

GNSS Interference Detection & Mitigation

May 2026

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Who is KEYSIGHT?

Empowering a Connected, Secure World



We inspire and empower innovators to bring world-changing technologies to life.
Accelerating Innovation. Securing the Future.



GLOBAL LEADER

Trusted test and measurement expertise for more than 85 years. Operating in 100+ countries with ~15,000 professionals.



DEEP EXPERTISE

Unmatched knowledge in RF, microwave, mmWave, GNSS, spectrum, and communications technologies.



TRUSTED PARTNER

Collaborating with innovators, engineers, and operators to solve the world's most complex challenges.




DRIVING INNOVATION


From design and validation to deployment and optimization—we help turn ideas into real-world impact.

SERVING CRITICAL INDUSTRIES



 **AEROSPACE & DEFENSE**
Mission-critical solutions for air, space, and defense.



 **AVIATION & ANSPs**
Enabling safe, efficient, and resilient air navigation.



 **TELECOM & NETWORKS**
Accelerating 5G/6G and next-generation connectivity.



 **SEMICONDUCTOR**
Ensuring performance and security at every stage.



 **AUTOMOTIVE**
Driving innovation for safer, smarter mobility.



 **ENERGY & INDUSTRIAL**
Advancing a sustainable, connected future.

END-TO-END CAPABILITIES



Design & Emulation



Test & Validation



Deploy & Monitor



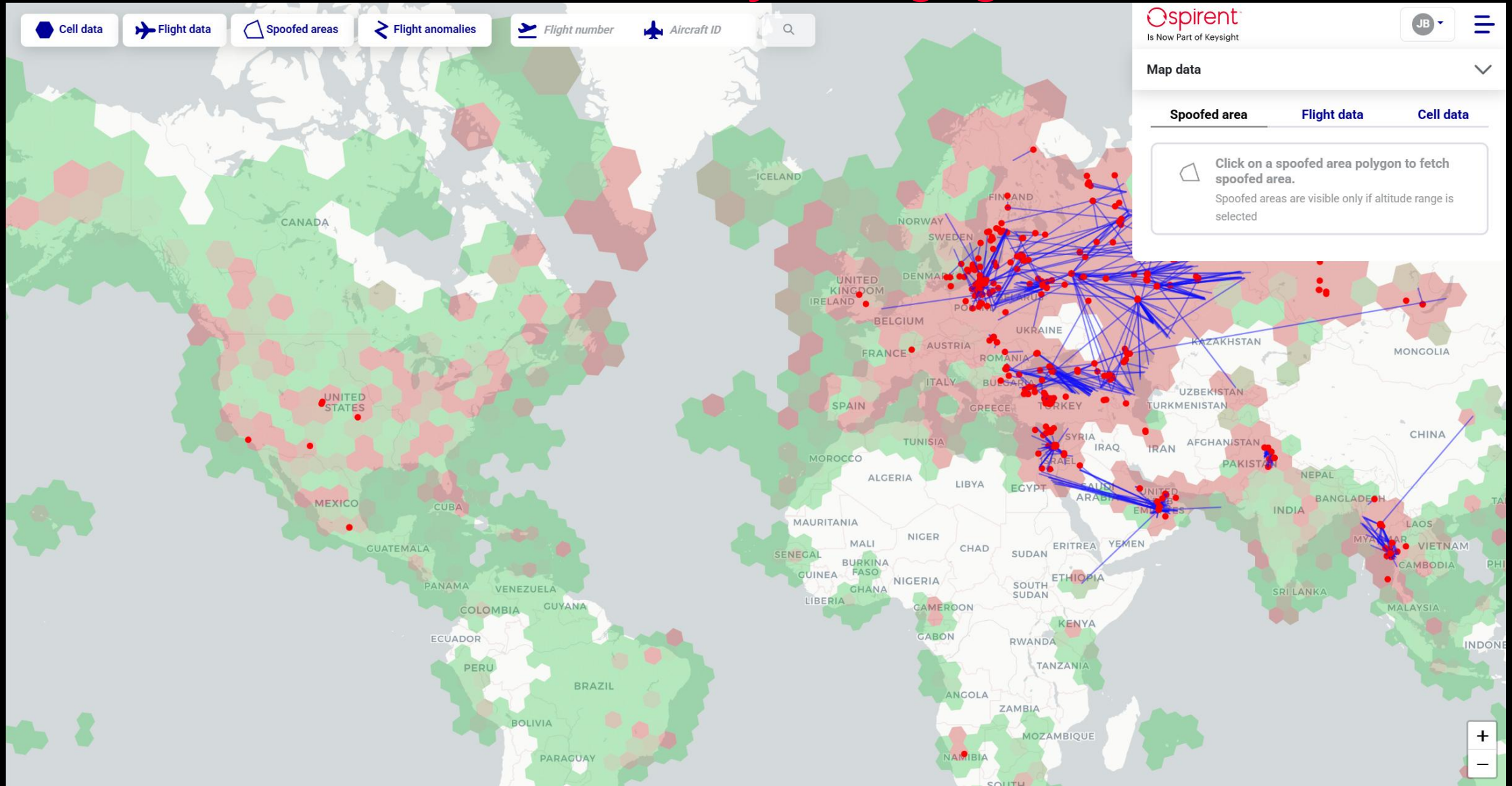
Secure & Optimize

COMMITTED TO A SAFER, MORE RESILIENT WORLD

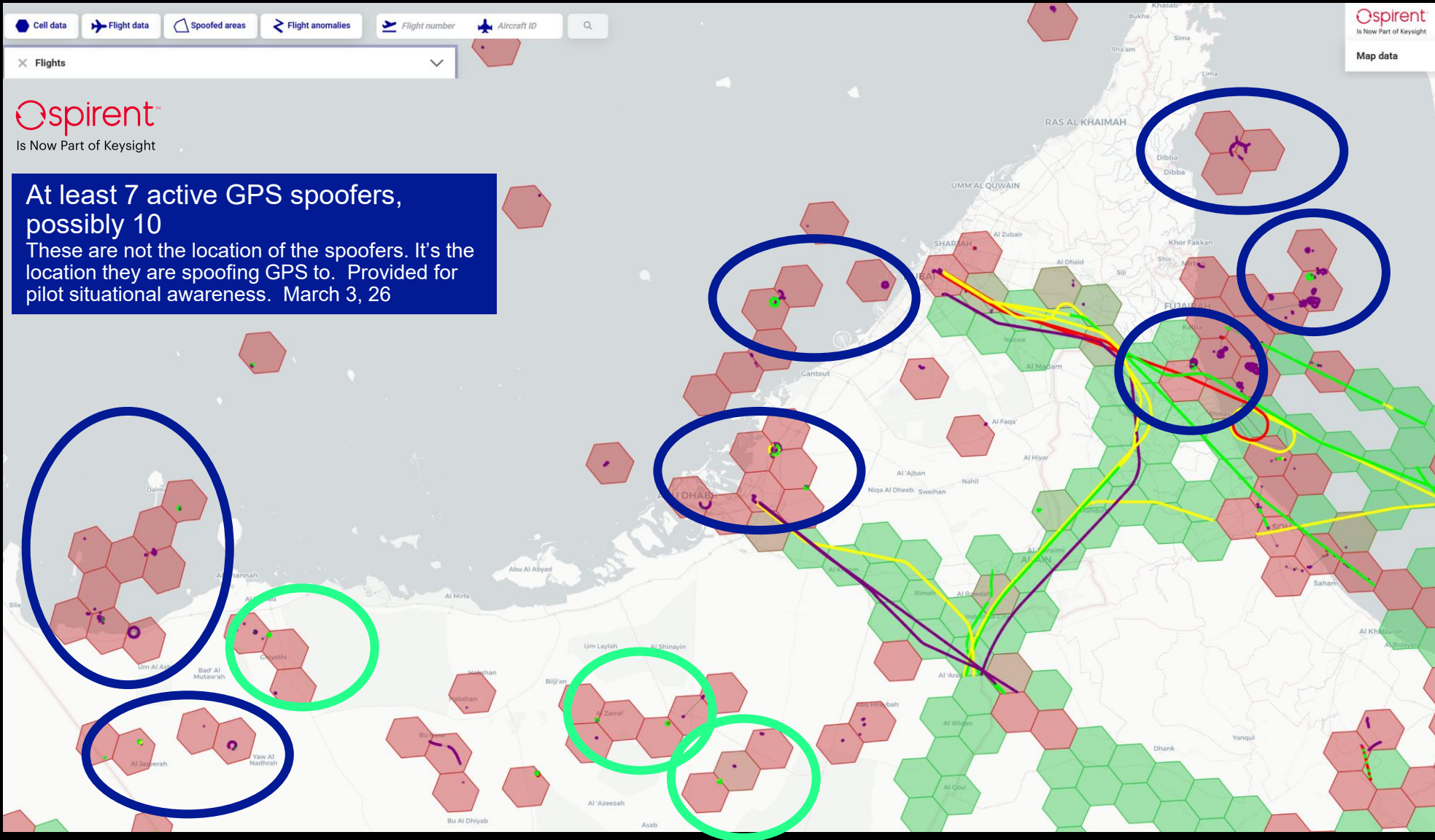
We deliver the technologies and insights that help protect people, connect the world, and drive sustainable progress.



