Leica Spider Infrastructure HW Solutions

Introducing: Leica GR30 & GR50

Reliable solutions for today and tomorrow
Leica Spider – Integrated Solutions

Introducing: Leica GR30 & GR50

Outline

- Introducing Leica GR30 & GR50
- Overview about Key Values
- Close-Up on few selected features
- Value Propositions
Leica Spider Infrastructure HW Solutions
Leica GR30 & GR50 GNSS Reference Servers

Product Range Summary

- Future Proof 555 channel GNSS SmartTrack+ capability:
  GPS – GLONASS – Galileo – BeiDou – QZSS – SBAS

- **Leica GR30** – Standard Network RTK System
  - “Plug & Play”: Intelligent & Easy to Use
  - Includes all essentials for reliable high performance service

- **Leica GR50** – High-end universal GNSS “Server” System
  - More than just a “receiver” – for highest demands
  - Flexible & redundant communication and power solutions
  - Two variants: Bluetooth 📲 - or - WLAN 📱
Leica GR30 & GR50 GNSS Reference Servers

Overview Key Values

The GNSS data value chain:

New: Innovative GNSS measurement engine generation 7 (ME7)

- Latest generation GNSS measurement engine with 555 channels on a single ASIC
- Up to 260 satellites and independent tracking of all signals per satellite
  - Industry leading Pulse Aperture Correlator (PAC) multipath mitigation and advanced interference rejection technology for superior quality measurements
  - Very low noise GNSS carrier phase measurements, typically < 0.5mm
  - Software upgradable for future signals as they become available
## Leica GR30 & GR50 GNSS Reference Servers Overview Key Values

<table>
<thead>
<tr>
<th>Key Value</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smart Logging &amp; Clean up:</strong> Up to 12 sessions (MDB, RINEX V2/3, NMEA)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Up to 32 GB internal &amp; FTP push</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Smart Streaming:</strong> Data rates up to 50Hz logging &amp; streaming</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>20 data streams (10 RTK) with multiple user connections</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Full Ntrip Server / Caster / Client support</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
## Key Value

<table>
<thead>
<tr>
<th>Smart Communication:</th>
<th>Serial, Ethernet, USB Client &amp; Slot-In devices</th>
<th>USB Host (e.g. for external disk)</th>
<th>WLAN</th>
<th>Bluetooth</th>
<th>Mobile Internet</th>
<th>Backup Comms management &amp; Residential Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="checkmark.png" alt="Checkmark" /></td>
<td><img src="cross.png" alt="Cross" /></td>
<td><img src="checkmark.png" alt="Checkmark" /></td>
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<td><img src="checkmark.png" alt="Checkmark" /></td>
<td><img src="checkmark.png" alt="Checkmark" /></td>
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</tbody>
</table>
# Leica GR30 & GR50 GNSS Reference Servers

## Overview Key Values

<table>
<thead>
<tr>
<th>Key Value</th>
<th>Bluetooth</th>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smart Power Concept:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual-External power supply &amp; Power Fail recovery</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Comprehensive management of power input levels and power source priority</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Integrated rechargable and removable battery</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Power over Ethernet</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Low power consumption</td>
<td>&lt;3.5W</td>
<td>&lt;3.1W</td>
</tr>
</tbody>
</table>
Leica GR30 & GR50 GNSS Reference Servers

Features - Close up

Integration of all HW/SW components

- Integrated GSM/GPRS/3G/UMTS
- Internet connection sharing (Routing)
- Automatic backup communication to Spider
- Active Spider connection via NTRIP

Flexible concepts:
- Logging
- Power supply
- Operation

Leica Spider GR30 & GR50 – May 2016, San Sebastian
Leica GR30 & GR50 GNSS Reference Servers
Features - Close up

Keeping it Simple ... ´Plug & Play´ connectivity

- Connect via Ethernet / LAN:
  Open Web Browser >> Type Hostname >> Login >> START - That´s it!

