

Global GNSS Correction Service

Topnet Live



WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?

Table of Contents

Navigate sections by clicking the buttons below.



**WHAT IS
TOPNET LIVE?**

**TECHNOLOGY
OVERVIEW**

**WHY
TOPNET LIVE?**

**WHY
TOPCON?**



Topnet Live

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 surveying, construction, GIS, mapping, OEM, system integrators and agricultural applications worldwide. 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. Our geodetic specialists and professional standards ensure high quality correction data is delivered globally to each GNSS receiver.

[WHAT IS
TOPNET LIVE?](#)

[TECHNOLOGY
OVERVIEW](#)

[WHY
TOPNET LIVE?](#)

[WHY
TOPCON?](#)

Topnet Live Solutions



Construction

Eliminating on-site base stations, Topnet Live is increasingly being used 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.

WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?



Technology Overview

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.

WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?

Positioning methods

Topcon manages, operates and monitors all Topnet Live reference networks.

Real-time Kinematic (RTK)

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 regions. 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)

PPP is a positioning method to calculate precise positioning down to a few centimeters of accuracy using a single receiver in a global reference framework. PPP provides a service anywhere on the planet, independent of local networks. It delivers accuracy suitable for mapping and guidance applications and has a short start-up time.



WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?

Constant Coverage

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

Full-Constellation Service

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

| | NETWORK RTK | PPP |
|---|--|--|
| + | <ul style="list-style-type: none">Provides survey-grade accuracyQuick start-up | <ul style="list-style-type: none">Global coverageSeamless coverage – just one subscription required |
| – | <ul style="list-style-type: none">Requires dense local networkRequires individual subscriptions to each network | <ul style="list-style-type: none">Less accurate than RTKSlower start-up than RTK |



Broadcasting

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

- NTRIP – Over the Internet, typically accessed using a mobile phone SIM card data link.
- L-Band – Direct broadcasting 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 are available to download. There is also an online correction processing service for specialist applications.



WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?



Why Topnet Live?



Truly global solution
Topnet Live is a truly global solution, providing correction service anywhere with the combination of global PPP and regional GNSS reference networks.



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



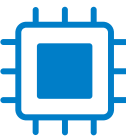
Operated by Topcon
Regional GNSS reference networks are operated by Topcon and our partners to provide coverage in all major regions of the world.



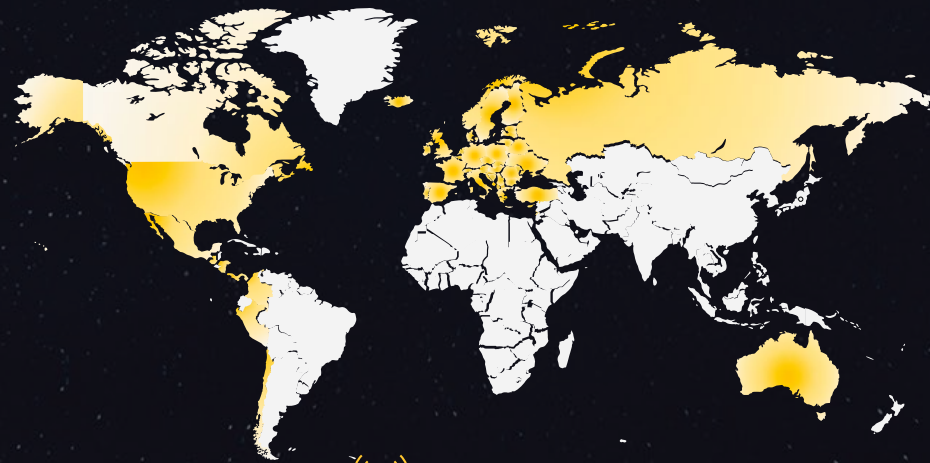
Flexible and tailored
Our OEM GNSS boards can be preconfigured for immediate use by system integrators' customers, with flexible subscription and licensing options to suit the exact need.



Seamless subscriptions
Customers can have a single subscription that provides borderless service which automatically switches between regional GNSS reference networks.



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



Realpoint

Provides network RTK accuracy and quick start-up time.



Starpoint

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



Skybridge

Skybridge allows RTK subscribers to combine RTK with PPP correction services. RTK is supported by PPP during lack of coverage or service outages, maximum 20 mins per event.

WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?

The Best of RTK and PPP

| | REALPOINT | STARPOINT PRO | SKYBRIDGE |
|--------------------------------------|--|---|--|
| Correction Type / Delivery | RTK via NTRIP | PPP via L-Band | Correction via satellite |
| Coverage | Regional | Global | Regional or Local |
| Horizontal Accuracy* | 2 cm | 3 cm | Infill for RTK |
| Vertical Accuracy* | — | 5 cm | |
| Initialization or Convergence Time** | Seconds | < 20 mins | Seamless Activate automatically |
| Industries | Surveying, Construction, Machine Control, Agriculture, OEM, Industrial IoT and Autonomous Robotics | Agriculture, OEM, Surveying in Remote Areas, Automotive, Industrial IoT and Autonomous Robotics | Surveying, Construction, and Agriculture |

*The specifications are based upon field and laboratory testing. Accuracy and convergence time may be affected by user hardware type (antenna/receiver), available GNSS constellation (PDOP), and site conditions.

