F.A.Q. SHEET

RULE THE SKY!

- **NEW!** Real-time ALL frequency monitoring (NO bands), detects any drone at any frequency!
- Real-time AI frequency monitoring and 3D DF including height information
- Scalable for huge sites and borders
- Extremely high detection range of up to 50 km
- 360°A/90°E full dome coverage with high tracking accuracy
- Detects and tracks 3G, 4G and 5G drones
- Ultra-wide frequency range (9KHz to 20GHz)
- All-in-one solution, multi-sensor support, latest AI-based software
- Locates drone swarms and drone operators

drone-detection-system.com
1. PERFORMANCE

How large is the system’s detection range?

The AARTOS Drone Detection System features a virtually unlimited detection range. Usually, the detection range is equal to (or larger than) the maximum distance between the operator and the drone, depending on the transmission power of the drone and/or its operator. The latest AARTOS DDS V6 generation can handle a DJI Phantom 4 FCC drone from a range of 50 km or more. The specific range depends on factors such as drone type and topography.

Can the system detect the altitude of the drone as well?

Absolutely – this is a unique feature of the AARTOS DDS! With two or more antennas, the DDS can detect the drone’s altitude; a single system will already show the azimuth.

How quickly can a drone be detected?

Detecting a drone may take the system between 10 µs to 500 ms, depending on factors such as the complexity of the specific AARTOS system in use, the number of IsoLOG 3D DF antenna arrays, etc.

Is it possible to measure the distance to the drone?

Yes, only two systems are needed to accurately measure the distance of the drone – most competing drone detection systems require at least three antennas for this. For best results, however, we recommend using three or more systems.

What does ALL-BAND MONITORING mean?

Traditional RF-based drone detection solutions only monitor specific bands (e.g. WiFi 2,4/5,8GHz or ISM 433/868MHz) because this is where most commercial drones have operated in the past. But the threat landscape is changing. The latest commercial and custom drones will connect at any (mostly illegal) frequencies. This is why we developed our unique all-band-monitoring receiver and ultra-wide-band tracking antenna.

The AARTOS DDS manages to monitor the entire frequency spectrum (e.g. 100MHz - 6GHz) hundreds of times per second. Whatever frequency the drone operator might use, we will be able to detect and track it. This feature is completely unique on the market.

What kind of coverage does the system provide?

The system’s 3D DF antenna provides 360° dome coverage (360° azimuth and full 90° elevation). This feature is unique on the market. It can also be adjusted to specific needs, e.g. a 90° or 180° (edge) coverage.

Can the AARTOS DDS locate the drone operator?

Yes, the AARTOS DDS will detect the drone operator. It can track the operator’s movements even if drone and operator are operating at different frequencies or bands.

What detection mechanisms are being used?

The AARTOS DDS uses real-time RF signal detection plus a combination of AI-based smart pattern triggers and neural network scans.

Optical, acoustic or radar-based drone detection solutions are not able to perform this kind of early-warning detection.

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**Does the AARTOS DDS depend on a line of sight?**

Even though the quickest detection is reached within line of sight, the system does not require it. The AARTOS DDS relies on RF signals, which by their nature can be traced regardless of obstructions – they can be detected and traced whether they originate behind buildings or trees, in the woods or within a crowd of people. If the signal is strong enough, the system's detection range is virtually unlimited.

**Are there limitations to the detection and tracking altitude and/or elevation with respect to the sensor(s)?**

Since the system can be equipped with an unlimited number of sensors to form a network covering larger areas, there are no inherent limitations in terms of altitude and elevation. All systems can be linked to a single monitoring center with remote-control capabilities for each individual system. Each single system covers a radius of 360°, including the airspace above the sensor (i.e. 360° dome coverage).

**If a drone's frequency range is unknown – how does the AARTOS DDS detect it?**

The latest AARTOS X3, X5 and X7 systems offer an extremely fast scan mode with a sweep speed above 1THz/s. This way, the system is able to monitor the complete frequency range (e.g. 100MHz - 6GHz) hundreds of times per second.

The AARTOS X9 system offers an even faster sweep reaching up to 48THz/s by stitching multiple receivers together.

**Does the AARTOS DDS support 24/7 surveillance?**

Yes, the AARTOS DDS can be switched to a 24/7 recording mode.

The system is able to continuously monitor and record the entire real-time spectrum as long as the internal/external storage space (HDD/SSD) does not run out. In the context of a criminal prosecution, this information can be used as valuable evidence.

