



Always One Step Ahead





What is Topnet Live

Technology Overview

Why Topnet Live

About Topcon



Topnet Live

Global GNSS Correction Services





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Why Topnet Live

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Soil Preparation



Seeding



Crop Care

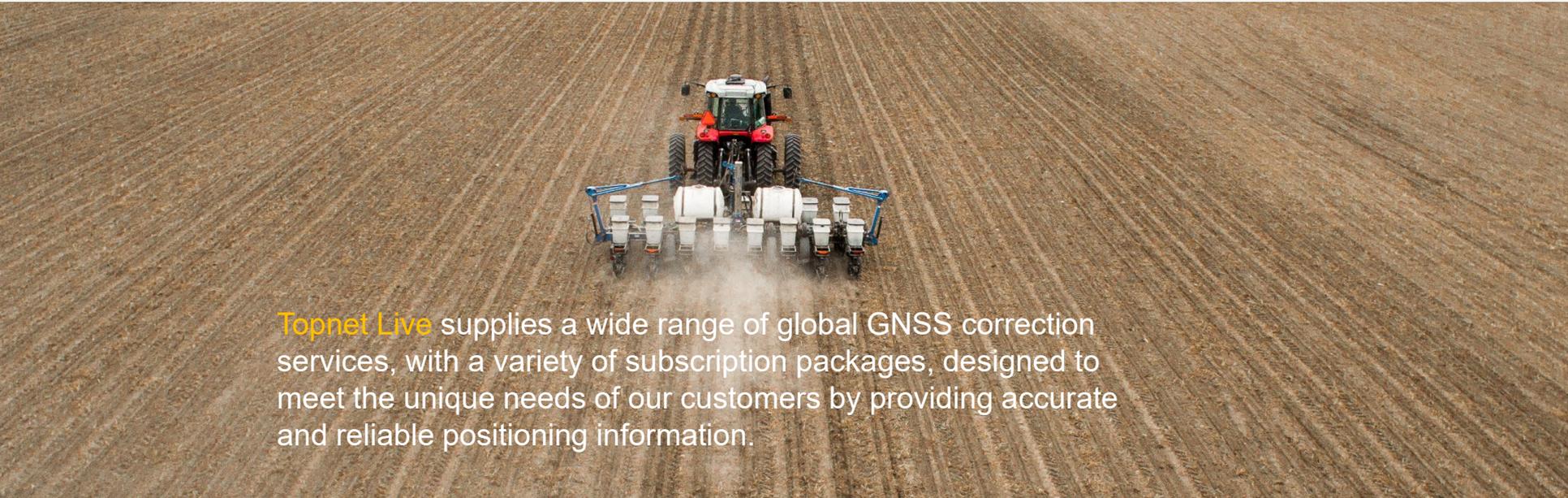


Harvest



What is **Topnet Live**?





