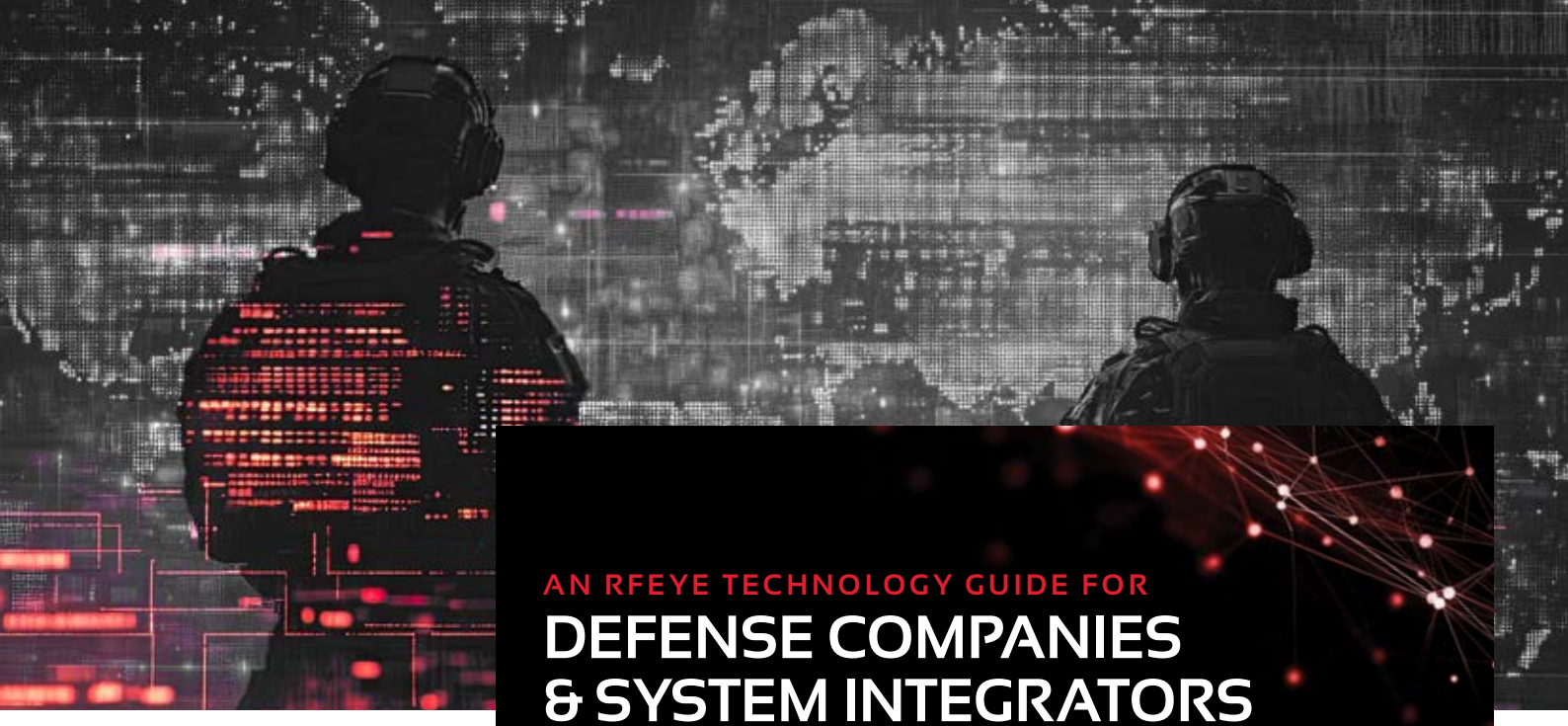

AN RFEYE TECHNOLOGY GUIDE FOR

DEFENSE COMPANIES & SYSTEM INTEGRATORS

GU-RFEYE-093-V1-20261003

SILVUS TECHNOLOGIES
a Motorola Solutions Company

RFeye®

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INTRODUCTION

We are living through a period of heightened risk and volatility. Russia's invasion of Ukraine in early 2022 has brought a significant, high-stakes land battle back to Europe with complex arrangements needed to safeguard sovereign security, maintain a NATO 'wall', and both defend and deter. China increasingly displays ongoing economic, military, technological and digital surveillance activity far beyond its internationally recognised borders. RF intelligence, high-fidelity signal capture, discovery and exploitation has helped Ukraine deter Russian aggression and provided a counteroffensive advantage.

