

SATEL SUCCESS STORIES



WIRELESS WORLD – LOCAL SOLUTION



- when it has to be **right**



PRECISE MEASUREMENT – FAST DATA TRANSFER

Leica Geosystems Oy is a subsidiary owned by Leica Geosystems AG and its main sales office is in Espoo, Finland. Leica has consolidated its position as a respected and trusted brand in measurement technology.

The company's main areas of focus are surveying, satellite measurement, mapping, laser scanning, construction and industrial measurement, and civil engineering measurement instruments. The technology is also suitable for controlling construction machines.

SATEL modems are extensively used in Leica's satellite positioning devices. Cooperation began in the late-1990s, when Leica required a reliable point-to-point wireless data transfer link.

Leica Geosystems measurement systems

SATELLINE modems are used to transfer satellite positioning correction data from an accurately known point to a mobile measurement receiver. In landscape conditions, the practical operating distance is typically up to 6-7 kilometres, but with permanently installed base locations, positioned in water towers for example, distances of up to 30 kilometres can be achieved.

When satellite positioning coordinates are corrected continually in relation to a known point, it is possible to achieve centimetre accuracy and kinematic (RTK, real-time kinematic) measurement is possible. The receiver can be carried by measurement personnel, enabling precise measurement data to be obtained quickly even over long distances, with no visual contact. A special application is construction machine guidance, in which the receiver is installed on the machine, thereby

enabling the location of an excavator bucket, for example, to be continually known. Measurement of demanding excavation tasks takes place efficiently as work progresses.

A significant benefit gained in the work-site environment is that an installed base station can be connected to any number of "measuring poles", whose locations are continually known to a centimetre level. The SATELLINE radio modem is extremely fast; the measurement data latency is only a few tens of milliseconds. Leica's systems are also fully compatible with future satellite positioning systems. For the radio modem frequency band, more compact correction data formats have been developed, ensuring that the reliable transfer of correction data will also be possible in future.



- Adapting SATEL technology to data transfer in precise positioning systems.
- SATEL products have been in use since the 1990s.
- SATELLINE radio modems used in many GPS/GNSS devices.
- Modems used both separately and integrated into measurement devices.
- Devices widely used by municipalities and companies.

According to Leica Geosystems' Esa Wikman, cooperation with SATEL has gone well and has deepened into a partnership. Cooperation has resulted, for example, in the development of solutions in which a radio modem is fully integrated into measurement devices. This has made the technology, used in sometimes very difficult field conditions, more reliable than before.



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VAISALA

NO COMPROMISES ON QUALITY

Vaisala is a global leader in environmental and industrial measurement solutions. The company offers a wide range of innovative observation and measurement products and services for the needs of industry, meteorology and many weather-dependent sectors, such as aviation.

Vaisala serves national meteorological institutes as well as organisations whose operations are significantly affected by weather. Vaisala's customers also include industrial companies for whom accurate measurements and monitoring of weather conditions are of vital importance.

Vaisala's products and services cover measurement devices ranging from small probes to comprehensive deliveries of weather observation solutions, such as regional surface weather observation networks and airport weather systems complete with data services.

Vaisala employs approximately 1,400 professionals at operating locations worldwide. The Group achieved net sales of EUR 253 million in 2010. Annually Vaisala serves customers in more than 150 countries.

BANGKOK'S NEW AIRPORT

SATEL radio modems are used at airports in many different types of equipment. At Bangkok they handle LLWAS-system data transfers. The system observes inconsistencies in the winds around the airport. Sudden windshears or downdrafts are dangerous phenomena for aircraft during take-off and landing. Downdrafts typically arise in the tropics, and air accidents have occurred in connection with them. Bangkok's new airport has wind sensors on 12 high masts. Based on continually updated information, the system calculates the consistency of the wind field and warns about sudden changes.

