

# Advancing precision agriculture

Comprehensive solutions for your GNSS and autonomy needs



# We are the global leader in OEM precise positioning and perception technology, trusted by the world's top agriculture companies.

Hexagon | NovAtel is a global technology leader, pioneering solutions for assured autonomy and positioning for integrators across a wide range of industries and environments. Our Global Navigation Satellite System (GNSS) receivers, antennas and correction services are found in the control, guidance and steering systems of the world's top precision agriculture, implement and vehicle manufacturers' products. With decades of field-proven reliability, our solutions optimize growers' productivity and efficiency, allowing them to save time, lower input costs and increase profits.



**Ag Leader®**



**FENDT**



# Building powerful partnerships

At Hexagon | NovAtel, we want you to grow your business and create unmatched experiences for your customers in the agriculture industry. That's why we are committed to developing the right OEM solution to help you achieve that success. We design our solutions to integrate seamlessly into your equipment, offering advanced industry solutions built for you.

Long-term, trusted partnerships are formed by collaborating, cooperating, and innovating together to create quality solutions. Our dedicated team, customer-focused approach, and robust supply chain support your business needs —and together, we can bring winning products to your customers.



## Hardware

High-precision reliability and industry-leading-low failure rates. Customisation options available to align with your brand.



## Firmware

Enhance precision and productivity with scalable field-upgradeable options.



## Corrections

TerraStar services deliver sub-meter to centimetre-level position accuracy with global coverage.



## Autonomy

Custom-built solutions combining positioning, corrections, sensor fusion and safety systems.

# All-in-one positioning hardware solutions

Looking for an all-in-one field ready solution?

All-in-one, ready to install positioning solutions, that expedite time to market of your precision agriculture systems. Supported with rugged, water and dust-tight enclosures built for tough Agriculture environments.



## SMART7 series

Premium all-in-one smart antenna solution for maximum performance and accuracy.

- High performance multi-frequency, multi-constellation GNSS receiver and antenna
- Integrated magnetic and screw mounting
- 14-pin connector for power and communication
- LED status indicators for easy monitoring
- Optional Terrain Compensation and SPAN GNSS+INS

**COM Ports:** 3 (RS-232), 1 (CAN), 1 (PPS), 1 (Ground Speed Output), Wi-Fi Optional, Ethernet Optional



## RELAY7 series

RTK rover UHF radio accessory attaches to SMART7 antennas to create a single unit for easy system integration.

- 400 MHz and 900 MHz radio receiver options for RTK corrections
- Compatible with many RTK Radio Protocols

## SMART7 summary

FEATURE		SMART7	SMART7-W Wi-Fi Only	SMART7-I Wi-Fi & Ethernet	SMART7-S SPAN Only	SMART7-SI SPAN, Wi-Fi & Ethernet
Positioning Solutions	GLIDE			✓		
	STEADYLINE			✓		
	TerraStar Correction Services		Software Option and Subscription Required			
	RTK Positioning		Software Option			
	RTK ASSIST/RTK ASSIST PRO		Software Option and Subscription Required			
IMU Hardware Options	Terrain Compensation	-	Optional	Optional	-	-
	SPAN	-	-	-	✓	✓
Connectivity Hardware Options	Wi-Fi	-	✓	✓	-	✓
	Ethernet	-	-	✓	-	✓
Accessories	RELAY7 UHF RTK Radio		Optional accessory			





### SMART2 series

Entry level all-in-one smart antenna solution for increased performance and accuracy.

- High performance multi-constellation, dual-frequency GNSS receiver and antenna
- Integrated magnetic and screw mounting
- 14-pin connector for power and communication
- LED for easy status monitoring

**COM Ports:** 3 (RS-232), 1 (NMEA2000 CAN), 1 (PPS), 1 (Ground Speed Output), Bluetooth optional

### SMART2 summary

	SMART2	SMART2-B	SMART2-TB
TerraStar Correction Services	Software Option and Subscription Required		
GLIDE	Software Option		
Terrain Compensation	-	-	✓
Bluetooth	-	✓	✓

# Customised positioning hardware solutions

## Looking for a customised solution?

Top-of-the-line receivers and antennas that deliver high precision and reliability in all conditions for integration into your own enclosure and system design.



### OEM7500

Multi-frequency GNSS receiver delivers precise positioning in a single-sided Surface Mount Device (SMD) package.

