# DETECT & DEFEND DRONES

## We protect your airspace

CONFIDENTIAL

# DETECT & PROTECT



WE DEFEND
YOUR AIRSPACE

**IDENTIFY & CLASSIFY**

Software-centric solution recognizes and classifies malicious drones

**LOCATE DRONES & PILOTS**

Localization technology pinpoints drones and their pilots

**NEUTRALIZE THREATS**

Deploys countermeasures to protect your organization or neutralize the drone

## We Protect your airspace

**Drone Dragnet**

Dedrone's RF Sensors form the foundation that enables robust security to protect against drones. They alert to potential threats even before they take off the ground, and measurement-grade RF technology pinpoints the locations of drone and pilot

**Software for the Sky**

DroneTracker aggregates sensor information about potential threats, recognizing and classifying drones of all kinds. Its web-based interface shows live threats, real-time drone flight paths, and records forensic details including video evidence.

# Introduction

Many DEFEND DRONES manufacturer ensure us that they have the correct system that can defend a drone.

But the questions is .... how you will be able to defend a drone equipped with camera, GPS system and maybe other devices if you are not able to detect this first?

Which security guard or fence or alarm or any other technology can defend a small, micro or nano technology drone that will easily violate your area or your property from any open path with main scope to damage your reputation, your business, your LIFE?

Our DE-DRONE system warrants that nothing will violate your area as it will be detected!
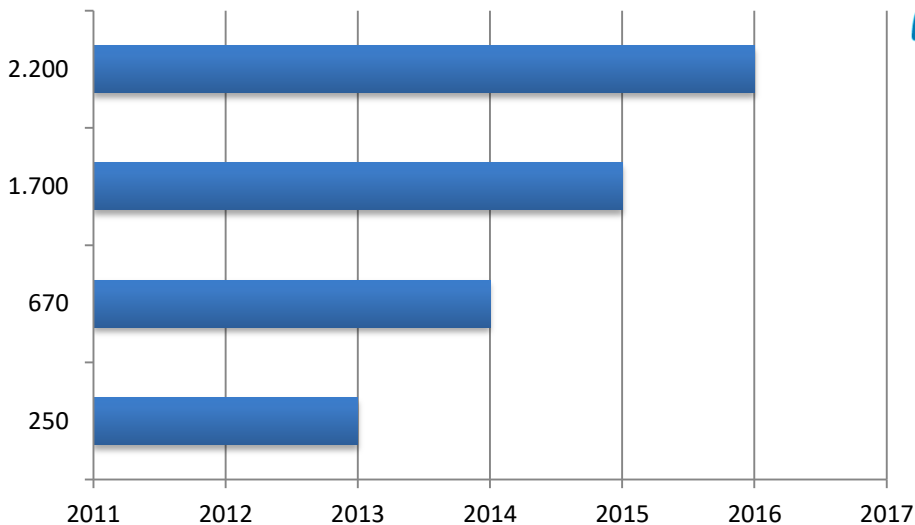
## A $500 DRONE DISRUPT
## A $400,000,000,000 SECURITY MARKET



Visit our website

# Consumer Drone Market Is Growing Rapidly

- Revenue will grow to +$2.0 billion in 2016 and further

- Approximately 4.5 million metric units shipped within the first half of 2016

- Drone manufacturer expects revenue to pass $1 billion this year!



| Year | Value |
|------|-------|
| 2.200 | (bar to 2016) |
| 1.700 | (bar to 2015) |
| 670 | (bar to 2014) |
| 250 | (bar to 2013) |

2011   2012   2013   2014   2015   2016   2017

## Drones Can Be Misused in Many Ways

Smugglers use drones to fly drugs into prisons
(repeatedly in 2015)

## Civilian Drone Warfare is a Serious Threat

Drones fly over nuclear power plants in France
(November 2014)

## Easily Controlled by Autopilot

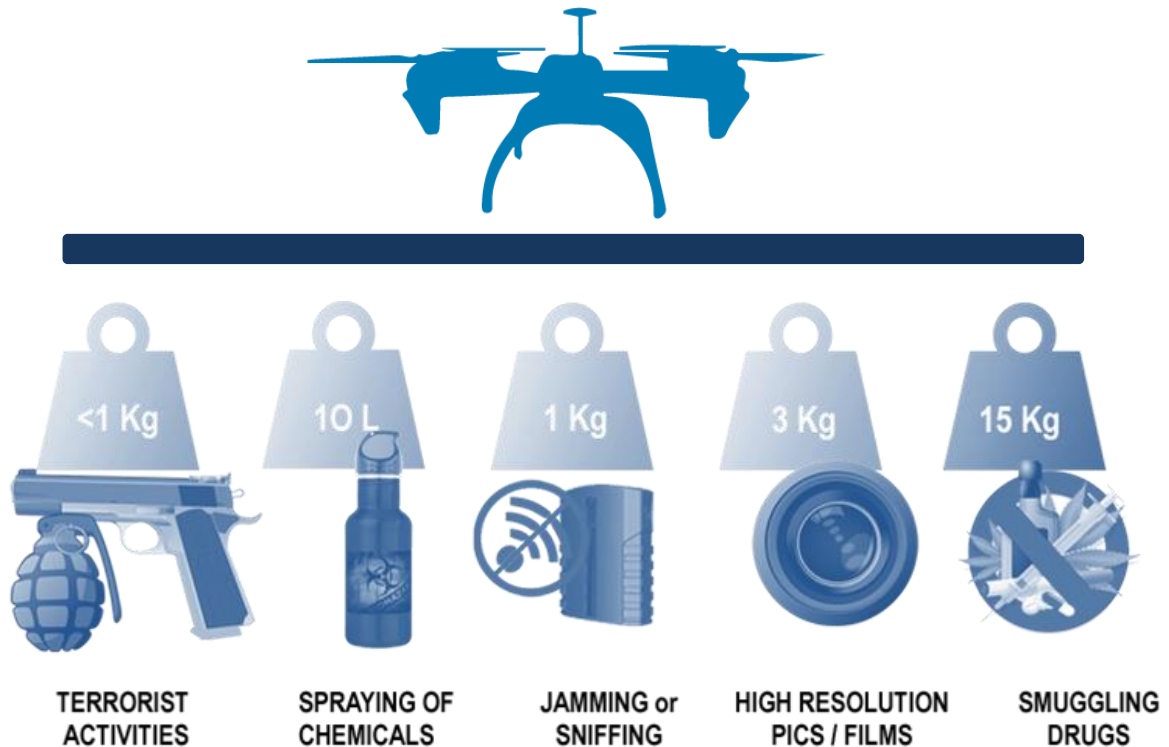Drone crashes in front of the White House
(January 2015)

# Maximum Payloads

**Terrorist activities, espionage, invasion of privacy and smuggling**

There is hardly any other technology currently developing as fast as drone technology.

However, the increase in drone efficiency also means more opportunities to misuse them for criminal purposes. When your airspace is exposed, no longer are fences, video cameras, and security guards adequate to protect sensitive buildings or personal.

| <1 Kg | 10 L | 1 Kg | 3 Kg | 15 Kg |
|-------|------|------|------|-------|
| TERRORIST ACTIVITIES | SPRAYING OF CHEMICALS | JAMMING or SNIFFING | HIGH RESOLUTION PICS / FILMS | SMUGGLING DRUGS |

## Drones Becoming More and More Powerful

| Range | 30 m | Microdrones |
|-------|------|-------------|
| Speed | 106 mph | Flytrex |
| Payload | 33 lbs | Scan-Copter |
| Flight time | 4 h | Hycopter |
| Control | pilot/autopilot | AutoQuad |
| Altitude | 3.7 m | DJI |
| Orientation | GPS, visual, ultrasonic | DJI |
| Smallest size | 1.2 in | Axis Drones |
| Biggest size | 4.6 ft | Gryphon Dynamics |
| Shape-changed | bird | Avinc, Clear Flight Solutions |

