Toknav
VRS CORS Solution

- **Professional Original Equipment Manufacturer**
- **Original Design Manufacturer**

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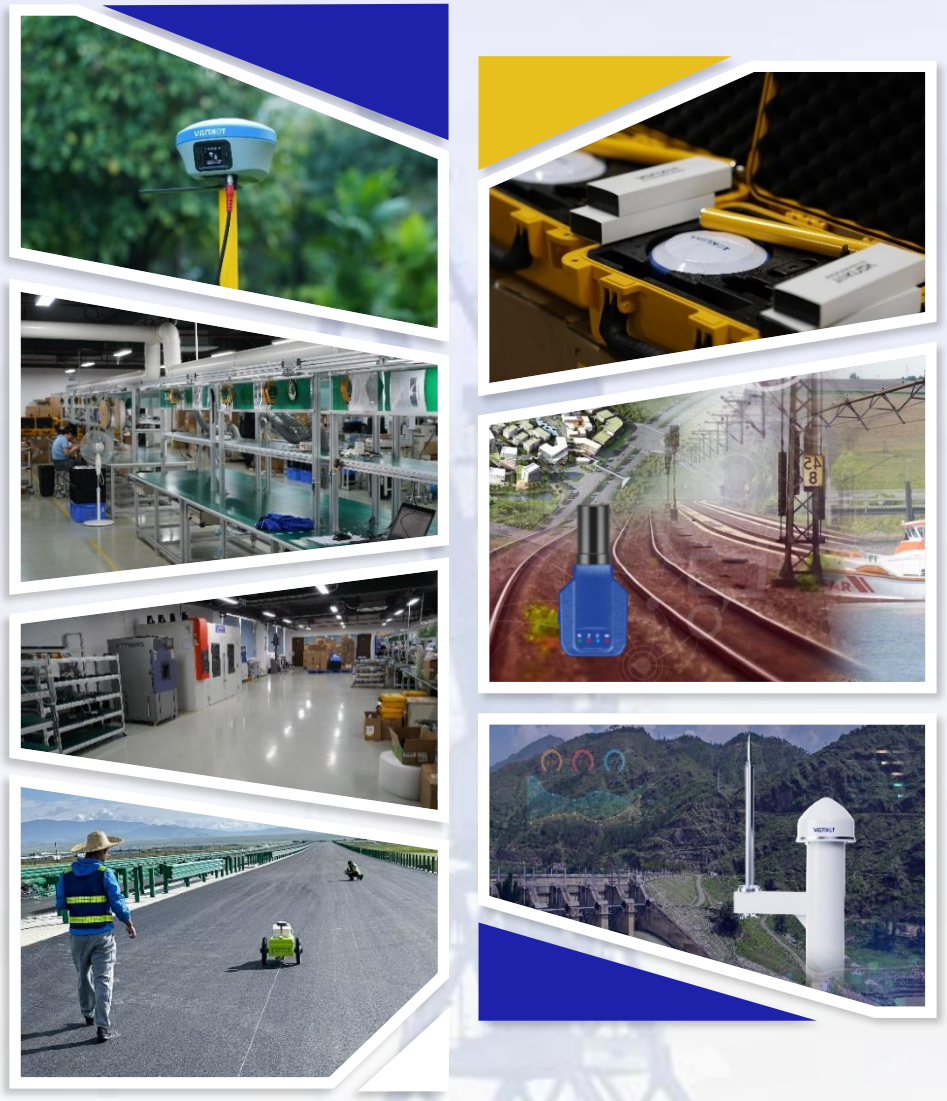
1. Company Introduction

Guangzhou TokSurvey Information Technology Co., Ltd. was founded in 2019 and by a team of R&D engineers. We are a domestic technology leader in related fields in China and a system integration supplier in the global market. We are committed to producing high-precision satellite positioning terminal products.

TOKNAV products are trusted by customers for their accuracy, reliability, and portability, and are widely used in the fields of surveying and mapping, precision agriculture, unmanned vehicles, automatic control of construction machinery, and deformation monitoring.



