COUNTERING DRONES

Drone surveillance in the military area

COUNTERING THE EMERGING THREAT OF DRONES

The proliferation of malicious and non-cooperative Small Uncrewed Aerial Systems (sUAS) poses a significant threat to defense customers worldwide. Whether at home or abroad, defense forces require efficient and reliable counter-UAS (C-UAS) solutions to protect their personnel and assets. Rohde & Schwarz is proud to offer a next-generation leap in counter-UAS technology, providing a cost-effective, system-of-systems approach that can autonomously detect, classify, and neutralize advanced threats.

A LAYERED APPROACH TO COUNTER-UAS

To effectively counter the threat of sUAS, a layered approach is necessary. Our counter-UAS solutions can protect defense customers from commercial and military drones across all environments and scenarios, often as part of a layered and integrated air defense network. Use cases include force protection for forward and rear operating bases, airfields, harbors, and surface vessels at sea, as well as mounted and dismounted ground forces.

ARDRONIS: A FAMILY OF COUNTER-UAS SOLUTIONS

The Rohde & Schwarz family of ARDRONIS counter-UAS solutions is ideally suited to supporting the full spectrum of defense requirements across multiple domains, including fixed, deployed, and mobile systems targeting sUAS. Our solutions provide 360-degree threat detection at extended ranges, rapid autonomous threat classification, and high output power over the entire frequency band with adjustable waveforms. With ease of use and adaptability to future threats, our ARDRONIS solutions ensure that defense customers can stay ahead of the emerging threat of sUAS.

VERTICAL INTEGRATION FOR ENHANCED SECURITY

At Rohde & Schwarz, we maintain a high degree of vertical integration, with nearly our entire value chain inside the company. All our products are developed and manufactured in our own factories, ensuring that we can guarantee the highest level of security and quality. With our comprehensive portfolio of solutions and our commitment to innovation, we are the trusted partner of choice for defense customers worldwide.

USE CASE 1: MOBILE

The threat of malicious and non-cooperative drones across the contemporary operating environment is not just restricted to fixed bases and airfields. Defense customers must also protect mobile tactical platforms and critical assets on land and at sea from sUAS threats.

Counter-drone solutions targeting sUAS must be small in form factor but powerful enough to satisfy the strict signal requirements of defense customers, in both permissive and contested operating environments. They must also support on-the-pause and on-the-move operations, even at high speeds.

Such counter-UAS solutions not only provide commanders with increased levels of situation awareness; they also ensure early warning against potential threats, allowing commanders to take the most effective courses of action, such as cueing integrated or external kinetic and non-kinetic effectors to neutralize targets.

Mobile solutions must also be capable of geolocating sUAS pilots to enable highly mobile ground or maritime units to take measures aimed at preventing further attacks.

MOBILE SYSTEM REQUIREMENTS:

▶ Early detection and classification of sUAS (including swarms) and pilots
▶ On-the-pause/on-the-move operation
▶ Reduced size, weight and power
▶ Rapid deployment
▶ Ease of use
▶ Modularity through open interfaces
▶ MIL-STD security and robustness
▶ Multiband coverage and jamming
▶ Cross-cueing of effectors

USE CASE 2: DEPLOYED

Counter-drone solutions for sUAS also support defense customers seeking to protect forward deployed operating bases, tactical operations centers, temporary landing zones and COMINT shelters.

Quick and easy to establish and operate, even in the most remote and austere operating environments, these counter-UAS solutions provide commanders with early warning as well as threat classification and neutralization of sUAS threats.

Solutions provide data flows that can be integrated into the common operating picture to maximize levels of situation awareness, compress decision-making cycles and ensure the most effective courses of action are taken.

Deployed solutions are networked to a variety of kinetic and non-kinetic effectors used to disrupt or destroy threats with maximum standoff to reduce the risk of collateral damage.

DEPLOYED SOLUTION REQUIREMENTS

▶ Early detection and classification of sUAS (including swarms) and pilots
▶ Extended range and 360-degree coverage
▶ 24/7 perimeter security
▶ Automatic alerts
▶ Rapid deployment
▶ Integrated common operating picture
▶ Modularity through open interfaces
▶ MIL-STD security and robustness
▶ Multi-band coverage and jamming
▶ Cross-cueing of effectors

USE CASE 3: FIXED

Counter-drone solutions for sUAS are particularly well suited to force protection for operating bases and airfields located in sovereign territory of defense customers.