**Can the AARTOS DDS be switched to an event-recording mode?**

Yes, the AARTOS DDS can be set to SmartEvent Recording Mode. This operation mode automatically filters out and deletes useless data to minimize the amount of data written to the internal/external storage devices (HDD/SSD).

**Can the AARTOS DDS detect 3G, 4G or even 5G Drones?**

Yes, the latest AARTOS DDS can detect any flying RF transmitter at any frequency - even flying cellphones!

**Can the AARTOS DDS be disguised or camouflaged?**

Yes, in fact the system can very easily be covered without impacting its detection capabilities.

The antenna can be covered with any material, such as camouflage netting, as long as the material is RF non-reflective (i.e. not made of metal). This is yet another advantage of the AARTOS DDS system over optical, acoustic or radar-based drone detection systems. When mounted on a vehicle, the AARTOS DDS can hardly be distinguished from a common TV or satellite antenna.
An AARTOS DDS container deployed in the Swiss Alps, self-sustaining for up to 3 months

Could the performance of the AARTOS DDS be negatively affected by other RF radiation (urban environment, WiFi, Bluetooth, etc.)?

No, additional RF radiation does not influence the system at all.

Does the AARTOS DDS work at night?

Yes, the AARTOS DDS works around the clock, day and night. The availability of daylight is not a limiting factor to the system.

Is the performance of the AARTOS DDS limited to certain weather conditions?

No, the AARTOS DDS is entirely weather-proof and impervious to fog, rain, snow, etc. It was designed and tested to be operated under the harshest conditions.
2. TRIGGERS AND IDENTIFICATION

Can the AARTOS DDS distinguish a drone signal from common WiFi or other RF signals?

Yes, our system uses intelligent AI-based pattern classification, enabling it to distinguish precisely between signal types.

How does the AARTOS DDS distinguish between different drone models or signals?

We use a sophisticated method of recording drone emission patterns. These patterns are saved in our Smart Trigger Pattern Database (STPD) which is constantly being maintained and expanded (optional upgrades are available via service contracts). For professional use, users can also add custom pattern recordings to their database through the system’s teach-in function.

Is it possible to prevent friendly drones from triggering the alarm?

Yes, the system is adaptable: You can use the teach-in function mentioned above to teach the AARTOS DDS which drones are friendly. Once recorded, the system is able to distinguish friendly drones from actual threats (black- and whitelist).

Could commercial planes, birds or other airborne objects cause the system to trigger a false alarm?

Absolutely not. The AARTOS DDS has been specifically designed to distinguish on a sophisticated level between drones and other airborne objects, minimizing the likelihood of false alarms.

When the AARTOS DDS detects a drone and triggers an alarm, can it provide any information on the location of the drone or the operator? How accurate is this information?

The AARTOS DDS will detect both drones and operators. However, the extent and accuracy of this information depends on the number of systems and antennas in use. A single AARTOS DDS can provide the direction and azimuth for a drone signal. The accuracy depends on the type of IsoLOG used: The IsoLOG 3D DF 160 antenna offers up to 1° sector accuracy, meeting ITU class A – the highest class. Real-life accuracy, however, depends on the specific environment (antenna height, reflecting objects etc.).

Another factor determining the level of accuracy is the number of IsoLOG antennas. If two or more antennas are being operated, signal triangulation enables users to locate the exact position and altitude of the drone and/or its operator. A single antenna will only register the direction and azimuth of the signal.

Is the system able to detect several drones at once?

Yes, the system can detect multiple drones or drone swarms at once – regardless of brand, type frequency/frequencies or direction.

Airport installation with AARTOS DDS Container
3. COUNTERMEASURE SOLUTIONS

Do you have any products that can prevent a drone from entering a facility’s airspace?

Yes, we offer various so-called countermeasure solutions (CMS), a.k.a. Jammers, to “keep drones out”, as it were. Both stationary and mobile solutions are available, such as our mobile handheld jammer and automatic stationary sector jammers.

Once detected, how long does it take to disable a drone?

From the time a drone has been spotted by the AARTOS DDS, it takes between 1-2 seconds to block the control signal and video link. These figures apply to the stationary and the mobile CMS versions as well.

Are the countermeasure solutions integrated into the main system?

Yes, the stationary CMS can be integrated seamlessly into the AARTOS DDS system.