1. Company Introduction

We strictly control each step of the product quality control process, such as Production Material Control (PMC), InPut Process Quality Control (IPQC), Quality Control (QC) and Quality Assurance (QA),

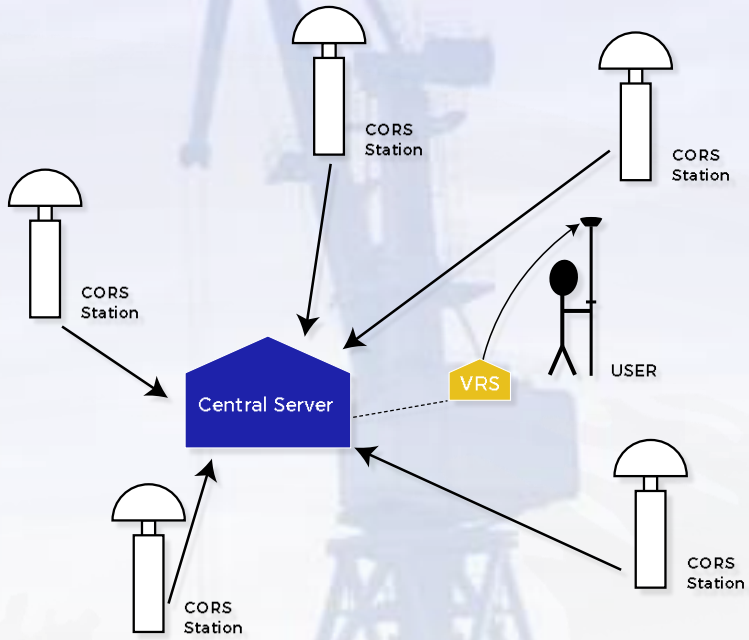
Many products have passed CE, NGS, IGS, KC and other certifications, and are exported to more than 60 countries and regions around the world. Our products are well received in the global market, and now we have become a system intergration supplier in the global market.

2. What is VRS CORS Services?

Definition

VRS, named as **Virtual Reference Station**, is a kind of Network Real Time Kinematic (NRTK) technology

- VRS generate and provide a virtual reference station data near user's position based on the regional real reference station for user to calculate RTK.
- VRS requires 3G/4G/5G to support communication.



Pic 2-1 VRS CORS System

Features

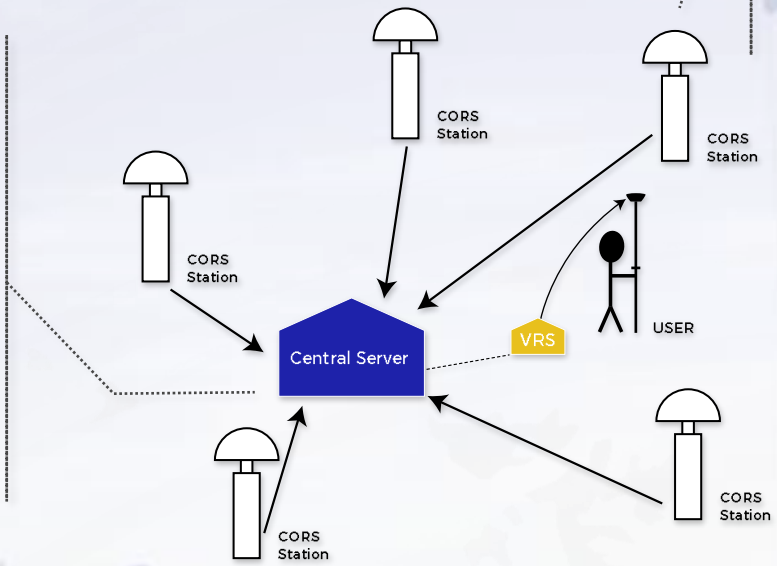
- Instant access to Real-Time Kinematic (RTK) corrections
- Centimeter-accurate corrections tailored to your geographic location
- Built-in redundancy to ensure connectivity, consistency and quality
- Cost-effective and simple to use
- Professionally-managed and secure
- Streamlined workflows, done right the first time