- Connect via USB connection to a PC:
  Open Web Browser >> Type 192.168.254.2 >> Login >> START - That´s it!
Leica GR30 & GR50 GNSS Reference Servers

Features - Close up

Internet Connection Sharing / Residential Gateway

- The GR-Server acts as a gateway to the internet for attached devices
- WAN: interface to access the internet (Mobile internet, Ethernet, WLAN)
- LAN: interface to which other device is connected (Ethernet, WLAN)

Example:
WAN interface: Mobile internet
LAN interface: Ethernet or WLAN
Leica GR30 & GR50 GNSS Reference Servers
Features - Close up

Comprehensive backup communication

- Define gateway priority
- Switches between available gateways if default gateway stops working
- WLAN will also be used, if available and configured
The GR receivers can act as full comprehensive Ntrip caster.
Automatic Firmware download and installation

- At predefined times
- From:
  - Public Leica Geosystems web server
  - or Local intranet FTP server
- Firmware file zipped → small size → fast transfer
- Benefits:
  - Minimized administration effort
  - Controlled maintenance
Leica GR30 & GR50 GNSS Reference Servers

Features - Close up

SNMP

- Simple Network Management Protocol (SNMP)
- Existing IT “Tool”
- Allows continuous and rapid IT infrastructure monitoring of all devices in an IT network
- Routers/Switches/Servers/…
- SNMP is a protocol for finding out the status of a device or service
Leica GR30 & GR50 GNSS Reference Servers
Features - Close up

... more GNSS Satellite Systems & Signals:

- GPS, GLO, GAL, BDS, QZSS, SBAS
- Logging
  MDB, RINEX 2 / 3.01 / 3.02 / Hatanaka, NMEA
- Raw Data Streaming
  OWI LB2, BINEX, RTCM MSM

<table>
<thead>
<tr>
<th>Tracking</th>
<th>GPS</th>
<th>GLONASS</th>
<th>GALILEO</th>
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<tbody>
<tr>
<td>Navigated</td>
<td>G</td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>GPS</td>
<td>7/8</td>
<td>8/8</td>
<td>2/2</td>
</tr>
<tr>
<td>GLO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDS</td>
<td>8/11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QZSS</td>
<td>1/0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBAS</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSC</td>
<td>Internal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Status

Date of GPS almanac 2016-03-21 19:56:48
Date of GLONASS almanac 2016-03-19 08:10:56
Date of GALILEO almanac 2016-03-19 10:30:00
Date of BEIDOU almanac 2016-03-18 12:18:22
Date of QZSS almanac 2016-03-20 12:05:20
Time signal Internal
Leica GR30 & GR50 GNSS Reference Servers

Features - Close up

Site Monitor with tailored RT-positioning modes:

- "Reference Station" to monitor the stability of a pillar
- "Monitoring" to monitor dams, bridges, landslides
- "Network RTK" to compute positions as on a rover

Monitoring & notifications: e.g. SpiderQC or RTKMon

⇒ NMEA RT Positioning
VADASE – What is it?

**Velocity And Displacement Autonomous Solution Engine**

- **Autonomously** detecting fast movements in real time
- The world’s first autonomous GNSS monitoring solution onboard a stand-alone receiver
- New Algorithm onboard **Leica GR30/GR50** receivers

GR30

GR50
VADASE – What is it?

**Velocity And Displacement Autonomous Solution Engine**

**Purpose**
Detection of fast relative movement in real time

**Method**
Velocity information from single-difference GNSS observations & derived displacement

**Benefits**
Fully autonomous - No reference data or correction services required
VADASE – How does it work?

- **Real time** - Instantaneous

- **Using** only satellite broadcasted information -> **autonomous**

- **Detecting** fast movements based on computed velocities

- **Informing** about detected velocities and displacements
Leica GR30 & GR50 GNSS Reference Servers
Sales Variants

