

**DIRECTOR GENERAL BORDER SECURITY FORCE**  
**PROVISIONING DIRECTORATE (Mod Cell)**

**Expression of Interest**

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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 held its meeting at BSF Headquarters on 26 Sep 2012, 14 Dec 2012, 29 Aug 2013, 27 Sep 2013, 08 Jan 2014, 01 Apr 2014, 21 Apr 2014, 13 June 2014, 11 Aug 2014, 13 Oct 2014, 15 Dec 2014, 12<sup>th</sup> Aug 2016, 30<sup>th</sup> Sep 2016, 06<sup>th</sup> Feb 2017 and 23<sup>rd</sup> Aug 2017 to formulate the Qualitative Requirement of "GUN-SHOT DETECTION SYSTEM (GDS)". After detailed deliberations the referred Sub-group has formulated the QRs which are as under :-

**QRs GUN-SHOT DETECTION SYSTEM (GDS)**

<b>A) GUN SHOT DETECTION SYSTEM- STAND ALONE STATIC</b>		
1.	General	The system should be easily mountable on tripod to detect Gun Shots from small arms of caliber 5.56 mm, 7.62 x 39 mm, 7.62 mm x 51 mm, 12.7 mm.
2.	Detection Range	Detection range at least as long as weapon/sight range. The system should be able to detect shots from various weapons as per the following: <ul style="list-style-type: none"> <li>➤ At least 400 meters(5.56 mm and 7.62 x 39 mm)</li> <li>➤ At least 800 meters(for 7.62 x 51 mm)</li> <li>➤ At least 1200 meters (for 12.7 mm)</li> </ul>
3.	Accuracy	The system should have accuracy of $\pm 2^\circ$ or better in azimuth and $\pm 2^\circ$ or better in elevation with probability of detection more than 90%.
4.	Response time	The System reaction time after receiving the threat should be under 1 sec.
5.	Detection rate	90% or better
6.	Coverage	180 <sup>o</sup> (minimum)
7.	EO System	The system should have Electro-optical facility to provide real time display with manual & automatic controlled Pan & Tilt mechanism mounted on tripod. It should consists of the following :- <ul style="list-style-type: none"> <li>a) Un-cooled Thermal Imaging Camera.</li> <li>b) CCD based day colour camera.</li> <li>c) Laser Range Finder (LRF).</li> <li>d) Inbuilt GPS.</li> <li>e) Inbuilt DMC.</li> </ul>
	i) Un-cooled	a) Video Format CCIR-PAL.

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	Thermal Imager Camera	<p>b) Spectral band of 3-5 or 8-14 <math>\mu\text{m}</math> or both.</p> <p>c) Detection Range for human target -1.5 Km (Min).</p> <p>d) FPA Resolution :- 640 x 480 (Min) 17 <math>\mu\text{m}</math>.</p> <p>e) Electronic Zoom : 2x, 4x (Min)</p> <p>f) Field of View :- <math>9.5^\circ \times 7^\circ</math> (Max)</p> <p>g) Full function Remote control facility through CDU.</p> <p>h) Rechargeable battery (Lithium based) with suitable/intelligent charger.</p>
	ii) CCD based day colour camera	<p>a) CCD Colour Camera/CMOS Camera.</p> <p>b) Stabilization of image.</p> <p>c) Resolution :-754 x 576 or better.</p> <p>d) Auto Exposure with</p> <p>aa) Automatic gain control (AGC)</p> <p>bb) Automatic Electronic Shutter</p> <p>e) Digital Zoom :- 2x, 4x (Min)</p> <p>f) Range for human target :- Detection Range - 1.5 Km (Min)</p> <p>g) Rechargeable battery (Lithium based) with suitable/intelligent charger.</p> <p>h) Graphics over Video.</p> <p>i) Full function Remote control facility through CDU.</p>
	iii) LRF	<p>a) Should have Class I eye safe Laser.</p> <p>b) Should be able to range a target from 50 meters (min) to 1.5 Km or better.</p> <p>c) Should have accuracy of <math>\pm 1</math> meter.</p>
	iv) Inbuilt GPS	<p>a) Should have inbuilt GPS.</p> <p>b) Positional accuracy should be <math>\pm 10</math> meters.</p>
	v) Inbuilt DMC	<p>a) Should have inbuilt DMC for north setting.</p> <p>b) Azimuth accuracy should be <math>\pm 1</math> degree.</p>
8.	CDU	<p>a) CDU should be ruggedized and comply with MIL Std 810 F or better.</p> <p>b) The control &amp; display unit should have 15" (min) LCD or LED display to monitor the video &amp; data.</p> <p>c) The system should be able to display the shooter's location in the following format as per user requirement</p> <ul style="list-style-type: none"> <li>- Co-ordinate : UTM, MGRS&amp;IGRS</li> <li>- Map datum : Indian datum and WGS-84</li> </ul> <p>d) The system should have facility to create modes like array monitoring zone, no interest zone etc.</p>
9.	Unit Weight	Complete system should be 15 Kg (Max) including tripod. Suitable carrying case, like back pack/man pack to be provided.
10.	Operating Temperature	-20 degree C to 55 degree C Fully qualified system in conformity with MIL-STD 810-F or better.

