

Leica GPS Spider Setting the Standard for GPS Networks



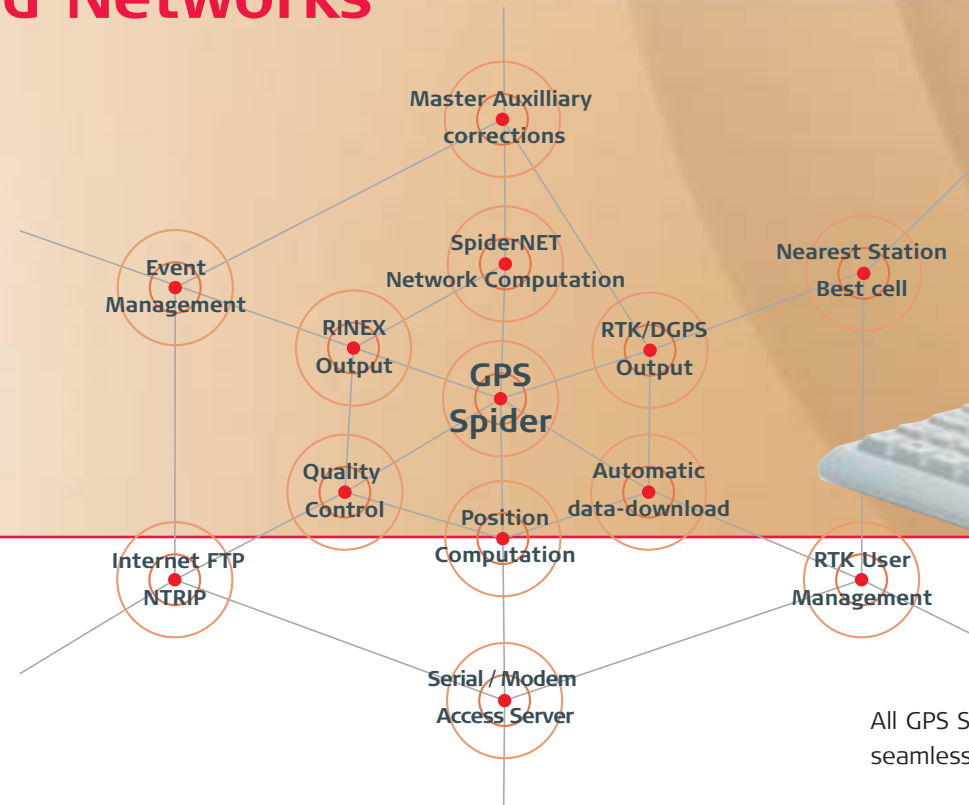
- when it has to be **right**

Leica
Geosystems

GPS Spider Reference Station Software

Modular and Scalable - For Single Stations and Networks

GPS Spider is an integrated suite of software for centrally controlling and operating single reference stations or networks of stations. GPS Spider is modular and scalable with new advanced solutions for long-range high-accuracy Network RTK (SpiderNET), centralized data distribution, data access management and also support the charging of data and services. Become a professional service provider using the best solutions for your needs thanks to GPS Spider.



All GPS Spider modules interact seamlessly with each other.



For multiple applications

GPS Spider provides data and services for all types of applications:

- Geodetic control
- Surveying
- Engineering
- Construction
- Deformation Monitoring
- GIS & Mapping
- Mining
- Positioning
- Machine control
- Navigation
- Hydrographic survey
- Aerial survey

For all receivers

Leica System 1200 and System 500 GPS receivers are the ideal partners for GPS Spider and integrate perfectly with the software. Other receivers are also supported.

Build up as you like For single stations and networks

With GPS Spider you only invest in what is necessary for your current needs. As requirements change and new services are demanded, it is easy to add extra capabilities or extend your network when additional areas have to be covered. You can build up easily at any speed.

- Standard license for full receiver control and status monitoring of single and multiple stations.
- File Products service module for automatic RAW, RINEX, Compact RINEX data management, data compression, quality control and FTP distribution for standard CORS applications.
- RTK/DGPS data distribution to support applications needing real-time positioning.
- Event Email and messaging, to keep you informed any time anywhere.
- Coordinate computations to monitor structures and analyze movements.