- Size: 35 x 55 x 4mm
- Weight: 12g



### OEM7700

Multi-frequency GNSS receiver delivers precise positioning and simplifies integration.

- Size: 46 x 71 x 8mm
- Weight: 31g



### OEM719

Multi-frequency GNSS receiver includes all modern signals and is backwards compatible with the OEM615/OEM617 receiver.

- Size: 46 x 71 x 11mm
- Weight: 31g



### OEM729

Multi-frequency GNSS receiver includes all modern signals and is backward compatible with the OEM 628 receiver.

- Size: 60 x 100 x 9mm
- Weight: 48g

## Receiver card summary

FEATURE		OEM7500	OEM7700	OEM719	OEM729
Positioning Solutions	GLIDE	✓			
	STEADYLINE	✓			
	TerraStar Correction Services	Software Option and Subscription Required			
	RTK Positioning	Software Option			
	RTK ASSIST/RTK ASSIST PRO	Software Option and Subscription Required			
	ALIGN	Software Option			
IMU Hardware Options	SPAN	Software Option and External IMU Required			
Connectivity Hardware Options	Ethernet	-	✓	-	✓
	COM Ports	3 (UART) 1 (CAN Bus) 1 (USB Device) 1 (SPI for external IMU)	5 (LVCMOS) 2 (CAN Bus) 1 (USB Device) 1 (USB Host) 1 (Ethernet)	3 (LVCMOS) 2 (CAN Bus) 1 (USB Device)	1 (RS232/RS422) 2 (LVCMOS) 2 (CAN Bus) 1 (USB Device) 1 (Ethernet)





### VEXXIS GNSS-500 series antennas

The VEXXIS GNSS-500 series antennas include a dual and multi-frequency antenna available with a rugged enclosure or as an OEM model for easy integration.

### GNSS antenna summary

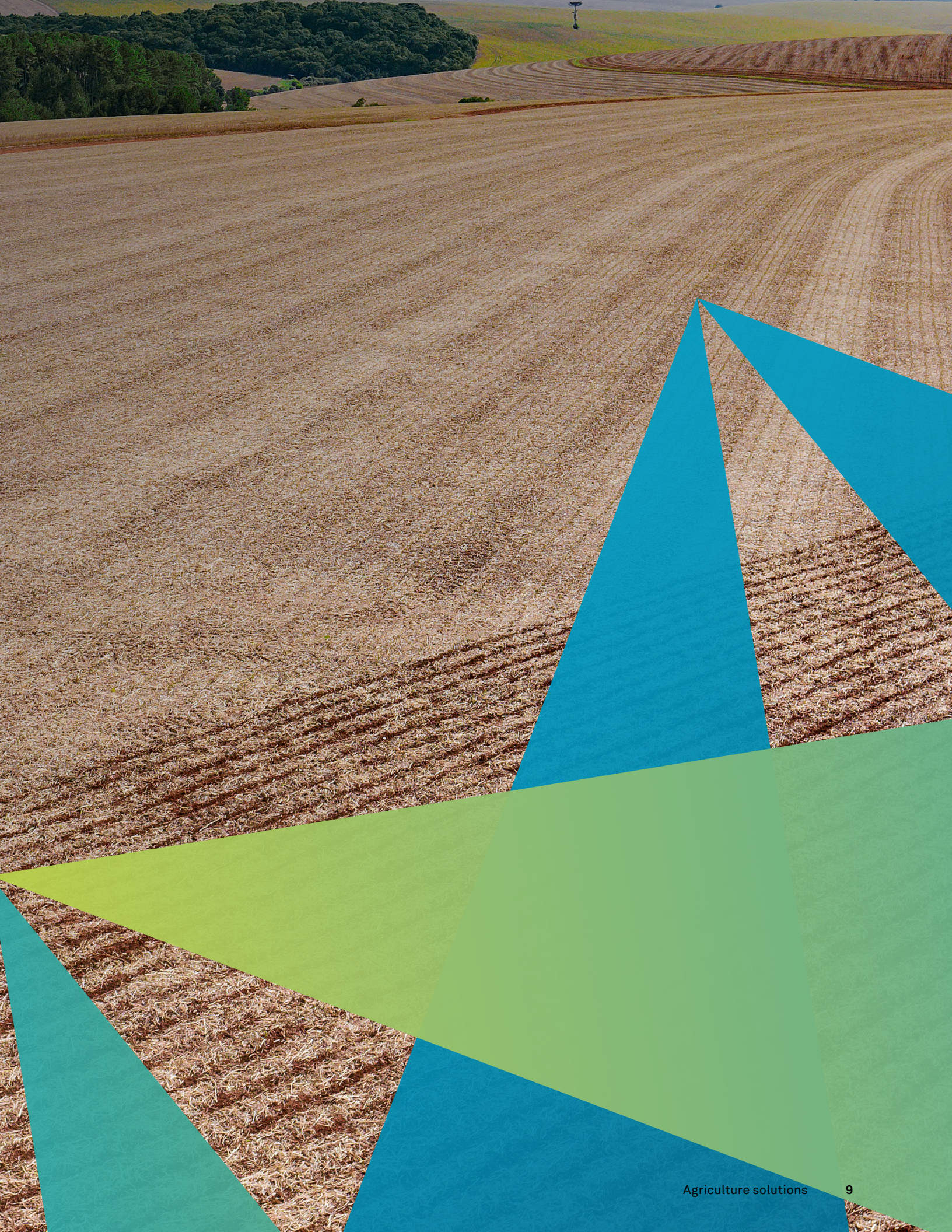
FEATURE	GNSS-502	GNSS-503	OEM-GNSS 503
OEM Integration Ready	-	-	✓
Robust Enclosure		✓	-
Magnetic Mounting		✓	-
Size	Diameter (155mm) Height (45mm) Weight (450g)		Diameter (127mm) Height (24.5mm) Weight (134g)
Signal Types Supported	Dual-Frequency, Multi-Constellation	Multi-Frequency, Multi-Constellation	
L-Band for TerraStar		✓	



