

**chapter**

# **7**

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# **RADAR AND OPTIC**

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## GSR -110 S Medium Range Ground Surveillance Radar



### DESCRIPTION

GSR - 110 PS is a solid - state medium range, all weather ground surveillance and target acquisition radar used to detect, locate and identify moving targets such as isolated infantry, vehicle and low flying helicopter. This system can be installed both on the ground and on the vehicle. The detected targets can be displayed on an LCD monitor by PPI scope and the resulting doppler sound can be heard by means of loudspeaker or headphone.

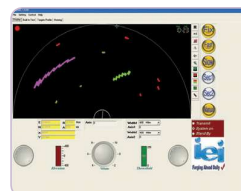
### FEATURES

- Pulse Radar.
- Fully Solid State Transceiver.
- Full Function Remote Control (FFRC)
- PC - Based Signal Processing, Control and Monitoring.
- Using Doppler Sound of Moving Targets.
- Built In Test (BIT) capability
- Automatic sectorial surveillance with sector axis and selectable width
- Area Management.
- Modular Design.
- Audible Detection Alarm.
- Manual & Automatic Scanning Mode.
- Low Probability of Interception.



### APPLICATIONS

- Battle Field Frontier Reconnaissance & Surveillance.
- Border Surveillance for Police Squadron.
- Protection of Important Zones.
- Military Force Deployment Monitoring.
- Guidance of Ground, Naval and Airborne Attack Units.



### TECHNICAL FEATURES

Detection Range	Pedestrian Light vehicle Heavy vehicle Helicopter	6 km 12 km 15 km 12 km
Resolution	In range In azimuth	40 m 50 mils
Location Accuracy	In range In azimuth	10 m 10 mils
Azimuth Coverage		0-360°
Detectable Target Velocity		3.5 km/h ~ 103 km/h
Power consumption(without computer)		150W
MTBF		≥ 1000 h
MTTR		≤ 30 min
Environmental conditions	Operator console temperature Equipment outdoor temperature Equipment storage temperature	0°C ~ + 50°C -20°C ~ + 55°C -30°C ~ + 65°C
Weight	net gross	117 kg 174 kg



## GSR-110 N Long Range Ground Surveillance Radar



Battlefield awareness is the key to battlefield dominance. The field commander who knows the enemy's location and the types of forces being deployed enjoys a great tactical advantage. GSR-110N radar is a long range ground surveillance radar system developed for detecting, locating, and tracking of ground moving targets like pedestrian, light and heavy vehicles and air moving targets at low altitude like helicopters. It is a full coherent pulse radar system which works in X-band and uses Doppler Effect to detect targets. The control and monitoring operation is performed on a laptop computer and processing operation is performed by a powerful processing platform. This system sits on a tripod. It can be installed both on the ground and on the vehicle, and carried by 2 people.

### FEATURES

- Pulse radar.
- Low Probability of Interception (LPI).
- Fully solid state transceiver.
- High RF bandwidth
- Audible detection alarm.
- Automatic tracking of targets (TWS).
- Displaying at least 10 tracked targets directions.
- Alarming when the searching target appears.
- Displaying of echo map zone.
- Displaying of Cartesian and Polar coordinates.
- Excellent ECCM capability (frequency agility, PRF jitter, low side lobe, pulse compression).
- Full Function Remote Control (FFRC).
- Automatic sectorial surveillance with sector axis and selectable width
- Area management.

### APPLICATIONS

- Battlefield frontier reconnaissance & surveillance
- Border surveillance for police squadron
- Protection of important zones
- Military force deployment monitoring
- Guidance of ground forces and airborne attack units



### TECHNICAL SPECIFICATIONS

Detection range	Pedestrian: 15 km Light vehicle: 30 km Heavy vehicle: 40 km Helicopter: 20 km	
Location accuracy	Range: 15 m Azimuth: 10 mils	
Resolution	Range: 30 m Azimuth: 50 mils	
Azimuth coverage	0 ~ 360°	
Detectable target velocity	3 ~ 103 km/h	
Power consumption(without computer)	less than 400 W	
Environmental conditions	operator console temperature	0°C ~ +50°C
	equipment outdoor temperature	-20°C ~ +55°C
	equipment storage temperature	-30°C ~ +65°C
MTBF	≥ 1000 h	
MTTR	≤ 30 min	
Weight	net	75 Kg
	gross	105 Kg

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## 3D Radar M4 3D Air Surveillance Radar

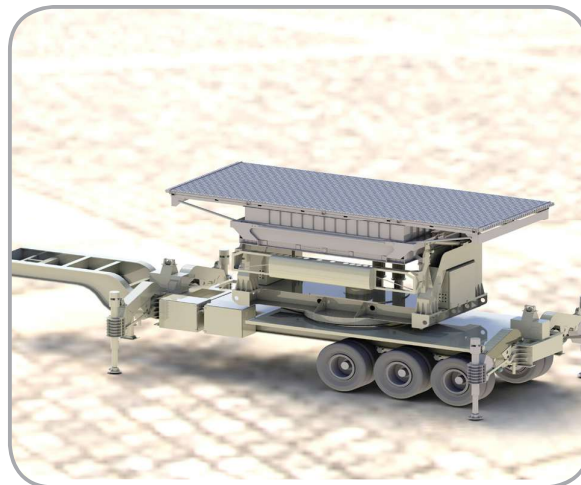
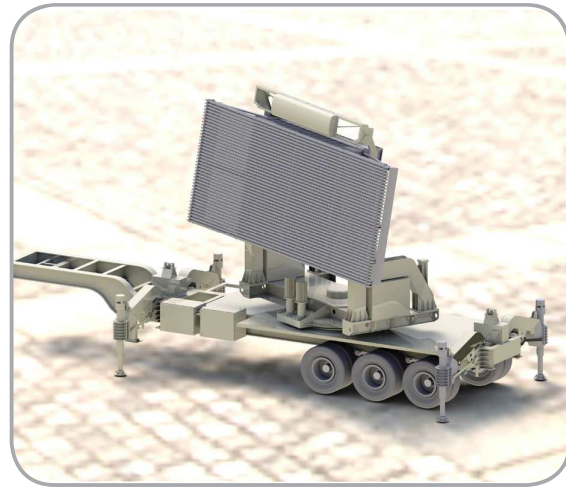
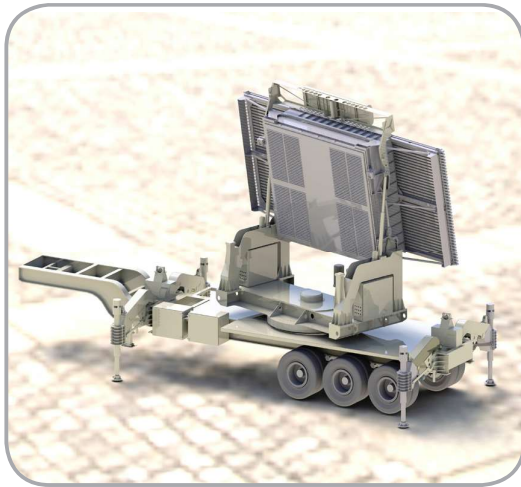


This three-dimensional air surveillance radar is a tactical, long range, fighter interceptor system with active phase array antenna; early warning; and ECCM capabilities operating in S band. It is developed to meet the primary requirement of the first stage of air defense network. The tactical and mobility feature of the system as well as reducing number of operators and organizations in charge can be regarded as an end user strategy element. Air targets intelligence which is detected by different sensors such as tracking radars, medium and short range radars are transferred to a command and control shelter via a secure network and will be combined in that center.

### APPLICATIONS

- Burn Through: concentrating the power in the direction of the active jammer in order to increase the radar range in the direction of the active jammer
- SLB: blanking the active input jamming signals from the side lobe
- SLC: cancelling the active input jamming signals from the side lobe
- Frequency hopping: random selection of radar operating frequency to encounter active and passive jammers
- JATS: smart selection of radar operating frequency by analyzing the active jamming signals
- Pulse Compression: standing against active jammers and providing the radar with capability of Low Probability of Interception (LPI)
- CFAR: standing against passive jammers and determining the automatic threshold level.
- Clutter Map: standing against passive jammers and cancelling the surface strong clutter
- Low SLL Antenna: standing against Anti-Radiation Missile (ARM) and passive jammers
- Sector Blanking (transmission switch off): turning off the transmitter in standby mode in order to hide radar from interception equipment and also keeping it safe against Anti-Radiation Missile (ARM)
- Pulse Doppler Mode: standing against the passive jammers like chaff and better cancellation of volume clutter.

RADAR AND OPTIC





## 3D Radar M4 3D Air Surveillance Radar



### TECHNICAL SPECIFICATIONS

Parameter	Value														
Operational Frequency	S band														
Radar Bandwidth	400 MHz														
Coverage in Elevation	0° ~ 25°														
Coverage in Azimuth	0° ~ 360°														
Track While Scan (TWS)	200 targets														
Radar Processing Modes	Normal, MTI, PD														
Range	450 km (Instrumental Range) 350 km (RCS 2m <sup>2</sup> , SW1, Pd=0.8, Pfa=10 <sup>-6</sup> )														
Accuracy in Range	100 m														
Accuracy in Azimuth	0.3°														
Accuracy in Elevation	600m (@200 Km)														
Resolution in Range	200 m														
Resolution in Azimuth	1.4°														
Resolution in Elevation	2° ~ 3.5°														
Speed of Detectable Targets	20 m/s – 3 Mach														
Antenna Rotation Speed	3 & 6 RPM														
Number of Beam	12 (Digital Beam Forming)														
Antenna Specifications	<table><tr><td>Antenna Type</td><td>Slotted Waveguide Planar Array</td></tr><tr><td>Antenna polarization</td><td>Linear, Horizontal</td></tr><tr><td>Antenna gain</td><td>40dB</td></tr><tr><td>Elev. S.L.L</td><td>&lt;-25dB</td></tr><tr><td>Az. S.L.L</td><td>&lt;-35dB</td></tr><tr><td>Elev. BW</td><td>2° ~ 3.5°</td></tr><tr><td>Az. BW</td><td>1.4°</td></tr></table>	Antenna Type	Slotted Waveguide Planar Array	Antenna polarization	Linear, Horizontal	Antenna gain	40dB	Elev. S.L.L	<-25dB	Az. S.L.L	<-35dB	Elev. BW	2° ~ 3.5°	Az. BW	1.4°
Antenna Type	Slotted Waveguide Planar Array														
Antenna polarization	Linear, Horizontal														
Antenna gain	40dB														
Elev. S.L.L	<-25dB														
Az. S.L.L	<-35dB														
Elev. BW	2° ~ 3.5°														
Az. BW	1.4°														
Detection Altitude	100 m – 28000 m														
Transmitter	Type: Solid State Number of Array Lines: 40 Power of each Array Line: 800 w														
ECCM Capabilities	Burn Through, SLB, SLC, Frequency Hopping, PRF Jitter, JATS, LSLL Antenna														
Calibration and BIT	Yes														
IFF	SSR/MSSR														
MTTR	>30 minutes														
MTBF	<800 hours														
Set up Time	30 minutes by 6 people														
Teardown Time	30 minutes by 6 people														
Number of Truck	3 trucks for radar system and 3 trucks for telecommunication and maintenance systems														
Number of Crew	6														
Non operational Temperature	-40°C ~ +70°C														
Operational Temperature	-30°C ~ +60°C outdoor -10°C ~ +45°C indoor														
Maximum Operational Altitude	3000 m from the sea surface														
Tolerable Wind Speed	25 m/s (operational mode)														
Humidity	95% @ 30° C														
Salt Fog	2 mg/m <sup>2</sup>														
Rain	5 mm/min														



### INTRODUCTION

RAL82 is an airborne system used to track the earth terrain and calculate the aircraft's altitude by transmitting a radar pulse and computing the pulse echo time. Its modular architecture allows the integrity level to be adapted to the necessities of each platform. The system has been designed to meet aircrafts, helicopters and trainers' requirements.

