



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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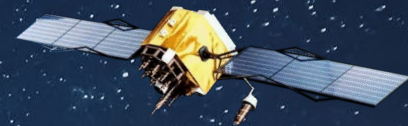


What is Topnet Live?



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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 surveying, construction, GIS, mapping, OEM, system integrators and agricultural applications on a worldwide scale. Fully interoperable with all makes of network capable rovers, subscriptions are made easily available through the Topnet Live website.

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.





Construction

Eliminating on-site base stations, Topnet Live is increasingly employed in high-profile construction projects. Large highway construction projects, airport runways and machine control operations all benefit from the reliable accuracy and performance of Topnet Live GNSS reference networks.

Agriculture

Topnet Live networks deliver consistent, high-precision positions to precision agriculture machines used in applications across the crop cycle such as soil preparation, seeding and crop care. Equipped tractors, sprayers, spreaders and harvesters benefit from fast initializations and reliable positioning any time of the day or night.





Survey

Topnet Live delivers high-accuracy positioning to professional surveying and engineering applications such as land surveys, engineering surveys, GIS and mapping. Topnet Live removes the need for individual base stations, dramatically increasing production and safety.

OEM – System Integrators

Topnet Live is a global positioning correction service for system integrators, product designers and OEMs. It is ideal for scalable, precision GNSS positioning needs for applications such as automotive, Industrial IOT and autonomous robotics.





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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.



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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.





Topnet Live



Network RTK

PPP



- Provides survey-grade accuracy
- Quick start-up

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

- Global coverage
- Seamless coverage – just one subscription required

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

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.

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.





Topnet Live



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.
- L-Band – Direct communication from a satellite.

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

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.





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Why Topnet Live?





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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 NRTK networks



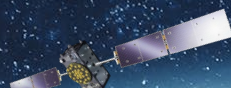
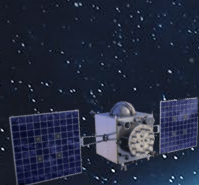
Topnet Live is managed by Topcon's own network and geodesy experts, which ensures a precise and reliable always-on service



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





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Skybridge

Skybridge allows subscribers to combine RTK and PPP correction services



Realpoint



Starpoint

Topcon manages, operates and monitors all reference networks.



Realpoint

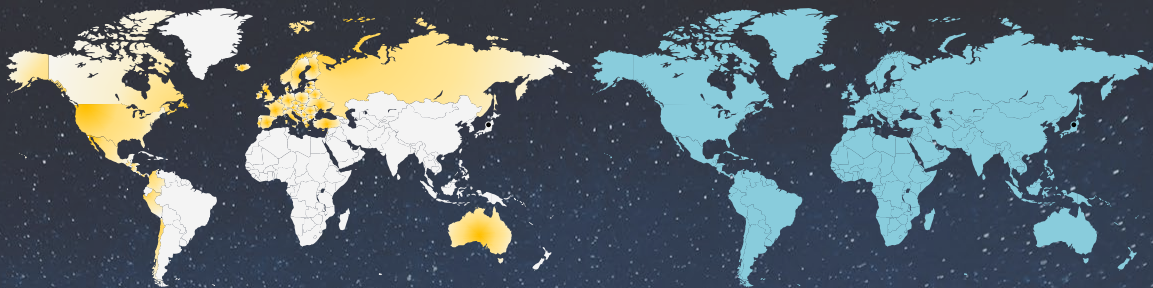


Starpoint

Starpoint Pro

Provides greater accuracy and quick start-up time

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



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



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	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



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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



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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



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

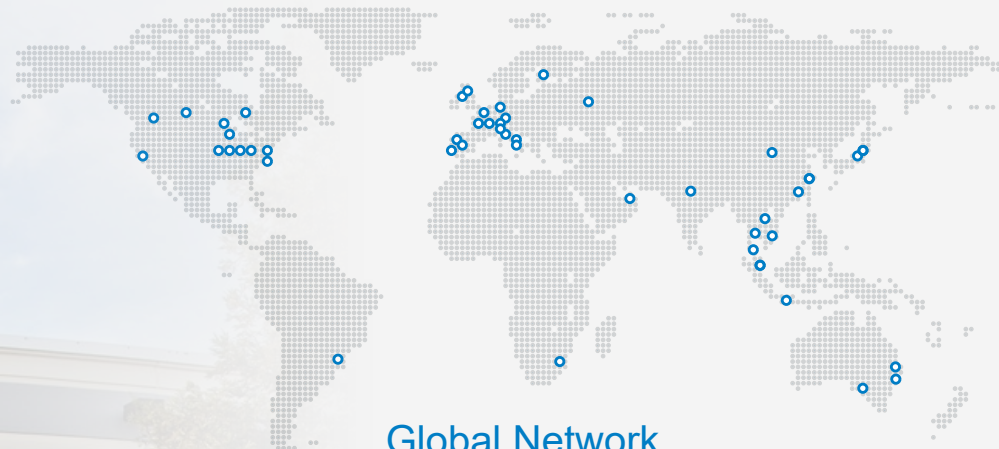
Independent Solutions

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.



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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.





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