



Acoustic precision detection

Personal drones threat assessment

The introduction of small, personal commercial drones has created a technology opening for criminals intending to use the systems for nefarious purposes. Risk analyses show that the following acts may be executed via the use of drones:



- Systematic mapping of resources
- Unauthorized surveillance and intelligence gathering
- Precision delivery of explosives, as well as chemical and biological weapons
- Smuggling contraband in and out of secure areas and perimeters
- Hacking into GSM and Wi-Fi networks

Government agencies expect an increase in frequency and impact of these incidents implied by the large drone sales figures.



Acoustics in drone detection

Acoustics fill a vital gap in proximity drone detection, as strict line-of-sight to target is not needed for positive tracking. The drone can operate in urban canyons, cluttered areas, behind obstructions and in darkness or fog, out of range for radars and optics, but still within the earshot of the Discovair acoustic sensor.

In open areas, acoustics will work on its own, or in conjunction with other detection technologies.

Microphone array superiority

Squarehead utilizes patented array microphones. Using hundreds of interconnected microphone

elements, the Discovair sensor units are able to establish azimuth and elevation to the target in real time using advanced digital signal processing.

The principles of the acoustic sensors create a completely modular and scalable solution. Discovair can be used for any purpose, from small mobile ground units to large perimeters and even borders.

User interface

Discovair is intended for 24/7 operations with little user intervention. Whenever a detection is made, the operator will receive an audiovisual warning.

During an incident, the system will display a map or satellite image of the protected zone. Any intruding drones will be shown in their respective sectors.



Applications

Discovair may be used to track and create a line of defense against unauthorized drones in many different environments:

Military / defense

System can be employed both for mobile units and stationary objects. Suitable for rapid deployment and small footprint operations as well as long term object protection.

Prisons

Prison perimeters have proven porous to aerial smuggling attempts. Narcotics, weapons and communication devices are known to have been airlifted into prison yards using drones.

Industrial facilities

Because drones can carry explosive or incendiary devices, industrial complexes working with flammable chemicals are exposed to aerial attacks.

High tech companies and government offices

IMSI-catchers and vulnerability exposing Wi-Fi routers are being used to hijack mobile phone or network traffic, exposing internal information to the opposition.



Features

The 2nd generation system is ruggedized (MIL-STD-810G Shock/Vibration, and IP x7) and developed with both rapid deployment as well as permanent installation in mind. The system is highly scalable as the sensor unit has the processing unit embedded.

The sensor itself is an acoustical microphone array with 128 individual microphone elements. Inside the sensor unit is also a signal processor and no additional computing unit is necessary. The sensor connects to a computer network as a regular network device (e.g. a network camera) and is configured and operated using a web client.

The system also has an open and flexible API for integration into Command & Control and security systems. The sensor has built in GPS for automatic localisation and time synchronization as well as sensors to measure orientation (pan, tilt). This allows for easy integration into 2D/3D map-based visualisation systems.

For mobile, ad-hoc and vehicle based use, from two to four sensors can be connected and powered from the ruggedized Discover Expansion Deployment Unit (EDU). The EDU can be operated on vehicle power (9-36 VDC) and if required the contents of the unit can easily be mounted in a standard 19" rack.



API

The API supports most C2 and security systems.

Specifications

Physical

Dimensions: 415 mm x 54 mm x 475 mm
Weight: 6 kg
Material: Aluminium, powder coated

Power Requirements

48 VDC (18 V to 75VDC), 600 mA
30 W

Processing unit (embedded in sensor unit)

CPU: Intel 4th Gen Core i7-4600U
Dual core (64- bit)
RAM: 16 GB DDR3L-1600
Storage: 240 GB SSD
Operating system: Linux 64 bit (Yocto build)

Audio and Video

Microphone elements: 128 MEMS microphones, 4th-order sigma-delta A/D converter
Microphone SNR: 65 dB
System SNR: < 85 dB
Frequency response: 200 Hz – 20 kHz
Camera resolution: 2592 x 1954 pixels
Camera FoV: 106° x 76°

Environmental

Operating temperature range: -20°C to 70°C
Storage temperature range: -40°C to 85°C
Ingress Protection: IP67

MIL-STD-810G

M 500.5, Procedure I and III, Low pressure
M 501.5, Procedure I-III, High Temperature
M 502.5, Procedure I-III, Low Temperature
M 506.5, Procedure I and III, Rain
M 507.5, Procedure II, Humidity
M 510.5, Procedure I and II, Sand and Dust
M 514.7, Cat 4, Vibration Com. Carrier transport
M 514.7, Cat 20, Vibration Ground vehicle operat.
M 516.7, Procedure I and V, Shock
M516.6, Procedure IV, Transit Drop Test