

RFeye Nodes

High performance spectrum monitoring
from 9 kHz up to 40 GHz



RFeye Nodes

WIDE BANDWIDTH

An instantaneous bandwidth of up to 100 MHz ensures that a signal of interest is never missed

BROAD FREQUENCY RANGE

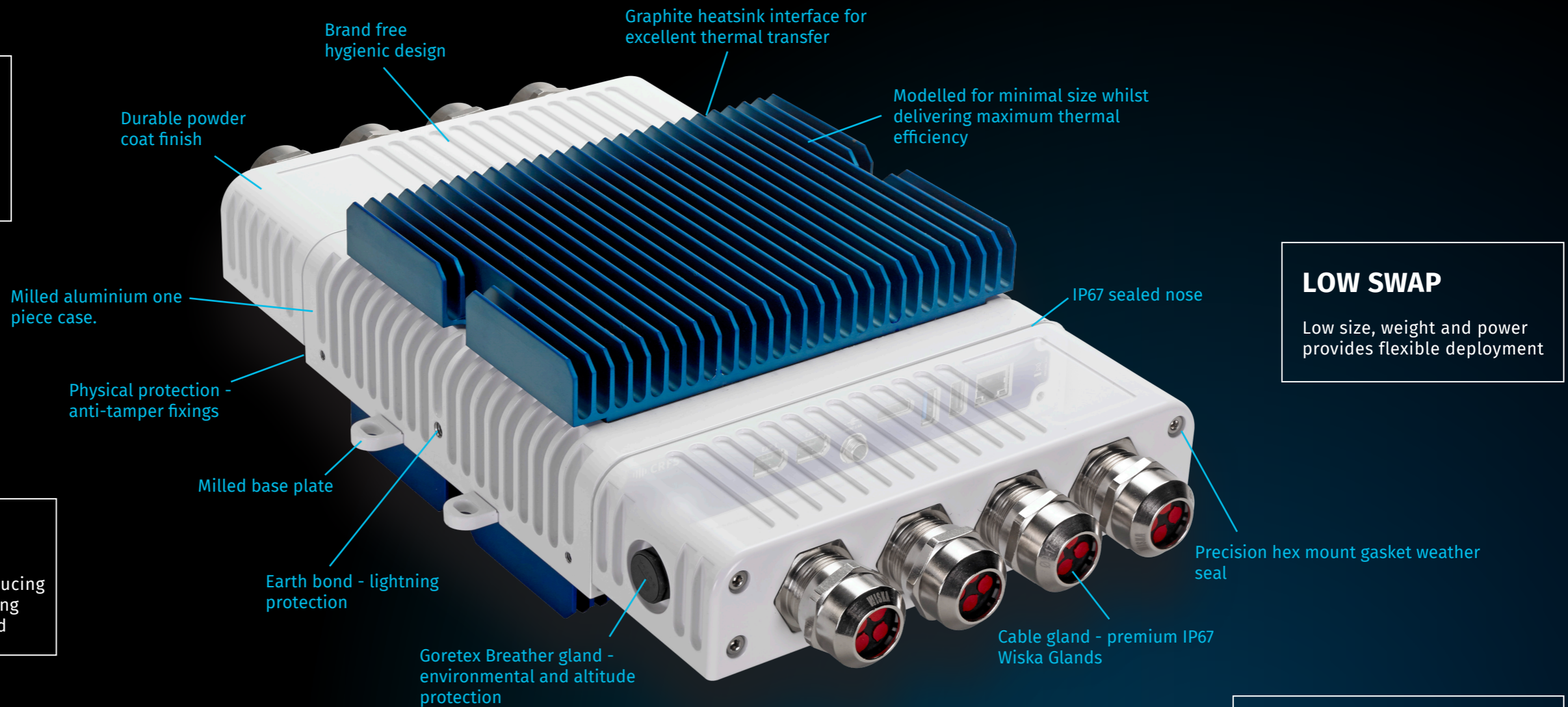
Broad detection range of 9 kHz to 8 GHz, 18 GHz or 40GHz allows you to capture diverse signals

RUGGEDIZED

IP67 protection ENABLES Nodes to be deployed outdoors in the harshest of conditions.