2. What is VRS CORS Services?

VRS CORS Structure

CORS Network Hardware
- GNSS receivers (NET660i, NET660) + Antenna

software/monitoring platform
- Ntrip caster



3. VRS CORS Hardware

- NET660i GNSS Receiver

Characteristic

- Based on Linux+Qualcomm Cortex-A7 intelligent system platform
- 1408 super channels
- Support BDS, GPS, GLONASS, GALILEO and QZSS
- Enhanced full constellation RTK technology
- Built-in 32G storage
- Support secondary development
- Solid magnesium alloy shell
- IP65 design requirements, safe and reliable

Pic 3-1 Net660i Packaging

Pic 3-2 Net660i Working schematic

3. VRS CORS Hardware

- TCA920 Choke Ring Antenna

Characteristic

- High performance GNSS antenna for base station that covers full frequency satellite signal tracking of GPS, GLONASS, GALILEO, BDS, QZSS, IRNSS, SBAS as well as L-Band correction service.
- A mini choke ring antenna with strong multipath suppression performance
- Specifically designed for applications as land and marine surveying, channel surveying, earthquake and landslide monitoring, deformation monitoring, and wharf container operations that require absolute positioning accuracy and multi-constellation support.

Pic 3-3 TCA920

4. TOKNAV VRS CORS Software/Monitoring Platform

- NTRIP caster

Software Platform Features

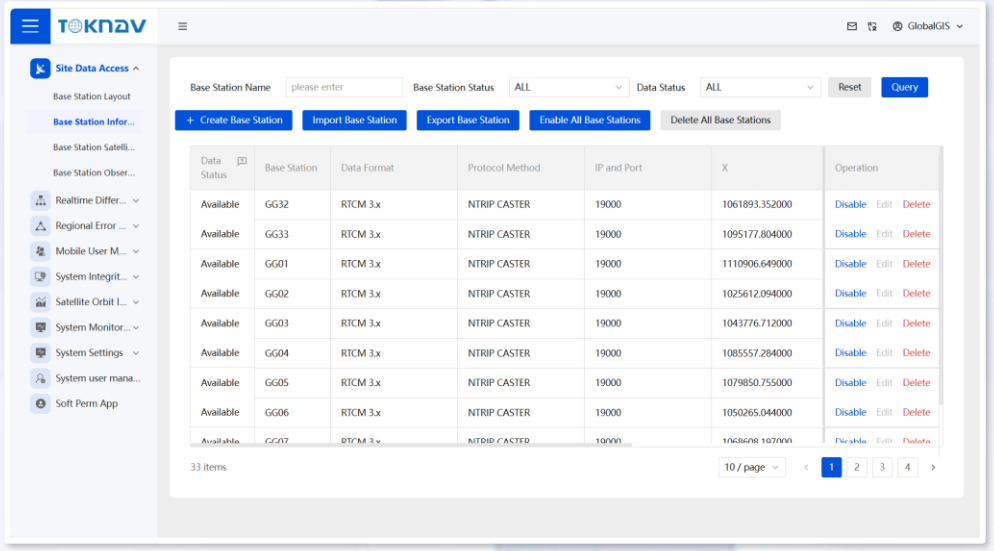
- Independently develop
- Support modernized Multi-GNSS system
- Support high-accuracy real-time GNSS data processing
- Obtained lots of academic achievements
- Obtained several invention patents

4. TOKNAV VRS CORS Software/Monitoring Platform

- NTRIP caster

Monitoring Platform Features

- Web UI Platform
- Network Monitor
- Data processing Monitor
- User Monitor
- Support millions of concurrent



5. Application Scenario

Government

Geodetic measurement and Mapping
Municipal Management

Economy

Public location-based services
Logistics management

Transportation

Navigation
Traffic management and auto drive

Agriculture

Precision agriculture
Intelligent agriculture

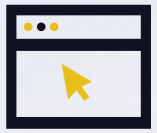
6. Advantage of Our Technology

High accuracy

We are the industry leader in providing centimeter-level accuracy.

High stability

Our reliable network ensures you have uninterrupted connectivity.



Easy to use

Our products have friendly interface and simple operation.
We can provide a trial version of the software for testing.

