Leica MobileMatriX

Release Notes Version 4.2

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1 About these Release Notes

Welcome and thank you for choosing Leica MobileMatriX, the mobile GIS software from Leica Geosystems AG.

Leica MobileMatriX, together with Leica instruments, is the most advanced and attractive application for mobile GIS in combination with TPS, GNSS, Level, Digital Cameras, and LRF on the market today. Our innovative solutions offer flexible and powerful systems that are scalable and designed for ease-of-use. Paired with the superior performance of our TPS and GNSS sensors, Leica Geosystems is setting new standards for mobile GIS applications.

2 About release 4.2

The following chapter documents all new features, enhancements and changes included in the Leica MobileMatriX 4.2 release.

Version:

- **Leica MobileMatriX 4.2 build 605**
- **Release Date: 30.05.2011**

For detailed information on using any MobileMatriX feature, please refer to the user manual and/or Quick Start Tutorials.

Please note MobileMatriX v4.2 only supports ArcGIS 9.3 and 9.3.1.

The new Leica MobileMatriX v4.2 can be obtained from your local Leica Selling Unit or Dealer, or via download from the Leica myWorld website free of charge for all customers with a valid Leica MobileMatriX Customer Care Package.

2.1 Improvements of Leica MobileMatriX v4.2

- Localisation is supported. The following languages are supported: English, German, and Chinese.
- Support of the new Leica GG02 plus GNSS/GIS SmartAntenna using Zeno Connect.
- New Viva CS Simulator version 3.5 included to support the firmware version 3.5 on the GS10 and GS15 sensors.
- Improved survey data import. Now it is possible to set the imported coordinate as current coordinate e.g. when importing survey points from an external adjustment package.
- Automatic image transfer from Zeno Field to MobileMatriX using EasyIn.

- Offset computations get created for offset points, e.g. measured with Laser Rangefinder in Zeno Field. This allows automatic re-computation of offset points after post-processing reference points. Additionally it is possible to review, modify, and re-compute offset point computations in MobileMatriX.
- Redesign of the EasyOut dialog to simplify and also enhance the workflow possibilities.
    - EasyOut now also supports to copy out data read-only or editable.
    - EasyOut now supports the automatic feature validation to ensure data integrity in Zeno Field.
- Update selected GNSS observations with a new antenna height. With this command, the user can simply change the antenna height to a selected set of GNSS observations

2.2 Supported operating systems

- Windows XP (32-bit)
- Windows Vista (32-bit)
- Windows 7 (32-bit)

2.3 Active Customer Care

A powerful and competent worldwide service and support network backs up Leica MobileMatriX.

Leica Geosystems customers benefit from our service and support that spans time zones and geography. Our Active Customer Care program provides customer packages to suit your needs, whether you use our simplest distance measuring device or the most sophisticated integrated solution. Active Customer Care is a true partnership, and it's our commitment to provide the highest level of support and collaboration that our customers have come to expect when you put your trust in Leica Geosystems.

2.4 Important Notes

- Leica MobileMatriX can only be installed and licensed successfully if the user is logged in as Administrator or with Administrator rights.
- To support the GS10/15 with a FW other than 3.5, it is required to install the according Simulator version. Please contact you local representative for further details.
- For Windows Server 2008, the 'Desktop Experience Component' has to be installed.

3 About release 4.1

This release contains new instrument drivers to support the latest Leica Viva TPS instruments, Leica TS11(i), TS15(i) and TS30 - as well as the new Viva GNSS instruments GS08 and GS12.

Please note MobileMatriX v4.1 only supports ArcGIS 9.3 and 9.3.1.

The new Leica MobileMatriX v4.1 can be obtained from your local Leica Selling Unit or Dealer free of charge for all customers with a valid Leica MobileMatriX Customer Care Package.

3.1 New feature of Leica MobileMatriX v4.1 at a glance

3.1.1 Support of new Leica Total Stations

- TS11 and TS15 as well as the imaging variants TS11i and TS15i
- In addition to the Sensor support, it is also possible to transfer the image taken on the TS11i or TS15i into MobileMatriX and store it there as a hyperlink to the feature or directly in the raster field of a feature.
- Please note that you require in TS1x FW 3.0 and the *GeoCom imaging* key in order to transfer images from the TS11i or TS15i to MobileMatriX.
- In order to configure GSI output and GeoCom remote control on the TS1x at the same time, you need a FW > 3.0.

3.1.2 Survey Data Synchronization SQL Express including GNSS data

3.1.3 Supported operating systems

- Windows XP (32-bit)
- Windows Vista (32-bit)
- Windows 7 (32-bit)

3.1.4 Improvements

- In some cases, the antenna height was not applied correctly when using NMEA GPS
- Multipoint feature got unlinked in specific workflow
- Error message appeared during startup if ESRI Survey Analyst extension is installed
- To simplify, a redesign of transformation page in Survey Project properties was made.
- Improved RINEX import
- Improvements in Post-Processing kernel

- Support of GIS servers, such as WMS
- Survey Object reports supports now also if one is logged in with User account

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3.3 Important Notes

- Leica MobileMatriX can only be installed and licensed successfully if the user is logged in as Administrator or with Administrator rights.
- To support the GS10/15 with FW 3.0, it is required to install the Simulator v3.0. Please contact you local representative for further details.
- For Windows Server 2008, the 'Desktop Experience Component' has to be installed.
- To connect the Zeno 10/15 to your desktop, you have to install the CS/Zeno driver. The driver can be found on the Leica Zeno GIS DVD (e.g. D:\Common\CS Driver). Please select the suited driver for your operating system (Windows XP, Windows Vista, or Windows 7) and install, prior to connect the Zeno 10/15 to your desktop. *Please check the Zeno 10/Zeno 15 user manual for detailed steps on installing the USB drivers.*

3.4 Closing remark

The new Imaging support of Leica MobileMatriX is a great feature for all GIS based data collection. The surveyor can just transfer the image taken from the surveyed feature (e.g. tree) and directly store it in the GIS database.

Leica MobileMatriX – the complete ArcGIS integrated surveying solution.

4 About release 4.0

This release contains new instrument drivers to support the latest Leica Viva GNSS instruments as well as L1 and L1/L2 post-processing functionality and dbx import.

Leica MobileMatriX on ArcGIS Edition is updated to support the latest ESRI ArcGIS version 9.3.1 and is able to run on Microsoft Windows XP, Vista and 7 (32-bit only). Please note MobileMatriX v4.0 only supports ArcGIS 9.3 and 9.3.1.

Leica MobileMatriX is also updated to support Microsoft Windows XP, Vista and 7 (32-bit only).

You can use MobileMatriX to post-process GNSS raw data collected with Zeno GIS, GPS1200 or Viva GNSS.

In addition, users can import now directly dbx files into the ArcGIS personal geodatabase measured with GPS1200, TPS1200 or Viva GNSS.

The new Leica MobileMatriX v4.0 can be obtained from your local Leica Selling Unit or Dealer free of charge for all customers with a valid Leica MobileMatriX Customer Care Package.

4.1 New feature of Leica MobileMatriX v4.0 at a glance

4.1.1 Support of ESRI ArcGIS Service Packs and other functionality

- Supports ArcGIS 9.3.1

4.1.2 Supported operating systems

- Windows XP (32-bit)
- Windows Vista (32-bit)
- Windows 7 (32-bit)

4.1.3 Support of new Leica Viva GNSS

- New GNSS Viva simulator integrated to support the new GS10/GS15.

4.1.4 DBX Import

- Import Leica Total Station and GNSS measurements (via dbx import/export)
  – including feature codes & attributes collected with Leica Smartworx.

4.1.5 L1 and L1/L2 GNSS post-processing

The user can now log raw data with GPS1200 or Viva GNSS, download the raw files from the sensor and post-process the raw data in the same application, without having the need to use another application to perform this task.

In addition, as known from Leica Zeno Office, MobileMatriX also supports the new EasyIn/EasyOut workflows, to simultaneously:

- Check-in feature and GNSS raw data
- Automated download of Reference Data (from internet server or your local machine)
- Post-Process and
- Update feature vertices

... in one automated process with a Live DataViewer to see the progress and save the results. Please note, you can also post-process any data which was measured with Real-Time corrections in the field, while using EasyIn.

Furthermore, the EasyOut and EasyIn process ensures that GNSS data is collected in the format of the GIS or CAD data model, transferring the data into the GIS/CAD is quick and easy and transcription errors are eliminated.

4.2 Quick Start Tutorial

Together with Leica MobileMatriX v4.0 a new Quick Start tutorials is available. All Quick Start Tutorials are located on the Leica MobileMatriX v4.0 CD:

- **New Leica MobileMatriX V4.0 Quick Start Tutorial - Using GS10 and GS15.pdf**
- Leica MobileMatriX v4.0 First Steps
- Leica MobileMatriX v4.0 Instruction
- Leica MobileMatriX v4.0 Quick Start Tutorial – Fundamentals
- Leica MobileMatriX v4.0 Quick Start Tutorial - Data collection with GPS
- Leica MobileMatriX v4.0 Quick Start Tutorial - Data collection with TPS
- Leica MobileMatriX v4.0 Quick Start Tutorial - Stakeout
- Leica MobileMatriX v4.0 Quick Start Tutorial - Real Time Processing Option
- Leica MobileMatriX v4.0 Quick Start Tutorial – Leveling
- Leica MobileMatriX v4.0 Quick Start Tutorial - Orthogonal Survey & COGO Tools
- Leica MobileMatriX v4.0 Quick Start Tutorial - Using Disto plus_A6
- Leica MobileMatriX v4.0 Quick Start Tutorial - Laser Rangefinder
- Leica MobileMatriX v4.0 Quick Start Tutorial – Distributed Geodatabase
- Leica MobileMatriX v4.0 ArcGIS QuickGuide

4.3 Active Customer Care

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Leica Geosystems customers benefit from our service and support that spans time zones and geography. Our Active Customer Care program provides customer packages to suit your needs, whether you use our simplest distance measuring device or the most sophisticated integrated solution. Active Customer Care is a true partnership, and it's our commitment to provide the highest level of support and collaboration that our customers have come to expect when you put your trust in Leica Geosystems.

4.4 Important Notes

- Leica MobileMatriX can only be installed and licensed successfully if the user is logged in as Administrator or with Administrator rights.
- Leica MobileMatriX on ArcGIS only ArcGIS supports ArcGIS 9.3 and ArcGIS 9.3.1.
- For Windows Server 2008, the 'Desktop Experience Component' has to be installed.
- To connect the Zeno 10/15 to your desktop, you have to install the CS/Zeno driver. The driver can be found on the Leica Zeno GIS DVD (e.g. D:\Common\CS Driver). Please select the suited driver for your operating system (Windows XP, Windows Vista, or Windows 7) and install, prior to connect the Zeno 10/15 to your desktop. *Please check the Zeno 10/Zeno 15 user manual for detailed steps on installing the USB drivers.*

4.5 Closing remark

Leica MobileMatriX removes any complexity in transferring the data and the post-processing the data back in the office - data integration between field crews and GIS database, CAD files and raster data has become extremely simple.

Leica MobileMatriX – the complete ArcGIS integrated surveying solution.

5 About release 3.1

Leica MobileMatriX v3.1 further continues to be the number one choice for multi-sensor mobile GIS solution. This release contains new instrument drivers to support the latest Leica Geosystems TPS and GNSS instruments. Using Leica GPS1200+ the GNSS systems GPS (includ-

ing L5), GLONASS, Galileo and Compass are supported. This allows to track all satellites today and tomorrow to ensure maximum performance in the field.

Leica MobileMatriX on ArcGIS Edition is updated to support the latest ESRI ArcGIS version 9.3 and is able to run on Microsoft Vista. Therefore organizations can use the latest ESRI software versions in the field and the office to ensure maximum compatibility and dataflow improvement when using Distributed Geodatabase functionality.

The same system is used in the field and in the office. This allows to access all necessary data directly in the field using the known ESRI ArcGIS environment and tools. Therefore the job can be finished directly in the 'mobile office' and later transferred to the office system. This reduces office work to a minimum. The system concept allows the user to perform QA/QC directly in the field and in real time. This prevents 'bad surprises' when reviewing the results in the office and makes time consuming and expensive site revisits unnecessary. As all work is done in one system only, the learning curve of new users is very fast.

The Leica MobileMatriX key features can be summarized like following:

- **In the field QA/QC** of the gathered information, resulting in "high integrity data" which can be migrated back into an enterprise database.
- Feature are mapped and recorded in the field live and in **real-time**.
- Raster data (such as Orthophotos) and vector data (such as CAD drawings or As-builts) can be used as **background** maps in a mobile computer for orientation and navigation purposes.
- **Multi-sensor GIS** supporting a wide range of sensors like GNSS, TPS, levels, laser distancemeters and laser rangefinders, digital cameras
- **Ease of use** and fast learning curve

The new Leica MobileMatriX v3.1 can be obtained from your local Leica Selling Unit or Dealer free of charge for all customers with a valid Leica MobileMatriX Customer Care Package.