Get the most out  
of your hardware with  
customised firmware  
options.









# Firmware options

## Want to boost your precision and reliability?

Customise your NovAtel equipment further with firmware options to enhance precision and productivity and maximise your hardware.

### GLIDE

Position smoothing feature for agricultural and machine guidance systems, designed to optimise pass-to-pass accuracy down to 35 cm. Compatible with and without SBAS corrections.

- **Benefits:** Minimizes gaps and overlaps between passes.
- **Potential use:** GLIDE is a standard feature on most NovAtel hardware, increasing pass-to-pass accuracy when a corrections source is unavailable.

### ALIGN

Combines two or more receivers to generate precise heading, pitch and accurate relative positioning. Compatible with SPAN GNSS+INS functionality. Requires a wired or wireless communication link between receivers.

- **Benefits:** Plug-and-play solution for relative positioning in leader/follower operations and in static and low-speed operations that require a high-accuracy heading.
- **Potential use:** Vegetable harvesting, implement steering, combine and grain cart coordination, autonomous robot swarm and more.

ALIGN accuracy			
Accuracy	0.5m Baseline	1m Baseline	2m Baseline
Dual-frequency – fixed heading accuracy	0.40°	0.20°	0.10°

### SPAN Technology

SPAN technology brings together GNSS positioning and inertial navigation (INS) for an assured, high-rate 3D position with velocity and attitude (pitch/roll/azimuth) measurements. By deeply coupling GNSS and INS measurements, SPAN algorithms deliver reliable positioning and orientation in all conditions even when satellite reception may be compromised for short periods of time.

- **Benefits:** Maintain high accuracy azimuth and positioning in uneven terrain and in areas with foliage and obstructions. SPAN outputs a corrected position that can be translated to any point on the vehicle allowing for translation to points of interest such as other sensor positions like cameras or LiDAR devices.
- **Potential use:** Generating high accuracy positioning and orientation of autonomous machines when operating at slow speeds and in a variety of environments, reliable positioning during end of row turns and headland passes along treelines, and more.

### Terrain Compensation

Corrects for errors in position caused by the roll and pitch of the vehicle when operating on uneven or sloped terrain.

- **Benefits:** Allows agriculture equipment to maintain GNSS accuracy when following guidance lines in hilled or sloped areas of a field.
- **Potential use:** Accurate mapping of grape harvester path during harvest operation and more.

### NovAtel OEM7 drivers for ROS™

Easily integrate NovAtel receivers into your autonomous system architecture. Drivers enable seamless access to the receiver's GNSS and inertial capabilities to simultaneously access live, recorded and post-processed data. Both ROS and ROS 2 drivers are available.

- **Benefits:** Save time and reduce the complexity of integrating GNSS into autonomous platforms.
- **Potential use:** Speed up integration and testing of GNSS performance in autonomous machine development to reach the market faster.