11.	Real time alerts for outdoor gunfire in coverage area	<p>The system must have facility to create zones as per the user requirement which allow focusing on specific coverage areas of interest</p> <p><b>A) "High interest zone"</b> : In order to .</p> <ol style="list-style-type: none"> <li>i) Focus the surveillance of the system within a user selectable zone/area identified as the area of potential threat.</li> <li>ii) To reject echoes generated by surrounding buildings and unwanted signals</li> <li>iii) Generated by a background noise of a city in activity.</li> </ol> <p><b>B) "No interest zone"</b> :</p> <p>Depending on the scenario of deployment the user can select a <b>No interest zone or Lock Out Zone</b> for each response point (RP) in order to reject unwanted shot origin from zone/area identified as not threatening.</p>
12.	Direction and speed of travel of one or more shooters	The system should be able to display gracefully all shooting locations on the area map to monitor with or without pan/tilt multispectral E.O sensor. The system should have the facility to identify and cue the turret to the shot positions manually or automatically.
13.	Number of shots and exact time of each shot	The system should be able to display gracefully all shooting events (shot listing with time and number of shots) and provides the possibility of post tactical recorded shots by overlaying the results on a map.
14.	Transportation Case	A suitable hardened, ruggedized carrying case for transportation should be provided.
15.	Operating Conditions	The system should be able to perform effectively under harsh weather condition in various combat scenario i.e urban , conventional and built up area without much effect to the accuracy of the system
16.	Operating Voltage	System should run on 240 V ( $\pm$ 30 V) AC and 24 V DC. Suitable AC and DC adopter to be provided.
17.	Battery	Suitable rechargeable batteries should be provided to run the system for 6 hrs minimum on a single charge.
<b>B) GUN SHOT DETECTION SYSTEM VEHICLE MOUNTED</b>		
1.	Type of Detected Threat	Small Arms (from 5.56mm up to 12.70 mm)
2.	Detection Range	<p>The system should be able to detect shots from various weapon's caliber when vehicle is stationary as per the following:</p> <ul style="list-style-type: none"> <li>➤ At least 400 meters(5.56 mm and 7.62x39mm)</li> <li>➤ At least 1000 meters(for 7.62 x51mm)</li> <li>➤ At least 1500meters (for 12.7 mm)</li> </ul>

3.	Accuracy	The system should have accuracy of $\pm 5^\circ$ in azimuth and $\pm 7^\circ$ in elevation with probability of detection more than 80%.
4.	Reaction time	The System reaction time after receiving the threat should be under 1 sec.
5.	Detection rate	90% or better
6.	Coverage	$350^\circ$
7.	EO System	The system should have Electro-optical facility to provide real time display with manual & automatic controlled Pan & Tilt mechanism mounted on tripod. It should consists of the following :- a) Un-cooled Thermal Imaging Camera. b) CCD based day colour camera. c) Laser Range Finder (LRF). d) Inbuilt GPS. e) Inbuilt DMC.
	i) Un-cooled Thermal Imager Camera	a) Video Format CCIR-PAL. b) Spectral band of 3-5 or 8-14 $\mu\text{m}$ or both. c) Detection Range for human target -1.5 Km (Min). d) FPA Resolution :- 640 x 480 (Min) 17 $\mu\text{m}$ . e) Electronic Zoom of 2x, 4x (Min) f) Field of View :- $9.5^\circ \times 7^\circ$ (Max). g) Full function Remote control facility through CDU. h) Rechargeable battery (Lithium based) with suitable/intelligent charger.
	ii) CCD based day Colour camera	a) High resolution, 1/3 Inch (min) CCD Colour Camera. b) Stabilization of image. c) 754 x 576 or better. d) Auto Exposure with aa) Automatic gain control (AGC) bb) Automatic Electronic Shutter e) Digital Zoom :- 4x (Min) f) Range for human target :- Detection Range - 1.2 Km (Min) g) Rechargeable battery (Lithium based) with suitable/intelligent charger. h) Graphics over Video. i) Full function Remote control facility through CDU.
	iii) LRF	a) Should have Class I eye safe Laser. b) Should be able to range a target from 50 meters (min) to 1.5 Km or better. c) Should have accuracy of $\pm 1$ meter.
	iv) Inbuilt GPS	a) Should have inbuilt GPS. b) Positional accuracy should be $\pm 10$ meters.
	v) Inbuilt DMC	a) Should have inbuilt DMC for north setting. b) Azimuth accuracy should be $\pm 1$ degree.