5.1 New feature of Leica MobileMatriX v3.1 at a glance

5.1.1 Support of ESRI ArcGIS Service Packs and other functionality

- Supports ArcGIS 9.3
- Supports ArcGIS 9.3 SP1
- Supports SQL Server Express for Personal SDE together with ArcGIS 9.2 and 9.3

5.1.2 Supported operating systems

- Leica MobileMatriX on ArcGIS running on ESRI ArcGIS 9.3 supports Microsoft Windows Vista

5.1.3 Improvement in working with TPS and GPS

- New TPS driver supports the instruments TS02, TS06 and TS09 of the Leica FlexLine series
- New GPS driver supports the instruments GX1210+, GX1210+ GNSS, GX1220 and GX1230 of the GPS1200+ series. Using Leica GPS1200+ the GNSS systems GPS (including L5), GLONASS, Galileo and Compass are supported.
- New GPS simulator v7.0 integrated to support the new SmartAntenna ATX1230+ GNSS of the GPS1200+ series. Using Leica GPS1200+ the GNSS systems GPS (including L5), GLONASS, Galileo and Compass are supported.

5.1.4 Other improvements and bug fixes

- Since v3.0 the Project wizard supports the import of map document and project schema. Now, the coordinate system can be changed during import as well to ensure fast and easy project creation independent of the working area.

Bug fixes:

- Move TPS to map location: Rod Height was not considered
- Only part of Survey Points where checked out when survey project was locked
- It was not possible to change attribute fields of feature classes in the new project manager when using map template to create a new project
- Coordinate Manager graphic view: It was not possible to switch on/off coordinates in special case
- Unchecked coordinate cannot be activated anymore in coordinate manager in special case
- Orthogonal survey report didn't include all data
- Tacheometry report: some data was missing
- Stakeout report on enterprise db didn't showed staked points
- Point quality was missing in Survey Point report
- Height was assigned to survey point after compute free station only

- ATX1230 didn't work with General Dynamics Duo-Touch Tablet PC
- Link Lines where not created, if linked feature classes where defined later

5.2 Quick Start Tutorial

Together with Leica MobileMatriX v3.1 a broad range of different Quick Start tutorials are available. All Quick Start Tutorials are located on the Leica MobileMatriX v3.1 CD:

- Leica MobileMatriX V3.1 First Steps
- Leica MobileMatriX V3.1 Instruction
- Leica MobileMatriX V3.1 Quick Start Tutorial – Fundamentals
- Leica MobileMatriX V3.1 Quick Start Tutorial - Data collection with GPS
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5.4 Comments

A new version of the GPS Simulator will be installed with the installation of Leica MobileMatriX v3.1. Due to that, all Real-Time Processing Option users need to set the antenna type (ATX1230 or ATX1230GG) and moving height (0.000m) again after installation. Please note there is also a message box indicating this procedure.

5.5 Installation

The following Microsoft® Windows™ operating systems are supported and recommended:

Operating System
Windows Vista (on ArcGIS 9.3 only)
Windows XP
Windows XP TabletPC Edition
Microsoft Windows 2000 SP 3

Important Note:

- Windows Vista is not supported in MobileMatriX Standard and Professional Edition.
- Leica MobileMatriX can only be installed and licensed successfully if the user is logged in as Administrator or with Administrator rights.

5.6 Closing remark

Leica MobileMatriX v3.1 is the complete package for surveyors working in a GIS environment. Data collection and maintenance tasks can be performed with a broad range of different sensors – in real-time or using post-processing. The data flow from office to field and back is performed with a standardized, efficient and reliable workflow which includes the combination of features and survey data. This allows analysis of all data together in one system and makes it easy for organizations to maintain and improve their data over time.

Leica MobileMatriX – the complete ArcGIS integrated surveying solution.

6 About release 3.0

The theme of the new release of Leica MobileMatriX is mainly: "Surveying in a GIS world" or better expressed "Finding the convergence between mobile GIS data collection in the field and enterprise GIS in the office". The new Leica MobileMatriX v3.0 can be obtained from your local Leica Selling Unit or Dealer free of charge for all customers with a valid Leica MobileMatriX Customer Care Package.

In the field, mobile GIS is mainly about the convergence of different technologies (Total Stations, GNSS, Level, ...) where field solutions are specially designed to met the needs of surveyors and other field crews. Back in the office GIS professionals need tools and processes to bridge the gap between different professions in order to work with data coming from these professions, and finally converting them into an enterprise database. Leica MobileMatriX v3.0 is all about shortening the distance between the office and the field and integrating different views for a seamless workflow. Leica MobileMatriX is the core element in such a convergence – a technology that has revolutionized field operations into field to office processes.

The most challenging aspect of the current GIS/Survey concept is **data integration**. Data integrity is vital because initial data acquisition/maintenance can be a time-consuming processes; however these are central to the core mission of many organizations (e.g. cadastral administration, infrastructure and utility management). Without current and accurate high quality data, many geoprocessing operations are ineffecient! An up-to-date management methodology is essential to improve the quality of data, resulting in less redundant data collection and also eliminating errors caused by transcribing survey data. This functionality (along with the ability to edit feature and attribute data) means that there are also fewer trips back to the field to recollect or update the same features.

Determination of the position, navigation, attribute and geometry recording are the primary drivers in mobile GIS applications. Field operators can locate and navigate to any feature stored in the GIS database and update it according to the actual conditions, thus enabling field personal to collect "high integrity data" for advanced business decisions later in the analysis portion of the project. Mobile GIS is one of the key areas where GIS users can **gain** a **major advantage** in **the dataflow** process, and most importantly in **Data Quality**. Leica MobileMatriX is a mobile field application that converges into a Multi-Sensor GIS. Not only does it combine GPS, Total Stations, Laser Rangefinders, Levels, **Imagery** and other instrumentations into a **single software application**, but also you to import a wide array of spatial data formats into one workspace.

- **GPS** is used to determine accurate positions, to navigate, and locate features in the field. Other sensors, such as TPS and Level are used to complement the GPS and enhance the tools available for field crews.
- While GPS is the most common sensor used for GIS data collection, other devices may also be used to extend the circumstances in which survey grade

data can be acquired. For instance, GPS has limitations in urban canyons or forested areas because the view of the satellites is compromised. By using **Total Stations** to provide distances and angles, users can work with their mobile GIS in any sort of environment. Enabling the surveyor to use any tool he requires for his work supports the further integration of surveying and GIS. By combining surveying and GIS applications with GPS, total stations, **laser distance meters**, **laser rangefinders** and other sensors, the advantages of this technology become far reaching. Imagine the use of additional sensors such as **echo sounders** (in combination with a GPS) to perform hydrographical surveys and collect a wide variety of different information directly in a GIS. You can monitor the sole or compute the aggradations of a river, power dam, or the littoral. The information about sediment deposit in rivers and lakes can be very important for the energy industry (GIS, fabrication, and construction).

- **In the field QA/QC** of the gathered information, resulting in "high integrity data" which can be migrated back into an enterprise database.
- Feature are mapped and recorded in the field live and in real-time.
- Raster data (such as Orthophotos) and vector data (such as CAD drawings or As-builts) can be used as **background** maps in a mobile computer for orientation and navigation purposes.

Working with such a toolset enables the Leica MobileMatriX user to store quality information together with feature data. This can be helpful when answering questions like: **What does Data Quality mean? Where does it start, how does it help me to improve my GIS data?** And finally, **what confidence level does the surveyor have with the GIS data collected?**

In recent years, surveyors have begun feeling pressure to take on various GIS functions in addition to their traditional services. This trend has several important implications for the GIS community. Generally speaking, GIS data created from survey features are known for **reliability** (because of accuracy and the source from which it was generated), and is often sought after in high-level data analysis. With this concept in mind, the integration of GIS and surveying is important for both professions. In recent years the use of GIS as a tool for municipalities, utilities, and engineers has become common, and many are eager to increase the accuracy of their projects. It is also important to note that today most GIS are centralized and moving towards an enterprise design, rather than being used as a cartographic tool like CAD. Nevertheless, Surveying and GIS are becoming natural partners just as GPS and GIS did in the past. Survey data and its **perceived accuracy** provide the basis for most GIS, hence GIS often contains the necessary information onto which cadastral, topographic, hydrographical and utility surveys are referenced. In the past, the surveyor didn't trust the data in a GIS (potentially the quality and data source was unknown). In the present, data collected by surveyors will potentially be split in the office into a survey measurement part and a feature part. The survey measurement is stored in a file or a separate survey database and the

feature is going into the GIS database, mostly without any indication of data quality. Leica MobileMatriX' new survey data synchronisation capability solves this problem, and at any time the survey and feature data can be stored in one enterprise database. What would happen if a GIS was enabled to store true survey data (measurements, quality, history, etc), would surveyors then trust GIS? It is more likely using this method that the two disciplines could work seamlessly together on a common platform.

The example above only describes in part what is possible with Leica MobileMatriX. Utility personal, military personnel, surveyors and other geospatial professionals could all benefit from using Leica MobileMatriX in their daily professional mapping projects.

6.1 New feature of Leica MobileMatriX v3.0 at a glance

6.1.1 Survey Data synchronization and versioning for survey data

- *Please note that it is recommended to work with only one Survey Data-set per database.*

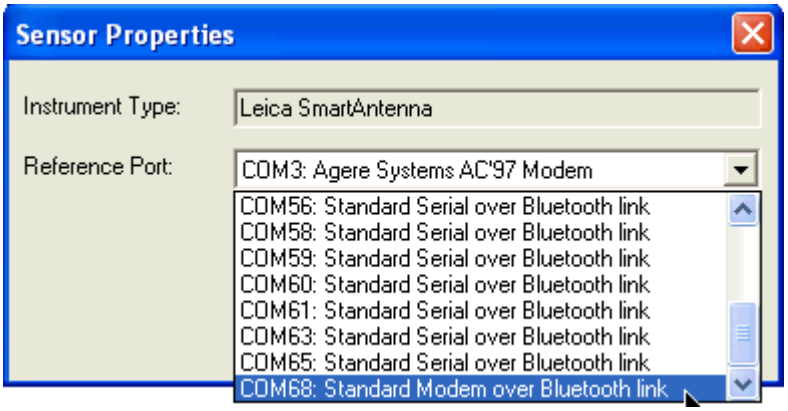
6.1.2 Support of ESRI ArcGIS Service Packs and other functionality

- Supports ArcGIS 9.2 SP5
- Supports SQL Server Express for Personal SDE together with ArcGIS 9.2

6.1.3 Improvement in working with TPS and GPS

- The **Toggle TPS/GPS** Instrument button allows connecting both TPS and GPS sensors to Leica MobileMatriX at the same time. Having TPS and GPS sensors available at all times ensures every point can be measured with the appropriate tool. When GPS is restricted by overhead obstructions... use TPS; when no TPS line-of-sight is available... use GPS. With this function, Leica MobileMatriX supports the Leica SmartPole. This saves time in the field because you can simply begin the survey and create your initial setup "On-the-Fly". Once the TPS orientation and coordinates are known (from GPS), just re-compute and all measured points are automatically updated.
- Automatic selection of last active TPS setup. This method can be used if the current computation is not a TPS computation and MobileMatriX receives a measurement from a TPS. The last used TPS computation is set to active automatically, when a TPS measurement is released and no TPS computation was active (e.g. due to combination TPS and COGO).

- Dial-up Networking ports can be used as reference ports. Before they didn't appear in the Reference Port combo box of the Sensor Properties dialog.



- 'Freeze' bug fixed. Connected to a GPS sensor (GX1230), sometimes the unit cannot compute a position, but still tracks satellites. In MobileMatriX, the GPS position stays at the last received GPS position and is no longer updated and taking measurements is still possible. This is now fixed in v3.0.
- Support of Open Traverse. From now on it is possible to compute open traverses in Leica MobileMatriX.
- GPS Measure Tool allows the user to control single and multiple GPS observations via a shortcut, which can be assigned to a Tablet PC function key.
- New GPS simulator integration, improving the performance when working with GLONASS.
- Move TPS to map location now considers z values.

6.1.4 Support of digital Bluetooth cameras (e.g. in mobile phone)

- The Leica MobileMatriX digital camera function supports the direct transfer of digital imagery from a Bluetooth enabled digital camera to your Tablet PC. The image is stored and the link to the corresponding feature is created automatically (when following the common procedure for attribute collection). All Bluetooth enabled cameras (supporting **OBEX push**), such as mobile phones are supported, with additional cameras (such as WiFi cameras) to be supported on request.

Supported Bluetooth driver:

- Microsoft
- WIDCOMM
- BlueSoleil (v2.3 or higher)

There are three different options, to store images for your features:

- Store the image with dynamic hyperlinks
- Store the image with field-based hyperlinks
- Store the image in the feature classes raster field

Store the image with dynamic hyperlinks

With this type of hyperlink, the image is linked to a particular feature automatically. This works without a field to supply the image names. The names of the images are stored automatically with the layer in your map. They are also stored with the layer if you save the layer to a file. You can define any number of dynamic hyperlinks for a feature. If more than one hyperlink is defined for a feature, when the feature is clicked with the Hyperlink tool, a dialog box will appear from which the desired hyperlink can be selected. The Hyperlink Base setting has no effect on dynamic hyperlinks.

