



**ctrl+sky**

drone detection and neutralization system



## Response to growing market needs

Demand for non-military counter-drone systems is driven by:



the sudden growth of the unregulated drone market is causing more frequent threats related to hostile / unwanted use of drones



an increase in the number of potentially harmful incidents and accidents involving drones, especially in public spaces



increased interest and recorded cases of drones being used by criminal groups and terrorists



growing awareness of governments and federal institutions of potential threats from drones used by hostile actors



### ctrl+sky

Ctrl+Sky is a unique multi-sensor counter-drone system that is able to detect, track and neutralize intrusive unmanned aerial systems. It is exceptionally effective because it is based on patented APS technologies and multi-sensor approach: from the software to the hardware.

### why ctrl+sky

Ctrl+Sky has many competitive advantages which makes it the most advanced product on the market. From the complete multi-sensor configuration of the system, the price-performance ratio, to the patented, unique sensors. Combining scientific approach with practical application and focusing on maximizing efficiency make Ctrl+Sky a global market leader in its category.

#### The world's only drone detection system using:

- Modular and fully reconfigurable 3D radar sensor
- MIMO radar technologies for improved detection accuracy
- Radar tracking based on MHT (multi hypothesis tracking) algorithms
- Acoustic sensor to determine the direction of incoming drones



## CTRL+SKY STATIONARY

- Multi-sensor drone detection, identification and neutralization system
- Integrated 3D radar, acoustic, RF and vision sensors, as well as jammers
- Modular and scalable design to protect effectively installations/areas of any size
- Robust design to withstand any weather conditions with flexible mounting options



## CTRL+SKY PORTABLE

- Portable, multi-sensor drone detection, identification and neutralization system
- Integrated 3D radar, acoustic, RF and vision sensors, as well as jammers
- Power supply from the battery or generator allows for 24 hours non-stop operation
- Mounting all the sensors on tripods provides mobility and allows quick installation of the system in the areas of interest



## CTRL+SKY MOBILE

- Multi-sensor drone detection, identification and neutralization system mounted on scissor lift on pickup
- Integrated 3D radar, RF and vision sensors, as well as jammer
- Neutralization in manual or automatic mode by jamming its remote control and positioning systems (all currently functional global navigation satellite systems (GNSS): GPS, GLONASS, Galileo, BeiDou)
- Mobility, availability and operational stand-by in just a few minutes to provide effective protection as a result
- Tandem power supply from accumulators or generator to ensure any long and autonomous operation of the system
- Operating from the internal control panel



## CTRL+SKY CyView





**Dedicated, web-based application with an intuitive and user-friendly interface allowing to provide secure access for a defined users group from a PC, laptop or a mobile device.**

- Monitoring a defined airspace
- Definition of protected area
- Scalable, multi-module system
- Integration of radar, acoustic, vision and RF sensors
- Real-time event preview on OpenStreetMap or Google Maps
- Indication of drone direction, height and speed
- Tracking many targets to detect drone swarms
- Archiving incidents data
- SMS, email and system alerts
- Open API for integration
- Optional integration with automated jammer and communication neutralizer



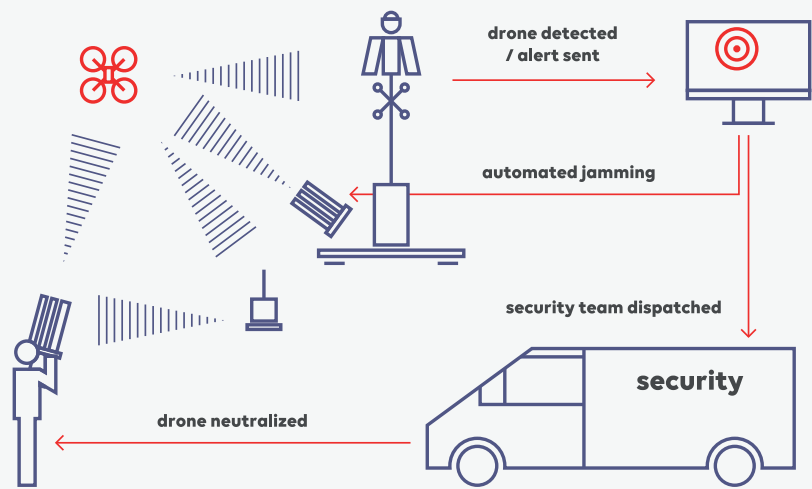
# Functionality

Functionality	RF sensor only	Acoustic sensor only	Ctrl+Sky (multi-sensor)
All-weather operation	✓		✓
Detects drones with no RF signature		✓	✓
Non-line of sight detection	✓	✓	✓
Value for money			✓
Reliable operation in urban environments			✓
Enhanced performance due to multi-sensor data fusion			✓
Coverage of wide threat set			✓

