Bluvec Technologies

SECURE YOUR SKY

BLUVEC TECHNOLOGIES

Founded in Vancouver, BC, Canada, Bluvec is the pioneering developer of the Deep Signal Inspection (DSI) and RTI (Rapid target Inspection) technology and is a leading supplier of high-tech software and hardware for the precise detection and localization of drones. As a high-tech security and defense company, we provide cutting-edge solutions designed for a variety of use cases including airports, correctional facilities (prisons), water treatment plants, power plants, nuclear facilities, VIP protection, border DRDF (Delta Rapid Defense Force) systems, oil and gas fields, homeland security, military forces, law enforcement, and public and private sectors.

Bluvec Counter-Unmanned Aerial Vehicle (C-UAV) system **is also the ultimate security solution for smart cities.**

Easy Integration & Cloud Control (M):

The Bluvec's system can be integrated with other hardware such as radar and photoelectric equipment. Furthermore, it is automatically connected to the cloud.

Invading Drones' Fingerprint (S)

Obtaining drone fingerprints containing information including the brand, model, unique identification number, flight path, and intrusion time. If the drone returns for a sec ond intrusion, it will be identi fied by Bluvec's DSI.

Accurate Geolocation (M)

The Bluvec's system provides 3 60 degree coverage, supports direction-finding, and accurately locates drones and their pilots.

Modular or Standalone Deployment (M)

Bluvec's equipment can be deployed independently or integrated into existing security systems.

Threat Level Detection (C)

AI-powered algorithms automatically identify threat levels.

360° Passive Detection (M)

Bluvec's solutions can provide real-time 360 degree surveillance of any invading drones and their pilots, detecting passively without emitting signals or interfering with other systems.

Whitelisting and blacklisting (S)

Bluvec's AI-powered solutions have the capability to whitelist and blacklist drones, for easier management of a drone database.

AI-Powered and User Friendly (M)

Bluvec provides a user-friendly and IoT-oriented defense system, powered by intelligent AI. Operation training only takes half a day. The fully automated system can be started with one click of a button.

DSI Gen-2 (S)

This groundbreaking C-UAS technology can extract highly reliable and detailed information from drone signals.
With DSI-GEN2, drone and pilot geolocation can be achieved with a single Blusensor unit.

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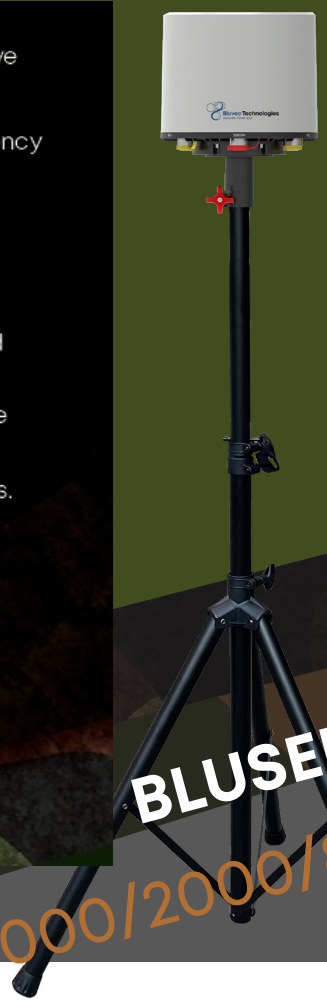
Blusensor employs Bluvec's pioneering Deep Signal Inspection technology for passive long-range detection and early warning of drones. It receives information without transmitting or impacting the surrounding environment, and accurately detects, locates and classifies drones and their remote controllers (under good radio-frequency propagation conditions)..

- Ultra-wideband support - 300 MHz ~ 6 GHz frequency band protocol analysis.
- Black & White List - able to add a drone into a black or white list with a single click. The white-listed drones do not trigger alarms.
- Easy installation and commissioning - the components can be quickly assembled through standard cables with minimal infrastructure construction.
- Scalability - a single sensor detects up to 8km, and the detection distance can be extended by deploying multiple sensors connected via an IP network.
- Compatibility - fully compatible with the Bluvec C-UAS control center and sensors.
- Robust operation- minimally affected by weather condition.
- Vehicle deployment as mobile detection units.

The system adopts an all-in-one design with high integrability, scalability, and adaptability. It can be integrated with other security systems and is suitable for long-term protection in areas such as airports, petrochemicals industry sites, critical infrastructure, correctional institutions, as well as large entertainment venues.