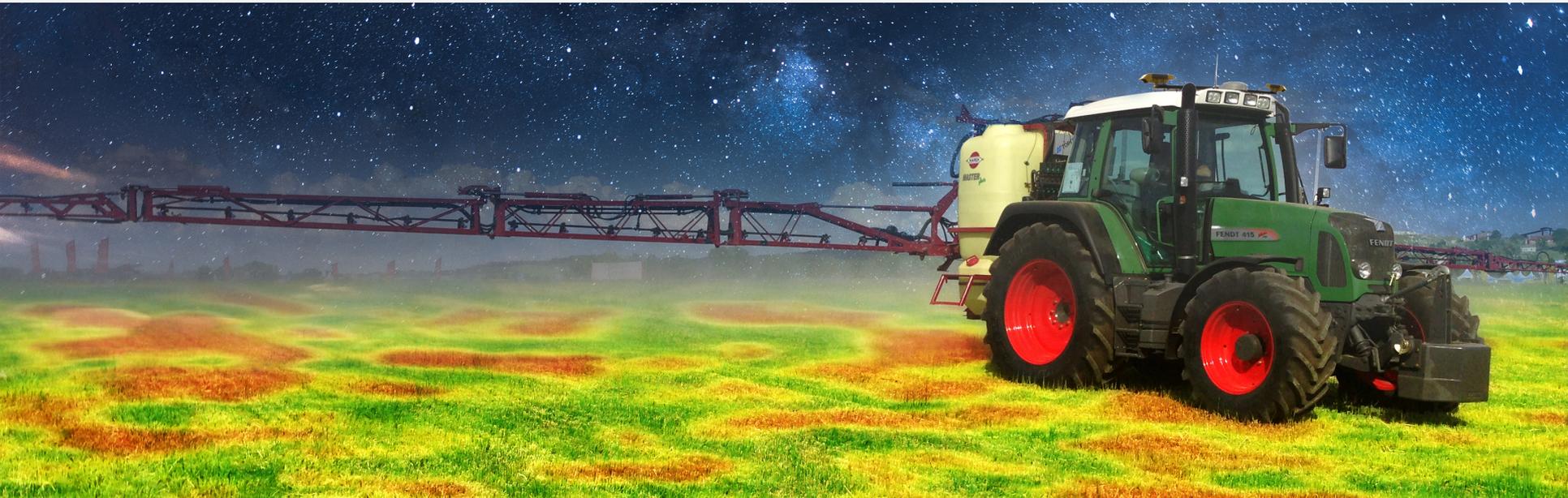
Topnet Live supplies a wide range of global GNSS correction services, with a variety of subscription packages, designed to meet the unique needs of our customers by providing accurate and reliable positioning information.



Topnet Live is a real-time GNSS correction service delivering high quality data to GNSS receivers used for agricultural applications on a worldwide scale. From localized RTK base stations to expansive networks including subscription-based access to cellular and satellite, Topcon offers tailorable correction services to fit any operation, machine and application.

Topcon Positioning Group operates and monitors all Topnet Live networks. Topcon's geodetic specialists and professional standards ensure high quality correction data is globally delivered to each GNSS receiver.





Correction services are essential to the accuracy of GNSS-based guidance and autosteering to support key applications throughout the crop cycle, including soil preparation, seeding, crop care, and harvest.

To account for the variable conditions and demands of global agriculture, Topcon has built a full-suite including localized- and network-based solutions to deliver the high-quality accuracy and repeatability for

any agricultural operation, application and machine. Now more flexible than ever, including cellular and satellite subscriptions, Topcon correction services are globally tested, proven and reliable.

Equipped tractors, sprayers, spreaders and harvesters benefit from fast initializations and reliable positioning any time of the day or night.





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Technology Overview

Why Topnet Live

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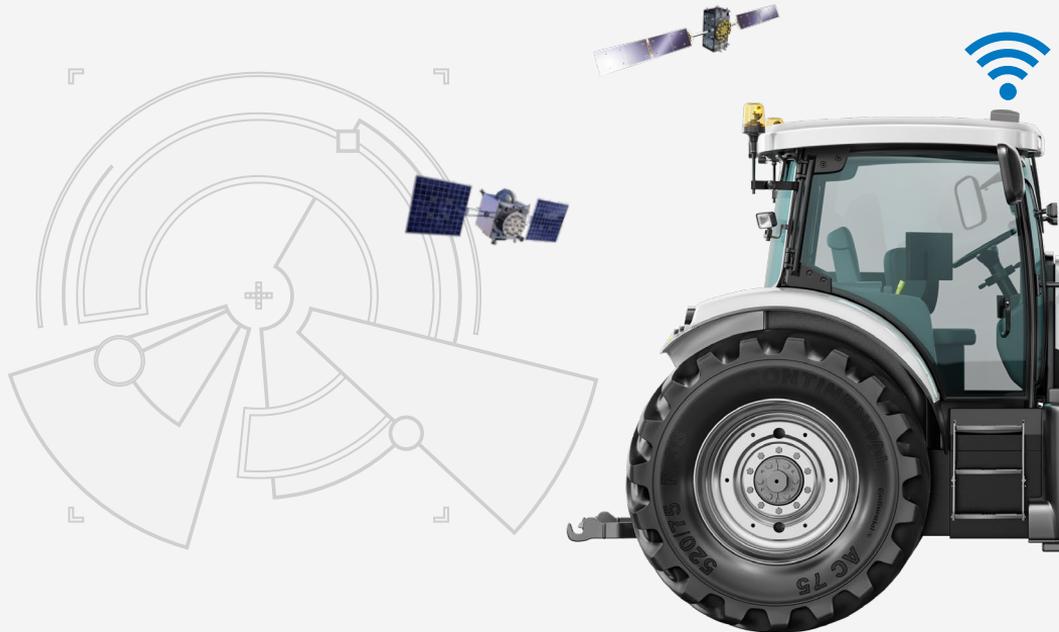




