MobileMapper Field & Office Software

User Guide

From MobileMapper Field v3.0 for Android
and MobileMapper Office v5.0

SOFTWARE END USER LICENSE AGREEMENT (EULA)

(TNL - TEBV)

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11.4. Attorneys' Fees and Costs. The prevailing party in any action to enforce this Agreement will be entitled to recover its attorneys' fees and costs in connection with such action.

11.5.Notices and Reports. Any notice or report hereunder shall be in writing. If to Trimble, such notice or report shall be sent to "Trimble Inc., 935 Stewart Drive, Sunnyvale, California 94085, U.S.A." to the attention of "General Counsel – Legal Notice". If to You, such notice or report shall be sent to the address You provided upon placing your order or at the time the Software has been first made available to You. Notices and reports shall be deemed given: (a) upon receipt if by personal delivery; (b) upon receipt if sent by certified or registered U.S. mail (return receipt requested); or (c) three (3) business days after being sent by a reputable international courier requiring signature for receipt, addresses to the party at its notice address. Either party may change its notice address by written notice to the other.

11.6. Amendments; Waivers. No supplement, modification, or amendment of this Agreement shall be binding, unless executed in writing by a duly authorized representative of each party to this Agreement. No waiver will be implied from conduct or failure to enforce or exercise rights under this Agreement, nor will any waiver be effective unless in a writing signed by a duly authorized representative on behalf of the party claimed to have waived.

11.7. Entire Agreement. This Agreement is the complete and exclusive statement of the mutual understanding of the parties and supersedes and cancels all previous written and oral agreements and communications relating to the subject matter of this Agreement. No provision of any purchase order or in any other business form employed by You will supersede the terms and conditions of this Agreement, and any such document issued by a party hereto relating to this Agreement shall be for administrative purposes only and shall have no legal effect. Notwithstanding the foregoing, if You have entered into a separate written license agreement signed by Trimble for use of the Software, the terms and conditions of such other agreement shall prevail over any conflicting terms or conditions in this Agreement.

11.8. Independent Contractors. The parties to this Agreement are independent contractors. There is no relationship of partnership, joint venture, employment, franchise or agency created hereby between the parties. Neither party will have the power to bind the other or incur obligations on the other party's behalf without the other party's prior written consent.

11.9. Force Majeure. Neither party shall be liable to the other for any delay or failure to perform any obligation under this Agreement (except for a failure to pay fees) if the delay or failure is due to unforeseen events, which occur after the signing of this Agreement and which are beyond the reasonable control of the parties, such as strikes, blockade, war, terrorism, riots, natural disasters, refusal of license by the government or other governmental agencies, in so far as such an event prevents or delays the affected party from fulfilling its obligations and such party is not able to prevent or remove the force majeure at reasonable cost.

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11.11. Third-Party Software. If designated in the Documentation, the Software may contain or be provided with certain Third-Party Software (including software which may be made available to You in source code form). Such Third-Party Software is not licensed hereunder and is licensed pursuant to the terms and conditions indicated in the Documentation and/or on the Third-Party Software conditions ("**Third-Party License**"). Except as may be set forth in the Third-Party License, neither Trimble nor Trimble Suppliers offer any warranty in connection with any Third-Party Software and neither Trimble nor Trimble Suppliers shall be liable to You for such Third-Party Software.

11.12. Official Language. The official language of this Agreement is English. For purposes of interpretation, or in the event of a conflict between English and versions of this Agreement in any other language, the English language version shall be controlling.

11.13. Reservation of Rights. Trimble reserves all rights not expressly granted by this Agreement.

If an executed agreement exists between You and Trimble at any time regarding the Software, the terms of that agreement shall supersede the terms of this Agreement in its entirety. Thus, if You enter into a separate written agreement with Trimble regarding the Software, that agreement (not this one) will control your use of the Software; and further if that agreement is terminated, You will not have the right to use the Software under the terms of this Agreement after termination. Notwithstanding the foregoing, pre-printed terms and conditions on your Order form shall not supersede this Agreement.

Trimble Inc., 935 Stewart Drive, Sunnyvale, CA 94085, U.S.A

English

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Introduction to MobileMapper Field and MobileMapper Office

MobileMapper Field and MobileMapper Office are two complementary software programs designed for general-purpose GIS data collection projects.

MobileMapper Field is a field software application used to collect GIS data. MobileMapper Field allows you to:

- Log features in the field and enter values for their attributes.
- Revisit features in the field to update their attributes.
- Define new categories of features (i.e. layers) and assign as many types of attributes as necessary for new projects.
- View background maps to help you more easily spot features in the field.
- Export the collected data in 2D/3D SHP, MIF, CSV or DXF format.
- Collect raw data in the background and then, when back at the office, enhance the accuracy of the collected positions. This requires that you purchase the Post-processing option for MobileMapper Field and you use exclusively MobileMapper Office to process your field data.

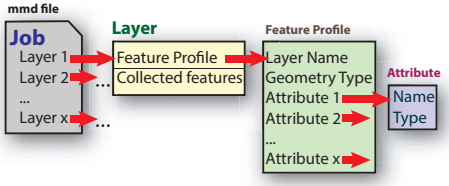
MobileMapper Office allows you to:

- Provide a better way to view the data collected in the field. Field data are grouped together in files (jobs) with the "map" extension.
- Automatically search for the reference raw data (raw data from a base) that match your field raw data and download them to your computer.
- Post-process all the raw data (from reference and field) to determine more accurate positions for all your features.
- Perform quality tests on the post-processing.
- Display background maps.
- Create new categories of layers for future projects.
- Export data to standard formats (csv, kml, gpx).
- View your features on Google Earth.
- Convert existing projects to get their results on different coordinate systems.

Terminology Used in MobileMapper Field & Office

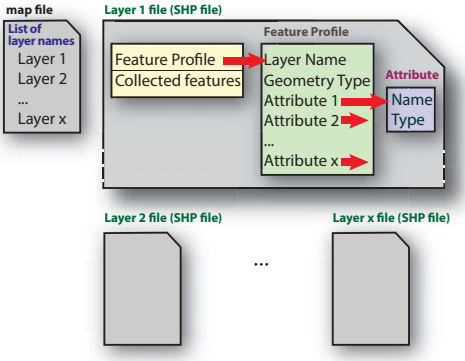
Jobs & Maps

In MobileMapper Field, a *job* is a file containing all the layers used in a campaign of GIS data collection. These layers include all the features collected through them.



Jobs are binary files using the “mmd” extension. Each “mmd” file has its own “mmd-Journal” file counterpart. Job files are saved to the ...\MMField folder on the Android mobile device used.

In MobileMapper Office, a *map* is just a file containing a list of layer names. When opening a map in MobileMapper Office, in fact you open each of the layer files (shp files) mentioned in the map file. In MobileMapper Office, a map is also called a *project*.



NOTE: Four companion files are systematically created along with each shp file: these are dbf, prj and shx files.

Layers

A layer first provides a *feature profile* through which you can collect a certain category of features and second, it's a container for all the features collected through it.

A layer therefore contains the following information:

1. A *feature profile*, which is defined by:
   - A layer name
   - A *geometry type*
   - A number of *attributes,* which provide all sorts of information useful to describe every collected GIS data. (See *Attributes on page 4*.)

   The *feature profile* is the only information present in the layer when creating a new layer. The layer is then said to be empty.
2. As you will be collecting data, each and every feature collected through this layer will be saved to that layer.

It is your responsibility to create layers, each of them describing a particular category of features you will encounter in the field. Attributes should be chosen to meet the specific requirements of your data collection campaigns. Layers can be created in either MobileMapper Office or Field.

Examples of layers: "Trees" (geometry type: point), "Overhead cables" (geometry type: line), "Ponds" (geometry type: polygon).

Examples of attributes: For the "Trees" layer for example:

- "Variety": May be a text-type attribute for free entry, or a menu-type attribute, for example with options "Elm", "Oak", "Pine", etc.
- "Size": A numeric or decimal attribute.
- "Picture 1": Allows you to create a picture of the tree as one of its attributes.
- "Last visited": "Date" attribute
- "Disease": "Yes/No" choice attribute
- etc.