BLUSENSOR

A1000/2000/8000

Technology	Deep Signal Inspection Gen2
Range of Detection	Up to 10 km (good RF conditions))
Geolocalization for Drone	10m (RMS)
Geolocalization for Polit	10m (RMS)
Detection Frequency	300 MHz~6 GHz Full band scanning, detection, display
Product Dimensions (D x H)	Cylinder: D 220 mm, H 210 mm
Weight	3 kg
Ingress Protection Rating	IP65
Operating Temperature	-20 °C to 55 °C
Power Supply	AC 100-240 V
Power consumption	≤ 35 W
Connectivity	LAN/Cellular
Configuration, Operation, and Alarms	Bluvec WebUI
Software Updates	Local and/or Cloud
Data Storage	Local and/or Cloud
System Integration	GraphQL and RESTFUL based API interface
Interference ÷à² Other Systems	Zero interference
Simultaneous Detection	Up to 45 Drones
Directivity	360° Omnidirectional

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Blusensor employs Bluvec's pioneering Deep Signal Inspection technology for passive long-range detection and early warning of drones. It receives information without transmitting or impacting the surrounding environment, and accurately detects, locates and classifies drones and their remote controllers (under good radio-frequency propagation conditions).

- Higher detection range: up to 24km.
- Hardware capabilities support direction finding.
- Ultra-wideband support - 300 MHz ~ 6 GHz frequency band protocol analysis.
- Black & White List - able to add a drone into a black or white list with a single click. The white-listed drones do not trigger alarms.
- Easy installation and commissioning - the components can be quickly assembled through standard cables with minimal infrastructure construction.
- Scalability - a single sensor detects up to 24km, and the detection distance can be extended by deploying multiple sensors connected via an IP network.
- Compatibility - fully compatible with the Bluvec C-UAS control center and sensors.
- Robust operation- minimally affected by weather conditions.
- Vehicle deployment as mobile detection units.

The system adopts an all-in-one design with high integrability, scalability, and adaptability. It can be integrated with other security systems and is suitable for long-term protection in areas such as airports, petrochemical industrial sites, critical infrastructure, correctional institutions, as well as large entertainment venues..

BLUSENSOR LV

Technology	Deep Signal Inspection Gen 2
Range of Detection	Up to 24km (Good RF conditions)
Geolocalization for Drone	10m(RMS)
Geolocalization for Pilot	10m(RMS)
Direction Finding	9°(RMS)
Detection Frequency	300MHz~6GHz Full band scanning, detection, display
Product Dimensions (L x W x H)	Cylinder: D 220 mm, H 210 mm
Weight	5 Kg
Ingress Protection Rating	IP65
Operating Temperature	-20 °C to 55 °C
Power Supply	AC 100-240V
Power consumption	≤ 35 W
Connectivity	LAN/Cellular
Configuration, Operation, and Alarms	Bluvec WebUI
Software Updates	Local/Cloud subscription
Data Storage	Local/Cloud subscription
System Integration	GraphQL and RESTFUL-based API interface
***nterfereÂ with Other Systems**	NA
Simultaneous Detection	Up to 45 Drones
Directivity	360° Omnidirectional
Calibration	NA

Bluvec Technologies
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Blucam is an all-in-one solution, based on Rapid Target Inspection(RTI) technology, offering both camera surveillance capabilities and C-UAS solutions. It integrates AI-enhanced software designed to detect and track drones. With 360° azimuthal coverage, Blucam-A100 provides a wide coverage area for accurate early warning of approaching UAVs in all directions. It can be integrated with the Bluvec C-UAS control center and multiple Blucams or Blusensors to provide extended coverage.

- Independent operation - The system does not require any auxiliary equipment for functions such as radar or radio spectrum scanning.
- Active discovery - Based on the servo pan-tilt, it automatically scans and searches the surrounding airspace and raises the alarm when a drone is found.
- Intelligent analysis- Using proprietary advanced intelligent visual analysis and AI recognition algorithms, it can accurately identify various types of drones.
- Tracking- Accurately determines the position of drones, and automatically tracks them to obtain recorded visual evidence of airspace intrusions.