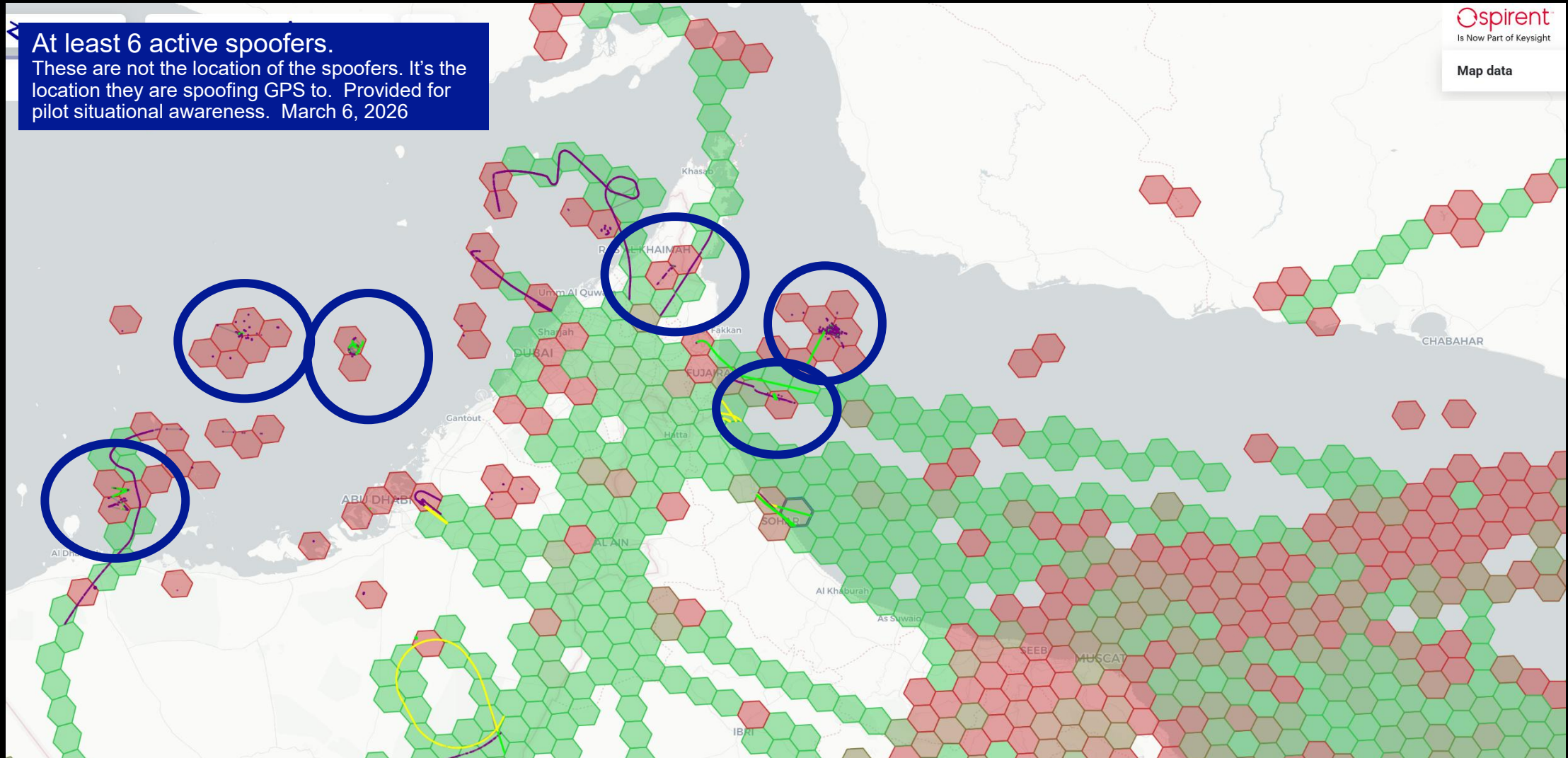
The Threat: GNSS Interference, always changing