# THE IDEA WAS BORN ON 2013

**Everyone Laughs, No One Realizes the Danger**



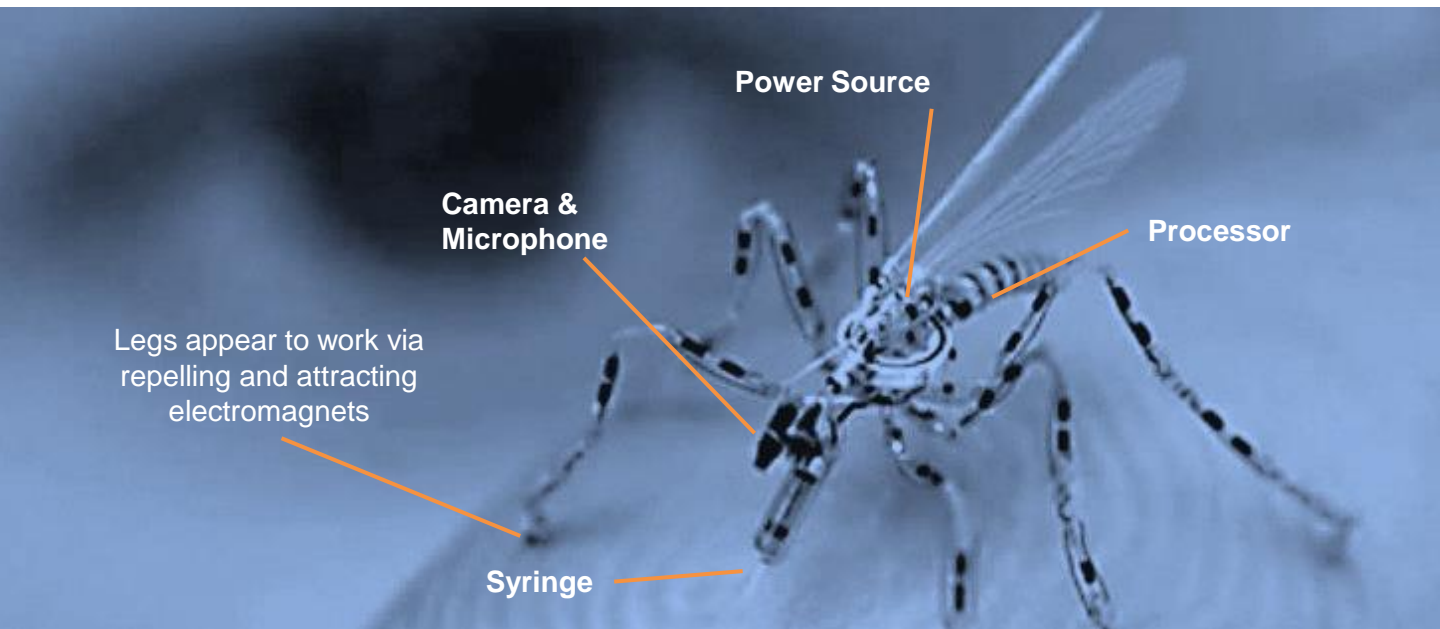| Applications | Aerial threats |
| --- | --- |
| ⚡ Utilities > | ((•)) Espionage |
| ▥ Prisons > | 💣 Terror |
| ▤ Data centers | 🔫 Smuggling |
| ⚾ Stadiums | Hacking |
| 🏛 Governmental buildings | 📷 Unwanted publicity |
| ✈ Airports | ☹ Vandalism |

# Secure Your Airspace Now

# DO YOU WANT TO BE A VICTIM ?

Only few seconds are needed for a small or a micro drone to real harms you!





Power Source

Camera & Microphone

Processor

Legs appear to work via repelling and attracting electromagnets

Syringe

The rapid expansion of drones technology can easily turn a funny game to a real threat!

## Secure Your Airspace Now

# DO YOU WANT TO BE A VICTIM ?

## AERIAL THREATS

Spying for further attacks
Terror
Hacking
Vandalism

## RISKS

Nuclear accident
Injury of persons
Power failure
PR disaster

**Protection against Espionage or Terrorist Attacks on Public Institutions by Drones**

Public buildings, courts of justice, government buildings and sports arenas are potential targets for espionage or – even more worryingly – terrorist attacks. Vast amounts of time, effort and money must be invested in safeguarding the security of such locations. Until recently, automatic detection of hostile civilian drones was not possible, but now it is – thanks to our Drone Tracker!

**Protecting Land and Property against Drone Cameras**

Everyone should be able to move with complete freedom – and in complete privacy – within the secure environment of their own property. No-one wants to be spied on by a third person in their own private retreat. Especially celebrities, or other persons who are always in the public eye, need some inviolable space that strangers cannot penetrate.

Only Drone Tracker offers you this security and privacy by identifying hostile drones and immediately raising the alarm, allowing counter-measures to be implemented right away.

## Secure Your Airspace Now

# DEFEND DRONES

**Keep your airspace safe**

# De-Drone Tracker

## Nowhere to Hide, Nowhere to Fly

Dedrone RF Sensors detect drones and remote controls by their radio frequency (RF) signatures.

Commercial, hobbyist, and homebrew drone models are detected, including the popular DJI line.

## Complete Airspace Security Solution

Modern security requires a layered approach that keeps up with the evolution of drone technology. Sensors connect to our Drone Tracker software, which detects, classifies, and protects against drone threats, including localizing the drone and its pilot. Passive and active countermeasures can be triggered, tailoring the defense mechanism to the severity of the threat.

# How it Works

**RF SENSORS**

Our RF Sensors are the cornerstone of airspace security, and detect commercial, consumer, and homebrew drones.
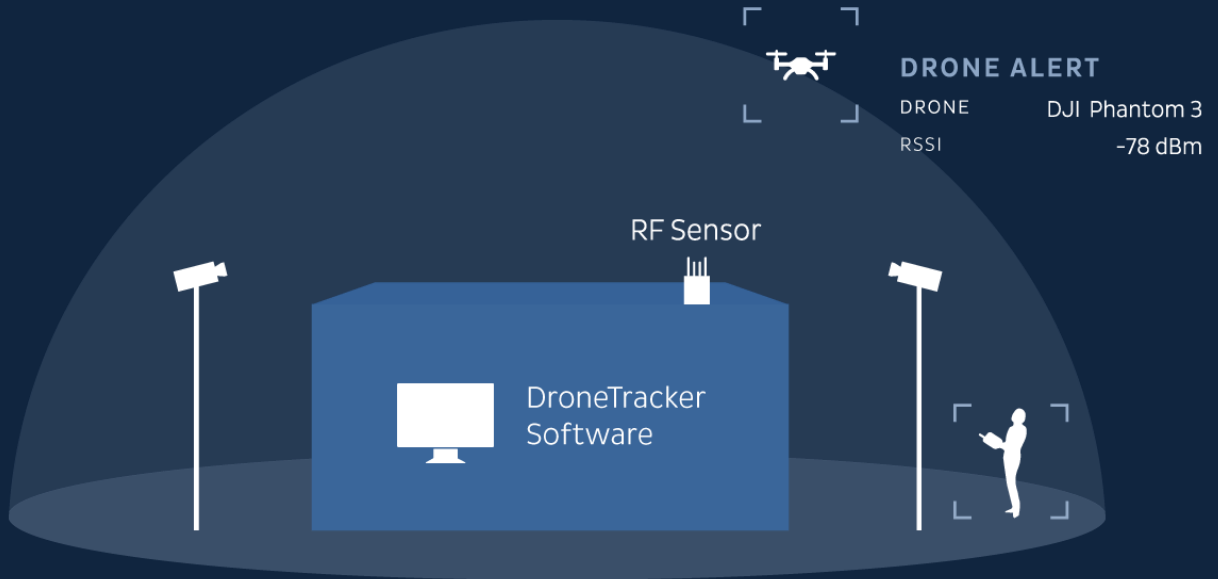
**SOFTWARE**

Drone Tracker software connects sensors, performs machine-learning analysis, and is the central nervous system for the complete solution.

**SENSORS & MITIGATION**

Additional sensors and countermeasures, such as video or jammers, add extra layers of security and integrate directly into Drone Tracker software.

# De-Drone Tracker



## Software Enabled Security

Drone technology advances rapidly, and only a software-centric solution can keep up. Dedrone's Drone Tracker software, hosted in the cloud or on-premise, uses our Drone DNA database to recognize and classify RF, WiFi, and non-WiFi drones.

Drone Tracker also integrates with 3rd-party sensors, and triggers alerts and countermeasures.

## Reporting & Forensic Evidence

Dedrone sensors and integrated external video cameras record forensic evidence of drone intrusions.

A combination of forensic data is automatically captured by the Drone Tracker software, including drone manufacturer, model, time and length of drone activity, and video verification. Summary reports are automatically produced and available on-demand for easy analysis of the most critical airspace security data.

# Drone DNA

Drone DNA is a machine learning system and classification engine that recognizes drones of all kinds. Trained on millions of images and data points, it can distinguish between different drone models, and detect the difference between drones and other moving objects such as birds, planes, or other objects.

Drone DNA signatures are continually updated via the cloud, enabling the Dedrone system to be always up-to-date to protect against the latest threats.



