We defend your airspace

Auto Counter UAVs Solution

R&D Background

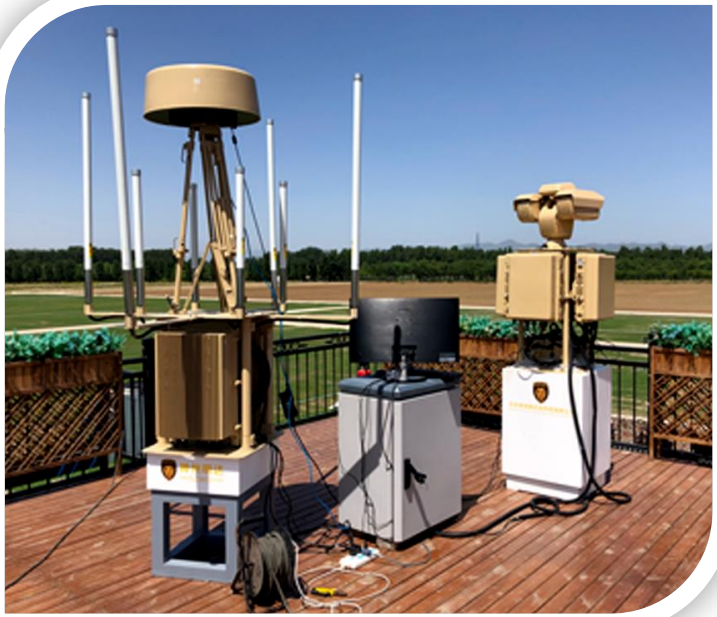
As rapid evolution of low-cost, highly capable drones presents a new set of challenges. The concerns grow, a new market for counter-drone technology is rapidly emerging.
Our integrated anti drone solution unique and flexible approach enables us to offer comprehensive drone defense protection. It mainly provides RF sensor passive detection, or Radar active surveillance detection , EO/IR tracking and location of multiple detected low-flying drones, as well as the mitigation by the RF neutralization system.

Radar Detection Subsystem--Drone Radar Real-Time Detection

Radars emit electromagnetic waves and receive and process the echoes reflected by objects, usually to locate them.
Drone detection Radar enables detection beyond the RF signal, which provide Front-end Real-time detection & monitoring with 360 degree/90 degree coverage and fastest scan rate, able to detect drones at distance of up to 1-3km, with automatic detection and tracking of multiple detected drones.

Radar surveillance systems

- Microwave Pulse Doppler technology based; (C-band & S-band)
- Detection of wide variety of moving objects (pedestrians, land vehicle and lo
- 360 degree/90 degree real-time monitoring
- Available for short range, medium range and long range requirement



Drone detection radar in combination with RF detection system or RF neutralization system to provide drone detection and counteraction for drones intrusion within protected area.

Auto Counter UAVs Solution

RF Detection Subsystem--RF passive sensor detection system

Civil drones are usually operated via a radio control signal and often have on-board data link transmitters for real-time sensor download. RF detection system can passively detect and identify the presence of RF transmissions that related to drones, even the signals are of low power or in RF noisy conditions.

RF drone detection systems
-- RF sensor detect for any drone that emits an RF signal (Known and unidentified drones)
-- 360 degree detection radius of up to 3 kilometer (diameter)
-- Simultaneous detect for many drones during the intrusion
-- Even geo location of the drone and the drone controller

RF sensor detection system can work together with Radar detection system to give the 3D location of the drones, the flight height as well as air speed. Once a drone is detected, the system will trigger an alert.

EO/IR Camera Tracking SubSystem

EO visual and thermal camera tracking

Our visual and thermal camera surveillance guarantees the ability to view any target, day or night. To be regarded as an additional layer to on top of RF/Radar to provide imaging of detected targets.

- High sensitivity Tracking capability within the detection range;
- Excellent visual output for day camera & thermal imaging camera;
- Visual intrusion alarms;

Auto Counter UAVs Solution

RF Neutralization Sub System

RF neutralization subsystem was designed to neutralize the flight unauthorized Drones by interfering their control and navigation signals.

- GNSS：1550-1620 MHz;
- Remote Control Signal：860-930MHz; 2400-2500MHz; 5725-5850MHz;
- Optional Frequency: 5150-5350MHz; 315MHz; 433MHz;
- Omnidirectional & directional antenna both available;
- Additional jamming bands can be added upon demand;
- Remote Control Signal: 1-3km; GNSS Signal: 3-5km

Monitoring Software Center

An information processing and command center of the automatic UAV detection and defense system used to control each subsystem and equipment of the system through collection, presentation, analysis, statistics and query of various information as well as real-time control of the system.