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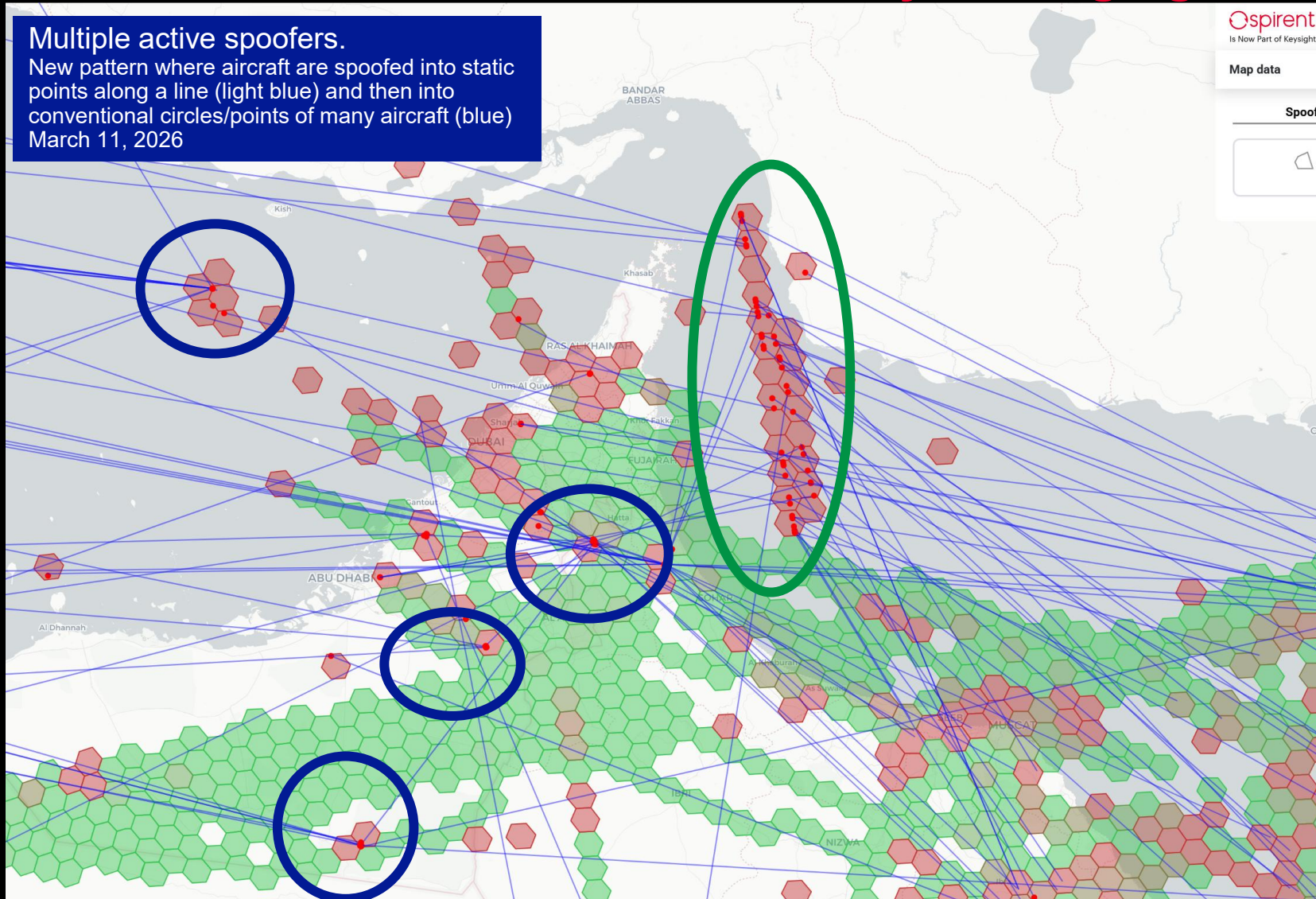


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Multiple active spoofers.
New pattern where aircraft are spoofed into static points along a line (light blue) and then into conventional circles/points of many aircraft (blue)
March 11, 2026



The Impact: Economic & Safety

- Most avionics use GPS L1 are not designed for jamming/spoofing resiliency
 - GPS navigation fails or shows false position & loss of RNP (safety & cost)
 - Can cause FMS/IRS inaccuracy (safety)
 - ADS-B Surveillance reports spoofed position & sometime residual errors (safety)
 - eGPWS & TAWS can falsely alert pilots to pull-up (safety & cost)
 - Incorrect ELT location (safety)
 - Incorrect Wx Radar tuning (safety & cost)
 - Autopilot, clock/timing/networks, AHRS also can fail (safety & cost)
- GPS may fail for the remainder of the flight even after exiting spoofing
 - Reduces safety & increases cost
- Inability to fly RNAV/RNP reduces airspace capacity



MFD showing GPS Spoofing

The Solution: Not just monitoring....