Detection Data → DroneDNA Processing → Match

DJI Phantom 4
02-Nov. 06:12 AM
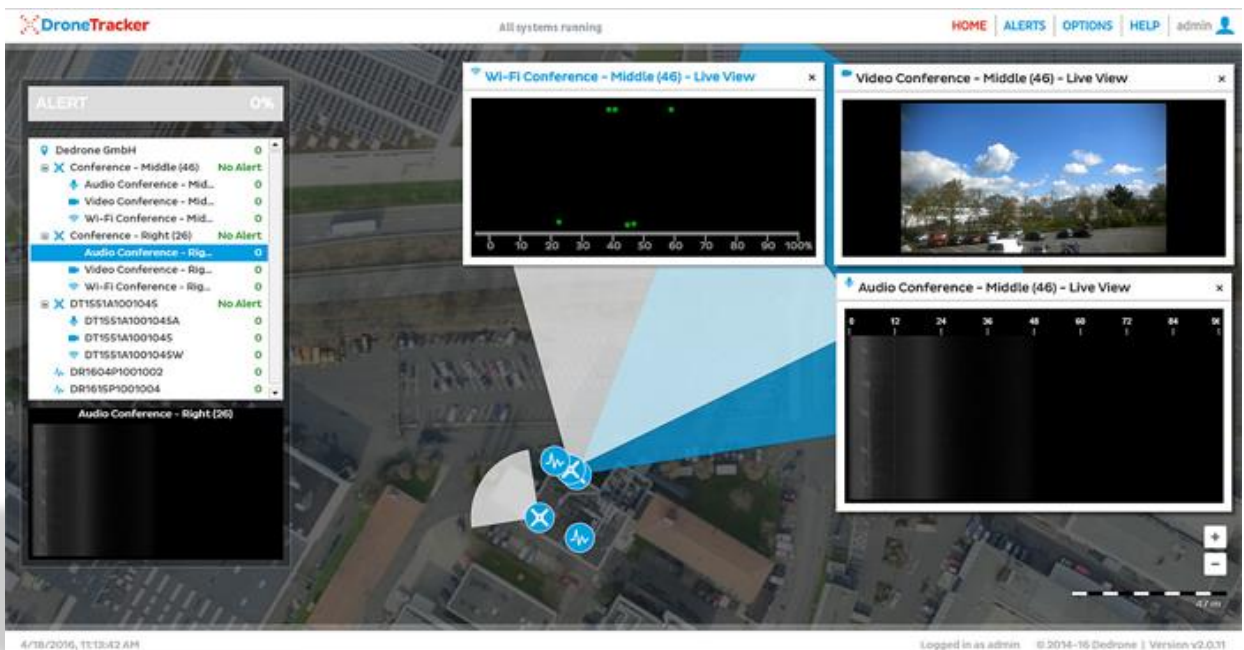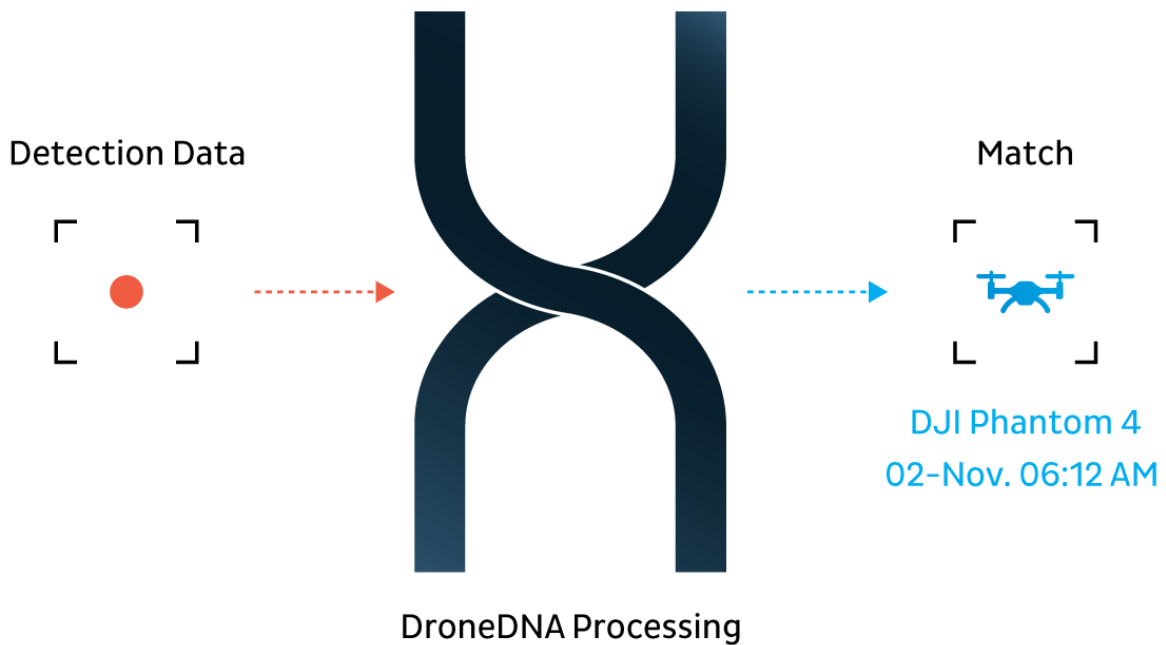
# Advanced Video Analytics

Dedrone's advanced, machine-learning algorithms are built-in to DroneTracker software, enabling the system to reliably detect the difference between drones and other moving objects in the airspace.

Based on an image recognition and classification library, the underlying analytics are trained on millions of data points and are continually updated via the cloud.

Drone Tracker accepts video from off-the-shelf surveillance cameras, turning them into full-time airspace monitoring sensors.
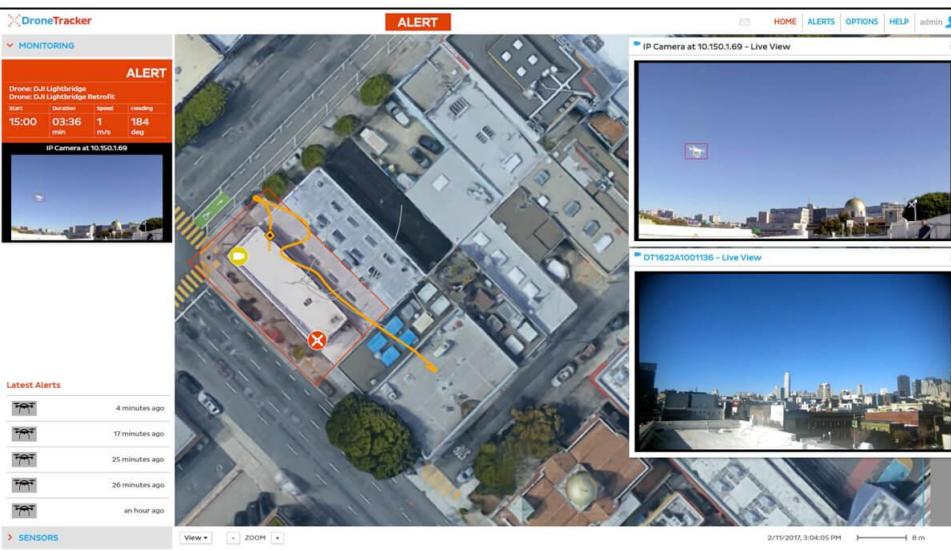


The **Dedrone Cloud** makes deployment simple, eliminating the need for on-premise servers. RF Sensors automatically connect to the cloud, and frequent software updates ensure the airspace is protected against the latest drone threats.

For environments requiring on-premise management, local management configurations are also available.



Dedrone Cloud

DroneTracker Software

Drone Detection Sensors
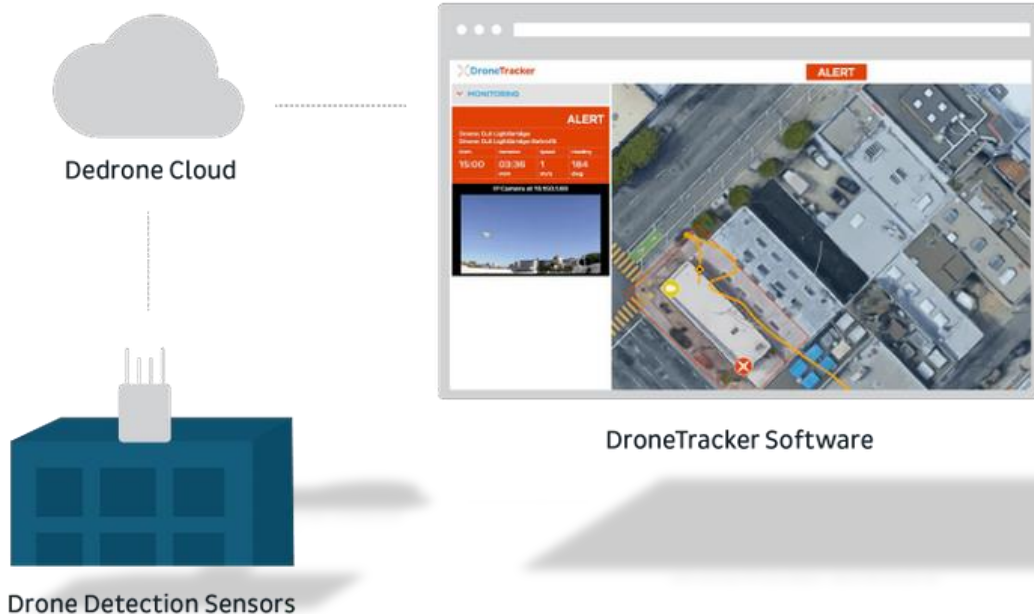
# Features Technology for Advanced Airspace Security

### DETECTION OF THE LATEST DRONE THREATS
DroneTracker is built on Dedrone's leading DroneDNA database.
Automatically updated and continuously trained through machine learning on drone signatures, it enables DroneTracker to detect the latest threats 24/7.