Technology Overview

In order to provide precise positioning accuracy, a GNSS receiver needs to compensate for inaccuracies caused by satellite constellations, receiver hardware and atmospheric conditions. These inaccuracies can be calculated by a network of fixed reference stations that constantly receive GNSS data.

This correction information is then broadcast to GNSS receivers as a correction service. Topnet Live is Topcon's GNSS correction service and consists of the reference station network, the correction calculation software and the correction broadcast service.



Real-Time Kinematic (RTK)

Real-Time Kinematic (RTK) is a positioning method to enhance the precision of position data derived from satellite-based positioning systems. RTK works through a network of stations covering local countries. Single Base RTK provides fast and accurate correction from one specific or nearest reference station. Network RTK delivers the correction from a number of stations in a local network of reference stations.

Precise Point Positioning (PPP)

Precise Point Positioning (PPP) is a positioning method to calculate precise positions up to few centimeter level using a single receiver in a global reference framework. PPP delivers great accuracy with slower start-up speed, but provides service anywhere on the planet, independent of local networks.





Constant Coverage

Both types of networks offer advantages and disadvantages. That is why Topcon designed and developed a service to provide its customer access to both systems simultaneously, even switching between automatically as reception changes. This means the customer always has the best of both systems and a truly global service.



AGS-2

Designed to work with Topnet Live GNSS Correction Services



RTK

PPP



- Provides survey-grade accuracy
- Quick start-up

- Global coverage
- Seamless coverage – just one subscription required



- Requires dense local network
- Requires individual subscriptions to each network

- Less accurate than RTK
- Slower start-up than RTK

Full-Constellation Service

The Topcon reference station network uses all four GNSS satellite systems: GPS, GLONASS, Galileo and BeiDou. This ensures the best accuracy and reliability, often referred to as a full-constellation service.

Broadcasting

The Topnet Live correction service is broadcast to customer receivers in two ways:

- NTRIP – The internet, typically using a mobile phone SIM card data link or Topcon CL-Devices.
- L-Band – Direct communication from a satellite.

Customers have both options and can use whichever is most convenient.



CL-55, CL-10

- Integrated NTRIP module
- Optional RTK Radio (CL-55)
- Data collection and connectivity for the Topcon Agriculture Platform (TAP)

Data Services

As an additional service, the raw data (RINEX) from the networks is available to download. There is also an on-line correction processing service for specialist applications.





What is Topnet Live

Technology Overview

Why Topnet Live

About Topcon



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Why Topnet Live?





Why Topnet Live?



Topnet Live is a truly global solution, providing correction service anywhere with the combination of global PPP and local NRTK networks



NRTK networks are operated by Topcon and its partners to provide coverage in all major regions of the world



Customers can have a single subscription that provides borderless service which automatically switches between networks



Topnet Live is managed by Topcon's own network and geodesy experts, which ensures a precise and reliable always-on service



Topcon's OEM GNSS boards can be preconfigured for immediate use by system integrators' customers, with flexible subscription and licensing options to suit the exact need



The entire solution is designed to be scalable, so system integrators do not need to limit locations or numbers of customers





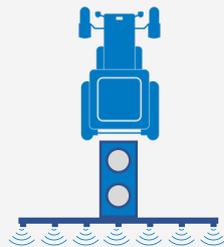
The key to any precision farming solution is the correct accuracy for the job at hand.

How precise do you need to be?