WATCH

AWARENESS & OPERATIONAL/
PILOT MITIGATIONS



ATC



AIRPORTS



AIRLINE OPS



PILOTS (EFB)



IDENTIFY

SPECTRUM ANALYZERS TO
UNDERSTAND, LOCATE, &
MITIGATE THE INTERFERENCE



UNDERSTAND

Detect & analyze
interference



LOCATE

Find the source
of interference



MITIGATE

Take action to
eliminate impact



FIXED SITES



MOBILE SYSTEMS



HANDHELD SYSTEMS



GLOBAL INTELLIGENCE

SHARED DATA TO PROVIDE DETAIL &
HIGH QUALITY GNSS AWARENESS



MULTI-SOURCE
DATA



STANDARDIZED
DATA SHARING



ACTIONABLE
INTELLIGENCE



TRUSTED & SECURE
PLATFORM



AIRCRAFT

INTEGRITY & IMPROVED
AVIONICS & SYSTEMS



ANTENNA
SYSTEMS



AVIONICS
MONITORING



PNT
SOLUTIONS



FLIGHT
MANAGEMENT
SYSTEMS



GNSS INTEGRITY
MONITORING



SPOOFING DETECTION
& ALERTING

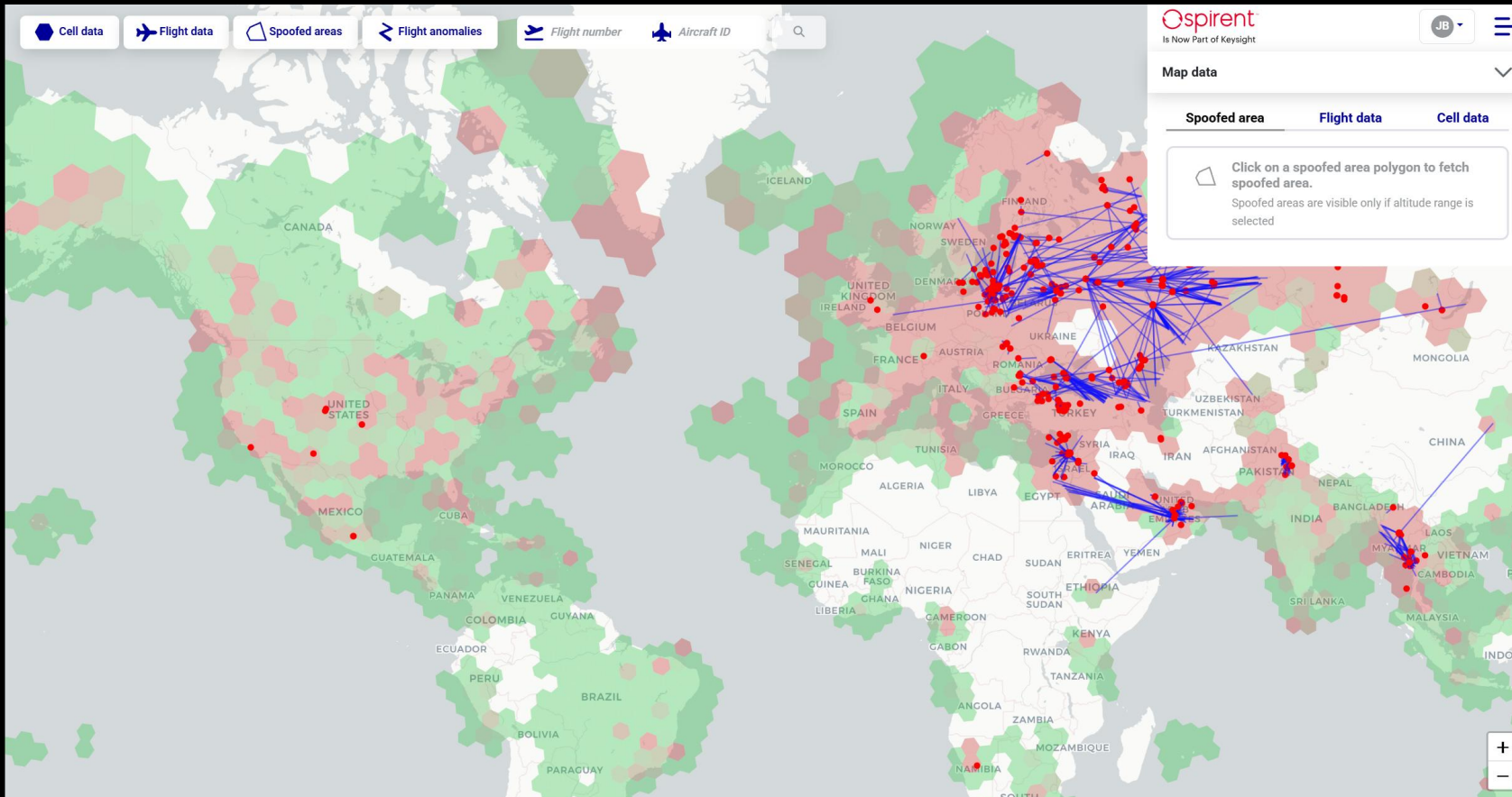


RESILIENT PNT
SOLUTIONS



IMPROVED AVIONICS
& SYSTEMS

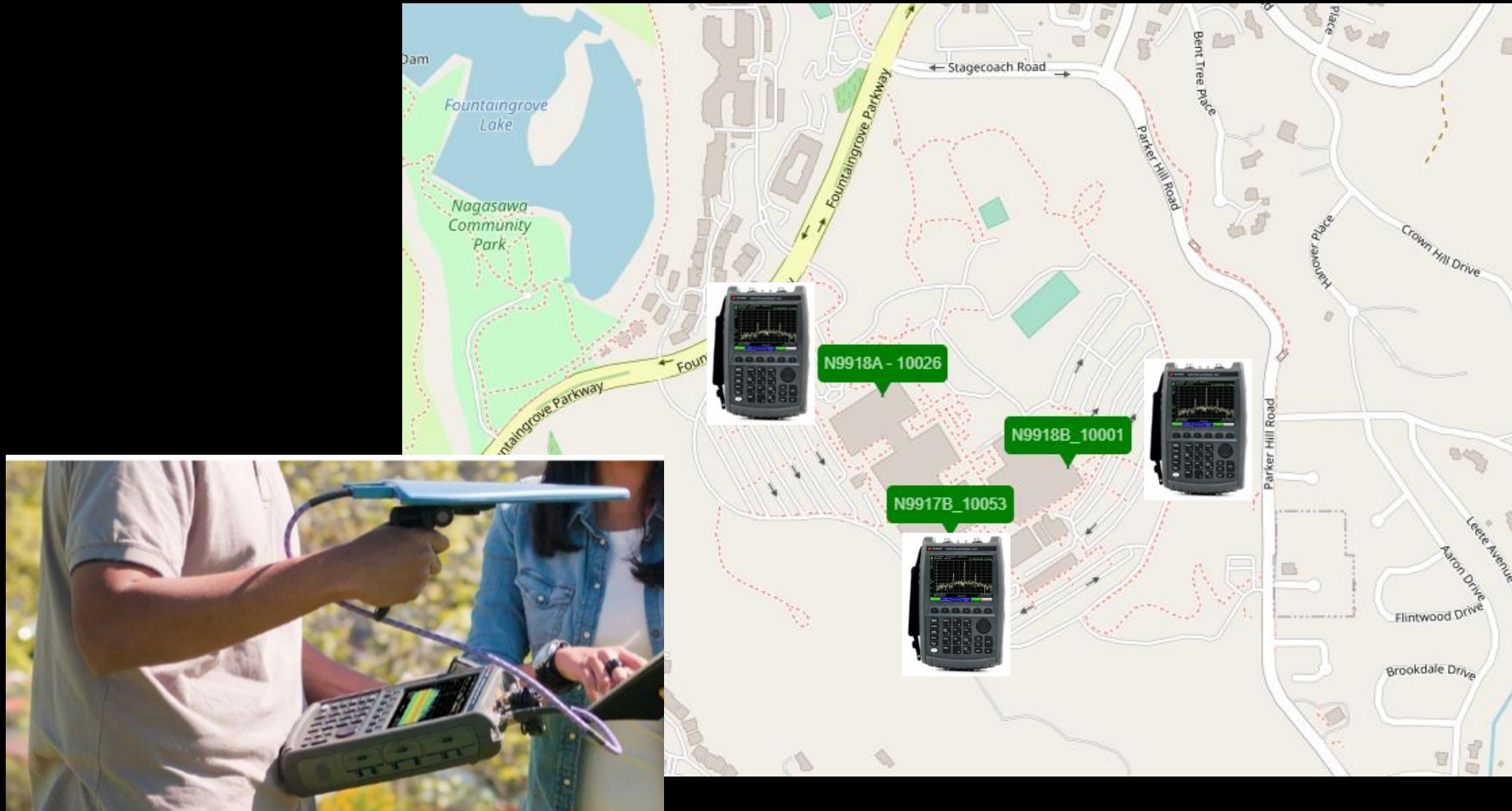
Watchman Prototype



- Patent pending detection of GNSS Spoofing based on ADSB tracks
 - Detection of Spoofing
 - Interference
 - Teleportation
 - Flights with failed GPS after being spoofed
- Free & Premium Accounts
- Can be integrated into dispatch/operations, ATC, EFBs, or other systems
- It is insufficient to solve the long term problem