1. Make sure that Bluetooth on your camera and Tablet PC is switched on.
2. Specify the feature to which you want to add the image. You have two possibilities:
   a) In the Survey Features tab, select the survey feature to which you want to add the image (new feature before finish).
   b) Select the feature in the map to which you want to add the image (already existing feature).
3. Take the image of the object in real-world.
4. Send the image via Bluetooth to your computer. Please refer to your device documentation on how to connect to a computer and how to send an image.
5. After the successful transfer, the hyperlink is created automatically and stored in the layer.
6. To show the image in the map, click on the feature using the hyperlink tool, which can be found on the Tools toolbar.

Store the image with field-based hyperlinks

With this type of hyperlink, the image is specified for each feature in a field within the layer's attribute table. The values of the field that you choose to provide image hyperlinks can include the full path to the target image.

Alternatively, the value may just contain the name of the target image, and you can use the Hyperlink Base property to specify the path where the target can be found. The Hyperlink Base property is specified using Document Properties in the File menu. Using this property makes it easier to manage hyperlinks; if the location of the images changes, you can simply edit this setting instead of having to edit each value of the field providing the hyperlink targets.

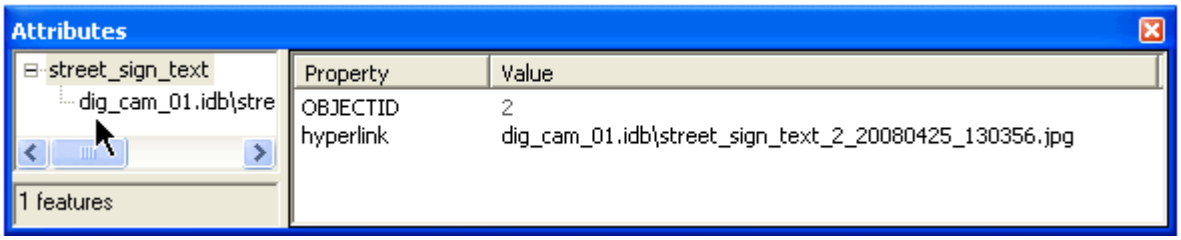
1. Make sure that Bluetooth on your camera and Tablet PC is switched on.

2. Specify the feature to which you want to add the image. You have two possibilities:
   a) In the Survey Features tab, select the survey feature to which you want to add the image (new feature before finish).
   b) Select the feature in the map to which you want to add the image (already existing feature).

3. Take the image of the object in real-world.

4. Send the image via Bluetooth to your computer. Please refer to your device documentation, how to connect to a computer and how to send an image.

5. After the successful transfer, the hyperlink is created automatically and stored in the attribute table.



6. To show the image in the map, click on the feature using the hyperlink tool, which can be found on the Tools toolbar.

Store the image in the feature classes raster field

Using this method, the image will be stored in a raster field of the feature class directly in the Geodatabase. A Hyperlink as described above will be store anyway. This method is recommended if the data later will be checked-in to a enterprise database. The images will automatically participate in a check-in process. Please note that the corresponding feature class needs to contain a raster field.

1. Make sure that Bluetooth on your camera and Tablet PC is switched on.

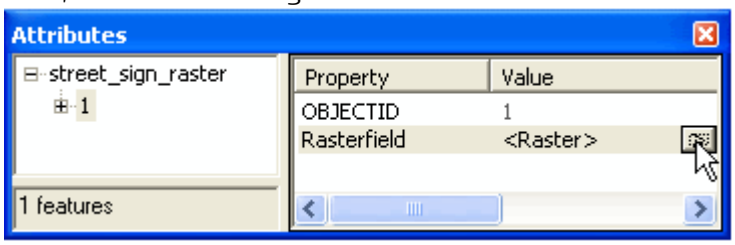
2. Specify the feature to which you want to add the image. You have two possibilities:
   a) In the Survey Features tab, select the survey feature to which you want to add the image (new feature before finish).
   b) Select the feature in the map to which you want to add the image (already existing feature).

3. Take the image of the object in real-world.

4. Send the image via Bluetooth to your computer. Please refer to your device documentation on how to connect to a computer and how to send an image.

5. After the successful transfer, the image is stored in the Geodatabase.

6. To show the picture, open the attributes dialog and click on the raster field, then on the image button.



7. Click on the image to show it in a larger window with zoom and pan functionality.

8. Additionally, a hyperlink is created automatically (either field-based or dynamic) dependent on the hyperlink settings.

9. To show the image via hyperlink click on the feature using the hyperlink tool, this can be found on the Tools toolbar.

6.1.5 Other improvements

- Installation improvements when installing with different users.
- Software update notification – the user is automatically informed about new versions available for Leica MobileMatriX (internet connection required).
- New Vectronix Laser Rangefinder driver now supports Vector 1500, Vector IV, Vector 21, Vector Nite and Vector 23.
- License Manager starts in the Leica MobileMatriX OEM Editions automatically after successful installation; in the Leica MobileMatriX on ArcGIS Edition it is only checked automatically if the product is licensed.
- Toggle button  between **Survey** and **Stakeout** Mode on the Leica MobileMatriX toolbar. From now on it is much easier to switch between survey and stakeout mode by simply pressing the toggle button.
- Resizing of Survey Explorer and new Survey Feature dialog.
- Improvement of delete survey objects. In this release, dependencies are considered.
- New **Project wizard** supports import of map document and project schema.

6.2 Active Customer Care

A powerful and competent worldwide service and support network backs up Leica MobileMatriX.

Leica Geosystems customers benefit from our service and support that spans time zones and geography. Our Active Customer Care program provides customer packages to suit your needs, whether you use our simplest distance measuring device or the most sophisticated integrated solution. Active Customer Care is a true partnership, and it's our commitment to provide the highest level of support and collaboration that our customers have come to expect when you put your trust in Leica Geosystems.

6.3 Comments

A new version of the GPS Simulator will be installed with the installation of Leica MobileMatriX v3.0. Due to that, all Real-Time Processing Option users need to set the antenna type (ATX1230 or ATX1230GG) and moving height (0.000m) again after installation. Please note there is also a message box indicating this procedure.

The databases you created with a version prior to 3.0 will not compatible with this release and need to be converted. Please backup the old database before using the "Upgrade Survey Dataset" command. When starting a project which contains an old survey dataset, Leica MobileMatriX asks to automatically upgrade the survey dataset to the latest version.

It is recommended to use the synchronization of survey data with Microsoft SQL Server and SQL Server Express.

6.4 Installation

The following Microsoft® Windows™ operating systems are supported and recommended:

Operating System
Windows XP
Windows XP TabletPC Edition
Microsoft Windows 2000 SP 3

Important Note: Leica MobileMatriX can only be installed and licensed successfully if the user is logged in as Administrator or with Administrator rights.

6.5 Closing remark

Leica MobileMatriX v3.0 introduces a new and improved workflow for surveyors working in the GIS industry. Data integration between field crews and an enterprise database has become increasingly complex with new data models, vector/raster datasets, and integrating data from other sources (like CAD). Leica MobileMatriX v3.0 is designed to fill this gap and to provide a smoother workflow between field and enterprise GIS. It must be in the **interest** of the GIS Manager to know the source of all the data within the system in addition to the accuracy was collected at, in order to improve workflow efficiency and production. Today **sub-contractors** providing survey deliverables for enterprise enabled GIS clients usually deliver CAD or raw data. The focus of the contractor should be to integrate the delivered data into the GIS database. Here a paradigm shift could improve the quality of the data delivered by the contractor if using Leica MobileMatriX. With Leica MobileMatriX he receives a version of the GIS database from the client and returns the database ready to check back into (including all updates) the enterprise system. Current projects show time/cost savings of up to and above 30-50%.

In general, the problem with data quality is that it's not always obvious if there are errors. People can neither see nor touch data quality, but nevertheless it is always there. Surveyors or project mangers often realize the quality of their data is poor after the collection process has been complete. For example, utility projects having problems with putting new pipes under ground or managing stormwater infrastructure and often realize that the cause (or at least part of the problem) has to do with the data – bad accuracy, unknown quality and/or not up-to-date. This is just one of many examples where people realize too late why data quality really matters. The often touted excuse about why data quality isn't important is: **cost**. One project manager stated: The question is not: ***"What does data quality cost us? It's not the cost of investing 1000 USD today collecting the data, it's realizing within the current budget year that we need more accurate data or more data collected (such as additional attributes and not just feature geometry) and now we cannot complete the project as planned."*** Think about the consequences and the resulting costs. Or think about investing 100,000 USD in equipping your survey crew with total stations to survey the ground work in CAD, then taking that data on a cheap PDA and coupling it with some consumer grade GPS to collect the so called GIS data? Later you want to merge survey-grade results and the consumer-grade GPS data into one project making it seamless. What is the cost of that, or is even possible? Would it not be more effective to work directly in one project, and have the ability to store all the data in one workspace? Even if you work with consumer-grade GPS, knowing the level of accuracy that comes with it and storing it directly within the feature. Later you will at least know what feature has 1cm accuracy and what has 5 m. With MobileMatriX you can choose at any time the right tool from your toolbox – either Total Station, GIS-grade GPS, Level etc and use it for your daily work. The high **return on investment** (ROI) of Leica MobileMatriX is in large part due to improved processes and dataflow, improved data quality, awareness of the data quality, and a wide toolbox for the field crews (within a single application you can work with a variety of sensors).

7 About release 2.1

When working with Leica's GPS1200 receivers and antennas, Leica MobileMatriX v2.1 now has the option to log raw GNSS data (including code and carrier phase measurements). This is available in addition to the GPS Real Time Processing Option. Using Leica Geo Office, raw data can be post-processed against other GNSS sources. This can be a second Leica GPS receiver, a reference station, or CORSs (Continually Operating Reference Stations) available throughout the whole world. One of the major advantages of the GNSS post-processing is that it is generally the most reliable and cheapest method of performing high-accurate GNSS surveys. To post-process survey data, it is necessary to have a post-processing software but the corrections are often available free of charge. Simple as that, GPS raw data is logged, then taken back to the office and processed. The measured features can then easily be transformed to new, corrected locations.

Real-time corrections for GNSS (RTK GNSS) provide major advantages on navigation and stake-out, the verification of spatial data directly in the field and effective data collection. But there are places in the world that don't have reliable real-time services, and in those regions the user requires better accuracy than can be achieved from navigated solutions alone. Second, not all field data collection tasks require data to be collected using RTK GNSS. Post-processing techniques are often essential to ensure that a feature's position can be defined to the required accuracy level. For example, a stormwater mapping project may require all data to have cm level accuracy. However, it may not be possible to have cm level accuracy in RTK all the time. By using raw data logging and post-processing techniques back in the office, field crews can focus on efficiently mapping as many stormwater structures as possible, without being concerned with real-time connections and accuracy results. Post-processing in the office will provide the required high levels of positional accuracy needed. It is also often required that raw data is logged for documentation tasks, even when receiving RTK corrections. Finally, post-processing allows you to re-process GNSS raw data several times. If post-processing the first time doesn't provide the expected results, you have the ability to re-process until you achieve the required level of accuracy.

When you can use post-processing:

- Where reliability is the main concern
- When real time accuracy is not so important
- When real-time correction services are not available
- When you have to store GPS raw data for documentation needs

In addition to the GNSS Raw Data storage and the ability to post-process GNSS data, the newest Leica MobileMatriX release focuses on workflow and quality improvements (an overview can be found in chapter Other improvements).

7.1 New features in Leica MobileMatriX v2.1

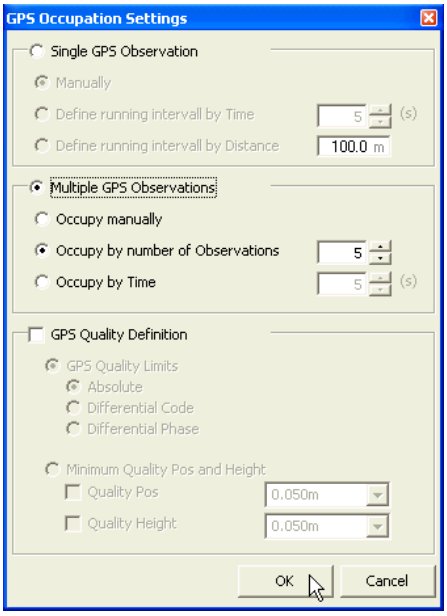
7.1.1 GNSS Raw Data logging

- GNSS Raw data logging for ATX1230, ATX1230 GG, ATX900, ATX900 GG, GX1230, GX1230 GG.

How to log GNSS Raw Data?

1. Connect to your GNSS antenna/receiver.

2. Click the 'Start Logging GPS Observations' button on the Leica GPS Tools toolbar to start the logging of GPS observations.