Strong compatibility

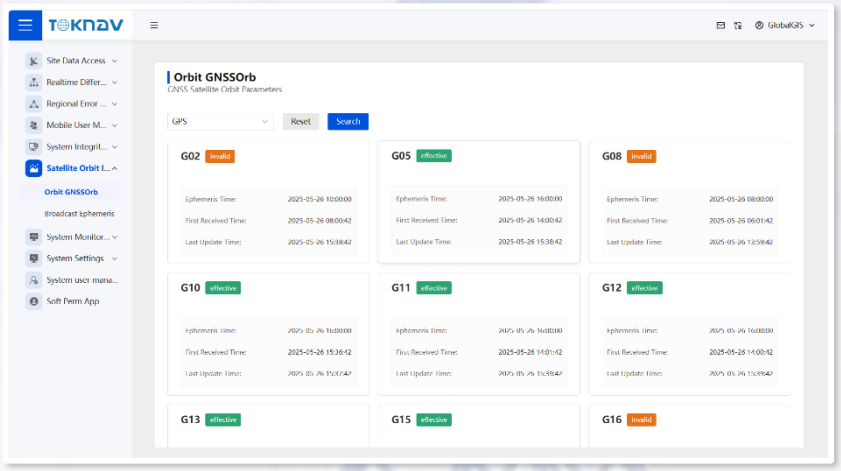
We have strong research and development capabilities.
We can build a complete VRS-CORS system in any region.

6. Advantage of Our Technology

- Industry-leading technology and products

Full-stack self-developed software and hardware technology

- The algorithms, software, and hardware used in our VRS service are independently developed.



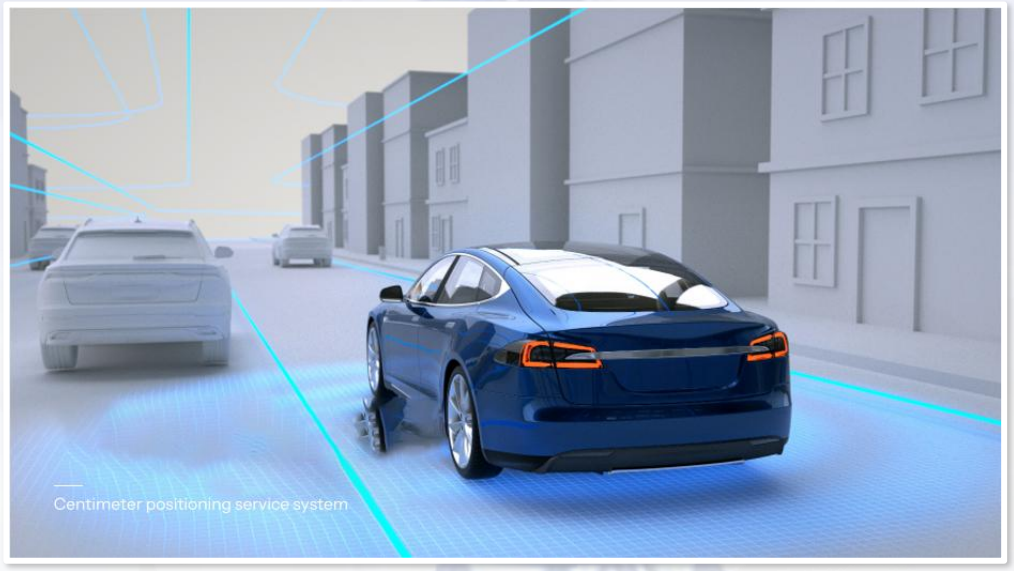
Maintain a leading position in terms of VRS service performance in China

6. Advantage of Our Technology

- Meeting various high-precision application needs

Serves diverse terminal users with 1600 operational reference stations in China:

Includes surveying users, agricultural drones for crop protection, building monitoring, geological disaster monitoring, car lane-level navigation, electric bicycles, and other types of users.

