PROTECTION – PASSIVE COHERENT LOCATION RADAR, RADIO MONITORING AND ANTI-UAV SYSTEM

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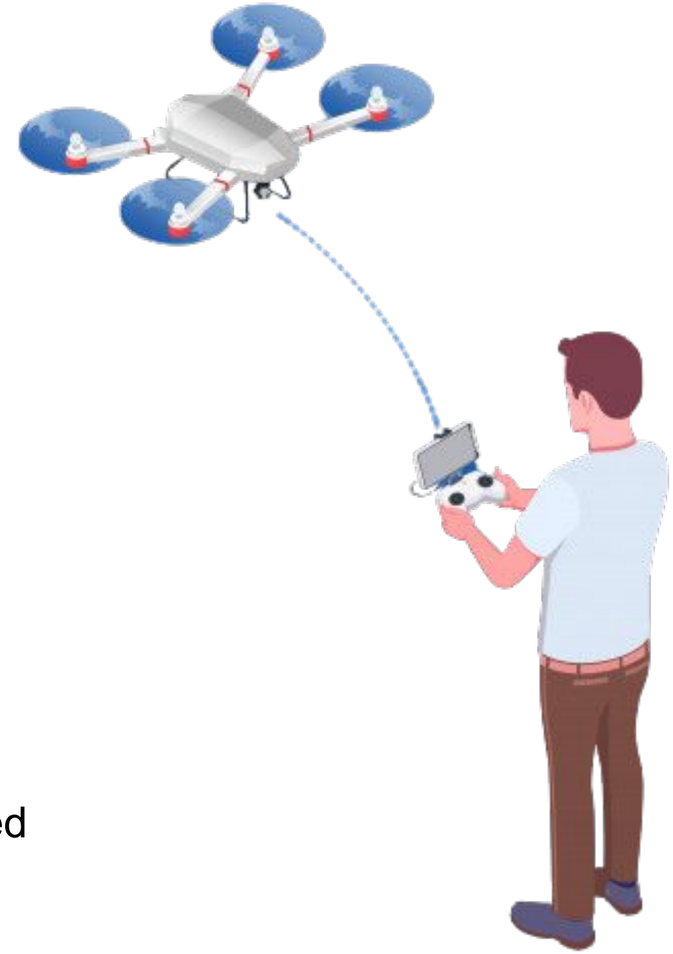
PROBLEM

- Unlawful transmission of various objects across the state border using UAV
- Unauthorized photo/video shooting and audio recording of sensitive sites
- Obstruction to movement of vehicles (airborne, maritime and ground vehicles), as well as causing emergency situations
- Use of UAV while preparing and performing unlawful acts



OUR SOLUTION

Detection, tracking, identification and countermeasures against unmanned aerial vehicles.

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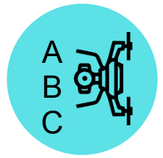
TASKS PERFORMED

Continuous monitoring of airspace for moving UAV (and other purposes)

Visual representation on a topographic map of the site when UAV is detected



Determined target type identification and distinguishing the UAV class

UAV flight route display on a topographic map

Determination of UAV control panel location

Issue of target indication to external (interfaced) UAV elimination and suppression system

Suppression of control signals and global positioning system (GPS)

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KEY SITES THAT NEED PROTECTION FROM UAV

Stadiums

Airports

Ports

Oil and gas infrastructure

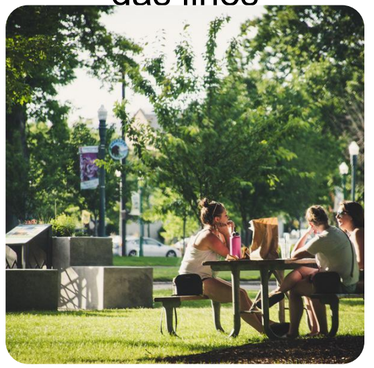
Oil and gas lines

Chemical plants

Hydropower plants

Nuclear power plants

Corrective labour institutions



Social infrastructure

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ADVANTAGES OF THE SYSTEM

- Mobility – the system is implemented on the basis of portable case containers and can be placed at any location
- System deployment time not more than 30 minutes
- Operates in passive mode, no active radiation
- Can be interfaced with UAV suppression and elimination equipment
- Selective action against intruder drone
- Detects location of UAV and remote control panel
- Displays UAV route on a topographic map
- Year-round operation in any weather conditions
- No EMI effect on infrastructure of the monitored site
- Coverage area – 360 degrees