Features

As already mentioned, a *feature* is defined as the basic piece of GIS data you can collect with MobileMapper Field.

Collecting a feature implies that you first choose the layer in which to store it. By making this choice, you confirm that the geometry type of the feature you want to collect matches that of the layer's feature profile and you accept to provide input for all the prompted attributes (see below).

When collecting a point feature, MobileMapper Field will automatically save the position computed at the feature's location as an additional attribute to the feature. (The position is computed in real time by the built-in GNSS receiver or by an external GNSS receiver connected to MobileMapper Field).

When collecting a line or polygon feature, MobileMapper Field will log several positions as you walk along that line or polygon. Position logging will take place in manual or automatic mode (see *Setting the Logging Mode for Lines & Polygons on page 22*).

Later when processing features in MobileMapper Office, position attributes will be displayed for each feature, together with all the other attributes.

Attributes

Attributes fall into two different categories:

- *User-defined* attributes. There are different types:
  - Text
  - Numeric
  - Decimal
  - Date
  - Yes/No
  - Menu
  - Submenu (see *page 6*)

  To create a new *user-defined* attribute, you need to name it, choose the type (see above) and possibly make it mandatory.

- *Predefined* attributes. The list of available *predefined* attributes depends on the type of geometry chosen for the layer (see table below).

Predefined Attribute	Point	Line	Polygon
Picture 1	•	•	•
Picture 2	•	•	•
Picture 3	•	•	•
Picture 4	•	•	•
Time	•	•	•
Satellites	•		
PDOP	•		
Status	•		
HRMS (1)	•		
VRMS (2)	•		
Length (3)		•	
Perimeter (3)			•
Area (3)			•

(1): Estimation of horizontal position accuracy
(2): Estimation of vertical position accuracy
(3): Expressed in the chosen unit (See Settings)

For *user-defined* attributes, you will be prompted to provide input for each and every feature you will collect in the field. Most *predefined* attributes will automatically be populated by the software itself. For those *user-defined* attributes with the Mandatory option active, field operators will imperatively have to provide input.

As mentioned earlier, position is an *implicit* attribute for all types of feature, i.e. it is added automatically without you to ask (see *Features on page 4*).

NOTE: In MobileMapper Office, *pre-defined* and *user-defined* attributes are not distinguished explicitly: *Pre-defined* attributes are prompted by default. Editing the name field of the *pre-defined* attribute currently displayed, is the way through which you can start creating a new *user-defined* attribute.

Submenu Attribute

A submenu is similar to a menu, but with the following differences:

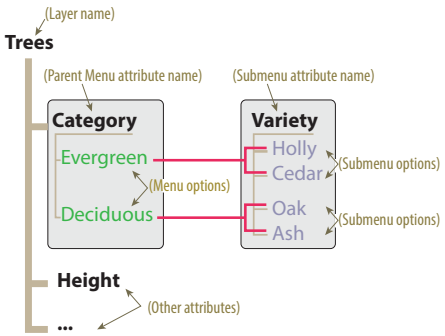
- A submenu attribute can only be created just after creating a menu attribute, to which it will necessarily be related.

  To create a submenu, just ask for the creation of a new menu attribute right after creating a menu attribute (the parent menu). The message "Create submenu?" will then be displayed (MobileMapper Field). If you tap "Yes", then you will be prompted to create a submenu attribute. In MobileMapper Office, you will just have to enable the Depends on... box and you will then be guided to enter the submenu items for each item of the first menu attribute.

- In a submenu you need to create sub-options for each of the options defined in the parent menu.

  Example (see also diagram below): In a layer named "Trees", you create a menu attribute named "Category", in which the possible options are "Evergreen" and "Deciduous".

  You then create a submenu attribute named "Variety". Because it's defined as a submenu, MobileMapper Field or Office will prompt you to create sub-options for each of the "Category" menu options. For example, you may create "Holly" and "Cedar" as sub-options for "Evergreen", and "Oak" and "Ash" as sub-options for "Deciduous".



That way, the field operator will only be allowed to choose between "Holly" and "Cedar" if the category of a visited tree is "Evergreen", or "Oak" or "Ash" if the tree category is "Deciduous".

Installing MobileMapper Field & SPace

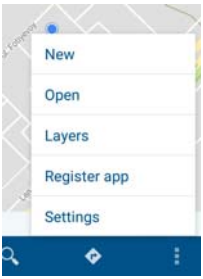
All languages are provided in a single installation package. When starting installation, the interface language is selected automatically based on the Android device's system settings. So you should first go to Settings > Language & Input, and select the language you wish to use in MobileMapper Field.

- Download the installation file (an apk file) from the Spectra Precision website.
- Copy the file to any folder on your Android device.
- Touch the apk file to start installing MobileMapper Field Android.
- The first time you start the application, you will be asked to enter the POPN (Proof-Of-Purchase Number). You should have received this number by now since it was emailed to you when you purchased MobileMapper Field Android.

  If you don't have a POPN, you may however install and run the software by clicking on the Start Trial button.

  The trial mode is only intended for evaluation purposes. In trial mode, you are not allowed to use the Export and Import functions and all the jobs you create cannot be re-opened in a fully registered MobileMapper Field. On launching MobileMapper Field after the trial period has expired, you will be prompted to register.

NOTE: You will need another POPN to activate raw data collection. This POPN will be asked when attempting to enable this function. So make sure you have purchased this option as well if you intend to collect raw data files.



If MobileMapper Field is currently running in trial mode and you recently bought a license from Spectra Precision, follow these steps to install the official version using the POPN (POPN: Proof of Purchase Number) delivered to you:

- Touch ⋮, then select Register app.
- Type in your POPN and then touch Register. This validates your license in the Android device.

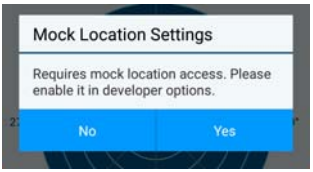
  NOTE: MobileMapper Field will check the POPN registration status once a day.

Before running MobileMapper Field, you need to also install the SPace software application on the same device.

SPace may be downloaded from Google Play (search for “Spectra precision” applications and then find “SPace” in the list of available applications).

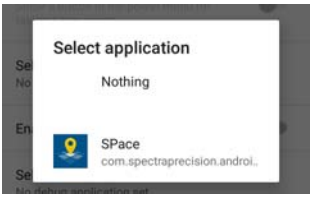
Follow the on-line instructions to install SPace.

When launching SPace for the first time, a message will first ask you to read and accept the EULA agreement. Another message will follow asking you to choose the application providing Android with precise location information:

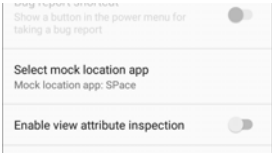


Touch Yes. This will open the list of developer options. Scroll down until you find Select mock location app in the Debugging section.

Touch Select mock location app. This opens a dialog listing the apps that can be used for this purpose.



Touch SPace as the application in charge of fulfilling this task. The screen then shows that your choice is now active.



Press ⮌ to return to SPace (SKYPLOT tab displayed).

NOTE: You need to do this setting only once.

SPace can also be set up to receive RTK or Trimble RTX corrections, thus providing MobileMapper Field with the requested positioning accuracy. For more details, see S*Pace Online Help*.

Preamble

Before you can log GIS data with MobileMapper Field, you need to create a *job* and at least one *layer* including at least one *attribute*.

The basic piece of GIS data you can collect with MobileMapper Field is called a *feature*. While collecting a *feature*, you will typically have to enter values for its *attributes*.

Every time you want to log a new *feature*, you will first need to select the *layer* in which the *feature* will be saved. See all these definitions in *Terminology Used in MobileMapper Field & Office on page 2* for more details.

Creating your First Job

Find and touch 

in the Android apps menu.This starts the MobileMapper Field application as well as the background service of SPace, which is indicated in the Android status bar by the following icon: 

With no job created yet in MobileMapper Field, the following icons can be seen in the title bar:

- Touch 
- Enter a file name for your first job and then touch OK.