### LOCALIZE DRONES & THEIR PILOTS
Using advanced video analysis or RF signal processing, localization technology pinpoints the locations of drones and their pilots, plotting them on an integrated map, enabling users to find the source of drone-based threats

### MULTI-SENSOR ANALYSIS
The RF Sensor is the foundation of the detection solution, providing early warning of malicious activities. Additional video sensors aid detection, show real-time views, and archive video evidence. More external sensors can be integrated via the API.

### SCALABLE & CUSTOMIZABLE
By combining several sensors, large spaces with complex layouts can be secured effectively.
Data from all sensors are combined and processed centrally in the cloud or an on-premise environment..

### EXTENSIBILITY WITH SENSORS & COUNTERMEASURES
Drone Tracker integrates with your existing security system. Surveillance cameras or 3rd-party counter-measures such as automatic blinds, fog bombs, or jammers are easily connected via the API

### AUTOMATED ALARMS
Alarms are triggered as soon as the approach of a drone is detected. Alerts can be sent through SMS, the software user interface, e-mail, network (TCP/IP), SNMP, or smartphone push notification.

### FORENSIC EVIDENCE
All detected events are recorded and stored locally, including collection of drone type, and model. If installed, video cameras accurately classify whether detected objects are drones and record video evidence — including the flight path of drone.

### AUTOMATED REPORTING
Automated summary reporting delivers the most critical information up-front. Find how many drones are intruding into your airspace, and details such as drone model, intrusion time, and frequency of recurrence.

# Defending Against Drone Swarms with NEW Drone Tracker 3.5



Dedrone is excited to release **DroneTracker 3.5**, the drone detection industry's response to understanding airspace activity and ensuring that protected sites are aware of all drone activity overhead, whether it be a single or orchestrated drone incursion.

Drone swarms, or more than three drones in a single area, have been demonstrated in action in modern military settings for surveillance and delivery. Pilots who operate more than one drone at a time can expand their reach and impact to an area, whether to support disaster response and recovery, drop contraband at a correctional facility, distract law enforcement from their operations, or threaten the security of a military base.

No airspace is immune to drone threats.

This is why we are continually advancing DroneTracker to ensure our customers can protect their assets against the growing threat of unauthorized drones in their airspace.

Our software platform detects, localizes, and tracks simultaneous drones and swarms to protect against advanced drone threats.

DroneTracker 3.5, hosted in the cloud or on-premise, uses Dedrone's DroneDNA database to recognize and classify RF, WiFi, and non-WiFi drones.
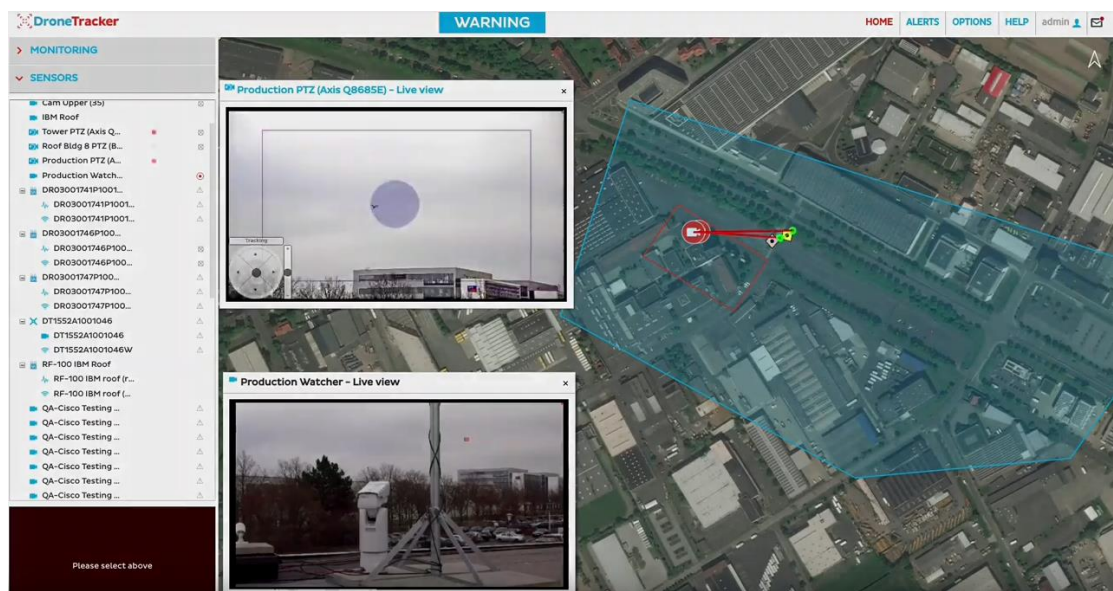
# Defending Against Drone Swarms with NEW Drone Tracker 3.5

**LOCALIZATION OF MULTIPLE DRONES AND REMOTE CONTROLS**
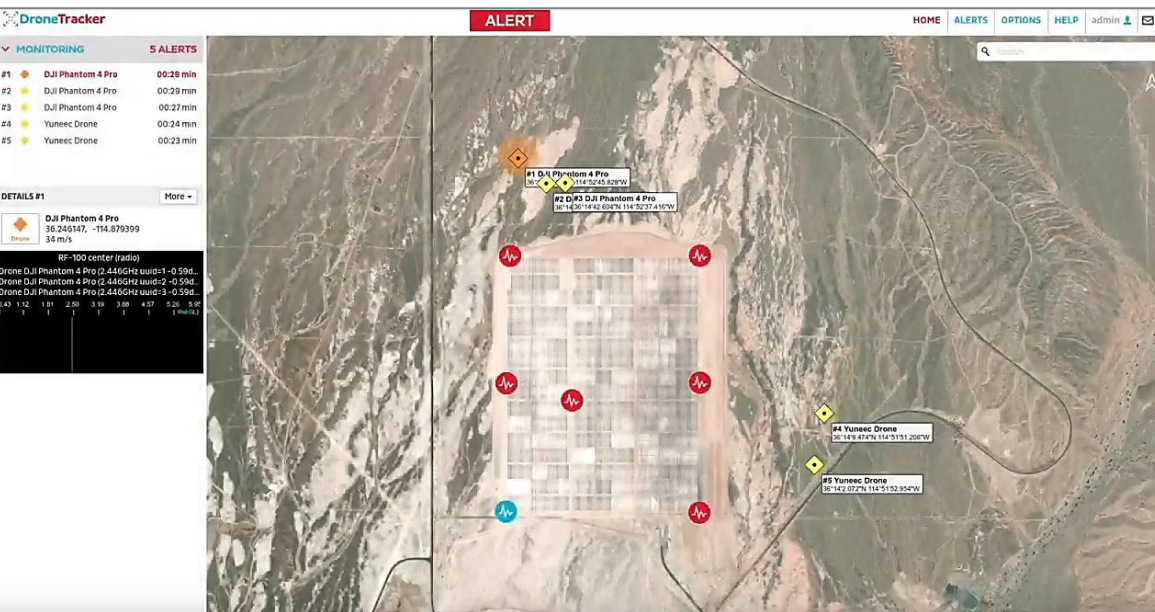


**VIDEO RECORDING OF EVIDENCE VIA AUTOMATED PAN-TILT-ZOOM TRACKING OF DRONES**

As drones maneuver through the airspace, certain PTZ cameras will now be prompted by DroneTracker 3.5 to automatically mimic the movement, providing increased visual awareness of the vehicle's identifying features and payload. In the case of multiple drones, DroneTracker 3.5 will prompt the PTZ camera to intelligently coordinate their behavior.

# Defending Against Drone Swarms with NEW Drone Tracker 3.5

**WORKS WITH NEW PTZ CAMERA MODES FOR INTELLIGENT TRACKING AND DETECTION**

PTZ cameras with Drone Tracker 3.5 now have three detection and information gathering stages, including:

**Passive:** No video detection or auto-tracking of drones
**Detection:** Camera detects drones, but does not track
**Tracking:** Camera actively gets positions from other sensors (such as RF-100 or RF-300) and automatically tracks the drone flightpath and movement



AXIS Q8685-E (HD)          AXIS Q8665-E (HD)          Bosch MIC IP dynamic 7000 HD