### NTRIP

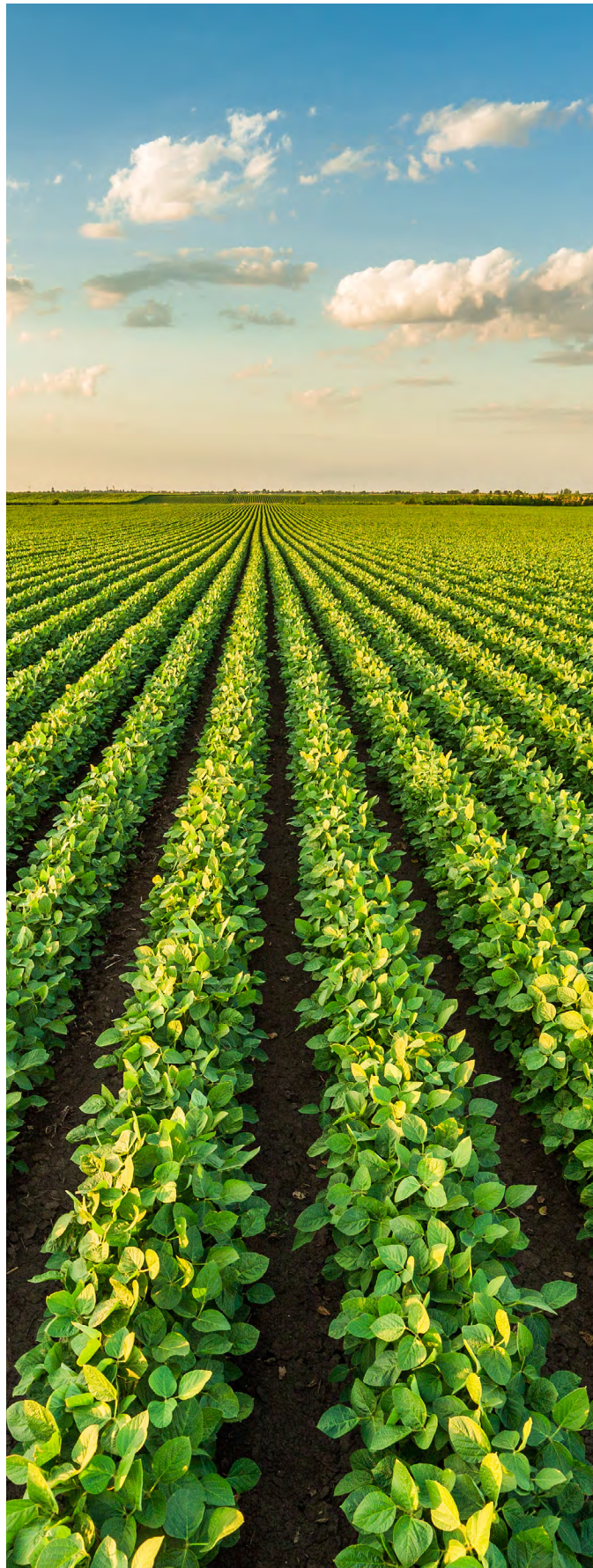
Network Transport of RTCM via Internet Protocol (NTRIP) is an application-level protocol used to stream GNSS differential correction data over the Internet. This allows quick and easy integration into any v1.0 or v2.0 NTRIP caster, ensuring universal support for worldwide GNSS infrastructure for base and rover applications.

- **Benefits:** Easily receive RTK corrections using the onboard NTRIP client on Wi-Fi or Ethernet-capable SMART7 receivers. NTRIP enhances productivity with easily configurable Ethernet connections and speeds up to 100 MB/s.
- **Potential use:** IP delivery of TerraStar corrections to add redundancy to L-Band delivery, easily receive RTK corrections over cellular, and more

### Interference Toolkit (ITK)

Identify and mitigate GNSS interference with spectrum analysis output, advanced signal processing and digital filtering.

- **Benefits:** Easier troubleshooting and mitigation of interference.
- **Potential use:** There are many sources that can interfere with your GNSS signals. NovAtel ITK can help you identify and filter out the noise.