- Simple, intuitive display and control of one or more subsystem
- Microsoft Windows based
- User definable alert and exclusion zones
- Automatic selection of background maps
- Continuous record and playback facility for post-event analysis

Auto Counter UAVs Solution

System Composition

- Low-altitude UAVs Detection Radar
- Passive RF Detection Subsystem
- Electro-Optical (EO) Track Subsystem
- Directional & Omni Directional RF Neutralization Subsystem Portable Jammer Gun
- Monitoring Center

The anti-UAV system is a fast and effective counter drone system which can alert, monitor and disrupt any drones of ultra-low altitude from flying into a protected area.

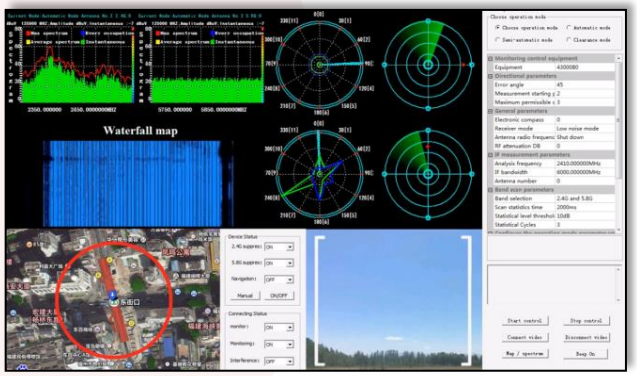
The UAV engaged in hostile airborne surveillance and potentially malicious activity can be quickly captured by the surveillance radar after its invasion, and the position information is sent to the EO tracking subsystem for further precise search, recognition and automatic tracking. After then neutralization subsystem will adopt electromagnetic interference to interrupt its satellite navigation system and wireless remote communication system, so that the hostile drone loses flight control capability (automatic landing or returning to the original place).

The system also can be used for countering multi-batch UAVs and UAV formations.

Auto Counter UAVs Solution

Hostile UAV

Passive Detection and
Positioning Subsystem



Control Center

EO Track Subsystem

Surveillance Radar

EO Tracking & Directional RF
Neutralization Subsystem

Auto Counter UAVs Solution

Radar Detection C band & S Band	1 KM	ASR 223-1C1K ASR 223-5C1K-3D
	3 KM	ASR 226-1C3K ASR 226-5C3K-3D
	4-6 KM	ASR 216-1S
RF Detection	3 KM	Passive RF Detection Subystem WSDF-3A4D

Drone Radar Real-Time Detection

Radars emit electromagnetic waves and receive and process the echoes reflected by objects, usually to locate them.

Drone detection Radar enables detection beyond the RF signal, which provide Front-end Real-time detection & monitoring with 360 degree/90 degree coverage and fastest scan rate, able to detect drones at distance of up to 1-3km, maximum range up to 4-6km, with automatic detection of multiple detected drones.

Radar surveillance systems

- Microwave Pulse Doppler technology based;
- C-band & S-band Technology;
- Accurate Detection of low flying drones;
- 360 degree/90 degree real-time monitoring;
- Available for short range, medium range and long range requirement;

Drone detection radar in combination with RF detection system or RF neutralization system to provide drone detection and counteraction for drones intrusion within protected area.

Air Surveillance Radar
ASR 223-1C1K / C band

ASR 223-1C1K, Adopting DBF technology, can directly control the amplitude and phase of each radiation unit through digital means, flexibly generating beams and beam pointing of various shapes.

Features

- High data rate and high positioning accuracy
- Multi-Input Multi-Output (MIMO) system
- All-weather adaptability

Application: Airports, military bases, border areas and other key areas security surveillance

Item	Specification
Working mode	Phased array + Pulse Doppler
Working frequency	C band (5.5-5.8GHz)
Detection range	1.2km (DJI Phantom 3/4、“ Mavic”, RCS≈0.01㎡)
Minimum detection range	≤100m
Azimuth coverage	Single panel：90° (Dual panel:180°, 3-panel:270°, 4-panel:360°)
Elevation coverage	40°
Distance accuracy	≤10m
Azimuth Accuracy	≤1.0°
Target detection speed	0.2m/s - 25m/s
Speed precision	≤0.2m/s
Data rate	≤1.5s
Peak Output	4W/Panel
Net weight	≤10kg
Power supply	AC220V/40W
Interface	Ethernet (UDP protocol)
Dimension	445mm X 300mm X 400mm
Working temperature	-40 ℃ ~ +60 ℃
Working Environment	Rain-proof; Dust Prevention; Sand-prevention; Moisture-proof, Mold-proof and Salt-proof

