



## Multi-Technologies Detection and tracking Unit

**MTDU is a one unit, which has a wide range of mission capabilities with flexible, and high-performance multi-sensor technologies. Including 200/320 MP panoramic view with VCA detection , Land/sea Radar and thermal tracking technologies.**

### MTDU unit boosting the following modules

Module	Coverage response
Ground-surveillance Radar	<b>25 km</b> Instrumental detection range
Long-range thermal camera with LRF	<b>21 km</b> Detection (DRI)
Long-range visible day/night camera	<b>10 km</b> Detection range
200 MP 180-degree panoramic camera	<b>500 meter</b> Detection range
320 MP 40-degree Panoramic Camera (Option)	<b>2500 meter</b> Detection range

### **The main functions of the MTDU are:**

- ◆ Early warning
- ◆ Remote and on-border detection
- ◆ Identification of illegal activities
- ◆ Detection and situation assessment by transforming raw data into essential information.
- ◆ Allowing timely coordinated Interception of potential intruders.

### **The MTDU consists of the following early-warning modules**

- ◆ Ground/Sea-surveillance electronic scan radar
- ◆ detection. Panoramic view with video content
- ◆ analysis. Thermal /day-night visual tracking.

### **General Functions**

- ◆ The MTDU increases the probability of early detection with low false alarm and false negative rates under various environmental conditions.
- ◆ It supports and help everyday work of Land/Sea Border Security and any other public authorities may be engaged during abnormal events.
- ◆ The system performs continuous monitoring and surveillance of potential intrusion threats, within a given time frame, preventing their entry into the protected territory allowing the forces to intercept and capture the prospect intruders in a timely manner.
- ◆ The system observes the object initially detected by seamlessly combined Doppler E-scan radar technology and panoramic video content analytic to provide early warning of intruders over long and short ranges and detect the target by assessing its key characteristics and provide automatic, semi-automatic and manually directing of the thermal tracking unit to observe the target.

- ◆ It detects moving targets under various environmental condition for 25 km range using E-scan radar, and slue to cue function to Visually track the detected target using the thermal, day/night vision.
- ◆ The panoramic features enable the system to view, monitor and track multiple target at the same time in addition to the ability to zoom in on covered area (180 degree/40 Degree) in both live and recorded mode thanks to 200/320 MP ultra-high resolution imaging.
- ◆ Using Zoning feature gives the ability to overlay different types of zones, with different priorities and to program the zones to be sensitive to target size and/or speed.

## **Alarm Response**

**Upon receiving an alarm from MTDU the control center initiate audible and visual notification and display the following:**

- ◆ Alarm area map showing the exact location detected target along with target information Such as type, speed and direction.
- ◆ Large Panoramic View of the target area.
- ◆ Panoramic View zoomed-in on target.
- ◆ Visual tracking view.
- ◆ Show the nearest available patrolling unit with its current location.

All parts are designed to withstand harsh environments to meet Military application requirements for shock, vibration, temperature and dust/water ingress.

## MTDU Modules Specification

### 200 MP 180 Degree Panoramic Camera Module

Resolution	55040 (H) x 3648 (V)
Frame rate	20 fps @ 200 MP
Video compression	JPEG2000 - Wavelet
Compression engine	MPX24 Signal Processor
Sensitivity	0.02 lux F1.4 Day mode or 0.002 lux F1.4 Night mode
Frame rate	20 fps at 200 MP
Image sensor	Each Image Sensor is 1" WDR color 20.48 Megapixel CMOS
Auto focus	Motorized back focus adjustment
Scanning system	Progressive, no interlaced scanning
Sensitivity	0.02 lux F1.4 Day mode or 0.002 lux F1.4 Night mode
Scanning system	Fix, auto, blur or noise priority
Shutter Type	Electronic rolling shutter (ERS)
Shutter Mode	1/10s - 1/50000 s, 1/1s in slow shutter mode
Gain control	1 programmable IO connections
Backlight compensation	Whole picture or any area selectable
Cooling system	Active cooling system , Passive heat pipes
Cleaning system	Wiper with washer, fluid pump and internal tank

### 320 MP 40 degree Panoramic Camera Module (Option)

Resolution	320 Megapixel
Image format	Equivalent resolution 600 Megapixel
Frame rate	20 fps @ 320 MP
Video compression	JPEG2000 - Wavelet
Compression engine	MPX24 Signal Processor
Image sensor	1" WDR 20.48 Megapixel CMOS
Auto focus	Motorized back focus adjustment
Scanning system	Progressive, no interlaced scanning
Shutter type	Electronic rolling shutter (ERS)
Shutter mode	1/10 - 1/20 000 s, 1/1 s low shutter mode
Sensitivity	0.02 lux F1.4 Day mode or 0.002 lux F1.4 Night mode
Gain control	Fix, auto, blur or noise priority
Backlight compensation	Whole picture or any area selectable
Field of View	Horizontal: 40° Vertical: 24°
Cooling system	Active cooling system , Passive heat pipes
Cleaning system	Wiper with washer, fluid pump and internal tank