Silvus Technologies is a well-established RF technology specialist focused on protecting NATO allies; contributing to national security interests; and enabling freedom of movement, signals intelligence, and spectrum superiority. We unlock different operational benefits for military, government agency, border agencies, defense contractors, and system integrators. If it emits or transmits we can detect and geolocate it.

Our RF sensor (RFeye Node) technology is widely recognized and acclaimed. Our software and APIs are designed to help you unlock and interconnect the EMCON, COMINT, SIGINT, and ISR missions that are vitally important for enhanced awareness.

This RFeye guide for defense companies and systems integrators outlines how integrating passive RF capabilities into larger systems can help allied forces achieve spectrum overmatch.

OUR FOCUS

- Deliver the outputs friendly Armed Forces need today
- Work to sharpen defence's edge to meet new and upcoming challenges
- Drive efficiency, reduce time to supply and cost effectiveness by working together

Matthew Hunt – VP Global Sales

MULTI DOMAIN OPERATIONS

Silvus Technologies provides sub-systems for defense companies and system integrators requiring RF capabilities in larger systems or platforms

USV

UGV

UAV

ELECTRONIC WARFARE SYSTEMS

AIRBORNE ISR

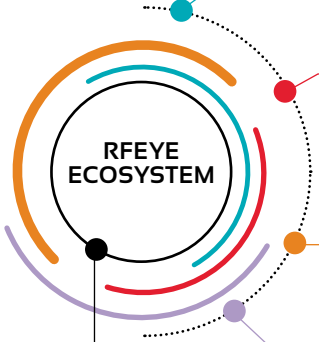
C-UAS

MARITIME

C4ISR SYSTEMS

AIR DEFENSE SYSTEMS

PROBLEM SPACES & SOLUTIONS



- RF technology
- Passive RF sensors
- Low SWaP
- Multi domain
- Multi mission
- API integrations

SENSE

Continuously monitor the spectrum for RF data

- 9 kHz to 40 GHz wideband monitoring & in-built RF edge processing
- Next-generation SDR technology
- Distinguish & detect all signals from the noise floor

UNDERSTAND

Gain insight into large data sets and share actionable RF intelligence

- Signal Discovery to find low probability of intercept and low probability of detect signals
- Smart sweeps, scans, surveys, and incident alerts
- Automated geolocations
- Interoperability enabled by open APIs
- Stream data in real-time in formats such as VITA-49
- Advanced spectrum monitoring and geolocation

EXPLOIT

Capture and exploit wideband, long-duration I/Q data (RF intelligence) in high-fidelity

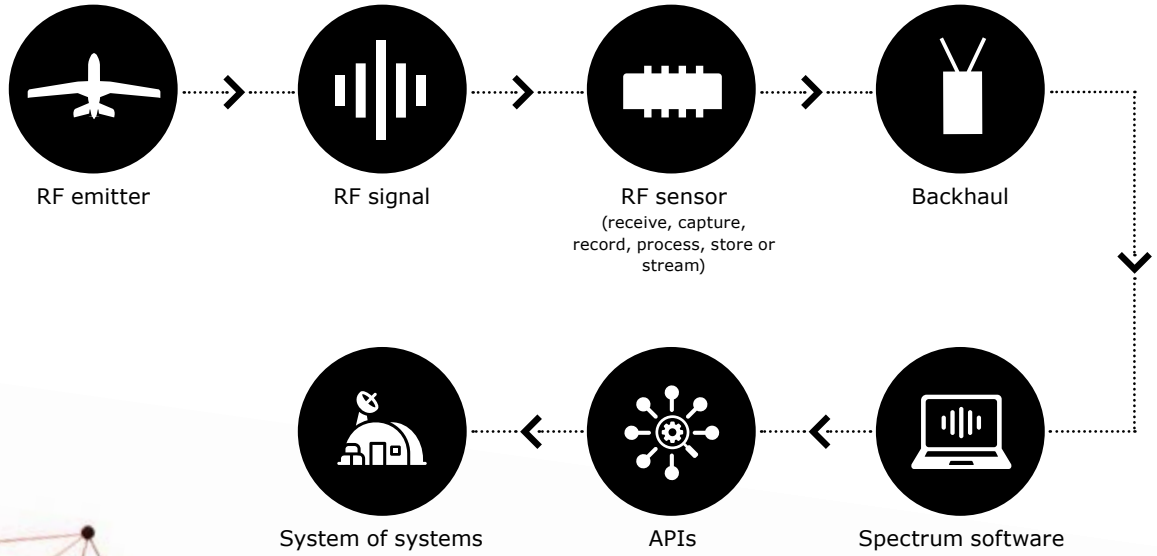
- Capture and record I/Q data
- Forensic signals analysis
- Advanced SIGINT