- GPS SpiderNET for continuous real-time network analysis and error modeling to provide Leica MAX standard RTCM V3.0 Master Auxiliary network corrections for long-range high-accuracy RTK.
- Advanced RTK distribution methods for efficient and quick real-time data access.
- RTK User Management enables you to protect data access, charge for your services and generate income.

With GPS Spider you're completely flexible in your system design - GPS Spider has everything necessary for GPS reference stations and networks.

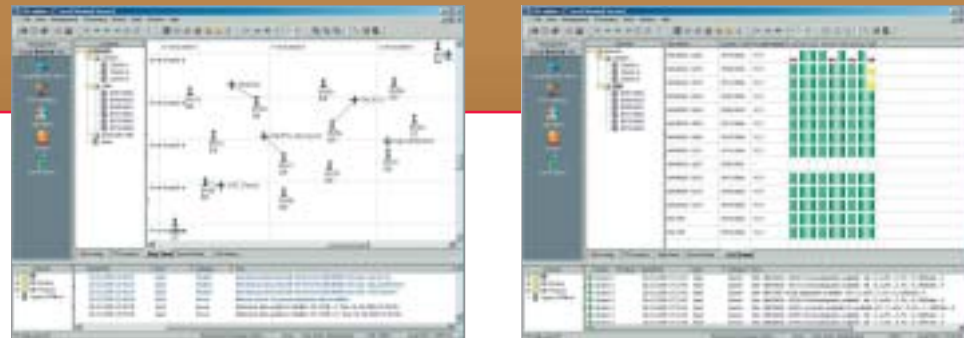
Your benefits

- Control over wide areas
- Homogeneous high accuracy
- Support of all user groups
- Increases efficiency and productivity
- Reduces costs
- Generates revenue and return on investment

GPS SpiderNET – Master Auxiliary Network corrections

Network RTK – To RTCM Standards

Using an array of permanently installed reference stations over a region or entire state removes the need to establish local control in the work area and set up temporary field reference receivers. Using GPS SpiderNET for real-time network analysis and error modeling provides even consistent high accuracy and improved RTK performance over the entire network region, with even larger distances between your reference stations. Network corrections can be provided as based on the newest standard RTCM V3.0 Master Auxiliary Network correction messages, which are fully integrated in Leica MAX technology.

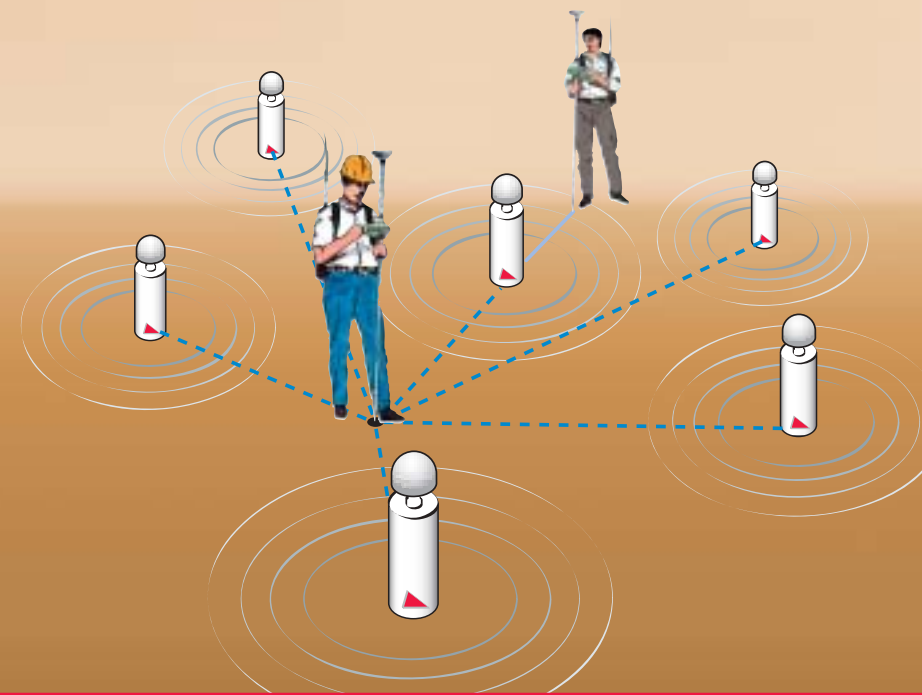


Smart performance and MAX productivity

Raw data are streamed continuously from the receivers into SpiderNET. This newly designed and developed processing kernel applies the latest in zero-difference processing algorithms and the legendary Leica SmartCheck technology to deliver outstanding reliability and performance.

