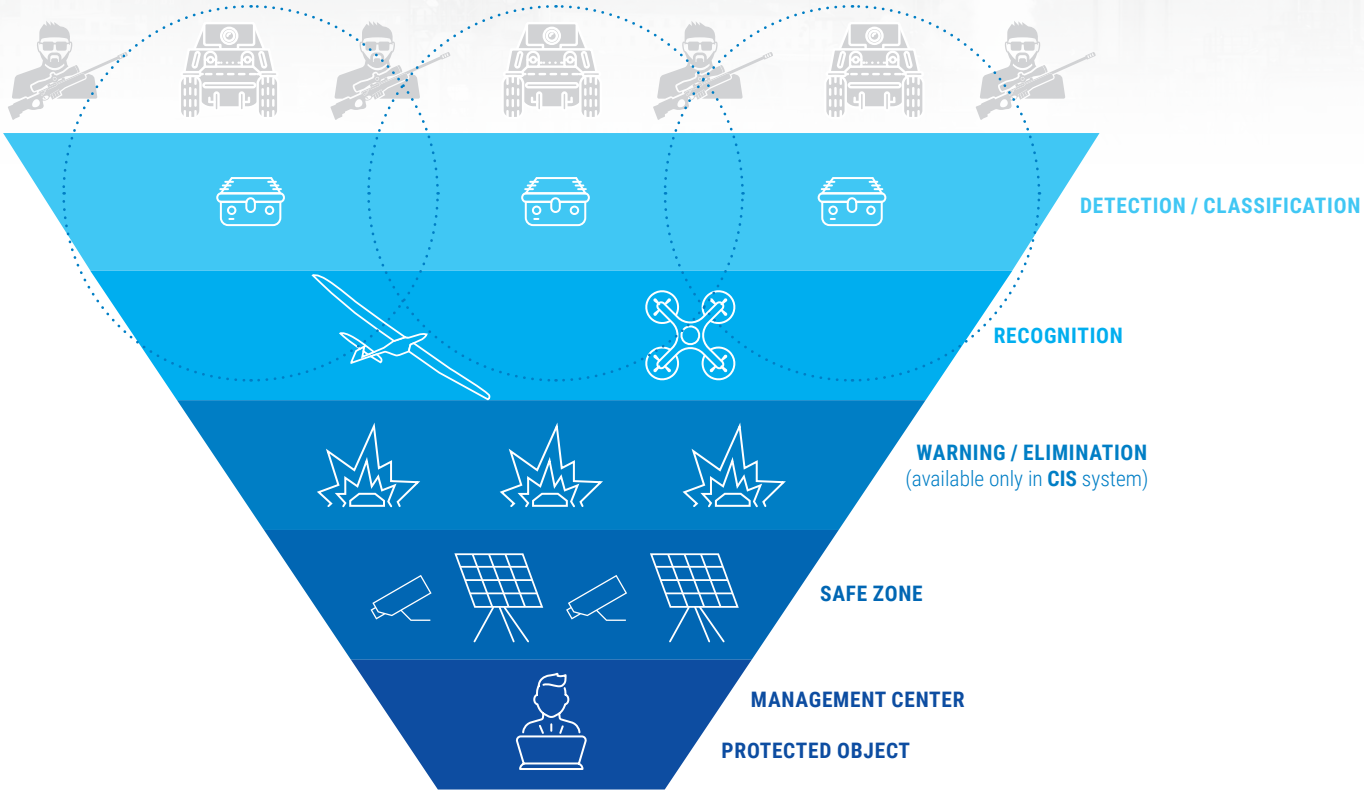
WB GROUP

DIGITAL BORDER AND CRITICAL INFRASTRUCTURE PROTECTION SYSTEM

AMSTA

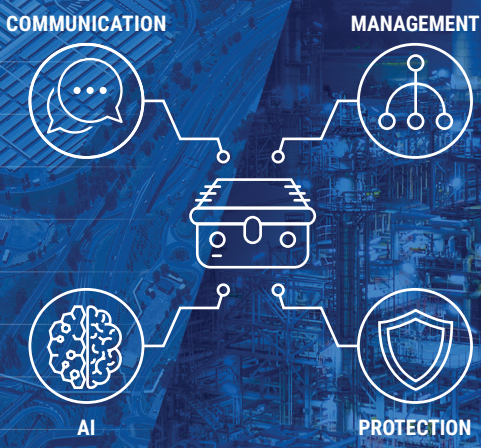
- Network of smart, self-learning, seismic and image sensors detecting intruders on foot and vehicles
- Distributed intelligence – each component works independently of the others
- Modularity – open architecture allows for the configuration and integration with UAVs, other observation systems, sensors/effectors, according to customer's requirements
- Two-way data transmission – the components are connected by a wireless communication network
- Low logistical requirements
- Operation using fibre optic cables and/or wireless data transmission

Sample critical infrastructure protection scenario



AMSTA is

- High detection, classification and intruders recognition efficiency
- Low false alarm rate
- Ad hoc configurations adapted to the site, security and customer requirements
- Rapid deployment and quick system launch
- Anti-tamper protection
- Automatic mapping of devices in the field
- The ability to change the detection range at the application level
- Open architecture (reconfiguration, expansion)



DESCRIPTION

The AMSTA system is a solution based on artificial intelligence algorithms for the protection of facilities and areas crucial to the safe operating of the state, such as power plants, airports, border areas, drinking water intakes, ports, refineries, depots and warehouses of energy resources, among others. The system uses neural networks implemented in seismic sensors and advanced image analysis algorithms from video sensors.

The system can be supplemented with 2D and 3D radar equipment and a fleet of FlyEye and FT-5 unmanned aerial vehicles (UAVs). UAV systems are capable of long-endurance airborne capability and are equipped with advanced object observation and reconnaissance sensors. AMSTA perimeter protection system provides the user with full situational awareness within the area of the protected facility or defined region.

The AMSTA system, is available in two variants: cable (fixed) and wireless (mobile). Each can be adapted to the specific needs of the user taking into account local field conditions. In the cable variant, all sensors in the system are connected to each other via a fibre-optic network and are powered from a fixed power source.