SIMULATE

Explore scenarios, RF modeling, and RF simulation

- RF training and simulation
- Wargaming tool
- Geospatial analysis and optimizing sensor networks

FROM RF EMITTER TO SYSTEM



9 KHZ TO 40 GHZ WIDEBAND MONITORING

All of the spectrum, all of the time

Passive RF systems continuously monitor the electromagnetic spectrum to detect RF emitters without giving away their position by sensing the spectrum for RF emitters and transmitted signals.

Highly sensitive and wide frequency superheterodyne technology can detect weak and low-power signals, intrinsic pulse characteristics, and transform probability of intercept and identification.

Built-in edge processing performs tasks on the RF sensor (RFeye Node), reducing bandwidth requirements, prioritizing bite-sized information or full streaming, and further processing and enhancing decision-making.

Solution: Wideband, intelligent RF sensor operating from 9 kHz to 40 GHz

RFeye Site: Real-time spectrum monitoring & geolocation toolkit

Key benefits

- If a signal is emitted or transmitted, RFeye sensors will detect it
- Sensor networks can be expanded to increase coverage
- Sensors integrate with other systems, such as radar or optical sensors
- Intelligent software reduces the operator's cognitive burden
- Command center for spectrum supremacy

REAL-TIME SIGNALS INTELLIGENCE, HIGH-SPEED I/Q DATA STREAMING, & LONG-DURATION RECORDING

RFeye Node Plus - next-generation RF sensor

Technological advancements mean RF signals are becoming increasingly complex. Finding these signals is ever more challenging in increasingly crowded environments, and traditional spectrum monitoring tools struggle to keep up.

The RFeye Node Plus offers enhanced processing power, full 100 MHz I/Q streaming and recording, and increased storage capacity. Its applications include full 100MHz IBW I/Q data capture for spectrum planning, SIGINT (COMINT, FISINT, ELINT), electronic support measures (ESM), ISR, and enhanced 3D time difference of arrival (TDoA) networks.

Key benefits

- Powerful processing power
- High-speed I/Q data handling
- Versatile deployment in harsh conditions
- Integrated SSD storage (16TB of solid-state drive storage)
- Advanced geolocation capabilities

Solution: Advanced SIGINT and hand-off receiver with full 100 MHz I/Q streaming and recording

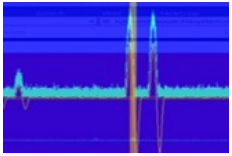
DIFFERENTIATE BETWEEN SIGNALS OF INTEREST & THE NOISE FLOOR

Build your own detectors

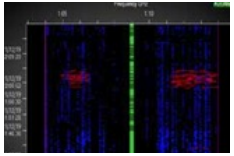
Advanced signal detectors play a critical role in modern RF operations. They reliably identify and capture signals of interest (SOI), reduce false positives, and minimize missed detections. By enhancing probability of intercept (POI) and improving geolocation accuracy in both 2D and 3D TDoA, they significantly strengthen signal awareness.

These detectors support a wide range of applications, including direction finding, 2D/3D TDoA, angle of arrival (AoA), real-time analysis, machine learning, signal library development, and ISR operations.

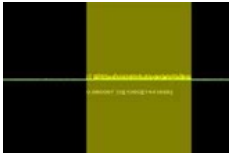
At its core, if a signal is a fingerprint, detectors are the scanners. Fine-tuned detectors can identify specific signal characteristics, while standard detectors respond to pre-set signal or pulse signatures in real time. Users can also create custom detectors tailored to their needs.



TACAN / DME pulse detections



1090 MHz



ADS-B

Key benefits

- Measure and capture time and frequency if a signal characteristic is unknown
- Find a true intelligence picture – never miss a signal
- Detect unknown signals – build signal libraries
- Backhaul optimization for TDoA
- Detectors are easily licensed and can run on any RFeye Node. Operators can also create custom detectors as needed

Solution: Choose out-of-the-box detectors or use software tools to build your own custom detectors

SIGNAL DISCOVERY HELPS FIND LPI & HARD TO DETECT SIGNALS

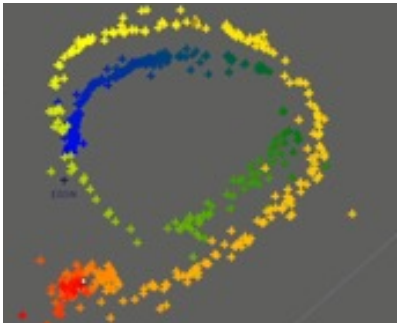
Advanced detector-based TDoA & PoA geolocation

Signal Discovery (within RFeye Site) allows the user to automatically detect previously unknown RF signals. The feature is particularly useful for EMSO, SIGINT, and COMINT applications.