SpiderNET analyzes the measurements from all available stations within the network. Distance dependent errors are then modeled to provide the Leica MAX – Master Auxiliary corrections to compensate for them.

The entire process runs continuously and automatically, and ensures accurate, consistent and fast RTK measurements for highest productivity in the field.



Network RTK versus Conventional RTK

Network RTK allows the use of correction information from an array of stations covering a large area, whereas conventional corrections from a single site are valid up to a limited distance from a reference station. Network RTK solutions provide many advantages over single site RTK:

- Increased coverage
- Improved availability
- Best reliability
- Faster rover initializations
- Consistent high accuracy
- Higher productivity

MAX Performance

for Network providers

- fast and accurate network processing
- cooperative with central or distributed installation
- reliable and robust processing thanks to Leica SmartCheck
- universal RTK product services for single sites and network solutions
- flexible multiple communication channels

for RTK rovers

- accurate and efficient at longer distances
- reliable with consistent accuracy
- faster initialization times

MAX Benefits

for Network providers

- economical with reduced investment as fewer reference stations needed
- comfortable with centralized network control
- reliable with data processing redundancy
- secure with protected access to GPS data streams and services
- scalable to expand geographic coverage
- modular to add extra product services
- versatile serving multiple applications
- global serving an unlimited number of users
- cost-effective with support for revenue generation