Mitigation: Spectrum Monitoring



- Portable instruments to measure, identify, locate, & mitigate GNSS & Communications interference
- One or more FieldFox can be used together
- Can also be deployed for full-time monitoring of critical sites

DETECT

Use Watchman to detect GNSS interference events in real time



- Real-time detection
- Spoofing & interference alerts
- Global situational awareness
- Actionable intelligence



ANALYZE

Use FieldFox to analyze interference signals and understand the threat



- Identify signal type
- Measure power & bandwidth
- Analyze modulation & behavior
- Assess impact to GNSS

LOCATE

Use FieldFox with direction finding tools to locate the source



- Direction finding (AOA/TDOA)
- Triangulate source position
- Confirm source

MITIGATE

Take action to eliminate the interference and restore trusted operations



- Neutralize / Block the source
- Monitor to ensure no further activity
- Restore normal operations

WATCHMAN™

Detects GNSS interference and alerts the right people in real time

FIELDFOX®

Analyze. Locate. Mitigate.

The complete workflow to resolve interference and protect operations.





Watchman **IGNITE** CONOPS

INTELLIGENCE FOR GNSS NAVIGATION INTERFERENCE & THREAT EVALUATION

SHARE. DETECT. PROTECT.
Stronger Together Against GNSS Threats.

Watchman IGNITE is the industry's first neutral, collaborative threat intelligence service for GNSS. We aggregate anonymized data from a global community of contributors to detect, analyze, and respond to jamming, spoofing, and other emerging threats—delivering actionable insights back to you, faster and stronger than ever alone.



HOW IT WORKS

1. CONTRIBUTE



Share anonymized GNSS observations, metadata, and threat reports.

2. AGGREGATE



Securely collect and normalize data from diverse sources worldwide.

3. ANALYZE



Detect jamming, spoofing, and anomalies with advanced analytics and AI.

4. SANITIZE



Ensure privacy with rigorous anonymization and data governance by a trusted, neutral party.

5. DELIVER



Access actionable threat intelligence, alerts, and benchmarks—anytime, anywhere.

WATCHMAN IGNITE THREAT INTELLIGENCE

GLOBAL THREAT MAP

THREAT ACTIVITY

TOP THREAT TYPES

- Jamming
- Spoofing
- Interference
- Other

RECENT ALERTS

High	Eastern Europe	2 min ago
High	Red Sea	11 min ago
Medium	South Asia	32 min ago
High	North America	45 min ago

ALERT
Potential Spoofing Detected Your Area
[View Details](#)

WHY IT MATTERS



EARLY WARNING
Detect threats sooner with global coverage and real-time data.



STRONGER INSIGHTS
Leverage the power of many—find what you can't see alone.



GREATER RESILIENCE
Protect operations, systems, and missions with trusted intelligence.



COLLECTIVE SECURITY
A safer GNSS environment for everyone, built by everyone.

WHO IT'S FOR



DON'T FACE GNSS THREATS ALONE.

JOIN THE NETWORK. SHAPE THE FUTURE. STAY AHEAD.



Watchman **IGNITE**

INTELLIGENCE FOR GNSS NAVIGATION INTERFERENCE & THREAT EVALUATION



TRUSTED & NEUTRAL
Independent. Governed.
Your data, your control.



GLOBAL & SCALABLE
Contributors from around the world, stronger together.



ACTIONABLE INTELLIGENCE
From raw data to real-world insights—delivered to you.

LEARN MORE & GET INVOLVED

watchman.spirent.com
stopbuzzer@spirent.com

Watchman IGNITE CONOPS

Contributors

- Governments
- ANSPs / ATC
- Airlines
- Airports
- Aircraft OEMs / Avionics OEMs
- UAS
- Other industries

Service Outputs

- GNSS Analysis
 - Jamming & Spoofing
 - Area of impact
 - Transient behavior
 - Increasing density/localization
 - Navigation/Time behavior
 - MFMC Correlation/Diff
 - GNSS Receiver behavior
 - I/Q Analysis & Signature Analysis
 - Interference source determination
- Impact Analysis
 - Impacts inside area of interference
 - Impacts after exiting interference
 - Impacts by device/receiver/antenna type
- Mitigation Plan (FieldFox)
- C-UAS & UTM Integration
- Improvement Plan
 - Attack signatures for test/development

