

Customer Story Leica MobileMatriX Salem Municipality: A revolutionary way of surveying



■ Company

Salem Municipality, Sweden

■ Challenge

Evaluate the usability of Leica MobileMatriX

■ Date

July 2005

■ Project Summary

Software Leica MobileMatriX
Mettenmeier Colibri X5
TabletPC

Instruments Leica GPS1200
Field Mobile Data Collection and
Mapping
Map completion

■ Benefits

- Visualize multiple features
 - Easy-to-use and learn
 - Rapid and easy workflow
 - Broad usage spectrum
 - Join data from several sources
 - SQL Queries to export to shape
- Innovative product

■ TabletPC

Mettenmeier Colibri X5 with 1.1 GHz processor
Useful battery lifetime
Leica TabletPC holder for convenient working
environment

by Ulf Brandstedt, Salem Municipality, Sweden

Could the concept of Leica MobileMatriX be as good as the demonstration showed?

Leica Geosystems has over the years presented new ideas for surveying. The innovation that received the most attention is the Leica SmartStation, a total station with integrated GPS. But the innovation that caught my eye, after a presentation last winter, was without a doubt Leica MobileMatriX combined with Leica GPS1200 and a Tablet-PC. Leica Geosystems' representative in Stockholm, Anders Freeman, had sent out an invitation regarding the introduction of a new

surveying system based on GPS-technology. Johannes Hotz, Leica MobileMatriX Product Manager from Leica Geosystems Headquarters in Switzerland held the presentation and demonstrated the whole concept in theory and reality.

(View a description of the concept at <http://www.isprs.org/istanbul2004/comm2/papers/101.pdf>)



- when it has to be **right**

Leica
Geosystems



*"I cannot wait until tomorrow to go out and survey again." Ulf Brandstedt,
Surveyor/GIS coordinator Salem Municipality*

Evaluation

After a request of an evaluation of the concept in Salem's municipality, I sent a DXF-file with aerial photos to Anders Freeman and he pre-pared the TabletPC (Mettenmeier Colibri X5) with the data. The exported DXF-file was from a selected area where houses had been recently built, along with some other objects (streets, lamp posts etc) that needed to be surveyed to complete the map database. Could the concept of Leica MobileMatriX be as good as the demonstration showed?

Initializing

After a quick but thorough briefing concerning the units (Leica GPS1200? and MobileMatriX/ Tablet-PC) by Anders Freeman, I was on my own during the following week. I contacted Lars Jämtnäs at Lantmäteriet's (National Land Survey of Sweden) SWEPOS NeWRTK, a national network of reference stations for GPS, and he granted us to test the RTK service for real-time positioning with centimeter accuracy. I received great support from them. After correcting some settings for the GSM-unit I was ready to test the GPS and the Leica MobileMatriX out on the field.

Surveying

After I had strapped the equipment on, connected all the cables, turned on the TabletPC I then dialed to receive RTK data from SWEPOS, done easily through the interface of the software, I received a high degree of accuracy (0,007-0,024 m) at my position. You can easily choose the right feature class for the survey objects and then you can start surveying. All the feature classes are set at the point of surveying. You can choose by polyline, point or polygon.

After a short time of surveying you feel you are in control of the process and it is easy to change feature class. The surveying was quick and easy to follow on the screen, with an instant feedback of the objects that had been registered in the map. The area of the surveying was open with no tall buildings or high trees that blocked the "view" of the satellites. In spite of good conditions, the accuracy of the position could drop to 0.2-0.4 meter during 1-3 minutes (occurred few times during the whole surveying project). After the short drop of accuracy, the GPS-sensor regained the highest accuracy. To control the accuracy of the GPS a property borders and high precision reference points with deviations in between 25 to 35 millimeters was surveyed. Several of these reference points were surveyed several times at different times during the test period. The deviations between the surveyed points came to an average of 0.045 meters. The size of the area was approximately 5 ha and was surveyed in 15 "efficient" hours. The battery of the TabletPC lasted in between 2-2,5 hours and that is very useful.

The weather during the test period was sunny and warm 23-32°C and the strong sunlight made the screen of the TabletPC display the map even clearer. When working in less bright conditions, the internal light for the screen can be turned on.

Post processing

With traditional surveying the post processing of survey data consists of emptying the memory unit of the surveying instrument, reformat the data structure to match the office program and then do the computations. In Leica MobileMatriX the surveyed data will be saved with the personal database. To be able to export the data into Salem's database, the surveyed objects will be selected by using SQL. The selected objects will then be saved as a shape-file. If you are using any of ESRI's software the shape-file could be imported as is. If your database is equipped with ArcSDE, Leica MobileMatriX can be connected with the possibility of disconnected editing. The office software in Salem is AutoKa-PC and that can import DXF data so the exported shape-file from Leica MobileMatriX has to be converted. With a conversion of symbols in AutoKa-PC makes the product look correct.

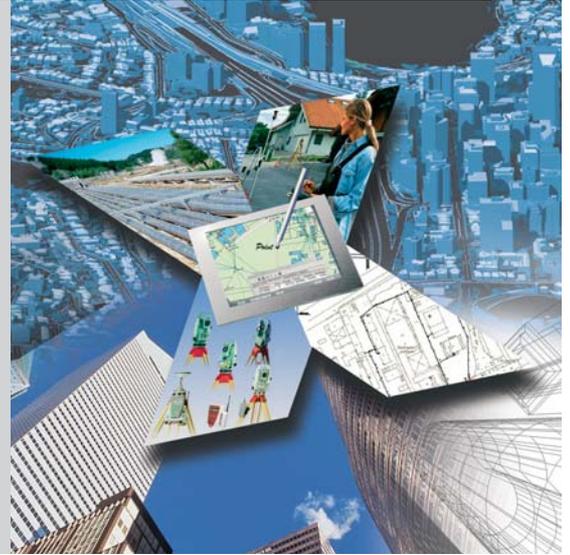
Ergonomics

The ergonomics is satisfactory with the equipment. After a few hours you can feel the weight of the TabletPC that is mounted on a chest plate and carried with a harness. The backpack with the GPS-sensor was comfortable but all these cables (Bluetooth - for cable-free work - though available from Leica Geosystems). The carbon fiber pole was light and easy to carry.

Summary

Could the concept of Leica MobileMatrix be as good as the demonstration showed?

To measure and compute data with Leica MobileMatrix was a new experience that I liked and suited me. I enjoyed working with the software and actually (after a full working day) looked forward to the working next day, and that does not happen always. I can visualize multiple areas where the concept could be used, such as rough stakeout of buildings. GPS surveying has its limits due to accuracy but many different surveying assignments could be performed with this equipment. With high accuracy stakeout a total station will be used as a complement to the GPS surveying, with Leica MobileMatrix too. Within a couple of years satellites from the GALILEO will be available and maybe we can hope that GLONASS will get back on its feet again and with that perspective it looks very promising for surveying that demands accuracy and quality.



Acknowledgements

Thank you, Anders Freeman at Leica Geosystems AB for your help and support, even on your vacation. Thank you Lars Jämtnäs at SWEPOS, for your generosity and letting us try the RTK service.

Thank you Åke Engelke, Salem's municipality for the support concerning the mobile phone company.

Take a look at Leica MobileMatrix at:

http://www.leicageosystems.com/corporate/en/products/software/lgs_5316.htm

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