Moreover, it is especially effective for airborne target acquisition, wide area air defense, and focused drone detection missions.

Signal Discovery is a new feature that uses signal-specific filtering (SSF) technology. It allows users to automate advanced detectors and easily identify and display prioritized results.

Solution: Automatically find, detect and geolocate signals of interest both known and unknown



The image shows the geolocation (over time) of a signal emitted by a drone using the Signal Discovery feature in RFeye Site software.

Key benefits

- Find LPI and hard to detect signals in huge datasets
- Reduce the cognitive burden and training needed
- Build a detailed picture of RF emitter activity
- Precisely identify and locate signals in real-time for rapid decision-making
- Collect data on signal types, signal intelligence frequencies, and patterns of life
- Identify jamming, spoofing, or unauthorized surveillance signals

AUTOMATED GEOLOCATIONS

Wide-area spectrum tripwire

Automatically geolocate and aggregate signals of interest based on frequency, bandwidth, signal location, time, and power. Generate PoA, AoA, TDoA and 3D TDoA geolocations automatically, or upload planned missions, for trigger-based or task-based geolocation.

Applications include border security, EMSO, ISR, air defense, drone detection, spectrum management, critical infrastructure protection, and space launches.

Solution: Automated geolocations – With high probability of accuracy (upto 40GHz)

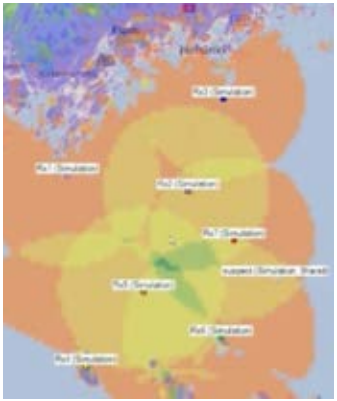


Image of a wide-area sensor wall. The propagation analysis shows that, with optimal sensor placement, no signal will go undetected.

Key benefits

- Reduce the operator's cognitive load
- Increase probability of detection
- Increased level of confidence

SMART SWEEPS, SCANS, SURVEYS & INCIDENT ALERTS

Intuitive automation for non-RF operators

Spectrum displays, waterfalls, and geolocation detections do not have to be complex datapoints. RFeye Mission Manager provides easy-to-understand, actionable RF intelligence, automation, schedule management, and permission-based sharing. The software is used by military and intelligence agencies around the world.

Solution: Automatically manage multi-mission spectrum operations for one or more networks

Key benefits

- Near-time control of sensors & data
- Detectors
- Incidents, alerts, notifications
- Map view
- Zones of interest
- Network status and diagnostics
- Multi-user
- RF record and I/Q capture
- Triggered tasks
- Report generator
- Scheduled tasks
- Geolocations
- Intelligence gathering
- Scans, sweeps, occupancy, time, bearing etc.

INTEROPERABILITY ENABLED BY OPEN APIS

Unlock full spectrum operations

Easily integrate and exploit the full capability of RFeye sensor processing, spectrum monitoring, geolocation, and I/Q data intelligence with open APIs.

Solution: Seamlessly integrate the capabilities of our software into your proprietary systems and platforms

Key benefits

- Adaptable, high-performance software processing ensures your customers can outpace evolving threats
- Open and modular for maximum flexibility
- Actionable real-time RF intelligence
- Proven TRL-9 technology

Comprehensive and interconnected software suite

RFeye Site – Real-time spectrum monitoring & geolocation toolkit

- Configure / test missions
- Build / test detector settings
- Run signal detector-based workflows
- Real-time detection, capture, geolocation
- Cluster analysis
- Geolocate streaming to C2
- Export solutions to RFeye Mission Manager to run automatically

RFeye DeepView – Forensic signal analysis software with 100% probability of intercept

- High fidelity RF recording (I/Q data)
- Signal parameterization (build signal detector settings)
- Extract signal fragments from big data
- Export and stream (VITA-49)
- Build an RF intelligence library

