

## DEPLOYMENT

# CAPTURING I/Q SIGNAL DATA AT A DEEP LEVEL

How a university research team uses I/Q data to develop cutting-edge spectrum technologies



Domain:  
Land



Application:  
Spectrum monitoring



Customer:  
University

## PROBLEM: BUILD A NATIONAL DATASET OF I/Q SIGNAL TRACES

RESTART Project is the largest telecommunications research project ever funded in Italy—worth €120 million. Professor Luca Chiaraviglio heads the lab that focuses on applying AI to telecom networks, specifically signal measurements, his area of expertise.

His team needed to record and build a national dataset of I/Q signal traces recorded across the country—from different landmarks and locations, including 5G private networks.

The goal was to develop a signal analyzer that can classify and help understand spectrum usage in Italy.

Having spent years carrying out classical signal analysis with spectrum analyzers, Luca's team needed to go further and dive deeper into the digital layer and extract more meaningful data using I/Q capture.

They needed technology to perform long-duration, high-resolution captures and automate trace analysis to produce meaningful AI-ready data.

## SOLUTION: HIGH-FIDELITY RF SIGNAL RECORDING

To take his project to the next level, Luca chose the RFeye SenS Portable for long-duration, high-fidelity RF signal recording. Despite being small and light, the highly sensitive RF sensor can capture hours of lab-quality signal data—ideal for transporting across Italy to record spectrum in multiple locations, including the city center of Rome as well as Bologna and Catania.

The team appreciated how the hardware worked seamlessly with RFeye DeepView. The forensic signals analysis software allowed them to zoom into individual trace segments and extract high-resolution signal imagery and meaningful information about 5G signals.

They built a bot to automate RFeye DeepView for sequential frequency analysis, capturing 20–30 traces per location. This enabled the team to train a classifier that could detect and identify signal types and internal signal structures like synchronization blocks. The classifier forms the basis of a new AI-driven approach to spectrum analysis.

## RESULTS: UNIQUE, BROAD, AND EXPLORATORY

Luca's approach is unique, broad, and exploratory. While most projects have mission-specific goals, his work now opens new applications and insights that national regulators, telcos, and defence stakeholders can build upon.

- **Rapid classification:** Signals can now be classified in milliseconds, enabling dynamic spectrum access and real-time threat detection.
- **AI integration:** RFeye DeepView automation and classifier training allow full-cycle signal intelligence from trace to insight.
- **New spectrum intelligence methods:** The team's research is contributing to a new body of literature based on I/Q-level, image-based classification.

Thanks to the ongoing success of the RESTART Project, the team will be deploying a fixed RFeye Node network across Rome to detect and geolocate signals to gather further RF spectrum intelligence.

"WE'RE MOVING  
BEYOND TRADITIONAL  
SPECTRUM ANALYSIS—  
CRFS' TOOLS ALLOW  
US TO EXPLORE THE  
SPECTRUM AT A LEVEL  
WE COULDN'T REACH  
BEFORE."

PROFESSOR LUCA CHIARAVIGLIO



## EQUIPMENT USED



**RFeye® Node Plus 100-18**  
Portable, rugged, exceptionally fast RF sensor with full 100 MHz I/Q recording and streaming for enhanced detection, POI and signal intelligence.



**RFeye® SenS Portable**  
A lightweight, portable I/Q recorder for high-fidelity, long-duration RF recording, and signal extraction.



**RFeye® Site**  
Real-time spectrum monitoring and geolocation toolkit.



**RFeye® DeepView**  
Forensic signal analysis with 100% probability of intercept.

Want to discuss your  
deployment needs?

Drop us a message & let  
us know how can we help



Talk to us

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**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.

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