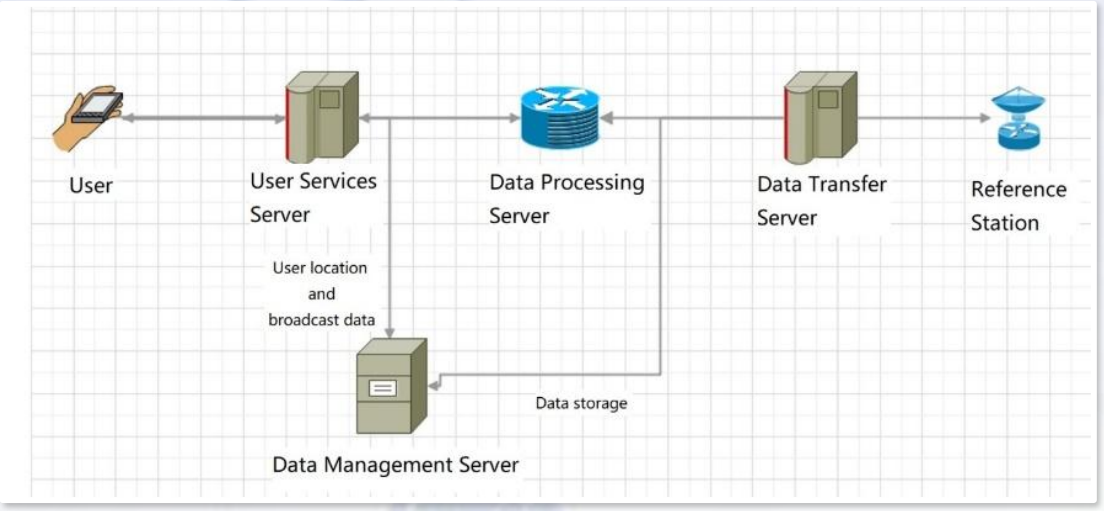


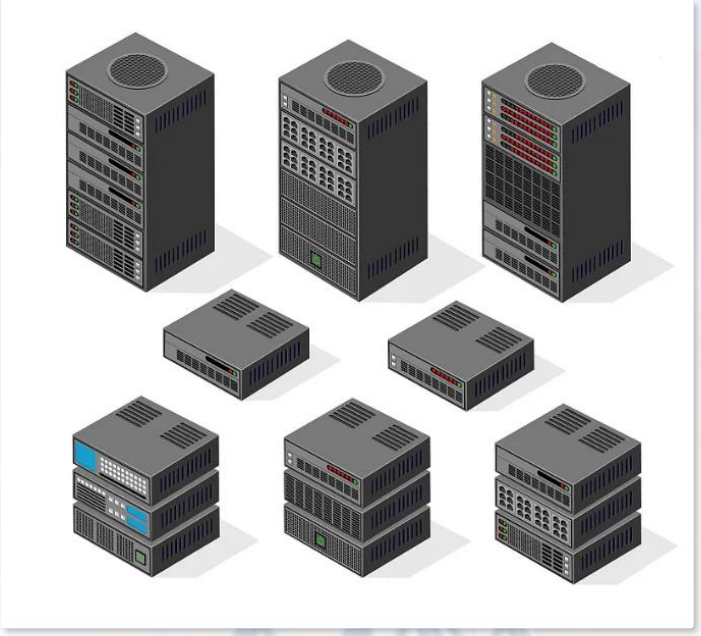
6. Advantage of Our Technology

- Ability to serve a massive number of users

Utilizes a distributed architecture

- Data management, data processing, and user services are independent of each other through a data bus.
- Not only possesses powerful service capabilities of individual servers, but also supports a massive number of concurrent users through server expansion.