**MAP AND VISUALIZATION UPDATES**

DroneTracker 3.5 now integrates a point of interest (POI) marker with a tactical overlay on the user's map, including real-time calculation of distance and movement of multiple targets. This POI marker helps users calculate the distance between an approaching drone and a specific point in the protected area, or a person's location. DroneTracker 3.5 now supports street, satellite and hybrid maps, allowing for users to view drone alerts and movement on the map of their choice.
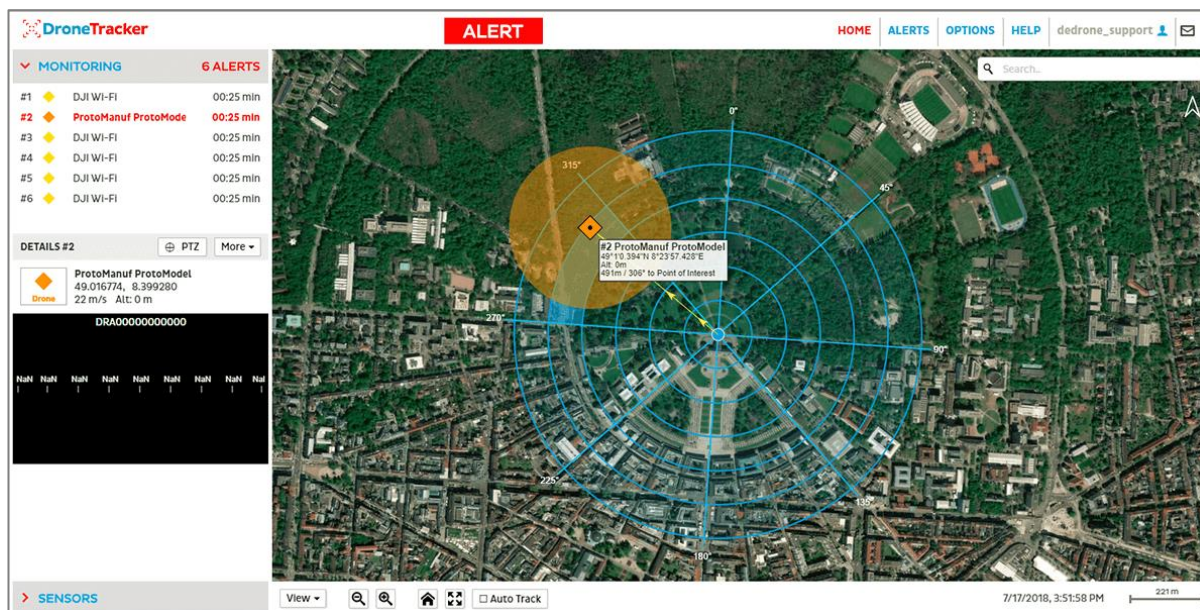
# Platform for Airspace Monitoring

Modern security requires a layered approach.

Dedrone hardware and software technology is augmented through 3rd-party sensors and countermeasures, allowing customers to adapt the solution to their exacting specifications.

Multiple sensors can be connected to the Drone Tracker software, allowing for detection of even the most obscure drones.

Both passive and active countermeasures can be triggered via the API, tailoring the defense mechanism to the severity of the threat.
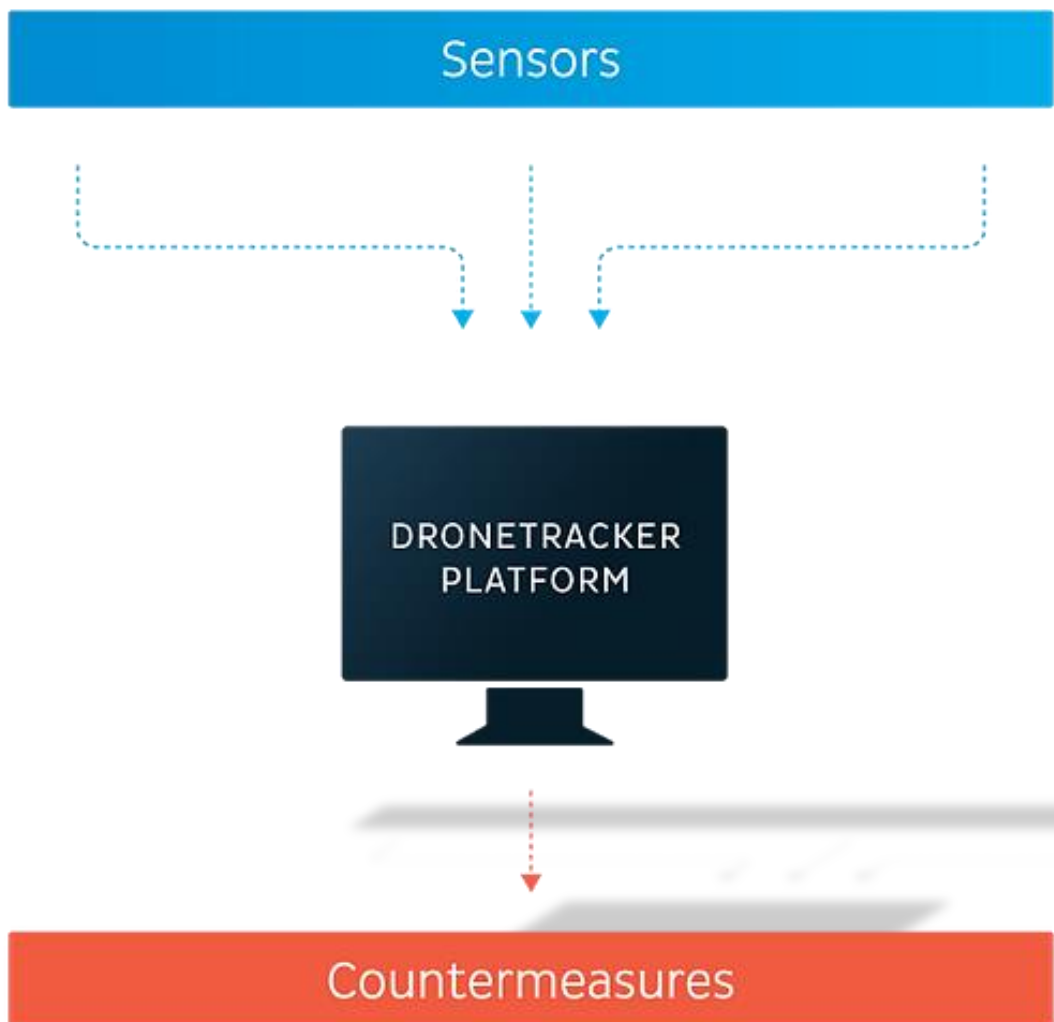
# Detector

# RF-100

OVERVIEW

The RF-100 detects and classifies drones via multiple, integrated software-defined radios (SDRs). Detection range can reach up to 1 mile, depending on installation and environment characteristics.

BEST FOR

Understanding how many drones intrude into the airspace

Early detection of drones, even before they take off

Classification of drone characteristics and incident logging

- Device Type sensor
- Range 3,280 ft (1 km) in good conditions up to 1.24 mi (2 km)
- Radio Frequency omnidirectional passive detection and classification
- L x W x H:  195 mm x 95 mm x 440 mm height without antenna: (250 mm)
- Weight 3.1 kg
- Ingress Protection Rating IP65
- Operating Temperature (-20 °C to +50 °C)
- Power Supply active PoE+ (IEEE802.3at)
- Power Consumption 15 W (typ.)
- Connectivity via LAN in existing IT infrastructure
- Software Configuration via DroneTracker User Interface
- Operation via DroneTracker User Interface
- Software Updates firmware and DroneDNA updates via cloud-based database connection
- Alarm Notifications via DroneTracker User Interface

# Detector

# RF-300

OVERVIEW

The RF-300 detects and classifies drones via multiple, integrated software-defined radios (SDRs). Detection range can reach up to 1 mile, depending on installation and environment characteristics.

BEST FOR

Understanding how many drones intrude into the airspace
Early detection of drones, even before they take off
Classification of drone characteristics and incident logging

- Detects communication between drone & remote controller (Wi-Fi and RF)
- Classifies drones by manufacturer and model
- Direction-finding locates drone and pilot
- Approximate coverage range 1.3 miles (depends on terrain)
- Ruggedized form-factor for extreme environments (IP65)
- Single connection Ethernet and power (PoE+)
- Scans all drone frequency bands

- Range (line of sight) Up to 0.65 mi (1.0 km) Up to 1.0 mi (1.5 km) in ideal conditions
- Accuracy of Direction Finding* ±5° (mean error)
- Geolocalization: With two or more RF-300, also through Wi-Fi signals
- Device Type Sensor
- Radio Frequency Omnidirectional passive detection, classification, and direction finding -
- Dimensions (L x W x H): 195 mm x 95 mm x 365 mm
- Weight 3.1 kg
- Ingress Protection Rating IP65
- Operating Temperature -20 °C to +55 °C
- Power Supply PoE+ (IEEE 802.3at)
- Power Consumption 18 W (typical)
- Connectivity Via LAN to existing IT infrastructure
- Configuration, Operation, and Alarms Via DroneTracker software (requires software version >= 3.1 and valid license)
- Software Updates Firmware and DroneDNA updates via cloud-based connection

# Video Camera

Video cameras integrate with Dedrone's Drone Tracker software to provide situational awareness, visual identification, and forensic recording.

Video analytics are powered by Dedrone's proprietary Drone DNA database, allowing the solution to distinguish drones from airplanes, birds, and other moving objects.

## OVERVIEW

Video cameras add situational awareness and forensic evidence to your airspace security systems.

An ideal addition to the Dedrone RF Sensor, they also enable Drone Tracker software to plot and record the drone's flight path on a map.

Dedrone's platform integrates with any ONVIF Profile S IP-based video camera with HD or higher resolution.