Air Surveillance Radar
ASR 223-5C1K-3D / C band

ASR 223-5C1K-3D is a security surveillance radar, which is the same type of radar as ASR 223-1C1K which is a phased array radar with advanced technology and stable performance developed for the detection of low flying drones.
The difference is that ASR 223-1C1K is a single-array radar, while ASR 223-5C1K-3D is a four-array radar, as well as equipped with height finding radar.

Features
- High data rate and high positioning accuracy
-- Multi-Input Multi-Output (MIMO) system
- All-weather adaptability

Application: Airports, military bases, border areas and other key areas security surveillance

Item	Specification
Working mode	Phased array + Pulse Doppler
Working frequency	C band (5.5-5.8GHz)
Detection range	1.2km (DJI Phantom 3/4、“ Mavic”, RCS≈0.01㎡)
Minimum detection range	≤100m
Azimuth coverage	4-panel: 360°+ (Height Detection Radar 3D)
Elevation coverage	40°
Distance accuracy	≤10m
Azimuth Accuracy	≤1.0°
Target detection speed	0.2m/s - 25m/s
Speed precision	≤0.2m/s
Data rate	≤1.5s
Peak Output	4W/Panel
Net weight	≤70kg
Power supply	AC220V/250W
Interface	Ethernet (UDP protocol)
Dimension	725mm X 725mm X 735 mm (2D) 725mm X 725mm X 1400 mm (3D)
Working temperature	-40 ℃ ~ +60 ℃
Working Environment	Rain-proof; Dust Prevention; Sand-prevention; Moisture-proof, Mould-proof and Salt-proof

Air Surveillance Radar
ASR 226-1C3K / C band

ASR 226-1C3K security surveillance radar is mainly used for searching small targets in the air. It has the function of all-airspace search to local airspace search, and can process multiple targets.

Features
- High data rate and high positioning accuracy
- Multi-Input Multi-Output (MIMO) system
- All-weather adaptability

Application: Airports, military bases, border areas and other key areas security surveillance

Item	Specification
Working mode	Phased array + Pulse Doppler
Working frequency	C band (5.5-5.8GHz)
Detection range	3.5km (DJI Phantom 3/4、“ Mavic”, RCS≈0.01㎡)
Minimum detection range	≤100m
Azimuth coverage	Single panel：90° (Dual panel:180°, 3-panel:270°, 4-panel:360°)
Elevation coverage	40°
Distance accuracy	≤10m
Azimuth Accuracy	≤1.0°
Target detection speed	0.2m/s - 25m/s
Speed precision	≤0.2m/s
Data rate	≤1.5s
Peak Output	120W/Panel
Net weight	≤11.2kg
Power supply	AC220V/120W
Interface	Ethernet (UDP protocol)
Dimension	445mm x 300mm x 156mm
Working temperature	-40 ℃ ~ +60 ℃
Working Environment	Rain-proof; Dust Prevention; Sand-prevention; Moisture-proof, Mold-proof and Salt-proof

Air Surveillance Radar
ASR 226-5C3K-3D

ASR 226-1C3K security surveillance radar is a four-array radar, as well as equipped with height finding radar.

Features
- High data rate and high positioning accuracy
- Multi-Input Multi-Output (MIMO) system
- All-weather adaptability

Application: Airports, military bases, border areas and other key areas security surveillance

Item	Specification
Working mode	Phased array + Pulse Doppler
Working frequency	C band (5.5-5.8GHz)
Detection range	3.5km (DJI Phantom 3/4、“ Mavic”, RCS≈0.01㎡)
Minimum detection range	≤100m
Azimuth coverage	4-panel:360°+ (Height Detection Radar 3D)
Elevation coverage	40°
Distance accuracy	≤10m
Azimuth Accuracy	≤1.0°
Target detection speed	0.2m/s - 25m/s
Speed precision	≤0.2m/s
Data rate	≤1.5s
Peak Output	120W/Panel
Net weight	≤91kg (5 panel) (80kg+11kg)
Power supply	AC220V/500W
Interface	Ethernet (UDP protocol)
Dimensions	725mm X 725mm X 580 mm (2D) & 800mm X 800mm X 900mm (3D)
Working temperature	-40 ℃ ~ +60 ℃
Working Environment	Rain-proof; Dust Prevention; Sand-prevention; Moisture-proof, Mould-proof and Salt-proof