**Performance may be degraded in conditions with high Ionospheric activity, extreme multipath, or under dense foliage. For maximum system accuracy, always follow best practices for GNSS data collections.

WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?



Trust Topcon

We are the ideal partner for developing advanced solutions for your positioning and machine control challenges. Our experience, technical expertise and overall company strength make us uniquely qualified to provide enhanced automation technology and ultimately drive your customers' productivity to higher levels—along with your market share.

We can provide customized or off the shelf products, including GNSS hardware or correction services. Our global technical centers ensure personalized support can be available no matter where your manufacturing operations exist.

SPEED TO MARKET | GLOBAL NETWORK | EXPERIENCED OEM TEAM

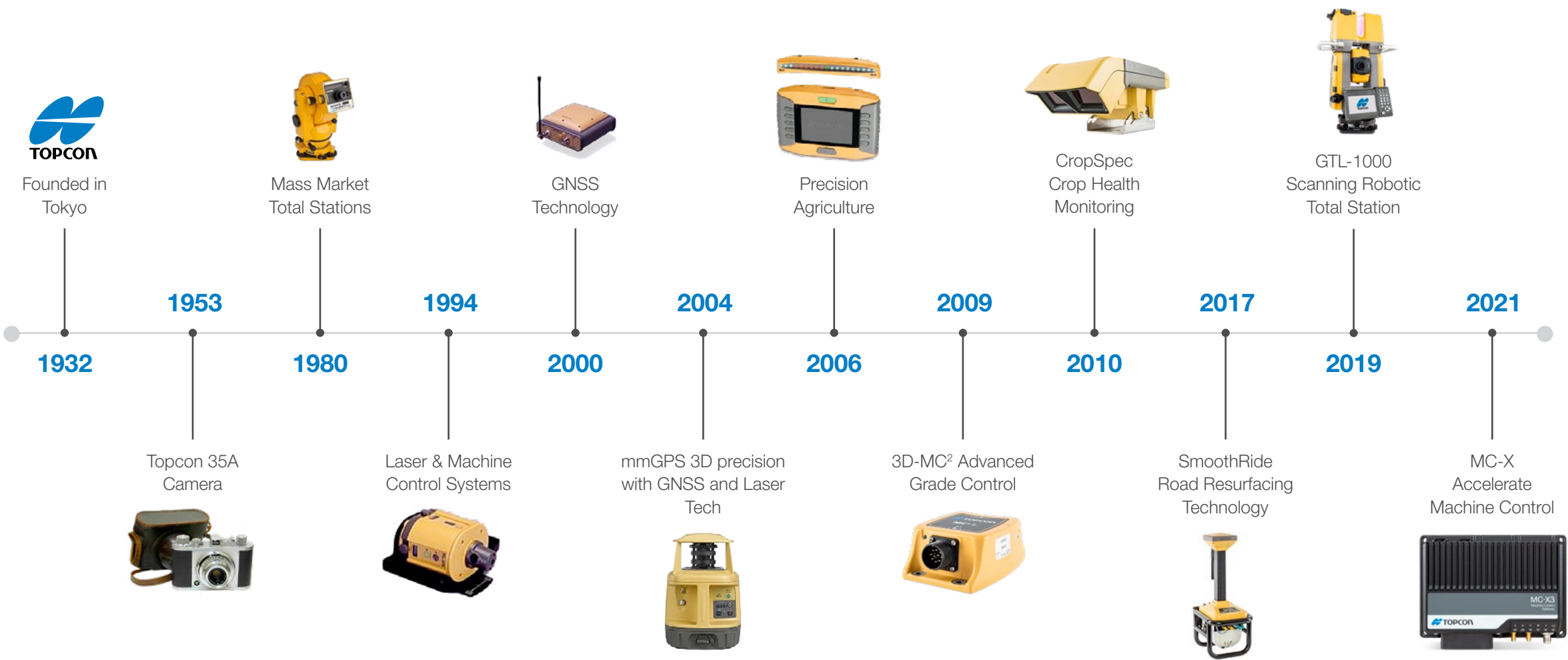
WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?

A History of Topcon Corporation



WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
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, we remain 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. Our experience helps 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?

WHY
TOPCON?



4900+ Employees | 2100+ Patents



WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
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 be your partner every step of the way.



topconpositioning.com/topnetlive

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WHAT IS
TOPNET LIVE?

TECHNOLOGY
OVERVIEW

WHY
TOPNET LIVE?

WHY
TOPCON?