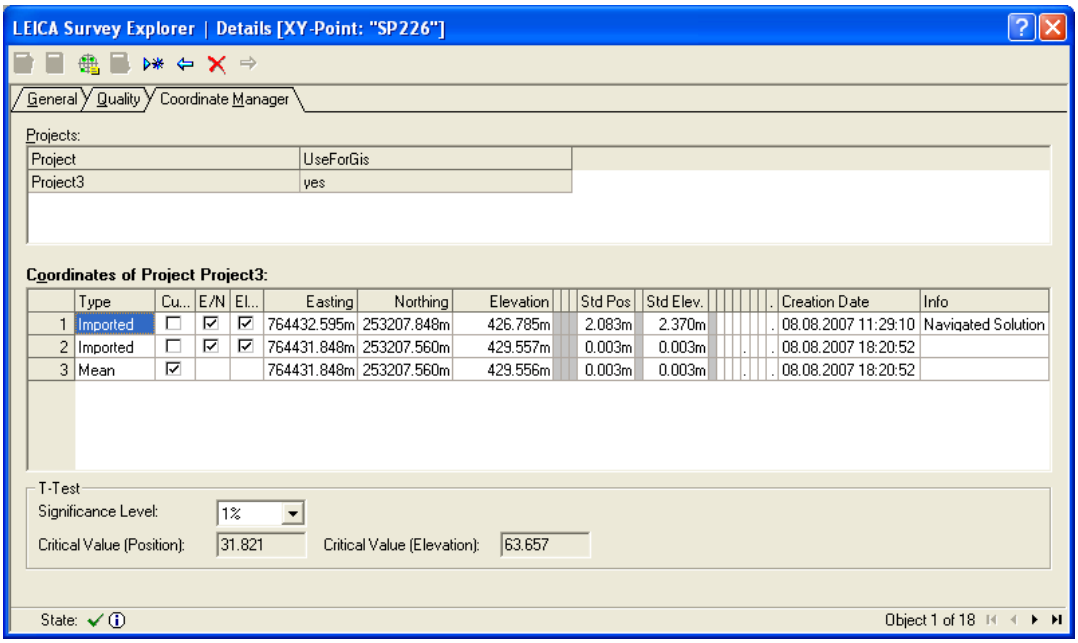


3. Set the antenna height in the GPS Status window.
4. GPS raw data logging is supported for multiple GPS observations only. Click the Settings... button on the GPS Status to access the GPS occupation settings. You have following options:
   - Occupy manually
   - Occupy by number of Observations
   - Occupy by Time
5. Measure your features in a common way. For more information, please refer to the Quick Start Tutorial 'Data collection with GPS'.
6. When you've measured all desired points, click the 'Stop Logging GPS Observations' button on the Leica GPS Tools toolbar. Please note, that you can stop GPS raw data logging during a survey session and restart it by clicking 'Start Logging GPS Observations'. This is also possible when completing a job at a later date.

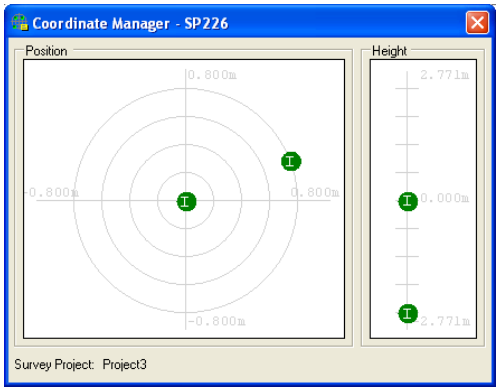
How to post-process GPS raw data?

For a post-processing application you can use Leica Geo Office (LGO). Please refer to LGO help to use the post-processing functionality.

After post-processing, the user can export the post-processed points (PointID matched with the points stored in MobileMatriX) in an ASCII file, which can then be imported in Leica MobileMatriX again. Leica MobileMatriX automatically averages the post-processed points with the existing points then creates an adjusted average.



The weighted mean is computed for position and elevation. Because of the big quality difference, the navigated coordinate doesn't affect the mean value. You can see this in the Coordinate Manager graphic view:

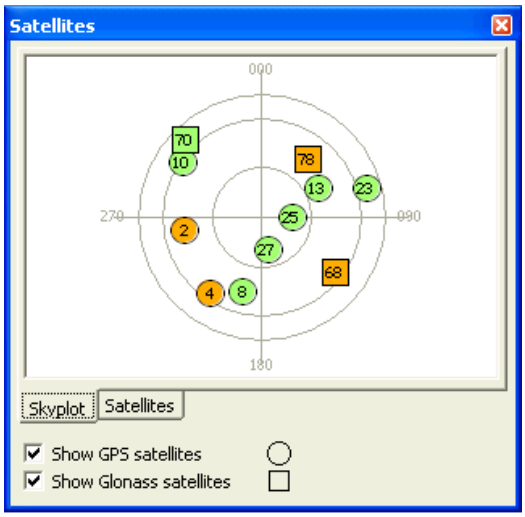


After the coordinates are averaged, the user can update/transform the uncorrected feature vertices to the corrected location.

7.1.2 Other improvements

- While importing survey points from ASCII files, the survey point now gets the date of the origin and not the one from import.

- When changing the Geoid and CSCS file, no restart of MobileMatriX is required anymore.
- It is now possible to do a 3D Free Station without entering an instrument height.
- The GNSS Skyplot now displays beside GPS/Glonass satellites.
- Reflector height changes automatically to 0 when switching measure mode from IR to RL. After switching back, the previously used reflector height is used again.
- Improvements in using the handwriting recognition functionality of Windows XP TabletPC Edition.



- Feature vertex symbol is now shown as linked if Height of Survey Point changes. This helps you to analyze which 3D feature needs to be updated in order to have the correct elevation stored.
- Leica MobileMatriX stops automatically when tracking by interval (time or distance) if the user opens the MobileMatriX Options dialog.
- No Error message appears when connecting to GTX1200 series.
- Furthermore, several improvements in performance are made while editing survey points.

7.2 New QuickStart Tutorial

In order to help you start working with the new GPS raw data logging functionality, an easy-to-use quick start tutorial is available:

- *Leica MobileMatriX v2.1 QuickStart Tutorial–GNSS Data Logging and Post-Processing.pdf*

7.3 Comments on Installation

It is not longer required to have Microsoft .NET Framework 1.1 installed when installing Leica MobileMatriX. The Microsoft .NET Framework 2.0 are sufficient.

Please Note:

- Leica MobileMatriX v2.1 works with Windows 2000, Windows XP, or XP TabletPC Edition. Leica MobileMatriX v2.1 doesn't support Windows Vista Operating System. To run the full functionality of Leica MobileMatriX, Internet Explorer 6.0 or higher is required.
- The Leica MobileMatriX v2.1 installation program will update the dongle drivers and will install (if required) the Microsoft .NET framework version 2.0.
- Under Windows 2000 or Windows XP (TabletPC edition) Leica MobileMatriX can only be installed successfully if the user is logged in as Administrator.
- If you install Leica MobileMatriX Standard or Professional Edition please note that no ArcGIS installation can run parallel with it. Prior to installing Leica MobileMatriX, please remove all installed ArcGIS components.
- If you install Leica MobileMatriX on ArcGIS Edition, an existing installation of ArcGIS 9.0 SP3, 9.1 or 9.2 and ESRI's .NET component (Version 2.0) is required on your computer; otherwise Leica MobileMatriX on ArcGIS will not be installed. Leica MobileMatriX on ArcGIS Edition comes with a separate installation CD.
- No serial or USB hardware key can be plugged in at the same time when starting Leica MobileMatriX.

7.4 Known Issue

Leica MobileMatriX Standard/Professional Edition and Microsoft IE7

Leica MobileMatriX Standard/Professional Edition v2.1 is not compatible with Microsoft Internet Explorer 7. Some functions such as Export Shape may cause a failure.

7.5 Closing remark

Leica MobileMatriX v2.1 introduces workflow improvements, bug fixes, and the ability to log GNSS raw data. Leica MobileMatriX not only provides the possibility to log raw GPS data, it also supports an easy way to post-process raw GPS data with LGO. Then you can import the post-processed points back into Leica MobileMatriX, updating the feature vertices to their accurate locations.

Post-processing is an effective method improving GNSS measured data when:

- You have to log GPS raw files for documentation tasks
- Real-time GPS isn't available or there are gaps when signal is not received
- Real-time correction isn't needed immediately
- Having a need of multiple time processing GPS raw-data

In many parts of the world real-time correction sources are not available, either because the infrastructure does not exist or because users are out of range geographically. Nevertheless, reference data for post-processing is often available for free download. Post-processing data also provides the most accurate and consistent GPS data of all and is beneficial for any application requiring reliable cm level accuracy.

To learn more about the Post-Processing, please read the *Leica MobileMatriX v2.1 QuickStart Tutorial – GNSS Data Logging and Post-Processing.*

8 About release 2.0

A short case study:

"We got the task to stake out some points, for pipes under the railroad track. We brought our SmartAntenna and TabletPC with Leica MobileMatriX and could easily explain to the company that was going to drill the hole under the railroad bank, where the best position where for the holes. We marked the positions and saved them in a project. A few days later the drilling company called - their drill had stuck, in rock or clay and they needed to find where it was, on the surface, in case they had to dig. With Leica MobileMatriX we could quickly analyse how to survey and display where the pipe should be "on the surface". With Leica MobileMatriX we could make a quick and accurate decision on the spot and easily explain to the drilling company what to expect." (Anders Freeman, Land Surveyor, Salem Municipality, Sweden)

As you can see from the case study above, today data acquisition, visualizing GIS and survey data directly in the field becomes more and more important. The combination of GIS and survey related tasks without a mobile field solution will be unthinkable. The integration of Leica MobileMatriX into ArcGIS work comfortable with all data they need daily in the field. Nowadays many surveyors collect and maintain GIS data and deliver those to utility companies, municipalities and many other organizations. The range of data collection spreads from data for traffic infrastructure, over utilities and water cadastre to architects and construction companies. The collected data are used to construct a building or road, or to maintain the GIS database of bigger utility company or national mapping agency.

The ability to work with datasets from the enterprise database anywhere at any time provides the mobile decision makers with the resources that make them just as knowledge-enabled as their colleagues in the office. Knowledge-enabling the entire workforce speeds up the dissemination and distribution of information, allowing the mobile workforce to remain independent and flexible, which results in less down time and faster results. Solutions are reached with more efficiency, but just as reliably.

8.1 QuickStart Tutorial

Together with Leica MobileMatriX v2.0 a broad range of different QuickStart tutorials are available. All QuickStart Tutorials are located on the Leica MobileMatriX v2.0 CD:

- Leica MobileMatriX V2.0 Quick Start Tutorial – First Steps
- Leica MobileMatriX V2.0 Quick Start Tutorial – Fundamentals
- Leica MobileMatriX V2.0 Quick Start Tutorial - Using Disto plus_A6
- Leica MobileMatriX V2.0 Quick Start Tutorial - Stakeout
- Leica MobileMatriX V2.0 Quick Start Tutorial - Real Time Processing Option
- Leica MobileMatriX V2.0 Quick Start Tutorial - Orthogonal Survey & COGO Tools
- Leica MobileMatriX V2.0 Quick Start Tutorial – Leveling
- Leica MobileMatriX V2.0 Quick Start Tutorial - Laser Rangefinder
- Leica MobileMatriX V2.0 Quick Start Tutorial - Data collection with TPS
- Leica MobileMatriX V2.0 Quick Start Tutorial - Data collection with GPS
- Leica MobileMatriX V2.0 ArcGIS QuickGuide

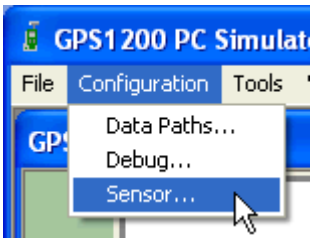
8.2 New tools

8.2.1 RTK Option now supports GPS/Glonass SmartAntennas

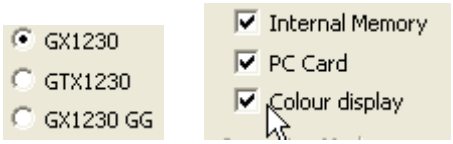
The **RTK Option** now supports **ATX1230 GG** antennas. Please note that it is not necessary to purchase the GG support for the RTK option. The user can now work with ATX1230 GG antenna in combination with Leica MobileMatriX. The RTK Option furthermore supports the **ATX900**.

In order to choose the correct sensor please start within Leica MobileMatriX the Simulator by pressing "Config" within the GPS Sensor Properties dialog.

1. The GPS1200 PC Simulator will be launched.
2. Click Configuration › Sensor...



3. Select either GX1230 when using a ATX1230 or GX1230 GG when using a ATX1230 GG. If desired you can switch to colour display. Then click OK.



4. Click ON to start the simulator.

8.2.2 Improvements in Leveling

- Tacheometry Leveling: foresight point gets automatically a coordinate
- Misclosure will be weighted distributed dependent on the measured target distances (same also applies for TPS Free Station and Tacheometry). With this new approach, for TPS measurements as well as for Level measurements all misclosures will now be distributed according to the measured target distances.

8.2.3 GPS and TPS enhancements

Support of CSCS files within Leica MobileMatriX

CSCS Models

Several countries have produced tables of conversion factors to directly convert between GPS measured coordinates given in WGS84 and the corresponding local mapping coordinates, taking the distortions of the mapping system into account. Using these tables it is possible to directly convert into the local grid system without having to calculate your own transformation parameters. Country Specific Coordinate System Models (CSCS Models) are an addition to an already defined coordinate system, which interpolates corrections in a grid file and applies the interpolated corrections. The extra step of applying these corrections can be made at different positions in the coordinate conversion process. Therefore different methods of CSCS Models are supported.