Ground Surveillance Radar
GSR 216-1S / S band

GSR216-1S, working in S-band, adopting the digital technology of active phased array system through the modular, satisfactory design, the integrated use of adaptive moving target detection, digital T/R (transmit/receive), DBF (digital beam forming), analogue to digital integration design, with a stable detection performance, high precision, and low cost.

Is an excellent ground-moving target detection radar, which can realize the critical monitoring area ground-moving target detection, vigilance and position indicator for monitoring the system to provide real-time, accurate and continuous target information.

Technical Highlights

- All-digital active phased array technology system, receiving and receiving DBF technology

- Digital T/R technology and highly integrated RF and digital integration design technology

- Adaptive moving target detection and doppler clutter suppression

- Stabilization tracking technology of ground moving target

Ground Surveillance Radar
GSR 216-1S / S band

Advanced technology

GSR216-1S radar adopts the phased array system of one-dimensional phase sweep, carries out electrical scanning in azimuth, as the result the beam pointing is flexible and fast, and can realize rapid scanning without inertia. At the same time, it can carry out non-uniform detection, and adopt different detection schemes for different regions to improve the overall detection performance.
The software radar design scheme based on the full digital phased array system has strong expansibility and online upgrade capability.

Excellent ground moving target detection ability

GSR216-1S Radar with Doppler filtering system, is designed based on the phased array system, which completely eliminates the clutter spectrum diffusion problem caused by the scanning modulation of radar antenna. It can be configured online for a long time and has stronger clutter suppression ability, which is more conducive to detection and tracking of low speed moving targets in a strong clutter environment.

High reliability

GSR216-1S radar does not need mechanical rotating equipment, which will not affect radar operation due to mechanical and electrical failure, and with higher reliability.

At the same time, compared with the parabolic radar with single channel, the phased array radar works in parallel with multiple channels, which can work normally even if some channels fail, thus improving the mission reliability of the product.

Simple installation, easy to operate

GSR216-1S radar adopts modular design, simple structure, easy installation, no rotating joint, and can be applied to different installation conditions.

Radar array interface is simple, including only a power interface and a network interface, simple and convenient wiring.
The radar outputs the target position and feature information, which is displayed and operated in the supporting terminal software.
The terminal software is simple to operate and easy to learn and use.

Ground Surveillance Radar
GSR 216-1S / S band

Item	Specification
Working system	Phased array system (Azimuth phase sweep)
Working mode	Pulse doppler
Working frequency	S band（5 operating frequency points）
Maximum detection range	≥ 8km (Pedestrians) ≥ 15km (Vehicle/ships)
Minimum detection range	≤ 100m
Detection range	Azimuth coverage：90° (Can be multi - planar array splicing, to 360°) Elevation coverage：18° (Center to adjustable range -12°- 12°)
Detection speed	0.5m/s～45m/s
Accuracy of measurement	Range accuracy：≤ 10m Azimuth accuracy：≤ 1.0° Speed accuracy：≤ 0.5m/s -45m/s
Data rate	Searching：≤2s
Data interface	RJ45, UDP
Power supply	AC 220V
Power consumption	≤ 200W
Working environment	Working temperature：-40℃～+55℃； Storage temperature：-45℃～+65℃； Waterproof grade is IP 66 at least.
Dimension	682mm×474mm×232mm
Weight	≤30kg

Note: Detection range condition: for pedestrians or vehicles (ships) with radial velocity not less than 0.5m/s, false alarm probability is 10-6, and detection probability is 0.8.

RF passive sensor detection system

Civil drones are usually operated via a radio control signal and often have on-board data link transmitters for real-time sensor download. RF detection system can passively detect and identify the presence of RF transmissions that related to drones, even the signals are of low power or in RF noisy conditions.

RF drone detection systems

- RF sensor detect for any drone that emits an RF signal (Known and unidentified drones);
- 360 degree detection range of up to 1-3 kilometer;
- Simultaneous detect for many drones during the intrusion;
- Even geolocation of the drone and the drone controller;

RF sensor detection system can work together with Radar detection system to give the 3D location of the drones, the flight height as well as air speed.

