## F.No. P-63013/23/2013-Ord/BSF /MHA-Prov-I 27/ Bharat Sarkar/Government of India Griha Mantralaya/Ministry of Home Affairs PM Division

26, Man Singh Road, Jaisalmer House New Delhi, Dated  $\mathcal{F}^{E}$  February, 2015

To,

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

Subject: QRs and Trial Directive for Multi Purpose Long Range Surveillance Camera.

The QRs and Trial Directives for Multi Purpose Long Range Surveillance Camera 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

(M.K. Chahar)

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 Equipments.

( R.K.∤Soni)

Section Officer (Prov-I)

Copy to: DDG (Procurement), MHA.

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Appendix-A!

## DIRECTOR GENERAL BORDER SECURITY FORCE (PROVISIONING DIRECTORATE (ORD SECTION)

The Sub-group of Technical Experts on Surveillance Equipments 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 held its meeting at BSF Headquarters on 01 Nov 2013, 30 Dec 2013 & 10 Feb 2014 to formulate the Qualitative Requirement of 'Multi Purpose Long Range Surveillance Camera'.

After detailed deliberations the referred Sub-group has finalized the QRs of 'Multi Purpose Long Range Surveillance Camerawhich are as under:-

## QUALITATIVE REQUIREMENTS FOR MULTI PURPOSE LONG RANGE SURVEILLANCE CAMERA

S/N	0		CDECI	FIGATION
1,		Gener	SPEUI	FICATION
' '		lay/nio	the lightweight multi conce	act single housing, fully integrated
		iay/ing shservi	nd and massuring range to	or Surveillance Camera capable of
	S	hould:	consist of the following:-	targets at 30 - 2,000m. The system
1	a	) In	nage Intensifier	
	b	/	ay Camera	
	C		nermal Imager	
	d		serRange Finder	
	е	<del></del>	gital Magnetic Compass	
	f)	Inc	clinometer	
	$\frac{1}{g}$			
2.			I Characteristics	
	a)	Lic	htweight, portable to be	Weight of 4 Kg (max) with Battery
			rried by single operator	Wolgin of 4 Mg (max) With Battery
	_b)	Qu	ickly deployable	Start up time of 1 minute or less
	(c)	Sh	ould be Hand Held and	Non-magnetic telescopic tripod
		fac	ility of mounting on Tripod	magnetic telegoopie tripod
ż	d)	En	vironmental Characteristics	
		i.	Ruggedized	MIL STD 810G or better and IP-
		i		65
		ii.	Operating Temperature	- 20°C to + 55 °C
	<del>  _</del>	iii.	Enclosure	Metal
3.	<u>Or</u>	peratio	onal Characteristics	
		7		
	a)		ge Intensifier	
		j. 	Image Intensifier	18 mm
		ii.	Magnification	3x
		iii.	Field of View	8° <b>x</b> 6°
İ		iv.	Diopter Adjustment	-6 to +2
		V.	IPD	54 to 72 mm
		Vi.	Highlight Sensor	Automatic shut-down at high
- 0 1			·	ambient light levels