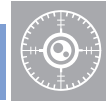
### FEATURES

- Enhanced tracking performance even in case of severe manoeuvres in roll and pitch.
- Immunity to multi path
- Jamming resistance
- Interface flexibility
- Easy integration
- Easy maintenance
- Analogue signal for autopilot

### SPECIFICATIONS

- Operational specification
- Operational Temperature: -40 to +71°C
- EMI/EMC: According to MIL-STD-461/462
- Environmental condition: According to MIL-STD-810F
- Dimension: 337\*194\*125 mm
- Weight: 6.1Kg
- Antenna Weight: 0.5Kg
- Tracking Capability up to 2000 Feet/Sec
- Transmitter Frequency 4.3 GHz
- Local Oscillator Frequency 4.3 GHz
- Transmitter Pulse Width (0 to 1000 Feet) 20±15nSEC
- Transmitter Pulse Width (1000 to 5000 Feet) 130±25nSEC
- Transmitter Peak Power (0 to 1000 Feet) 25 to 100 watts
- Transmitter Peak Power (1000 to 5000 Feet) 100 to 300 watts
- Pulse Repetition Frequency 10 KHz
- Receiver Band Width (0 to 1500 Feet) 30 MHz
- Receiver Band Width (1500 to 5000 Feet) 10 MHz
- Antenna Pattern (at half-power points)
- Pitch or roll (H and E plane) 35°
- VSWR (4.3GHz) 1.2:1.0
- Gain (4.3GHz) 13db
- Altitude Accuracy ±5feet+3% of actual altitude
- Height indicator Slew time: 2sec, Sensitivity less than 0.2Scale degree,
- Accuracy ±0.9 scale degree
- Power requirements 115(+4,-8), 400Hz (±20)
- P.F. =0.9, 100VI, 28VDC





### INTRODUCTION

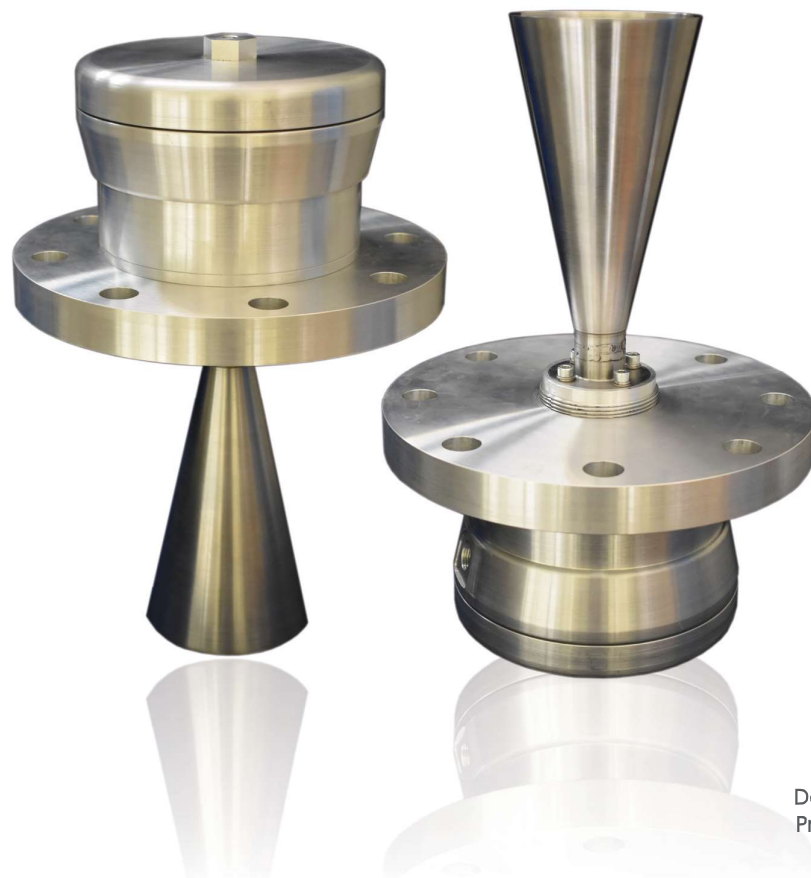
The Level Meter Radar LMR100 is a non-contact measuring device with excellent reliability in a wide range of applications. This Radar is based on FMCW (frequency modulated continuous wave) technology which is suitable for high temperature and high pressure applications. It operates in 24-26GHz frequency band to ensure that it delivers both accuracy and reliability in a wide variety of level gauging applications. The Level Meter is designed for measuring distance, level, volume and reflectivity of liquids and solids.

### Features

- State of the art technology
- Non-contact measuring
- High accuracy
- Easy installation
- Compact in size
- Unaffected by tank pressure and temperature
- Liquid & Solid Applications

### Technical Specifications

- Frequency: 24GHz (X-Band is available on request)
- Sweep: 2GHz
- Radiated Power: <5mW
- Accuracy:  $\pm 3\text{mm}$  ( $\pm 1\text{mm}$  is available on request)
- Measuring Range: 0.5 to 30m
- Output Signal: 4 -20mA/HART 2 Wires
- Protection Category: IP66/67
- Approvals: EXd IICT6



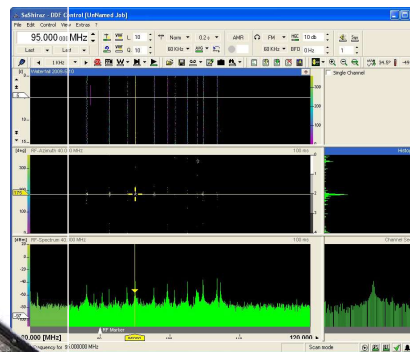


## GENERAL DESCRIPTION

This system with extremely high scan speed is designed by making use of the latest technology in the field of military communications. This system can intercept and find the direction of frequency/time hopping, burst and fixed frequency signals in the wide frequency range from 30MHz to 3000MHz. This system uses correlative interferometry algorithm. The antennas are designed for in stationary and semi-mobile applications. Using of large aperture antennas with nine elements, the system can reach highly accurate bearings. For better accuracy the DF consists of three antenna sets, which are arranged for three sub-band frequency. One set of nine elements antenna covers 30-200MHz frequency band, set of nine elements antenna covers 30-1300MHz and another set of eight elements antenna covers 1300-3000MHz frequency band. Overall system is protected against lightning that prevents it from natural malfunctions.

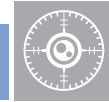
## FEATURES

- High-speed direction finding using correlative interferometer algorithm
- Simultaneous direction finding of wide-band (FH/Burst) and narrow-band signals
- Excellent resistance against powerful signals
- Appropriate diversity of antennas to cover frequency band
- Enhanced DF accuracy and sensitivity by using wide aperture DF antennas
- Extremely high frequency resolution
- Direction finding of all narrow-band digital and analog modulated signals
- Simultaneous direction finding of three frequency-hopping signals with 2500hops/S in 20MHz bandwidth
- Networking capability for position finding
- Direction finding of the burst signals with the time duration more than 400µsec.
- Equipped with GPS receiver for time synchronization
- Automatically correct the error difference angle with respect to magnetic north by compass
- Demodulation of the AM and FM signals.
- Self-test ability with the error and its fault status determination
- User-Friendly GUI
- Appropriate weight and dimensions
- Tactical and stationary application
- Scale indicating
- Able to arrange any DF system on the map
- Possibility to add or delete layers on the map
- Capability to show a map in vector or raster shape in infinitive multi-layer
- Printing ability





## VRF-12-141/ACV/UHF V/UHF Direction Finder



### TECHNICAL SPECIFICATIONS

Description	Range
Frequency	30-3000MHz (Expandable to 6GHz)
Instantaneous Bandwidth	20MHz (Expandable to 80MHz)
Frequency Resolution	100Hz
Frequency Accuracy	0.1ppm
Phase Noise	-105dBc/Hz @10KHz
Image Frequency Rejection	≥ 80dB
Noise Figure	≤16dB
Adjacent Channel Suppression 10 KHz	80dB
Modes of Demodulation	AM, FM
Dynamic Range	≥ 120dB Offline (Including AGC) ≥ 70dB Online
DF Method	Correlative Interferometer, Music (option)
Instrument DF Accuracy	1° RMS
System DF accuracy	Dependent to Antenna Type (Refer to Antenna Spec.)
Display	Azimuth vs. Frequency, Level vs. Frequency, Polar Diagram, Histogram, Waterfall, Real-Time IF Panoramic Display
Display Resolution	1°
DF Sensitivity	Typ. 1μv/m (-107dBm) to 9μv/m (-90dBm) (Frequency Dependent)
Operating Modes	FFM (Fix Frequency Mode), WBM (Wide Band Mode), SCAN (F-SCAN, M-SCAN), Frequency Hopping(up to 3 nets) with 2500hops/s
Frequency Span in Wideband Mode	1MHz/ 2MHz/10MHz/20MHz
Minimum Detectable Burst Duration	400μs
Scan Speed	Up to 1GHz/sec with 20KHz Resolution
Channel Spacing (Depending on Selected Real Time Band Which)	100KHz/50 KHz/25KHz/20KHz 12.5KHz/10 KHz/8.33KHz/5KHz 2KHz/1 KHz/0.5KHz/0.2KHz 0.1KHz/0.05 KHz/0.02KHz
Direction Finding Bandwidth	60KHz/30KHz/15KHz/12KHz/7.5KHz/6KHz/5KHz/3KHz/1.2KHz/0.6KHz
Demodulation Bandwidths	30KHz/15KHz/7.5KHz
Azimuth Range	360°
Maximum Detectable Hopping Rate	2500Hop/s (Expandable to 5000Hop/s)

Version	A	B	C
Frequency Range	30 to 1300MHz	1300 to 3000MHz	30 to 200MHz
Antenna Type	9-Element Circular Array	8-Element Circular Array	9-Element Circular Array Switchable Active/Passive Mode
Polarization	Vertical	Vertical	Vertical
Nom. Impedance	50Ω	50Ω	50Ω
DF Error	≤2.5°rms, 30 to 200MHz	≤2°rms	≤ 2°rms
(In Reflection Free Environment)	≤1.5°rms, 200 to 1300MHz		
Dimension (Diameter, Height)	1.1 x .26meter	0.31 x 0.5meter	3 x 2.8meter
Weight	about 30kg	about 20kg	about 70kg

### Environmental

Environmental Test Standard	According to Mil-STD-810G
Operation Temperature Range (Indoor)	0°C to 50°C
Operation Temperature Range (Outdoor)	-25°C to +65°C
MTBF	2000hours
MTTR	20minutes
Dimensions (W x H x D)	Approx. 60 x 70 x 70cm
Weight	Approx. 65kg
Standard	According to Mil-STD-810G
Power supply	220VAC, Maximum 1.5KVA
ITU-R Recommendation Compliant	SM. 1053, SM. 1269, SM. 1370, SM. 1392, SM. 1537-0, SM. 1537-1, SM. 1598, SM. 1600-0, SM. 1600-2, SM. 854-1, SM. 854-3



## GENERAL DESCRIPTION

VRB-12-141 /A(V/UHF) is designed for automatic and manual detection and analysis of military and non-military radio communications in the frequency range of 30MHz to 3000MHz

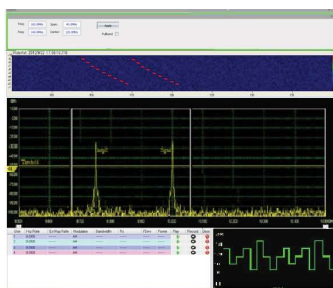
Different types of signals are supported like:

- Fix frequency (analog and digital – narrow and wide band)
- Burst
- FH (frequency hopping spread spectrum)
- TH/FH (frequency hopping spread spectrum/ time hopping spread spectrum)
- DSSS (direct sequence spread spectrum)

Parameter estimation, demodulation and extraction of voice or bit stream are capabilities of this system. Protocol analysis software can be optionally added to the system to decode protocols. The system can be installed on stationary or tactical platforms and can be used with other EW equipment in battlefield as a part of command and control network.