## BEST FOR

- Tracking of drone across a wide scene (with PTZ cameras)

- Recording forensic evidence of drone intrusion

- Image classification and recognition of drones for positive

- ID of threat

# Passive and Active Countermeasures

Passive and active countermeasures can be integrated into the Dedrone solution, depending on needs and capabilities. Together with detection from sensors, they secure the airspace security around your facility.
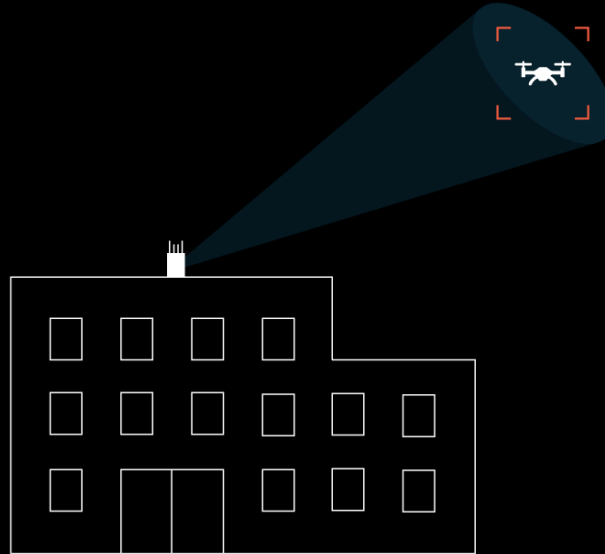


# Protect Your Facility

**Passive countermeasures** protect your facility by leading people to safety, blocking sensitive areas from view, locking (cell) doors and gates, shutting down parts of the IT infrastructure, and searching for dropped objects.

### ADVANTAGES

- Highly effective
- Does not need approval or authorization
- Granular control
- Drone does not crash and cause damage

### DISADVANTAGES

- Does not directly stop drone flight

# Passive and Active Countermeasures

Passive and active countermeasures can be integrated into the Dedrone solution, depending on needs and capabilities. Together with detection from sensors, they secure the airspace security around your facility.

# Protect Your Facility

## ACTIVE Countermeasures

### Counter-Drone
A counter-drone system employs a separate drone to catch or disrupt the targeted drone.

*ADVANTAGES*

*- Drone is stopped*
*- Both drones may land safely*

*DISADVANTAGES*

*- Very competent (pilot needed at all times)*
*- Counter-drone must be extremely powerful*
*- Crash risk*
*- Expensive*

### Jammer and Spoofer
Jams or spoofs radio connection or GPS, causing the drone to return to its starting position, sheer away, land, or crash

*ADVANTAGES*

*- Drone is stopped*
*- Locating the pilot may be possible*

*DISADVANTAGES*

*- Highly regulated, may require legal approval*
*- Drone may crash in unintended area*

### Fire Arms, Electromagnetic Pulse (EMP), Laser
Drone is electronically and/or physically destroyed and crashes.

*ADVANTAGES*

*- Drone is stopped*

*DISADVANTAGES*

*- Highly regulated, may require legal approval*
*- Drone may crash in unintended area*
*- Short range*

### Anti-Drone Nets
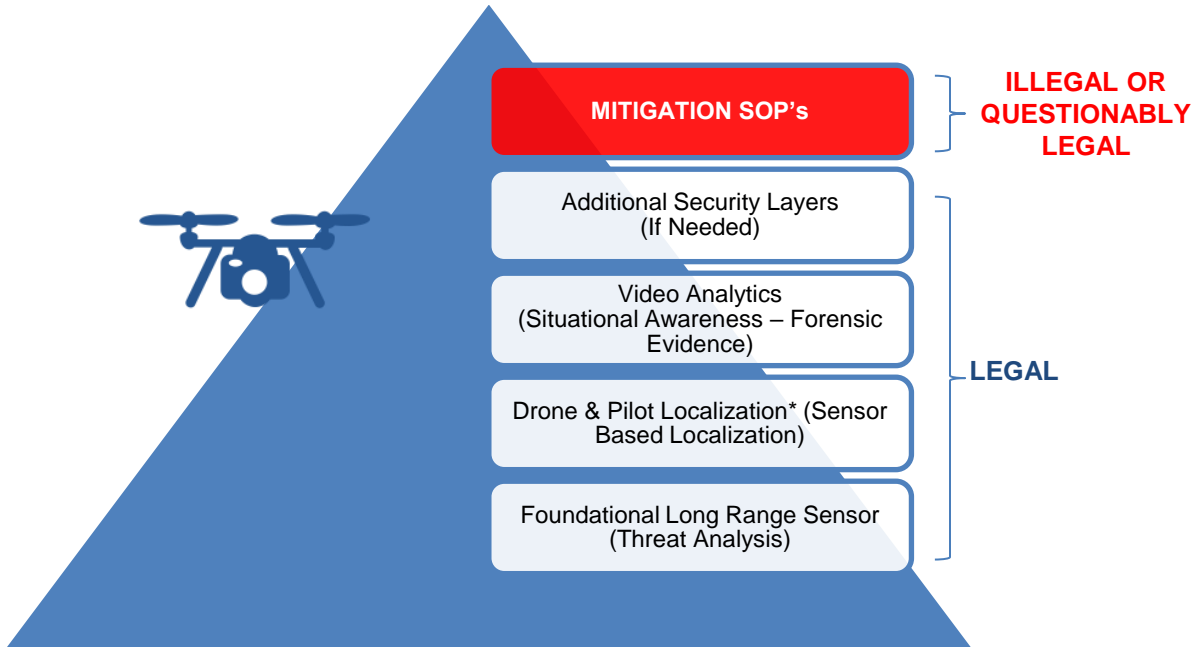A net is shot over the drone from the ground or via another, chasing drone.

*ADVANTAGES*

*- Drone is stopped*

*DISADVANTAGES*

*- Low success rate*
*- May cause unintended damage*
*- Short range*
*- Expensive*

# Customer Journey:
# A Scalable Solution That Tailors To Your Needs

**MITIGATION SOP's** — **ILLEGAL OR QUESTIONABLY LEGAL**

Additional Security Layers (If Needed)

Video Analytics (Situational Awareness – Forensic Evidence)

Drone & Pilot Localization* (Sensor Based Localization)

Foundational Long Range Sensor (Threat Analysis)

**LEGAL**

*De drone RF-100 RF Sensor*

- **-** *Detects & classifies widest variety of drones*
- *Early warning alarms*
- *Wide spectrum coverage*
- *Discreet form factor*
- *Built by De drone*
- *On It Own Functions As A threat Assessment Sensor*

*De drone RF-300 RF Sensor*

- *Detects, classifies, localizes drone, and localizes pilot*
- *Integrated direction finding localizes pilot and drone*
- *Early warning alarms*
- *Wide spectrum coverage*
- *Discreet form factor*
- *Built by De drone*

# Complete solution to secure your airspace



- Detection and localization of drone
- Immediate alarm notification
- Preservation of evidence
- Individual countermeasures
- Scalable solution
- Drone DNA database
- Integration of multiple sensors
- API to 3rd-party products

# BAD DRONE RISING

**Altitude**
6 km above sea level

**Start**
50 km autonomous waypoint flight

**Navigation**
by GPS

**Espionage**
with 4k camera

**Cross-border smuggling**
drugs

**Speed**
up to 170 kph

**Theft**
payload 5 kg

**Bomb attack**
on critical power infrastructure

**Navigation**
optical, without GPS

**Smuggling into prison**
weapons, drugs, phones

**Espionage in government buildings**
with autonomous systems

**Next time a swarm of drones will come**

**Drone collision**
with aircraft

**Flight time**
up to 2 hours

**No pilot needed!**

## Extensive Features

Drone Tracker is a complex, software-based drone detection and counter-drone platform for all kinds of applications. Learn more about its unique features.

Airspace Surveillance 24/7

Immediate Alarm Notification

Securing Evidence

Simple Configuration

Cloud Service
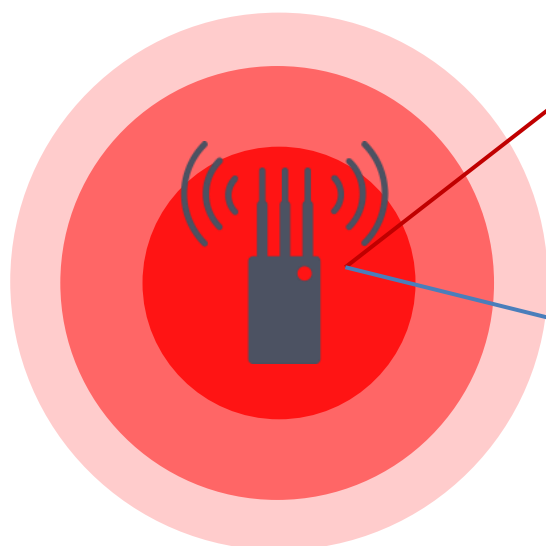
Drone DNA Database

Large Scale Monitoring

Multi-Sensor Enabled

Extended API Access

Technical Support

Depending on the application and threat situation you can action different counter-measures.
For the future we are planning interfaces that can automatically trigger defensive measures in the case of a drone alarm!

**3D PARTY**

# Drone Alert – ACT NOW!

### Identify, Alert, Take Measures, Secure Evidence

Depending on the application field, there are various ways of reacting to a drone alert.

