



21Km 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 MP panoramic view, 25Km Land Radar and 21Km thermal tracking technologies and Gyro-stabilization

MTDU unit boosting the following modules:

Module	Coverage response
Ground-surveillance Radar	25 km Instrumental detection range
Long-range thermal camera with LRF	21 km Detection (DRI)
Long-range visible day/night camera	10 km Detection range
200 MP 180-degree panoramic camera	1Km Detection range

* All above ranges are based on ideal environmental conditions

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) in both live and recorded mode thanks to 200MP 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.

Panoramic Camera Module	
Description	200 Megapixel Panoramic IP Camera, Auto Back Focus with Ten 1" sensors and ICR function for Day/Night switching
Resolution	55040 (H) x 3648 (V)
Frame rate	20 fps @ 200 MP
Video compression	JPEG2000 - Wavelet
	MPIX24 Signal Processor
Image sensor (Ten similar sensors)	Each Image Sensor is 1" color 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
Lens	Standard C/CS mount DC auto/manual IRIS, P-IRIS lens
Inputs/Outputs	1 programmable IO connections
Sound	Built-in microphone, 1 ch external 24 kHz/16bit, sound in/output
Intelligence	Integrated motion detection
Ethernet connection	10 Gbit SFP
Thermal Camera Module	
Sensor	Cooled MCT
FRP Format	640 x 512 pixels
Pitch	15 μ m
Spectral Band	3 to 5 μ m
NETD	20 mK typical (<25 mK)
Focus control	Auto / Manual
Different continuous optical zooms available @F/5.5 (different zooms @F/4 available in option)	24x continuous optical zoom – F= 42 to 1020 mm, F/5.5 Horizontal Field Of View from 13° to 0.54° i.e min 9.6 x 7.2m @ 1000m
HD Day/Night Camera	
Sensor	Progressive CMOS sensor – Approx 2.1 Mpixels
Resolution	1920 x 1080 pixels
Minimum Illumination	Color: 0.2 lux (sensor)
Continuous Zoom	Optical 64x / Digital 4x
Focus control	Auto / Manual
Maxi Aperture	F/2.8@WFOV
Field Of View (HxV)	@max FOV: 17.8° x 10° i.e 325 x 183m @ 1000m @min FOV: 0.29° x 0.16° i.e 5.1 x 2.85m @ 1000m

Electronic Radar Module	
Architectural Overview	
Radar type	E-scan Frequency Modulated Continuous Wave (FMCW) Doppler Ground Surveillance Radar
Frequency band	Ku band
Spectrum occupancy	<ul style="list-style-type: none"> – Wide-band (WB): 15.7 to 17.2 GHz – Narrow-band (NB): 16.2 to 17.2 GHz
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
Target Detection Performance	
Maximum detection ranges	
Crawling person (RCS 0.1 m2)	4.6 km (2.9 mi.)
Walking person (RCS 1.0 m2)	11.0 km (6.8 mi.)
Moving RIB (RCS 5 m2)	16.0 km (9.9 mi.)
Moving vehicle (RCS 30.0 m2)	20.0 km (12.4 mi.)
Large moving vehicle (RCS 100 m2)	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)
Coverage	
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
Target Output & Identification	
Target output port	available for cueing of pan/tilt-mounted cameras and thermal
Doppler audio modes	optional

Connectivity & Software	
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
Reliability	
MTBF	>65,000 h (zero maintenance)
Pan/Tilt System Module	
Pan Range	N x 360°
Tilt Range	+/-90° with software and mechanical stops
Pan speed	0.11°/s to 60°/s (payload dependent)
Tilt speed	0.07°/s to 40°/s (payload dependent)
Position Accuracy	<0.1° (1.75 mrad) typical
Resolution	0.005° (0.087 mrad)
Eenvironmental	
Working Temperature	-30°C to +65°C
IP rating	IP 67
Weight	152.5

