F.No.P-63013/05(UGS)/2012-Ord/BSF/MHA-Prov-I
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 18th March,2013

To,

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

Subject: QRs and Trial Directive for Un –Attended Ground Sensors.

The QRs and Trial Directives in respect of Un-Attended Ground Sensors (UGS) as per Annexure have been accepted by the Competent Authority in MHA.

2. 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

(Smt. S.B.Nanda)
Under Secretary to the Govt. of India
Tel: 23381278

Copy forwarded for necessary action to :-

The ~~Director, NIC~~ SO (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 Equipment Head)

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

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

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Director General Border Security Force
(Provisioning Directorate)

The Sub-group of Technical Experts on Surveillance Equipment constituted by MHA vide their letter No. IV-17017/18/2011-Prov-I dated 05 Jul 2002 held its meeting at BSF Headquarters on 15 Sep 2011, 19 Oct 2011, 22 Dec 2011, 04 Oct 2012, Ist Nov 2012 and 26 Nov 2012 to formulate the fresh QRs of 'Un-attended Ground Sensor' (UGS) System.

After detailed deliberations the referred Sub-group has finalized the QRs of of 'Un-attended Ground Sensor' (UGS) System as under:-.

QUALITATIVE REQUIREMENTS OF UN ATTENDED GROUND SENSOR (UGS) SYSTEM

Srl no.	SPECIFICATIONS
1.	Real time alarm system to detect an intruder or multiple intruders' location simultaneously to ensure round the clock (24x7) surveillance.
2.	Control and display unit should have video recording & imaging capability of minimum 200 hours on a variable frame rate with date & time on screen display. There should be facility to get the data for making soft copies of video recorded. Auto as well as Manual Start & Stop facility for recording during surveillance should be provided.
3.	The entire system should be able to work efficiently in the temperature range of -20°C to +55°C.
4.	The system should be able to perform efficiently up to relative humidity of 95%. The firm should submit National or International accredited lab report or certificate for the same.
5.	All the units & sub units of UGS system should comply with IP-65 & MIL-STD-810F environmental standards. The firm has to submit National or International accredited Lab report or certificate of each unit.& sub unit.
6.	One UGS System should comprise of the following units & sub-units and the users to have choice to select them as per their operational requirements : i) Video surveillance camera with Pan & Tilt mechanism: a) Night Camera b) Day Camera ii) Sensors: a) Passive Infra-Red sensor b) Magnetic sensor c) Seismic sensor d) Make & Break sensor e) Acoustic sensor f) Microwave sensor g) Pressure cable sensor (Piezo principle)

	iii) Control & Display unit iv) Hand held control receiver
7.	All the UGS System units & sub units should have its own power source and their battery life (working life) must last up to minimum 1year at 20 detections/hour except for video surveillance cameras. A certificate to this effect from National/International accredited lab be provided.
8.	All the Sensors & cameras should have non line of sight wireless communication facilities at its own, between each other, with the control & display unit and with the hand held control receiver. Wireless Radio communication between the units should be on two ways secure Radio channel with guaranteed delivery of alarm messages i.e. ≤ 5% false alarm rate. All the units/sensors also must act as independent repeater to transmit the alarm information to the other and data exchange routes should be automatically established at the moment unit is installed and switched 'ON'.
9.	The non-Line-Of-Sight wireless communication should be capable, digital Modulation, with minimum dual-diversity antenna, maximal ratio combining, narrow-band width, with user's option of selectable ultra-narrowband with encryption of AES-128/256. Wireless communication must have the ability to completely overcome the multi-path effect. The transmitted signal should operate with minimal disturbances when operated with obstructions like high-rise buildings, metallic structures, hill features etc. Firm has to submit National/International accredited lab certificate/report for the same. The networking range for the complete system should be 1.5 Square Kilometre.
10.	The UGS System can be used as a standalone self-contained system and designed in such a way that other existing audio and video surveillance systems can also be integrated. Note :- **Audio & Video Surveillance Systems to be integrated with UGS be specified by the user.**
11.	All the sensors should transmit confirmation trigger or heart beat continuously to confirm the status of the sensor. CDU must display the battery status of each sensor.
12.	Control & display unit (CDU) and hand held control receiver should be capable to handle minimum 64 sensors of the system at any point of time.
13.	**Video Surveillance Camera:** 1. It should consist of a Day Camera and a Night Camera (Thermal Image Camera) mounted on a remotely controlled Pan & Tilt mechanism. 2 Day & Night camera should run continuously in activated mode for 4 hours or more on single charged battery. 3 Both cameras should get activated with the detection of an intrusion and go in the operational mode from standby mode automatically. There should also have provision in the CDU to activate the cameras independently and direct them to the required location with remote operated zoom-in facility. 4 The output video of the day and night camera should appear simultaneously on the screen by digital pixel selective fused method.