Although it is technically possible to interfere with radio and GPS signals using a jammer or spoofer, causing the drone to crash, this course of action involves a lot of legal uncertainties. An out-of-control drone can damage property or even pose a risk to human life and limb. Besides, the effects of jammers and spoofers are not restricted to the radio and GPS signals of the targeted drone, but also interfere with other devices in the vicinity.

However, many anti-drone measures are available that are individually determined by our customers and do not involve shooting the drone down. In addition, alert videos provide important documentary evidence and help to analyze the incident and identify the culprit(s).

**Actions & Measures**

Lead people to safety
Block view
Lock (cell) doors and gates
Search site for dropped objects
Search for pilot

**Depending on Legal Situation:**

Jam radio connection
Jam or spoof GPS
Physical anti-drone measures

# PREVENT & PROTECT

# WHO NEED DE-DRONE SYSTEM

**PRISONS: Prevention of Arms and Drugs Smuggling**

It's a prison guard's worst nightmare: an inmate suddenly has a gun, delivered directly to his cell window or dropped in the yard by a drone that can overcome any high wall or security system.

It's now common for drugs, tobacco and cellphones to be smuggled into jails with drones – which are also used to send illegal "airfreight" consignments across national frontiers

**INDUSTRY: Protection Against Industrial Espionage & Terrorist Attacks**

The risk of a drone taking high-definition pictures of documents, secret construction sites or board meetings is only one of many.

Non-military drones fitted with the right equipment can be misused for data espionage, sabotage, or even terrorist attacks.
They can intercept or interfere with radio and telecommunication signals, as well as bypassing conventional security personnel to smuggle sensitive information out of factories or offices.

**PUBLIC: Protection against Espionage or Terrorist Attacks on Public Institutions by Drones**

Public buildings, courts of justice, government buildings and sports arenas are potential targets for espionage or – even more worryingly – terrorist attacks.

Vast amounts of time, effort and money must be invested in safeguarding the security of such locations. Until recently, automatic detection of hostile civilian drones was not possible, but now it is – thanks to our DroneTracker!

**REAL ESTATE/FAMILIES: Protecting Land and Property against Drone Cameras**

Everyone should be able to move with complete freedom – and in complete privacy – within the secure environment of their own property.
No-one wants to be spied on by a third person in their own private retreat. Especially celebrities, or other persons who are always in the public eye, need some inviolable space that strangers cannot penetrate. Only De-Drone offers you this security and privacy by identifying hostile drones and immediately raising the alarm, allowing counter-measures to be implemented right away

# Drones Becoming More and More Powerful

## INDIVIDUAL REACTIONS

### Measures

### Non-invasive measures

- Lead people to safety
- Block View
- Lock (cell) doors & gates
- Search side for drop objects
- Search for pilot

### Depending on legal situation
### 3RD Party solutions to;

- Jam radio connection
- Jam of spoof GPS
- Take physical anti drone measure

+1,000,000 drones are sold worldwide every month
Drones are becoming cheaper by the day
Drones are turning into high-performance airborne robots

## Protection against Espionage or Terrorist Attacks on Public Institutions by Drones

Public buildings, courts of justice, government buildings and sports arenas are potential targets for espionage or – even more worryingly – terrorist attacks.

Vast amounts of time, effort and money must be invested in safeguarding the security of such locations.

Until recently, automatic detection of hostile civilian drones was not possible, but now it is – thanks to our Drone Tracker!

# Aerial Threats, Weapons and Actions



## Aerial Threats

Collision

Terror

Smuggling of weapon

**Risks**

Crash
Terror attack
Kidnapping
Injury to persons

# Aerial Threats, Weapons and Actions



## Drones as Weapons

Commercial drones are used from hobby pilots to take pictures (and they do not always know what they are doing) but also from criminals as cheap and easy available weapons.

**Example: commercially available quadrocopter**
**Price:** $900
**Range:** 3,2 miles
**Altitude:** 500 m
**Speed:** 16 m/s

# Aerial Threats, Weapons and Actions



## Countermeasures

- Detect drone
- Inform security officers
- Track drone
- Jam drone
- Capture drone
- Localize and arrest pilot
- Provide evidence
- Discourage others by example

# DEFEND

## Essential Countermeasures Against All Threats

- Alert security personnel
- Deploy scare tactics against drone: laser, strobe light, silent alarm
- Notify authorities
- FIND PILOT

Post-Event Resolution
- Document event
- Record evidence using De drone software
- Legal prosecution

## Additional Countermeasures by Threat

### Cyber Threats
- Alert security personnel
- Automatically trigger Access Points or SSIDs to shut down
- Trigger WIPS/WIDS

### Privacy / Surveillance Threats
- Trigger curtains to shut
- Send notifications
- Deploy fog bomb

### Physical Threats
- Increase security presence
- Notify authorities
- Change security protocols

### Smuggling Threat
- Lock down area and send team to retrieve contraband

# Drone Detection Radar

Detection systems need to maintain their capabilities under low visibility conditions and in urban environments full of obstacles and moving objects.

The Drone Detection Radar is specifically designed to meet these challenges.

The radar system covers a full 360 degrees view. It detects larger fixed wing targets at a range of nine kilometres, and smaller multi-rotor drones detected at up to three kilometres.

However, completely securing an area, requires more than just range detection. It requires flexibility, reliability and provides unlimited coverage through its ability to combine multiple radar devices into an integrated sensor network.

The output from multiple sensors is incorporated into one unambiguous picture.

| | |
|---|---|
| Detection range | 3 – 9 km, depending on target size |
| Classification range | 1.1 km |
| Beam width | 10° x 10° |
| Azimuth resolution | 1° |
| Range resolution | 1,5 m |
| Technology | FMCW |
| Frequency | X Band 9650 MHz |
| Rotation speed | 60 RPM, update rate 1 Hz |
| Dimensions (W*D*H) | 0,9 x 0,9 x 0,8 m excl. mount |
| Weight | 83 kg |
| Power | 230 VAC |
| Communication | WiFi/3G/4G |

# Modular UAV Jamming System

The jammer system uses H.P.'s Direct Digital Synthesis Sweep and dedicated software to maximize its effectiveness.

The system enables the operator to program the system quickly using a Windows®-based notebook or USB stick in order to adapt to any given threat scenario or use the system as tactical jammer.

The jammer system will jam drones using GPS, GLONASS, Galileo, WLAN 2.4 GHz and from 5000-6000 MHz.

It is a field proven system and used in several missions e.g. to protect events, VIP´s etc.

Accessories

- Omni Directional antenna set
- Modular System –Upgradable-
- Notebook
-   DDS Controller Software for dedicated system
-   programming

## Jammer (w/o antennas)

| | |
|---|---|
| Dimensions | 520 mm x 520 mm x 520 mm |
| Weight | 65 kg |
| Protection class | IP42 |

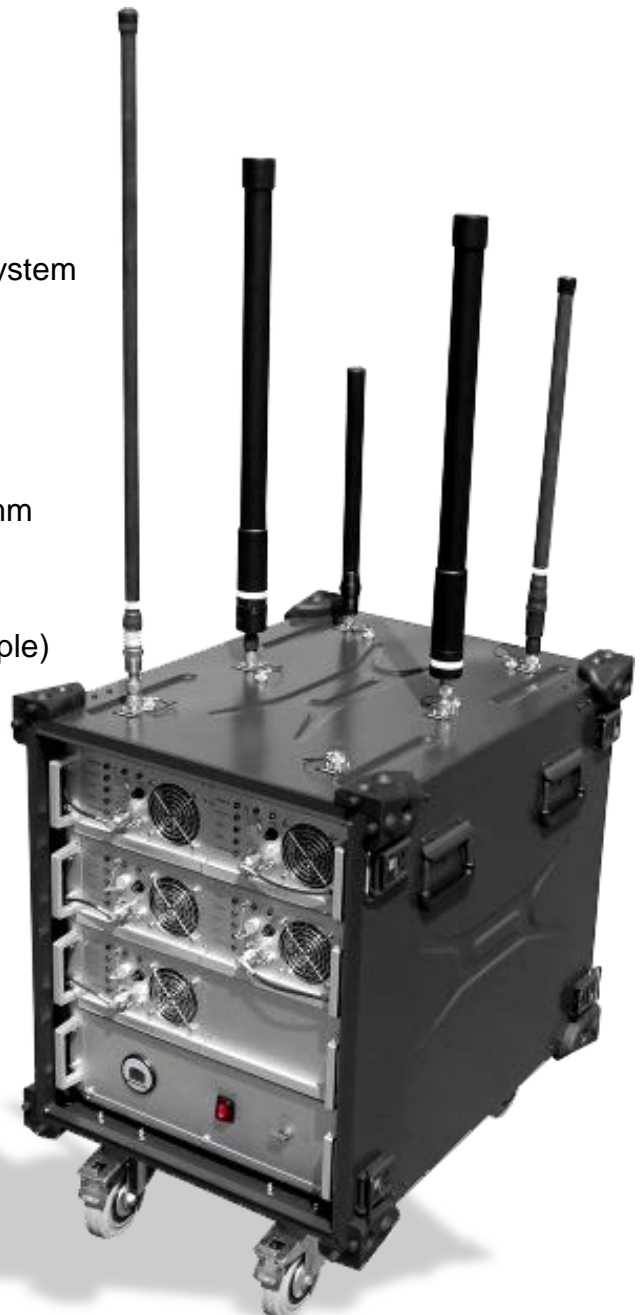Frequency bands and output power (example)
Omni directional

| | |
|---|---|
| Channel 1 | 1559 – 1610MHz/40W |
| Channel 2 | 2400 – 2483,5MHz/50W |
| Channel 3 | 2400 – 2483,5MHz/50W |
| Channel 4 | 5725 – 5875MHz/20W |
| Channel 5 | 430 – 480MHz/50W/ |

# ANTI-DRONE RIFLE



**Portable UAVs-Defender System**

This Anti-drone weapon is designed to disable the hostile unmanned aerial vehicles (UAVs) , it can utilizes radio waves to take the hostile flying Drones down but without any damage to them.