  That's it! The name of your first job is now displayed in the title bar.

Creating Your First Layer and its Attributes

After creating a new job, or after opening an existing, empty job:

- Touch  in the title bar.
- Touch  .
- Enter a name for the layer.
- Complete the Geometry type field to define a geometry type for the layer (Point, Line or Polygon).
- Touch OK. MobileMapper Field then prompts you to define the attributes specific to the layer. (MobileMapper Field cannot create a layer without an attribute so you need to enter at least one.)

- Touch  .
- Enter your first *user-defined* or *predefined* attribute. For a *user-defined* attribute, choose a name, a type and possibly make the attribute mandatory (see also *Attributes on page 4*). Then touch OK. For a *predefined* attribute, just choose the desired one(s) from the list. If you tick several of them, then as many pre-defined attributes will be created when touching OK. MobileMapper Field will then show the list of attributes you've just created.
- Touch  again to add more attributes, following the same procedure as above. You can create as many attributes as necessary.

Attributes may be modified or deleted before completing the creation of a layer.

NOTE: When adding attributes to a new layer, and as long as you do not validate the definition of the layer, you may still modify or delete any of the layer's attributes:

  - To modify an attribute, touch its name in the list of attributes and edit its definition.
  - To delete an attribute, just hold a finger pressed on the attribute name until the menu bar turns yellow. A trash can icon is displayed in this bar:  . Just touch it to delete the selected attribute.

- Touch  when you are done with attributes. This takes you back to the layers list where you can now see the name of the newly created layer.

Layers may be deleted from a job.

NOTE: You may delete any layer from the job: Just hold a finger pressed on the layer name until the menu bar turns yellow. A trash can icon is displayed in this bar:  . Just touch it to delete the selected layer.

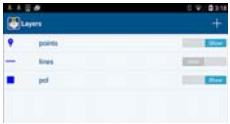
- From there, you may touch  to create a new layer.

NOTE: After a layer has been created in a job, you can create new layers directly from the menu located in the title bar:

- Touch  , select Layers then touch  .

NOTE: Even after collecting features through a layer, you can still add – but not remove – attributes to this layer.

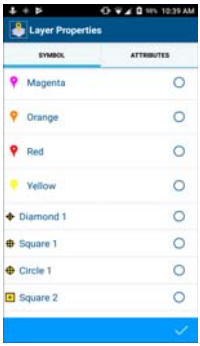
Showing/Hiding a Layer



You can ask MobileMapper Field to show or hide any of the layers part of your job.

- Touch and select Layers. MobileMapper Field lists the names of all the layers found in the open job.
- Set the slide button corresponding to the layer you want to show or hide: Touch Hide to make all the features pertaining to that layer invisible on the map view, or touch Show to make them visible.

Defining Visual Properties for Layers



You can change the visual properties of each of the layers added to a job.

- Touch and select Layers. MobileMapper Field lists the names of all the layers found in the open job.
- Touch a layer name and then set the visual properties:
  - For point layers: You may choose the color of the standard point icon or choose a different icon (more than 50 available).
  - For line layers: You may choose a color and a style (line thickness + dotted or continuous line).
  - For polygon layers: You may choose a color for the contour line, and a fill (solid or transparent).

After choosing visual properties and touching , you are taken back to the layers list where you can see that the selected visual properties are now associated to the layer. All features stored in this layer will now be shown on the map screen with these visual properties.

Creating a Job from another Job

You can create a new empty job using the currently open job as a template.

When you do this, MobileMapper Field copies all the layers from the open job to the new job, but deletes all the features stored in these layers (which then become empty layers).

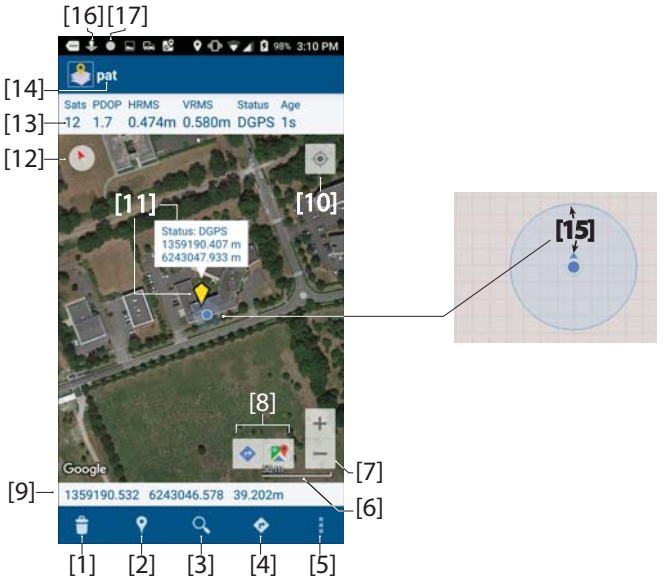
Follow this procedure to create a job from another job used as a template:

- Open the job you want to use as template.
- Touch then New.
- Name the new job and touch OK. Then the message "Use current job as a template?" is displayed.

- Touch Yes. The new job is then created and opened in MobileMapper Field (and the project used as template is closed).

Map View

With a job open in MobileMapper Field and after a few features have been collected, the map view looks like this:



- **[1]**: Touch this icon to delete the feature you've selected on the map.
- **[2]**: "Log feature" function.
- **[3]**: "Search feature" function.
- **[4]**: "Go to/Update feature" function.
- **[5]**: Main Menu (see *Main Menu on page 14*).
- **[6]**: Map scale value.
- **[7]**: Zoom settings.
- **[8]**: Icons giving access to respectively Google Map Directions and Google Map Search. Shown only when a logged feature is selected on the map.
- **[9]**: Coordinates of currently computed position.
- **[10]**: Touch this button to move the last computed position to the center of the screen, causing the map view to be updated accordingly.

NOTE: An Internet connection is needed to allow MobileMapper Field to get from Google the map that suits the working area. The time for MobileMapper Field to display the map will depend on how fast your Internet connection is.

- **[11]**: Touch a logged feature to read its attributes (including position).
- **[12]**: Compass icon. Shown only after giving the map a certain angle using two fingers on the screen to rotate the map. Touch this icon to bring the North direction back to normal (i.e. oriented upward).
- **[13]**: This line contains the following real-time information: Number of satellites used, current values of PDOP, HRMS and VRMS, position computation status and age of corrections (if any received). Note that the values of HRMS and/or VRMS will display in red if they are greater than those chosen in the Position Filter setting (see *page 21*).
- **[14]**: Name of open job.
- **[15]**: Current position occupied by the GNSS receiver (small blue circle). A second, light-blue, half-transparent circle, concentric to and bigger than the first one, shows the extent of the uncertainty on the computed position, directly tied to the displayed value of HRMS.
- **[16]**: Icon indicating that SPace is running in the background (always visible when running MobileMapper Field whether SPace was launched beforehand or not).
- **[17]**: Data logging icons (one or two). When visible, indicate that raw data, GPX data and/or lines or polygons are being logged. The shapes of these icons are as follows:

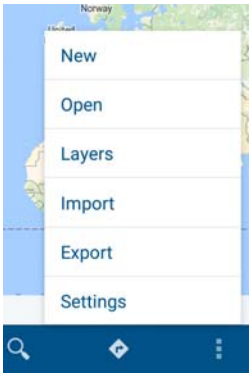
Icon	Meaning
	Raw and/or GPX data being logged.
	Line or polygon feature being logged in automatic mode.
	Line or polygon feature being logged in manual mode.

Examples:

Icon	Meaning
	Raw/GPX data being logged + line/polygon feature being logged in automatic mode.
	Raw/GPX data being logged + line/polygon feature being logged in manual mode.

Main Menu

(The menu is as described below after a valid POPN has been entered and at least one job has been created in MobileMapper Field.)



NOTE: If MobileMapper Field is running in trial mode, the **Import** and **Export** functions won't be available, but an additional option (**Register app**) will be made available so you can enter a POPN validating the license you purchased earlier (see *page 7*).