Thermal Camera Module	
Detector array resolution	1280 x 720 (HD)
Detector pitch	10 $\mu$ m (HD)
FOV	0.61° (H) to 12.8° (H)
Detector technology	InSb focal plane array
Spectral range	3 to 5 $\mu$ m
optical zoom	57 – 1200 mm
Continuous Zoom	Optical 21x, digital zoom 16x
Detector NETD:	<25mK
Frame rates	50/60Hz (100Hz with windowing)
Communication	RS422 Ethernet
Analogue video output	PAL (CCIR)
Digital video output	Ethernet (H.264, ONVIF) ,RS-422
Vehicle Detection (DRI)	21Km
Human Detection (DRI)	16Km
range enhancement	Dynamic Range Enhancement
Image stabilization	Yes
Turbulence mitigation	Yes
Focus	Focus Automatic or Manual / remote
Defrost:	Automatic Window defrost
Non-uniformity corrector	Built;-in reference and quadratic NUC
HD Day/Night Camera	
Sensor	Ultra high sensitivity 2/3" CMOS
Pixels (H x V)	1920 (H) x 1080 (V)
Focal Lens	16-1000mm (50X zoom) , (32-2000 mm) with x2 extender
Field of view	Narrow: Hor. .5° (.25°) Wide: Hor. 24.8° (12.4°)
Digital output	H.264 (MPEG-4) , ONVIF.
Resolution	1920 x 1080 HDTV - 1080 p 1280 x 720 HDTV - 720 p 640 x 480 VGA
Sensitivity	Color: 0.008 Lux @ (F2.8, AGC ON), B/W: 0.0008 Lux @ (F2.8, AGC ON)
Spectral response	Auto switch between DAY and NIGHT mode (IR cut filter)
Image adjustment auto /manual :	Brightness , Saturation , B&W/Color or mode , BLC , HLC , AGC
Scanning system	Up to 30 fps @ 1920 X 1080
zoom	Continuous optical zoom
Focus	manual / auto / remote
Filter	De-Fog filter
Wide dynamic range:	(DWDR)
image stabilization:	EIS (electronic image stabilization)

<b>Electronic Radar Module</b>	
<b>Architectural Overview</b>	
Radar type	E-scan Frequency Modulated Continuous Wave (FMCW) Doppler Ground Surveillance Radar
Frequency band	Ku band
Spectrum occupancy	- Wide-band (WB): 15.7 to 17.2 GHz - Narrow-band (NB): 16.2 to 17.2 GHz
Scan type	fully electronic scanning in azimuth ('e-scan') using a Passive Electronically Scanned Array (PESA)
Transmitter power (nominal)	1 Watt (standard power transmitter version) or 4 Watt (high power transmitter version)
Multi-radar operation	supported and unlimited
Embedded software and firmware	field upgradeable via network connection
<b>Target Detection Performance</b>	
<b>Maximum detection ranges</b>	
Crawling person (RCS 0.1 m <sup>2</sup> )	4.6 km (2.9 mi.)
Walking person (RCS 1.0 m <sup>2</sup> )	11.0 km (6.8 mi.)
Moving RIB (RCS 5 m <sup>2</sup> )	16.0 km (9.9 mi.)
Moving vehicle (RCS 30.0 m <sup>2</sup> )	20.0 km (12.4 mi.)
Large moving vehicle (RCS 100 m <sup>2</sup> )	25.0 km (15.5 mi.)
Maximum targets per scan	700
False Alarm Rate (FAR)	1 false alarm per day
Minimum detectable target radial velocity	0.37 km/h (0.23 mph)
<b>Coverage</b>	
Instrumented maximum range	2, 5, 8, 16 or 32 km
Instrumented minimum range	less than 10 m (33 ft.)
Azimuth scan angle	90°, 180°, 270° or 360° horizontal e-scan
Elevation beam	10° or 20° vertical beamwidth
Fastest scan time (for 90°)	1 s
<b>Target Output &amp; Identification</b>	
Target output port	available for cueing of pan/tilt-mounted cameras and thermal
Doppler audio modes	optional
<b>Connectivity &amp; Software</b>	
Main I/O interface (for radar control)	10/100 Ethernet network interface
Auxiliary I/O interfaces	RS-232 and RS-422 control lines, opto-isolated control/status inputs and isolated switched contact outputs
<b>Reliability</b>	
MTBF	> 65,000 h (zero maintenance)

<b>Pan/Tilt System Module</b>	
Max load (kg)	30kg + 30kg / 60Nm
Height/width /length (mm)	412 X 735 X 302 mm
Pan angle	n X 360°
Tilt angle	± 90°
Pan movement speed	0.001 ° to 90°/sec
Tilt movement speed	0.001 ° to 90°/sec
Accuracy	0.05° / 0.9 mRad
Resolution	.1 mRad
Park/ Home position	Yes
Backlash	None
Gyro Stabilization	±300 µrad
Communication	R-232, R-4B5, RS-422, Ethernet
Control protocol	ST-PT protocol , PelcoD (optional)
Material	Aluminum
<b>Laser Range Finder Module</b>	
Laser type	Erbium glass
Wavelength	1,54 µm
Safety	Class 1 IEC 60825-1 ED 2 of 2007-3
Measuring range	80m to 20,000m
Range resolution	±5m
Range accuracy	±10 m
Extinction	37db
Measuring rate	6 ppm continuous
Multiple targets	First, second and last target
Multiple target resolution	50m
Nominal ocular hazard distance (NDHD)	0 m
<b>Eenvironmental</b>	
Working Temperature	(-30°C to +65°C)
IP rating	IP 67
Compliance	Comply with MIL STD 810 F
Weight	110 Kg