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PROTECTION – PASSIVE COHERENT LOCATION RADAR AND RADIO MONITORING SYSTEM WITH ANTI-UAV FEATURE

UAV DETECTION

PASSIVE RADIOLACATION

- UAV detection
- Determination of UAV location
- UAV tracking

UAV CONTROL PANEL DETECTION

RADAR MONITORING

- Direction finding of operator control panel
- Determination of UAV control panel location

SUPPRESSION OF UAV COMMUNICATION AND NAVIGATION CHANNELS

SERP

- Suppression of UAV navigation and control channels
- Corner (sector) UAV jamming

POTENTIAL FOR BUILDING UP THE SYSTEM BY INTERFACING WITH OTHER UAV SUPPRESSION AND ELIMINATION EQUIPMENT

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PRINCIPLE OF OPERATION

SERP and other UAV suppression and neutralization equipment

Illumination signal

Return signal

Forward signal

TV broadcasting center

Determination of UAV location → Reception and procession of signals → Displaying on the map

Suppression of UAV navigation and control channels

↓

Sector UAV jamming

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PCLR (PASSIVE COHERENT LOCATION RADAR)

PURPOSE AND COMPOSITION

Passive coherent location radar equipment is designed for position determination of moving and radio silent targets. Principle of operation is based on detecting and processing the digital TV signals reflected from the target.

Composition:

1. Antenna-feeder equipment of passive coherent location radar system.
2. Radio receiver of passive coherent location radar system.
3. Processing and display unit.
4. Set of communication equipment.

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PCLR (PASSIVE COHERENT LOCATION RADAR) TECHNICAL CHARACTERISTICS

- Elevation coverage, degrees not less than 60
- Maximum number of simultaneously tracked targets not less than 50
- Operating frequencies of passive coherent location radar system, MHz 470-790 MHz
- Frequency range of receiving channels for passive coherent location radar system not less than 8 MHz
- Sensitivity of receiving channels for passive coherent location radar system not more than -95 dB/mW in 7,8 MHz band
- Number of receiving channels for passive coherent location radar system not less than 24
- Number of antenna elements in the antenna for passive coherent location radar system not less than 24

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RADIO MONITORING. PURPOSE AND COMPOSITION

Radio monitoring equipment is designed for tracking the objects using their own control signal. The data allow to identify both the drone and the operator.

Composition:

1. Antenna-feeder system of radio monitoring.
2. Equipment for receiving the radio monitoring signals.

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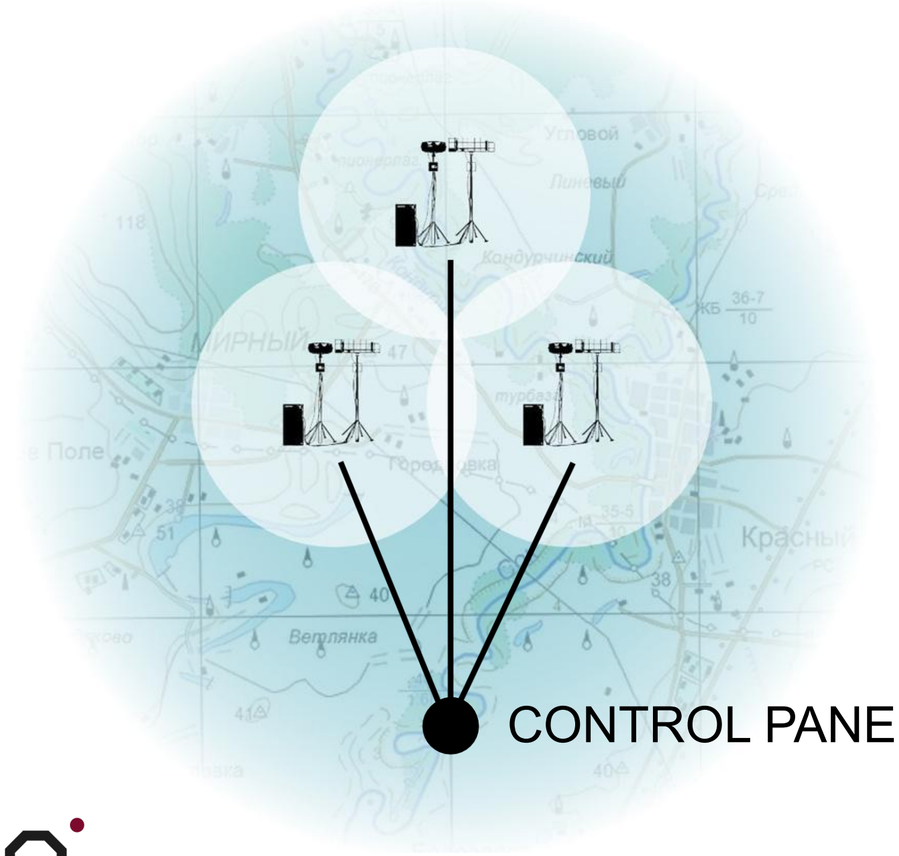
DETERMINATION OF EXACT COORDINATES OF DRONE AND CONTROL PANEL