## FEATURES

- Monitoring, interception, recording and analysis of wide and narrow-band signals
- Selectable scanning bandwidths
- Waterfall and spectrum displays
- Automatic analog and digital modulation recognition (AMR)
- Signal parameter estimation (center frequency, bandwidth, SNR, modulation type, bit rate, symbol rate) for fix frequency signal and demodulation and extraction of voice or bit stream
- Signal parameter estimation (center frequency, bandwidth, SNR, modulation type, hop rate, hop duration) for FH and burst signal and demodulation and extraction of voice
- Signal parameter estimation (center frequency, bandwidth, SNR, modulation type, chip rate, bit rate, symbol rate, code length) for DSSS signal and demodulation and extraction of bit stream
- Detection, classification and decoding of communication protocols (optional)
- Capability of using offline analysis tools for unknown protocols (optional)
- Recognizing and discrimination of three frequency hopping signals
- Recording of demodulated signals
- Voice Operated Recording capability (VOR)
- IF recording (optional)
- Ability to control hand-off receivers
- Ability to dedicate hardware resources to any operator
- Spectrum activity record in data bank and report generation
- Capability of selecting different antennas
- Client-server architecture
- Self-test capability





## TECHNICAL SPECIFICATIONS

### Description

### Range

Frequency Range	30 to 3000MHz (Extendable to 26.5GHz)
Frequency Resolution	100Hz
Frequency Accuracy	≤ 0.1ppm
Oscillator Phase Noise	-105dBc/Hz@10KHz Offset
Image Frequency Rejection	≥80dB
IF Rejection	≥80dB
Noise Figure	10-12dB typ., f ≤ 2000MHz 12-15dB typ., f > 2000MHz
Internal Spurious Level	-100dBm
Sensitivity	Measurement with Telephone Filter acc. to CCITT Normal Mode
AM :BW = 6KHz, SINAD = 10dB fmod = 1KHz, m = 0.5	≤ 1μV (≤ -107dBm), f ≤ 2000MHz
FM : BW = 15KHz, SINAD = 20dB fmod=1KHz, m = 0.5, deviation = 5KHz	≤ 1.4μV (≤ -104dBm), f = 2000MHz to 3000MHz
SSB : BW = 2.4KHz, SINAD = 10dB	≤ 1μV (≤ -107dBm), f ≤ 2000MHz
CW : BW = 300Hz, SINAD = 10dB	≤ 1.4μV (≤ -104dBm), f > 2000MHz
BER	≤ 0.5μV (≤ -113dBm) ≤ 0.22μV (≤ -120dBm)
IP2	≤%1 FSK(2,4,8),PSK(2,4,8) at SNR=15dB
IP3 (in Band)	≤%1 QAM16) at SNR=18dB ≤%1 QAM(32) at SNR=25dB ≤%1 QAM(64) at SNR=32dB
Dynamic Range	≥55 dBm (linear mode)
ADC Resolution	(Low Distortion Mode)
ADC Sample Rate	≥ 17dBm, f ≤ 300MHz, ≥ 20dBm, f > 300MHz
Attenuator	≥110dB (Offline)/ ≥ 70dB (Online)
AMR & Demodulator	14Bit
Control Interface	166MHz
Instantaneous Bandwidth	0 to 35dB
Display Modes	Analog: CW,AM,FM,DSB,ISB,LSB Digital:BPSK,QPSK,8PSK,OQPSK 16QAM,2FSK,4FSK,MSK,GMSK,32QAM,64QAM
Memory Scan Mode	LAN 100/1000Mb/s
Search Scan Speed	Maximum 80MHz (Extendable to 200MHz)
IF Recording Time	Waterfall, RF Spectrum
Virtual Narrow Band Channels	The Receiver Settings can be Programmed for the Monitoring of up to 1000 Channels and Scan Speed up to 100 Channels / s
Hand-off Receivers	25GHz/s with 30KHz Resolution
DS Detection & Analysis	3 hours with 40MHz bandwidth
Radio Link Detection and Analyses	(Extendable to 10hour and 200MHz Bandwidth)
Frequency Hopping Detection	8 Simultaneous Channels with Maximum 100KHz Bandwidth (Extendable to 32 Channels)
Burst Detection	8 channels (Extendable to 64)
Offline Analysis Tools	SNR:-12dB, GP=30dB with Short Code
Antennas	Link4, link11, link16 (option)
(According to customer requirements)	Maximum 3 Signals with 2500hop/s (Extendable to 10000 hop/s)
	Time length > 400 μS (Extendable to Time Length > 10μS)
	Bit Analyzer and Protocol Analyzer
	Omni Active Antenna (20-1300MHz) Vertical
	Directional Antenna (80MHz-1300MHz) Vertical
	Directional Active Antenna (1000-3000MHz)
	Vertical and Horizontal
	Omni Antenna (1000-3000MHz)
	Vertical and Horizontal

### Environmental and Operational

Environmental Test Standard	Mil-STD-810G
Operation Temperature Range (Indoor)	0°C to 50°C
Operation Temperature Range (Outdoor)	-25°C to +65°C
Storage Temperature Range	-30°C to +70°C
Humidity	80% in 40°C for Indoor Parts 95% in 40°C for Outdoor Parts
Dimensions (W x H x D)	Approx. 85 x 60 x 75cm (One 19" Rack)
Weight	Approx. 120kg
Power Supply	220VAC, Maximum 1KW
MTBF	2000hours
MTTR	20minutes

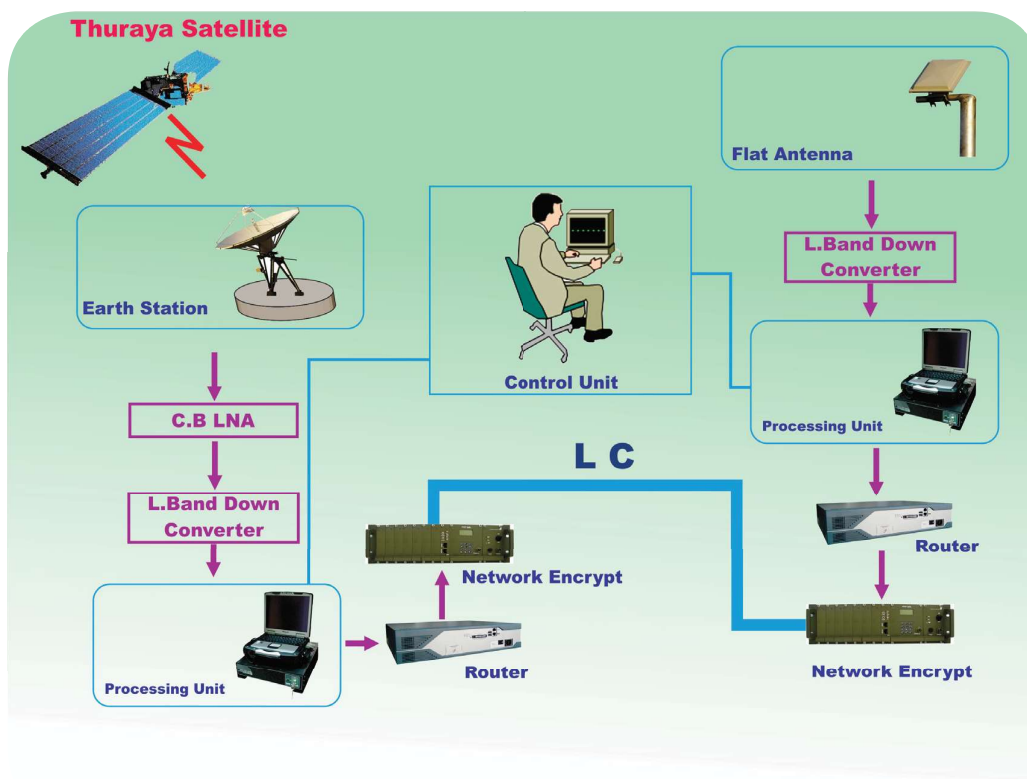


## GENERAL DESCRIPTION

Thuraya Monitoring system is designed for surveillance, tracking, monitoring and analysis of voice communication traffic purposes and can monitor and process real time signals in both L and C bands. Downlink traffic is monitored in L-band and for having a global coverage; uplink traffic is monitored in the C-band. This system provides calls and SMS decoding straightaway. All intercepted traffic can be saved in a database.

## FEATURES

- Showing the position of user on digital map
- Voice monitoring
- Duplex monitoring
- Showing the time of activities
- Reporting geographical position of terminals activities (GPS information)
- Report of all the communications in coverage region
- Intercepting all communications in the recognized traffic channels
- Straightway decryption of the encrypted traffics
- Scanning and processing 1200 traffic channels
- Interception results (Voice and SMS) are all saved
- Detection of the most important intercepted information: IMEI, TMSI
- The reason of call
- Phone number spot number phone position IMSI in four digits
- Software control
- Log file and reporting





## TECHNICAL SPECIFICATIONS

### Description

### Range

#### L-band tuner

Input Frequency	1500-1700MHz
IF BW	38MHz
Frequency Steps	1KHz
Image Rejection	≥ 70dBc

#### C-band tuner Input

Input Frequency	3.4 to 4.2GHz
IF BW	120MHz
Frequency Steps	1KHz
Noise Figure	12dB
Image Rejection	> 85dB

#### L-band Antenna

Antenna Type	Small Dish or Flat
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#### C-band Antenna

Antenna Type	Parabolic 24ft
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#### Temperature

Operating Temperature	Range Indoor 0°C to 50°C Range Outdoor -25°C to +65°C
Storage Temperature	Range -30°C to +70°C



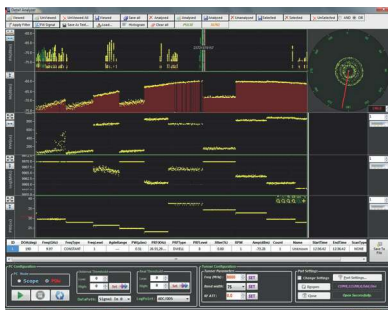
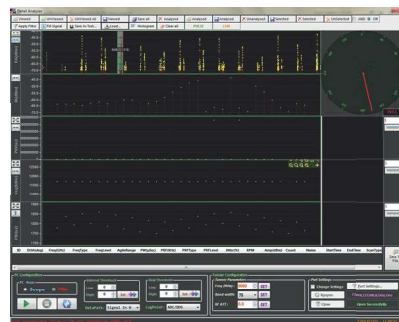
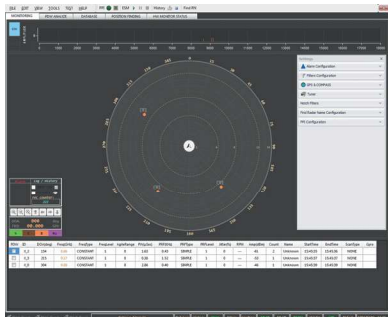
## GENERAL DESCRIPTION

This system is a tactical radar signal interception sensor with immediate reaction for weapons association. The target might be jammed or handed off to a lethal response unit. The received signal can also be used for situation awareness and identification of the types and direction of the enemy's forces, weapons or electronic capabilities. WPT-11-200(2~18GHz) can be used as an intelligence gathering system. The unique receiver technology offers excellent sensitivity to detect, analyze, and identify a full spectrum of sophisticated emitters in extremely dense radiation environments. The system can operate in an essentially unattended mode, displaying all the intercepted signals, and generating audible and visual alarms against predefined threat signals.

