GNSS Foresight
for autonomous vehicles

Assure reliable navigation by knowing in
advance where and when GNSS will be reliable
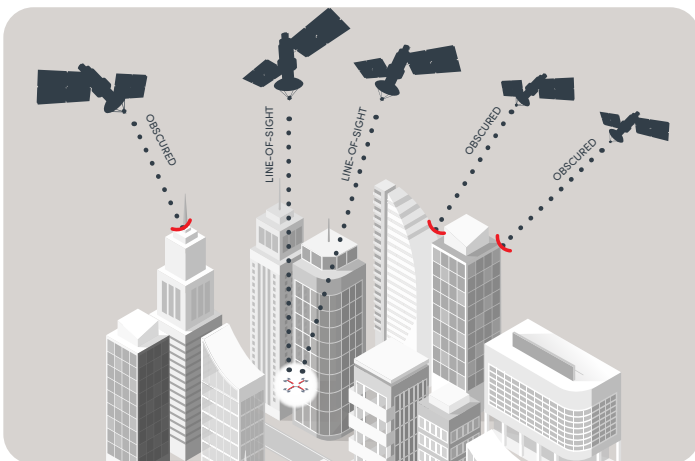

spirent™
Federal Systems

Know in advance where and when GNSS is reliable

Autonomous Vehicles (AVs) operate in environments where obstructions to GNSS signals are common, resulting in unpredictable GNSS navigation performance. A forecast of GNSS signal reception based on the actual city environment, including buildings and other signal obstructions, can ensure the AV knows the expected performance, and knows when to utilize & prioritize GNSS as part of the navigation solution.

What is GNSS Foresight?

Spirent's GNSS Foresight is a cloud-based forecasting service that uses 3D maps and precise orbital information to enable users to find out where and when GNSS will be reliable, allowing them to plan routes to optimize navigation performance and operate safely.

Spirent's Foresight solutions are provided as a Risk Analysis delivery, or as cloud delivered Forecast Service. GNSS Foresight works by ray casting/ tracing each GNSS satellite's line-of-sight and non-line-of-sight for every square meter 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

Performance and Reliability

GNSS sensors are common across virtually all AVs, delivering a high level of availability. However, users need a system that can be relied on consistently. Spirent's GNSS Foresight gives users the confidence to qualify and quantify their GNSS positioning data, identifying safe areas of operation and detailing challenging areas.

Route Selection

Using our precise modeling, users can plan a route with the best GNSS availability, know when to utilize GNSS, and when to rely on other sensors to traverse an area safely. Furthermore, ultra-fast data response times mean these decisions can be made in real-time. Assured navigation planning enables you to save time, plan better, and deliver consistently, gaining the greatest return on your investment in autonomous technology by maximizing availability and reliability of a proven technology.

Performance Improvement

Satellites are in constant motion, meaning GNSS positioning precision fluctuates constantly due to changes in line-of-sight satellite availability. With GNSS Foresight, users can accurately predict when and where their systems will operate accurately, enabling more reliable absolute position performance.

Risk Analysis

GNSS Snapshot Report by Area

Periodic reports add detailed coverage information over the course of a day - identifying when a service area or specific lane can be safely utilized, or where the most challenging streets may be found. Multiple update rates and durations are available. Risk Analysis GNSS Snapshots show:

- Where and when AVs can operate free of serious GNSS error
- Where and when mitigation techniques are required
- Correlation of predicted and actual performance
- Locations where GNSS coverage greatly varies

Foresight takes the guesswork out of planning or analyzing test drives, routes, and where to trust your GNSS-derived position. The Risk Analysis is provided as:

- Data
- Heat-map imagery
- Analysis of problematic areas
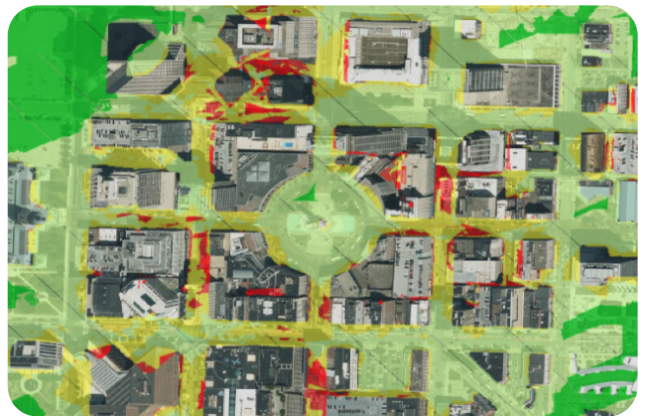- Report

Forecast Service

Second-by-second Predictions to Enable GNSS Navigation in Challenging Environments

The GNSS Foresight Forecast Service provides second-by-second predictions to enable AVs to know where and when GNSS meets their navigation requirements. Locations previously viewed as unreliable for GNSS navigation become predictable and accessible with additional routes and safer operations. The Forecast Service enables:

- Real-time navigation and fusion engine optimization
- Real-time GNSS optimized route planning
- GNSS coverage calculation for every square meter, every second
- Foresight for up to three days into the future

The service is accessible:

- From Spirent's cloud service
- Through Spirent's partners
- As an annual subscription by service area

| **GNSS** | > | **Augmentation and Additional Sensors** | > | **Spirent GNSS Foresight** |

GNSS provides position, navigation, and time globally. It is the primary source for absolute positioning for most AV applications.

Real-Time Kinematics (RTK) and other augmentation systems greatly improve the accuracy of GNSS – where it is available. Integrity & reliability remain an issue for autonomous operations.

Foresight provides a prediction of GNSS coverage that takes into account buildings and other issues at ground level. Foresight provides increased integrity and reliability to any GPS, GNSS, RTK, WAAS, multi-sensor vehicle. Spirent's GNSS Foresight is a critical enabler for real-world autonomous operations.

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 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
- 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.spirent.com**

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