Using one system allows to determine the drone coordinates and direction to its control panel, but using three systems allows to find exact coordinates for both the drone and the control panel.

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RADIO MONITORING. TECHNICAL CHARACTERISTICS

- Operating frequencies of radio monitoring 300-6,000 MHz
- Number of antenna elements in the antenna for radio monitoring two letters 9 elements each
- Frequency range used during simultaneous analysis for radio monitoring in the mode of detection and direction finding 100 MHz
- Scan rate with simultaneous direction finding during radio monitoring 1 GHz/s
- Direction finding time during radio monitoring, 100 ms for 100 MHz band

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SERP JAMMER

PURPOSE AND COMPOSITION

PROVIDES:

- Suppression of GPS and GLONASS (L1, L2, L5), GSM900, WiFi signals
- Suppression of control channels and data transmission to UAV

COMPOSITION:

- Control generation unit IVB111
- 5-band antenna system
- Power supply unit IVB112
- Quadro-pod
- HF cables set
- Power supply cable
- Ethernent cable

Antennas within the frequency range from 900 to 5,600 MHz

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SERP. TECHNICAL CHARACTERISTICS

- Suppression of signals within the range of 300 to 5,600 MHz
- Elevation sector of suppression 0-60 degrees
- Suppression range up to 20 km

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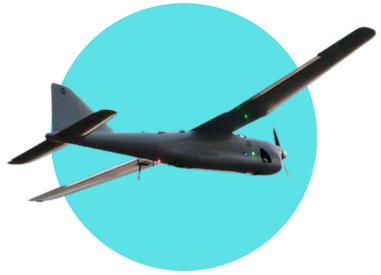
RANGE OF COVERAGE

Quadcopter
(RCS 0.01 m2)

2 KM

Light airplane
(RCS 2 m2)

11.3 KM



Orlan
(RCS 15 m2)

7 KM

Helicopter
(RCS 1.5 m2)

10.5 KM

*Estimation for equivalent monostatic range when using the receiver with equivalent radiation power of 1 kW. When distance between the target and transmitter increases, the range decreases proportionally.

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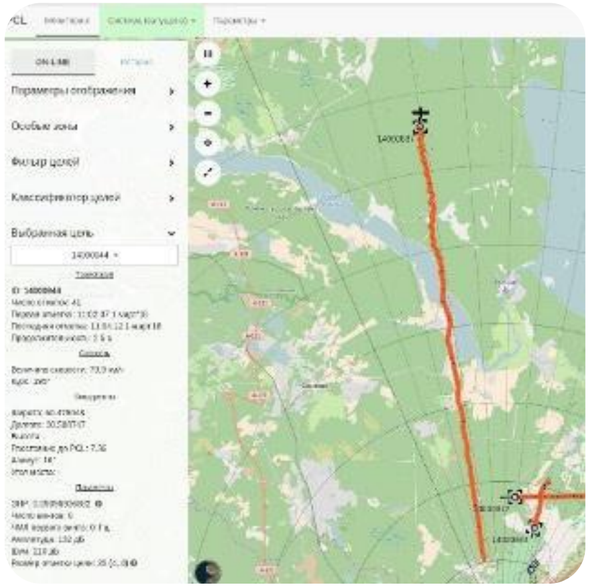
SYSTEM INTERFACE

System operation algorithm allows to find the direction and flight route of unmanned vehicle. The received information is displayed on topographic maps, installed in the server of control device.