RFeye Mission Manager – Automated spectrum management & near-time incident reporting

- Import and run configuration files from RFeye Site into a schedule
- Test schedules over longer periods
- Set / manage tasks / triggers / alerts
- Generate and export schedule settings

STREAM DATA IN REAL-TIME IN FORMATS SUCH AS VITA-49

Embedded Mission Processor (EMP)

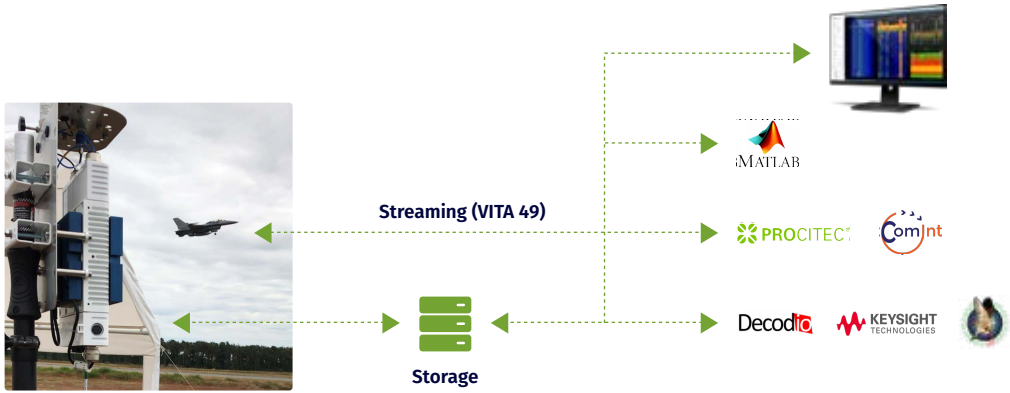
The EMP API manages asynchronous tasks across individual RF sensors, enabling real-time capture and sharing of key data — such as sweeps, occupancy, bearing, detections, remote I/Q recordings, and VITA-49 I/Q streaming.

Video example

Scan the QR code to watch a video of Procitec receiving RFeye' I/Q data stream in real time for signal classification.

EMP API data streaming requires a simple one-time setup, enabling third-party tools to access I/Q data for RF intelligence.

SCAN TO WATCH



Solution: API for non-synchronous tasks on a single sensor (RFeye Node)

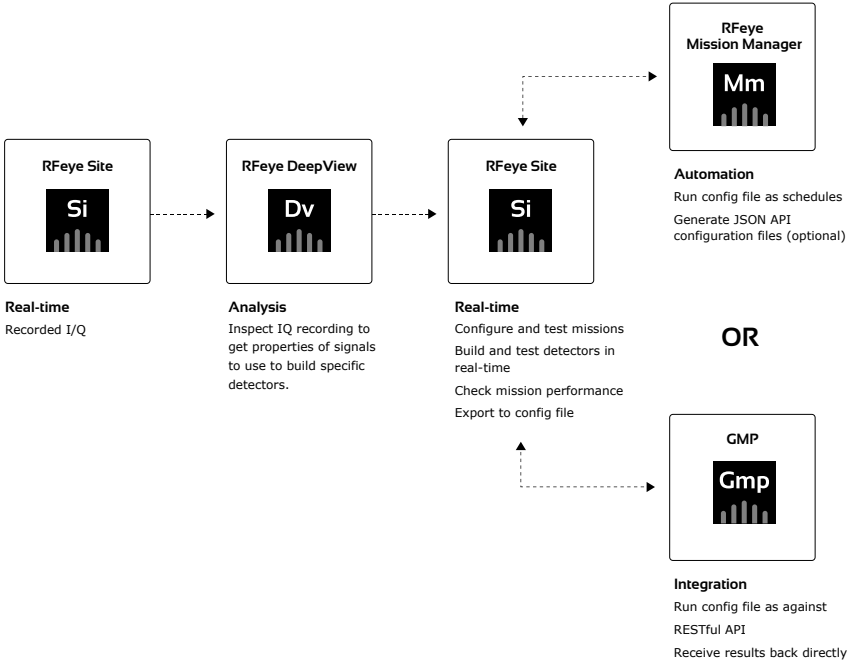
ADVANCED SPECTRUM MONITORING & GEOLOCATION

Group Mission Processor (GMP)

GMP APIs are designed to handle synchronous tasks across multiple RFeye Nodes. The GMP APIs play a crucial role in managing complex, coordinated efforts that are vital in advanced spectrum monitoring and geolocation.

