RFEYE SITE SIMULATOR

POWERFUL RF SIMULATION SOFTWARE FOR RF TRAINING

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EXTRAORDINARY
RF TECHNOLOGY

RFeye Site has traditionally empowered spectrum managers to identify and geolocate signals of interest emitted in or around an RFeye Node network.

RFeye Site Simulator provides experienced and trainee spectrum managers with the same capabilities but employs simulated RF sensors. By simulating real-world scenarios, this powerful tool can be used for interference hunting, strategic planning, and spectrum allocation.

The primary advantage of the simulation software is its high degree of configurability, which enables users to design a wide array of scenarios. This flexibility is achieved through features such as a configurable spectrum environment and customizable training scenarios. RFeye Site Simulator's potential is limited only by its users' creativity.

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

RFeye Site Simulation's mapping functions enable users to effectively plan future deployments by analyzing terrain and determining optimal placement, positioning, and height of RF sensors. This strategic planning capability enhances the capture, detection, and geolocation of signals, thereby supporting spectrum management and regulatory functions.

- Lay out baselines
- Practice against any scenario and simulate any capability
- Scalable training
- Dynamic environment
- Multiple missions, multiple students
- Simulate multiple RF sensors
- Randomization can be used to create deviations from a path or track within a zone, mask triggers, and simulate signal masks and randomized breeches

KEY SIMULATION FEATURES

- Pulsed, sweep, co-located, randomized, and timed signals at any frequency or power
- Signals between 9KHz – 40GHz
- Frequency hopping – set frequency range, power, and sequence
- Different noise levels to generate background noise and interference to test RF sensor location planning
- Directional transmitters – set direction and power
- Rotating transmitters – static or moving rotating TX, ideal as radar simulation
- Ground transmitters – static or moving following terrain
- Airborne transmitters – static or moving up to hypersonic speeds
- Marine/seaborne transmitters – include tidal height variance over time
- Terrain-aware simulations that model the real world
- Terrain-aware paths and courses for transmitters to follow

Benefits for trainers

- Teach large classes as students are connected to the trainer's RFeye Site simulated Nodes over remote connections
- Maintain dynamic control over the simulation
- Create a variety of training scenarios with different transmitters placed around any geographic location
- Inject simulated transmission signals of any power, frequency, or modulation type anywhere in the virtual landscape
- For realistic training, use terrain data, such as SRTM elevation data, to simulate shadowing and other propagation conditions over a wide area

Benefits for students

- Train remotely, with data transferred via TCP/IP sockets
- Practice with the same operational software used in the real world
- Practice signal detection, geolocation, and spectrum management
- Place markers based on geolocation results
- Receive data from virtual transmitters (while in moving vehicles) in a modeled landscape

USE CASE

GEOLOCATING TRANSMITTERS OF INTEREST

Locating transmitters of interest is critical to deconflict the spectrum. Using the RFeye Site Simulator, trainers or scenario designers can configure simulation transmitters with any power and transmit frequency.

They can establish several different types of transmitter modes, manually program bearing and location, and establish whether the simulation transmitter is located on a fixed or mobile ground base or an aircraft.

Based on the parameters, trainee spectrum managers can identify hidden transmitters, discover from the signal's characteristics, and carry out the correct geolocation (PoA, AoA, 2D TDoA, or 3D TDoA) for the mission.

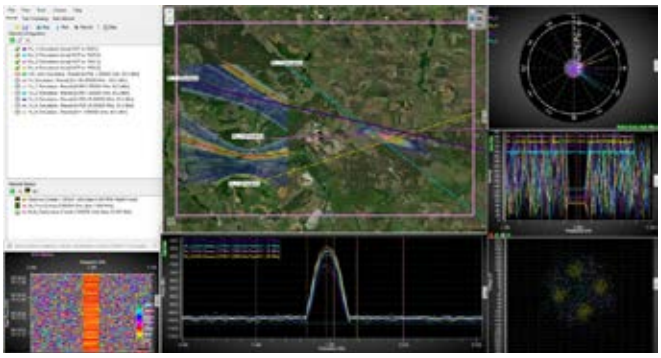


Image 1: *Geolocating a signal in RFeye Site (showing AoA and TDoA as an overlay)*

USE CASE

INTERFERENCE HUNTING

Interference is often the result of issues such as high-powered, low-powered, pulsed signals or signals with a non-standard center frequency.

To effectively practice what to do when interference is detected, instructors can design scenarios that simulate environments with multiple spectrum users, including licensed entities like FM radio broadcasters, across various frequency bands. By intentionally introducing issues—such as increasing signal power within a specific frequency band—operators are prompted to troubleshoot potential interference. This involves examining each frequency band to identify anomalies and subsequently geolocating the interfering transmitter.