New

Use this function to create and name a new, empty job. "Empty" means the job does not contain any layer.

A new job can be created using the currently open job as a template (see *Creating a Job from another Job on page 11*).

Open

Use this function to open an existing job. MobileMapper Field lists all the jobs found in the mobile device's *...\Internal storage\MM Field* folder. Just touch a job name to open it.

NOTE: When starting MobileMapper Field, the job that was left open at the end of the previous session is automatically re-opened in MobileMapper Field.

Layers

This function is available if the job contains at least one layer. In that case, a window opens listing all the layers found in the job.

Touch  to create a new layer (see *Creating Your First Layer and its Attributes on page 9*). If the open job is new or still empty:

- First touch  in the title bar.
- Then touch  to create a new layer. The new layer will automatically be saved to the job.

Import

Use this function to import an existing layer to the open job. Layers you can import should be in one of the following formats: 2D SHP, 3D SHP or DXF format. Layers in KML format can also be imported, but only as a background layer. MobileMapper Field will list all the layers found in the mobile device's Download folder. Select the layer you want to import to the job. Typically, you will import layers provided from outside. These may also be layers exported from another job created on the same device.

Please note that a layer in shape file format can be imported only if the corresponding four files (prj, shp, shx and dbf files) are all present in the Download folder. Other files (mnu files, in the form "<layer_name>***.mnu") may be part of a layer's file list if the layer includes one or more menu-type attributes. This type of file ensures compatibility between MobileMapper Office and MobileMapper Field for menu-type attributes.

IMPORTANT: When you import a layer, be aware MobileMapper Field DOES NOT check to see if the coordinate system used in the layer is the same as the one used in the open job. It is you responsibility to check that the two systems match.

NOTE: Importing a layer always implies importing both the feature profile and all the previously collected features stored in this layer. If you want to start working using empty layers, it is a good practice to create a new job from a job containing the layers you are interested in (see *Creating a Job from another Job on page 11*) rather than use the Import function.

Export

Use this function to export the open job with all its layers to the local ...\Download\<job_name>\ folder or to a Google Drive account. In the latter case, you have to specify a Google Drive account before MobileMapper Field can upload the exported files to this remote folder.

The table below lists the different types of files generated through the export function, depending on the selected export format.

Export to:	2D/3D Shape Files	MapInfo MIF Files	CSV Files	DXF files
File generated for the job	<job_name>.map <job_name>.crw	<job_name>.map <job_name>.crw	<job_name>.map <job_name>.crw	<job_name>.map <job_name>.dxf <job_name>.crw
Exported layers	All geometry types	All geometry types	Point type only	All geometry types
Files generated for each layer	<layer_name>.drw <layer_name>.dbf <layer_name>.prj <layer_name>.shp <layer_name>.shx <layer_name; menu_attribute name>.mnu *	<layer_name>.drw <layer_name>.mid <layer_name>.mif <layer_name; menu_attribute name>.mnu *	<layer_name>.drw <layer_name>.csv <point_layer_ name; menu_attri-bute name>.mnu*	<layer_name>.drw <layer_name; menu_attribute name>.mnu *

*Will be generated for each menu-type attribute included in a layer. This file is generated to guarantee compatibility with MobileMapper Office. This type of file will not be generated if there is no such attribute type in a layer.

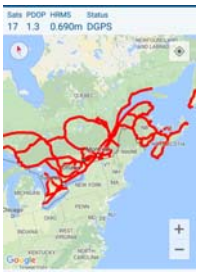
NOTE: Only 2D/3D shape files can be processed in MobileMapper Office.

Be aware that only point-type layers can be exported to “CSV” format.

Exporting a job is the normal procedure to follow after data collection so you can subsequently process the collected features in MobileMapper Office. To process the job as a whole (i.e. with all its layers included), open the <job_name>.map file in MobileMapper Office, making sure all the corresponding SHP files (and accompanying files) have all been copied to the same folder as the map file you open (MobileMapper Office in fact opens each of these SHP files).

Settings

- Linear Units: Choose the distance unit (meters, feet or US feet).
- Area Units: Choose the area unit (square meters, square kilometers, hectares, acres, square feet, square yards or square miles).
- Angle formats: Choose a format for angles:
  - 00.00000000°: Angles expressed in degrees and fraction of a degree.
  - 00°00'00.0000"': Angles expressed in degrees, minutes, seconds and fraction of a second.
- Map Type: Choose the aspect of the map displayed in the background:
  - None: No map is displayed. Only the features you have logged are.
  - Hybrid: The map combines the satellite and normal views.
  - Normal: The map shows the normal map view.
  - Satellite: The map shows the satellite view.
  - Terrain: The map shows certain details of the area.
- Background Map: Choose this function to add one or more background maps to the map view.



  Touch + to add a new background map. This opens a new screen listing all the files stored in your Android device's Download folder which can potentially be converted into background maps. These can be vector maps (a set of files with shp, shx, prj, dbf extensions), kml or georeferenced raster maps (bmp, non-animated gif, tif or jpg files).

  NOTE 1: To georeference a raster map, refer to Georeferencing A Raster Map on page 51.

  NOTE 2: For big shp jobs, it may be more convenient to use them as a background map rather than import them into the open job. This is because the time required to create a background map in this case is much shorter than importing the file into the job.
- Coordinate system: Choose the coordinate system in which feature positions will be expressed. This choice is made in four steps:
  - Country: Specify the country where you are using MobileMapper Field. This allows MobileMapper Field to make a pre-selection of the datums and projections (see the two fields below) available for this country.

- Datum: Choose a datum from this list.
- With/without projection: Choose a projection from this list. For “no projection”, select “Latitude/Longitude”.
- Geoid: Choose a geoid from this list (or “Ellipsoid” for “no geoid”).

Use  to create a custom coordinate system.

Use  to view the properties of the currently selected coordinate system.

Use  to validate the coordinate system you have defined through the above four-step procedure.

- Record GPX: Use this ON/OFF switch to enable or disable GPX data recording. GPX is a convenient data exchange format used by many software applications to describe point coordinates as waypoints, tracks and routes. For more details, see *page 49*.
- Record raw data: Use the ON/OFF switch to enable or disable raw data recording.

  Recording raw data with MobileMapper Field requires that you first purchase this option from Spectra Precision. On making the purchase, you will receive a POPN by email.

  The first time you select the Record raw data function in MobileMapper Field, you will be requested to enter the POPN. And only then will you be allowed to use this function.

  For more details on raw data recording, see *page 48*.

  NOTE: When raw data or/and GPX data recording is in progress, the following icon will be continuously displayed in the Android status bar:

  If you take a look at the Android Notification screen, you will see exactly what data recordings are currently taking place.

Before Starting Your First Job

A Few Important Details To Know

Take some time reading the few notions introduced below. This will allow you to use MobileMapper Field in the best possible way:

1. **Antenna height**: If you are only interested in 2D positions, the antenna height may be left equal to "0". Remember however that positions are always collected as 3D positions. When exporting your data to SHP format, you can however choose to export them as 2D positions.
2. **Position Averaging**: You should ask yourself whether you want to get the most accurate positions possible for each and every point feature you will collect in the field.

   To optimize the accuracy of these positions, you should stay at standstill for a certain time on each of the points you will be occupying. This will allow MobileMapper Field to refine the feature position by averaging all the positions it will compute successively over this period of time. The time during which the position is averaged is called Averaging time and is fully user-controlled.

   – If you don't need optimized position accuracy or/and you want to be quick at collecting features, then you should set Averaging time to "0". In that case, features are logged quasi-instantly, picking the last position computed as the feature position.

   – If you need optimized position accuracy, set Averaging time to a value other than "0". If you choose "10" for example, that means MobileMapper Field will ask you to stay still for 10 seconds on the point before the averaged point position is available.

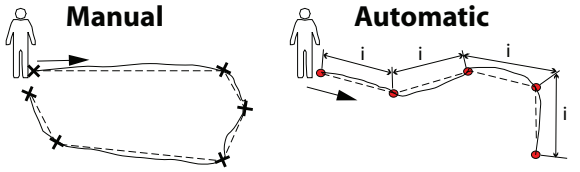
     In that case you will then need to touch  at the end of the averaging time to save the feature and all its attributes (including averaged position).