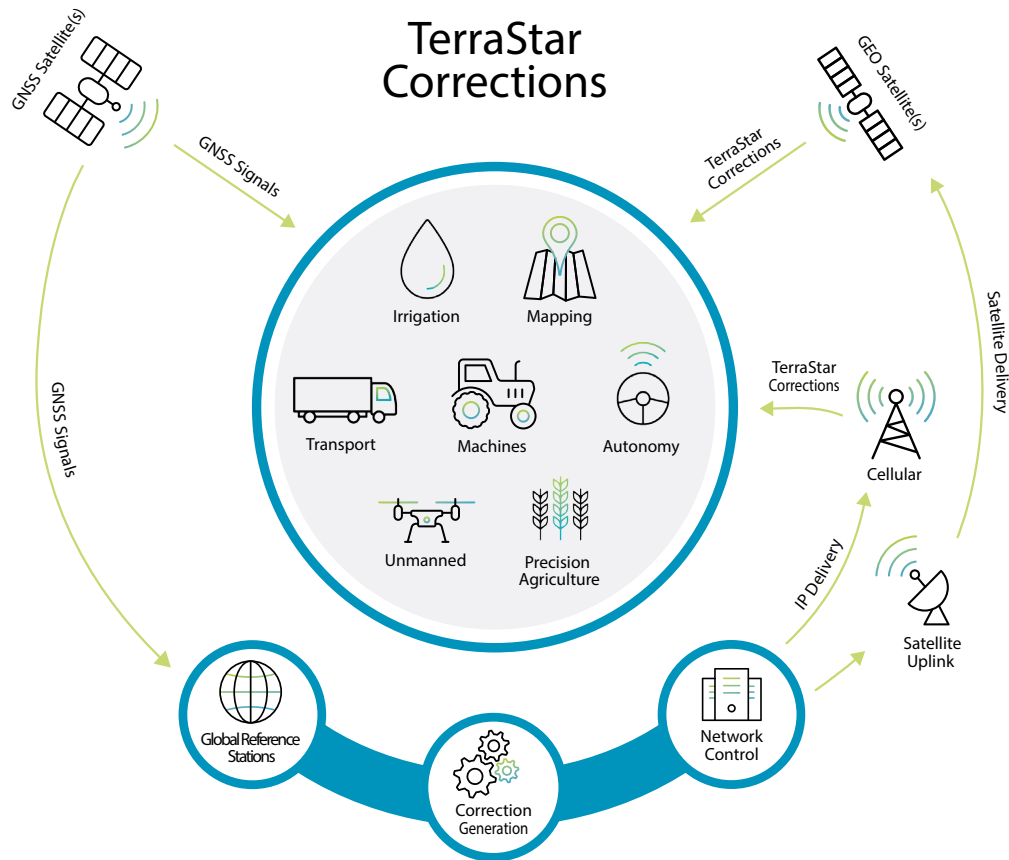


# Correction services

## TerraStar correction services

Looking to enhance your precision?

TerraStar Correction Services deliver PPP corrections 24/7/365 to your NovAtel receiver via a satellite link or Internet connection to provide a reliable solution with a variety of service levels.



### High-performance global corrections

TerraStar's worldwide reference station network is constantly streaming data into our correction generation servers to provide high-quality, multi-constellation, multi-frequency clock and orbit corrections.

### Reliability trusted by leaders

Reliability is built into the whole system, from redundancy at each reference station to geographically separated, independent network control centres. This robust system, combined with our expert monitoring and support teams, ensures over 99.999% service availability and uptime.

### Symbiotic design

TerraStar users get the best performance and experience from NovAtel systems. Long-trusted for high-precision positioning technology, NovAtel's corrections, positioning algorithms and hardware are designed side-by-side to ensure a seamless solution with powerful performance. The result is 24/7/365 all-weather operation.

### The security of simplicity

Corrections are broadcast over geostationary L-Band communication satellites for continuous, no-hassle data delivery and are conveniently available over the Internet for connected users. Subscriptions are easy to manage online, with flexible durations and scalable service levels to suit your application needs.