The electricity required for the masts is obtained from solar panels, and data transfer is handled by radio modems. Key selection criteria for the SATELLINE

modems were their low power requirement and suitability for 12-volt electrical systems. The modems also operate reliably at distances of up to 5 km or more, which is difficult to achieve with "free frequency" devices. SATEL is a renowned manufacturer with impeccable testing documentation, so official approval presents no problems.

Equipment usability was also an important criterion. SATEL has considered matters from the user's perspective and its devices are easy to configure. Vaisala's project manager in the Bangkok project says that the fact that the user-interface and the necessary tools have been purposefully kept the same year after year is a truly positive feature.



Although Vaisala builds its systems such that the malfunctioning of one device does not bring down a whole system, the project manager considers SATEL's durability and reliability to be a big plus.

"The equipment's mechanical structure inspires confidence, and maintenance has been absolutely excellent compared with some other manufacturers we've dealt with."

System in a nutshell

LLWAS
(Low Level Windshear Alert System)
Bangkok's new airport.

- Four weather stations containing SATELLINE modems monitor wind stations in the airport area.
- 12 wind stations containing SATELLINE modems
- Quadruple authentication
- Wind stations send data once every 10 seconds
- Wind stations have 50 W solar panels and 2 x 26 Ah batteries, 12 V
- Completech antennas
- Obelux mast lights
- Temperature up to 40°C, no cooling or fan



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RELIABLE ELECTRICITY TRANSMISSION

Finland's E.ON companies are part of the international E.ON energy group. E.ON Kainuu Sähköverkko Oy is engaged in the planning, construction, use and maintenance of electricity networks and in the purchase of related services. The company is also responsible for electricity transmission in the municipalities of Kainuu and Pyhäntä and in the new Siikalatva municipality in North Ostrobothnia.

Best solutions found in cooperation with experts

When E.ON Kainuu Sähköverkko Oy, which continually develops its operations, was looking for an expert and reliable partner for the data transmission of its remote-controlled disconnecter stations, it opted for SATEL Oy.

It wanted to replace the old radio transmission technology with an efficient, modern solution. It was also seeking easily PC-programmable equipment to help in building a routable radio network. Management of the radio network was a particularly important aspect.

Efficient equipment for every need

SATELLINE radio modems helped in achieving the objectives of the network changes. Efficient data transmission is now handled by over 100 outdoor-compliant, high transmission power SATELLINE-3AS / -3ASd radio modems, and by nearly 100 SATELLINE-3AS NMS / -3ASd NMS radio modems controllable via an NMS network management program.

The excellent working relationship between the companies was later also extended to switching stations.

Now data on the state, measurement and control of the disconnecter and switching stations are transferred efficiently in a distribution management system, using the IEC 870-5-101 protocol. An effective solution was also found for power plant needs. Lake surface level measurement data are transferred easily to the power station's logic controller using a SATEL HLINK.

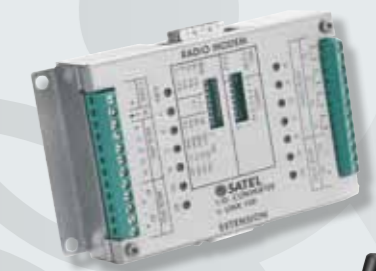
Remote management of electricity network brings savings

E.ON Kainuu Sähköverkko Oy is particularly satisfied with the remote management features of SATEL's NMS network. The state of the



Intelligent data transmission

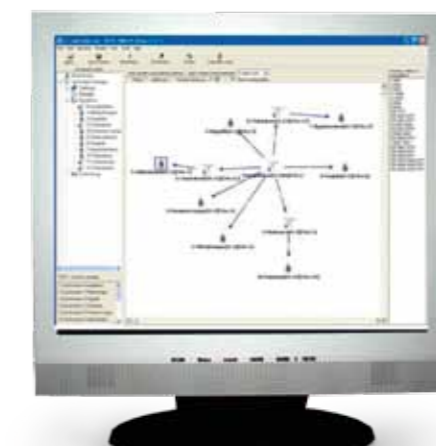
- Long-term cooperation brings results
- Savings through remote management
- Different SATEL products for different locations on the network



radio network is easy to monitor, and possible problems are quickly detected. The Kainuu electricity network extends over long distances, so remote management also brings savings in work time and travel costs.