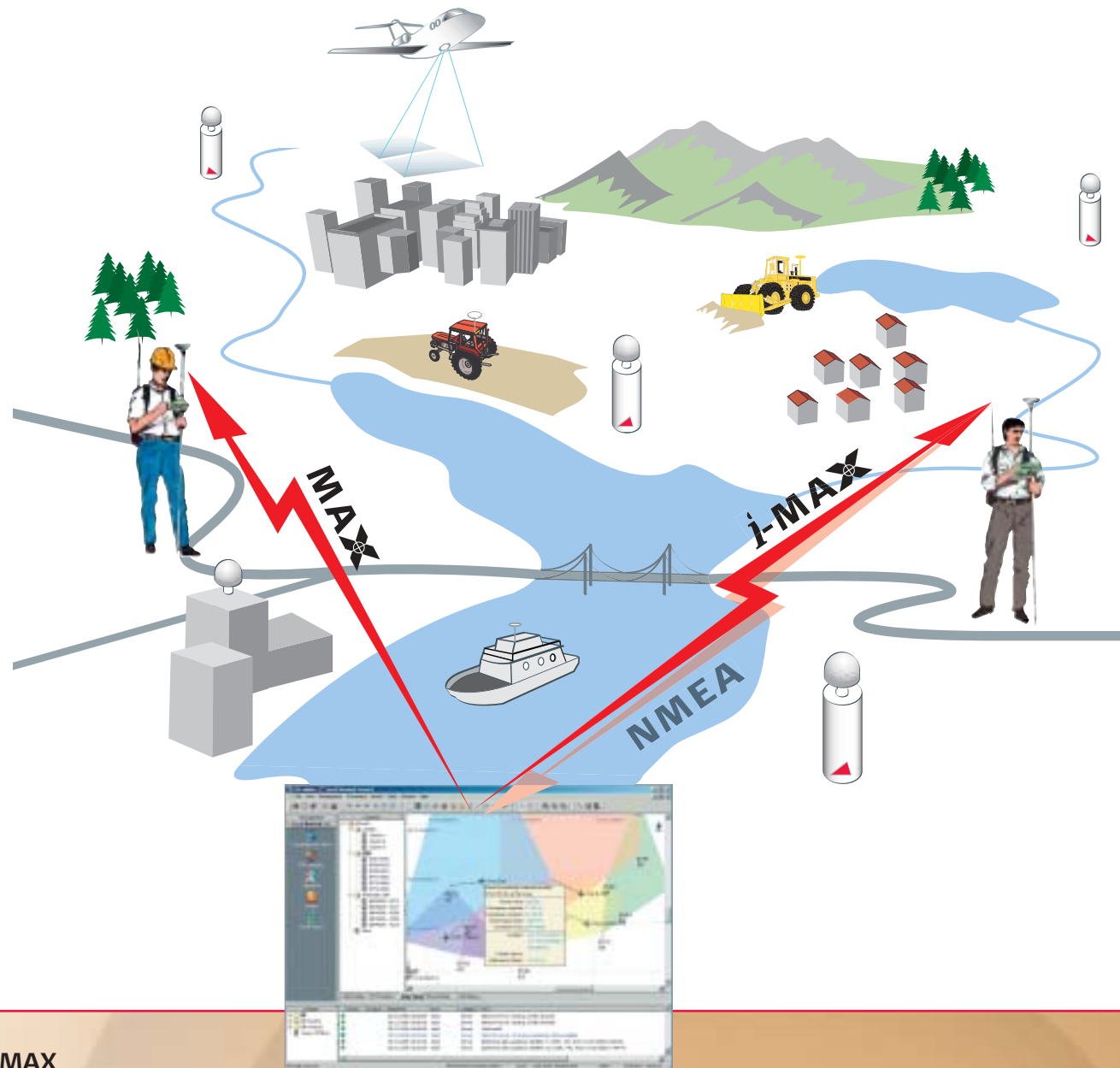
for RTK rovers

- economical no mobile field reference required, need to only to invest in rover receiver
- quicker start up time, thus reduced cost
- reliable always-on service

Leica technology at the MAX

Together with GPS SpiderNET continuous network processing and Leica MAX Master Auxiliary corrections, you achieve increased RTK performance and reliability when covering large areas with a minimum number of reference stations - it's the ideal "Win-Win" situation!

Using Leica SmartStation, your Total Station can even benefit from the latest in Network RTK technology.



Improved RTK – Moving with the Standard

Whichever method is used, whatever application you have, longer range, consistent accuracy, higher reliability and faster RTK initialization times will increase your productivity. Using Leica MAX or i-MAX corrections provides superior performance over all other existing known methods for Network RTK. With Leica MAX users are at all times in full compliance with the only industry approved RTCM V3.0 Network RTK Message format – a Standard jointly driven by Leica Geosystems - the class leader in GPS Surveying.



SpiderNET – Network RTK services MAX and i-MAX

MAX

Raw data and Master Auxiliary corrections transmitted to rovers.

MAX provides full network master-auxiliary corrections derived from GPS SpiderNET advanced processing algorithm in full conformance with the new RTCM V3.0 Standard for Network RTK correction messages.

- Compatible rovers can optimally use full network correction data or decide to use only the Master station raw data.
- Full flexibility for rovers to achieve optimum performance.
- MAXimum network information over minimum bandwidth.
- MAXimum transmission flexibility using ISDN/PSTN phone or Internet broadcast.
- Ideal for broadcast media – one-way transmission, e.g. using radio modem.
- Can serve an unlimited number of rovers.

i-MAX

Individualized RTK correction data transmitted to the rover.

For i-MAX, the rover provides its approximate position from which SpiderNET identifies the nearest available reference station. The Master Auxiliary network corrections determined for the network are then applied to provide individually network corrected RTK data to the rover. From these corrections, the rover is then able to compute higher accuracy RTK coordinates than with conventional non-network corrections.

- Each rover receives its own i-MAX correction data stream, individualized for its position.
- Standard RTK formats, such as RTCM 2.3/3.0 or Leica proprietary, can be used to transmit network corrected observation data for the nearest site.
- Rovers can benefit from network corrections without the need to understand RTCM V3.0 Master Auxiliary corrections format.
- i-MAX is ideal for supporting legacy GPS receivers.
- Requires two-way communication using ISDN / PSTN phones or Internet.





