



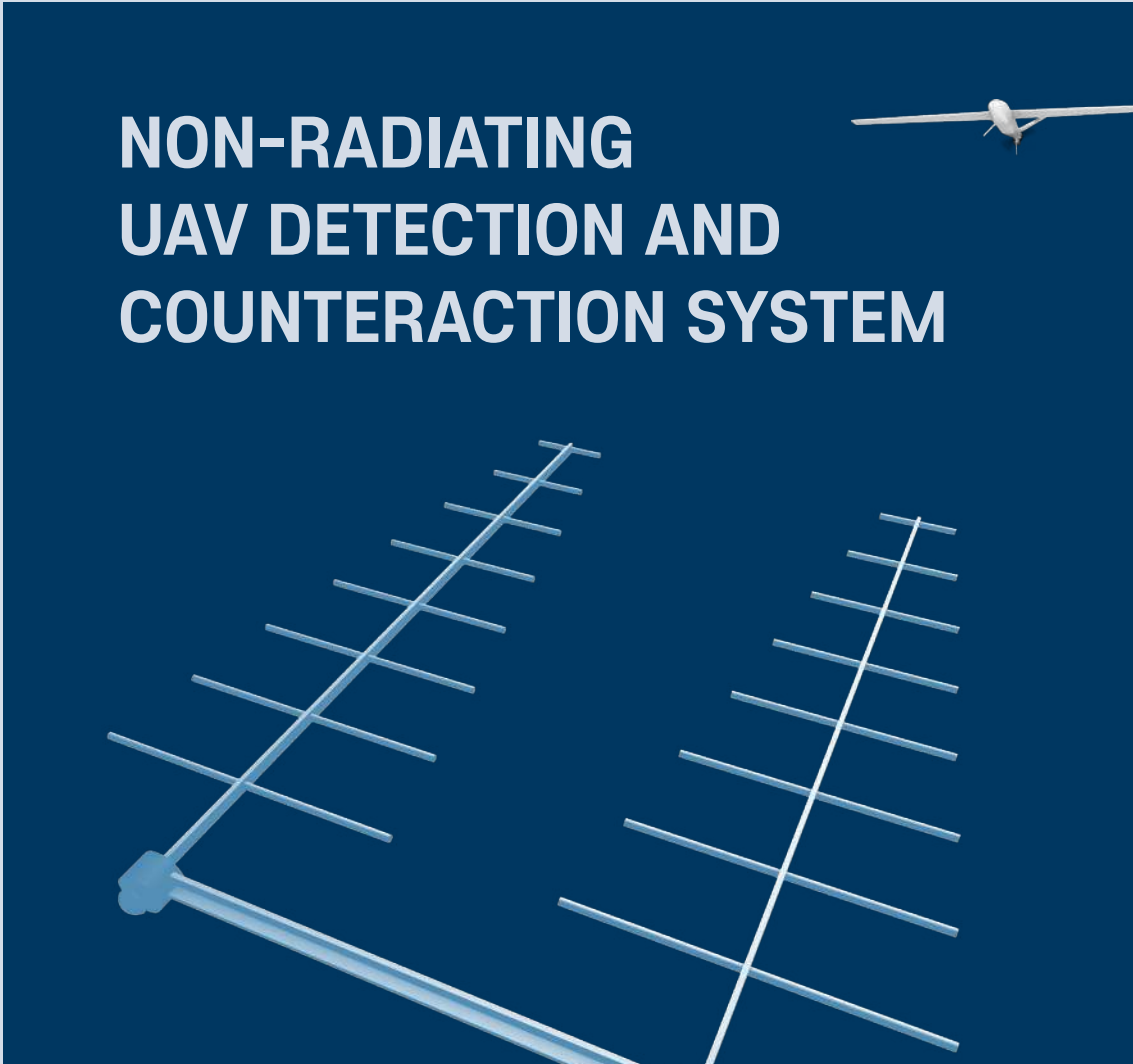
J S C V Y M P E L

JSC VYMPEL is a leading company engaged in development, installation and testing of unique air and space defense systems, including early warning and space monitoring systems.

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Guarding the cosmos for the world

Experience — Knowledge — Development — Reliability — Consistency



# NON-RADIATING UAV DETECTION AND COUNTERACTION SYSTEM

UAVs are widely used for civil, special and military purposes. This is why it is necessary to create a detection, identification and targeted UAV counteraction system.

One of the most promising ways to detect an UAV is to create a passive (non-radiating) radar system that detects UAV by analyzing scattered broadcasting signals (TV, radio, cellular etc). Similar systems are developed in Germany (TwInvis) and Sweden (AULOS).