8.	CDU	<p>a) The control &amp; display unit should have 15" (min) LCD or LED display to monitor the video &amp; data.</p> <p>b) The system should be able to display the shooter's location in the following format as per user requirement</p> <ul style="list-style-type: none"> <li>- Co-ordinate : UTM, MGRS&amp;IGRS</li> <li>- Map datum : Indian datum and WGS-84</li> </ul> <p>c) It should display real time alerts gunfire in coverage area.</p>
9.	Operating temperature	-20 degree C to 55 degree C Fully qualified system in conformity with MIL-STD 810F or better.
10.	Direction and speed of travel of one or more shooters	The system should be able to display gracefully all shooting's location on the area map to monitor with or without pan/tilt multispectral E.O sensor. The system should have the facility to identify and cue the target to the shots positions manually or automatically.
11.	Number of shots and exact time of each shot	<p>The system should be able to display gracefully all shooting events (shot listing with time and number of shots).</p> <p>The system should be able to provide the possibility of post selecting recorded shots in order to re-engage the previous detected targets.</p>
12.	Signal detection for noise of quiet location deployments	<p>The system should have user selectable two modes (All Shots Detection mode and Enemy Shot Detection mode) to be used depending on the ambient noise of the area of deployment.</p> <p>i) <b>"All shots Detection mode"</b> :- The system should trigger upon detecting the shock Wave from small arms whether the fired rounds entering or not in the <b>system</b> Array's field.</p> <p>ii) <b>"Enemy shot Detection mode"</b> :- When the system is triggered only upon detecting shock waves generated by a supersonic bullet fired at or flying passed the vehicle (with the bullet miss distance from the system Array is 25 to 100 meters or less, depending of the caliber) offering <b>Enemy Shot Detection capability.</b></p>
13.	Transportation Case	A suitable hardened ruggedized carrying case for transportation should be provided.
14.	Operating Conditions	The system should be able to perform effectively under harsh weather condition in various combat scenario i.e urban, conventional and built up area without much effect to the accuracy of the system.
15.	Power Sources	(i) Alternate power source directly from

		<p>the vehicle for the complete system should be provided.</p> <p>(ii) Suitable rechargeable batteries should be provided to run the system for 6 hrs minimum on a single charge.</p> <p>(iii) Suitable AC and DC charger should be provided.</p>
<b>C) GUN SHOT DETECTION SYSTEM- DISMOUNTED SOLDIER</b>		
1.	General	The system should be easily mountable on weapons like 5.56 mm INSAS Rifle, 7.62 mm Rifle, Assault Rifle AK Series, LMG, MMG, AGL etc to detect Gun Shots from small arms of caliber 5.56 mm, 7.62 x 39 mm, 7.62 mm x 51 mm, 12.7 mm.
2.	Detection Range	<p>The system should be able to detect shots from various weapons in close proximity to the user (25 m to 100 m depending on calibre) as per the following :</p> <ul style="list-style-type: none"> <li>➤ At least 300 meters(5.56 mm)</li> <li>➤ At least 400 meters(for 7.62 x 39 mm)</li> <li>➤ At least 500 meters (for 7.62 x 51 mm)</li> <li>➤ At least 1200 meters (fro 12.7 mm)</li> </ul>
3.	Accuracy	The system must have accuracy of $\pm 5^\circ$ in azimuth and $\pm 7^\circ$ in elevation direction with probability of detection more than 80%.
4.	Response time	1 sec (after receiving the treat)
5.	Detection rate	Min 85% or better
6.	Detection Coverage	360 <sup>0</sup>
7.	Unit weight	The weight of the system should not be more than 500 gm.
8.	Operating Temperature	-20 degree C to 55 degree C Fully qualified system in conformity with MIL-STD 810-F or better.
9.	Real time alerts	The system should give real time alerts with LED Indicators.
10.	Transportation Case	A suitable hardened, ruggedized carrying case for transportation should be provided.
11.	Operating Conditions	The system should be able to perform effectively under harsh weather condition in various combat scenario i.e urban, conventional and built up area without much effect to the accuracy of the system.

**Note- No comments will be entertained without OEM broucher/catalogues with model number.**

The Sub-group has decided to upload the QRs on MHA/ BSF website for 15 days to invite the views/ comments/ suggestions of prospective bidders to make the QRs more broad based.

*Riship Singh*  
05/02/17

**(Rishipal Singh)**  
**Second-In-Command (MOD)**