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vii. viii. ix.  Day i. ii. iii. v.	Resolution SNR Human Identification Range / Camera Type Resolution Field of View	64 – 75 lp/mm  22 or better  250m or better  Colour CCD
Day i. ii. iii. iv.	Human Identification Range / Camera Type Resolution	250m or better  Colour CCD
Day i. ii. iii. iv.	Range / Camera Type Resolution	Colour CCD
i. ii. iii. iv.	/ Camera Type Resolution	
i. ii. iii. iv.	Type Resolution	
ii. iii. iv.	Resolution	
iii. iv.		O Maga piral au batteu
iv.	Field of View	2 Mega pixel or better
	LI ICIU OI VICW	9° x 6° (max)
٧.	Optical Zoom	10x continuous zoom
- •	Human Identification	250m or better
	Range	
The	ermal Imager	
	Dand	8 to 12µm
		10x continuous zoom
	<u> </u>	
	<u></u>	384 x 288 or better
	<u> </u>	9° x 6° (max)
V.		250m or better
v i		700m or better
VI.	_	/ John of Delief
vii		1,500m or better
	· · · · · · · · · · · · · · · · · · ·	1,30011101 better
Luş	er nange i muer	
i.	Туре	Class 1 eye safe
ii.	Range	30m to 2,000m
iii.	Accuracy	± 5m or better
iv.	Measuring Rate	1Hz
Dig	ital Magnetic Compass and	d Inclinometer
	Angular Pango Azimuth	360°
	<u> </u>	±40° or higher
		1° in both directions
_	· <b>-</b> · · · · · · · · · · · · · · · · · · ·	
i	Target Azimuth	Display Target Azimuth
ii.	TargetRange	DisplayRange to the Target in meters
iii.	Target Grid	Display MGRS(Indian)
	Target co-ordinates	Display Latitude, Longitude and
iv.		I Albitical a at the a Taracat
		Altitude of the Target
	ge Processing	Altitude of the ⊺arget
		Altitude of the Target  Software based image
	i. ii. iv. Digi i. iii. GPS prov	iii. Resolution iv. Field of View v. Human Identification Range vi. Human Recognition Range vii. Human Detection Range Laser Range Finder  i. Type ii. Range iii. Accuracy iv. Measuring Rate Digital Magnetic Compass and i. Angular Range Azimuth ii. Angular Range Elevation iii. Accuracy GPS: Should have an integrat provide Longitude, Latitude and Data Processing i. Target Azimuth

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		ii.	Metadata Overlay	Target specific information displayed to the user while observing the target.
		iii.	Sensor Fusion	
				display real-time feed from individual intensifier, day camera and thermal
			feed from combination l. Image interest	to display real-time digital pixel fused ation of sensors nsifier + thermal imager a + thermal imager
		iv.	Adaptive Contrast Enhancement Mode	User selectable mode for enabling / disabling adaptive contrast enhancement
	i)	Sto	rage	
		,	novable SD Card of minir ges, videos along with me	num 64 GB capacity for storage of etadata to be provided.
	j)		ernal Interface	•
		i.	Video	Analog I/O
1	Del	li.	Data and Control	RS-232, USB
4.	Bai	itery a	ınd Electrical	
		i.	Battery Type	Rechargeable Li-ion / Li-ion polymer
		ii.	Battery Endurance	6 hours or greater
		iii.	Battery Charger	90VAC – 250VAC 50Hz
		iv.	Spares	Two spare batteries
5.			<b>DFDM WIRELESS TRAN</b> ed with wireless video tra	
	a)	Fred	quency Band	300MHz to 450MHz or 1.65MHz to 2.5MHz
	b)	Mod	lulation	16 QAM, QPSK, BPSK
	c)	Wei	ght	300grams (max)
	d)	RF (	Output Power	100mW
	e)	Fred	uency Tuning Step	250KHz
	f)	Cod		AES 128
	g)	Data	a Interface	RS232
	h)		ge NLOS	300m (min)
	i)	Ran	ge LOS	700m (min)
6.	Vide	eo Re	ceiver	To have video out port as well as display.
	i.	LED	Video Display	7" (minimum)
	ii.		Standard	PAL
	iii.	Cod		MPEG-4
	****	1 554	····s	Contd. P/4

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				11411		,	1 L 9
,	iv.	Frame R	oto		Selec	table from 1f/s	to 25f/s
	V.	Latency	216		1s (m		10 201/3
7.			d Storage:	The equi		/	led in suitable
			r durability a				
8.							each discrete
			system shou				
9.							on operation,
	mair	ntenance, f	ault finding a	ind user lev	/el repa	airs.	
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DIRECTOR GENERAL BORDER BECURITY FORCE