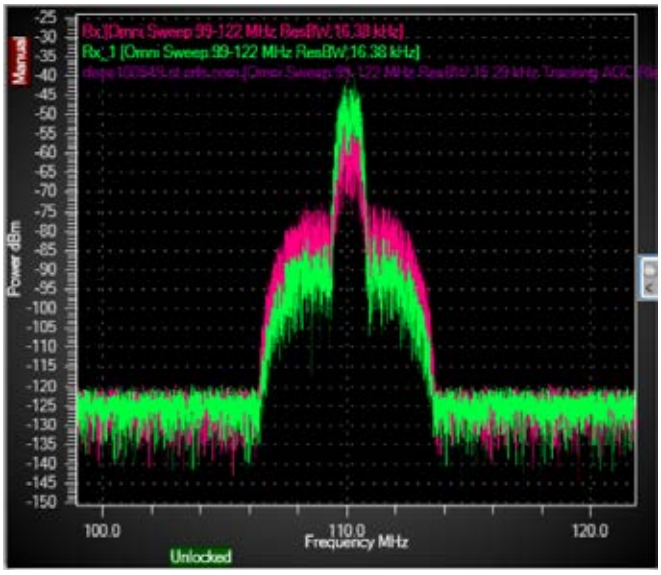


Image 2: *Signal interference from two overlapping signals. The signals share the same center frequency (109 MHz) but have two different power (dBM) levels, causing interference.*

USE CASE

OPTIMAL SENSOR POSITIONING

To effectively understand the electromagnetic spectrum, spectrum managers and regulators must strategically establish baselines by optimally positioning RF sensors. RFeye Site simulated Nodes and transmitters allow users to consider how issues such as line-of-site, the curvature of the earth, multipath from natural and artificial obstacles, Fresnel Zones, and free space path loss affect RF signal propagation.*

Users can benefit from RFeye Site Simulator's Propagation Analysis function, which allows them to simulate signal propagation. They can learn how to design and optimize RF sensor networks for efficient monitoring and geolocation and simulate near real-world scenarios.

**Propagation analysis is an add-on feature.*

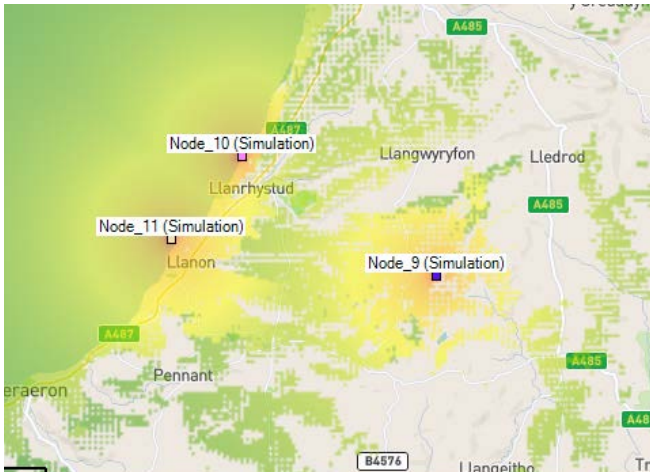
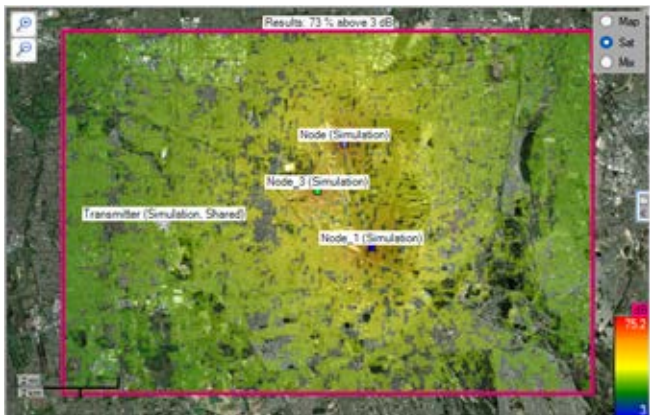


Image 5: *Map image of the areas around Cors Caron Nature Reserve in Wales, UK. The image shows the Fresnel Zone based on the placement of three RFeye Nodes. Moving the RFeye Nodes will change the quality of the signal: Yellow indicates greater power (dB) and green indicates less power (dB), as seen by the Nodes.*



Images 3 and 4: *Map and satellite images (top and bottom) of Cape Town International Airport. The images show the placement of RFeye Nodes around the airport and the resulting Fresnel Zone. Yellow indicates greater power (dB) and green indicates less power (dB), as seen by the Nodes.*

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CRFS SOFTWARE SUITE

You can use our software products individually or the whole software suite of products based on your operating requirements. Talk to your CRFS account manager for more information.

RFEYE® MISSION MANAGER

Automated spectrum monitoring & mission management

RFEYE® SITE

Real-time spectrum monitoring & geolocation toolkit

RFEYE® DEEPVIEW

Forensic signal analysis with 100% probability of intercept (POI)

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EXTRAORDINARY
RF TECHNOLOGY

CRFS creates deployable technology to detect, identify and geolocate signals in complex RF environments. With a leading position in the US, Europe and a global reach, our systems are used worldwide by regulatory, military, system integrators, government security agencies and corporates. They require actionable spectrum intelligence across the widest possible frequency range, in both congested and contested environments. They rely on our highly sensitive RF sensors, accurate transmitter geolocation, signal captures, classification and real-time RF intelligence to fulfil EMSO and electronic warfare support missions.

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