**Features:**

With Light-weight less than 5 kilograms

1km effective distance

Overwhelming signals including 2.4Ghz, 5.8Ghz, GPS(USA), Galileo(Europe), Gallonass (Russia), Beidou (China)

Two mode options forcing drones to land or return to its point of origin.



**Jammer Specifications**

Voltage: 12V
Runtime: 35-40 min (Continuous working)
Max distance: Up to 1km
Jammer frequencies:
WIFI:2.4Ghz-2.5Ghz; 5.725Ghz-5.825Ghz;
GNSS: 1.56Ghz-1.61Ghz;
Body Weigh: 4.8KG (Including Battery)
Body Dimension: L890xW380xH140mm

**Warranty:** 2 Years

**Antenna Specifications**

Antenna Gain 8dB
V-Plane: 60 degrees
Environment Operating temperature: -10℃ to + 50℃

**Battery Specifications**

Built-in Lithium Battery 12V,10Ah
Operating Temperature: -10℃ to + 50℃

# Wireless Drone Jammer With Long Range For Personal Protection



The battle for control of the skies continues. As the amount of unmanned aerial vehicles (UAVs) drones increases each year, many people are stepping up their efforts to keep the devices out of the air.

The Drone Defender stated to use "radio control frequency disruption technologies to safely stop drones in the air, before they can pose a threat to military or civilian safety." It operates on standard GPS, 2.4G, 5.8G and ISM radio bands, allowing for it to interference with both commercial and special UAV drone signals.

The Drone Defender can hit objects from 100 to 5000 meters with an effective angle from 30° to 360°. A Drone Defender can be done from the smallest handheld portable jammer to the biggest Prison Jammer and VIP vehicle Mounted Jammer by different requirements.

When a remote control signal is interfered, drones will often enter into their safety protocols, which usually includes one of three options.

It will either hover in place until the pilot can regain a control link, attempt to land so the pilot can recover it physically, or try to return to its point of origin. Since the Drone Defender is mentioned to be attacking the GPS signal as well (for optional, adjustable and can be turned off independently), the scenario is that the device will hover for a while or try to land.



NO DRONE ZONE

TSL-DJ

# Wireless Drone Jammer With Long Range For Personal Protection

**Characteristic**

- Portable handheld design
- UHF wideband interference, effective power (channel power) high, far interference distance
- Multi-band frequency design, interference all kinds of aircraft flight control
- The antennas had been design switch , efficient and convenient at emergency
- Imported components, The design of low starting circuit can avoid spark phenomenon of mechanical switches, high integration level , stable operation
- Be Alone Antennas with main, ease for replacement and maintenance
- Protection design foe the amplifier model ,protect operational reliability.

**Application**

- Prison safety protection
- prison routine safety protection
- Research confidentially safety protection;
- Government, administrative protection;
- Military base confidentiality protection;

| Frequency | Output power | Blocking target |
|---|---|---|
| GPS | 37dbm | GPS |
| 2.4 | 37dbm | 2.4G Flight control |
| 5.8 | 37dbm | 5.8G Figure the flight control and Beidou navigation system |

**Behavior of electricity**

Output power: 37dbm
Power supply mode: Built-in battery 24V,8A(could full power working 120 minutes)
Jamming frequency: Drone flight control frequency and positioning system

**Physical Properties**

Dimension (L×H×W): 960×400×230mm
Humidity: 5%-95%
Operating temperature: -10℃ to +50℃
Weight: 7.2Kg

TSL-DJ

# ALARMING NEWS
## INCIDENTS

# Emirates calls for tougher action on drones after airport closures



**October 2016:** Dubai International Airport was closed for 80 minutes because of unauthorized drone activity'.

**DUBAI**: Drone detectors and heavy fines for people who fly the devices into flight paths are being called for by Emirates airline.

Thousands of passengers have faced delays and millions of dirhams were lost this year after drones caused the closure of Dubai International Airport on several occasions.

Emirates has called for authorities to take stronger action to discourage future incidents in and around Dubai airspace.

Network disruptions cost millions each time as airlines are forced to divert flights or hold aircraft until security checks have been completed.

Drones have forced the airspace around Dubai International to close on three separate occasions since June, with one half-hour closure in September causing delays to 85 departing Emirates flights.

**READ THE ARTICLE**

# Shropshire drone accident fear is raised by RAF office



It is only a matter of time before a drone causes a major accident involving an aircraft over Shropshire, an RAF safety officer has warned.

It comes after six reports of drones causing a potential risk to aircraft associated with RAF Shawbury this year, including in places such as Telford and Nesscliffe. The legal maximum flying height for drones is 400 feet, but they have been spotted in Shropshire flying at 2,000 and 1,500 feet. Squadron Leader Gary James, Station Flight Safety Officer (SFSO) at RAF Shawbury, said he is not against the ideas of drones, but stressed the need to use them safely.

*They are getting cheaper and cheaper and more people are having them so the risk has increased. You can get them from eBay, Amazon and Jessops really easy. It is only a matter of time before something happens. Last year it was more hearsay, but this year we have had actual sightings from our helicopters. There has been one flying at 2,000 feet over Telford, which is illegal and stupid. One of the problems is that the law is difficult to enforce as its hard catching people in the act. But police have been given guidance.*

**READ THE ARTICLE**

# Dramatic increase in drone sightings from pilots, says ILF



**September 2016:** Pilots reported 39 drone sightings from their planes in the first five months of 2016, a dramatic increase on last year, according to new figures. The ILF Environment and Transport Inspectorate said 31 of these drones – flown for fun by members of the public – were spotted at airports and 24 at Schiphol. Of the 39 reports, 35 were drones and four were model aircraft.

In the whole of 2015, just 15 drones were reported and there are concerns about safety and collisions with planes, which fly so fast that the impact of any small crash would be greater.

The increasing numbers spotted are, reports NOS, probably due to technically more advanced drones. Anybody can buy and fly these, but it is not permitted to fly an unmanned craft on or near an airport.

**READ THE ARTICLE**

# Queenstown drone forces plane to divert



**August 2016:** An incident where a plane in Queenstown had to change course to avoid hitting a drone was extremely dangerous, the Civil Aviation Authority says.

An Air New Zealand flight coming into Queenstown Airport yesterday afternoon, with 150 passengers on board, had to divert after the unmanned aerial vehicle (UAV) was spotted by the control tower.

Drones are not allowed to be flown within 4km of airports. It was the second incident of its kind in New Zealand, after a near miss between a drone and a plane leaving Christchurch a year ago.

Civil Aviation Authority spokeswoman Philippa Lagan said the incident was risky.

"We take it really seriously, and we do hope that the police can find the person responsible and lay the maximum charge possible, because these UAVs pose significant safety threats to planes that are either taking off or landing."

The authority was leaving it to the police to find the pilot of the drone, Ms Lagan said.

**READ THE ARTICLE**

# And many – many other ….



Can the rapid expansion of drones technology turn a funny game to a real threat?

- Derry Ryanair flight in near miss with drone
- UK police probe drone near-miss with commercial flight
- FAA investigating drone spotted near Logan Airport
- Drone closes busy Dubai International Airport for an hour
- Plane has close call with drone while landing in Winnipeg
- Drone Flying Over Airport Delays 55 Flights In Southwest China
- Drone flew 30 metres from airliner at Manchester airport
- Drones in near-misses with planes almost once a week
- Drone Comes Within 200 Feet of Airliner Near LA Airport
- Number of Near Misses Involving Drones Quadruples in 1Year

## WE KEEP YOUR AIRSPACE SAFE

# R & D

**Joining Forces against illegal Drones**

Airbus DS Electronics and Border Security is collaborated in order to defend against small drones

*Munich / San Francisco / CA - 27 July 2016 - Airbus DS Electronics and Border Security (EBS) and De-Drone, San Francisco, have concluded a cooperation agreement to combine their skills to protect lower airspace from small drones. The partners intend to jointly offer drones defense systems that can reliably detect and defend against the unauthorized entry of drones in critical airspaces.*



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