## TerraStar correction services

SERVICE LEVELS <sup>1</sup>				
Performance	TerraStar-X	TerraStar-C PRO	TerraStar-C	TerraStar-L
Horizontal Accuracy	2cm (RMS) 2.5cm (95%)	2cm (RMS) 2.5cm (95%)	4cm (RMS) 5cm (95%)	40cm (RMS) 50cm (95%)
Pass-to-Pass Accuracy	2cm (95%)	2cm (95%)	3cm (95%)	15cm (95%)
Convergence Time	<1 min	5 min	<30 min	<5min
Supported Constellations	GPS/GLO	GPS/GLO/GAL/BDS	GPS/GLO	GPS/GLO
Supported Platform(s)	OEM7, SMART7	OEM7, SMART7, SMART2	OEM6, SMART6-L	OEM7, SMART7, SMART2, OEM6, SMART6-L
Coverage Area	Regional <sup>2</sup>	Global	Global	Global

1. Performance specifications subject to GNSS system characteristics, Signal-in-Space (SIS) operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length, multipath effects and the presence of intentional or unintentional interference. Best performance achieved with multi-constellation and multi-frequency products.

2. Available regionally in the United States. Visit [terrastar.net/services/terrastar-service-options](https://terrastar.net/services/terrastar-service-options) for a service area map.

## Bridging solutions

### Looking to keep your operations moving through RTK interruptions?

Maintain centimetre level accuracy even when RTK goes out. RTK ASSIST and RTK ASSIST PRO services leverage TerraStar Corrections to make any RTK solution more robust and reliable for maximum uptime to keep your operations moving.

**RTK ASSIST:** Maintains centimetre-level accuracy for up to 20 minutes through RTK outages.

**RTK ASSIST PRO:** Maintains centimetre-level accuracy for extended RTK correction outages indefinitely. Provides fast and independent centimetre-level positioning, enabling operations in areas with no RTK base or network coverage through the included TerraStar-C PRO service.





POLE  
0 m/s

BALE  
0 m/s

BALE  
0 m/s

IMPLEMENT  
1.38 m/s >>

HUMAN  
0.5 m/s >>

BALE  
0 m/s



# Autonomy Solutions

## Developing for the future?

Hexagon's Autonomy & Positioning division is developing safe autonomous vehicle solutions industry-wide through our GNSS and perception programs. We are building a comprehensive autonomous platform for agriculture by combining the world's leading technologies including:

### Positioning solutions

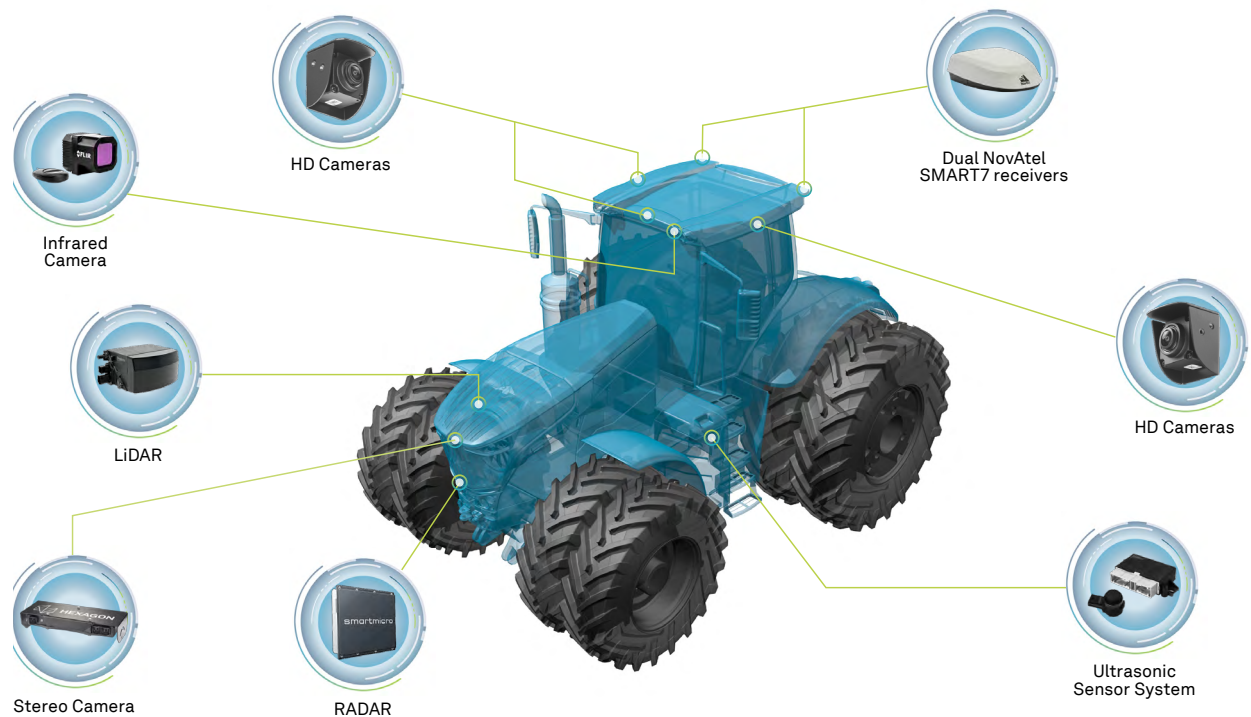
High-accuracy, high-reliability positioning solutions which can be integrated into your autonomous platform through our software and hardware combinations to provide high-performing solutions.