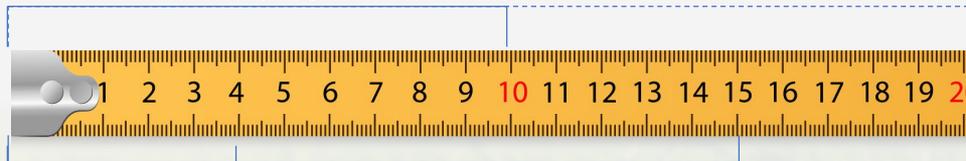
Topcon pioneered multi-constellation GNSS pinpoint positioning and has supported the global industry standards – ISO protocol, from the start.

Pick the accuracy you need based on your field applications and/or crop types and the Topcon modular platform technology will let you get the job done quickly, easily and for less monetary outlay.

Up to 10cm



Spraying



Planting



4cm

Harvesting



Up to 15cm

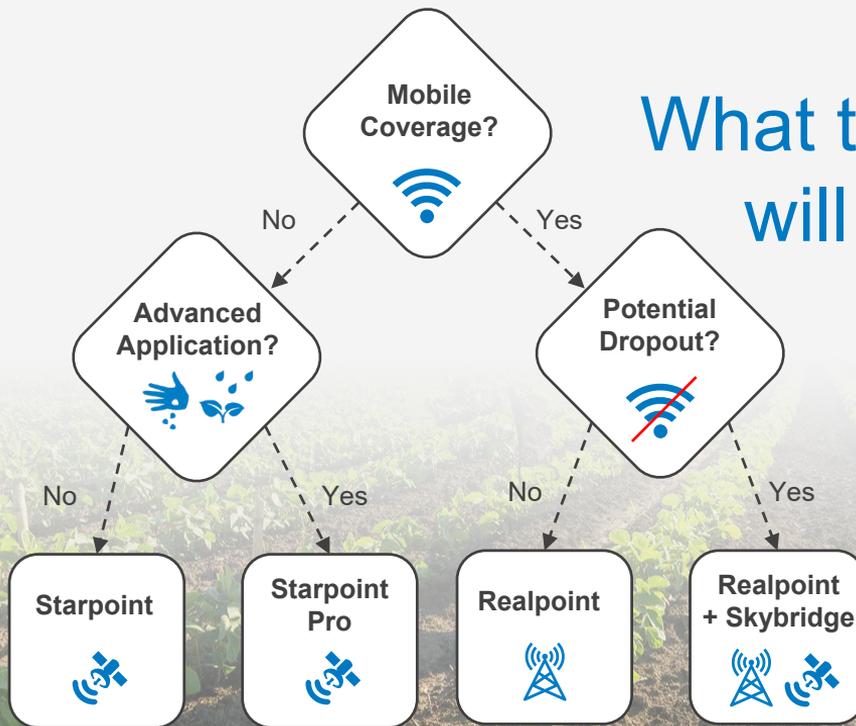
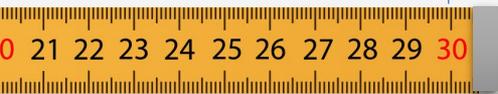




Up to 30cm



Field Preparation



What type of service will work for you?





Topnet Live

| | Realpoint | Starpoint | Starpoint Pro | Skybridge |
|----------------------------|--|--|---------------------------|---|
| Correction Type / Delivery | Correction from internet | Correction from satellite | Correction from satellite | Correction from internet or radio with satellite backup |
| Coverage | Local | Global | Global | Global |
| Accuracy | 2 cm | 50 cm | 3-6 cm | 2-4 cm |
| Initialization Time | Seconds | < 5 mins | < 18 mins | Seconds |
| Applications | Surveying, Construction, Machine Control, Agriculture, OEM, Industrial IOT and Autonomous Robotics | Machine Control, Agriculture, OEM, Surveying in Remote Areas, Automotive, Industrial IOT and Autonomous Robotics | | Surveying, Construction, Machine Control, Agriculture |





Topnet Live



Skybridge allows subscribers to combine RTK and PPP correction services



Provides greater accuracy and quick start-up time



Provides the service anywhere on the planet, independent of local networks

Topcon manages, operates and monitors all reference networks.