Solution: API for synchronous tasks on a network of sensors (RFeye Nodes)

GMP detector-based TDoA workflow example



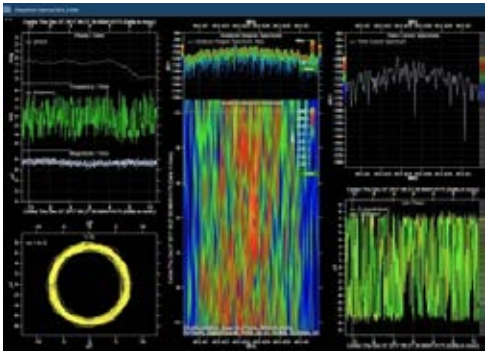
OUTMANOEUVRE ADVERSARIES IN THE EMS

Capture and record I/Q data to unlock intelligence

Recording I/Q data in high fidelity allows operators to analyze signal data for patterns, changes, and unexpected transmissions.

Recording I/Q data enables analysts to capture, identify, and process RF intelligence. It also allows for the detection and cataloging of sophisticated signals that cannot be identified in real-time. By analyzing this data over time, patterns of life and anomalies can be identified, providing valuable insights. Forensic analysis through post-processing further enhances intelligence, using advanced algorithms and techniques to unlock COMINT and SIGINT with greater accuracy.

Solution: Capture I/Q data in high-definition with RFeye DeepView software for forensic analysis



RFeye DeepView software: Record and analyze multiple signals in high-fidelity

Key benefits

- Electromagnetic supremacy and superiority
- Targeting adversary assets
- Deep SIGINT
- Fast responses in contested & congested environments
- Countermeasures
- Enhanced multi-domain operations
- Understand red / blue / green spectrum

SIMULATE SCENARIOS & RESOLVE TACTICAL PROBLEMS

RF training and simulation

Engage in training or wargaming scenarios involving signal detection and target acquisition as part of electromagnetic spectrum operations (EMSO).

In training scenarios, instructors maintain dynamic control over the simulation so they can move transmitters, hide signals, and add high- power transmitters.

In wargaming scenarios, at the planning level, RFeye Site training allows planners to conduct highly realistic simulations that contribute to answering a fundamental combat estimate question: What are the enemy doing and why?

Solution: RF simulation and wargaming with RFeye Site (training only license option)

Key benefits

- Geolocate transmitters of interest
- Hunt interference
- Optimal sensor positioning
- Practice electronic surveillance tactics
- Identify GNSS jamming
- Intelligence preparation of the battlefield

C-UAS

Detect and respond to threats faster with unique detector-based technology

RFeye technology is designed to integrate into any c- UAS system and is interoperable with other sensors. RFeye' Signal Discovery technology is designed for specific-signal filtering, making it a powerful tool for detecting drones in even the most complex RF environments.

Key benefits

- Early warning threat detection
- Enhanced detection and geolocation range
- Highly accurate geolocation
- Detector-based TDoA—not a library-based system
- Wide area coverage
- Fills in detection gaps for other sensors (radar EO/IR)

PRESS RELEASE

Rafael completes integration with multi-mission RFeye ecosystem

AIR DEFENSE

A layered air defense architecture with RF sensors enhances detection, geolocation, and response capabilities for the most robust force protection possible

Key benefits

- Early threat detection: Passive RF ≈ hundreds of km
- EW-enabled air defense: RF sensors carry out ESM and support
  EP and EA (low-cost threat elimination)
- Enhanced situational awareness: Real-time data to the C2 for multi-sensor data fusion
- Operate in contested environments: Monitor for jamming or spoofing
- Detect small targets: Complement radar by detecting small targets that might appear to be birds

READ THE GUIDE

Airborne Target Acquisition: Passive air defense using 3D TDoA

EW SYSTEMS

Supporting multi-domain operations with situational awareness and actionable RF intelligence

Key benefits

- Real-time detection and geolocation of adversary RF emissions for ESM
- Identify enemy emitters for EA
- Adaptive measures to safeguard friendly communications for EP
- Identify defence gaps as part of a Surveillance and Target Acquisition Plan (STAP)
- Identify GNSS jamming
- Analyze electronic space for an Intelligence Preparation of the Battlefield (IPB)
- Generate an Electronic Order of Battle (EOB)
- EMCON / understand Red & Blue force emissions