LOW BACKHAUL

Data is processed on the Node reducing backhaul requirements and enabling control from anywhere in the world

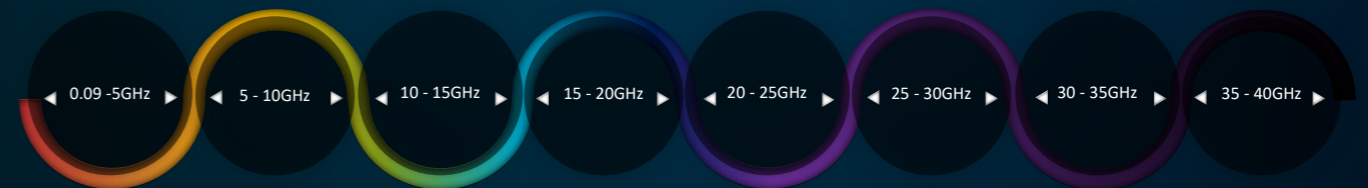
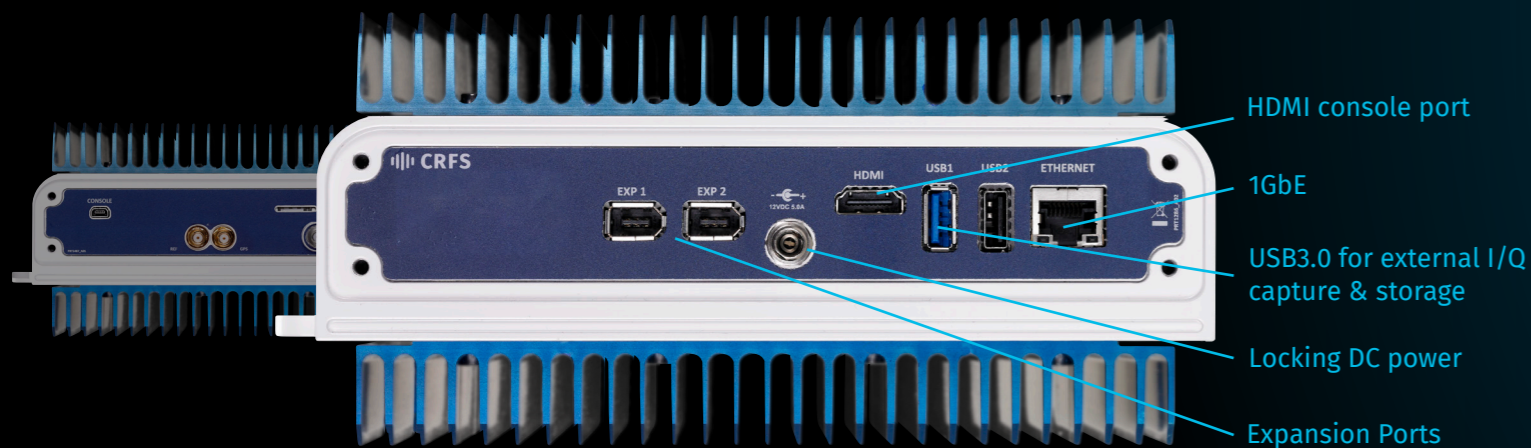


LOW SWAP

Low size, weight and power provides flexible deployment

SIGNAL CLARITY

Low noise figure, low phase noise and high SFDR let you capture and differentiate weaker signals



What is an RFeye Node?

The RFeye Node is the benchmark for high performance, real-time 24/7 monitoring of the radio spectrum.



RFeye Nodes are extremely sensitive radio receivers. They form the backbone of all CRFS hardware, from the RFeye Arrays to the SenS Portable. What makes Nodes unique is a combination of superior RF performance and clever design.

There are a number of key innovations and unique proprietary technologies that underpin the RFeye ecosystem of products. These include:

- High performance superheterodyne RFeye receiver architecture
- Node Control Protocol (NCP) Server that enables multi-user multi-mission capability, manages efficient operation and user interaction with the nodes
- Distributed node synchronization technology (SyncLinc) that enables synchronous operations and geolocation using multiple nodes
- Range of embedded and PC application software that has been developed over a decade to cater for many different user applications.

Easy to deploy as fixed, portable or mobile units

RFeye Nodes are physically small and housed in a rugged, compact, and lightweight enclosure. With the optional environmental cover, IP67 protection can be provided, meaning they are able to be deployed outdoors in the harshest of conditions. Depending on the application the Node can be attached to a mast, building or even a free-standing tripod for temporary installations.

They can also be discreetly deployed in-building for Technical Surveillance Counter Measures (TSCM) purposes (RFeye Guard), or in man-portable (RFeye Stormcase) and mobile configurations. Power consumption is low, and the unit can be powered from multiple sources enabling rapid re-deployment.



Flexibility by design

Broad bandwidth and frequency range

We have a range of different Nodes to suit every application with a frequency range of 9 kHz to 8, 18 or 40 GHz. This ensures that a signal of interest is never missed. Nodes come with either a 50 MHz or 100 MHz instantaneous bandwidth (IBW). The IBW is the frequency range a receiver can acquire without having to retune. A wide IBW allows RFeye Nodes to quickly sweep through the frequency range with less time to retune. This translates to faster sweep speeds and a higher probability of intercept.