5 The video surveillance system should have inbuilt GPS & DMC for defining the co-ordinates of its own.

6. Port connectivity for interfacing output video on to a TV, HDMI, Ethernet over IP should be provided.

The detail specifications of the sub-units are as follows:-

a) **Day Camera** should have: -

i) High resolution, ¼ Inch (min) HAD CCD/CMOS colour Camera.
ii) Stabilization of image.
iii) 3 Mega pixel or better.
iv) Auto Exposure with
  aa) Automatic gain control (AGC)
  bb) Automatic Electronic Shutter
v) Field of view: - 12° X 10° (min) without zoom.
vi) Zoom: - Optical Zoom 24 X (Min) &
  Digital Zoom 8 X (Min)
vii) Range for human target: -
  - Detection Range - 2.4 Km (Min)
  - Recognition Range - 1.2 Km (Min)
  - Identification Range - 800 Mtr (Min)
viii) Manual & Auto Focus throughout the entire zoom
ix) Rechargeable battery (Li-ion) with suitable/intelligent charger.
x) Graphics over Video.
xi) Full function Remote control facility through CDU of UGS.

b) **Night Camera (Un-Cooled Thermal Image Camera)** should have

i) Video Format CCIR-PAL.
ii) Spectral band of 3-5 or 8-14 μm or both.
iii) Detection Range for human target - 1 Km (Min).
iv) FPA Resolution:- 640 x 480 (Min).
v) Zoom:-
  aa) Optical Zoom 4 X (Min)
  bb) Electronic Zoom of 2x (Min)
vi) Field of View:- 12°x 10° (Min).
vii) Automatic Gain Control (AGC).
viii) Manual & Auto Focus throughout the entire zoom.
ix) Full function Remote control facility through CDU of UGS.
x) Rechargeable battery (Li-ion) with suitable/intelligent charger.

c) **Pan & Tilt unit:-**

Pan & Tilt mechanism with camera mounted should have the provision to be fitted on a Mast or a Tripod and remotely controlled through CDU. It should have:-

i) Elevation movements - ±45° (Min).
ii) Elevation max. Speed - 20° /sec.
iii) Azimuth movements - 360°

	iv) Azimuth maximum speed - 40° /sec. v) Black anodized Aluminium finish.
14.	**Passive Infra-Red sensor:** The PIR sensor should detect the passage of an object by the change in IR signature. The sensor should detect passage of any person or vehicle in the vicinity. It should have :- i) Range - a) Length for detection: 50 meters (Min) for Foot born intruder. 100 meters (Min) length for Vehicle. b) Width of detection zone: 3 meters (Min) c) Height of detection zone: 2 meters (Min) ii) Sensitivity control. iii) Onboard Global Positioning System.
15.	**Magnetic Sensor:-** A magnetic sensor should detect the passage of any magnetic object entering or leaving the magnetic field around the sensor. This sensor should be effective for detecting armed personnel and vehicles. Magnetic Sensor should have:- i) Sensitivity control to change/select the sensitivity of the sensor. ii) Detection range- 12 m (Min) for an armed (with AK Series Weapon) person iii) Onboard Global Positioning System.
16.	**Seismic Sensor:-** A Seismic sensor should detect the passage of people and vehicles by sensing the vibrations produced in the ground. The vibrations should be picked up by a geophone that activates an alarm. It should have i) Range – in the radius of 20m (Min). ii) On board Global Positioning System.
17.	**Make & break Sensor** be compact, light weight and easy to install.
18.	**Acoustic Sensor should have:** i) Omni directional microphone. ii) Range : in the radius of 5 meters (Min).
19.	**Microwave Sensor should have:-** i) Detection of personnel & vehicles. ii) Detection zone (depends upon the distance between the Tx & Rx installation): a) Zone Length : 3 to 100 meters b) Zone Width: not more than 3.5 meters. c) Zone Height: up to 1.6 meters.
20.	**Pressure Cable Sensor:** The Pressure Cable sensor should detect the passage of an object by sensing the pressure on the sensor buried under ground. It should have :- i) Pressure operated sensor for alarm. ii) Pressure sensitivity -100 gms/cm² minimum (adjustable). iii) The facility to sense and alarm the pressure & cutting of cable. iv) The length of the cable sensor to be specified by the user.
20.	**Control & Display unit should have:** i) 10"(Min) colour LED display with resolution of 480x230 (Min). ii) The facility to operate on battery as well as on AC Mains supply.