DIRECTOR GENERAL BORDER SECURITY FORCE NEW DELHI-110 003,

## A ββενοίι×- 'Β' TRIAL DIRECTIVES OF MULTI PURPOSE LONG RANGE SURVEILLANCE CAMERA

S/140	SPECIFICATION	CATION	TRIAI DIRECTIVES
<del></del>	General Description: A compact single	gle housing, fully integrated day/night.	
	lightweight multi-sensor Surveillance Camera capable of observing and measuring	era capable of observing and measuring	
<del></del> ,	range to targets at 30 - 2,000m. The system should consist of the following:	n should consist of the following:	
-	a) Image Intensifier		To be checked physically by BOO
•••	b) Day Camera		To be checked physically by BOO
	c) Thermal Imager		To be checked physically by BOO
	d) LaserRange Finder		To be checked physically by BOO
	e) Digital Magnetic Compass		To be checked physically by BOO
	f) Inclinometer		To be checked physically by DOO
_	g) GPS		To be checked physically by BOO
S	Physical Characteristics		10 be checked physically by BOO
i	1/3		
	a) Lightweight, portable to be carried	Weight of 4 Kg (max) with Battery	Check physically with the help of weighing
	by single operator	,	kept
			with hand strap or neck strap and the optical lens covers for If tube. LRF. Day camera and Thermal
			lmager.
	b) Quickly deployable	Start up time of 1 minute or less	Check physically using the ston watch
	c) Should be Hand Held and facility of	Non-magnetic telescopic tripod	To be checked physically by BOO
	mounting on Tripod	-	to a construct bullength by DOO
	d) Environmental Characteristics		
	i. Ruggedized	MIL STD 810G or better and IP-65	Data sheet/ Specification sheet to be submitted by
			to be checked by BOO.
	ii. Operating Temperature	- 20°C to + 55 °C	Data sheet/ Specification sheet to be submitted by
		-	the OEM. Validity and authenticity of data sheets to be checked by BOO.
<u> </u>	iii. Enclosure	Metal	To be checked physically by BOO

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and the following											a)	3. <u>Ope</u>
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de sec		UNK Human Identification Dange	nesolution		Highlight Sensor	7	Diopter Adjustment	Field of View	Magrillication	illage mensiler	Image Intensifier	Operational Characteristics
Me tolor Owin	250III OF Detter		64 – 75 lp/mm		Automatic shut-down at high ambient light levels	54 to 72mm	-6 to +2	8° <b>x</b> 6°	3X	18mm		
The state of the s	Keep a jawan with INSAS weapon at 250m distance line of sight from the device. Observer should be able to identify him at the given range (moving or stationary), he should in ideal conditions should be able to differentiate between a civilian and a jawan.  Note: Test the identification range at the same	Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.	Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.	Turn on the II tube in day light and verify that the output of II shuts down after a specific duration. Recheck by starting the system in dark to see that system has not got damaged.		Measure the min and max distance between the two eye pieces using vernier caliber. Min and max should be within the specified limits	To be checked physically by BOO	Measure the Field of View in 1x mode using collimators in SIW BSF or similar lah	Verify the 3x magnification by measuring the field of view of the device using Collimators in SIW BSF or similar lab. The fov in 3x mode should be < 2.6°x 2°.	Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.		