- Two common sales variants:
  - “Baseline”: Base-variant with 555 channels with GPS & GLONASS constellation, Multi-frequency (L1, L2P/L2C, L5). Additional options to be added as needed.
  - “Highline”: Full GNSS constellation & multi-frequency
    Plus Server Package:
    RINEX, FTP push, Multi-client & Ntrip caster. Further additional options can be added as needed.
Leica GR serie GNSS Reference Servers
Build your system – with the Reference Server

With its *Modular* design and *Scalability*

- The GR30/50 can be *upgraded* in the future *when you need it*.
- New signals coming – update firmware or exchange the tracking engine (GR10/25), not the whole system.
- Need more memory – add larger SD card or USB hard disk or flash disk
- Need new communications – add new slot-in or external devices
- Need different power sources – on GR50 use any of the 4 sources and manage them
Leica GR30 & GR50 GNSS Reference Servers

Solving Power Supply Issues

Keeping your reference station running 24/7 is critical

- Being a high end GNSS receiver with four power sources, the GR50 has a very low power consumption at 3.1 Watts typically
  - Two external power ports via a single Lemo port and Y cable
  - Internal battery and charger
  - Power over Ethernet (PoE)
- With the GR50 internal battery, both raw data logging and communication backup is fully integrated. No need for additional separate UPS device.
  - Raw Data Logging Only : Up to 27 hours
  - Raw Data Logging and GPRS streaming : Up to 22 hours
- Or use GR30 with external re-chargable GEB371 as UPS (>48h)
- GR50 with Configurable power management
  - Define power on – power off voltage limits
  - Select primary and secondary source
Leica GR30 & GR50 GNSS Reference Servers
Solving Communication Issues

The GR50 has all the communications you need – all integrated and managed

- Ethernet (ruggedized - IP67 even when in use)
- USB client / host
- Slot in/external devices (Radio/GSM/GPRS/UMTS)
- Serial RS232 (Lemo)
- Bluetooth  (GR50 BT only)
- WLAN     (GR50 WLAN only)

<table>
<thead>
<tr>
<th>Streaming</th>
<th>Web Interface</th>
</tr>
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<tbody>
<tr>
<td>✔</td>
<td>✔</td>
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<td>✔</td>
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<td>✔</td>
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</tbody>
</table>

External VSAT/BGAN can also be used:
- GR30/GR50 has low bandwidth web interface configuration mode
Leica GR30 & GR50 GNSS Reference Servers
Complemented by excellent GNSS Antennas

GPS – GLONASS – Galileo – BeiDou – QZSS – SBAS – L-Band

AR25 – The Scientific

- Scientific 3D choke ring antenna for tasks demanding the best low elevation tracking
- “Dorne & Margoline” Antenna Element

AR20 – The High-End Standard

- High end choke ring with unmatched multipath rejection, excellent phase center characteristics and very low noise – 3D inside design
- The standard antenna for RTK Networks

AR10 – The Economic Standard

- Near choke ring level performance compact antenna with integrated robust UV resistant radome

Leica Spider GR30 & GR50 – May 2016, San Sebastian
Leica GR30 & GR50 GNSS Reference Servers

Summary

Key Benefits:

- Don’t think receiver – Think reference server
- Future proof state of the art GNSS measurement engine technology
- Easy to use and install ‘Plug & Play’ GNSS Reference Station
- Reliable performance today as well as tomorrow
- Modular – when Flexibility and Adaptability matter
Leica Spider – Integrated Solutions
Integrated Product Suite

Leica GNSS Software:
- GNSS Spider
- SpiderQC
- SpiderWeb
- Spider Business Center

GNSS Antennas:
- Leica AR10
- AR20
- AR25

Leica Services:
- CrossCheck
- SmartNet
  powered by Leica Geosystems

Leica Spider GR30 & GR50 – May 2016, San Sebastian
THANK YOU FOR YOUR ATTENTION!

The best answers combine the smartest solutions
The Leica Spider family of products provide all you need for smart solutions. From single base stations to comprehensive infrastructure RTK networks.

GNSS Networks and Reference Stations
Smart Solutions from Leica Geosystems