## FEATURES

- Installable on different platforms like ships and submarines as well as ground based applications
- Great accuracy with one omnidirectional and eight directional antennas (for each sub-band)
- Detection of angle of arrival, pulse repetition frequency, pulse width, radio frequency and radar antenna
- Scan rate excellent sensitivity and speed to detect, analyze and identify all types of radar signals

## RADAR AND OPTIC





## TECHNICAL SPECIFICATIONS

### Description

### Range

Frequency Range	2-18GHz (Option 18-40GHz)
Frequency Accuracy	4MHz RMS (Option: 200kHz)
Probability of Intercept	99%
Receiver Type	DLVA/IFM (Option: Wide band Super Heterodyne)
Sensitivity	2-8GHz: < -65dBm 8-18GHz: < -60dBm
Dynamic Range	>65dB
Super Heterodyne Sensitivity	<-75dBm @ Analysis bandwidth=600MHz
Pulse width Range	100nSec to 1mSec
Pulse width Accuracy	$\pm(50\text{nSec} + 2\% \text{PW})$
PRF Range	200Hz to 400kHz
PRI Accuracy	$\pm(100\text{nSec} + 1\% \text{PRI})$
DF Accuracy	Better than 5°RMS
Azimuth Coverage	360°
Working Continuity	24hours
Power Supply	220 VAC (50Hz)
Built-in Test	Yes
Antenna Type	Omni & Directional

### Environmental

Operating Temperature Range (Indoor)	10°C to 40°C
Operating Temperature Range (Outdoor)	-20°C to +55°C
Storage Temperature Range	-30°C to +70°C
Power Consumption	3KW
Humidity	90% @ 40°C
Operation Time	Continues



### GENERAL DESCRIPTION

The system is designed to effectively electromagnetically jam the GPS and GLONASS navigation systems. The system can be used in different GPS navigation system deception scenarios such as fixed/mobile position lock on a specified location or predefined route. The system can be installed on different mobile and stationary platforms.

### FEATURES

- Deception capability: This system can spoof target GPS receiver to a fix position or a route that is drawn on map in GUI by operator.
- Facility of transmitting single frequency, barrage signal, digital modulated signal (SincM, SincC and SincMC) in single mode and sweep mode.
- Connecting to the peripheral systems such as radar, electro optical systems, and C4I easy maintenance and repair
- Modular construction
- Fan ventilation
- Self-test and error alarm facility
- Light weight and compact size
- Standard 19" rack
- Tactical case which is resistant against rain for being installed on the vehicle/mast
- Resistant against vibration, rain, dust, shock and drop according to the standards easy transportation
- Protection of keys, buttons and connectors of the panel Az/EI servomechanism to target track
- Log file and reporting

RADAR AND OPTIC





## TECHNICAL SPECIFICATIONS

Description	Range
Jamming Frequency Band	GPS : L1: 1575.42MHz L2: 1227.6MHz GLONASS : L1: 1602.0MHz L2: 1246MHz
Deception Frequency Band	L1: 1575.42MHz
Jamming BW	L1& L2: 2MHz, 20MHz
Deception BW	L1: 2MHz
Total Output Power	4X70W
Coverage Range in Civil Band (LOS)	about 70Km
Coverage Range in Military Band (LOS)	about 5Km
MTBF	More than 1000hours
MTTR	45min
Polarization	Circular, Right-turn
Output Impedance	50Ω
Full Time Operation	up to 6hours
AC Input Supply	220V ±10%
Power Consumption	about 5Kw
Weight	Rack: 60kg Transmitter case: 50kg Antenna and Servo mechanism: 35 kg Rack: 67 x 57 x 77
Dimensions (L x W x H)cm	Antenna: 30 x 30 x 50 Transmitter Case: 75 x 45 x 45
Body	Aluminum and Iron
Operating Temperature Range	Indoor Section: -5 to +50°C Outdoor Section: -10 to +60°C
Storage Temperature Range	Indoor Section: -15 to +60°C Outdoor Section: -20 to +70°C
Humidity	90% @ 36°C
Vibration and Shock	Subjected to MIL-STD-810
Sealing	Rain Test



## GENERAL DESCRIPTION

The TPJ-11-102(X) is a main lobe noise jammer. This system is capable of receiving the threat information via ESM, and then selects the best jamming type against the threat according to its type. The antenna has the capability of 360 degrees rotation in azimuth and 70 degrees in elevation. The system has its own receiver for making the jamming more intelligent by extracting the threat's characteristics accurately.

It has the capability of setting different scenarios related to a threat or for each threat in its database to be done serially in a predefined time.

## FEATURES

- Capable of performing different jamming scenarios
- Capability of connection to ESM system
- Remote control capability

RADAR AND OPTIC





## TPJ-11-102(X) Radar Jammer



### TECHNICAL SPECIFICATIONS

Frequency Range	8 to 12GHz (Optional 6 to 18GHz)
Effective Radiation Power (ERP)	6KWatts Minimum (Optional 20KW)
Amplifier Output Power	200Watts
Antenna Beam Width	30 x 30Degree (Optional 15 x 15Degrees)
Antenna VSWR	< 2
Antenna Gain	15 to 17dBi (Optional 19 to 20dBi)
Polarization	Slant
Receiver Sensitivity	-70dBm
Receiver Type	Super Heterodyne
Receiver Bandwidth	2.5, 10, 20, 50, 70MHz
Jamming Modes	Noise Jamming (Impulse, CW, Sweep CW, Spot, Barrage, Wide Band)
Spot Bandwidth	10 to 100MHz Selectable
Barrage Bandwidth	4GHz
Frequency Accuracy	Better than 1MHz
MTBF	2000hours
MTTR	30 Minutes
Operating Temperature Range (Indoor)	-5°C to 50°C
Operating Temperature Range (Outdoor)	-20°C to +70°C
Storage Temperature Range	-30°C to +70°C
Humidity	90% Relative Humidity @ 40°C
Rack Size	30U
Power Supply	5KVA
Weight	300kg
Dimensions (W x D x H)	4600 x 2200 x 2100 (mm)



## NVG1001-NVB700-NVB800 High Performance Night Vision Binoculars



### GENERAL DESCRIPTION

NVG1001 night vision goggle is a Battle-proven technology designed for the most demanding of night time applications and rigors of combat. It is used in many special operations by elite armed forces and enables the user to perform a variety of tasks at night such as

walking, driving, weapon firing, patrol, map reading, vehicle maintenance and administering medical aid. It comes with a built-in infrared light source with momentary or continuous switching function to dose-in viewing under zero light conditions and optional IR spot / flood

lens to focus the diffused IR light source and intensify the beam.

NVG1001 is also available with 4X and 6X objectives called NVB700 and NVB800 for general purposes observation and surveillance. The units have the same chassis of NVG1001 to offer the proven performance and reliability of 18 mm super generation image intensifier

tube and objectives similar to NVS700 individual and NVS800 crew served weapons which is a big advantage for logistic support purposes.

### FEATURES

- Light weight.
- Ergonomic in design.
- Rugged construction.
- Easy operation and maintenance.
- 18mm super generation image intensifier tube to offer
- Crystal clear super bright viewing in visible and near infrared.
- Capability of continuous, passive operation over a 15-hour period without battery replacement.
- Modular construction.
- Comprehensive two-year warranty.



### APPLICATIONS

- Nocturnal observation, target location, perimeter
- Surveillance and reconnaissance for tank commanders, forward
- Area observers, boarder
- Patrols/customs and Special Forces.
- Command and control.
- Rapid night time artillery fire control.
- Terrain navigation.
- Selection of fighting positions.
- Search and rescue.
- Law enforcement, drug control.

### TECHNICAL CHARACTERISTICS

Magnification (Nominal)	x1	x3.6	x5.9
Field of view	40°	10.8 degrees	6.6 degrees
Resolution power	0.68 (cy / mr )	2.44 (cy/ mr )	4 (cy/ mr )
Range (Human Target, 30%)	150 m (Star)	300 m (Star)	350 m (Star)
Contrast	200m (Moon)	600 m (Moon)	700 m (Moon)
Objective focal length	26 mm	95 mm	155 mm
T number (Nominal)	T/1.30	T/1.70	T/1.70
Focusing range	25 cm to ∞	10 meters to ∞	20 meters to ∞
Eyepiece focal length	26 mm	26 mm	26 mm
Diopter adjustment	-6 to +2 diopters	+2 to - 6 diopters	+2 to - 6 diopters
Interpupillary adjustment	55 to 71 mm	55 to 71 mm	55 to 71 mm
Battery	(2) AA or (1) BA-5567/U	(2) AA or (1) BA-5567/U	(2) AA or (1) BA-5567/U
Operating temperature range	-51°c to 45°c	-51° C to + 45°C	-51° C to + 45°C
Storage temperature range	-51°c to 71°c	-51 to 71°C	-51 to 71°C
Weight (with head mount)	680 GR	1.4 Kg	3.4 Kg
Physical Dimensions (Length x Diameter)	162 x 152 mm	260 x 150 mm	350 x155 mm
	Nominal	Nominal	Nominal



## TIC-S-150 Cooled Thermal Camera



### GENERAL DESCRIPTION

TIC-S-150 imager with high thermal sensitivity and low noise is designed to create very high accuracy in adverse weather conditions and for daylight and night applications.

It can be widely used for various long ranges by being mounted on different types of military vehicles, ships and vessels and platforms.

### FEATURES

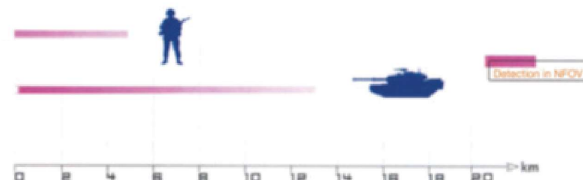
- High resolution for recognition of faraway targets
- High thermal sensitivity for target detection
- Low noise
- Equipped with 3 fields of view for searching, detecting and tracking of targets
- Long detection and recognition range

### APPLICATIONS

- Observing camouflage targets.
- Detecting targets at poor climatic conditions.
- Border control and coastal surveillance.
- Air Defense systems.
- Mountable on military vehicles.



### ( Detection Range )



### TECHNICAL CHARACTERISTICS

Sensor	MCT Cooled FPA detector with a resolution of 320×256 pixel
Spectrum Range	3~5 $\mu\text{m}$
Focal Lens	320/80/25 mm
Field of view	Narrow: 1.7 × 1.3 Medium: 6.9 × 5.2 Wide: 22 × 16.5
NETD	Less than 25 mk
Gain Adjustment	Manual / Automatic
Operating Temperature	-20°C ~ + 50°C
Dimension	160 × 200 × 460 mm
Cooling Time (in 20° c)	7.5 minutes
Electronic Magnification	2X
Video Output	Analog / Digital
Data Exchange	RS/422, RS/232



## PLDS-S-2 Active Laser Defense System



### OPERATION CONCEPT

This system may be used to countermeasure laser-guided bombs and laser-guided missiles. It employs the combined countermeasure of laser active jamming and laser passive jamming to blind the approaching laser-guided weapons or decoy them as pseudo-target so that the valuable target can be protected effectively. It assists protection of significant vehicles of command posts such as command vehicles, missile launcher trucks and valuable military targets like hubs of communications and important installations of C3I. The system is able to employ module combination, be extended according to the area and shape of targets to be protected.

### FEATURES

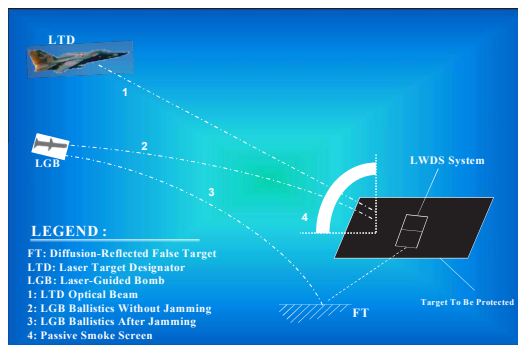
- All-round (360°) detection of laser targets.
- Smoke screen is available in manual and automatic mode.
- Equipped with laser source to jam threats.
- Angle of threat is illustrated by computer.
- Computer commander software to communicate ingredients of the system.
- Furnished with reflector for scattering laser beam.