3. **Position Accuracy Criterion**: You may prevent MobileMapper Field from saving features if position accuracy is not better than a certain level. This level is called Position filter. It allows you to define the maximum tolerated values for the HRMS and VRMS.

   MobileMapper Field will warn you when at least one of these values is exceeded (the HRMS and/or VRMS values will then appear in red characters in the accuracy bar).

   The Position filter setting applies to all types of features: points, lines and polygons.

4. **Logging Mode**: Collecting a line or polygon feature requires that you choose a logging mode.



Continuous lines show actual paths traveled. Dotted lines show features, as logged.

Two options are possible (see also the above diagram):

– *Manual*: As you walk along the line or polygon, you decide when you want MobileMapper Field to pick up positions.

  This logging mode is suitable for any feature having a regular shape, for which only the positions of vertices are enough to accurately describe the feature's size and location.

  If you choose this mode, you must provide a value for the **Averaging time** parameter (see above).

– *Automatic*: As you walk along the line or polygon, MobileMapper Field will automatically pick up instant –therefore non-averaged– positions at regular intervals of time or distance (see **Log by** parameter).

  If you choose this mode, you must specify the time or distance interval MobileMapper Field should work from (see **Logging interval** parameter).

5. **Nesting**: While logging a line or polygon, you may want to log a point feature found along the way.

   In this case, collecting this other feature is called "nesting" (also called "double-logging"), which means logging a new point while being still logging the line or polygon.

6. **Entering Attributes**: For points, MobileMapper Field will prompt you to enter the attribute values before you log the point (case of instantaneous measurement). If an average time greater than 0 is used, attribute values may be entered before starting the averaging process, during the averaging process, and after the averaging time has elapsed (i.e. as long as you have not logged the point).

For lines and polygons, attribute values may be entered at any time after touching  . MobileMapper Field will always prompt you to enter these values both at the beginning (before touching ) and at the end (before touching ) of the data collection.

Note that the values of **Averaging time**, **Antenna Height**, **Position Filter**, **Log by** and **Logging interval** you choose will be kept unchanged until you decide to use another value for each of these parameters.

Setting the Antenna Height

Accessing the antenna height setting is possible in the following context:

- Open a job.
- Touch  and choose any of the available layers.
- Touch  and select **Antenna height**.
- Enter the value of antenna height, expressed in the chosen unit, and then touch **OK**.

Setting the Averaging Time for Point Features

Accessing the averaging time setting is possible in the following context:

- Open a job.
- Touch  and choose any of the available point-type layers.
- Touch  and select **Averaging time**.
- Scroll the field up or down until you get the desired value (in seconds) between the two horizontal blue lines and then touch **OK**.

Setting the Position Filter

Accessing the position filter setting is possible in the following context:

- Open a job.
- Touch  and choose any of the available layers.
- Touch  and select **Position filter**.
- Enter the desired value of position filter, expressed in the chosen unit, and then touch **OK**.

Setting the Logging Mode for Lines & Polygons

- Open a job.
- Touch  .
- Select a layer, of the line or polygon type.
- Touch  and select Logging mode.
- Select the desired mode (Automatic or Manual) and touch OK.

If you have selected “Manual”, there is no additional setting required. If you have selected “Automatic”, choose a suitable logging interval:

- Touch  and select Log by.
- Select the type of logging interval you wish to use (Time or Distance) and touch OK.
- Touch  and select Logging Interval.
- Scroll the field up or down until you get the desired value of time (in seconds) or distance (in the chosen unit) between the two horizontal blue lines and then touch OK.

Logging Points

First make sure your GNSS receiver is delivering a valid position.

General Case

- Stand next to the point feature you want to log.
- Touch .
- Select the layer where to store the point.
- Unless already done, touch and set successively the following parameters: **Averaging time**, **Antenna height** and **Position filter** (see also *Before Starting Your First Job on page 19*).
- Then as prompted on the screen, enter the different values of attributes specific to the point.

  NOTE 1: If MobileMapper Field is run on an SP20, you may refine the position of your device over the surveyed point using the view provided by the rear camera (see *page 25*).

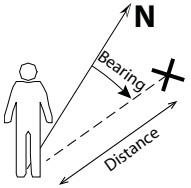
  NOTE 2: Still if MobileMapper Field is run on an SP20, you may also log any point of interest shown on the map screen and assign values to its attributes (see *page 26*).
- Touch .

  If you chose an averaging time equal to "0", the point feature is saved quasi-instantly with all its attributes (see also *Before Starting Your First Job on page 19*).

  If you chose an averaging time other than 0, stay at standstill until MobileMapper Field has finished averaging the position (progress bar shown on top of the screen as a thin, red horizontal line). Then touch to save the feature and its attributes (including averaged position) to the layer.
- If you now need to collect a new point feature the same type as the one you've just collected, you may use the **Repeat feature** function to save time (see *Collecting Features of the Same Type on page 29*).

NOTE: Touching a collected point on the map screen will display the corresponding attribute(s) as well as the name and coordinates of this point (see example).

Logging an Offset Point



- Stand at some distance from the inaccessible point you want to log.
- Touch .
- Select the layer where to store the point.
- Unless already done, touch and set successively the following parameters: **Averaging time**, **Antenna height** and **Position filter** (see also *Before Starting Your First Job on page 19*).
- Touch and select **Offset**.
- Enter the bearing, distance and possibly vertical offset (if 3D position is required) to the inaccessible point. Use external means to make these measurements.

  Vertical offset refers to the height deviation between your current position and the inaccessible point.
- Touch .
- As prompted, enter the different attributes qualifying the point.

  NOTE: If MobileMapper Field is run on an SP20, you may refine the position of your device over the surveyed point using the view provided by the rear camera (see *page 25*).
- Touch .

If you chose an averaging time equal to “0”, the point feature is saved instantly with all its attributes (see also *Before Starting Your First Job on page 19*).

If you chose an averaging time other than 0, stay at standstill until MobileMapper Field has finished averaging the position (progress bar shown on top of the screen as a thin, red horizontal line). Then touch to save the feature and its attributes (including averaged position) to the layer.

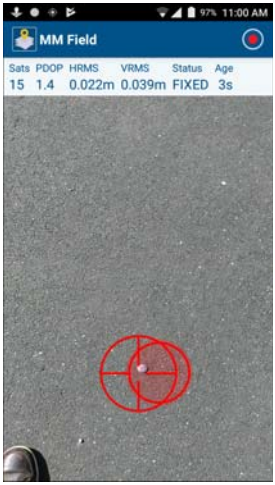
- If you now need to collect a new feature the same type as the previous one, you may use the Repeat feature function to save time (see *Collecting Features of the Same Type on page 29*).

Using the Rear Camera to Better Aim at a Point

(With SP20 only)

When you are ready to log a point (whether with zero or non-zero offset), you may touch to get a real view of the ground, as seen by your device’s rear camera.

The camera view will show you something like this:



You then have to orientate your device so that the two cross-hairs become concentric and green in color, meaning the

device is level. Then gently move the device horizontally so that the two cross-hairs aim at the desired ground point:

When you are precisely over the target, touch the button below, then located in the title bar, at the top of the screen:

Be sure you keep the cross-hairs green throughout the data collection otherwise the point logging will be aborted. This is especially critical if you have chosen a long averaging time (see *page 21*).

At the end of the data collection, MobileMapper Field comes back to the previous screen where you should touch  to save all the data logged for the point.

Logging any Point from the Map screen

(With SP20 only).

When you are ready to log a point (whether with zero or non-zero offset), you may alternately touch  to log any point of your choice. After touching this icon, MobileMapper Field shows the area around your current location on the map screen. Then do the following:

- Touch a point on the map where you wish to create a new point. The icon chosen for the selected layer to represent a point feature appears at this precise location.
- Touch  in the lower bar.
- Enter attribute values for that particular point, as requested by the type of layer you have chosen.
- Touch  to save the point and its attributes, which are then automatically shown on the map screen, attached to the new point on the map.