	iii) The facility to display alarm ID, Time and Date. iv) Software to process messages / alarm from the sensors, display their operational status along with battery status of all sensors. v) Windows operating system with specialized Mapping system software. vi) The facility of notifying the alarm to the operator through sound, text messages and the colour of the symbols on the map. vii) Area map in the background with the location of the deployed sensors on ground. viii) The facility of controlling the parameters of the sensors, pan & tilt and camera. ix) Provision to control devices- 64 (Min).
21.	Hand held control receiver should be portable and should have: i) 5" (Min) colour LED display with resolution of minimum 480x230. ii) Inbuilt Global Positioning System receiver, iii) Inbuilt digital compass iv) Number of controllable devices: - 64 (Min).

(A Chaturvedi)
Group Comdr, TSG, NSG

(N K Nayyar)
Dy Director, DRDO

(Venukumar K.M)
Jt Director, DCPW

(Mohd Yusuf)
Dy Comdt (Ord), CRPF

(A.K Shukla)
AC (Tech), CISF

(Ajit Pratap)
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(Pradeep Sharma)
Sub Inspr (Tech), SIW, BSF

APPROVED / NOT APPROVED

(SUBHASH JOSHI) IPS
DIRECTOR GENERAL, BSF

TRIAL DIRECTIVE
FOR
UN-ATTENDED GROUND SENSOR
(UGS)

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INTRODUCTION:-

Un-attended Ground Sensor (UGS) is a system integrated with number of sensors used to dominate the sensitive operational areas. One UGS system may consist of various types of sensors based on the ground requirements. All the sensors have the capability to detect the intrusion or motion in the vicinity and give alarm. Each sensor has its own wireless transmitter to send the alarm signal and its positional co-ordinates to the main control station & to the hand held receiver of the operator.

The system has sensors like Seismic, Make & Break, Microwave, Magnetic, Acoustic, PIR, Pressure cable sensors, Video Surveillance camera with Pan & Tilt mechanism and Control & Display unit, Hand Held Control Receiver. One can control all the sensors remotely. If any alarm from any of the sensor installed is received by the control unit it directs the camera directly to zoom to that particular point. The system has the facility to direct the camera to that position manually as well as. All the unit of UGS are battery operated whereas control receiver and control station can be operated on mains supply also. Each sensor has its own detecting range according to its type and software installed in it.

AIM:-

To facilitate BOO to carry out physical evaluation of Tender sample of UGS at the time of procurement process.

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 Un-attended Ground Sensor 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) Variable AC source ranging from 90-270 Volt single phase 50 Hz
(b) Weighing Machine
(c) Measuring Tape
(d) Multimeter

TRIAL DIRECTIVE FOR UN-ATTENDED GROUND SYSTEM (UGS)