How to use CSCS files

1. Right-click the according Survey Project in the Data Manager tab and select Properties...
2. Change to the Project Settings tab.
3. Select the LEICA Global Positioning Data (GPS) survey package and click Settings...
4. Check the use CSCS file check box.
5. Browse for the desired CSCS file and click OK.

Support of Geoid files within Leica MobileMatriX

Geoid definition

A geoid is the particular equipotential surface which coincides with mean sea level, and which may be imagined to extend through the continents. This surface is everywhere perpendicular to the direction of the force of gravity.

Geoid Separation

The distance from the surface of the reference ellipsoid to the geoid measured outward along the normal to the ellipsoid.
Ellipsoidal height (h) = Orthometric height (H) + Geoid Separation (N)

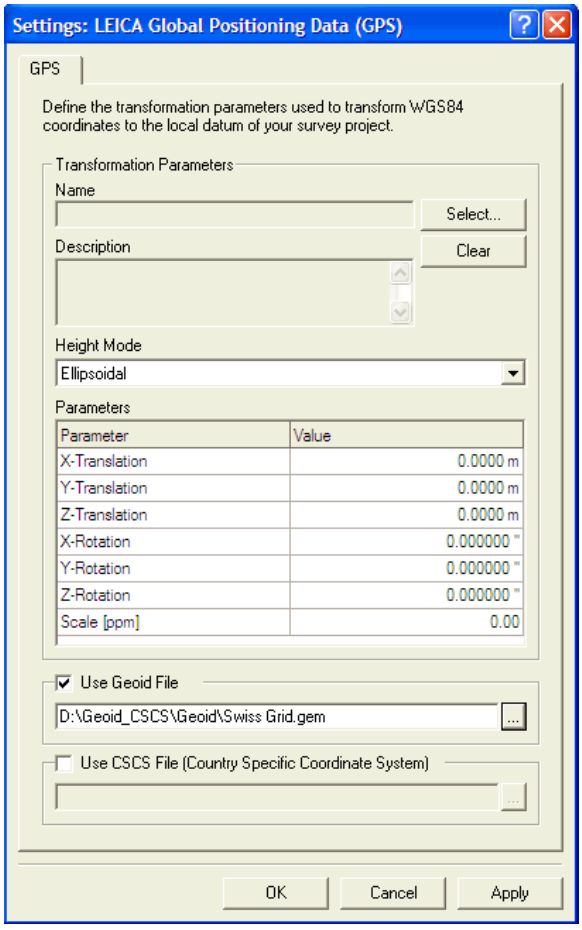
Geoid Models

The user can utilise a Geoid Model that is appropriate for the mapping area under consideration. An Ellipsoid is attached to the Geoid Model. It is the user's responsibility to obtain the model, which will be in the form of an executable computer program. Geoid Models can be defined for Geodetic or Grid Coordinates and refer to a particular Ellipsoid.

With a Geoid Model attached to a Coordinate System you can compute Geoid Separations of the Points in a Project. The Geoid Model replaces the requirement for you to manually input Geoid Separations for your points.

If Geoid Separations are available it enables you to switch between viewing Ellipsoidal and Orthometric heights. The relationship between Ellipsoid and Orthometric heights is given by:
Ellipsoidal Height (h) = Orthometric Height (H) + Geoid Separation (N)

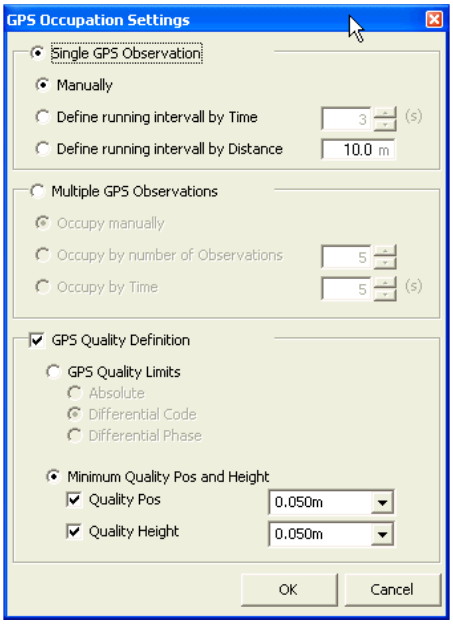
Geoid Models are always an approximation of the actual Geoid. In terms of accuracy, they may vary considerably and in particular global models should be used with care.



How to use geoid files

1. Right-click the according Survey Project in the Data Manager tab and select Properties...
2. Change to the Project Settings tab.

3. Select the LEICA Global Positioning Data (GPS) survey package and click Settings...
4. Select the measured height mode. **If you're measuring already orthometric heights, no geoid files can be used.** When measuring ellipsoidal heights, geoid files can be used.
5. Check the use geoid file check box.
6. Browse for the desired geoid file and click
7. OK.



GPS Occupation Interval by Distance

The GPS by Distance setting allows the user to measure continuous GPS observations by a defined distance interval. If you want to measure on a dam every 20m a position, select the Define running interval by Distance radio button, define the distance interval and start the continuous GPS measurement by clicking Measure in the GPS Status window.

Improved version of Simulator to work with ATX1230 and ATX900.

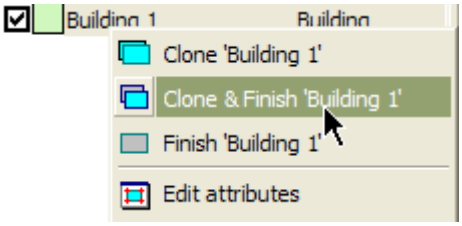
Mainly quality improvements are made in the new Simulator version of Leica MobileMatriX, furthermore it is now possible to work with coloured display in the Simulator.

8.2.4 Working with a Disto™

You can now use the DISTO™ A6 or DISTO™ plus together with any edit field within Leica MobileMatriX. The Leica DISTO™ A6 lets you operate with a typical measuring accuracy of ± 1.5mm from 0.05 to 200 m. The "DISTO™ transfer PC" software runs in the background and sends your measurement readings, directly to the active edit field in Leica MobileMatriX. Values such as COGO measurements, TPS Offset measurements or other distance measurements can easily be received wirelessly from the DISTO™. For details please see the Disto QuickStart Tutorial.

8.2.5 Improvements in Multiple Feature Editing

- *Clone&Finish*
  The Clone&Finish command is especially helpful when working with similar line and polygon feature.



By using Clone&Finish a feature with the same schema and of the same feature type will be generated and the existing will be closed – all within one command. This functionality further improves the usability of Leica MobileMatriX.

- *Attribute dialog always shows the active feature after cloning*
  Another major usability improvement is the possibility to keep the Attributes dialog open at any time open. From now on it is possible to simply click in the Survey Feature tab and the attributes of the active feature will be displayed without having the need of closing and re-opening the attributes dialog. This functionality improves attribute capturing with Leica MobileMatriX.

8.2.6 Further Improvements

- Auto de-activate setting for Multiple Feature Editing
- Enhanced Laser Rangefinder drivers

Vectronix Vector 4 BT (Bluetooth)

Leica LaserLocator

- Evaluation Version of Standard and Professional Edition now supports full Leica MobileMatriX functionality; only limited to 30 days run-time.
- Improvements while working with Multiple Survey Projects.
  From now on it is possible to work with the same coordinates in multiple projects. For example The user could have now the coordinates of his control points in one project and another project is used for the data capturing and 3rd project can be used to stakeout points.
- Leica MobileMatriX v2.0 now supports in the on ArcGIS Edition ArcGIS 9.2
  Please note that Leica MobileMatriX v2.0 doesn't support file-based Geodatabases.
- Support of the Microsoft .NET 2.0 framework

8.3 What's new in ArcGIS 9.2?

- Support for Metadata ISO 19139
- Direct read of Microsoft Excel files
- Support for OGC GML Simple Features data

- Additions to the core geodatabase data model

Terrain support (i.e., TINs stored and managed within the geodatabase)

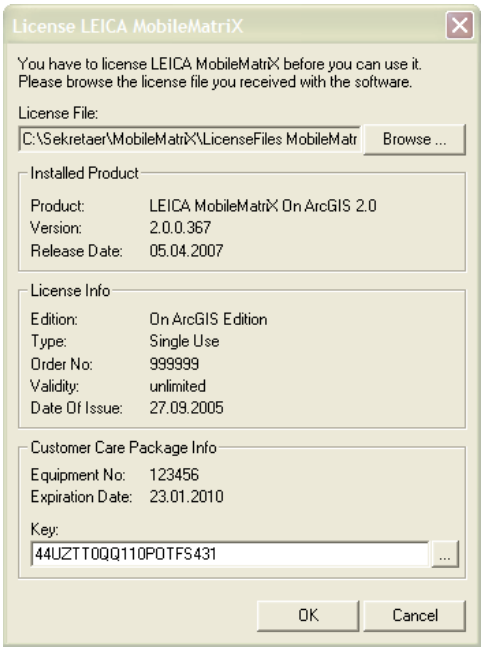
High-precision coordinate storage for enhanced precision

- Improved raster management
- Improved transaction management
- Geodatabase replication between systems
- Geodatabase history to record and display changes over time
- Georeferencing toolbar that allows users to move, rotate, and scale CAD files using the mouse; create control points; and so forth
- Full support for TrueType fonts
- Improved CAD text and symbology

Please be aware that the Leica MobileMatriX Standard/Professional Editions are based on ArcGIS 9.0 SP3.

8.4 COMMENTS ON INSTALLATION

8.4.1 Leica MobileMatriX Customer Care Packages (CCP)



Note that Leica MobileMatriX v2.0 can only be executed, if you have a valid maintenance licence with an expiry date beyond the release date of version 2.0.

When starting the software you will need to register your licence. This only needs to be done once.

In Licence Manager enter the CCP key, which is delivered with your Leica MobileMatriX CD. Enter the licence key or browse to the key file. Press OK to activate the CCP key on your computer and to start Leica MobileMatriX.

After registering your Leica MobileMatriX software maintenance licence all new versions of Leica MobileMatriX, which will be released before the expiry date of your licence can be installed and executed.

Within Leica MobileMatriX you can check the expiry date of your maintenance in the About Box. There you can also register a new CCP key, if you need to extend your maintenance. Please contact your Leica representative for details.

Please read Leica Geosystems Software License Agreement carefully:

http://www.Leica-geosystems.com/corporate/en/ndef/lgs_3295.htm

Please Note:

- Leica MobileMatriX v2.0 is running under Windows 2000 or Windows XP or XP TabletPC Edition. Leica MobileMatriX v2.0 doesn't support Windows Vista Operating System. To run the full functionality of Leica MobileMatriX Internet Explorer 6.0 or higher is required.
- The Leica MobileMatriX v2.0 installation program will update the dongle drivers and will install – if required - the Microsoft .NET framework version 2.0.
- Under Windows 2000 or Windows XP (TabletPC edition) Leica MobileMatriX can only be installed successfully if the user is logged in as Administrator.
- If you install Leica MobileMatriX Standard or Professional Edition please regard, that no ArcGIS installation can run parallel with Leica MobileMatriX. Prior to install Leica MobileMatriX please remove all installed ArcGIS components.

- If you install Leica MobileMatriX on ArcGIS Edition, an existing installation of ArcGIS 9.0 SP3, 9.1 or 9.2 and ESRI's .NET component (Version 2.0) is required on your computer; otherwise Leica MobileMatriX on ArcGIS will not be installed. Leica MobileMatriX on ArcGIS Edition comes with a separate installation CD.
- No serial and USB hardware key can be plugged in at the same time when starting Leica MobileMatriX.

8.5 Closing remark

Participating in the Leica Geosystems CCP program, provides a number of technology and business benefits to our customers. Keeping customers technology investment up-to-date with latest technology updates and software releases and simplifying their maintenance and support budgeting process with predictable annual program fees. The maintenance program can even be extended to a 3 years contract ensuring best possible investment secureness. Software updates are an important benefit of the maintenance program. If you participate in the Leica Software Maintenance Program and your maintenance subscription is current at the time the software update is released. This provides the latest software technology advantages, any new functionality, and productivity and usability improvement tools as well as any fixes or patches to the software. Furthermore, Leica's long-standing commitment to serving and responding to their customers is exemplified by the goals of our support services. To further utilize the full power of software a flexible and comprehensive support program is included in the Customer Care Packages.

GIS implementations provide various benefits, such as better resource management, better information management and accuracy (due to centralized databases), better decision making, and increased efficiency.

The combination of centralized GIS implementations and the extension of office database into the field (mobile GIS) adds further value to the user – some examples:

- **Field Assets.** For every GIS user, it is clear that all field assets are represented, stored and managed in an office database, which allows the analysis of these data. This clear benefit gets more attention with value added through mobile GIS: The adoption of mobile GIS enables organizations to manage not only slack assets but also reduce staff time and costs related to data collection and

maintenance of assets. Finally Leica MobileMatriX enables more staff to perform field data collection, improving the accuracy of data.

- **Data Reliability.** GIS are used to manage project information, and to make the information available in a network with accuracy, reliability and security. Although GIS tools require some time to be properly implemented, guarantees data reliability and integrity, and ensure that all professionals linked to the project will have quick access to updated projects information. The use of Leica MobileMatriX increases the data reliability and accuracy through daily data acquisition and maintenance in the field. Even more, spatial data analysis can be performed in the field, things such as "analyze before you dig" (see Use case in section 1).