These solutions defend a predefined perimeter to ensure protection against enemy intelligence gathering activities and kinetic strikes. These C-UAS solutions can detect, identify and neutralize both individual targets and swarms, providing early warning and ensuring decision-makers take the most appropriate course of action to safeguard human life and critical assets.

Counter-drone solutions for sUAS also optimize situation aware-ness across an operating base or airfield with the capability to cue a variety of kinetic and non-kinetic effectors to neutralize threats.

A secondary requirement, for these solutions is also to geolocate the position of sUAS pilots, so measures can be taken to prevent further attacks.

FIXED SYSTEM REQUIREMENTS:

▶ Early detection of sUAS (including swarms) and pilots
▶ Large area and simultaneous multiband coverage
▶ Visualization of the situation picture (location, behavior, threat level, etc.)
▶ Autonomous or human-in-the-loop operations
▶ Open architecture
▶ User access levels
▶ MIL-STD security, reliability and robustness
▶ Report/evidence recording
▶ Integration of suitable countermeasures

ROHDE & SCHWARZ ARDRONIS FAMILY:

ARDRONIS is a family of counter-UAS solutions specifically designed to support the operational requirements of defense customers.

The Rohde & Schwarz system-of-systems approach provides customers with the ability to detect, identify, locate, track, verify and counter malicious threats in line with their unique requirements.

ARDRONIS DETECT

Providing accurate detection and classification of any type of sUAS, ARDRONIS Detect provides end users with early warning of threats through RF signal recognition. The solution is lightweight and easily deployable, making it an ideal choice for a wide range of use cases in defense.

ARDRONIS LOCATE COMPACT

Suitable for large area detection of malicious and non-cooperative sUAS, ARDRONIS Locate Compact features a single-channel direction finder capable of locating analog and digital video downlinks. ARDRONIS Locate Compact is a rapidly deployable and cost-effective solution for defense customers and particularly well suited to airfield protection. ARDRONIS Locate Compact can be upgraded to detect FHSS and Wi-Fi enabled drones with the addition of ARDRONIS WiFi.

ARDRONIS LOCATE ADVANCED

Defense customers benefit from automatic detection and identification of radio-controlled drones. ARDRONIS Locate Advanced provides early warning and accurate classification of threats with predefined, real-time notifications to selected individuals. The solution, which includes the capability to locate and track FHSS signals, can geolocate cUAS and their ground control stations. ARDRONIS Locate Advanced can be upgraded with the optional ARDRONIS WiFi upgrade to detect and identify Wi-Fi controlled drones.

ARDRONIS EFFECT

ARDRONIS Effect detects drones and, by analyzing the control link, intelligently generates targeted jamming signals to disrupt drone communications. It delivers powerful performance across a wide frequency range with high output power. ARDRONIS Effect can jam multiple bands simultaneously and make use of custom waveforms to effectively address evolving threats, thereby preventing unauthorized drones from entering protected areas.

ARDRONIS Wi-Fi

The ARDRONIS Wi-Fi is the perfect solution to detect, identify and mitigate Wi-Fi controlled drones and decode emitted identification data. With this functionality ARDRONIS Wi-Fi is a perfect upgrade for other sensors in the ARDRONIS family. The solution displays an approximate direction of the detected signal. ARDRONIS Wi-Fi identifies the drones by using information provided by their transmitted RemoteID. Depending on the national regulations, the Remote ID includes information such as its unique identifier, GNSS location, speed and altitude.

ARDRONIS PAN-TILT-CONTROL

The full range of ARDRONIS solutions can be upgraded with ARDRONIS Pan-Tilt Control which enables automatic pan-tilt control of directional sensors to verify and counter sUAS threats.

SAPIENT COMPLIANT

ARDRONIS counter-UAS systems are easily integrated into agnostic battle management systems, making the technology suitable for supporting layered air defense networks.

ARDRONIS is already compliant with the UK's SAPIENT (Sensing for Asset Protection with Integrated Electronic Networked Technology) standard which employs machine learning and artificial intelligence to streamline decision making and reduce cognitive load on personnel.

SAPIENT supports the networking of advanced sensors, including counter-UAS solutions, to optimize intelligence gathering and sensor management, reduce demand for bandwidth and encourage greater levels of operational flexibility.

