GNSS Foresight *for aviation*

Assure the safety and reliability of autonomous
systems with precise GNSS forecasts

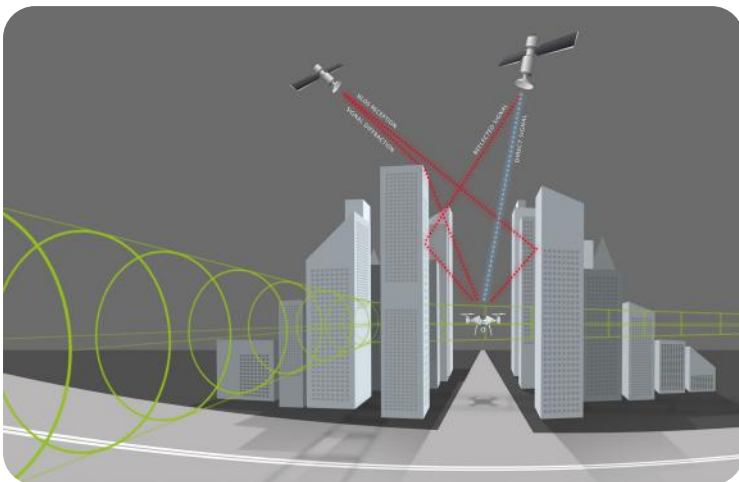**testforce**

Spirent™

Know in advance when and where GNSS is reliable

Unmanned Aircraft Systems (UAS) operate in environments where obstructions to GNSS signals are common, resulting in poor navigation performance. A forecast of GNSS signal reception based on the actual city environment, including buildings and other signal obstructions, can ensure the UAS and UTM know the expected performance, helping to minimize risk when choosing a flight path.

What is GNSS Foresight?

Spirent's GNSS Foresight is a series of cloud-based forecasting solutions that use 3D maps and precise orbital information to enable users to find out where and when GNSS will be reliable.

Foresight solutions are provided either as a Risk Analysis delivery, or as a cloud delivered Forecast Service - typically called a Supplemental Data Service. GNSS Foresight works by ray casting/tracing each GNSS satellite's line-of-sight and non-line-of-sight for every square meter and foot of altitude, every second, using high-definition 3D maps and precision orbital models. The Foresight engine calculates - with a high degree of accuracy - the times and locations at which each satellite will be obscured by buildings or other impediments, accurately predicting satellite availability and associated positioning performance.

Key Benefits

Safety and Reliability

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In safety-critical unmanned airspace, users need a system that can be relied on. Spirent's GNSS Foresight gives users the confidence to trust their GNSS navigation by finding the best times and places to fly, providing safer and more reliable VLOS and BVLOS operation.

Route Selection

📍

Using our precise modeling, users can plan a route with the best GNSS availability, meeting the capabilities of the aircraft, risk ratio of the flight and compliance to regulations, waivers, and CoAs. Ultra-fast data response also enables real-time, on-the-fly decision making. Assured navigation planning enables you to save time and deliver consistently, gaining the greatest return on your investment in autonomous technology.

Performance Improvement

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Satellites are in constant motion, meaning GNSS signals change continuously. With GNSS Foresight, users can predict when and where their systems will operate accurately, enabling delivery of the best possible service.
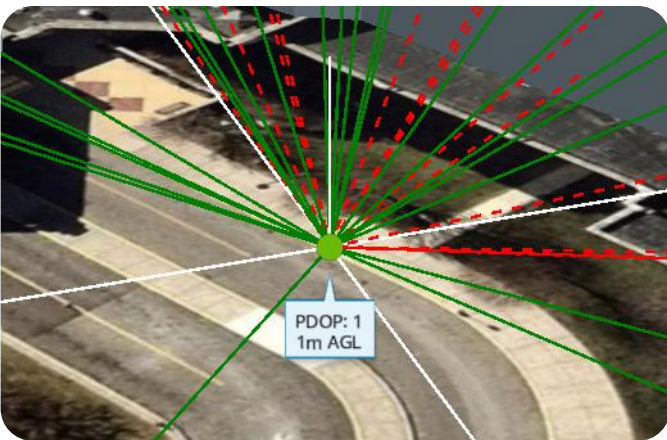
Foresight Live

Second by second predictions to enable flight in challenging environments

Where buildings and obstructions interfere with GNSS, such as urban areas, Foresight Live provides second by second predictions to enable flights exactly when GNSS meets the navigation requirements. Locations previously viewed as unreliable for GNSS navigation now become predictable and accessible for expanded operations.

Foresight Live calculates GNSS for every meter, every second, from 1-100 meters above ground level, for the current time and up-to three days in the future. The data can be accessed via an API, with data response within seconds for flight planning or flights in operation.

The service is accessible directly from Spirent's cloud service, or through Spirent's partners where it can be used as a part of flight planning, risk-assessment, or a USS/SDSP. Foresight Live is available as an annual subscription by service area.

Foresight Risk Analysis

Best & Worst Case GNSS to determine "Fly Anytime" Areas

In suburban and rural areas many assume that GNSS is perfect. A GNSS Foresight Risk Analysis provides a best- and worst-case scenario that shows where safe flight can always be achieved, where it cannot, and locations where GNSS varies that would require a forecast service. Foresight takes the guesswork out of planning where safe flights can be consistently achieved, where fixed routes can be established, and where vertiports can be built.

The Risk Analysis aggregates GNSS forecasts to provide a best-case, worst-case, and 90th percentile predictions over a service area. The analysis is provided as heatmap imagery, data, analysis of problematic areas, and report. The risk analysis can then be used as a part of a CONOPS to limit flights to safe areas for navigation in the user's flight planning tools and control systems.

GNSS >

The global standard for positioning, GNSS technology is subject to impediments that make autonomous operation difficult without additional solutions.

Augmentation and Additional Sensors >

Current solutions such as RTK and inertial navigation systems can help to augment and add robustness to GNSS positioning performance, but these remain largely dependent on the existing integrity of the GNSS solution.

Spirent GNSS Foresight

Whereas RTK and other solutions focus on accuracy, Foresight addresses a GNSS system's reliability and safety. With the ultimate goal of increasing UAS operation, Spirent's GNSS Foresight is a critical piece in the puzzle of flying safely now.

Americas   Europe   Asia

About Spirent
Positioning Technology

Spirent enables innovation and development in the GNSS (global navigation satellite system) and additional PNT (positioning, navigation and timing) technologies that are increasingly influencing our lives.

Our clients promise superior performance to their customers. By providing comprehensive and tailored test and assurance solutions, Spirent assures that our clients fulfil that promise.

Why Spirent?

Over five decades Spirent has brought unrivalled power, control and precision to positioning, navigation and timing technology. Spirent is trusted by the leading developers across all segments to consult and deliver on innovative solutions, using the highest quality dedicated hardware and the most flexible and intuitive software on the market.

Spirent delivers

- Ground-breaking features proven to perform
- Flexible and customisable systems for future-proofed test capabilities
- World-leading innovation, redefining industry expectations
- First-to-market with new signals and ICDs
- Signals built from first principles — giving the reliable and precise truth data you need
- Unrivalled investment in customer-focused R&D
- A global customer support network with established experts

About Spirent Communications

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks. We help bring clarity to increasingly complex technological and business challenges. Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled. For more information visit: **www.spirent.com**

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