BLUCAM A100

Technology	Rapid Target Inspection
Detection Method	Active scanning, searching, identifying
Detection Distance	^p to 1.5km (in ideal weather conditions)
Accuracy of Direction Finding	±1°
Geolocalization	50m (RMS)
Angular Range	Horizontal: 360°, Vertical: 48°, 12.8 seconds per round
Focal Length	6 mm ~ 128 mm
Product Dimensions	1113mm×208mm (Height×Maximum diameter)
Weight	25 kg (Stand included)
Ingress Protection Rating	IP65
Operating Temperature	-30 °C to +65 °C (-22 °F to +149 °F)
Operating Humidity	<90%
Power Supply	AC 110 V or 220 V
Connectivity	Via LAN to existing IT infrastructure
Configuration, Operation, & Alarms	Bluvec WebUI
Software Updates	Local and/or Cloud
Input	RJ-45 Port
Data Storage	Local/Cloud subscription
System Integration	GraphQL and RESTFUL based API interface
Interference ÷ith Other Systems	Zero Interference
Systems	Zero Interference
Zoom	23x Optical
Resolution	3840 x 2160 pixels
Simultaneous Detection	1000 within directional width of 32 degrees

Bluvec Technologies
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The **Blucase P5000**, Bluvec's signature product powered by DSI-GEN2 and advanced AI- designed as portable solution for early-warning, drone detection, identification and location of the drone and the pilot. The monitoring data stream enables users to respond in an educated manner as quickly as feasible.

- Real-Time Detection
- Data Analysis *(not necessary because it would lead to data decoding which is illegal in USA and Europ)*
- Drone & Pilot Geo-localization (DJI & Non-DJI)
- 360- passive detection
- Waterproof- IP 67[1]
- Stand-Alone

The touch screen displays detailed telemetry data, including the drone model, serial number, speed, geolocation, altitude, and movements of the drone, as well as the pilot's position.
The mobile Blucase, as opposed to the fixed- deployed unit, is suitable for event monitoring, public safety events, VIP security, and different fields. Due to its compact, mobile, easy-operating settings, minimal training is required for adaptation of solution.
Blucase, provides central monitoring, command, and investigative capabilities while combining data from prior flights (history reports)

Technology	Deep Signal Inspection Gen 2
Range of Detection	Up to 5km (good RF conditions)
Geolocalization for Drone	Up to 5km
Supported UAVs	Non-DJI & DJI
Battery Mode Duration	>12h (up to 15h)
Detection Frequency	300MHz~6GHz Full band scanning, detection, display
Product Dimensions (L x W x H)	W 470 mm x D 357 mm x H 176 mm
Weight	<=12 Kg
Ingress Protection Rating	IP67
Operating Temperature	-20 °C to 55 °C
Power Supply	AC 100-240V
Power consumption	≤ 35 W
Connectivity	LAN/Cellular
Configuration, Operation, and Alarms	Bluvec WebUI
Software Updates	Local/Cloud subscription
Data Storage	Local/Cloud subscription
System Integration	GraphQL and RESTFUL-based API interface
Interference with Other Systems	NA
Simultaneous Detection	Up to 45 Drones
Directivity	360° Omnidirectional
Calibration	NA

BLUCASE P5000

Bluvec Technologies
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The Blubox uses Deep Signal Inspection (DSI) technology in order to detect and identify drones. With its small size and lightweight design, geolocation of the drone and pilot can be accomplished with a single device.

- Real-Time Detection
- Drone & Pilot Geo-localization (DJI & Non-DJI)
- 360- passive detection
- Waterproof- IP 67
- Stand-Alone

The mobile Blubox VIP, as opposed to the fixed- deployed unit, is suitable for event monitoring, public safety events, VIP security, and different fields. Due to its compact, mobile, easy-operating settings, minimal training is required for adaptation of solution. Can be easily integrated with other Bluvec products or third party technologies.

Technology	Deep Signal Inspection
Range of Detection	Up to 3km, upon request and additional antenna can up to 5km
Geolocalization	Drone & Pilot
Supported UAVs	Non-DJI & DJI
Geolocation of Drone & Pilot	Drone & Pilot geolocation, via DSI Gen2
Detection Frequency	300MHz~6GHz Full band scanning, detection, display
Product Dimensions (L x W x H)	L 27cm x W17 cm x H 5cm
Weight	3 Kg
Ingress Protection Rating	IP67
Operating Temperature	-20 °C to 55 °C
Power Supply	AC 100-240V
Power consumption	≤ 35 W
Connectivity	LAN to existing IT infrastructure
Configuration, Operation, and Alarms	Bluvec WebUI
Software Updates	Local/Cloud subscription
Data Storage	Local/Cloud subscription
System Integration	GraphQL and RESTFUL-based API interface
Interference with Other Systems	NA, passive
Simultaneous Detection	Up to 45 Drones
Directivity	360° Omnidirectional
Calibration	NA

BLUBOX VIP

What is DSI Generation 2?