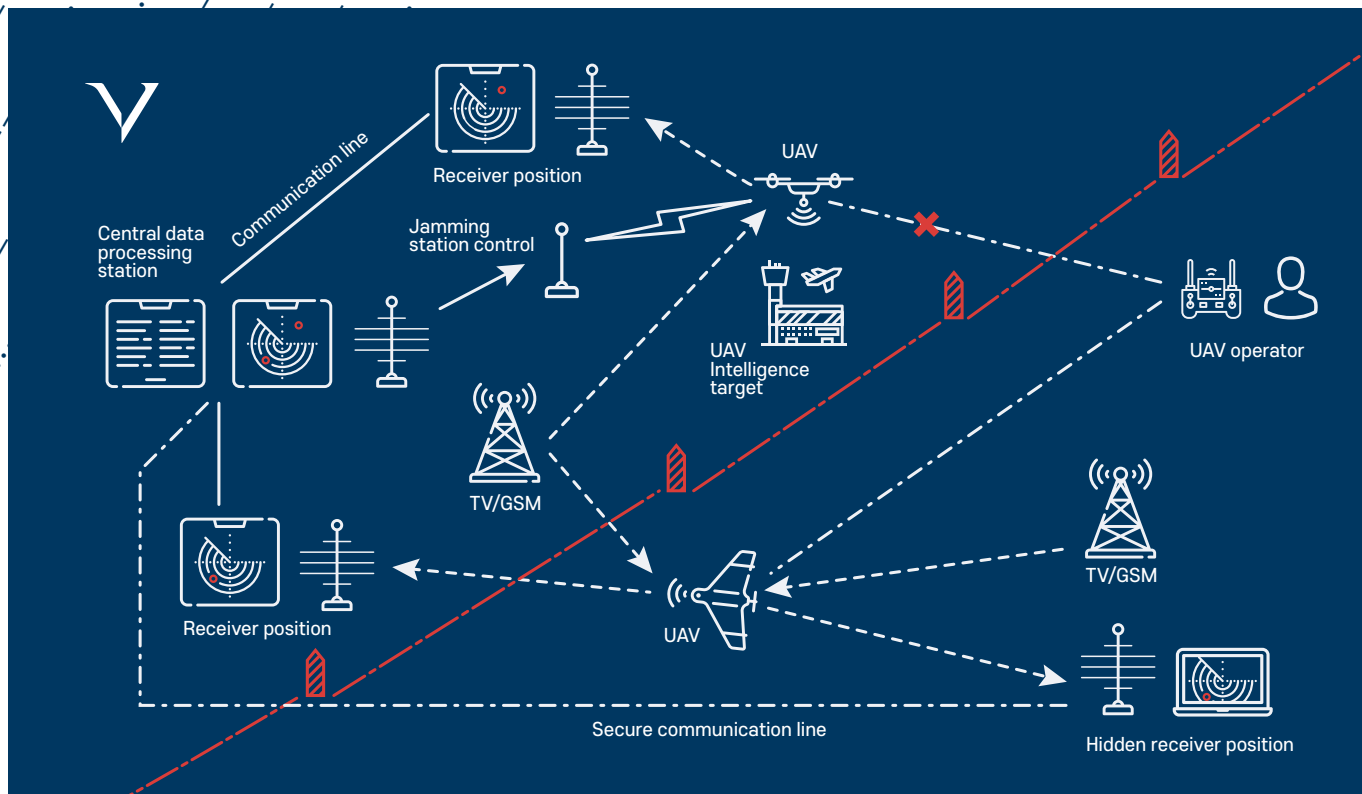
### THE VYMPEL SYSTEM ALLOWS:

- 24/7 UAV detection, regardless of the weather,
- Identification of UAV type/class
- Aiming electronic warfare stations
- Staying hidden from optical and radio technical intelligence

### SYSTEM ARCHITECTURE:

- set of receivers that, in their responsibility area, detect UAVs
- jamming stations
- central data processing station for information processing and integration, for jamming and receivers control
- local and remote system control

Signal processing is performed on commercial computer/notebook with our own software



The station prototype participated in tests at the Air Force Military Training Center. The results confirmed the possible detection and tracking of small, unmanned aircraft to ranges up to 16 km.

#### UNIQUE SOLUTIONS:

- Our own software for:
  - > identifying the target class by reflected signal frequency characteristics and movement parameters using AI components;
  - > suppressing noise signal in the reception channel of signals reflected from targets;
  - > adaptive correlation signal processing;
  - > selecting optimal sensing signals from the possible group;
  - > trajectory tracking of targets;
- Adaptation of the system configuration to the customer's specific tasks;
- Possible use of commercial or especially developed hardware.

#### COMPETITIVE ADVANTAGES:

In contrast to the systems created in Germany (TwInvis), Sweden (AULOS), Russian and others, the proposed MAC VYMPEL system has unique features:

- Multi-position structure allows optimization of the number of stations depending on the customer's requirements;
- Self-teaching smart system of target identification;
- The system is supplemented with a dual-purpose external radiation source;
- The positions can be made in unattended, compact and concealed design;
- Low energy consumption allows the use of autonomous power sources;
- Low-cost.

#### SYSTEM CHARACTERISTICS

- All-weather radar detection and object's trajectory estimation in concealed (non-radiating) mode;
- Possible protection from visual surveillance;
- Detection of ultra-small UAVs, including quadcopters up to 5 km;
- Detection of medium UAVs, including quadcopters (one-meter wingspan) up to 10 km;
- Surveillance mode: continuous sector or period circular;
- Frequency of surveillance — up to 10 Hz;
- Range estimation accuracy — up to 10 m;
- Azimuth estimation accuracy — up to 2 degrees;
- Speed estimation accuracy — better than 1m/s;
- Targets tracked at the same time — >50;
- UTC synchronization of object's position — better than 1 ms;
- Possible UAV transmitter detection and additional tracking by these signals;
- Possible correlation (data emission) with jamming stations at primary and/or secondary processing level.