DEPLOYMENT STORY

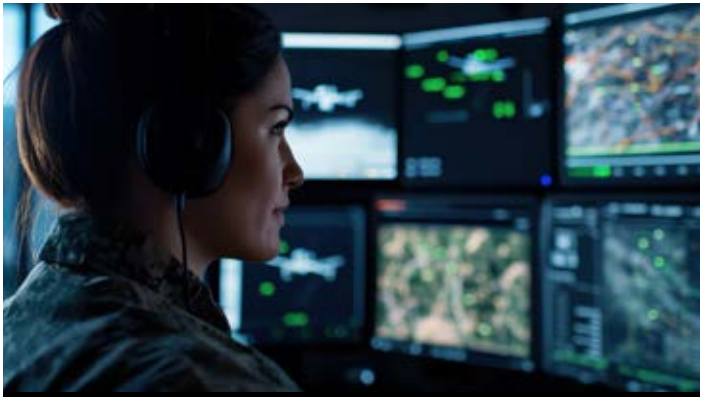
How a NATO member monitors the spectrum of multiple locations from one central location

C4ISR

RF-enabled C4ISR allows you to see, understand, and act faster

Key benefits

- Enhanced ISR: detect and geolocate RF signals from communication devices, radars, or jamming systems.
- Real-time situational awareness: RF sensors send actionable intelligence to C2.
- Platform agnostic: RF sensors can be fit on manned and unmanned platforms across the land, air, and sea domains, covering wide areas.
- EW-enabled C4ISR: RF technology helps with the coordination of information, decision-making, and electronic combat capabilities
- Multi-sensor fusion: RF sensors complement other sensors.
- C4ISR fusion: SIGINT fused with data from other sources to provide a comprehensive picture of the battlefield.
- EMCON: Understand Red and Blue force emissions



DEPLOYMENT STORY

How combining ground & air-based RF sensors improved ISR and target acquisition

AIR: UNMANNED SYSTEMS (UAVS)

RFeye SWaP-optimized RF sensors (weighing <2kg) can be integrated into UAVs of all sizes—from small tethered drones to HALE UAVs (Groups 2–5)

Key benefits

- Increase line-of-sight (LOS) improved for TDoA
- Combine ground and air-based RF sensors for improved ISR and target acquisition
- Extend coverage and protect large geographical areas from hostile threats
- Understand who is exploiting the EMS
- On-board processing to operate in narrow backhaul environments
- Operate further from the Forward Edge of Battle Area (FEBA)

DEPLOYMENT STORY

How TEKEVER & Silvus Technologies collaborated to fit UAS with ultra-sensitive RF receivers as a payload

Image: AI generated

LAND: UNMANNED SYSTEMS (UGVS)

SWaP-optimized RF sensors can be integrated into all UGVs that are designed for modular integrations

Key benefits

- Networked sensors for improved situational awareness (real-time RF signal detection)
- Speed up the OODA loop for faster decision making
- Operational redundancy
- Operate further from the FEBA
- Force multiplier
- Enhanced ISTAR

MARITIME: UNMANNED SYSTEMS (USVS)

SWaP-optimized RF sensors can be integrated into all USVs designed for modular integrations

Key benefits

- Networked sensors for improved situational awareness (real-time RF signal detection)
- Speed up the Observe, Orient, Decide, and Act (OODA) loop for faster decision making
- Operational redundancy
- Operate further from the FEBA
- Force multiplier
- Extend coverage and protect large geographical areas from hostile threats
- Understand who is exploiting the EMS
- On-board processing to operate in narrow backhaul environments

Image: Syos Aerospace SM300 USV

INTEGRATION OF RFEYE 100-18 LW SENSOR

Our lightweight sensor and software as a sub-system is delivered to fulfil mission capability within your system-of-systems