  NOTE: The coordinates of the point are not computed from GNSS measurements, but simply deduced from the map orientation and scale, and also from the location where you clicked on the map.

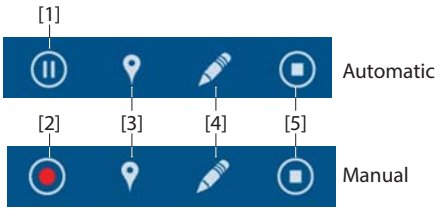
  Creating such points may be useful for example to initiate a Goto function to one of these points.

Logging Lines or Polygons

General Case

First make sure your GNSS receiver is on and delivering a valid position.

- Stand next to the start of the line or polygon you want to log.
- Touch .
- Select the layer where to store the line or polygon.
- Unless already done, touch and set successively the following parameters: Logging mode, Antenna height, Position filter and Log by + Logging Interval or Averaging time (see also *Before Starting Your First Job on page 19*).
- Enter the different attributes qualifying the feature. This may be done at any time during the logging (choose the moment that's the most convenient to you). See below.
- Touch to start logging the feature.
- Start walking along the line or polygon. Depending on the chosen logging mode, the title bar will be one of the following two:



Follow the instructions below to complete the logging.

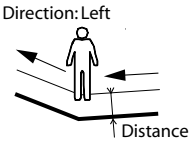
- **[1]**: Touch this icon to pause logging (MobileMapper Field stops logging positions at regular intervals of time or distance).
- **[2]**: Touch this icon to log a position manually, which will be part of the line or polygon you are currently collecting. Depending on the value of Averaging time, the position will be averaged or not (see also *Logging Points on page 23*).
- **[3]**: Allows you to log another point feature while a line or polygon feature is being logged (nesting).
- **[4]**: Touch this icon to enter the feature attributes. This can be done at any time while logging the line or polygon.
- **[5]**: Touch this icon when arriving at the end of the line or polygon feature to complete the logging of the feature.

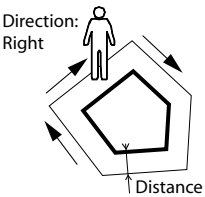
NOTE: Touching a collected line or polygon on the map screen will display the corresponding attribute(s) as well as the coordinates of the point (on the line or polygon) that you touched (see example).

Logging an Offset Line or Polygon

First make sure your GNSS receiver is on and delivering a valid position.

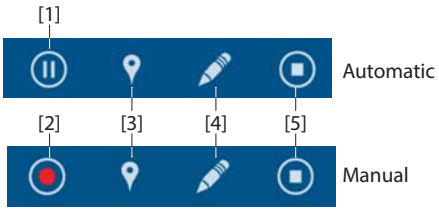
- Stand at some distance from the inaccessible line or polygon you want to log.
- Touch .
- Select the layer where to store the line or polygon.
- Unless already done, touch and set successively the following parameters: **Logging mode**, **Antenna height**, **Position filter** and **Log by** + **Logging Interval** or **Averaging time** (see also *Before Starting Your First Job on page 19*).





- Touch and select **Offset**.
- Enter the direction (right or left) and distance to the inaccessible line or polygon. Use external means to make these measurements.
- Touch .
- Enter the different attributes qualifying the feature. This may be done at any time during the logging (choose what's the most convenient for you). See below.
- Touch to start logging the feature.
- Start walking along the line or polygon, taking care to comply with the offset (direction and distance) you have

just entered. Depending on the chosen logging mode, the title bar will be one of the following two:



Follow the instructions below to complete the logging.

- **[1]**: Touch this icon to pause logging (MobileMapper Field stops logging positions at regular intervals of time or distance).
- **[2]**: Touch this icon to log a position manually, which will be part of the line or polygon you are currently collecting. Depending on the value of Averaging time, the position will be averaged or not (see also *Logging Points on page 23*).
- **[3]**: Allows you to log another point feature while a line or polygon feature is being logged (nesting).
- **[4]**: Touch this icon to enter the feature attributes. This can be done at any time while logging the line or polygon.
- **[5]**: Touch this icon when arriving at the end of the line or polygon feature to complete the logging of the feature.

Collecting Features of the Same Type

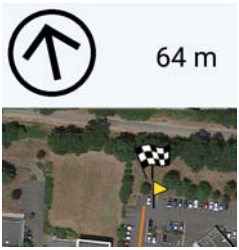
When you have to collect successively several features of the same type, you may advantageously use the Repeat feature function to reduce the number of clicks you have to do between two features. As you walk away from the last collected feature, heading for the next one (of the same type), just do this:

- Touch  and select Repeat Feature. This takes you directly to the log screen where you can enter the attributes of that new feature and log it once you stand there. For most attributes, MobileMapper Field will prompt as default values those that were saved for the previous feature.
- Repeat this action as long as you need to collect similar features.

Revisiting Features to Update the Values of their Attributes

Being able to easily revisit features in the field allows you to update the values of their attributes.

- Open the job containing the features to revisit.
- Touch (Go to function).
- Choose Select destination from list.[1]
- Select the layer containing the feature or features to revisit. MobileMapper Field lists all the features stored in the layer.



- Select one in the list. MobileMapper Field then displays the direction to follow and the distance still to go before you reach the feature (this implies your GNSS receiver can compute a valid position from where you currently are. To get a valid direction –as indicated by the arrow– you need to walk). A checkerboard flag is placed on the destination point.
- Head for the feature. Once you get there and you know which attributes should be updated, do the following:
- Touch and make the necessary changes. You can edit all or part of the attributes and make a new measurement of the point position, possibly aided with the rear camera view (as explained on *page 25*).
- Use or to select the next feature to go to:
  - selects the previous feature in the list.
  - selects the next feature in the list.
- Then repeat the same steps as above until all the concerned features have been revisited.

Deleting Features

- Select a feature on the map view.
- Touch and confirm the deletion. The feature then disappears from the map. You can only delete one feature at a time.

Search Function

You can use this function to search for a particular feature stored in the job, based on a specific value of one of its attributes, or on a combination of specific values of some of its attributes. Note that picture, time, HRMS, VRMS, length, area and perimeter attributes cannot be involved in a search.

1. At this stage, MobileMapper Field offers another function, which is to guide you to any position based on its sole known coordinates. If that's what you want to do, choose Select target coordinates, enter the target coordinates, touch OK and then let MobileMapper Field guide you to this location.

- Touch  in the title bar.
- Select the layer containing the type of feature you are looking for. MobileMapper Field then lists the attributes pertaining to the layer.
- For the concerned attribute(s), enter the value(s) you are looking for.
- Touch  again. Mobile Mapper Field then shows the result of your search, which is the feature, or features, meeting your search criteria.

  If you touch any of the listed features, MobileMapper Field will spot this object on the map view. You can view the information attached to this feature or even delete the feature, but you cannot modify the feature.

Unlocking the Post-Processing Option

This is done by entering the POPN that was emailed to you after you purchased the option.

- Touch  , select Settings and enable Record raw data.
- Touch  . MobileMapper Field then asks you to enter the POPN.
- Enter the POPN and touch Register. Raw data recording starts right away. This is indicated in the Android status bar with this icon:

MobileMapper Office

Installing MobileMapper Office Software

- Download the installer from the Spectra Precision website and run this program on the computer. Wait until the welcome screen is displayed.
- The installation program may ask you to install one or several Microsoft applications on your computer. If this happens, please accept. These are:
  - Microsoft .NET Framework 4.5
  - Microsoft Visual C++ Runtime Libraries
  - Microsoft Windows Installer 3.1
- The installation program then installs MobileMapper Office.
- At the end of the installation, click Finish to quit the installation program.

Installing Optional Centimeter-Accurate Post-Processing

- Run MobileMapper Office and then click  . This opens a new dialog showing what optional features are currently active and which are not.

  "Post-processing with submeter-level accuracy" is a default feature in MobileMapper Office and so is always installed.