Service Benefits

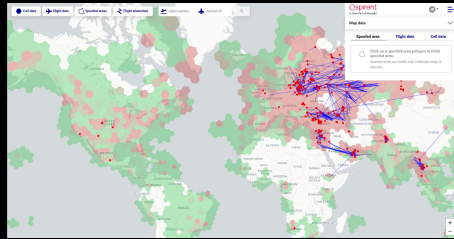
- Business
 - Enables competitors to share data safely
 - Enables industries that do not interact to share safely
 - Enables cost effective situational awareness at a level no industry/company could achieve in isolation
- Scale
 - Multiple methods to detect
 - Different levels of detail
 - Global coverage
- Safety
 - Earlier detection & mitigation
 - Higher confidence alerts
 - Reduced false positives
- Synergy
 - Enables customers to add their own private data layers
 - Add FieldFox handheld & fixed monitoring

Improving Avionics, you can enable the industry

Real-World Data



Field recording with full complexity of real environment captured, but **no intrinsic 'knowledge'** of signals



Detect & Capture GNSS attacks. Once mitigated, develop a defense.

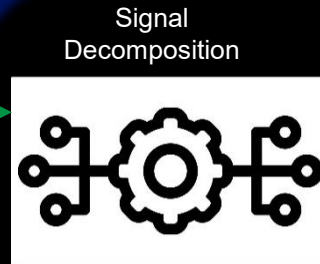


Embedded SimXTRACT can also contribute data

Signature Extraction

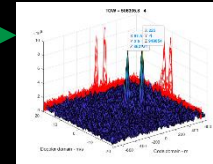
SimXTRACT

I Q



Signal Decomposition

Signal analysis tools



Generates PosApp scenario



Truth* trajectory

dB

Doppler

MP

Lab Simulation

PNT Virtual Simulator



Virtualized GNSS Simulation to scale development of advanced mitigation solutions

GNSS simulator – **Generates signals with realism** of recorded environment, but with full flexibility and control



Updated & New avionics resilient to GNSS attacks

WHY KEYSIGHT?

The only end-to-end solution for GNSS interference awareness, analysis, mitigation, and resilience.



WATCH

Real-time Awareness with **Watchman**

Detect GNSS interference and monitor aircraft integrity in real time.



- Aircraft-level detection & integrity tracking
- Alerts with situational awareness
- Global coverage with shared intelligence
- Actionable data for all stakeholders



IDENTIFY

Deep RF Analysis with **FieldFox**

Understand interference by analyzing signals in the real world.



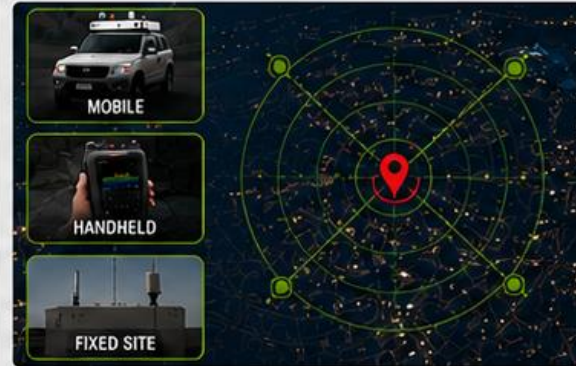
- Identify signal type & characteristics
- Measure power, bandwidth & behavior
- Assess impact to GNSS & systems
- Deep insight for informed decisions



LOCATE

Find the Source with **FieldFox**

Locate interference quickly with direction finding and triangulation.



- Direction finding (AOA/TDOA)
- Triangulate source position
- Confirm & track moving sources
- Fixed, mobile & handheld solutions



MITIGATE & IMPROVE

Act Now. Build Resilience. with **Keysight**.

Mitigate threats, restore operations, and strengthen future systems.



- Mitigate or remove interference sources
- Monitor to ensure no further activity
- Feed data into avionics improvement
- Build more resilient PNT ecosystems



Only Keysight Delivers **THE COMPLETE SOLUTION**



WATCH
Detect & Alert



IDENTIFY
Analyze & Understand



LOCATE
Find & Confirm



MITIGATE & IMPROVE
Act & Strengthen

End-to-End. Trusted. Proven.

For a Safer, More Resilient World.



85+ YEARS
of Innovation



15,000+
Experts Worldwide



100+ COUNTRIES
Serving Customers



Trusted by Governments,
Industries, and Operators

Thank you

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