- **Decision Making.** The increasing involvement of stakeholder groups in solving spatial decision problems has created a need for information technology capable of supporting collaborative spatial decision making. With Leica MobileMatriX stakeholder groups have the ability to make decisions where and whenever required. Better informed decisions can be made in the field when using Leica MobileMatriX, a fact that can significantly increase the value of your GIS.

- **Up-to-date data.** Organizations should revitalize their current data, with special emphasis on keeping the data up to date. Furthermore researchers need the most up-to-date information for planning and analyzing and billing. Mobile GIS user can ensure to keep information up-to-date and thus increasing the value, quality and depth of information of the enterprise GIS, especially compared to relative data acquisition techniques such as satellite imagery.

9 About release 1.51

For the past years, the GIS community has been wakening up to the pre-existing and continuing profession of surveying and mapping. "ALL GEOGRAPHIC TRUTH IN ANY MAP OR GIS CAN BE TRACED TO A SURVEYING AND MAPPING PROCESS". Leica Geosystems followed up this technology and trend from the early beginning.

LEICA MobileMatriX is a mobile GIS and survey solution for the integration of Surveying in GIS. It allows collecting, editing and visualizing GIS and survey data direct in the field as well as managing the data later in the office.

Mobile GIS is a natural expansion of the enterprise. It is part of the whole office system and environment. While wireless technology will increase the usability of mobile GIS in the future, it is not an essential component for the successful operation of mobile GIS now. The expansion of the enterprise allows the entire field crews of an organization to access data and analytical tools from anywhere at anytime. Decisions are made by those who need to make them when and where they need to. Not all decision makers are confined to an office environment.

Mobile GIS removes the need for intermediary paper-based recording. It is not unknown within organizations for modifications made on paper maps to never make it into a digital format, which means many changes to the real world are never reflected correctly within the enterprise. With mobile GIS, data is always in a digital format, making it easy and efficient to transfer from the field to the office without introducing interpretive errors. Checks and balances are still required, of course, but many of these can be automated so those carrying out the checks can focus on the real errors without the drudgery of filtering through large quantities of repetitive data. Data that is current and reliable results in less delays and faster solutions that are less prone to error.

The field device (TabletPC) is an integral component of the mobile GIS - it must be robust and based on industry standards (WLAN, Bluetooth, Microsoft, etc). Location information is central to the operation of mobile GIS. Reliable location definition ensures the efficient management and use of data - both in the field and between the field device and the office system. Mobile GIS GIS-enables the workforce with the tools and data they require – when and where they need it.

We are pleased to announce that from now on LEICA MobileMatriX supports the Level Measurements and Sensors.

Using the ***Level Option*** in Leica MobileMatriX one can measure accurate locations with GPS and in a second step one can update the less accurate height information with a level measured height. This "Height Modernization" is the start of the establishment of accurate, reliable heights using GPS in conjunction with traditional and highly accurate Levelling information in a GIS. Accurate and consistent height information serves as the basis for

- Improved transportation mapping systems,
- Sea level raise estimations,
- Floodplain, flood area and river basins mapping,
- Homeland Security and emergency prevention
- Storm surge modeling,
- Resource management,
- Regional and urban planning
- Erosion mapping
- Command & Control in military and public safety applications

With the Level Option you can also update the height of existing 3D feature. Use Tachy Level application to update the height with mm accuracy of existing feature and monuments.

Version 1.51, especially the newly released Level Option further improves the strengths and uniqueness of LEICA MobileMatriX as the new standard for Surveyors and GIS Professionals and adds new functionality to improve height information in a GIS.

9.1.1 Who uses LEICA MobileMatriX?

A LEICA MobileMatriX user is any person responsible for managing and collecting spatial information, making measurements either using TPS or GPS sensors in the field to create and update maps and plans, and is suitable for:

- Geodesy and Land Surveying
- Urban and Regional Mapping
- Utility market and Power Supply Industry
- Cadastral
- Public Safety & Homeland Security
- Forestry and geologic mapping
- Agricultural Mapping
- Archaeology
- Construction Industry
- Environmental Data collection
- Traffic Infrastructure

Figure 9.1: LEICA MobileMatriX user in the UT market segment

9.2 QuickStart Tutorial

Together with Leica MobileMatriX v1.51 a broad range of different QuickStart tutorials:

- Enabling a GDB working with LEICA MobileMatriX
- GIS Data Organization in Leica MobileMatriX
- Leica MobileMatriX Exploring TPS Computations
- Leica MobileMatriX Quick Start tutorial Levelling
- Leica MobileMatriX Quick Start tutorial Orthogonal Survey
- Leica MobileMatriX Quick Start Tutorial
- LEICA MobileMatriX v1.5 ArcGIS QuickGuide

All QuickStart Tutorials are located on the Leica MobileMatriX v1.51 CD.

9.3 New Level Option

The requirement to access information anywhere, anytime has never been stronger and will increase more and more within the next years. Professional users move towards mobile platforms to increase productivity through efficient information handling, resulting in cost reduction, as well as a fully integrated mobile workforces. Leica MobileMatriX, a mobile GIS - the natural expansion of the enterprise database into the field - allows the user to add points, measurements and features either using TPS (Total Stations), GPS (Global Positioning System), Level Instruments or other sensors (e.g. Laser Range Finder). Mobile GIS enables the workforce with tools and data they require – when and where they need it. Furthermore, since the software is graphically based, data quality and completeness can be checked immediately as data is acquired, which avoids expensive re-measurements when quality control activities in the office detect deficiencies. Using the connection to Level sensors field crews can measure accurate locations with GPS and in a second step they can update the less accurate height information with a level measured height. This "Height Modernization" is the start of the establishment of accurate, reliable heights using GPS in conjunction with traditional and highly accurate Levelling information in a GIS.

The challenges of managing a rapidly growing GIS databases, the need to respond to Homeland Security and emergencies, Surveying and Cadastral agencies, Water and waste water supplier and Utility companies make it imperative that bigger organizations continue to develop and improve its geographic information infrastructure. One theme that will be covered more and more in the near future is to improve the height within a GIS. The so-called, Height Modernization provides a mechanism for significantly improving the accuracy of our geographic information and maps especially in the 3rd dimension. The Height Modernization functionalities within Leica MobileMatriX will greatly assist GIS users in managing critical issues, such as:

- Flood Hazard Mapping
- Cadastral Information Systems
- Utility companies
- E911 and emergency response
- Homeland Security

The primary goal of the Height Modernization is to utilize GNSS (Global Navigation Satellite System) technology together with Level instruments and to finally support and improve all mapping, surveying and engineering activities.

The Height Modernization functionalities in Leica MobileMatriX will:

- Provide a more accurate, consistent, and improved accuracy for GIS databases and mapping

- Enable reliable sharing of spatial information between organizations and reduce unnecessary duplication of data while working with different sensors. In the past GPS, TPS and Level measurements have to be analyzed in different software packages.
- The combination results in lower the costs of surveying, and mapping throughout the whole workflow and data analysis chain

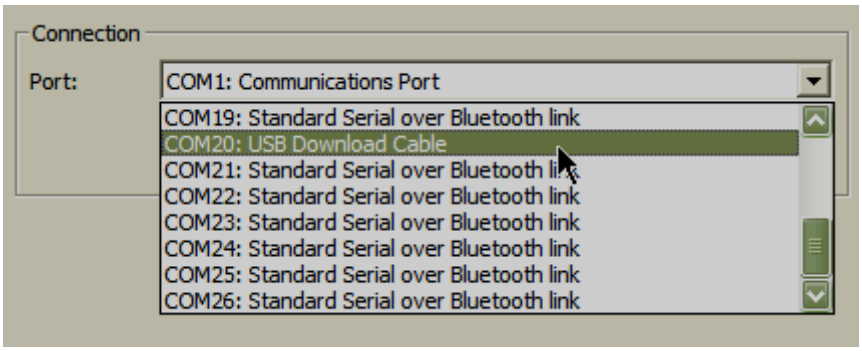
The overarching benefit of the Height Modernization functionality is that it will provide an accurate and consistent spatial framework for all mapping and surveying activities. Furthermore, it will dramatically improve the spatial infrastructure of the entire database. The importance of a robust and reliable spatial data is the consistent thread that runs through all the following examples:

- Height Modernization benefits Mapping of an entire water distribution system: the objective is to know the location of every component of the system at a level of accuracy that will allow them to quickly find that component (such as a valve), even if it is under water.
- Height Modernization benefits the measurement process of control points to establish a 3D geodetic network.
- Height Modernization benefits the accurate elevations, which are absolutely essential for e.g. flood hazard mapping: there is simply no other way to know where the water will go. In many cases, elevations must be carried over long distances for determining elevations at a particular project site where flood hazard mapping is needed. The traditional survey technique for transferring elevations – optical Levelling – is extremely post-processing-intensive, and expensive. Especially combining the level and GPS measurements finally in the enterprise GIS required many steps. This cost and workflow can be greatly reduced by using GPS and digital levels within Leica MobileMatriX with its Height Modernization functionalities.

9.4 New tools

Additionally to the new released Level Option, LEICA MobileMatriX includes further improvements in various areas.

- Connection to sensors simplified by displaying the COM port related device
  - Each connection dialog has an extended combo box for choosing the COM port.



LEICA MobileMatriX –Improved COM Port selection

- Coordinate Management: Separation of Position and Height
  - Each Coordinate averaging process can be separated by Position and Height information. This improvement strengthens the possibility to further improve the height information especially in combination with the Level Option.

Coordinates of Project Training:

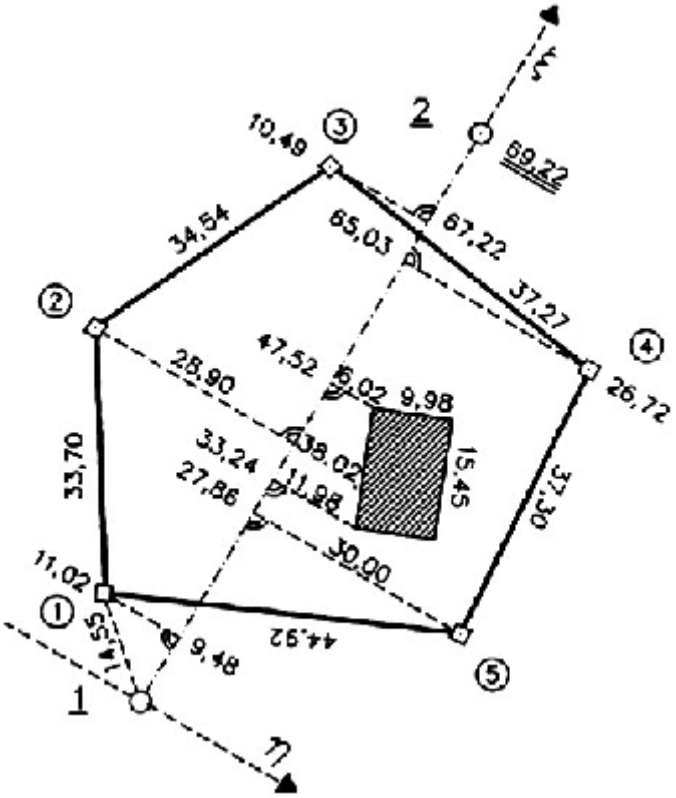
	Type	Cu...	E/N	Elev.	Easting	Northing	Elevation	dE	dI
1	Imported	☐	☑		764534.929m	253179.446m		0.000m	0.000
2	Imported	☐		☑			421.898m		
3	Mean	☑			764534.929m	253179.446m	421.898m	-	

LEICA MobileMatriX –Separation of Position and Height coordinates

- New Laser Range Finder tools
  - With the interface of Laser Range Finder to Leica MobileMatriX a low-cost, highly productive method of in-field data collection is added to Leica MobileMatriX. In combination of a GPS and a Laser Range Finder the current position is always known and simple side shots can be taken to map coast lines, forests or any other feature.
    - Already included in the Leica MobileMatriX Standard Edition
    - Binocular with distance and azimuth measurement
    - Setup on known point in the map or use the current GPS position

- Complete functionality within one toolbar
- Measure new Survey Features using easy-to-use multiple and pending feature editing
- Easy-to-use: no survey information will be stored and/or required

- New Orthogonal Survey Method
  - Already included in the Leica MobileMatriX Standard Edition
  - Supports traditional survey methods where vertices are measured with their orthogonal offset to an existing or virtual line
  - Please note that the Orthogonal Survey is only available in Geodatabases created with Leica MobileMatriX v1.51.



LEICA MobileMatriX – Orthogonal Survey

9.5 Comments on installation

Before you install...

Please read Leica Geosystems Software License Agreement carefully:

www.leica-geosystems.com/corporate/en/ndef/lgs_3295.htm.

Note that LEICA MobileMatriX Version 1.51 is running under Windows 2000 or Windows XP or XP TabletPC Edition. Internet Explorer 6.0 or higher is required.

Under Windows 2000 or Windows XP (TabletPC edition) LEICA MobileMatriX can only be installed successfully if the user is logged in as Administrator.

If you install LEICA MobileMatriX Standard or Professional Edition please regard, that no ArcGIS installation can run parallel with LEICA MobileMatriX. Prior to installing LEICA MobileMatriX please remove all installed ArcGIS components.