Forward together

The reliability of SATEL's technology is tried and tested. This brings certainty to network and production management, and the equipment's easy connectivity with the remote management system is a clear advantage. In future, the intention is to expand in the direction of the NMS network. The challenges of an intelligent electricity network will create the need to develop the radio network in future, too.



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NOKIA WATERWORKS

Nokia is a developing town of more than 30,000 inhabitants in the Pirkanmaa region, near Tampere in southern Finland. At the end of 2011, Nokia Waterworks had around 6,000 connected customers, representing around 90% of properties. In addition to residential customers, the largest water users include a spa hotel and a hospital as well as a tissue paper mill and other industry.

The length of the water mains network is around 270 km. During 2011, a total of 2,050,000 m³ of household water, an average of around 5,500 m³ per day, was pumped into the network. The length of the wastewater sewer network is around 230 km and the length of stormwater sewer network 120 km. The Kullaanvuori wastewater treatment plant treats a total of 3,700,000 m³ of wastewater per year and the Siuro wastewater treatment plant 300,000 m³, i.e. an average in total of just under 11,000 m³ per day.

In Nokia the water management data transfer network is being built and developed with a long-term perspective. Different generations of equipment operate together, allowing the network to be renewed one part at a time. SATEL radio modems have been used in Nokia Waterworks since the 1990s, in remote monitoring and control at various locations. The network currently has around 50 substations and four receiving stations. The shortest interval between stations is around 300 m and the longest around 6 km. Connecting new equipment into the remote monitoring and control system will also be easy in future. With the aid of automation systems, operations at water intake plants, the central waterworks, the water mains and wastewater sewer networks, and wastewater pumping plants are monitored and controlled.

Productivity at the waterworks is improving, because the maximum ratings of plants and equipment can be reduced with a direct impact on operating costs. The soundest reasons for using SATEL radio modems are reliability and the capacity to operate a network oneself. Long distances, a rugged landscape and changeable weather conditions easily present challenges for data transfer. Inexpensive operating costs are also a clear advantage.

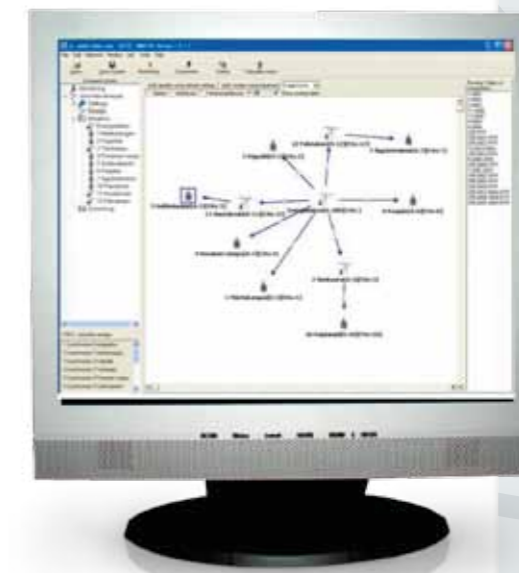


Long-term cooperation.

- Nokia Waterworks is one of SATEL's hundreds of Finnish waterworks customers.
- SATEL products have been in use since the 1990s.
- SATELLINE-3AS NMS radio modems.
- Network monitoring and remote control with the aid of the SATEL NMS PC program.
- The network has 50 substations and 4 receiving stations, and is being expanded further.

Because the network is developed in Nokia itself, additional factors favouring the selection of SATEL modems are the manufacturing of the products close by, efficient analysis and configuration tools, and good training in their use.