Sensor Type	Benefits	Limitations
 3D radar sensor	<ul style="list-style-type: none"><li>→ Detects ANY commercial or hobbyist drone</li><li>→ All-weather operation</li><li>→ Provides exact drone position</li><li>→ Extremely low false alarm rates</li><li>→ Flexible detection ranges (few meters to few km)</li><li>→ Affordable</li></ul>	<ul style="list-style-type: none"><li>→ Requires line-of-sights (does not see thru)</li></ul>
 Acoustic sensor	<ul style="list-style-type: none"><li>→ Does not require line-of-sight for acoustic signal</li><li>→ Low cost</li><li>→ Provides drone bearing</li><li>→ Drone vs non-drone signal classification</li></ul>	<ul style="list-style-type: none"><li>→ Extreme weather might have impact</li><li>→ Short-range (&lt;200m)</li></ul>
 RF sensor	<ul style="list-style-type: none"><li>→ Low-cost</li><li>→ Freely available</li><li>→ Early-warning sensor (RF signal presence detection)</li></ul>	<ul style="list-style-type: none"><li>→ Requires RF signal presence</li><li>→ Difficult to use in URBAN scenarios</li></ul>
 Vision cameras	<ul style="list-style-type: none"><li>→ Easily available</li><li>→ Low cost</li><li>→ Visual confirmation sensor</li></ul>	<ul style="list-style-type: none"><li>→ Weather sensitive (problems with clouds, sun, etc)</li><li>→ Short-range</li></ul>

# How it works

Thanks to the multi-sensor approach, Ctrl+Sky enables efficient detection, identification and neutralization of drones, day and night, in all weather conditions. Ctrl+Sky offers a scalable multi-sensors approach to ensure a complete “dome” of protection from unwanted drone invasion.



The combination of proprietary radar, acoustic, vision and RF sensors allows Ctrl+Sky to minimize false alarms and detects even small drones at distances up to 2000 meters.



Video cameras register recordings of detected drones, so it is possible to present hard evidence of an intruder in a protected area.



The 3D radar sensor provides a true target position in three dimensions (range, azimuth and elevation). It operates as FMCW in X-band and uses AESA and MIMO technology to accurately locate drones. Ctrl+Sky uses the most advanced radar tracker based on MHT algorithm. The system can distinguish drones from other flying objects.



RF Sensor detects radio-link between a drone and remote control-station by identifying radio frequency (RF) signatures of Wi-Fi signals. By using multiple RF Sensors the drone operator could also be localized.



Acoustic sensor is based on 8-element microphone array that uses digital beam forming technique in the acoustic domain to accurately localize sound sources in 3D space. Advanced, machine learning based classification algorithms discriminate between drones and other objects.

**Ctrl+Sky Jammer – efficient and advanced radio transmission and navigation jammer – is an optional element of the System. It allows direct neutralization of intrusive drones by jamming its remote control and positioning systems. Its use is restricted to a group of customers with appropriate permissions.**

## Unmatched system performance thanks to multi-sensor approach:

- Operation in all weather conditions, both day and night
- Detection of autonomous drones
- Detect drones with RF communication disabled
- Precise positioning of drones distances and directions
- The best price / quality ratio in the market
- Possibility of purchasing or leasing the system

## Solutions

Ctrl+sky is a system for every entity that needs to control an airspace over the protected object.

The potential use of such a system is very broad



Private Property



Public Events



Government



Stadiums



Airports



Critical Infrastructure



Prisons



U-space Monitoring

Advanced Protection Systems is a technology company that has developed and commercialized a unique system for identifying and neutralizing drones: Ctrl+Sky. The system is based entirely on the original patented solutions developed by the APS team, a group of outstanding scientists and engineers.

Advanced Protection Systems with Ctrl+Sky, according to the Markets and Markets report, is one of the key players in the global drone detection and identification market.

### Prizes and awards

Between 2015-2018, Advanced Protection System has received many awards and been recognized in the field of innovation and safety.



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