BROCHURE

GNSS Foresight *for aviation*

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

Spirent™ Federal Systems

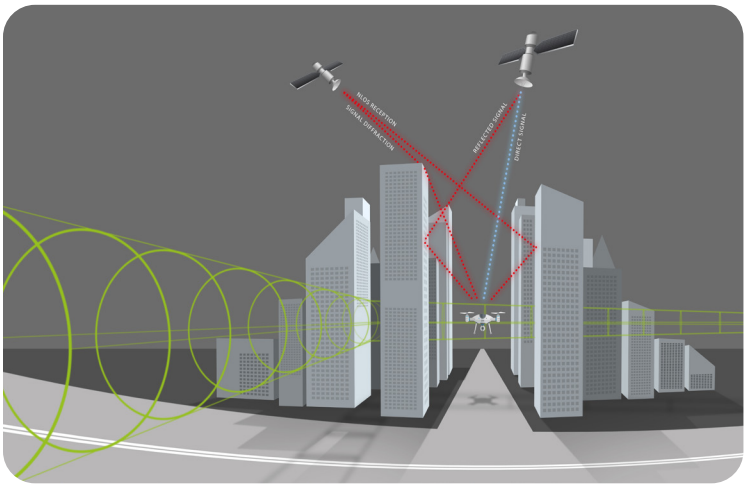
Know in advance when and where GNSS is reliable

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 3D 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 of ground and meter 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

Navigation, Airspace Management, and Surveillance

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.

Waiver Submissions and Compliance

Safety Risk Management policy 8040.6 from the FAA requires operators determine the likelihood and severity of GPS degradation. GNSS Foresight can be used to determine this for waiver applications and/or compliance.

Foresight Live

Navigation SDSP for Flight Planning

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.

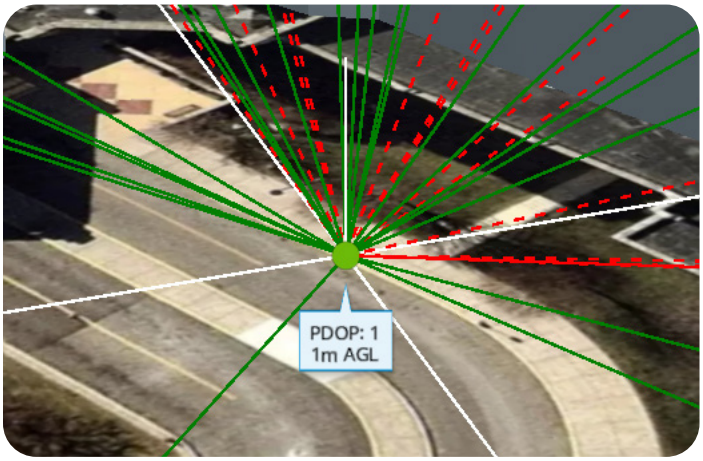
The service is accessible directly from Spirent's cloud service, or through Spirent's partners where it can be used as a part of flight planning, risk-assessment, or 3rd party data supplier (SDSP). Foresight Live is available as an annual subscription by service area.

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 fulfill that promise.

Why Spirent?

Across five decades Spirent has brought unrivaled 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 customizable SDR technology 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
- Unrivaled investment in customer-focused R&D
- A global customer support network with established experts

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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.spirentfederal.com**

US Government & Defense
+1-801-785-1448 | info@spirent.com

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