### STANDARD ACCESSORIES

- Carrying case.
- Instruction manual.

### OPTION

- Aerosol grenades.



### TECHNICAL SPECIFICATIONS

Radiation identification range	900 to 1700 nm
The sensor identifies the following	Ruby, GaAs, Nd:YAG, Raman Shifted, Erbium
type of threats	Glass
Received FOV	In azimuth 360°, in elevation -20° to +70°
Laser threat type	Pulse laser, 1 to 30 Hz with pulse width 7nsec-100nsec
Jamming system	Aerosol grenades + laser active jamming
Laser active jamming properties	Power:200mj, Nd:YAG, PRF:up to 30Hz, Input voltage:220V AC, 50Hz, 3KW.
Jamming wavelength	1064 nm
Effective jamming time	45sec. in 3 minutes periods.
Screen setting time	3 sec.
Probability of error	Less than 5%
Angle accuracy	15°
Operation conditions	Temperature -20° to +50°, humidity 0 to 90 %, shock 5G, 2G Vibration



## SSDL-S-1200 Surveillance and Sniper Detection Laser System



### GENERAL DESCRIPTION

SSDL-S-1200 is designed to detect and locate optical or opto-electronic scopes used by snipers and sight systems on the battlefield, sensitive areas or urban zone. It detects all optical systems aimed at the detector, often associated with an immediate threat (i.e. snipers) and its sensors will accurately localize a threat and perform target identification by spotting the laser reflected from the optical elements of the weapon's sights, using high definition daylight or infrared cameras.

SSDL-S-1200 is able to detect threats with a very high level of accuracy which makes it compatible with complementary fire control systems. It operates effectively at distances up to 1200 meters regardless of the principle of the targets operation (passive, active), the level of light and time of the day. The system can be used as a hand-held device or fitted on a fixed mount, on a tripod or on a vehicle. Images of video output may be post processed by a dedicated computer which automatically displays the distance and a view of the threat localization. It can be deployed as a Situational Awareness (SA) tool to oppose and counter sniper threats for: vehicle convoys, static observation locations and/or counter surveillance/counter-sniper use in high threat or targeted areas of interest.

### FEATURES

- Detecting and ranging of optical devices with optical alarm
- Enhancing the speed and accuracy of shooting at a pointed optic
- Active scanning and searching with automatic display on a remote screen

### APPLICATIONS

- Detection of laser systems of picking up information
- VIP security
- Detection of snipers
- Security of important locations and embassies
- Protection of borders and border territory
- Detection of covert video and photography
- Security of peace missions

### TECHNICAL SPECIFICATIONS

#### Operational Characteristics

Maximum detection range	1200 m
Minimum viewing distance	3 m
Continuous operation	Battery: 1.5 hours AC mains: 3 hours
Field of View	Horizontally: 4° 30' Vertically: 3° 20'
Power consumption	13 Watt
Laser type	Diode laser array
Wavelength	880 nanometers

#### Electrical Interface

Power supply	Battery: 9 - 36 VDC AC mains: 100 - 240 VAC(50-60 Hz)
Video signal standard	CCIR

#### Environmental Conditions

Operating temperature	-10° C to +40° C
Storage temperature	-10° C to +40° C

#### Mechanical Interface

Dimensions	325 × 140 × 80 mm
Weight	2.3 kg



RADAR AND OPTIC



## MJ-1 Laser Proximity Fuze



### FEATURES

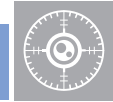
The function of this fuze is to protect military heavy vehicles like tank and significant structures and buildings. In this fuze, laser beam is placed in front of the protected area and as soon as any threat comes into this laser wall, the necessary operation to eliminate the threat will be done.

### TECHNICAL SPECIFICATIONS

- Laser wavelength: NIR
- Functional distance: 1-5m
- Coverage: 360°
- Beam figure: Conical to the front
- Capable of detecting targets with 140mm length with 700m/s speed (according to speed change, target dimensions are changed)
- Dimensions: Diameter of 150mm and length of 190mm
- Weight: 3250g

RADAR AND OPTIC





The purpose of designing laser warning systems is to warn about enemy laser systems threat (missile, bomb) against the desired location, equipment and vehicles. These warning systems are used to protect aircrafts, ships, tanks, helicopters, commanding posts, missile and telecommunication sites and other vital equipment. According to the effective performance of laser warning and detector systems, vehicle laser warning system is used to protect the desired vehicle against vehicle laser threats.

### Technical Specifications

- V12VDC input voltage that can be supplied from vehicle battery
- Detection in the range of 6.1 to 9.0 micro meter wavelength
- A360°horizontal coverage and 90° vertical coverage ( $\pm 45^\circ$  perpendicular to the detector)
- Displaying threat type by using LED display screen, detecting the threat with repetition rate or single pulse.
- Alarming when a threat appears
- Receiver sensitivity about 20.1 mW/m
- Storage temperature:  $-30$  to  $+70^\circ\text{C}$
- Minimum operational temperature:  $-20$  to  $+60^\circ\text{C}$
- Very light weight and low volume that can be quickly installed on a vehicle



RADAR AND OPTIC





## SL-ASR-II Semi-Long Vhf Air Surveillance Radar



### DESCRIPTION

Mobile solid state digital VHF band radar is a semi-long range system designed to detect air targets within the radar's coverage to determine the target's coordinates such as range, azimuth and range rate as well as to transmit radar information to the air defense information network. SL-ASR-II is new generation radar, combining advanced radar developments, modern digital technologies and hardware with constructive technological solutions. The radar can operate in self-contained mode and also as a component to automation C3I system. SL-ASR-II is a highly mobile, fully solid state, medium altitude surveillance radar developed based on the armed forces' operational demands. This radar is vehicle carried and designed based on full coherent pulse compression and MTD detection techniques. The radar is characterized by good performances such as high mobility, high automation, etc.

### FEATURES

- Advanced signal processing and data extraction
- Early detection of air targets and determination of their coordinates including range, azimuth, radial velocity and height.
- Capability of IFF system conjunction as secondary radar.
- Advanced ECCM capabilities against wide range of jamming and interference.
- Target tracking using TWS technique.
- Detection of targets with small RCS, stealth, and low altitude (such as UAVs).
- Supplying peripheral radars with extracted target data.
- Standard ports for data transmission
- High reliability and easy maintenance
- Modular designed system



### TECHNICAL FEATURES

#### Transmitter

Type	Fully solid state
Frequency band	VHF
Peak power	12kw
Duty cycle	10 %
Signal	Pulsed

#### Antenna

Type	Array yagi
Gain	27 dB ~ 28 dB
Azimuth beam width	6.5°
Elevation coverage	20° (Csc2)

#### Receiver

No. of channels	2
Type	Super heterodyne
Noise figure	≤5 dB
Dynamic range	≥80 dB

#### Processing

Processing modes	Normal, MTI, MTD
------------------	------------------

#### Tracking

TWS	≥40 targets
Max. detection range	500 km (RCS≥ 5m2)
Min. detection range	2 km

#### ECCM capabilities

Adaptive threshold (CFAR), sector blaning, frequency agility, code agility, staggered PRF

#### Environmental conditions

Indoor temperature	0°C ~ +40°C
Outdoor temperature	-20°C ~ +55°C
Storage temperature	-30°C ~ +65°C

#### Control and Monitoring

Monitors size	19" (2 pieces)
Operator console	2 pieces
Built in Test capability	Yes



## PAR-X30 Precision Approach Radar



### DESCRIPTION

Precision Approach Radar (PAR) is a type of radar guidance system designed to provide lateral and vertical guidance for an aircraft pilot during landing, until the landing threshold is reached. After the aircraft reaches the Decision Height (DH) or Decision Altitude (DA), guidance is advisory only. This system is used in air traffic control and precision guidance of aircrafts and helps pilots keep the aircraft on course and glide path during final approach.

PAR-X30 is one of the most important sensors in Air Traffic Control Systems and plays a very important role in providing the flight safety, especially in landing operation, for both civil and military aircrafts. This system is a very high precision, 3D system working in X-band frequency and specifically designed to help pilots in landing fighters even on the shipboards.

### FEATURES

- Increasing the flight safety during the landing especially at night, rainy and dusty weather.
- Checking and controlling the aircraft function and guiding the aircraft in three dimensions (range, azimuth, altitude) on the airport glide path from the landing point to the distance of up to 30 km.
- Communicating with other airport radars such as PSR and SSR.
- Checking and measuring flight altitude in order to improve the landing operation.
- Being full function remote controlled and monitored in air traffic control tower through optical or radio links.



RADAR AND OPTIC

### TECHNICAL FEATURES

Operation frequency		X-Band (9.0 GHz ~ 9.2 GHz) In 10 channels
Antenna	Azimuth	Beam width: 0.85°x3.5° Max gain: 38.5 dB (in linear polarization)
	Elevation	Beam width: 0.65°x3° Max gain: 39.5 dB (in linear polarization)
Transmitter	Type	Fully solid State
Receiver	Peak power	100 W
	Type	Full coherent solid state
Environmental Conditions	Noise figure	3.5 dB
	Temperature	Indoor: -10°C ~ + 45°C Outdoor: -30°C ~ + 60°C
	Humidity Wind speed	90% @ 40°C 90 km/h (operation) 120 km/h (non-operation)
Power Supply		380 VAC (50 Hz ~ 60 Hz), 3 phase, Max input: 10 kw
MTBF		≥ 2000 h
MTTR		≤ 45 min
Turntable		200°



## SWL-M2 S-Band Weapons Locating Phased Array Radar - Medium Range



### DESCRIPTION

SWL-M2 is a medium range phased array radar which is employed for positioning the launch point of hostile projectiles in three different classes of mortar, artillery, and rockets.

It can also be used for correcting the impact point of friendly firing units. This radar is capable of scanning 90° of azimuth sector quickly. It is also capable of declaring the launch point position of 6 projectiles simultaneously in a short period of time. It is equipped by advanced ECCM capability and is able to perform its mission in environments full of different types of jammers. Since all of different radar sub-systems are installed on one truck, the radar is completely tactical and can be set up by two operators in a short time.

### FEATURES

- Ability to confront EW.
- Locates mortars, artillery, and rocket launchers.
- Adjusts friendly fire.
- Predicts impact of hostile projectiles.
- Permanent storage for 99 targets.
- Remote control and remote data display capability.
- Possibility of selecting fixed or staggered PRF.
- Wide band transmitter and receiver.
- Possibility of operator controlled frequency change over the entire frequency band.
- Carrier frequency hopping capability over the entire transmitter bandwidth.
- Capability of turning STC on or off by user.
- Possibility of combining and displaying different videos (Normal and MTI)
- SLC capability and separate receiver for JATS



### TECHNICAL FEATURES

Frequency	band S Band
Peak power	50 kW
RF band width	400 MHz
Antenna type	Micro-strip patch
Working mode	Hostile Mode: For Launch point estimation of hostile mortar, artillery and rocket - Friend Mode: For Impact point estimation of friendly mortar, artillery and rocket and guidance of counter fire
Detection Range	Mortar(with at least 120mm caliber) @ 12Km Mortar(with at least 181mm caliber) @ 8Km Artillery(with at least 122mm caliber) @ 12Km Rocket(with at least 122mm caliber) @ 25Km
Radar Distance to Battlefield	5km
Minimum range for projectiles detection Rmin	< 3km
Coverage angle in azimuth	90°
Coverage angle in elevation	40°
Range accuracy for projectiles	75m
Angle accuracy for projectiles	0.5°
Weapon Location Error	Max(0.6%Range , 100m)
Simultaneous Weapon Locating	6
system set-up time	≤ 15 Min
System Time to be ready for movement	≤ 10 Min
Working staff	2 operators,
MTBF	200 hrs
MTTR	30 min
Power	3 phase, 380v/50Hz



## MNG-87 Night Vision Monocular



### DESCRIPTION

The MNG-87 Night Vision Monocular (goggles) is an electro-optical system which utilizes image intensifier tube in order to perform different ground and marine operations overnight. Having unique features, it is possible for the user to mount it either on the helmet or on the weapon.