What is the shutdown range of the countermeasure solutions?

Depending on the specific model, the stationary CMS has a range of up to 12 km (7 miles).

Since the mobile handheld CMS is entirely manual, it is not available as an integrated solution.

The mobile CMS has a shutdown range of 1-2 km (1 mile), while still being able to block the systems of targets further away.

Does the stationary CMS require an operator to be present?

Once set up correctly, a stationary CMS does not require an operator. All our stationary CMS can be controlled manually, semi-automatically or in fully-automated mode – tailored specifically to users’ needs.

An AARTOS DDS range and field test at the beach
4. INSTALLATION AND INFRASTRUCTURE

Does the AARTOS DDS have any infrastructure requirements?

Specific requirements depend on the system: Our portable systems are powered by an independent battery. Other systems require an external power supply. Systems that rely on multiple remote units need a power supply as well as Ethernet cable connections.

We also offer versions that are GSM-based, use an 24GHz airFiber link or a satellite link-up. These systems do not require an Ethernet cable connection.

Provided power, additional equipment and crew are already on site – how long does it take to set up a single system?

Our mobile AARTOS DDS X3 is ready to use within 30 seconds.

With our bigger systems – X5, X7 and X9 – a trained crew of two people can set up a single system within 3 to 5 minutes.

How long are the expected downtimes of the AARTOS DDS?

Software upgrades (e.g. for the drone database, new software features, and device firmware) generally take around 10 to 20 minutes. The system does not require any further downtime.

Does the AARTOS DDS always need to be manned?

Not at all. Once initial setup is completed, the system works fully automated. DDS operation can also be switched at any time to semi-automated or completely manual mode.

Is it possible to integrate the AARTOS DDS into existing surveillance systems?

Yes, the AARTOS DDS system includes an application programming interface (API), allowing the user to integrate it into any existing surveillance software and hardware systems.

How long does it take to train a new system operator?

The training necessary to operate the AARTOS DDS can be obtained within a few days at our training campus in Germany. Please contact mail@aaronia.de for further details regarding our trainings.

Is there a recommendation at which height the antennas should be installed for best results?

The antenna should be installed at a minimum height of 3 meters from the ground. The general rule of thumb is: The higher the antenna, the more accurate are its results and the higher is its range.
Can the AARTOS DDS be protected against lightning?

Yes, a standard lightning rod can be installed and does not influence the AARTOS Drone Detection System’s performance.

In what temperature range can the system be used?

The IsoLOG 3D DF antenna supports an operating temperature range of -40° C to +80° C.

Our real-time spectrum analyzer (XFR V6 PRO) supports operating temperatures of -20° C to +60° C.

In terms of mobile use, is the AARTOS DDS limited to certain vehicle types?

Not at all. Thanks to its durability, the AARTOS DDS can be mounted on many types of mobile vehicles: it can be installed on cars, trucks, vans, even on yachts. All parts of the IsoLOG 3D DF antenna are resistant to salt water in addition to its weather and splash resistance with full IP65 certification. Coastal and marine environments do not limit the system’s performance.

Does the AARTOS DDS emit any radiation that may interfere with the operation of e.g. airports or communication infrastructure?

No, the AARTOS DDS does not emit any radiation which could interfere with such an infrastructure. The DDS is an entirely passive system.
When it comes to drone detection, the term 'target group' becomes ambiguous – drones may pose a potential threat to commercial, public and private causes alike. Our drone detection system can hence be beneficial to a variety of customer groups: companies such as the automotive and chemical industry, critical infrastructure such as nuclear power plants, correctional facilities, governments, but also operators of airports, stadiums and concerts.

Military branches and security firms benefit from drone detection on a similar level, as do private individuals seeking to protect their homes and properties.

The AARTOS DDS is under continuous development and consistently kept up-to-date. In addition, we offer service-level agreements (SLAs) including regular updates to and maintenance of the drone database, the DDS software, the firmware for our analyzers and even the hardware of the IsoLOG 3D DF antennas and the receivers.

We provide support for a minimum of 10 years for the AARTOS Drone Detection Systems.

The AARTOS DDS is vehicle-mountable
Drone Detection System

- Real-time ALL frequency monitoring
- Up to 48THz/s sweep speed
- 360° gapless full-dome coverage
- Detects 3G, 4G and 5G drones
- AI multi-target image and RF pattern recognition
- Ultra-high range of up to 50 km
- Hardware and software made in Germany

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