Society should be

(a)	<u>×</u>	<	.<	· ==	E:	
	Hum	Hum	 	Reso	Opti	Band
	ian Rec	lan Iden	Held of View	Resolution	Optical Zoom	<u>G</u>
as	Human Recognition Range	Human Identification Range	<		n n	
`	Range	n Range				
	700	250	9°	38.	<del></del>	8 to
	700m or better	250m or better	9° x 6°(max)	384 x 288 or better	1X continuous zoom	8 to 12µm
100	tter	itter	<b>\$</b>	or better	ous zoor	
21					מ	
Te-						
(A)		0.100 50 00 70 70	<b>+</b> < 0 > 0 0 = .1		7 - 0 > 0 7	
3	Keep a ja distance, li the weapor move left t should be sange (mov	Keep a jawan with distance, line of sight identify him at the stationary), observer i able to differentiate jawan.  Note: Test the Ident digital/optical zoom ac	To be checked physically by lab using collimators. During camera should operate in 1x or digital zoom.  Also, calculate the focal I dimensions and the focal I Vendor should provide the rocal lengths of the lens used.	Data sheet/ Specification the OEM. Validity and to be checked by BOO.	Measure the mof the camera Also calculate and the min allens. The ratio of the more.	Data sheet/ Specification the OEM. Validity and to be checked by BOO.
S S S S S S S S S S S S S S S S S S S	(eep a jawan with INSA distance, line of sight. The he weapon up and down. The move left to right at the given should be able to recogniange (moving or stationary)	jawan line of thim at him at y), obse differen est the	necked collim co	et/ Spec . Validit .cked by	the min amera u culate the min and	et/ Spec
X7	with INSAS sight. The so nd down. The t at the given to recognize stationary)	with IN sight. O the grver in i thate be that be lidentific macros	ked physica ollimators. [ ollimators in the feate the feate the feate the feate the feate the feate of the lens is of the lens in the feate the feate of the lens in the lens	ification y and a BOO.	imum au sing co ne fov u max fo	pification y and a BOO.
	jawan with INSAS weapon at line of sight. The soldier should on up and down. The soldier should to right at the given distance. Other able to recognize him at the oving or stationary)	Keep a jawan with INSAS weapon at 250 distance, line of sight. Observer should be able identify him at the given range (moving stationary), observer in ideal conditions should lable to differentiate between a civilian and jawan.  Note: Test the Identification range at the san digital/optical zoom across all vendors.	be checked physically by BOO in SIW using collimators. During measuremer nera should operate in 1x default mode wital zoom.  o, calculate the fov using the delensions and the focal length of the lor should provide the min/max and cal lengths of the lens used.	sheet t uthentic	nd maxi Ilimator using de ocal leng	sheet t
100	weapon at Idier should Idier should soldier should Ilistance. Ob him at the	veapon should I should I mge (mnge (mnditions a civiliange at modors.	neasure ault moc ault hoc gth of gth of	o be subity of da	mum fie in SIW stector could and the stector could be steed to the steed from the	o be sut ity of da
The state of the s	Keep a jawan with INSAS weapon at 700m distance, line of sight. The soldier should move the weapon up and down. The soldier should also move left to right at the given distance. Observer should be able to recognize him at the given dange (moving or stationary)	250 able ng uld and	To be checked physically by BOO in SIW BSF lab using collimators. During measurement the camera should operate in 1x default mode with no digital zoom.  Also, calculate the fov using the detector dimensions and the focal length of the lens. Vendor should provide the min/max and default focal lengths of the lens used.	Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.	Measure the minimum and maximum field of view of the camera using collimator in SIW BSF lab. Also calculate the fov using detector dimension and the min and max focal length and F# of the lens.  The ratio of the max and min fov should be 1X or more.	Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.
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(g)		f)											е)											d)								-	
Data	Long	GPS	.≡:				-	<b>;</b> :				-	Digi		·	₹.	≣			<del>=</del> :				Lase							≦.		
Data Processing	ongitude, Latitude and Altitude information	GPS: Should have an integrated	Accuracy					Angular Range Elevation		,		Angular Range Azimuth	Digital Magnetic Compass and Inclinometer			Measuring Rate	Accuracy			Range			Туре	LaserRange Finder							Human Detection Range		
	rmation.	GPS, which should be able to provide	1° in both directions					±40° or higher				360°	linometer			1Hz	± 5m or better			30m to 2,000m			Class 1 eye safe								1,500m or better		
	7	To be checked physically by BOO	To be checked physically by BOO	noted should not vary by more than 1°	every 30°azimuth position, the azimuth values	returned by the system. Note down the values at	tilt position and note down the azimuth values	Tilt the unit at 20°and at 40°rotate full 360°at each	noted should not vary by more than 1°	down the values at every 30°, the azimuth values	azimuth values returned by the system. Note	Rotate the unit full 360° and note down the		to be checked by BOO.	the OEM. Validity and authenticity of data sheets	Data sheet/ Specification sheet to be submitted by	To be checked physically by BOO	given distance if fired.	at 2000m, the LRF should be able to return the	To be checked physically by BOO. Keep a jawan	to be checked by BOO.	the OEM. Validity and authenticity of data sheets	Data sheet/ Specification sheet to be submitted by		digital/optical zoom across all vendors.	Note: Test the detection range at the same	presence of the jawan.	should be able to detect the movement and	move left to right at the given distance. Observer	distance, line of sight. The soldier should also	Keep a jawan with INSAS weapon at 1500m	digital/optical zoom across all vendors.	Note: Test the recognition range at the same