The radio communication system allows the dispatcher to share images from fixed cameras or directly from the UAV monitoring the selected area with foot and vehicle patrols in the field.

Seismic sensors using algorithms based on artificial intelligence are able to filter out animal signatures from humans with very high efficiency, and therefore reduce false alarms and support image analytics.

The system architecture is resilient to the effects of single failures.

MANAGEMENT CENTER

All data from seismic sensors, radars and images from cameras and unmanned systems are transmitted directly to the management centre. A specialised application, running on a ruggedised laptop or tablet, consists of functional modules designed to configure the system, modify the settings of individual system components and analyse data received from seismic sensors, radar and cameras and unmanned systems. The application continuously receives data from the server (from all system components) and visualises it in the form of messages, warnings, videos, photos and other necessary data, and archives the current operation of the system. The management application can be extended to include a module for managing active effectors integrated with AMSTA, creating a CIS* system.

COMMUNICATION

The AMSTA system in the wired version is based on digital fibre-optic solutions ensuring secure data transmission and a fixed 230V/24V cable power supply. In the wireless version, data transmission takes place in a two-tier network: the LCS and DCS.

LCS (Local Communication System) – ensures data exchange between sensors /effectors. Maximum transmission range is up to 2000 m in an open area. Depending on the application, LCS creates communication network optionally in several frequency bands, including dedicated or special frequency bands, resulting in higher reliability and coverage ratio – regardless of the type of terrain.

DCS (Distant Communication System) – ensures two-way data exchange between the LCS network, server and Management Centre. DCS nodes are associated with each of the TS devices. DCS communication is carried out via a mobile network (3G / 4G / LTE modems) or special/closed dedicated communications using user-assigned frequencies. Note: all data exchange in the DCS is conducted via a server.

Communication modules – standalone, embedded in VS/radar, ensuring communication between sensors and management centres.