GPS Services for all applications

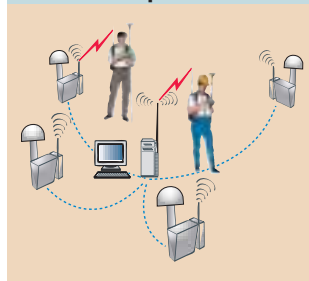
Innovative real-time services

Accurate, fast and efficient

With GPS Spider, it's easy to use the method or combination of methods that will best satisfy your operational needs. RTK and GIS rovers, construction machines, hydrographic survey vessels and others will be able to operate accurately and efficiently at even longer ranges.

Real-time services

From GPS Spider or from the receivers



Single station RTK and DGPS data can be output directly from the receivers or computed using GPS Spider and output from the control center. SpiderNET can provide Network RTK corrections

as Leica MAX and i-MAX streams, which can be distributed securely through the RTK Proxy server. The real-time data can be provided easily and efficiently via various communication equipments, such as radios, phones, access server or the Internet.

All formats

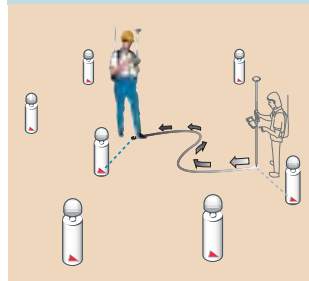
GPS Spider and the connected receivers will output RTK and DGPS data in several formats. All standard RTCM formats (V2.1/V2.2/V2.3/ V3.0) are fully supported as well as the most common proprietary formats (Leica, CMR, CMR+).

NTRIP Services

GPS Spider supports full NTRIP services. The NTRIP Caster can provide RTK data through a single TCP/IP port to which access can be restricted using NTRIP authentication. Field users running NTRIP clients can easily select their preferred data source. Reference station data streams can be sent to other NTRIP Casters as well as being received from them.

Automated RTK services

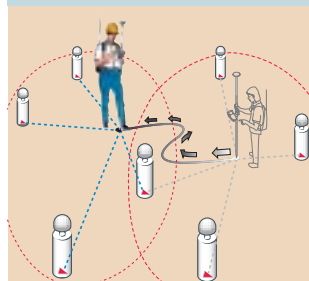
Automatic station selection



For a rover sending its position, GPS Spider can determine which is the nearest reference station and transmit the conventional RTK data for this particular station. This ensures that as the

rover travels through the network, GPS Spider can always provide the rover with data from its nearest reference station.

Automatic cell selection



Networks benefiting from the SpiderNET network processing may have a high number of stations covering a very large area. If a rover sends its position, SpiderNET can automatically create a best

suitable Master Auxiliary cell based on this position. Additionally a regular recheck process ensures the most optimal cell configuration as the rover moves within the network.

User Management services

Return on investment



GPS Spider helps you to work towards returning a profit with your system by supplying the relevant information needed for billing users for the services they have received.

Organizations that operate reference stations and networks can typically recoup a considerable part of their initial investment and cover their on-going running costs.

Authentication and Authorization

It's easy to configure the registration of new users so that they must enter passwords in order to access the data on FTP servers. GPS Spider can be organized so that field rovers have to register their telephone number, IP address or password as part of their authentication procedure. Once this is done, they can then be authorized for access to general or specific RTK/DGPS data services.

Auditing & Accounting

With access restricted specifically to registered users, system operators have full control over the usage of the network and its stations. Online status is provided for every user accessing the real-time data services. Comprehensive report logs detail the type of services, connection times and durations for which rovers have obtained data meaning that users can be charged for the data and services they receive from GPS Spider.

Positioning services

Real-time positioning

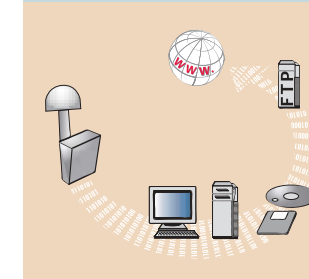
Using continuously streamed raw data, the GPS Spider Positioning module computes the baselines of a network automatically and continuously in real-time. This real-time processing is ideal for solving short and medium baselines between stations and monitoring rapid changes of reference station positions. The integration of Leica's legendary RTK algorithm and continuous SmartCheck processing guarantee the required accuracy, reliability and integrity.