Srl no.	SPECIFICATIONS	Procedure suggested for trial for Board of Officers	Result expected / desired	Complied / Not Complied
1.	Real time alarm system to detect an intruder or multiple intruders' location simultaneously to ensure round the clock (24x7) surveillance.	Install the sensors and CDU in a wide area as per their detection capability in active mode. Check one by one and simultaneously the detection of the sensors in CDU. Run the equipment continuously for at least one week.	Detection should be real time and the CDU shows the location parameters and sound the alarm on detection. It sounds alarm when a single sensor detects any intruder and multiple sensors detect intrusion simultaneously. The CDU must be capable to process multiple detection signals from the sensors simultaneously. The system must run continuously round the clock efficiently with minimum 20 detections per sensor per day.	
2.	Control and display unit should have video recording & imaging capability of minimum 200 hours on a variable frame rate with date & time on screen display. There should be facility to get the data for making soft copies of video recorded. Auto as well as Manual Start & Stop facility for recording during surveillance should be provided.	• Check the CDU for recording capability by record the video for at least 2 hours. Check the space taken by the recorded video of 2 hours and then calculate the space for 200 hours. Check the recording for variable frame rate with date & time display. • Check the system for recording manually and automatically during	• Control and display unit must have video recording & image capability of minimum 200 hours on a variable frame rate with date & time on screen display. • Auto as well as Manual Start & Stop facility for recording should be provided.	

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		surveillance. • Check the system for the facility to get the soft copy of the recorded data.	• There must be a facility to get the data for making soft copies of video recorded.	
3.	The entire system should be able to work efficiently in the temperature range of -20°C to +55°C.	Keep the system with sensors in the Hot & Cold temperature chamber in working condition for one cycle at -20°C to +60°C with 30 minutes dwell time. (Hot & Cold chamber is available with SIW BSF)	The entire system must be able to work & stored in the temperature range of -20°C to +60°C.	
4.	The system should be able to perform efficiently up to relative humidity of 95%. The firm should submit National or International accredited lab report or certificate for the same.	Check the National/International accredited lab report / certificate in respect of the humidity in operational mode.	Check the national/ international accredited lab test report for the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.	
5.	All the units & sub units of UGS system should comply with IP-65 & MIL-STD-810F environmental standards. The firm has to submit National or International accredited Lab report or certificate of each unit.& sub unit.	Check the National/International accredited lab report / certificate in respect of IP 65 & Mil-STD-810F environmental standards.	Check the national/ international accredited lab test report for the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.	
6.	One UGS System should comprise of the following units & sub-units and the users to have choice to select them as per their operational requirements : i) Video surveillance camera with Pan & Tilt mechanism: a) Night Camera b) Day Camera	Check the UGS system tender sample for the Units & Sub-units provided as per the TE.	One UGS System must comprise of the Units & Sub-units as per the TE.	

	ii) Sensors: a) Passive Infra-Red sensor b) Magnetic sensor c) Seismic sensor d) Make & Break sensor e) Acoustic sensor f) Microwave sensor g) Pressure cable sensor (Piezo principle) iii) Control & Display unit iv) Hand held control receiver			
7.	All the UGS System units & sub units should have its own power source and their battery life (working life) must last up to minimum 1year at 20 detections/hour except for video surveillance cameras. A certificate to this effect from National/International accredited lab be provided.	Check all the Units & Sub-units of UGS system for their power source. Check the current consumption of the each and every unit & sub-unit with the help of Multimeter. The firm has to submit OEM certificate for the battery working life of minimum 1 year at 20 detections/hour except surveillance cameras.	All the UGS System units & sub units must have its own power source. All the units and sub units should consume very less current in the range of maximum 100 mA in operational mode. Their battery life must last up to minimum 1 year at 20 detections/hour except for video surveillance cameras.	
8.	All the Sensors & cameras should have non line of sight wireless communication facilities at its own, between each other, with the control & display unit and with the hand held control receiver. Wireless Radio communication between the units should be on two ways secure Radio channel with guaranteed delivery of alarm messages i.e. ≤ 5% false alarm rate. All the	• Check the UGS system for two way communication between sensors, cameras, between each other and with the CDU & Hand Held Control receiver. Install and activate UGS then set the parameters of all the sensors & cameras through CDU & Hand held control receiver one by	• All the Sensors & cameras should have non line of sight wireless communication facilities at its own, between each other, with the control & display unit and with the hand held control receiver. Wireless Radio communication between the units should be on two ways secure Radio	