### TECHNICAL FEATURES

Magnification	1×
Field of view	36.9°
Resolution	0.76 cycle/m radian
Diopter adjustment	-6 to +2 diopter
Ease of distance	25mm
Goggle weight	380g
Power supply	2AA batteries
Operational temperature range	-25 to +55°C
Storage temperature range	-40 to +71°C
Immersion	1m in 30 minutes
Image intensifier tube	18mm inverter of Gen 2 or Gen 3

## NDG-87 Diving Night Vision Goggles

### DESCRIPTION

The NDG-87 Diving night vision goggles is an electro-optical system that uses image intensifier tube, which makes it possible to perform different diving operations overnight up to the depth of 30m. This system can be also used out of water. By using specific mask, this system can be used in marine, police and commando missions.



### TECHNICAL FEATURES

Magnification	1×
Field of view	38° in air
Resolution	0.68 cycle/m radian
weight with mask	1.4 kg
Objective focal length	26mm
Diopter adjustment	-6 to +2 diopter
Pupils distance adjustment	55 to 71mm
Ease of distance	25mm
Power supply	2.7 to 3V (2 AA batteries)
Operational temperature range	-25 to +55°C
Storage temperature range	-40 to +71°C
Underwater operation depth	30m
Image intensifier tube: 18mm sifier tube	18mm non-inverter of Gen 2 or Gen 3



## ANG-86 Pilot Night Vision Goggles



### DESCRIPTION

The ANG-86 pilot night vision goggle is an electro-optical system. Utilizing image intensifier tube, it makes nightly operations possible for helicopter pilots. Having unique features such as light weight, simple adjustment, high image resolution this goggle is announced as one of the most effective and equipped night vision optical systems.

### FEATURES

- Target normal look capability by using two independent channels with minimal fatigue
- Capable of being mounted on standard pilot helmet
- Using military standards in design and manufacture process
- Capable of moving in different directions and rotation to the helmet and Flip-Flop
- Having Minus Blue filter to be compatible with blue lights inside cockpit



### TECHNICAL FEATURES

Magnification	1×
Field of view	36.9°
Resolution	0.76 cycle/m radian
Up and down adjustment range	16mm
Front and rear adjustment range	16mm
Angle adjustment range	8°
Weight	550g
<b>Objective lens</b>	
Effective focal length	27mm
Focus range	28cm to infinity
<b>Eye piece lens</b>	
Focal length	27mm
Diopter adjustment	-6 to +2 diopter
Pupils distance adjustment	52 to 72mm
Eye relief	25mm
<b>Power supply</b>	
Required voltage	2.7 to 3V
Battery type	Two separate batches, each one includes 2 AA batteries
<b>Environmental conditions</b>	
Operational temperature range	-25 to +55°C
Storage temperature range	-40 to +71°C
Relative humidity	95%
Image intensifier tube	18mm non-inverter of Gen 2 or Gen 3



## TIS-S-60 Monocular Thermal Vision Sight



### DESCRIPTION

Tabesh 60 is an uncooled 3rd generation monocular thermal vision sight with light weight and small size that can be installed on rifles and shoulder-fired weapons for targeting during day and night. By using special software, it is possible to design and save 8 different reticles from among different reticles of individual and shoulder-fired weapons like 12.7, Dragunov, G3, M16, RPG-29 and etc on a vision sight to become bore sighted with those weapons.

### FEATURES

- Having micromonitor and eyepiece
- Light weight and low volume
- Can be installed on individual-served weapons like: M16, G3, Dragunov, RPG-7, RPG-29 , etc.
- Applicable with Li-ion rechargeable Battery.
- Manual and Automatic brightness and gain setting.
- Having different electronic reticles that can be replaced for different individual carried weapons.
- Capable of replacing the eyepiece with different focal lengths to increase the range (optional).
- Capable of observing and targeting through eyepiece that can be mounted on the helmet.
- A2X electronic magnification.



### TECHNICAL FEATURES

#### Image Performance

Detector	micro bolometer
Pixels	384 ×288
Pixel Pitch	25μm
Spectrum Range	8-12μm
Micro monitor	High Resolution OLED
NETD	<80 mK @ 25°C
display	60 mm
FOV	9.1° × 6.8°

#### Gain/ brightness adjustment

Video Output	CCIR 625 Lines/50HZ, Analog PAL 1.0 VPP 75Ω
Image Processing	Auto/Manual Brightness and Contrast Manual NUC Bad Pixel Correction Polarity inversion, Electronic Zoom×2

#### Interface

Remote Control	RS422 & RS232
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#### Power Supply

Rechargeable batteries	8 V
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Operating Temperature	-30°C ~ +50°C
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Storage Temperature	-40°C ~ +60°C
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Physical Characteristics	
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Size	260 ×105×80 mm
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Weight (with battery)	1.3Kg
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Detection & Recognition Range	
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Target	Detection	Recognition
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Tank	2000 m	1000 m
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Person	900 m	450 m
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## Monocular Thermal Goggle



### DESCRIPTION

Monocular thermal goggle is an uncooled 3rd generation goggle with light weight and small size that can be installed on infantry soldier helmet for walking and patrolling at night. This system can also be mounted on light individual served weapons for targeting at night.

### FEATURES

- With micromonitor and eyepiece
- Light weight and low volume
- Capable of being installed on infantry soldier helmet for walking and patrolling at night
- Capable of being installed on individual served weapons
- Applicable with Li-ion rechargeable battery
- Manual and automatic brightness and gain control
- Utilizing electronic reticle



### TECHNICAL FEATURES

Detector	Microbolometer	
Pixels	384 ×288	
Pixel Pitch	25µm	
Spectrum Range	8~12µm	
Micromonitor High Resolution	OLED	
NETD	<80 mK @ 25°C	
LENS	18 mm and F# =0.8	
FOV	30,0° × 22,5°	
<b>Image Presentation</b>		
Video Output	CCIR 625 Lines/50HZ,Analog PAL 1.0 VPP 75Ω	
Image Processing	Auto/Manual Brightness and Contrast Manual NUC Bad Pixel Correction Polarity inversion, Electronic Zoom×2	
<b>Interface</b>		
Remote Control	RS422 & RS232	
<b>Power Supply</b>		
Rechargeable batteries	9 V	
<b>Environmental</b>		
Operating Temperature	-30°C ~ +50°C	
Storage Temperature	-40°C ~ +60°C	
<b>Physical Characteristics</b>		
Size	143×60×52 mm	
Weight	440 gr	
<b>Detection &amp; Recognition Range</b>		
<b>Target</b>	<b>Detection</b>	<b>Recognition</b>
Tank	700 m	350 m
Person	400 m	200 m



## TIC-S-8 Thermal Vision Sight



### DESCRIPTION

TIC-S-8 thermal vision sight of missile launcher provides target visibility at nights and in bad weather conditions up to 4400 meters range. Targets are seen by a one to one image transfer relay through eyepiece and reticle of missile launcher. The system can be installed on any missile launcher very fast and easily without any need for radar reset or boresight.

### FEATURES

- Target observation through periscope and day sight eye piece
- Fast and easy installation without any need to boresight
- One to one image transfer system
- Target visibility at night and in bad weather conditions



RADAR AND OPTIC

### TECHNICAL FEATURES

detector type	VOX uncooled FPA micro bolometer
Resolution	640*512 pixel
detector pitch	17 $\mu\text{m}$
Spectral response	8-14 $\mu\text{m}$
NETD	,50mk @ F/ 25°
Frame rate	25 Hz
focal length	180mm
Display	Micro OLED
field of view	3.4 x 2.8 deg.
Gain/ brightness	manual / automatic
adjustment operating	-20° to +50°C
Temperature dimension	235x230x345mm
weight	<6 kg
Start-up time	<20 sec
target recognition	4500 m
Video output	PAL
installation time	<10 sec
Bore sight accuracy	< 20 ARC second



## MRS-110 Video surveillance system



### DESCRIPTION

"MRS-110" video surveillance is an electro optical system with a powerful rotating platform and with suitable daylight vision and long range night vision and 20km eye safe laser range finder. Having day and night target automatic track and capability of being linked to border guard radars and making use of native software, it is used for controlling borders security and for video surveillance. By putting several products from different locations in a network, it makes it possible for operation information of different combat units to be more effective in military operations.

### FEATURES

- Target video track in day and night
- Capable of being linked to ground surveillance radars for effective use in border surveillance
- Capable of being installed on different types of tripods and rising platforms
- Having high image resolution at night by using long range cooled thermal camera
- Capable of being placed in a network
- Capable of operating in different weather conditions with high performance
- Having user- friendly native software capable of upgrading the system



### TECHNICAL FEATURES

Sensor type	Cooled MCT detector
Spectral range	3.7 to 4.8 $\mu$ m
Number of pixel	256 $\times$ 320 pixels
Thermal sensitivity	less than 25 mc
Size of detector element	30 $\mu$ m
Focal length	70/200/800 mm
Electrical zoom	2 $\times$
Brightness setting	Manual and automatic
Contrast setting	Manual and automatic
Narrow field of view	0.55 to 0.75 $^{\circ}$
Medium field of view	2.2 to 2.7 $^{\circ}$
Wide field of view	6.3 to 7.8 $^{\circ}$
Focal number	4
Angular resolution power	38 $\mu$ rad
Cooling time	7 min
Operational temperature	-20 to +50 $^{\circ}$ C
Weight	20kg
Dimensions	28 $\times$ 25 $\times$ 65cm
Detection range of receding aircraft	300km
Detection range of approaching aircraft	150km
Detection range of Karar UAV	40km
<b>Rotating platform</b>	
Horizontal rotation angle	360 $^{\circ}$
Vertical rotation angle	-20 to +70 $^{\circ}$
Horizontal rotation speed	0.1 to 90 $^{\circ}$
Vertical rotation speed	0.1 to 50 $^{\circ}$
Resolution	0.05 $^{\circ}$
<b>Vision camera</b>	
Focal length	25 to 500mm
Wide field of view	8.2 $\times$ 11 $^{\circ}$
Narrow field of view	0.18 $\times$ 0.13 $^{\circ}$
Magnification	60 $\times$ continuous
CCD format	1.3 inch
Resolution	596 $\times$ 1024
Focal range	5m to extreme
Magnification adjustment	motorize
Focus adjustment	motorize
IRIS adjustment	automatic
Weight	5.2kg



## EOTS-I-1

### Electro optical firing control system for ballistic aerial defense



EOTS-I 1 is a passive electro optical firing control for anti-aircraft artilleries. This system is equipped with visible and thermal cameras and high frequency laser range finder for tracking targets. The system uses environmental sensors and gun orientation information to calculate trajectory of the target then fires on target future point.

