have an integrated GPS and give co-ordinates of a point in Lat/Lon.
	(ii)	The system accuracy should be ± 10 Meters.	To be physically checked by the BOO and compare the result with the help of map.	The system accuracy must be ± 10 Meters.
(d)	**Digital Magnetic Compass**			
	(i)	**Angular Range Azimuth**-360°.	To be physically checked by the BOO.	System must have 360°angular Range in Azimuth direction.
	(ii)	**Angular Range Elevation**- ± 30° or higher.	To be physically checked by the BOO.	System must have ±30° angular Range in Elevation direction.
	(iii)	**Accuracy**-1° or lower in both directions.	The firm should provide National / International accredited Lab certificate in respect of accuracy-1° or lower in both directions.	A National / international accredited Lab certificate/report submitted by the firm must confirm the same. In case of doubt in the veracity of the report, the same may be checked from the concerned lab.
(e)	**Laser Range Finder**			
	(i)	Laser should be Class 1 Eye Safe.	The firm should provide National / International accredited Lab certificate in respect of Class1 eye safe.	A National / International accredited Lab certificate/report submitted by the firm must confirm the same. In case of doubt in the veracity of the report, the same may be checked from the concerned lab.
	(ii)	**Ranging Distance**-2000 Meters.	Select a target at a distance of 2 Kms, 500 Meters & 20 meters and range it with LRF.	The LRF must range targets from 20 meters to 2 Kms (min) or better.
	(iii)	**Accuracy**- ± 5 Meters or better.	Range a target (whose distance is known) from a distance of 2 Kms and 500 meters and note down the reading shown.	The accuracy of the range shown by the LRF must be ±5 Meters or better.
(f)	**Fusion** The equipment should provide following real time pixel level sensor fusion video between thermal Imaging Channel and CCD Camera Channel for use in		Physically checked by the BOO.	The image of Day Camera and Thermal camera should be fused resulting in an image which has elements of Day Camera as well as Thermal Camera.

		urban/built-up areas. **Note**: - Fusion mode requirement is optional being force specific and should be defined by the user at the time of indent.		
(g)		**Image Processing , Data Processing and Storage**		
	(i)	Software based Image Stabilization.	Physically checked by the BOO.	Image Stabilization must be Software based.
	(ii)	Target Range, Target co-ordinates in term of + Lat/Lon and IGRS information on the display as per the requirement.	Physically checked by the BOO.	Target Range, Target co-ordinates in term of Lat/Lon and IGRS information must be on the display.
	(iii)	Should have the provision to save images and video along with metadata on board the equipment and also on external USB device/SD card. External storage device of minimum 24 hours of video recording to be provided.	Physically checked by the BOO.	Must have the provision to save images and video along with metadata on board the equipment and also on external USB device/SD card.
	(iv)	Necessary cables for image and video storage and any software if required be Provided.	Physically checked by the BOO.	Necessary cables for image and video storage and any software if required be must be provided.
(h)		**Power** The equipment should be able to run on 90 to 270 V, 50 Hz AC mains supply and batteries. Suitable connectors to be provided.	Physically checked by the BOO. AC main input connect through the variance and vary the output from 90 to 270 v. The output must give the constant output	The equipment must run on 90 to 270 V, 50 Hz AC main supply and batteries. Suitable connectors must be provided.
	(i)	**Battery**- Lithium based (rechargeable).	Physically checked by the BOO.	Firm must provide Lithium based rechargeable battery.
	(ii)	**Endurance**-4 hours or higher.	Physically checked by the BOO.	Device must run for 4 hours or more.
	(iii)	**Battery Charger**- 90 to 270 V, 50 Hz AC mains supply.	Physically checked by the BOO. AC main input connect through the variance and vary the output from 90 to 270 V. The output must give the constant	Battery charger must run on 90 to 270 V, 50 Hz AC mains supply

			output.	
	(iv)	Two Spare Battery to be provided.	Physically checked by the BOO.	Must provide Two spare Battery.
(j)		**Ports and Connectors:** Analog and Digital I/O ports should be there and suitable connectors should be provided for video output to a TV or a DVR.	Physically checked by the BOO.	Analog and Digital I/O ports must be there and suitable connectors must be provided for video output to a TV or a DVR.
6.		**Portability and storage:** The equipment to be provided in suitable soft carrying case and hardened, ruggedized box for transportation.	Physically checked by the BOO.	The equipment must be provided in suitable soft carrying case and hardened, ruggedized box for transportation.
7.		**Literature:** Operating and Technical literature for each discrete components of system should be in English language.	Physically checked by the BOO.	Operating and technical literature for each discrete components of system must be in English language.

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(K K SHARMA) IPS
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