	units/sensors also must act as independent repeater to transmit the alarm information to the other and data exchange routes should be automatically established at the moment unit is installed and switched 'ON'.	one. Check the detection alarm of each sensor on CDU & Control receiver and video of cameras on CDU wirelessly. • Check the sensors alarm with wireless communication with CDU for false alarm rate. Arrange 20 detections with each sensor and observe the real time alarm on the CDU & Hand held control receiver. • The firm has to submit National/International accredited lab report/certificate in respect of Non line of sight, two ways secure Radio channel wireless communication, all the units/sensors as repeater and establishment of data exchange routes automatically as the unit switched 'ON'.	channel. • The false alarm rate must not be ≤ 5%. • All the units/sensors must also act as independent repeater to transmit the alarm information to the other and data exchange routes should be automatically established at the moment unit is installed and switched 'ON'. • Check the national/ international accredited lab test report in respect of Non line of sight, two ways secure Radio channel wireless communication and all the units/sensors acts as repeater. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab. •	
9.	The non-Line-Of-Sight wireless communication should be capable, digital Modulation, with minimum dual-diversity antenna, maximal ratio combining, narrow-band width, with user's option of selectable ultra-narrowband with encryption of AES-128/256. Wireless communication must have the ability to completely overcome the multi-path effect. The	• Operate the sensors in different terrain with obstructions like high-rise buildings, metallic structures, hill features etc. The installation of the sensors should be in 1.5 square Km areas. • Check the National/International accredited lab report / certificate in	• The transmitted signal must be operated with minimal disturbances with obstructions like high-rise buildings, metallic structures, hill features etc. The networking range for the complete system must be 1.5 Square Kilometre. • Check the national/ international	

	transmitted signal should operate with minimal disturbances when operated with obstructions like high-rise buildings, metallic structures, hill features etc. Firm has to submit National/International accredited lab certificate/report for the same. The networking range for the complete system should be 1.5 Square Kilometre.	respect of the non-Line-Of –Sight wireless communication with digital modulation, with minimum dual-diversity antenna, maximal ratio combining, narrow-band width, with user's option of selectable ultra-narrowband with encryption of AES-128/256.	accredited lab test report for the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.	
10.	The UGS System can be used as a standalone self-contained system and designed in such a way that other existing audio and video surveillance systems can also be integrated. Note :- **Audio & Video Surveillance Systems to be integrated with UGS be specified by the user.**	• Check the UGS System for operation as a standalone system without aid of any external major unit or sub-unit. • Check the system for integration of audio and video surveillance systems exists with the intender & mentioned in the tender enquiry for integration.	• The UGS System can be used as a standalone self-contained system. • UGS must be compatible with the external existing audio & Video surveillance system with the intender mentioned in the TE.	
11.	All the sensors should transmit confirmation trigger or heart beat continuously to confirm the status of the sensor. CDU must display the battery status of each sensor.	• Check the CDU for confirmation trigger or heart beat from the sensors continuously for sensor status. • Check the battery status of each sensor on CDU screen.	• All the sensors must transmit confirmation trigger or heart beat continuously to confirm the status of the sensor. CDU must display the battery status of each sensor.	
12.	Control & display unit (CDU) and hand held control receiver should be capable to handle minimum 64 sensors of the system at any point of time.	Check the National/International accredited lab report / certificate in respect of the same.	Check the national/ international accredited lab test report for the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.	