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		External Interface	Ε×	<u> </u>
7		along with metadata to be provided.	alor	
To be checked physically by BOO	Removable SD Card of minimum 64 GB capacity for storage of images, videos	movable SD Card of minimum 6	Rer	
		Storage	Sto	
humans.				
dark with no hot objects, sky, scene with a lot of				
by changing the scene drastically between very				
device to a display and compare the video output	disabling adaptive contrast enhancement	Enhancement Mode		
To be checked physically by BOO. Connect the	User selectable mode for enabling /	Adaptive Contrast	7	
two images.				
image blending, picture in picture or overlay of the	day camera + thermal imager	II. day camera +		
Note: The fusion process should not be a simple	lmage intensifier + thermal imager	l. Image intensif		
lab using fusion test software.	9.7	combination of sensors		
The sensor Fusion should be checked SIW BSF	splay real-time digital pixel fused feed from	b. Should be able to display		
captured in real time.				
individual video feeds can be simultaneously	(image intensifier, day camera and thermal imager)	(image intensifier, day	<u>-</u>	
To be checked physically by BOO, verify all the	to display real-time feed from individual sensors	a. Should be able to dis		
		Sensor Fusion	≓	
	the user while observing the target.			L
To be checked physically by BOO	Target specific information displayed to	Metadata Overlay	=:	
the motion and give stabilized output.				! <u> </u>
stabilized video, stabilized video should negate				
Observe the difference between raw video and				
displays and give jitters in tilt or pan direction.				
output and stabilized video output to individual				
Mount the unit on a tripod, connect the raw video	Software based image stabilization	Image Stabilization	; <del></del> -	
	· · · · · · · · · · · · · · · · · · ·	Image Processing	lma	크
	of the Target			
To be checked physically by BOO	Display Latitude, Longitude and Altitude	Target co-ordinates	₹.	
to be checked by BOO.				
the OEM. Validity and authenticity of data sheets				
Data sheet/ Specification sheet to be submitted by	Display MGRS(Indian)	Target Grid		
To be checked physically by BOO	DisplayRange to the Target in meters	TargetRange	<b>.=</b> :	
To be checked physically by BOO	Display Target Azimuth	_ l arget Azimuth	-	

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Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.	250KHz	e) Frequency Tuning Step	
Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.	100mW	d) RF Output Power	
Check physically with the help of weighing machine.	300grams (max)	c) Weight	T
Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.	16 QAM, QPSK, BPSK	ļ	
Data sheet/ Specification sheet to be submitted by the OEM. Validity and authenticity of data sheets to be checked by BOO.	300MHz to 450MHz or 1.65MHz to 2.5MHz		a)
		with wireless video transmitter.	
TO be discover physically by boo	R: The equipment should be provided	NLOS COFDM WIRELESS TRANSMITTER:	וע
To be checked physically by BOO	Two spars bottonion		
To be checked physically by BOO	6 hours or greater	<u> </u>	
certificate regarding commercial availability of batteries in India to be produced by the firm.			
Make, markings,	Rechargeable Li-ion / Li-ion polymer	i. Battery Type	
		Battery and Electrical	4.
the software provided by the firm. The software should allow the user to control the device, control should at least feature –  1) Fire LRF 2) Read Target GPS 3) Read Source GPS 4) Display Video 5) Select Video output between (Day/IR/II/Fused)			
Connect the device to a computer and execute	RS-232, USB		
To be checked physically by BOO	Analog I/O	i. Video	

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finding and user level renairs	raining: In situ training of users for	Literature: Operating and Technical system should be in English language	durability and ease of carriage.	ortability and Storage: The equipme	v. Latency	iv. Frame Rate	iii. Coding			ii. Line Standard	i. LED Video Display		Video Receiver	Range LOS	Range NLOS	Data Interface			Coding	
	Training: In situ training of users for three day on operation, maintenance, fault	Literature: Operating and Technical literature for each discrete components of system should be in English language		Portability and Storage: The equipment to be provided in suitable rugged case for	1s (max)	Selectable from 1f/s to 25f/s	MPEG-4			PAL	7" (minimum)	display.	To have video out port as well as	700m (min)	300m (min)	RS232			AES 128	
_	Certificate regarding training by the firm to be	To be checked physically by BOO		To be checked physically by BOO	To be checked physically by BOO	To be checked physically by BOO	To be checked physically by BOO	to be checked by BOO.	the OEM. Validity and authenticity of data sheets	Data sheet/ Specification sheet to be submitted by	To be checked physically by BOO		To be checked physically by BOO	To be checked physically by BOO	To be checked physically by BOO	To be checked physically by BOO	to be checked by BOO.	the OEM. Validity and authenticity of data sheets	Data sheet/ Specification sheet to be submitted by	

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