#### FEATURES

- Passive observation, detection and tracking system.
- Operation during day and night in normal and harsh environment.
- Electromagnetic jamming resistant
- Tracking of aerial targets up to 25 km
- Compatible with 35mm,37mm,57mm,100mm artilleries.
- Calculating trajectory of the ballistic targets and firing on target future point
- High speed response and detection algorithm
- Environmental sensors (wind speed, wind direction, pressure, temperature and moisture)
- Easy transportation and deployment about 20 minutes
- Installable on different types of military vehicles and shelters.
- Simultaneous controlling fire of four artilleries
- Up to 100 meters distance between tracking platform and operator site
- Operation against stealth, cruise, RPV and other targets with poor RCS

#### TECHNICAL SPECIFICATIONS

##### IR Camera

Detector	HgCdTe Cooled FPA, 3 ~ 5 $\mu\text{m}$ , 320 * 256 pixels
Field of view	9.1 * 6.9 (Wide)
Brightness / Gain adjustment	2.3° * 1.7° (Narrow)
Non-Uniformity Correction (NUC)	Automatic, Manual
NETD	1 point, 2 point, External, Internal
Storage temperature	$\leq 20$ mK @ 25°C
Operation temperature	-40°C ~ +70°C
Start-up Time	-30°C ~ +55°C
Power Consumption	$\leq 8$ min
Water Resistance	14 W
Communication Port	IP67 - Standard RS422/232



##### TV Camera

CCD Sensor Type	IL T CCD SUPERHAD black & white
Minimum illumination	Sun rise - Sun set
Resolution	550 $\pm$ 50 TV Lines
Lens Focal Length	10mm-500mm
Field of View	27.5° * 20.4° (Wide), 0.57° * 0.42° (Narrow)
Zoom, Focus	Continuous
Available Accessories	Sunshield
Water Resistance	IP67
Communication Port	Standard RS485

##### Laser Range Finder

Wavelength	1.064 $\mu\text{m}$
Energy	60 mJ
Operating Range	200m ~ 10Km
Accuracy	$\pm 5$ m
Frequency	12.5 Hz
Operating Temperature	-30°C ~ +55°C
Storage Temperature	-40°C ~ + 70°C
Relative Humidity	90%
Communication Port	RS422

##### Platform

Speed	Variable speed :0°-120°/s Pan; 0°-90°/s Tilt
Pan / Tilt Axis Range	Horizontal continuous with Slipping, Vertical -5° ~ +85°
Communication port	Fiber Optic
Positioning Feedback	25 bit (17bit used) absolute encoders
Water Resistance	IP65
Power	220VAC - 1 Ph, 50Hz / 380 VAC 3 Ph



## EOTS-I-4 Naval Electro Optical Tracking System



EOTS-I 4 is a passive electro optical firing control for naval artilleries; this system is equipped with visible and thermal cameras and high frequency laser range finder for tracking targets. After positioning the target and locking on it, system tracks target with high precision and sends target data (position, elevation, distance, speed and trajectory of the target) to FCU for firing control operation.

### FEATURES

- Operation during day and night in normal and harsh environment.
- Electromagnetic jamming resistant
- Passive observation, detection and tracking system.
- Tracking of targets by thermal and visible camera up to 20 km
- Range finding of targets up to 20 km
- Stabilization with 500  $\mu$ Rad precision.
- Real time position, distance, elevation, speed information.
- Installable on the warship Class PEYKAN.
- Four second response time.
- Aiming according to the ballistic trajectory calculation
- High speed operation and automatic target tracking algorithm
- Can be linked with FCS, RTU and artillery.
- Operation against stealth, cruise, RPV and other targets with poor RCS

### TECHNICAL SPECIFICATIONS

#### IR Camera

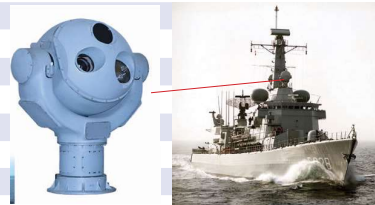
Detector	HgCdTe Cooled FPA.
Field of view	3 - 5 $\mu$ m. 320*256 pixels 9.1 * 7.3 (Wide). 2.3*1.7° (Narrow)
Brightness / Gain adjustment	Automatic. Manual
Non-Uniformity Correction (NUC)	1 point, 2 point, External. Internal
NETD	$\leq 20$ mK@ 25°C
Storage temperature	-40°C ~ +65°C
Operation temperature	-40°C ~ +55°C
Start-up Time	$\leq 8$ min
Power Consumption	14W
Water Resistance	IP67
Communication Port	Standard RS422/232

#### TV Camera

CCD	1/3 Inch Black & white
CCD Sensor Type	IL T CCD SUPERHAD black & white
Minimum illumination	Sun rise - Sun set
Resolution	550 $\pm$ 50 TV Lines
Lens Focal Length	10mm~500mm(with built in 2x extender: 20 - 1000)
Field of View	27 .5° * 20.4(Wide).0.57° * 0.42°(Narrow)
Zoom, Focus, Extender	MOTORIZED
Available Accessories	Sunshield
Water Resistance	IP67
Protocol	Standard RS485

#### Laser Range Finder

Wavelength	1.064 micrometer
Energy	60 mj
Operating Range	200m ~ 20Km
Accuracy	$\pm 5$ m
Frequency	1~12.5 Hz
Operating Temperature	-30°C ~ +55°C
Storage Temperature	-40°C ~ + 70°C
Relative Humidity	90%
Protocol	RS422



#### Platform

Speed	Variable speed: 0~120°/s Pan; 0~120°/s Tilt
Pan / Tilt Axis Range	Horizontal continuous with Slipring. Vertical -20° ~ +85°
Communication port	Fiber Optic
Positioning Feedback	17bit absolute encoders
Water Resistance	IP67
Voltage	110V / 220VAC - 1 PH. 50Hz
Power Consumption	2 Kw



## IRSS-I-3 Passive Infrared Search Systems



Today, active defense systems and electromagnetic radars are detectable and attacked by jammers. IRSS-I 3 is a passive Infrared Search system to detect planes, missiles and helicopters. Mission of this system is detection of flying targets without sending electromagnetic waves, which makes it difficult to be detected by enemies. The system searches for flying objects then reports its position to control panel.

### FEATURES

- Passive detection of flying objects.
- High rotation rate : 360°/s
- Sending azimuth and elevation coordinates to firing control systems.
- Day/Night operation.
- Electromagnetic jamming resistance.
- Installable on high towers
- Panoramic image display (360° view)
- Horizontal searching view: 360°
- Vertical searching view: 13.5°
- Connection to a Weapon Control Chain
- Detection range in the normal atmosphere:
  - Cruise missiles 15 km
  - Helicopter 20 km
  - Fighter 40 km



### TECHNICAL SPECIFICATIONS

#### IR Camera

Spectral Range	8 $\mu$ m ~ 12 $\mu$ m
Detector	Cooled MCT 4×288 pixels
NETD	<100 mK
Lens focal length	70 / 200 mm
Field of View	3×2.25° or 9×6.75°
Operation temperature	-30°C ~ +55°C

#### Platform

Pan rotation range	n×360°
Tilt rotation range	-10° ~ +80°
Pan rotation rate	Max 360°/s
Tilt rotation rate	Max 90°/s
Platform position measuring accuracy	0.01°
Communication	Fiber Optic
Operation temperature	-20°C ~ +60°C
Humidity	95%
Weight	340 Kg with stand and 230 Kg without stand

#### Laser Range Finder

Wavelength	1.064 micrometer
Energy	120 mj
Operating Range	1Km ~ 20Km
Accuracy	± 5m
Frequency	1~12,5 Hz
Operating Temperature	-20°C ~ +50°C
Storage Temperature	-30°C ~ +55°C
Relative Humidity	95%
Protocol	RS422



## IRSS-I-6 Passive Infrared Search Systems



Today, active defense systems and electromagnetic radars are detectable and attacked by jammers. This system is a passive electro optical system to detect planes, missiles and helicopters. Mission of this system is detection of flying targets without sending electromagnetic waves, which makes it difficult to be detected by enemies. The system searches for flying objects then reports its position to control panel.

### FEATURES

- Passive detection of flying objects.
- High Rotation rate: 360°/s
- Sending target data (azimuth and elevation) to firing control systems.
- Day/Night operation.
- Electromagnetic jamming resistance.
- Four Thermal Cameras.
- Image Panoramic display 360 ° views.
- Horizontal range: 360°
- 5.78, 2.30 or 1.16 Vertical range up to four steps.
- Detection range in the normal atmosphere(vertical range 1.16 up to four steps):
  - - Cruise missile: 17 km
  - - Helicopter : 30 km
  - - Fighter: 50 km



RADAR AND OPTIC

### TECHNICAL SPECIFICATIONS

#### IR Camera

DETECTOR	Cooled MCT 288x4
NETD	Less than 100 mk
Focal length	80 or 200 or 400 mm
FOV	1.16°x1.55° or 2.30°x3.07° or 5.78°x 7.71°
Operation temperature	-30°C ~ +55°C

#### Platform

Weight	561 Kg
Pan rotation rate	216°/s Middle 309°/s Wide 108°/s Narrow
Pan rotation range	nx360°
Tilt rotation range	-10° ~ +80°
Platform position measuring accuracy	0.01
Communication	Fiber Optic
Dimension	1.4x1.8x1.0 m



## EOSS-I-103 Passive Electro Optical Surveillance System



The EOSS-I 103 is an ideal system for long range surveillance, observation and monitoring of land, air and sea related operations. The system is designed in a modular construction for conversion and adapting system performance to mission parameters. A variety of sensors and control equipment have been integrated, including precise high speed payload, infrared and visible cameras with variable focal length lenses and a laser range finder.

### SYSTEM SPECIFICATIONS

- Day imaging (TV camera with 110x zooming and variable focal length from 10 to 1100 mm)
- Night imaging (Cooled IR camera with lenses from 240 mm to 1020 mm focal length -as optional)
- Passive (Radiation less if LRF is not used)
- Determining Target azimuth and elevation on time (Feedback of absolute encoder with 0.003° accuracy)
- Enhanced image quality (SUPERVIEW, RQUILIZE and DDE image processing algorithms)
- Stabilization (Removing image fluttering to 25% of image dimensions)
- Moving targets recognition and tracking



### TECHNICAL SPECIFICATIONS

#### IR Camera

Sensor type	320x256 HgCdTe cooled FPA
Wavelength	3~5μm
Focal range options	M18:50mm , 250mm ,600mm, M18E:85mm, 425mm, 1020mm M3:60mm, 240mm M3E:120mm, 480mm
Start-up Time	≤5 min

#### Platform

Installation	Easy installation and replacement on-site
Speed	Variable speed: 0-40°/s Pan: 0-20° /s Tilt
Movement	Horizontal: nx360°, Vertical: -45° ~ +90°
Positioning Feedback	17bit absolute encoders
Water Resistance	IP66
Voltage	24VDC
Operating Temperature	-30°C ~ +60°C
Storage Temperature	-40°C ~ +70°C

#### Laser Range Finder

Wavelength	1.064 micrometer
Energy	30 ~60 mj
Operating Range	500m ~ 10Km
Accuracy	+5M
Frequency	1~5HZ



## EOSS-I-202 Electro Optical Surveillance System



EOSS-I 202 as a new electro-optical imaging and tracking system includes LRF, thermal and TV cameras, monitor and control unit. The system provides all the day and night surveillance and its main features are as follow:

### FEATURES

- Day imaging (TV camera with 110x zooming and variable focal length from 10 to 1100 mm)
- Night imaging (Cooled IR camera with lenses from 240 mm to 1020 mm focal lengths as optional)
- Passive (Radiation less if LRF is not used)
- Determining target azimuth and elevation on time (Feedback of absolute encoder with 0.003° accuracy)
- Enhanced image quality (SUPERVIEW, RQUILIZE and DDE image processing algorithms)
- Stabilization (Removing image fluttering to 25% of image dimensions)
- Moving target recognition and tracking

### TECHNICAL SPECIFICATIONS

#### IR Camera (M6)

Sensor type	320x256 Hgcdc cooled FPA
Wavelength	3~5μm
Focal range options	M18:50mm , 250mm ,600mm M18E:85mm, 425mm, 1020mm M3:60mm, 240mm M3E:120mm, 480mm
Start-up Time	≤6 min

#### TV Camera Options

CCD Sensor Type	1/3 Inch, Twin ILT CCD HAD Color Exview Air Cooled
Sensitivity at CCD (Real Time)	5 mlux. With 30% video out. max AGC
Resolution	480 TV Lines
Lens Focal Length	10mm-1100mm (with built in 2x extender)
Field of View	26° (Wide), 0.26° (Narrow)
Zoom, Focus, Extender, IRIS	Motorized

#### Platform

Installation	Easy installation and replacement on-site
Speed	Variable speed: 0-40°/s Pan: 0-20°/s Tilt
Movement	Horizontal: continuous with Slipring, Vertical: -45° ~ +90°
Positioning Feedback	17bit absolute encoders
Water Resistance	IP66
Voltage	24VDC
Operating Temperature	-30°C ~ +60°C
Storage Temperature	-40°C ~ +70°C

#### Laser Range Finder

Wavelength	1.064 micrometer
Energy	30 ~ 60 mj
Operating Range	500m ~ 10Km
Accuracy	±5m
Frequency	1 ~ 5Hz



## M122-K Proximity Fuze



### DESCRIPTION

It is used in warhead of 122mm standard M122-K rocket.