13.	**Video Surveillance Camera:** 1. It should consist of a Day Camera and a Night Camera (Thermal Image Camera) mounted on a remotely controlled Pan & Tilt mechanism. 2 Day & Night camera should run continuously in activated mode for 4 hours or more on single charged battery. 3 Both cameras should get activated with the detection of an intrusion and go in the operational mode from standby mode automatically. There should also have provision in the CDU to activate the cameras independently and direct them to the required location with remote operated zoom-in facility. 4 The output video of the day and night camera should appear simultaneously on the screen by digital pixel selective fused method. 5 The video surveillance system should have inbuilt Global Positioning System & DMC for defining the co-ordinates of its own.	• Check the UGS System for day and Night (Un-cooled Thermal Imager) camera mounted on Pan & Tilt mechanism with remote control facility. • Switch 'ON' the camera on fully charged battery in activation mode and check the continuously run time. • Switch 'ON' the cameras and keep it in standby mode. Now check the status of the cameras on detection alarm from any of the sensor. • Check the cameras (day & night) for manual controlling by changing it from standby mode to operational mode through CDU and direct it to the required location. Check also the zoom-in operation of the camera remotely. • Check the video of day & night cameras on the monitor for single image reproduced by combining output of both of the cameras through digitally pixel selective fused method. The image should not be overlapped image. • Check the system for inbuilt Global Positioning System & DMC by installing it on the place whose co-ordinates are known and verify it through CDU.	• System must have day and night (Thermal Imager) camera mounted on Pan & Till mechanism and must be remotely controlled. • Video cameras must run continuously in activated mode for 4 hours or more on singe charged battery. • Cameras must get activated with the detection of an intrusion and switch over from standby mode to operational mode automatically. • Cameras must also be controlled manually from CDU whenever required and can be zoom-in or out remotely. • The output of the day & night cameras must appear simultaneously on the screen by digital pixel selective fused method. • The system must have inbuilt Global Positioning System & DMC for defining the co-ordinates of its own.	

	6. Port connectivity for interfacing output video on to a TV, HDMI, Ethernet over IP should be provided. The detail specifications of the sub-units are as follows:- a) **Day Camera** should have: - i) High resolution, ¼ Inch (min) HAD CCD/CMOS colour Camera. ii) Stabilization of image. iii) 3 Mega pixel or better. iv) Auto Exposure with aa) Automatic gain control (AGC) bb) Automatic Electronic Shutter v) Field of view: - 12° X 10° (min) without zoom. vi) Zoom: - Optical Zoom 24 X (Min) & Digital Zoom 8 X (Min) vii) Range for human target: - ➢ Detection Range - 2.4 Km (Min) ➢ Recognition Range- 1.2 Km (Min) ➢ Identification Range-800 Mtr (Min) viii) Manual & Auto Focus throughout the entire zoom. ix) Rechargeable battery (Li-ion) with suitable/intelligent charger. x) Graphics over Video. xi) Full function Remote control facility	• Check the system for the connectors or facilty to interface with the TV, HDMI Port, Ethernet over IP in the video surveillance camera itself. • Check the National/International accredited lab report / certificate in respect of the QRs No 13 (a)-(i), (iii), (iv) & (vi). • Mount the camera and switch 'ON' it. Monitor the image stability by disturbing the camera position. • Check the FOV of the camera in the SIW lab with the help of ITS. • Switch 'ON' the system and detect a human target from a distance of 2.4 Km minimum, recognize him from a distance of 1.2 Km and identify him from a distance of 800 mtr. • During zoom operation, select a target and focus it manually and automatically. • Check the system for rechargeable battery (Li-ion) and its charger suitable and intelligent to charge the battery provided. • Check graphics over video during operation like zoom, brightness, contrast etc. • Check the functions of the UGS	• Port connectivity for interfacing output video on to a TV, HDMI, Ethernet over IP must be provided • Check the National/ International accredited lab test report for the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab. • The image must be stable with little disturbance in the position of the camera. • FOV must be 12° X 10° (min) without zoom. • Human target must be at the ranges: • Detected : 2.4 Km (mini) • Recognized : 1.2 Km (mini) • Identified : 800 mtr (mini) • The system must have manual & auto focus throughout the entire zoom. • The system must have rechargeable battery (Li-ion) with suitable/intelligent charger. • All the information regarding operation or functions must be displayed graphics over video. • All the functions must be controlled	