Operations Engineer Matti Tamski says that the installation of the radio modem network has been straightforward and that SATEL radio modems have proved themselves to be an excellent choice in network monitoring. When complete, the radio network will have more than 60 stations, covering the whole of the Nokia Waterworks' area.



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Teknoscale Oy



HOW TO READ DATA FROM DOZENS OF MEASUREMENT POINTS AT ONCE?

Teknoscale Oy, founded in 1994, is a private company focused on manufacturing axle load scales and other special scales, such as crane and animal scales. The first wirelessly operating scale, EVOCAR, was introduced in 1998, and since then the company's products have been widely used by traffic control authorities in, for example, the Nordic countries, Germany and Belgium. The latest member of Teknoscale's product range is the EVOPLANE aircraft scale.

EVOPLANE aircraft scale

Teknoscale originally applied SATEL modems in the late-1990s to the EVOCAR scale, which is used to weigh the axle loads of heavy vehicles. The scales are used by the police in traffic control and they enable measurement data to be received simultaneously from 10-12 measurement points, i.e. from an entire articulated vehicle at once.

Teknoscale's Jarkko Tuomisto says that the same solution was applied to the EVOPLANE aircraft scale, because in this way it was possible to raise ease-of-use and measurement accuracy to a totally new level. Previously, weighing was done manually by reading screens or by transferring measurement data by cable.

With the aid of SATELLINE modems, many scales can be used simultaneously and measurement is accelerated significantly. For example, up to 24 scales, with a combined capacity of up to 35,000 kilograms, are needed to weigh an Airbus A380 aircraft. The weighing of smaller aircraft can be achieved with six scales. Aircraft must be weighed after each major overhaul, so that any change in their centre of gravity can be calculated. In major overhauls, removal, furnishing and painting work is performed, which influences the aircraft's weight distribution.

In structure, the EVOPLANE scale is very low and the angle of ascent shallow, enabling aircraft to be moved with ease in a hangar on to suitably positioned scales.

"The weighing software requests measurement data three times from each scale separately and ensures that the reading is stable," says Tuomisto explaining the measurement process. "Cooperation with SATEL has gone well; the necessary modems have been delivered on time, and help is available when necessary."



The benefits are clear. EVOPLANE makes measurements accurately, quickly and, above all, safely. Measurement personnel do not need to be near the aircraft during the process. Previously, weighing took place, for example, using three detectors at wing measurement points, which in terms of accuracy was uncertain, time consuming and awkward. A new, more pre-

cise version of EVOPLANE for weighing fighter jets is under development. Teknoscale's Export Manager, Leena Salminen, says that their aircraft scale is currently being used by Lufthansa and Finnair, among others. A new field of business involves Bridgestone, which uses scales to check the condition of straddle carrier tyres.



- Applying SATEL technology to the data transfer of vehicle and aircraft scales
- SATELLINE-1870 radio modems as a component in EVOPLANE aircraft scales and EVOCAR axle load scales
- Modems integrated into the measurement device



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SUCCESS STORIES – ONE COULD BE YOUR CUSTOMER

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SATEL distributor; your customers now have the opportunity to enhance their company brand and receive positive recognition.

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As a distributor, you work with many types of customer. The SATEL Success Stories publication offers distributors a unique opportunity to create a customer portfolio, which will distinguish distributors favourably from their competitors and

- facilitate negotiations with new customers
- improve your standing among existing customers
- serve as an excellent sales tool and checklist

WE'LL TAKE CARE OF EVERYTHING

We will turn your and your customer's success story into a fascinating article for the Success Stories publication – with professionalism, dedication and describing your customer's business.

We'll need, however, a little help from you, too. In practice, this means that you tell your customers about this opportunity to communicate in a quality publication. Send us by e-mail your customer's contact and factual information, as well as any existing photographs. If necessary, you will participate in a follow-up discussion with the writer of the article before any customer interview. That's all.

SATEL will handle everything else, including photography, customer interviews, scheduling, editorial work, lay-out and printing as well as distribution of the brochure.



Designed and manufactured in Finland by:

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