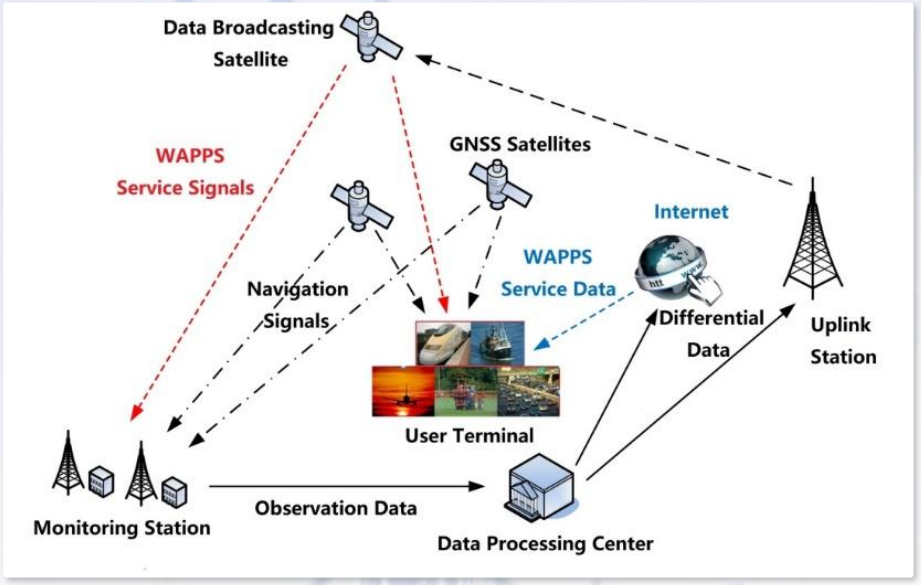




6. Advantage of Our Technology

- Capability of Satellite-based and Ground-based fusion processing

- Capable of satellite-based and ground-based fusion processing, enabling network RTK and PPP-RTK fusion processing.
- The head of the Kepler technology team is also the head of the IGS Analysis Center and IGS Data Center team at Wuhan University, possessing globally leading GNSS data precision processing capabilities.



IGS Analysis Centers (ACs)

Institution	Abbreviation	Country/Region
Natural Resources Canada	EMR	Canada
Wuhan University	WHU	China
Geodetic Observatory Pecny	GOP-RIGTC	Czech Republic
Space geodesy team of the CNES	GRG	France
European Space Agency/ESOC	ESA/ESOC	Germany
GeoForschungsZentrum	GFZ	Germany
Center for Orbit Determination in Europe	CODE	Switzerland
Jet Propulsion Laboratory	JPL	USA
Massachusetts Institute of Technology	MIT	USA
NOAA/National Geodetic Survey	NGS	USA
Scripps Institution of Oceanography	SIO	USA
U.S. Naval Observatory	USNO	USA

6. Advantage of Our Technology

- Capability of High-precision processing in low-latitude area

- Ensures high-performance positioning in low-latitude area through processing multi-GNSS data and refining ionospheric models.
- The head of the Kepler technology team is also the head of the IGS Ionospheric Analysis Center and IGS MGEX Analysis Center at Wuhan University.

Multi-GNSS Working Group

Established: 2003

Chair: Oliver Montenbruck

Mailing List: IGS Multi-GNSS Working Group Mailing List

Ionosphere Working Group

Established: 1998

Chair: Andrzej Krankowski

Charter: Ionosphere Working Group Charter

Mailing List: IGS Ionosphere Working Group Mailing List

Website: IGS Ionosphere Working Group

Tim Springer	PosiTim (@ESA/ESOC)	Germany	Selected data analyses
Peter Steigenberger	DLR	Germany	Broadcast ephemerides and DCB product
Andrea Stürze	BKG	Germany	Data quality control, real-time streams
Ningbo Wang	AIR/CAS	China	DCB product
Qile Zhao	Wuhan University	China	BeiDou

Robert Weber	TU Wien
Pawel Wielgosz	UWM
Brian Wilson	JPL
Yunbin Yuan	CAS
Qile Zhao	WHU

6. Advantage of Our Technology

- Capability of processing large-scale reference station

- Equipped with 1600 reference stations.
- Provides large-scale network RTK services covering most regions of China.
- Possesses extensive engineering experience in delivering stable services to various users nationwide.

