

Automated Cyber-Physical System for Enhanced Security

The system integrates innovative methods for improved security of critical infrastructure, military installations, and borderline. Its structure is based on the 5C architecture concept for cyber-physical systems to combine and interconnect heterogeneous systems. The system combines digital twins, unattended sensors (personal ID cards, environmental sensors, cameras), automated mobile robots (drones, wheeled and walking robots, ships), communication infrastructure, and algorithms for data collection, fusion, and evaluation. Operation automation and an event management system improve operator's situational awareness and the decision-making process.

Key Features

- ✦ Increased security of remote or inaccessible areas
- ✦ Robotic air and ground units integrated into one system
- ✦ AI-based patrolling paths using game theory
- ✦ Improved coverage, reduced revisit times, and faster response times
- ✦ Automated operation in remote areas without human presence
- ✦ Automated reaction on intrusion detection
- ✦ Unattended 24/7 operation
- ✦ Multiple sites fully manageable from one command center

UAS with unattended docking base

- ✦ Robotic solution for battery swap
- ✦ Near-continuous operation
- ✦ Hangar for off-limit weather conditions
- ✦ Endured for various weather conditions
- ✦ Automated, semi-automated, or remote operator manual operation modes
- ✦ Optional onboard image processing and AI-based autonomy
- ✦ Optional add-on sensors or EW equipment

UGV for outdoor and indoor capability

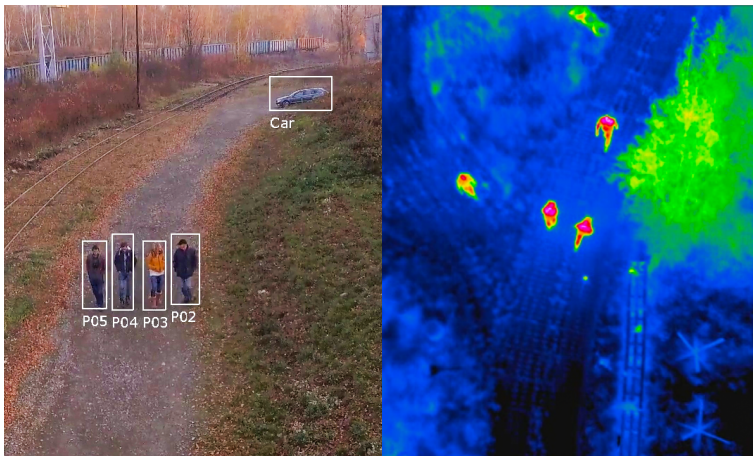
- ✦ Autonomous operation in a dynamic environment, long-term autonomy
- ✦ Simultaneous localization and mapping system
- ✦ Intrusion detection based on significant changes in surroundings
- ✦ Charging and docking stations
- ✦ Continuous navigation outdoors and indoors

Core control system

- ✦ Synergistic integration of all units into one team
- ✦ Unit coordination to maximize coverage
- ✦ Modeling and simulation of adversarial behavior
- ✦ 3D modeling of area of interest, sensor placement optimization

Use cases

- ✦ Borderline security and checkpoint protection
- ✦ Critical infrastructure protection, supply/ammunition warehouses
- ✦ Rapid deployment in disaster areas



Autonomous robots stream videos to the control center using various onboard sensors. Image recognition algorithms are used to detect intrusion and anomalies.

Control center software helps to improve the situational awareness and automate the situational control.