Once a drone is detected, the system will trigger an alert.

UAV RF Passive Detection Subsystem-WSDF-3A4D
Monitoring frequency range: 840-940MHz ; 2400-2500MHz ; 5725-5850MHz;
Signal style: UAV measurement and control signals, IEEE 802.11a, b, n, g, digital transmission, remote control signals;
Detection distance: ≥1km (WSDF-3A4D-1K)
Detection distance: ≥3km (WSDF-3A4D-3K)
Detecting airspace: azimuth 360° full airspace;
Measure accuracy: better than ±3° (RMS);
Single station ranging accuracy: better than 20%R;
Multi-station positioning accuracy: better than 5%R (baseline distance is greater than 1km);
Detecting the number of drones simultaneously: greater than 40
First interception time: ≤3s
Power Supply: 28V/DC or 220V/AC
Waterproof: IP65
Interface requirement: Ethernet & Power interface
Working temperature: -20 ℃ ~ +70 ℃
Working Environment: Rain-proof; Dust Prevention; Sand-prevention; Moisture-proof, Mold-proof and Salt-proof

EO Day and IR thermal camera tracking

Our day camera and IR thermal camera surveillance guarantees the ability to view any target, day or night. To be regarded as an additional layer to on top of RF/Radar to provide imaging of detected targets.

- High sensitivity tracking capability within the detection range;
- Excellent visual output for day camera & thermal imaging camera;
- Visual intrusion alarms;

EO Tracking Subsystem (Customized by Clients)

Day & IR Cameras
Day Camera: 2km (UAVs)
Thermal Camera: >2800m (UAVs) and >8000m (Vehicle)
Resolution: IR camera: 640*512 @50Hz
Visible light camera: 1920*1080 @60Hz.
Max recognition & tracking distance: ≥ 1.2km;
Zoom: 36x optical zoom
Pan angel：0°~ 360°; Ø Tilt angel：-50°~ 40°; Ø MTBF: ≥10000hrs;
Power Consumption: 100w;
Weight: ≤ 25Kg
Dimension: 646×411×330mm
Waterproof: IP65
Interface requirement: Ethernet & Power interface
Working temperature: -20 ℃ ~ +60 ℃
Working Environment: Rain-proof; Dust Prevention; Sand-prevention; Moisture-proof, Mold-proof and Salt-proof

RF Neutralization system & Directional RF Jamming System (WSDG1.0-DN3000)

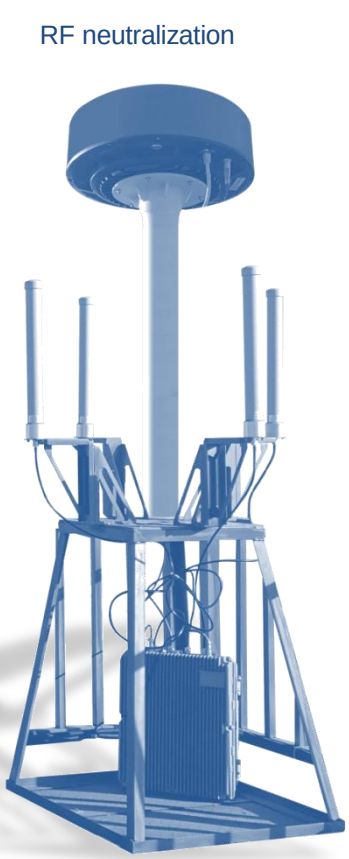
RF neutralization subsystem was designed to neutralize the flight unauthorized Drones by interfering their control and navigation signals.

- GNSS：1550-1620 MHz;
- Remote Control Signal：860-930MHz; 2400-2500MHz; 5725-5850MHz;
- Optional Frequency: 5150-5350MHz; 315MHz; 433MHz;
- Omnidirectional & directional antenna both available;
- Additional jamming bands can be added upon demand;
- Remote Control Signal: 1-3km; GNSS Signal: 3-5km;

Directional RF Jamming System - WSDG1.0-DN3000

Interference Frequency Bands: GNSS：1550-1620 MHz
Remote Control Signal：
860-930MHz;
2400-2500MHz;
5725-5850MHz
Optional Frequency:
5150-5350MHz; 315MHz; 433MHz
Jamming Range (Customized for Clients) Standard Jamming Range:
Remote Control Signal: 1-3km; GNSS Signal: 3-5km;