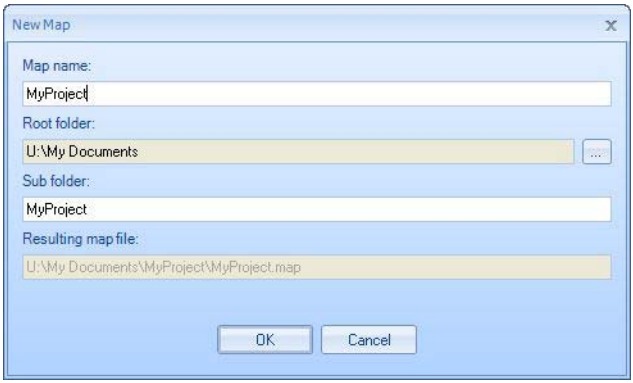
  The "Post-processing with centimeter-level accuracy", option may be added by entering the required POPN that you will have purchased beforehand. Follow the procedure below to activate this optional feature.
- Click Upgrade. Enter the POPN and then click Upgrade again. Wait until the upgrade is complete.

NOTE: Read-only field License key and the Activation key field may also be used for upgrading the software, but only in some particular cases. The streamlined procedure is POPN based.

Post-Processing Features in Mobile-Mapper Office Software

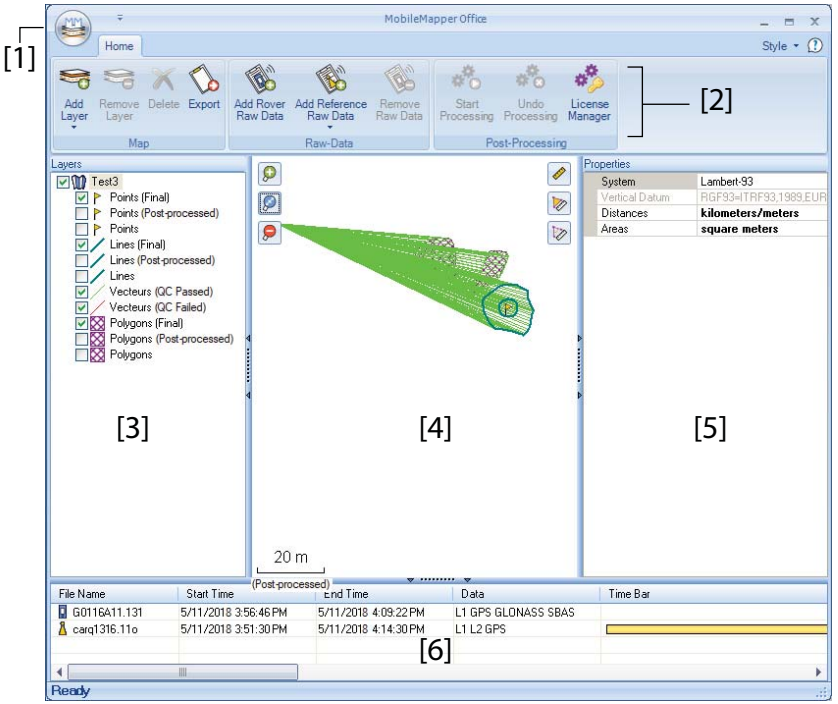
- Copy the following field data files from your mobile device to a folder of your choice on the computer:
  - *.map files
  - *.shp files
  - img*.jpg files
  - G* or *.urw file (raw data file depending on the equipment used).
  - A* or *.crw file attached to the raw data file (link between feature and collection time). An A* file is necessarily relevant to a G* file, and a crw file is relevant either to a G* file if named as the job, or to a urw file if named as this file..
- Run MobileMapper Office on your computer.

  The program first displays a window allowing you to quickly create a new project (a map file).



Just give your project a name and indicate where to store it and the program will automatically create the file structure for the project. If you want to open an existing project, click Cancel and then use button [1] below to select Open and browse your computer for the existing project. Next time you launch MobileMapper Office, the last opened project will automatically re-open.

The MobileMapper Office main window looks like this:

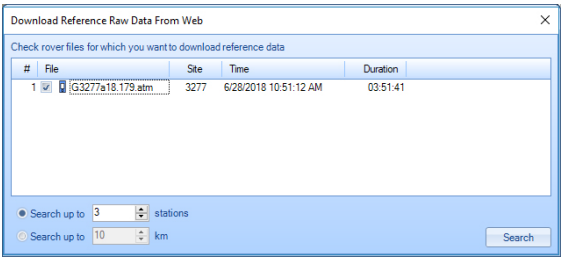


The different areas are described below:

- [1]: Open/Create Map button
- [2]: Menu bar
- [3]: MAP filename and Layers list
- [4]: Map screen showing the content of the open project, Also includes zoom buttons on the left and distance/angle/area tool buttons on the right.
- [5]: Depending on what is currently selected in area [3], [4] or [6], this area shows project properties (coordinate system and units used), layer attributes and appearance, or raw data file properties (observation time span, etc.). When selecting a feature on the map screen, the sound and image attributes pertaining to the feature can be heard and viewed by clicking on the three dots button after the file path in the corresponding field. Clicking on this button will start your computer's default editor used for respectively WAV and JPG files.

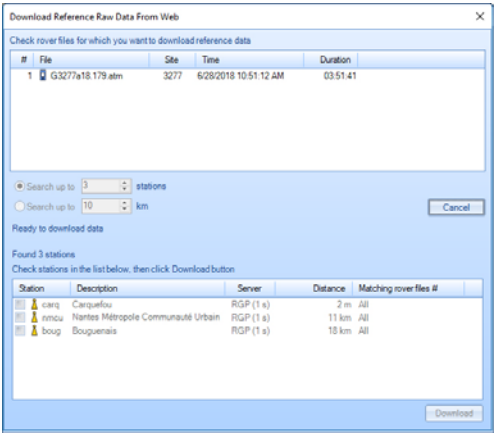
  - [6]: Observation times covered by the raw data files added to the project. A blue bar stands for a receiver raw data file, and a yellow bar, for a base raw data file.

- Click  and select **Open**. Browse to the folder containing your field data files.
- Select the Map file and click **Open**. MobileMapper Office shows the content of the project in areas [3], [4] and [5] (see screen above).
- Click on **Add Rover Raw Data**. Select the raw data file corresponding to the project (from the same folder as previously) and click **Open**. MobileMapper Office imports the *G or urw file and then shows the file properties in areas [5] and [6].
- Assuming you are working with a third-party reference station, click successively on **Add Reference Raw Data** then **From Web** (your computer is supposed to have an Internet connection). A new window then opens in which you have to indicate how you wish to search for the reference station you will use for post-processing your project.



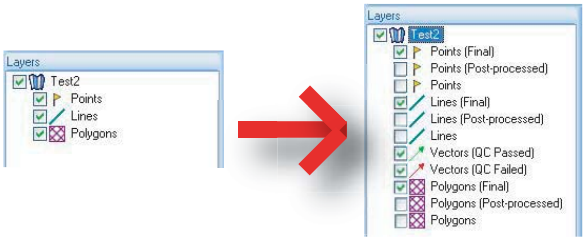
- Choose one of the following two search criteria:
  - **Search up to x stations**: Specify a preset number of stations you want to list before choosing one. All the listed stations will be the closest to your working area, but there is no range limit for these stations.
  - **Search up to x km**: Specify a limit of distance between your working site and the stations. The shorter the distance, the better the raw data from the station, but the smaller the number of stations that can potentially be used.

- Click Search, then wait until the search is complete. At the end of the search, MobileMapper Office lists the stations meeting the search request.
- Select the most suitable reference station, mainly according to the distance (baseline) to that station.



- Click Download. MobileMapper Office imports the base raw data and then show its properties in areas [5] and [6].