6. Advantage of Our Technology

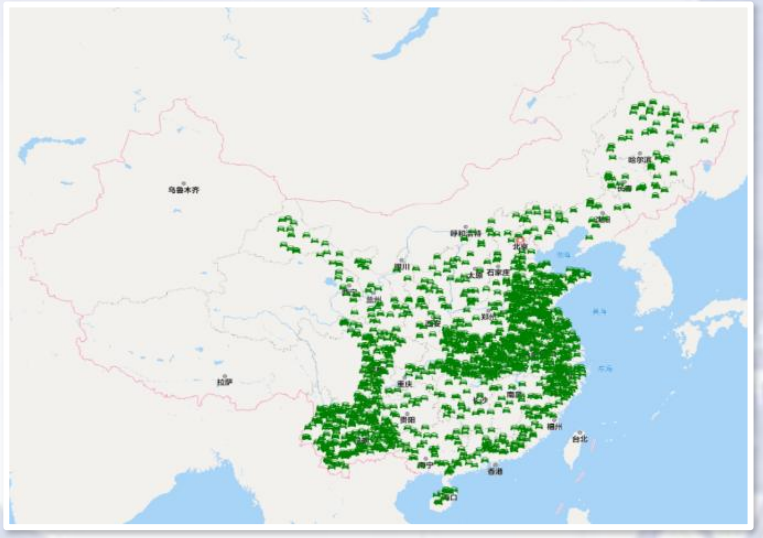
- Rich operating experience in serving large users and large areas

Our Network cover most area of China

- With over 1600 station.

Our VRS service can support large-scale users

- Supply VRS service to millions of users simultaneously.



- Rich operating experience in serving large users and large areas

Practical example
-VRS Services in China

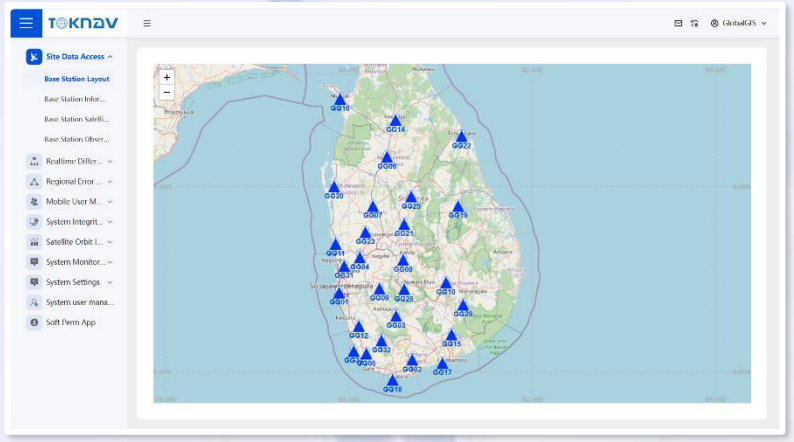
Network Features

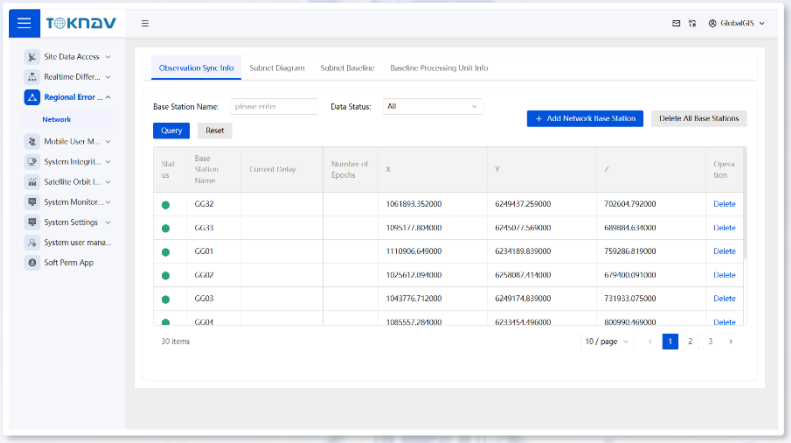
- Independently develop
- More than 1600 stations
- Cover most areas of China
- Support Multi-GNSS
- Adaptive network construction technology
- Operational 24 hours a day, 7 days a week

7. Application Examples

- Sri Lanka

- Base station cover most area of sri Lanka
  - With over 30 station.
  - Supply VRS service to millions of users simultaneously.





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