Post-processed positions

Post-processing is appropriate for longer baselines between reference stations and detecting slower longterm station movements. Leica Geo Office software can be configured to fully and automatically process baselines using the data files regularly produced by GPS Spider.

File based services

Automatic data download



GPS Spider downloads the raw data files logged in the receivers at the intervals and times configured by you. Continuously streamed raw data can be archived by GPS Spider instead of, or in addition

to, downloaded files that were internally logged. Everything runs smoothly and automatically according to your specifications.

Quality Control

Validation of raw data for quality and completeness data can be performed automatically.

Production of RINEX files

GPS Spider converts the raw data to RINEX or compact RINEX with different observation types, rates and duration for each station according to your needs. Files can be compressed and the command line feature allows further automatic user-defined processing on the files.

Distribution via FTP server

RINEX and raw data files can be pushed automatically to an FTP server affording the GPS user community easy access to this data via the Internet.

All data readily available

With GPS Spider you can be sure that all the data are available, complete and on time for everybody depending on them.

Monitoring the Earth's crust

Utilize GPS Spider Positioning for monitoring tectonic plates, fault lines, earthquake zones, volcanoes and other natural structures. Depending on the expected size of movement and interstation distances, either real-time or post processing approaches can be used.

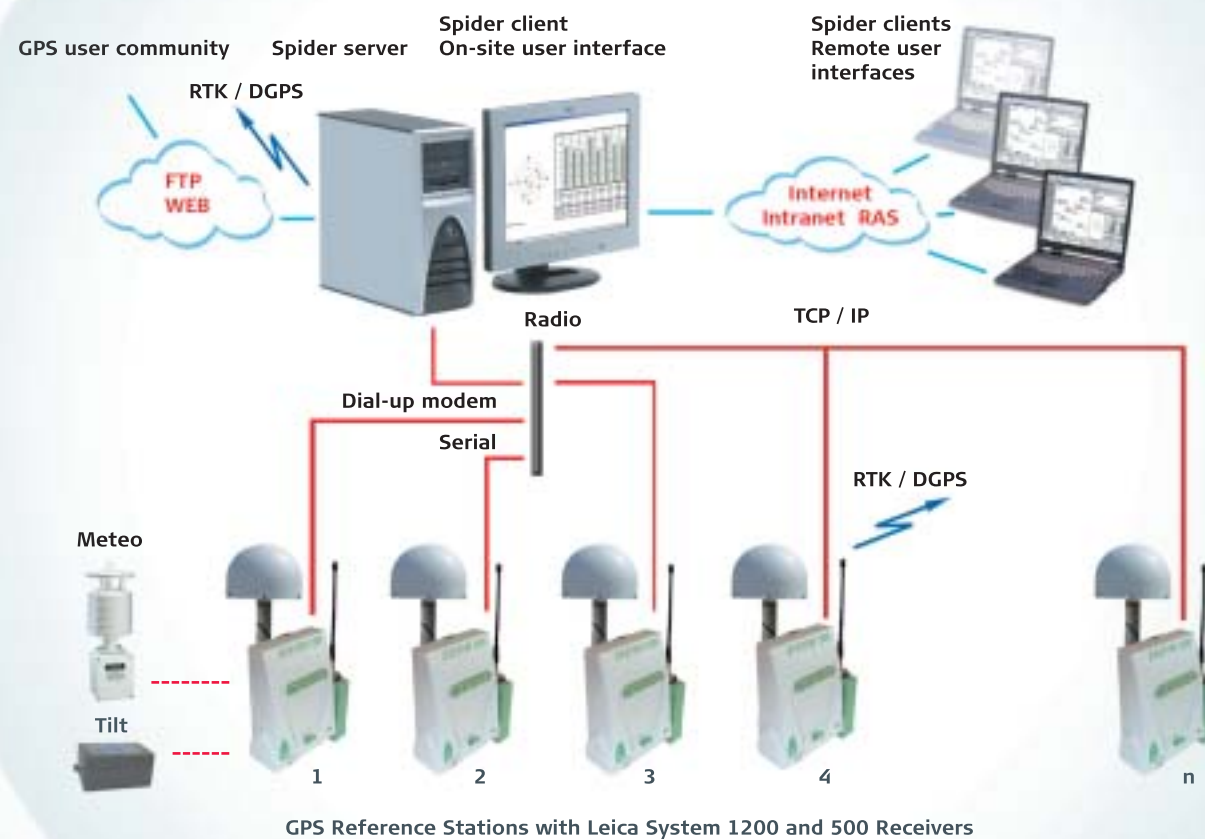
Monitoring man-made structures

Safety regulations require that dams, bridges, towers, buildings, oilrigs and other large safety-critical structures have to be constantly inspected and monitored. Real-time processing detects movements and vibrations as they occur assisting safety engineers to provide warning messages in a timely manner.

Stability of reference stations

Organizations operating networks need to be confident that the antennas are completely static and do not move. GPS Spider provides the data to automatically compute the antenna positions at regular intervals providing checks on the fiducial integrity of an operating network.

Powerful, versatile, totally reliable and secure



System Management

Automatic, Reliable, Secure

GPS Spider servers run as services on Microsoft® Windows™ operating systems. Once started, GPS Spider automatically runs stations and networks, continuously supplying the full range of GPS data, RTK and DGPS services that are needed today for surveying, engineering, construction, monitoring and other GPS applications.

GPS Spider's distributed server architecture allows for centralized as well as highly distributed installations, with maximum connection reliability.

A separate GPS Spider proxy server can be used for RTK-/DGPS data distribution to provide maximum security.

On-site and remote