The UK Ministry of defense (MoD) has already successfully adopted SAPIENT with an Interface Control Document (ICD) freely available to enable the integration of counter-UAS solutions.

The standard is also being adopted by NATO and, in September 2023, ARDRONIS was tested for compliance with SAPIENT at NATO's C-UAS Technical Interoperability Exercise 2023 in the Netherlands.

ARDRONIS solutions were integrated into SAPIENT in coordination with the Royal Air Force's (RAF's) Rapid Innovation Cell which is tasked with testing and evaluation of commercially available counter-UAS solutions.

ROHDE & SCHWARZ: YOUR TRUSTED PARTNER

Counter-UAS requirements of defense customers for sUAS continue to evolve apace. As a trusted partner, Rohde & Schwarz provides customers with unrivalled support throughout the entire lifecycle of their product line.

As an independent company, we are perfectly positioned to provide the highest levels of in-service support to assist defense customers with integration, maintenance and upgrading counter-UAS solutions.

Our support network extends across the world's time zones, enabling 24-hour support whenever it is required.
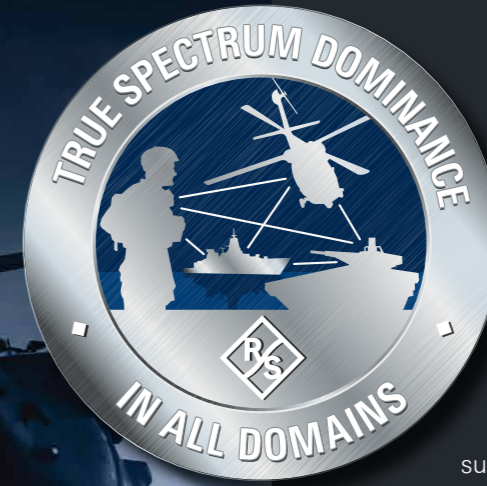
SERVICES & TRAINING

Although the ARDRONIS family of counter-UAS solutions are designed for ease of use, Rohde & Schwarz remains committed to supporting the training requirements of defense customers.

The company offers both on-site and off-site training programs that allow customers to understand and problem-solve in their own work environments.

Rohde & Schwarz also supports customer-defined training objectives through specialist and customized training programs that are tailor-made to match specific end user requirements.

TRUE
SPECTRUM DOMINANCE
IN ALL DOMAINS

TRUE SPECTRUM DOMINANCE IN ALL DOMAINS

Today's military missions increasingly rely on information superiority and advanced command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) systems. Control over the electromagnetic spectrum has become essential in achieving strategic military dominance.

Rohde & Schwarz develops, designs, manufactures and implements turnkey end-to-end solutions for secure communications, SIGINT / EW, intelligence, test & measurement and security in modern warfare. Our solutions contribute to effective C4ISR, enabling customers to achieve dominance in the electromagnetic spectrum for a decisive edge in modern warfare.

SIGNAL MASTERY

Signal testing and generation, secure communications, encryption, signal detection, location, analysis and interception from a single source.

VERTICAL INTEGRATION

Rohde & Schwarz maintains a high degree of vertical integration with nearly its entire value chain inside the company. All products are developed and manufactured in its own factories.

ONE-STOP SHOP

Rohde & Schwarz provides a one-stop shop with the full range of turnkey solutions, from sensors and analysis to effectors across the electromagnetic spectrum.

TRUSTED PARTNERSHIP

As an independent, privately-owned company, Rohde & Schwarz finances its growth with its own resources. The company is not beholden to capital markets or stock market expectations.

NON-TERRESTRIAL MONITORING

MONITORING SOLUTIONS

COUNTERING DRONES

ELINT / RESM

COMINT / CESM

CYBERSECURITY

MOBILE NETWORK TESTING

NAVAL COMMUNICATIONS SYSTEMS

CELLULAR NETWORK AND IP ANALYTICS

TEST & MEASUREMENT

TACTICAL COMMUNICATIONS

AIRBORNE COMMUNICATIONS

Rohde & Schwarz

The Rohde & Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems and networks & cybersecurity. Founded 90 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Sustainable product design

► Environmental compatibility and eco-footprint
► Energy efficiency and low emissions
► Longevity and optimized total cost of ownership

Certified Quality Management	Certified Environmental Management
ISO 9001	ISO 14001

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