Inbuilt processing for low backhaul

All RFeye Nodes have their own inbuilt processor. This enables the Node to process the RF data in situ to perform geolocation and monitoring tasks. The results of these tasks can then be sent securely over VPN in realtime to a centralized location without the need for high data rate backhaul. Data can also be stored locally to USB drive/ optional internal SSD or transmitted via an external cellular modem.

Multi-user, multi-mission capability

The Node's unique architecture is capable of supporting multiple, simultaneous tasks and missions, as well as queries from multiple users.

So, if you needed to perform multiple TDOA geolocations at the same time as a colleague makes spectrum occupancy measurements, you can. Remote programming allows tasks to be assigned relative priorities and the Node is able to seamlessly execute the required tasks in the most efficient manner.

Example tasks include:

- Spectrum sweeps
- IQ captures
- Spectrum occupancy measurements
- Signal classification
- Alerting on mask breakages and triggering alarms
- Geolocating signal sources

RFeye Node	Freq Range (GHz)	IBW (MHz)	Sweep Rate	Noise Figure
40-8	9kHz to 8 GHz	40MHz	100 GHz/s	6dB - 10dB
100-8	9kHz to 8 GHz	100MHz	280 GHz/s	6dB - 10dB
100-18	9kHz to 18 GHz	100MHz	390 GHz/s	8.5dB - 13dB
100-40*	9kHz to 40 GHz	100MHz	390 GHz/s	8.5dB - 16dB

*Preliminary Information

Node architecture

RFeye Nodes have been designed using the latest microwave components to give the radio hardware exceptional RF performance.

- Low system noise figure
- Excellent front end linearity under high signal conditions
- Multi-stage pre-selection filtering
- Class-leading phase noise
- Low local oscillator (LO) re-radiation from all antenna ports
- High dynamic range with extremely low internally generated spurious components
- Manual and intelligent automatic gain control (iAGC) on a capture by capture basis

Only after the radio hardware section has completed its processing in the analogue RF domain, is the signal digitized and sent to the radio FPGA. This is a key differentiation between the RFeye Node and lower cost software defined radios. Without such close attention to managing the RF signals, RF performance will always be inferior.

The digitized RF data is then transferred to the baseband FPGA where it is formatted for IQ streaming or FFT processing. The IQ data and/or FFT spectral data are then made available

to the embedded operating system for further processing or routing to the network ports and/or onboard data storage using USB mounted drives.

RFeye Nodes are complemented with an API which allows fine-grain control and bespoke applications to be written to control the node, using a controlled schema.

Expansion ports are available to connect external references or output internal references and control external peripheral devices such as RFeye switches and SyncLinc in-building synchronization systems.

Remote Access

Powerful processing on board the RFeye Nodes enables distributed computing across a node network which has several advantages. The objective here is to make a scalable system whereby the embedded software performs as much of the required processing as possible, thereby relieving the client of the responsibility and reducing backhaul bandwidth requirements. The embedded software includes a range of available local clients including an Embedded Mission Processor (EMP).

The CRFS difference

At CRFS, we design, build, program and deploy systems and solutions for RF spectrum monitoring, management and geolocation. We serve both defense and homeland security customers as well as the civilian regulatory market.

We believe that the best hardware, software and know-how contributes to our customers' success. And with that philosophy in mind we have developed some of the most advanced RF sensors available; wideband receivers with lightning-fast sweep speeds and best-in-class noise figures and phase noise. These high-sensitivity receivers are known as RFeye Nodes. Our Nodes are high performing, compact, rugged and modular, coupled with intuitive software that can turn RF data into actionable intelligence.

It's not just the products that are high performing – it's also the people: developers, engineers and scientists with experience within the military, regulatory and research sectors. They understand the challenges facing our customers and work with them to deliver uncompromising solutions.

How we work with you

We don't just provide hardware and software; we are part of the solution. We can work with you to determine, build and deploy the system that meets your specific needs and those of your customers. We have long-term partnerships with many of our customers, working closely with them not just to ensure successful deployment of equipment, but also to develop the specific features and functionality they require.

We provide:

- An open architecture
- Proven, reliable hardware and software
- Comprehensive documentation
- Expert support
- Transparency

All of which leads to a smooth integration and a successful project. We pride ourselves on being responsive, agile and collaborative, getting your projects up and running fast.



About CRFS

CRFS creates deployable systems to detect, identify and geolocate signals in complex RF environments.

We provide end-to-end automated solutions for spectrum management and deconfliction, interference hunting and threat detection, using

our intelligent receiver technology, software and advanced analytics.

Our RFeye systems are widely deployed by military, intelligence, law enforcement and regulatory agencies around the world.

For further information or to schedule a demonstration visit:

[crfs.com](https://www.crf.com)



See through the noise

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