Deep signal inspection (DSI) is an advanced signal detection technology invented by Bluvec Technologies Inc. It leverages the receiving and decoding of the protocols transmitted by wireless signal sources, e.g., the drones, cellphones, IoT devices, etc., to detect and identify the signal sources. To be simplified, we take drones' detection as an example in the following description of the DSI technology.

Due to the advantage that the DSI decodes wireless signal protocols, it provides highly precise detection with identification of drones. Such precise detection introduces almost no false alarms. In the meanwhile, DSI supports identification of drones which can distinguish different individual drones even in the same brand and same model, such as multiple DJI Mavic Pro drones. The identification (ID) of each individual drone will be decoded once it is detected. Such functionality can support swarm attacks of multiple drones. Further, DSI technology depends on a signal database, which contains different protocol patterns and detection algorithms. Bluvec Technologies R&D team continues contributing to the database. As of now, it has covered the patterns and detections of almost all the commercial drones and DIY (do-it-yourself) drone modules in the current market. Besides, the DSI database is also scalable. More future drones will be added once it comes to the market.

Recently, Bluvec has evolved the DSI technology to generation II (DSI-2) by further decoding the signal protocols to the application layer. From the decoded application layer data, more precise information about the drone has been extracted, including but not limited to the serial number, flying status, GPS location and fly traces of the drone and even the remote controller's real-time location, etc. Such technology could help Blusensor identify and geo-localize the drone and its corresponding pilot more precisely with only a single sensor station. Bluvec DSI-2 supports various protocols, such as DJI, crossfire, mavlink, etc. In the meanwhile, Bluvec continues investments to extend the protocol coverages of DSI-2.

Bluvec Blusensor series products are powered by the DSI technology for drone detection, identification and geo-localization. The software-defined radio (SDR) module is built in the Blusensors to receive wireless signals. The implementation of the DSI technology is running over a multi-core CPU and GPU for signal processings which consumes the received wireless signals. The multi-core GPU (>=384 cores) rapidly accelerates the signal processing for DSI detections and identifications. It yields almost real-time outputs for drone detection. With the power of DSI technology, Bluvec Blusensors provide one of the best C-UAS solutions in the market.

Applied Products: Blusensor A1000/2000/8000, Blusensor LV, Blugun, Blushield A8000.

What is TDOA Technology?

Time-Difference-of-Arrival (TDOA) technology is an advanced method of determining a transmitter location by measuring the time differences for a transmitted signal to reach each node of a receiver network. A network of spatially separated Blusensors can use TDOA measurements to determine the location of a drone that is detected simultaneously by at least three of the sensors in the network. With network nodes separated by several kilometers, this technique is accurate to within tens of meters for drones that are within the perimeter of the network.

The radio frequency communication signal from a drone to its controller is always framed by some form of synchronization sequence which is used by the controller's receiver to acquire and maintain the timing of the radio link. A sensor trained to recognize this synchronization sequence can eavesdrop on this radio link and estimate its timing relative to the sensor's time base. Then two such sensors with a common time base can measure a TDOA from the drone and, using the radio wave propagation speed, translate this to a range difference. With the drone and the sensors considered to be in a plane, the range difference defines a hyperbola of points passing between the two sensors, with each point representing a possible location of the drone. Either of these sensors paired with a third sensor on the same time base can determine a second hyperbola of possible drone locations, and the intersection of the two hyperbolas would determine the drone location uniquely.

Applied Products: Blusensor A1000/2000/8000, Blusensor LV, Blushield A8000.

What is RTI Technology?

Rapid Target Inspection(RTI) is optimized for tiny targets in high-resolution 4k images. By employing AI-assisted scanning strategies, our powerful camera network can quickly pinpoint long-distance objects for target inspection. Due to highly specialized training, the camera can discover targets that are only a few pixels in size. We utilize the deep features generated by our artificial neural network to distinguish between target objects and other flying objects, such as birds and airplanes. We designed a hierarchical representation for detected objects and an intelligent ranking algorithm to ensure rapid target inspection. Our engine can score detected objects and focus on the most relevant targets even when interference is present. Furthermore, by incorporating temporal information, the camera system is able to maintain short-term memory of visual regions of interest. By observing frames in succession, the engine prioritizes targets based on their risk level.

Applied Products: Blucam.

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