### FEATURES

More area of destruction: Destruction area in proximity is three times more than impact fuze. Desirable performance of proximity fuze happens in targets where impact performance is very low like in ground covered by snow, soft ground, marsh, salt marsh, and on the water.

### SAFETIES

It is used in warhead of 122mm standard M122-K rocket.

### FEATURES

Safety in transportation, storage, and firing according to:

- S&A manual switch
- Primary electronic delay of 1.5 sec
- Selectable electronic delay in proximity function
- Using wind turbo generator



RADAR AND OPTIC

### TECHNICAL FEATURES

Burst height	An average of 8 meters
Delay time	1.5 to 75 seconds
Functional mode	A) impact function B)proximity function with point detonation back up
Power supply	Turbo generator activating by wind force
weight	670 g
Minimum arming condition	470m/sec,
flight time	1.5 sec
Thread specifications	M45×2-6g



## MT122-K Time Fuze



### DESCRIPTION

To be used in the warhead of standard 122mm M122-K rocket.

MT122-K electronic time fuze has been designed to be installed on warhead of 122mm M122- K rocket. Time fuze is used to form firewall in the space by using HE war ammo, to make smoke, to illuminate and other applications of M122-K ammunitions.

### FEATURES

- Safe on transportation and storage
- Being used instead of proximity fuze
- Low armed time
- High technology of circuitry and electronic parts
- Cheap price, high reliability, safety and simplicity in usage



### SAFETIES

Safety in transportation, storage, and firing according to:

- S/A manual switch
- Primary electronic delay of 1.5 sec
- Selectable electronic delay in proximity function
- Using wind generator



RADAR AND OPTIC

### TECHNICAL FEATURES

Functional modes	A) Time function, B) self-blasted system with impact function as support
Power supply	Generator activating by wind force
Adjusting time	2 – 199.99 sec with 0.01 sec accuracy
Weight	670 g
Minimum arming condition	470m/sec, flight time: 1.5 sec
Thread specifications	M45×2-6g



## EOAS-I-12 Electro Optical Airborne System



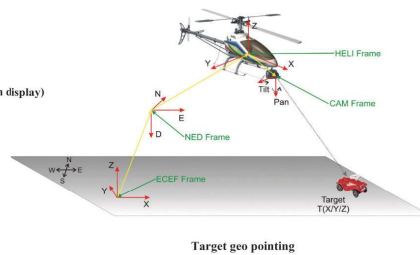
EOAS-I 12 is a light weight (less than 0.5 kg) 2 D.O.F Gyro-stabilized platform equipped with TV camera to be used for reconnaissance, surveillance and tracking targets and can be installed on different flight vehicles such as small UAVs, helicopters and police aerial patrols.

### FEATURES

- Day Observation 10x video camera, 42 mm lens with PAL system output images
- Identification and tracking of aerial, sea and land targets using image processing techniques (COR, WCENT, BCENT, MCOR algorithms)
- Touch screen monitor



Touch screen monitor (target selecting is done by touching image on display)



Target geo pointing



### TECHNICAL SPECIFICATIONS

#### TV Camera

Detector	Color 1/4", EX-View HAD CCD
Field of View-Optical	4.6° ~ 46.0°
Optical Zoom Ratio	10X

#### Tracker (Optional)

Output Video	Pal
Resolution	720x576 pixels

#### Platform

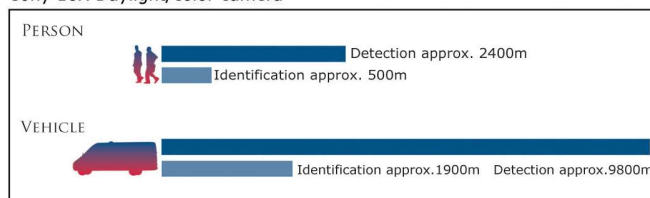
Power Consumption	12W(Peak), 5W(Continuous), 24 VDC
LOS Stabilization	< 4.0 miliradian
Field Of Regard	200° AZ, 0° ~ +90° EL (can be increased to +15° on EL)
Slewing Rate	60°/s Max. on pan and 40°/s Max on tilt
Weight(Kg)	0.45(kg)
start-up time	D=120 mm, L=150 mm

RADAR AND OPTIC

### RANGE CHART

Actual range may vary depending on camera set-up, environmental conditions, user experience and type of monitor or display used.

sony 10X Daylight/color camera





## LRF- I-11D Eyesafe Laser Range Finder 40Km,3Hz



### FEATURES

- High reliability and low maintenance
- Equipped with 12X optical sight or CCD camera
- 40 Km range finding capability ( In 40 Km atmospheric visibility range )
- Detecting and saving 3 targets simultaneously
- Range finding in 1 ~ 3 Hz operation with highest measurement accuracy
- Installation on electro optic, surveillance and seeking systems
- Built-in self-test



RADAR AND OPTIC

### TECHNICAL SPECIFICATIONS

Laser Type	Nd:YAG
Wavelength	1064 nm
Laser Output	~ 400 mJ
Laser Classification	Class 4
Repetition Rate	1 Hz ~ 3 Hz
Range Finding	2 Km ~ 40 Km
Target Dimensions	Nato Target (2.25x2.25)m <sup>2</sup>
Pulse Width	12 ± 5 ns
Target Accurate	± 5 m
Target Discrimination	30 m
Divergence	0.5 mRad

#### Electrical Specifications

Operating Voltage	20 ~ 30 VDC
Operating Current	20 A
Interface	RS422

#### Physical Specification

Operating temperature	-30°C ~ +55°C
Storage temperature	-40°C ~ +70°C
Cooling	Water-Cooled
Dimensions	390x255x260 mm
Weight	< 30 Kg



## MND-I-6 Marine Navigational Display



MND-I6 offers a comprehensive solution for marine navigation display requirements. It combines the latest GPS and Glonass technology and advanced processing software with an elegant design. Taking the advantage of the standard structure, MND-I 6 is fully integrated to different marine navigation systems and sensors such as wind sensor, gyro-compass, speed log, auto-pilot FCS and radar.

### FEATURES

- Built- in precise GPS and Glonass to monitor navigation data such as time, latitude, longitude, speed, SOG, COG, and heading
- NMEA 0183 compliant
- Graphical presentation of the quality of received signals, position and status of the locked satellites
- Easy calibrating of speed log sensor through software
- Configurable interfaces and ports for defining different inputs and outputs
- Fully integrated and PC-based design
- Customized interfaces to meet the user requirements
- Easy define and labelling new routes and waypoints
- Fully adjustments to zero-dim for night vision
- Bright, sunlight and wide-viewing LCD
- Optional DGPS to increase the accuracy
- Rugged and waterproof design
- Easy-to-use software controlled through soft-touch buttons
- Moving map application taking the advantages of the preloaded worldwide satellite map
- Switch to dead reckoning in case of poor GPS signal quality



RADAR AND OPTIC

### TECHNICAL SPECIFICATIONS

#### Physical

Image size	10.4"
Chassis size	380.50 x 256.50 x 113 mm (L x W x H)
Weight	9 Kg max
Color	Black face
Input voltage	12-32 VDC

#### Display

Type	TFT
Size	210.4 x 157.8 mm
Resolution	1024 x 768
Brightness	300 Nits
Viewing angle	+60/-45 deg. vertical +/-60 deg. horizontal
Refresh rate	60 Hz

#### Standard Compliance

EMI/EMC	EN 50082 EN 50081-1
Speed log	IEC 61023
GNSS antenna	IEC 61108-1
Environmental	MIL-StD-810

#### Interfaces

USB	RS422 (NMEA-0183)
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## FMFD-I-10 Fighter Multi-Function Display



FMFD-I10 is a generic fighter multi-function display which provides all information necessary for airplane mission by pilot such as flight information, navigation, information electronic war, weapon information and radar systems. It is designed to enhance situational awareness and safety for pilots. Digitalized airplane instruments

### Features

- 5"x5" color AMLCD
- Customizable resolution
- Three extensive Built-in testing modes (IBIT, CBIT, PBIT)
- Several interfaces options (RS422/RS232/1553/ARINC 429)
- Convection/Conductive cooled system
- Sunlight readable and wide viewing angle LCD
- Software customization capability
- Software loadable through connector interface
- Conforming to military electrical, software and mechanical standards
- O-Level and I-Level accompanied testers
- The first safety critical national avionic product based on IEC-61508



RADAR AND OPTIC

### TECHNICAL SPECIFICATIONS

#### Physical

Image size	7.1"
Chassis	205x160x213 mm (L x W x H)
Weight	max 6 kg
Color	Black face
MTBF	Over 40000 hours

#### Display

Type	AMLCD
Size	5"x5"
Resolution	600 x 600 pixels
Brightness	700 fl min.
Gray shade	64 levels per color
Viewing angle	+30/-45 deg. Vertical
Refresh rate	+/-45 deg. Horizontal 60 Hz

#### Standard Compliance

EMI/EMC	MIL-StD-461F
Environmental	MIL-StD-810F
Power	MIL-StD-704F
Reliability	MIL-HDBK-217F

#### Interfaces

USB	MIL-StD-1553 ARINC 429 RS422 1 video input StANAG video output
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## 20×120 Observatory Binoculars



### FEATURES

- Supplied with complete holding arm and sturdy tripod
- Fully coated optics
- Airtight mechanism/ protection against water, dust, rust, moisture, etc.
- Nitrogen gas filled
- Included ocular focusing



### TECHNICAL SPECIFICATIONS

Objective diameter	120 mm
Magnification	20X
Real field of view	3°
Exit pupil diameter	6mm
Relative brightness	36
Inter pupillary	58D ~ 72 mm
Diopter adjustment	-4D ~ +2D
Weight	17 Kg
Azimuth	6400 mil
Elevation	1000 mil
Depression	500 mil

## 7×42 Handheld Binocular

### FEATURES

- Fully coated optic
- Equipped with graduation reticule
- Completely water proof
- Fully covered by shock-resistance rubber armor
- Nitrogen gas filled.



### TECHNICAL SPECIFICATIONS

	with compass	without compass
Objective diameter	42mm	42mm
magnification	7x	7x
Real field of view	7.3°	7.3°
Exit pupil diameter	6mm	6mm
Relative brightness	36	36
Inter pupillary	58mm ~ 72mm	58mm ~ 72mm
Diopter adjustment	-4D ~ +4D	-4D ~ +4D
Weight	1kg	1kg
Size	165x190mm	165x190mm
Reading accuracy	1°	-



### FEATURES

- Secure observation
- Battlefield surveillance
- Equipped with a CCD adapter
- Protection against water and dust
- Nitrogen gas filled



### TECHNICAL SPECIFICATIONS

Model	TPS-501
Magnification	5X
Field of view	10°
Entrance pupil diameter	25mm
Exit pupil diameter	5mm
Eye relief	25 mm
Dioptrically setting range	-4D ~ +4D
Interval of divisions	5mil
Close focus	15m ~ ∞
Height of periscope	470mm
Model	TPS-12
Magnification	12X
Field of view	5°
Entrance pupil diameter	40mm
Exit pupil diameter	3.3mm
Eye relief	22 mm
Dioptrically setting range	-5D ~ +5D
Interval of divisions	5mil
Close focus	35m ~ ∞
height of periscope	470 mm