GPS Spider stations and networks are extremely powerful yet very easy to set up and use. The intuitive graphical user interface has the tools and functions for easy control of receivers, station management and administration of the entire network.

As the user interface can be installed on remote computers as well as on the central server, supervisors can work at distant locations, and even at home, as well as at the main control center. It's easy to arrange a friendly duty schedule that suits everybody perfectly.

Administrators and viewers

System supervisors have administrator rights – they can control the software and the receivers, start and stop the various operations, control network processing and RTK/DGPS services or audit rover user access.

Supervisors can log off and close down their interface without stopping the server as the GPS Spider servers continue automatically. Viewer rights can be allocated to selected parties so they can inspect system operation and status or check receiver status. Viewers however cannot control or modify the system.

Access restriction routines and password protection provide the required system security.

All communication methods supported

Reliable communication is vital for GPS reference stations and networks. Communication between the receivers and the server running GPS Spider will usually be by TCP/IP, phone modems or even direct serial link. Transmission of RTK/DGPS data can be via Internet, phone modems or radios, or a combination of all three!

System supervisors at remote locations connect to GPS Spider using the Internet, Intranet or RAS (Remote Access Service).

Use the communication methods that are most efficient, cost-effective in suiting your particular applications and requirements – you are free to choose with GPS Spider.

- TCP/IP / NTRIP
- Access Server / Phone modems
- Radio modems

GPS Spider – Takes you to the MAX

- Versatile, powerful, reliable
- Modular and fully scalable
- Reliable and secure
- For all requirements and applications
- For single and multiple stations
- For small and large networks
- For Post-Processed and RTK Networks
- For all types of GPS receivers
- For all communication methods
- Easy to install and use
- Extend and enhance as your needs change and increase
- Facilitates charging for data and services
- Helps get a return on your investment

Whether providing corrections from just a single reference station, or an extensive range of services from a nationwide RTK network – innovative reference station solutions from Leica Geosystems offer tailor-made yet scalable systems, designed for minimum operator interaction whilst providing maximum user benefit. In full compliance with international standards, Leica's proven and reliable solutions are based on the latest technology.

Precision, value, and service from Leica Geosystems.

When it has to be right.

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Leica Reference Stations
Equipment list



Leica GRX1200
Product brochure



Leica GPS1200
Product brochure



Leica SmartStation
Product brochure