Customer: Military End-User

System Integrator Platform: Tekever AR-3

EW RFeye Node 100-18 LW sensor: 1.98KG

Element	Consideration	RFeye support	System Integrator task
Physical	Mount sensor on airframe Vibration damping	Supply CAD drawings, spacer (model) for testing and vibration tolerance parameters	Design cavity and fit, vibration damping for platform payload cavity within agreed shock limits
SWaP-C	Sensor weight and accessories meet MTOW and funding threshold. 12V DC power (40W max)	Dimensions, weight, initial and whole of life pricing. Supply power supply limits	Optimize payload for MTOW and confirm budget 'fit'. Provide correct DC voltage and fused power
Environmental	Cooling and waterproofing	Supply min / max operating temperatures and connections for IP-67 sealing and protection	Provide forced air cooling and solutions to avoid water pooling and build-up for sub-system
RF	Establish RF transmitters, appropriate antennas, correct RF filters and RF cable connections	Guidance on RF measurements. Survey RF characteristics, antenna choices, filters and isolation requirements, cables and connections	Take RFeye advice and work through co-engineering challenges
GNSS signal	GNSS signal input to RF / EW sensor	Advise on GNSS signal type	Enable GNSS signal feed to RF / EW sensor
SSD storage	Capacity and connectivity	Advise on solution and dependencies	Fit and secure to platform
Data connection	Ethernet GigE data connection (in/out)	Advise on Ethernet connection against capability parameters	Provide Ethernet connection / switch
User acceptance	Mission, capability, hardware, software and API functionality	Test, survey, co-engineering guidance	Plan, writeup, present, sign-off
Training	Technical, mission fulfilment	Onsite, off-site technical and non-technical	Internal and external stakeholder satisfaction
Advanced requirements	Capability, shortcuts, workflows, automation	Advise introduce tools – APIs etc	Internal and external stakeholder satisfaction
Maintenance & lifecycle	N/A	User Guides and customer support	Inspection, maintenance, lifecycle management

LEVERAGE OUR FORMER SERVICE EXPERIENCE

Andrew Flanagan
Business Development Manager

Andrew served in the British Army for 34 years, specialising in Electronic Warfare (EW), Cyber and Electromagnetic Activities (CEMA), intelligence, and operational planning. Throughout his career, he held a variety of command, staff, and specialist appointments in the UK and overseas, supporting operations, capability development, and strategic defence engagement. He worked closely with wider UK Defence, NATO allies, and international partners to deliver capability across the electromagnetic spectrum and address complex operational challenges. Recognised for combining technical expertise with operational insight, Andrew advised senior leaders, led multidisciplinary teams, and contributed to the development of future defence capabilities.

Matthew Hunt
VP Global Sales

Matt Hunt is a former Royal Marines Commando with 22 years' service. Operating as a rifleman in 40 Commando for 8 years before conducting technical training with the REME to become a specialist RF technician within the corp. Matt has operated and maintained equipment around the globe including the arctic and jungle, plus multiple operations in the desert. Conducting additional training as a specialist communicator, Matt finished his career in a Tier 1 maritime unit as the Capability Development lead for all C4ISR systems and was recognised by a Strategic Command 4-star commendation for his work.

Val Long
Sales Enablement Director

Valarie Long is a retired US Air Force Colonel with 27 years of service. As a career intelligence officer, she served at all levels and completed four combat tours. Her final deployment was to Afghanistan as Chief of ISR and Targeting at the 4-star, and her final assignment was as in command of the 423d Air Base Group where she oversaw four bases in the UK and Norway.

Krzysztof Gorecki
Senior Account Manager
(Eastern Europe)

Krzysztof Gorecki is a former Polish Navy Commander with 23 years of service. He concluded his military career at the Polish Ministry of National Defence as Head of the Foreign Procurement Office, overseeing critical international acquisition programs. Over the last 12 years, he has transitioned this high-level procurement expertise into the civilian and defence sectors, focusing on delivering and deploying mission-critical C4ISR solutions for military and commercial clients.

BENEFITS OF WORKING WITH SILVUS TECHNOLOGIES

- Proven COTS technology
- TRL-9
- Rapid prototyping
- Non-ITAR
- Reduced time to market
- Open systems architecture
- Consultative approach
- Continuous technical support and advanced training

NEXT STEP

Talk with a system integrator & defense advisor to discuss a program or integration requirement

SILVUS TECHNOLOGIES
a Motorola Solutions Company

RFeye®

Silvus Technologies, a Motorola Solutions company, builds mission-critical capabilities that enable defense and security organizations to understand the electromagnetic environment, maneuver through the spectrum, and maintain an operational advantage in contested conditions. Through an interoperable ecosystem of industry-leading RFeye™ sensors, resilient tactical communications, and advanced electronic warfare capabilities, Silvus extends SIGINT to dismounted operators and uncrewed platforms—empowering forces to sense threats, connect forces, and command the spectrum. Together, these capabilities deliver the situational awareness and decision advantage needed to achieve spectrum superiority.

SILVUS TECHNOLOGIES
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Silvus Technologies UK Ltd
Unit 1, Bourn Quarter
Wellington Way
Cambridge
CB23 7FW

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