-  Realpoint
-  Starpoint
-  Starpoint Pro



The graphics are intended as a representation of countries that have coverage available. However, coverage may not be fully available within the countries indicated.



[What is Topnet Live](#)[Technology Overview](#)[Why Topnet Live](#)[About Topcon](#)

Why Topcon

Topcon is the trusted partner for developing advanced solutions for your positioning and machine control challenges. Our decades of experience, technical expertise and reputation make us uniquely qualified to provide enhanced automation technologies and ultimately drive your customers' productivity – along with your market share – to higher levels.

Independent Solutions | Speed To Market | Global Network | Experienced OEM Team





What is Topnet Live

Technology Overview

Why Topnet Live

About Topcon



1932
Founded
in Tokyo



1953
Topcon 35A
Camera



1980
Mass Market
Total Stations



1994
Laser & Machine
Control Systems



2000
GNSS
Technology



2004
mmGPS
3D precision with
GNSS and Laser Tech



2006
Precision
Agriculture



2009
3D-MC²
Advanced
Grade Control



2010
CropSpec
Crop Health
Monitoring



2017
SmoothRide
Road Resurfacing
Technology



2019
GTL-1000
Scanning Robotic
Total Station



2020
BYOD
Making Tech
Accessible to All



Topcon Corporation

A History



[What is Topnet Live](#)[Technology Overview](#)[Why Topnet Live](#)[About Topcon](#)

Trust Topcon to get you there faster with high-quality positioning and automation solutions tailored to your product strategy.

Independent Solutions

In an industry with many contractual alliances, Topcon remains independent. We have the freedom to develop technologies that best fit your unique product goals. Our custom OEM solutions are all clean-sheet designs, providing more opportunities to differentiate your product from the competition.

Speed To Market

Product development carries an inherent pressure to do everything faster and better than before, particularly since technology is only viewed as innovative if it arrives before the competition. Topcon's experience helps to simplify and shorten the design process, allowing you to go to market with your product faster – and with the utmost confidence.



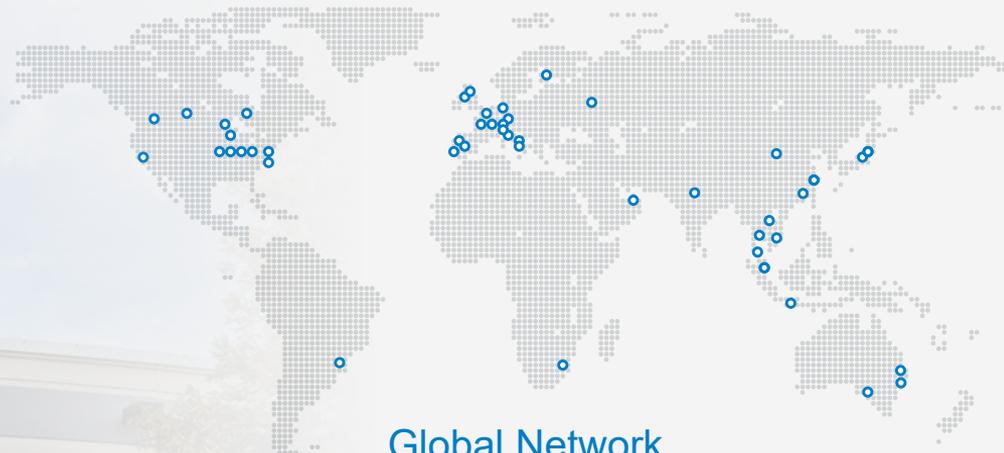


What is Topnet Live

Technology Overview

Why Topnet Live

About Topcon



Global Network

With an extensive worldwide network of corporate offices, R&D centers and technical groups, we have an unmatched capability to assist any manufacturer, no matter where they are located, with fully integrated machine automation solutions. This also positions us to create programs to assist and support your dealer networks, directly or through extensive training programs.

Experienced OEM Team

Our experienced OEM team knows what questions need to be answered first and the potential pitfalls to be avoided along the way. Their first objective is to make sure our technology is the right fit for your application, and then to be your partner every step of the way.





Grow Without Limits