- Multiple enclosure and hardware design profiles to provide synchrony with your product design requirements.
- Sensor fusion paired with NovAtel's SPAN solutions lead to greater accuracy, redundancy, and robustness of your positioning solution by bridging GNSS positioning interruptions for greater machine uptime and position accuracy.
- Globally available correction services to provide high-accuracy and high-reliability positioning for your machines.
- Industry-leader advice on how hardware, software, and correction services combinations can better achieve functional safety goals.

### Perception and awareness systems

Hexagon's Autonomy & Positioning division has a long history of developing autonomous platforms and helping customers develop their products all the way from concept through to production. Our experience and expertise span across a wide range of perception technologies including LiDAR, radar, ultrasonic and vision based systems.

Enabled by our extensive machine learning and AI-powered algorithms our solutions can save you engineering and development costs and accelerate your products' time to market.





At Hexagon | NovAtel, robustness and reliability are not buzz words.

**We prioritise quality, reliability and robustness of our solutions to ensure users achieve the best position, navigation and timing possible.**

**We build robustness and reliability through every stage of product development.**

# Why partner with Hexagon | NovAtel?

## A comprehensive process to partnerships

We are your GNSS and autonomous systems specialists. Our goal is to support you and your business in these areas, now and into the future. That is why we have a transparent process for our partnerships, giving you the support you need and keeping you at the forefront of new developments.

### Identify

A solid partnership begins with a strong understanding of each partner and their needs, challenges, goals and vision. When you work with Hexagon | NovAtel, you have a key account manager who leads your account and is responsible for understanding your business and addressing your needs. They will work with you and bring in subject matter experts to identify solutions and areas where our products can support your business.

This relationship is ongoing. Your key account manager will work with you and keep you informed of new advancements in technology, product upgrades, supply management and quality management.

### Technology

Once we understand your challenges and where you want your business to go, we have a range of solutions to help you achieve your goals. Having access to a team of qualified experts in GNSS and autonomous solutions can allow you to focus your resources on other areas to advance your equipment and stay ahead of your competition.

### Design

Reliability and robustness are built into the DNA of our products. Not only do we have quality off-the-shelf solutions that you can easily integrate into your equipment now, but we can custom design a solution specific to your needs. You can also choose to rebrand our offerings to offer a consistent outward appearance for your equipment, products, and brand.

### Manufacture

Manufacturing is at the core of what we do. Quality and reliability are of the utmost importance when integrating a positioning or autonomous solution. Our LEAN manufacturing, testing and continuous improvement principles have led to our world-class quality rating and on-time delivery record

It is becoming more and more essential to manage sustainability within our own companies and throughout the value chain. We have built a robust, sustainable business model that supports our suppliers and manages supply risks before they arise. As new products and solutions enter the market, our team works directly with you to manage supply, transition to new products, and mitigate any risks.



## Market

Developing materials to promote and educate on specific technologies can be time-consuming and take away resources from promoting your overall solution. Our team creates white labelled marketing materials that can be easily customized to meet your brand standards, highlight benefits to support your dealers and educate your customers.

While your people are focusing their efforts on marketing your equipment and product line, we can help you promote the added benefits of a precision solution.