	through CDU of UGS.	system from CDU remotely.	through CDU remotely.	
	b) **Night Camera (Un-Cooled Thermal Image Camera)** should have i) Video Format CCIR-PAL. ii) Spectral band of 3-5 or 8-14 µm or both. iii) Detection Range for human target - 1 Km (Min). iv) FPA Resolution:- 640 x 480 (Min). v) Zoom:- aa) Optical Zoom 4 X (Min) bb) Electronic Zoom of 2x (Min) vi) Field of View:- 12°x 10° (Min) without zoom vii) Automatic Gain Control (AGC). viii) Manual & Auto Focus throughout the entire zoom. ix) Full function Remote control facility through CDU of UGS. x) Rechargeable battery (Li-ion) with suitable/intelligent charger.	• Check the Thermal camera for its type i.e cooled or un-cooled. • Connect the video out from the camera with TV and observe it. • Check the National/International accredited lab report / certificate in respect of the QRs No 13 (a)-(ii), (iv), (v) & (vii). • Switch 'ON' the system and detect a human target from a distance of 1 Km minimum. • Check the FOV of the camera in the SIW lab with the help of ITS. • During zoom operation, select a target and focus it manually and automatically. • Check the functions of the UGS system from CDU remotely. • Check the system for rechargeable battery (Li-ion) and its charger suitable and intelligent to charge the battery provided.	• The night camera must be Un-cooled Thermal Imager. • The video format must be CCIR-PAL system. • Check the national/ international accredited lab test report for the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab. • Detection range for a human target must be 1 Km minimum clearly. • FOV must be 12°x 10° (Min) without zoom. • Manual & Auto Focus throughout the entire zoom. • All the functions of the UGS must be controlled through CDU. • The system must have rechargeable battery (Li-ion) with suitable/intelligent charger.	

	c) Pan & Tilt unit:- Pan & Tilt mechanism with camera mounted should have the provision to be fitted on a Mast or a Tripod and remotely controlled through CDU. It should have:- i) Elevation movements - ±45°.(Min). ii) Elevation max. Speed - 20° /sec. iii) Azimuth movements - 360° iv) Azimuth maximum speed - 40° /sec.	• Check the pan & tilt unit for mounting on Tripod or on a mast. • Check the National/International accredited lab report / certificate in respect of the (I) to (v).	• Pan & Tilt unit must have the provision to mount on Tripod & mast. • Check the National/ International accredited lab test report for the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.	
14.	**Passive Infra-Red sensor:** The PIR sensor should detect the passage of an object by the change in IR signature. The sensor should detect passage of any person or vehicle in the vicinity. It should have :- i) Range - a) Length for detection: 50 meters (Min) for Foot born intruder. 100 meters (Min) length for Vehicle. b) Width of detection zone: 3 meters (Min) c) Height of detection zone: 2 meters (Min) ii) Sensitivity control. iii) Onboard Global Positioning System.	• Check the PIR sensor for its detection length, width & height for human target and vehicle. • Check the system for sensitivity control. • Check the system for onboard Global Positioning System by checking the co-ordinates of its own through CDU.	• The Range length for detection, width of detection zone and height of the zone must be as per QRs para's. • PIR sensor must have sensitivity control. • It must have onboard Global Positioning System.	
15.	**Magnetic Sensor:-** A magnetic sensor should detect the passage of any magnetic object entering or leaving the magnetic field around the sensor. This sensor should be effective for detecting armed personnel and vehicles. Magnetic Sensor should have:- i) Sensitivity control to change/select the sensitivity of the sensor. ii) Detection range- 12 m (Min) for an	• Check the sensor for sensitivity control. • Check the detection range for an	• The sensor must have sensitivity control. • The sensor must detect armed person	

	armed (with AK Series Weapon) person iii) Onboard Global Positioning System.	armed person with AK series weapon. • Check the sensor for onboard Global Positioning System through CDU.	from a distance of 12 meters (min). • The sensor must have onboard Global Positioning System.	
16.	**Seismic Sensor:-** A Seismic sensor should detect the passage of people and vehicles by sensing the vibrations produced in the ground. The vibrations should be picked up by a geophone that activates an alarm. It should have i) Range – in the radius of 20m (Min). ii) On board Global Positioning System.	• Check the sensor for its detection range. • Check the sensor for onboard Global Positioning System through CDU.	• Detection range must be in the radius of 20 meters. • The sensor must have onboard Global Positioning System.	
17.	**Make & break Sensor** be compact, light weight and easy to install.	• Check the make & break sensor for its compactness and east to install.	• It must be compact, light weight and easy to install.	
18.	**Acoustic Sensor should have:** i) Omni directional microphone. ii) Range : in the radius of 5 meters (Min).	• Check the sensor for omni directional sensing and its range of detection.	• It should have omni directional and range in the radius of 5 meters (minimum).	
19.	**Microwave Sensor should have:-** i) Detection of personnel & vehicles. ii) Detection zone (depends upon the distance between the Tx & Rx installation): a) Zone Length : 3 to 100 meters b) Zone Width: not more than 3.5 meters. c) Zone Height: up to 1.6 meters.	• Check the Microwave sensor for its detection of personnel & vehicle. • Check the Microwave sensor for detection zone length, width and height.	• Microwave sensor must detect personnel & Vehicle. • The detection zone length, width & height must be as per the QRs paras.	