If you install LEICA MobileMatriX on ArcGIS Edition, an existing installation of ArcGIS 9.0 SP3 or 9.1 and ESRI's .NET component (Version 1.1) is required on your computer; otherwise LEICA MobileMatriX on ArcGIS will not be installed. LEICA MobileMatriX on ArcGIS Edition comes with a separate installation CD.

No serial and USB hardware key can be plugged in at the same time when starting LEICA MobileMatriX. The installation program includes the installation of LEICA MobileMatriX including the new Real-Time processing option. Please note, that this option is only available when the customer purchased this option.

9.6 Closing remark

Leica MobileMatriX fully supports a multi-sensor GIS. Currently no other mobile GIS solution provides such an extended multi-sensor mobile GIS. The multi-sensor GIS will be a future trend and an emerging market for mobile mapping applications. The allowance of a task-oriented implementation of geodetic measurement concepts in a mobile GIS will allow a fast, immediate and cost-effective data acquisition. By accurately synchronizing data from various independent sensors, the solution of a specific problem is easily possible by using data into integrated measurement process and storage of those in one system. This then offers by far more advantages then already existing with X concept implemented in Leica TPS/GPS and LEICA MobileMatriX. This results in conceptual clarity, as well as task-oriented system and data flow optimization, and also offers in most cases the potential for real-time solution, which is becoming more important in many mobile GIS applications. E.g. exploit the full potential of data collection with the lightweight, wireless, easy to use and highly accurate SmartAntenna and LEICA MobileMatriX in combination with Level sensors. Explore new markets with these powerful and absolutely unique tools

View and manage your survey information in an integrated way together with the possibility of feature and attribute collection. Everything together provides a real Field-to-Finish Solution. LEICA MobileMatriX ensures you get the best field workflows.

To summarize then, there are three main points:

1. Mobile GIS is an extension of the enterprise. It's part of a system, and in fact is dependant on a system for its success. It's not an island unto itself. It's useful to note that while wireless will be very useful for mobile GIS in the future, it's not essential, at present anyway, for successful operation.

2. The field device (the combination of TabletPC, GPS, TPS, Level or other sensors) is an integral component of the mobile GIS system. It needs to be robust, easy to handle and based on industry standards. When considering the right device to use, don't forget to think about just how valuable the data that resides on it is.

3. Finally, location is central to the operation of mobile GIS – even more so than your office-based GIS – as location will ensure the efficient management and use of data on your field device and between the field and the office. Both now and even more so into the wireless future.

Mobile GIS means "GIS-enabling the workforce where they work with the tools and data they need when and where they need it."

As the enterprise GIS goes mobile, location-enabled devices will become commonplace, the incorporation of location into mobile devices enables data to be managed efficiently and seamlessly, resulting in higher productivity, less data handling errors

and less redundant data. The efficient expansion of the enterprise GIS to the entire workforce of an organization depends on the seamless integration of location into the applications used by the mobile workforce.

10 About release 1.5

For the past years, the GIS community has been wakening up to the pre-existing and continuing profession of surveying and mapping. "ALL GEOGRAPHIC TRUTH IN ANY MAP OR GIS CAN BE TRACED TO A SURVEYING AND MAPPING PROCESS". Leica Geosystems followed up this technology and trend from the early beginning.
With the approach of mobile GIS, field crews are enabled to use geographic data in the field on mobile devices (TabletPC). Survey crews and GIS Professionals have at all time all survey and feature data available in the field and can manage points, coordinates and surveyed features directly with an immediate quality and completeness control. With the streamlined workflow of mobile GIS, emergency workers, inspectors, maintenance teams, utility crews, and many other field workers have real-time access to the enterprise data they require to do their job.

Mobile GIS integrates 3 main components:

- Global Positioning System (GPS), Total Stations and/or any other sensor for location positioning,
- (Rugged) TabletPC and
- GIS software

The combination of these technologies makes the enterprise database directly accessible to field crews - whenever it is required.

LEICA MobileMatriX is a unique solution that provides survey and data collection tools to extend the GIS framework of ArcGIS 9 into the field, without compromising the integrity of survey measurements and methodology. Features include:

- Data storage models and components for survey measurements,
- extended field measurement management and editing with online connection to TPS and GPS sensors,
- survey computations that are stored in the Geodatabase,
- a convenient field data interface,
- the functionality to control measurement sensors and
- the ability to associate GIS features with survey data.

LEICA MobileMatriX sets new standards in efficient data collection. E.g. while working with repeating features, LEICA MobileMatriX uses the Clone (schema only copy) feature functionality for repeating the attributes of previous identical feature, which saves time when recording multiple similar features (such as power poles, trees, manholes, ...).

We are pleased to announce that from now on LEICA MobileMatriX supports the **Leica Smart Antenna ATX1230** – using a wireless connection between TabletPC and SmartAntenna. When not on a SmartStation, the SmartAntenna ATX1230 is together with LEICA MobileMatriX a

stand-alone rover. The processing of the GPS raw measurements is done in LEICA MobileMatriX; no receiver (GTX1230) is required to process the raw measurements. This combination provides field crews a lightweight, cable free GPS RTK Rover with detailed mapping capabilities while having all the performance and accuracy from GPS1200 (L1 and L2). The RTK Processing Option is a newly released option for LEICA MobileMatriX.

Version 1.5, especially the newly released Real-Time Processing Option further improves the strengths of LEICA MobileMatriX as the new standard for Surveyors and GIS Professionals and adds new functionality to work with a highly accurate and light-weight GPS solution.

In addition to the existing Standard and Professional Edition Leica Geosystems releases together with Version 1.5 a new edition: **LEICA MobileMatriX on ArcGIS Edition**. LEICA MobileMatriX on ArcGIS Edition runs on any ESRI ArcGIS Desktop product (ArcView, ArcEditor, ArcInfo) with version 9.0 (SP3) or 9.1.

10.1 Who uses LEICA MobileMatriX?

A LEICA MobileMatriX user is any person responsible for managing and collecting spatial information, making measurements either using TPS or GPS sensors in the field to create and update maps and plans, and is suitable for:

- Geodesy and Land Surveying
- Urban and Regional Mapping
- Utility market and Power Supply Industry
- Cadastral
- Public Safety
- Forestry and geologic mapping
- Agricultural Mapping
- Archaeology
- Construction Industry
- Environmental Data collection
- Traffic Infrastructure

Figure 10.1: LEICA MobileMatriX user in the UT market segment

10.2 LEICA SmartAntenna Support

Release 1.5 contains a new installation for the integration of the SmartAntenna into LEICA MobileMatriX. The Real-time processing option uses Bluetooth® for the wireless connection to the SmartAntenna. Bluetooth is an Industry Standard and provides with the SmartAntenna a short-range wireless connection – up to 10 m. TabletPCs have the ability to connect to cell/mobile phones (for the RTK solution), SmartAntenna and peripheral devices at the same time.
The Bluetooth connection between the TabletPC and the SmartAntenna or the mobile phone is configured according to the used Bluetooth device and driver software. The configuration of the RTK connection is done in LEICA MobileMatriX and uses the GPS1200 PC Simulator. The GPS processing is done by the SmartAntenna option (like the GTX1230 - connected to the SmartAntenna - does).
Please also note that together with the release of the Real-Time Processing Option bundled packages with LEICA MobileMatriX will be available:

749536	GSW 555. LEICA MobileMatriX RTK Standard Package. LEICA MobileMatriX package including all available options, based on LEICA MobileMatriX Standard Edition.	17'190 CHF
749538	GSW 556. LEICA MobileMatriX RTK Professional Package. LEICA MobileMatriX package including all available options, based on LEICA MobileMatriX Professional Edition.	22'240CHF
749540	GSW 557. LEICA MobileMatriX on ArcGIS RTK Package. LEICA MobileMatriX package including all available options, based on LEICA MobileMatriX on ArcGIS Edition.	14'475 CHF

10.2.1 Difference between SmartStation and SmartAntenna

SmartStation

- SmartStation is used as a Total Station with the possibility to observe the setup point with GPS
- Processing of the GPS raw measurements is done on the sensor
- TPS manages the SmartAntenna
- **No** need of the LEICA MobileMatriX RTK Processing option

SmartAntenna

- SmartAntenna is used as a light-weight, highly accurate GPS rover
- Processing of the GPS raw measurements is done in LEICA MobileMatriX
- LEICA MobileMatriX manages the SmartAntenna
- **Requires** the LEICA MobileMatriX RTK Processing option

10.2.2 Hardware Requirements

- SmartAntenna ATX1230
- Battery GEB211
- Pole
- TabletPC with integrated or external Bluetooth device (according to the LEICA MobileMatriX hardware requirements)
- Holder for TabletPC
- Mobile phone with Bluetooth (for RTK only)
- Hardware key for LEICA MobileMatriX and Real-Time Processing Option

10.2.3 Software Requirements

- LEICA MobileMatriX V1.5 with Real-Time Processing option
- Installed Bluetooth software (e.g. Microsoft or Widcomm)

10.2.4 Configuration of the SmartAntenna

LEICA MobileMatriX uses the GPS1200 PS Simulator to set up e.g. the Real Time interface. Finally, the stored configuration will remain valid until it will be changed.

Please note, that the GPS1200 PC Simulator only works with the SmartAntenna and is only available in the Real-Time processing option.

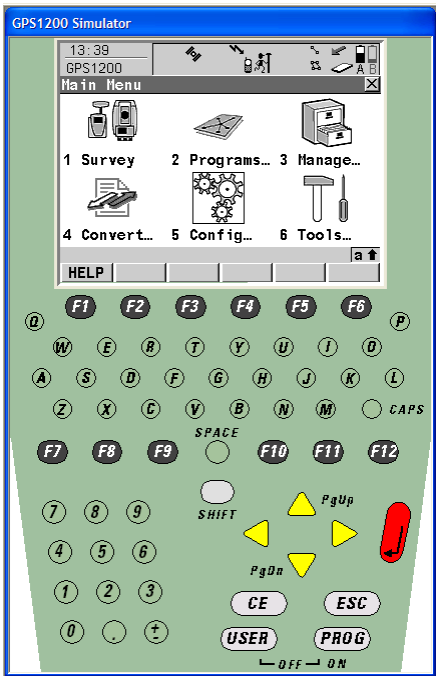


Figure 10.2: GPS1200 PC Simulator to configure the SmartAntenna ATX1230

10.2.5 QuickStart Tutorial

A QuickStart Tutorial for the Real-Time Processing Option is available with Release 1.5. This document describes how to connect to a SmartAntenna and a mobile phone using a Bluetooth connection. Furthermore it describes how to use the GPS1200 PC Simulator to connect to a Reference Station to receive correction data.

10.2.6 Advantages

The combination of the SmartAntenna with LEICA MobileMatriX has several advantages for the user:

- Light-weight, cable-free GPS RTK Rover combined with a mobile GIS

- Supports Ntrip
- No backpack or other equipment required
- Performance, reliability and accuracy as GPS1200
- Together with LEICA SmartStation a perfectly usable system – just remove and go!
- Standard Bluetooth Mobile Phones can be used
- Bundled package for the high accurate survey
- Attractive prices for GPS mapping, data collection and maintenance tasks

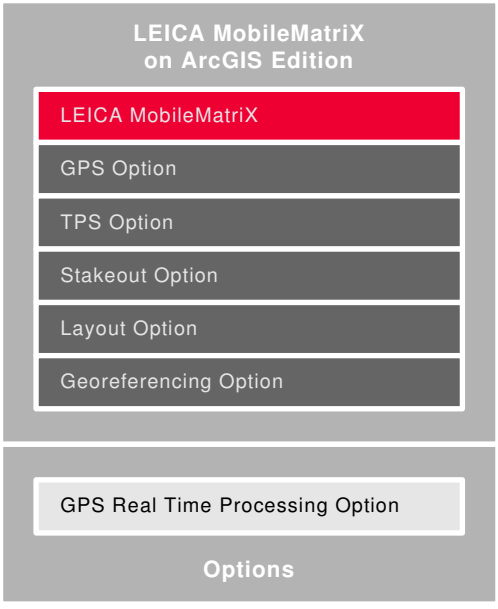
10.3 New Edition – LEICA MobileMatriX on ArcGIS Edition

LEICA MobileMatriX on ArcGIS Edition runs on any already installed ESRI ArcGIS Desktop product (ArcView, ArcEditor, ArcInfo) with version 9.0 (SP3) or 9.1. The main difference to LEICA MobileMatriX Standard and Professional Edition is a complete GIS functionality of underlying ArcGIS Desktop. The new released version enables the ArcGIS users to use their existing licenses, and to simply buy LEICA MobileMatriX as extension to their installation. Additionally, LEICA MobileMatriX on ArcGIS Edition enables ESRI development partners to combine their products together with LEICA MobileMatriX in an integrated way. The ArcGIS LEICA MobileMatriX extension enables ArcView, ArcEditor, and ArcInfo users to use their GIS for mobile data collection and maintenance tasks with connected surveying sensors.

- Full GIS functionality of underlying ArcGIS Desktop available.
- GIS functionality varies according to ArcGIS Desktop product: ArcView for viewing and editing of simple features, ArcEditor for definition, viewing, analysis and editing of simple and complex features, or ArcInfo for additional geoprocessing and data conversion.
- Product specific differences between ArcGIS Desktop products (ArcView, ArcEditor, ArcInfo) can be found on http://www.esri.com/software/arcgis/about/desktop.html.