** Refers to solutions available only in **CIS system**.*

SENSORS

Sectorial Seismic Sensor – SSS

A smart, omnidirectional, self-learning, next-generation sensor, designed for on the ground moving objects detection. Buried in the ground sensor detects and analyses seismic waves and detects and classifies, based on proprietary algorithm development, two classes of moving objects – "human" and "vehicles". After obtaining the "detection" status it sends an alarm signal via radio or fixed link that an intruder has been detected and classified, along with an indication of the sector in which it appeared. Self-learning information processing algorithms and a benchmark seismic signature database maximally reduce the number of false alarms.

Detector type	Seismic, Sectorial	
Detection range	human	75 m
	vehicle	300 m
Sensor weight	2.5 kg	
Dimension LxWxH	262x182x90 mm	
Power supply	battery, up to 36 months as standard, or fixed cable power	

Visual Sensor VS / Observation Camera KD-20T and KD-20 with communication module

Adapted for use with radio communication modules for remote image transmission and control. Adjustable for mounting on poles and trees, with special straps and bracket. Hermetic housing allows operation over a wide temperature range and in various weather conditions.

	KD20T	KD20
Detector type	Uncooled bolometric / CMO	BW and NIR
Classification range	Min. 320 m (D/N all weather)	Min. 260 m (D)
Weight	3.5 kg	3.5 kg
Dimension LxWxH	250x227x170 mm	250x227x170 mm

Signal Transmitter (ST) / Signal Retransmitter (SR)

A component of the stationary Management Control system (SSK), it can also act as a SR signals, extending the operating range of the system. Its task is to transmit and receive control signals from other system components such as seismic sensors or cameras. It interfaces with the SSK via an Ethernet interface, linking SSK applications with remote devices using radio communications:

- **LCS (Local Communication System)** – communication with seismic sensor and as a signalling channel for communication with cameras;
- **DCS (Distance Communication System)** – broadband communication with cameras.

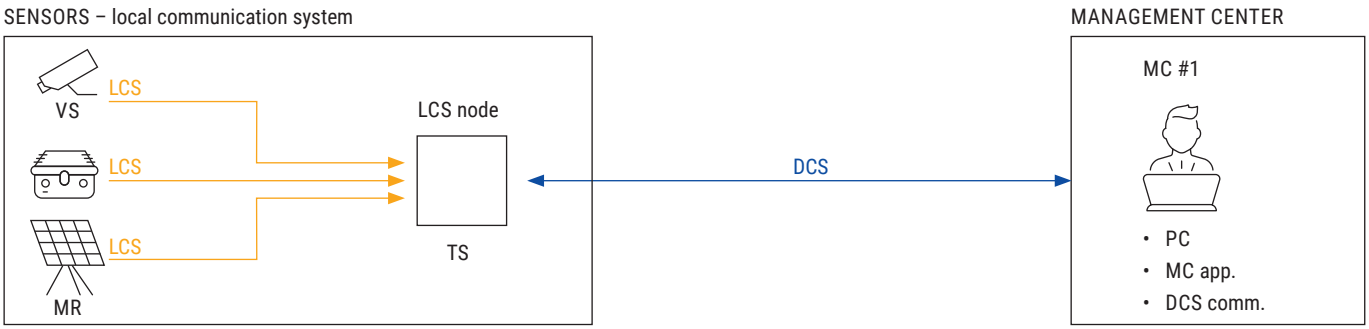
Range	600 – 2000 m
Sensor weight	2.5 kg
Dimension LxWxH	300x190x190 mm