- Polarization: Vertical Min 30°- Max 60°(For different type of Jammer)
- Antenna Gain: Min 10dB
- Output Power: Min 20 Watts/channel; GNSS: Min 10 Watts
- Reaction Time: 1s-3s (Depends on the distance of UAVs)
- Operation Temperature: -20℃ - 60 ℃
- Waterproof: IP65
- Interface requirement: Ethernet & Power interface
- Working temperature: -20 ℃ ~ +60 ℃
- Working Environment: Rain-proof; Dust Prevention; Sand-prevention; Moisture-proof,
- Mold-proof and Salt-proof



Neutralization Subsystem
i-directional Jamming- WSDG1.0-ODNF1

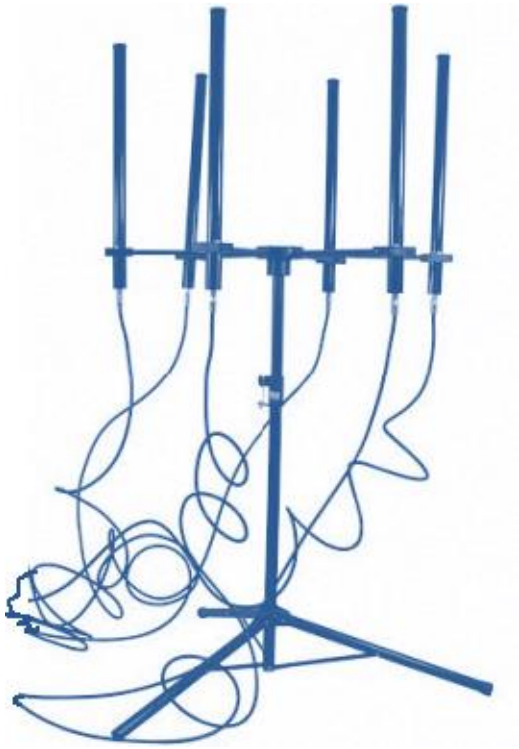
Omni-Directional RF Jamming System--WSDG1.0-ODNF1

Interference Frequency Bands:
GNSS：1550-1620 MHz
Remote Control Signal: 860-930MHz; 2400-2500MHz; 5725-5850MHz
Optional Frequency: 5150-5350MHz; 315MHz; 433MHz

Jamming Range (Customized for Clients)
Standard Jamming Range: Remote Control Signal: 1-2km;
GNSS Signal: 1-2km;

Polarization: Vertical
Antenna Gain: 3dB
Output Power: Min 20 Watts/channel; GNSS: Min 10 Watts
Reaction Time: 1s-3s (Depends on the distance of UAVs)
Waterproof: IP65
Interface requirement: Ethernet & Power interface
Working temperature: -20 ℃ ~ +60 ℃
Working Environment: Rain-proof; Dust Prevention;

Sand-prevention; Moisture-proof, Mould-proof and Salt-proof



Neutralization Subsystem

Omni-Directional RF Jamming System
WSDG1.0-ODNF1K-B

Frequency:
2400 - 2500 MHz;(Standard) 5725 - 5850MHz; (Standard)
1550 - 1620 MHz (GNSS); (Standard)
860 - 930 MHz; (Standard)
430-436MHz; (Optional)

Power Consumption: 500w
Jamming Range: Up to 2km
Dimension: 1200x1200x1400mm
Weight: 60kg

Omni-Directional RF Jamming System
WSDG1.0-ODNF1-4A5K

Frequency:
1550-1620 MHz;
860-930MHz;
2400-2500MHz;
5725-5850MHz;
Optional Frequency:
5150-5350MHz;
315MHz; 433MHz;

Jamming Range：3-5km;
Polarization: Vertical Min 30°- Max 60°;
Output Power: Min 100 Watts/channel;
GNSS: Min 20 Watts;
Reaction Time: 1s-3s;
Operation Temperature: -20℃ - 60 ℃;
Waterproof: IP65;
Interface requirement: Ethernet & Power interface

Omni-Directional RF Jamming System
WSDG1.0-ODNF1-4A

Frequency:
2400 - 2500 MHz;(Standard) 5725 - 5850MHz; (Standard)
1550 - 1620 MHz (GNSS); (Standard)
860 - 930 MHz; (Standard)
430-436MHz; (Optional)

Power Consumption: 500w
Jamming Range: Up to 3Km
Dimension: 1200x1200x1400mm
Weight: 60kg