LEICA MobileMatriX on ArcGIS Edition includes the following options:

- TPS Option: supports Leica Total Stations.
- GPS Option: supports Leica GPS sensors as well as any other NMEA compliant GPS sensor.
- Stakeout Option: used to stakeout points in the field.
- Layout Option: used to layout a map and print it.
- Georeferencing Option: used to support raster images as background.



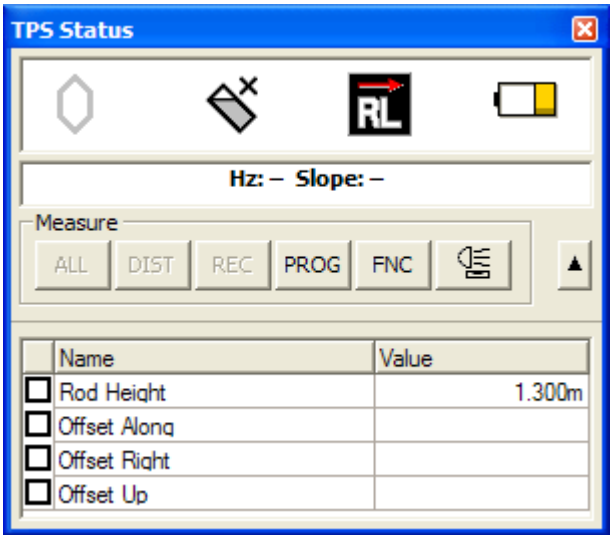
LEICA MobileMatriX on ArcGIS Edition Options

10.4 New tools

Additionally to the new released Edition and Option, LEICA MobileMatriX includes further improvements in various areas.

- Working with TPS
  - Performance improvements when working with several hundred measurements on one Station
  - Tacheometry: Distance check included

    The user has now an additional control when targeting a backsight point. The Measured and calculated distances are compared to ensure that the targeted backsight point was the right one.
  - Free Station allows now height only points as orientation points
  - TPS Status dialog now includes Rod Height, Offset entries



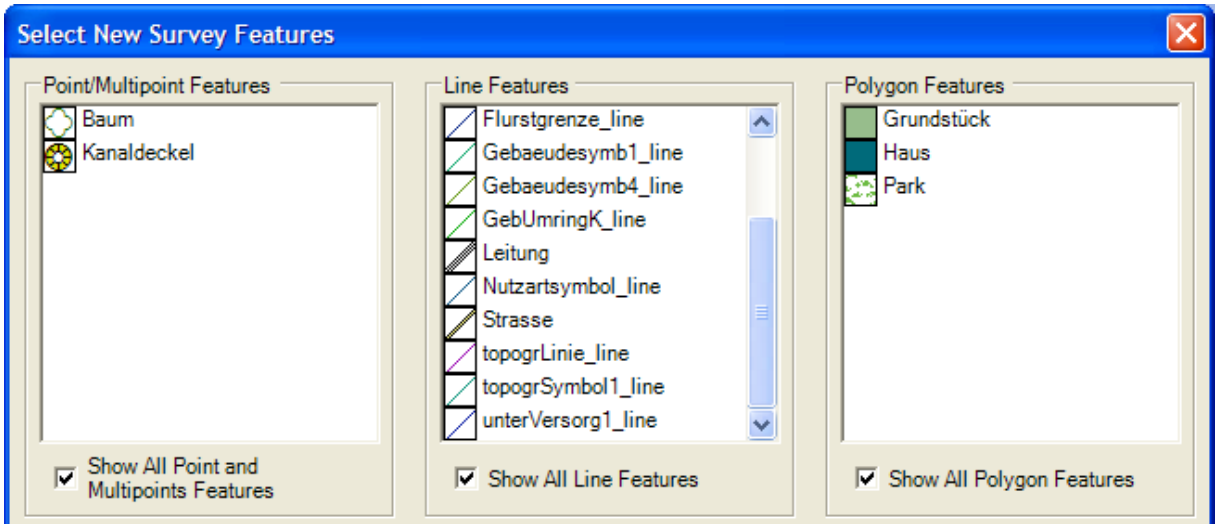
LEICA MobileMatriX – New TPS Status window with quick entry functionality

- Improvements in survey feature selection

  Instead of the drill down we have implemented a dialog, which allows a multiple selection of different survey features.

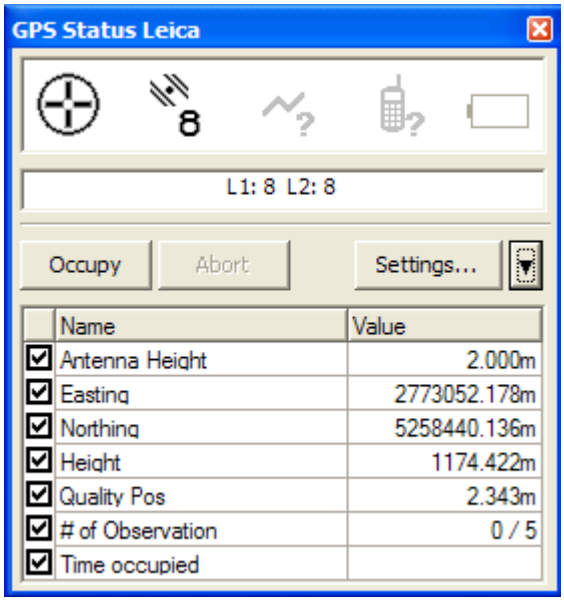
LEICA MobileMatriX - Survey Feature selection (existing)

For additional usability the user can only display the last 10 used survey features.



LEICA MobileMatriX- Newly implemented method of Survey Feature selection

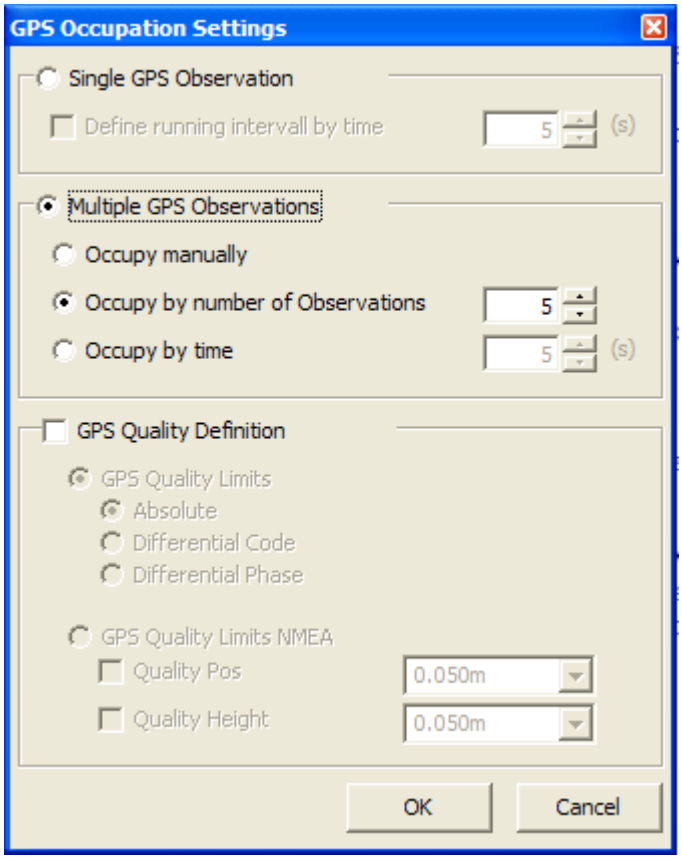
- GPS Option now supports optional only GGA NMEA message.
- GPS Status dialog improvements include a quick Antenna Height and Measurement Type entry as well as a Multiple and Single GPS Observations functionality.
  The ability to have multiple measurements in LEICA MobileMatriX (and to store finally only one coordinate) was required of many users providing GPS mapping services to Municipal, DOT and other State agencies.



LEICA MobileMatriX- New design of GPS window

The first group box describes the Single Observation mode. This mode has the same functionality as previously the existing Measure button. One single measurement is called (after pressing Measure in GPS Status) and immediately recorded to the coordinate.

The **Running Mode** button is removed from the GPS Status (Leica and NMEA) dialog and placed into the Settings dialog.
The second group box describes the **Multiple GPS Observations**. The interval for streaming measurements defines the interval in which GPS Observations are used for averaging the position. The user has the choice between Occupy manually, by number of observations or by time.
The third group box is an optional setting for working with a specific GPS Quality Definition.



LEICA MobileMatriX- Settings dialog for multiple and single GPS Observations

- Feature Validation and Domain Support - Attribute dialog recognizes now must values and range checks.
- Improvements Survey Explorer
  - Select objects in Survey Explorer via drag and drop

    The selection of several objects is now specially designed for TabletPC.
  - Improved deletion of survey objects

    LEICA MobileMatriX allows now deletion of survey objects without previously deleting all dependencies.

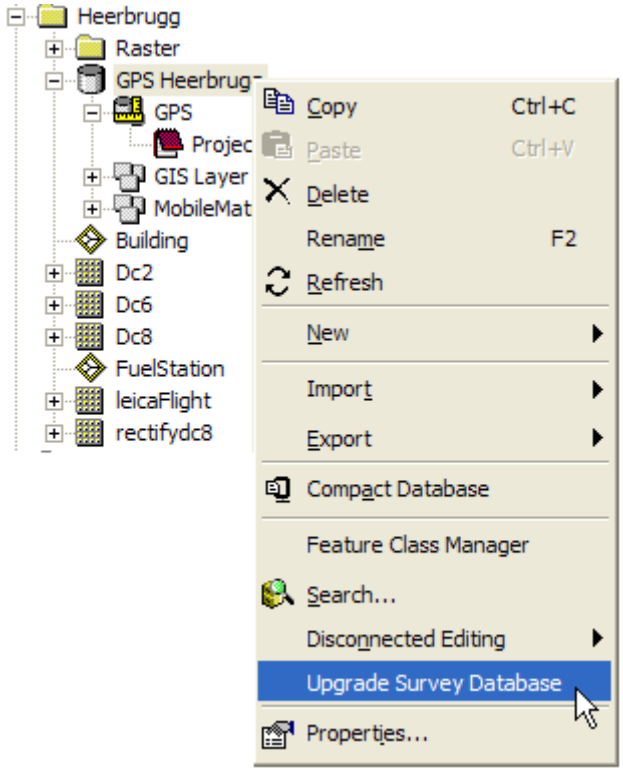
10.5 Working with Databases from Version 1.0, 1.01 or 1.1

In LEICA MobileMatriX V 1.5 we did some major changes in the survey database. Therefore databases from Version 1.0, 1.01 or 1.1 cannot be used without using the upgrade utility in advance. This tool has to be used once for each database.

Please note that the upgrade utility is only enabled to convert databases from Versions 1.0, 1.01 or 1.1 to Version 1.5.

Use of upgrade utility:

- Start LEICA MobileMatriX, select a blank map document and click Data Manager tab (*LEICA MobileMatriX Standard or Professional Edition*) or
- Start ArcCatalog (*LEICA MobileMatriX on ArcGIS Edition*).
- Navigate to the database you want to update.
- Use the Upgrade Survey Database utility to upgrade the survey database by a right click on the database in the catalog tree.



LEICA MobileMatriX- Upgrade Survey Dataset Utility

- Create a new map document with the updated survey dataset. You may use the Layer files to import the previously used symbology.

Note: Do not open the map document with a survey database from version 1.0, 1.01 or 1.1

Please backup the old databases before you upgrade to the new Release!

10.6 Comments on installation

Note that LEICA MobileMatriX Version 1.5 is running under Windows 2000 or Windows XP or XP TabletPC Edition. Internet Explorer 6.0 or higher is required.

Before you install...

Under Windows 2000 or Windows XP (TabletPC edition) LEICA MobileMatriX can only be installed successfully if the user is logged in as Administrator.

If you install LEICA MobileMatriX Standard or Professional Edition please regard, that no ArcGIS installation can run parallel with LEICA MobileMatriX. Prior to installing LEICA MobileMatriX please remove all installed ArcGIS components.

If you install LEICA MobileMatriX on ArcGIS Edition, an existing installation of ArcGIS 9.0 SP3 or 9.1 and ESRI's .NET component is required on your computer; otherwise LEICA MobileMatriX on ArcGIS will not be installed. LEICA MobileMatriX on ArcGIS Edition comes with a separate installation CD.

No serial and USB hardware key can be plugged in at the same time when starting LEICA MobileMatriX. The installation program includes the installation of LEICA MobileMatriX including the new Real-Time processing option. Please note, that this option is only available when the customer purchased this option.

10.7 Closing remark

Exploit the full potential of data collection with a lightweight, wireless, easy to use and highly accurate SmartAntenna and LEICA MobileMatriX. Explore new markets with the new LEICA MobileMatriX on ArcGIS Edition – existing ESRI customer will benefit from this new editions.

View and manage your survey information in an integrated way together with the possibility of feature and attribute collection. Everything together provides a real Field-to-Finish Solution. LEICA MobileMatriX ensures you get the best field workflows.