20.	**Pressure Cable Sensor:** The Pressure Cable sensor should detect the passage of an object by sensing the pressure on the sensor buried under ground. It should have :- i) Pressure operated sensor for alarm. ii) Pressure sensitivity -100 gms/cm² minimum (adjustable). iii) The facility to sense and alarm the pressure & cutting of cable. iv) The length of the cable sensor to be specified by the user.	• Check the sensor for its type. • Check the sensor for the provision of pressure sensitivity adjustment and the value. • Check the cable/sensor for its activation by pressure & cutting. • Check the cable length as mentioned in the TE.	• The sensor used must be pressure operated for alarm. • The pressure sensitivity must be adjustable and minimum value 100gms/cm² • The sensing must be from pressure & cutting of the cable. • Cable length must be as per tendered.	
20.	**Control & Display unit should have:** i) 10"(Min) colour LED display with resolution of 480x230 (Min). ii) The facility to operate on battery as well as on AC Mains supply. iii) The facility to display alarm ID, Time and Date. iv) Software to process messages / alarm from the sensors, display their operational status along with battery status of all sensors. v) Windows operating system with specialized Mapping system software. vi) The facility of notifying the alarm to the operator through sound, text messages and the colour of the symbols on the map. vii) Area map in the background with the location of the deployed sensors on	• Check the CDU display for the size of the screen by measuring the size. • Check the CDU for operation with battery and AC mains supply directly. • Check the CDU to display alarm ID, time & date. • Check the CDU for displaying of messages / alarm from sensors, their operational status along with battery status of all sensors. • Check the CDU for window OS with mapping software. • Check the CDU to notify the alarm through sound, text messages and the colour of the symbols on the map. • Check the CDU for displaying the	• Size of the display must be 10" (min). • The CDU must be operated on battery as well as on AC Mains supply. • It must have the facility to display alarm ID, time and date. • CDU must be able to process messages/alarm from the sensors and display their operational status along with status of all sensors. • The CDU must have windows OS with specialized mapping system software. • The CDU must have the facility of notifying the alarm to the operator through sound, text messages and the colour of the symbols on the map. • The CDU must be able to display area	

	ground. viii) The facility of controlling the parameters of the sensors, pan & tilt and camera. ix) Provision to control devices- 64 (Min).	area map in the background with the location of the deployed sensors on ground. • Check the CDU to control the parameters of the sensors, pan & tilt and camera. • Check the National/International accredited lab report / certificate in respect of the LED Display & its resolution & provision to control 64 (min) devices.	map in the background with the location of the deployed sensors on ground. • The CDU must control the parameters of the sensors. pan & tilt and camera. • Check the National/ International accredited lab test report for the same. In case of any doubt in the test report, the veracity of the same may be checked from the concerned lab.	
21.	Hand held control receiver should be portable and should have: i) 5" (Min) colour LED display with resolution of minimum 480x230. ii) Inbuilt Global Positioning System receiver, iii) Inbuilt digital compass iv) Number of controllable devices: - 64 (Min).	• Check the display screen size with the help of measuring tape. • Check the system for inbuilt Global Positioning System receiver. • Check the system for inbuilt digital compass. • Check the National/International accredited lab report / certificate in respect of the LED display, resolution and controllable devices.	• The screen size must be 5". • The system must have Inbuilt Global Positioning System receiver & digital compass. • Check the national/ international accredited lab test report for the same. 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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