Passive coherent location radar data display unit



Data displayed on a topographic map

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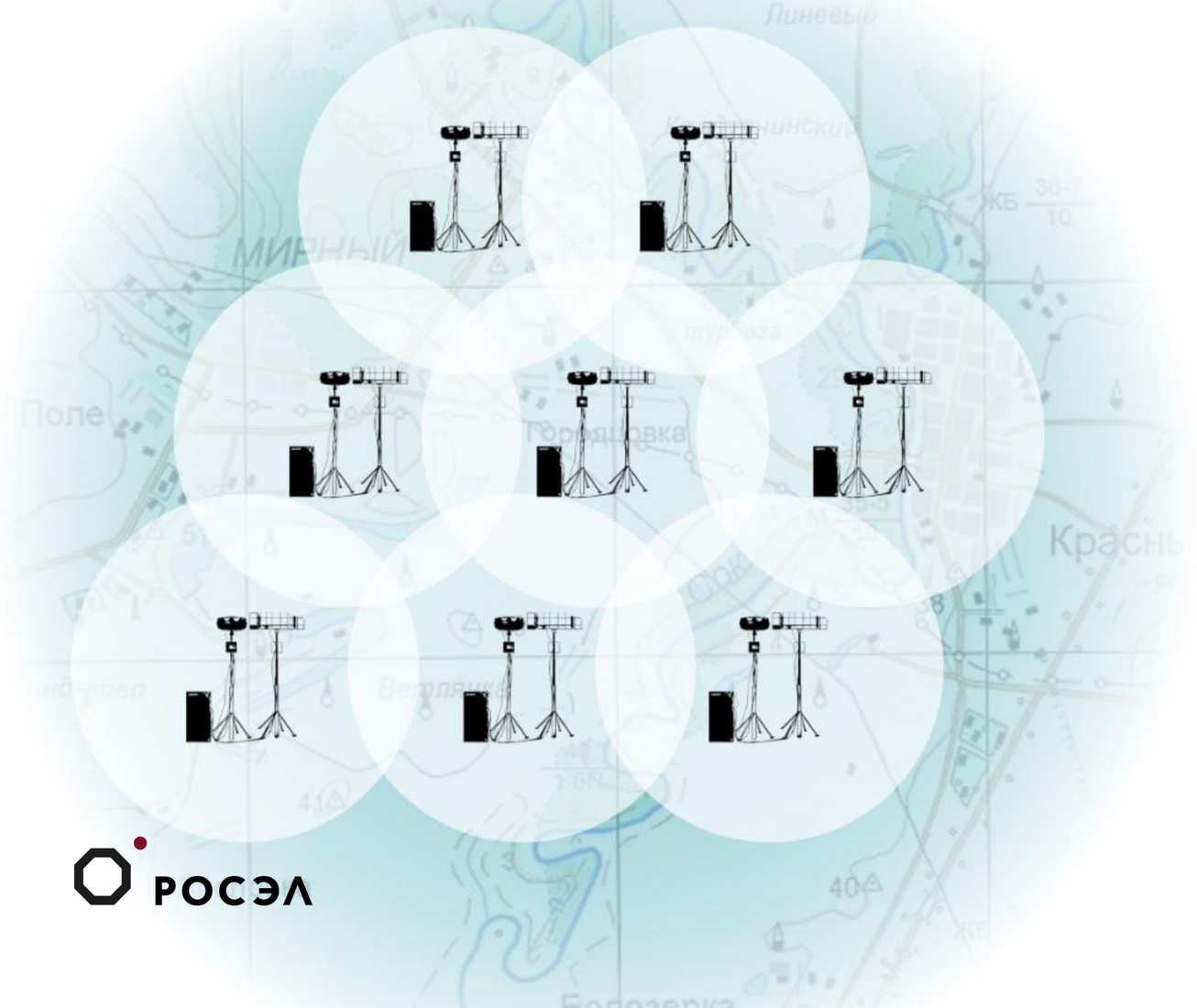
BUILDING UP THE MULTIPOSITION COMPLEX OF PASSIVE COHERENT LOCATION RADAR AND RADIO MONITORING EQUIPMENT



Different versions of Multi-position complex of passive coherent location radar and radio monitoring equipment can include one to eight receiving positions.

Expanding the complex to 8 receiving positions allows to achieve the maximum coverage area.

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