## Support

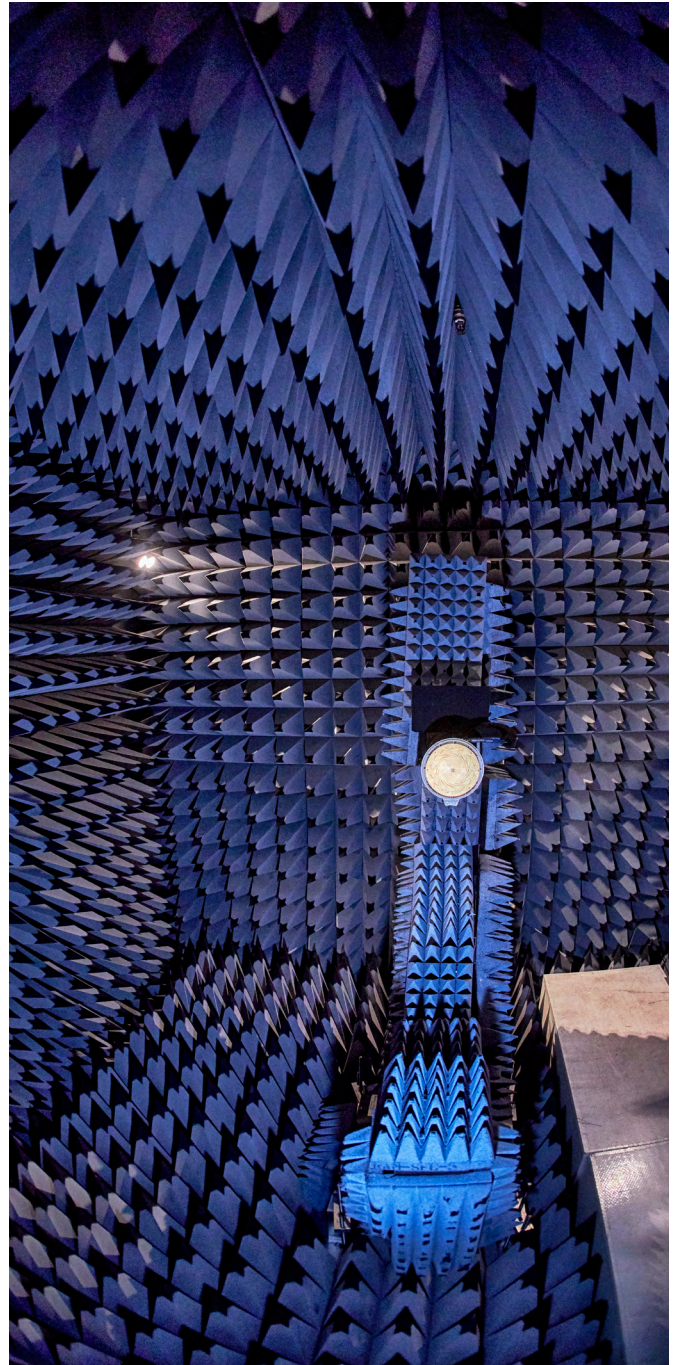
Our support team is the best in the industry. The team's mission is to support the installation and operation of NovAtel products and services by providing you with industry-leading support, training and knowledge. In addition, we make it easy to do business with us by minimizing integration time and providing proactive support and early engagement to anticipate and prevent issues.

Your business is unique in where and how it operates. We have an extensive team that spans 11 countries, providing a global support network.

## Improve

Our focus on innovation and improvement helps keep you ahead of the curve and keeps existing equipment relevant for extended periods. When your business needs to pivot to respond to the market, we are here to support you.

Not only do we actively manage our products but also our supply chain. We monitor supply trends with each of our components to identify risks early on and mitigate or prevent any impact it could have on our supply; this is one of the critical factors that has led to our 100% on-time delivery score.







# Contact us and learn more

## Questions about what we offer?

With the diverse challenges in positioning and developing autonomous platforms, we recommend contacting our team directly for information on the latest technologies available for your applications.

[sales.nov.ap@hexagon.com](mailto:sales.nov.ap@hexagon.com)

## Looking for support?

Along with our high-precision products, you can count on our team for assistance at any stage of development, integration or operation.

[support.novatel@hexagon.com](mailto:support.novatel@hexagon.com)

## Looking for more information?

Visit our websites for more information on products, support, reference materials and industry resources.

### NovAtel

<https://novatel.com/industries/agriculture>

### TerraStar Correction Services

<https://terrapstar.net/industries/precision-agriculture>



# HEXAGON



Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications. Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

NovAtel, part of Hexagon, is a global technology leader, pioneering end-to-end solutions for assured positioning for land, sea, and air. NovAtel designs, manufactures and sells high precision positioning technology developed for efficient and rapid integration. Its solutions are empowering intelligent positioning ecosystems in vital industries that depend on the ability to tackle the most complex challenges in the most demanding environments. Learn more at [novatel.com](https://novatel.com).

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