APPLICATION

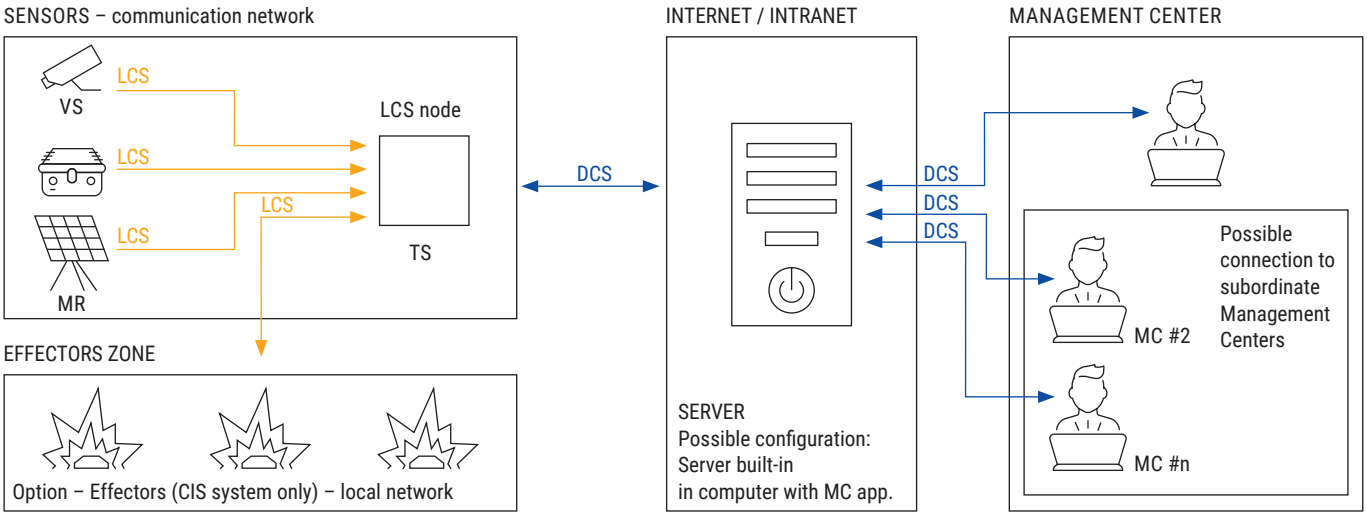
- Protecting **state borders**, temporary and permanent **military bases, airports and training zones, warehouses, industrial areas**, etc.
- **Critical infrastructure** protection

SOLUTIONS

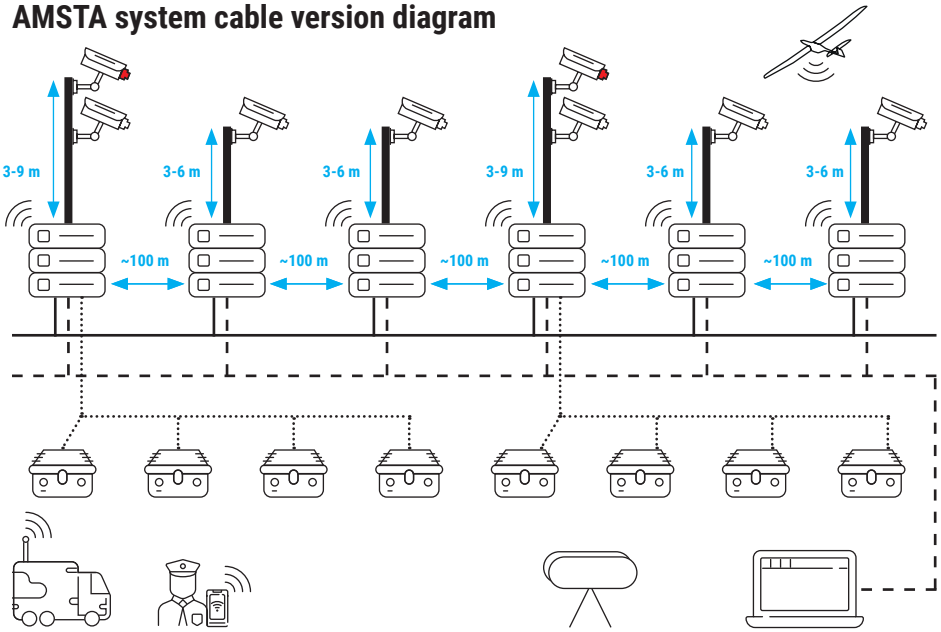
AMSTA wireless version – sample block diagram



AMSTA CIS communication scheme sample – wireless version



AMSTA system cable version diagram



LEGEND

- Thermal cameras
- Day cameras
- Seismic sensors
- 2D/3D radar systems
- Telecommunication cabinets
- Vehicle patrols
- Foot patrols
- Operations centre
- FlyEye and FT-5 unmanned systems
- Wireless terminal
- Radio communication
- Masts
- Power supply 230V
- Fibre optic
- 24V power supply and data transmission

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