  NOTE: Spectra Precision does not guarantee 100% quality results when using raw data files from reference stations that are situated beyond 200 km (125 mi) from your working area. It is also important to check that the downloaded base data offer at least the same type of raw data as the rover. If for example, the rover data are GPS/GLO L1 data, then the base data should be at least GPS/GLO L1 data. The post-processing may otherwise be degraded to a certain extent.
- Click on Start Processing. MobileMapper Office post-processes the different files present in the project. Below is an example of what can be seen in the Layers pane at the end of the post-processing step:



For each layer (<Layer_name>) present in the project MobileMapper Office has created two extra layers:

– **<Layer_name> (Final)**: This layer is viewed by default. It shows all the features of the **<Layer_name>** layer, namely those that have just been post-processed, for which you can now see the refined positions on the map screen, and also those not impacted by the post-processing, whose positions are unchanged compared to what they are in the initial **<Layer_name>** layer.

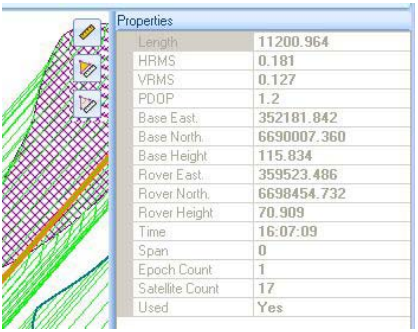
– **<Layer_name> (Post-processed)**: This layer is not viewed by default. It only contains the features that were actually post-processed. You may choose to only view this layer if you wish to focus on the sole post-processed features.

  (The "initial"<Layer_name> layer is also hidden by default.You may want to view this layer to see all the features as they were before the post-processing step.)

MobileMapper Office has also added two different vector layers to the project. Each vector describes the conditions in which the baseline between each post-processed point and the base station used has been determined. The resulting components of the vector are also provided. The two vector layers are:

- **Vectors (QC Passed)** (in green): The vectors pertaining to that layer meet all the quality control parameters defined on the **Options** tab (see *Quality Control in Post-Processing on page 38*).
- **Vectors (QC Failed)** (in red): None of the vectors pertaining to that layer meets the quality control parameters defined on the **Options** tab. If the layer is empty (no red vectors), then that means all the points were post-processed successfully.

Each vector can be visualized individually. Just select one on the map screen and the properties of the vector will then appear In the right-hand pane (see example below).



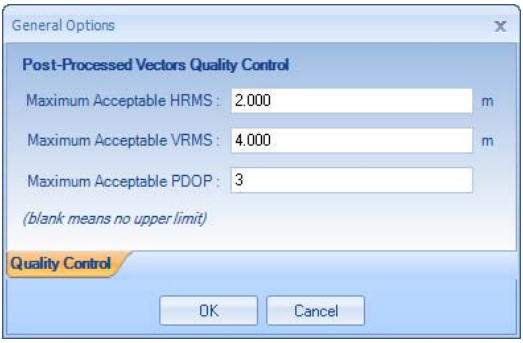
All new layers have been created –and can be found– in the same folder as those initially found in the project.

NOTE: DXF job files, MIF and CSV layers are not supported in this version of MobileMapper Office.

Quality Control in Post-Processing

You can place a quality control filter through which MobileMapper Office will rate the post-processing results according to your own requirements. Following the post-processing of your project, MobileMapper Office will associate the resulting vectors to two different layers: one containing the vectors that passed the quality control (green vectors), and a layer containing those that failed (red vectors).

- Click  and then on the **Options** button located in the lower-right corner of the pop-up window.
- Enter your three quality control settings, i.e. the maximum permitted values for HRMS, VRMS and PDOP. (see screen example below).



- Click OK to confirm your filter settings.

  All the vectors for which the HRMS, VRMS and PDOP are less than those specified here will pass the quality control whereas all the others, if any, will fail.

  Note that the quality control filter is applicable to all the projects you open in MobileMapper Office, until you modify the filter settings. To remove the filter, you just need to set the three fields blank and click OK.

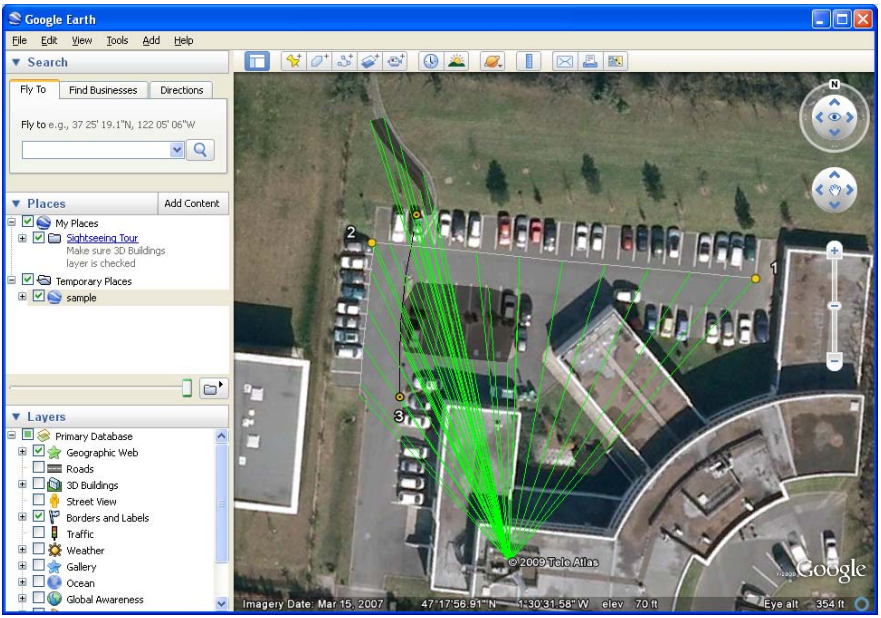
  Note also that the PDOP characterizes each point when it was logged (the PDOP is re-calculated by MobileMapper Office, based on the content of the job file). In contrast, the HRMS and VRMS are part of the post-processing results and characterize the post-processed positions.

Export Function

MobileMapper Office can export the visible layers from the open project to three different formats:

- GPS exchange format (*.gpx). All the selected layers will be merged into a single gpx file. Point features will be converted into waypoints, lines and polygons into tracks.
- Google Earth format (*.kml). All the selected layers will be merged into a single kml file.

  Opening a kml file from the Google Earth initial view will cause the Earth representation to be gradually rotated and zoomed in to show the exact location of the features held in the kml file.



- ASCII format (*.csv). Each selected layer will result in a separate csv file.

Follow the instructions below to export layers:

- Open your project.
- Make visible the layers you want to export (turn on the corresponding check boxes). As background maps will not be exported, they can stay visible in the project.
- Click on  and then select the format and destination of the file(s) generated by the Export function.
- Click **Save** to complete the Export sequence.

Re-Project Function

MobileMapper Office can convert the entire content of a project into another project, with all the original coordinates converted to another coordinate system.

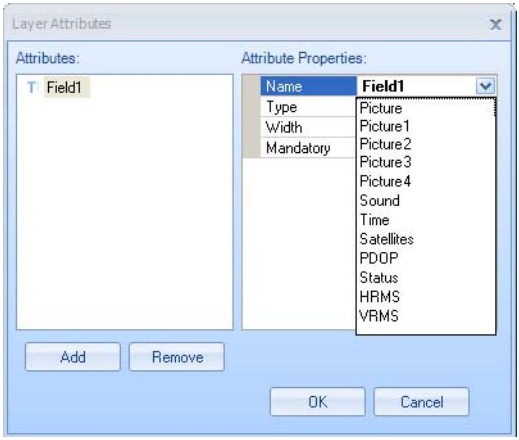
- Open the project you want to convert
- Click  and then select **Reproject As**.
- Define the coordinate system in which to convert the entire project. This definition includes the choice of the

linear unit used to express all the coordinates (meters, feet or survey feet), then click OK.

- Then name the resulting project (this will automatically define a subfolder for this new project) and click OK. Wait until the conversion is complete. MobileMapper Office then shows the newly created project.

Adding Layers

- Click  , select Create New and then choose a geometry type for the new layer (point, line or polygon). MobileMapper Office then asks you to enter a name for the new layer file (a shape file with "shp" extension) and choose or create a folder where to store this layer. Also, you should indicate whether you are creating a 3D or 2D shape file (see Save as type field).
- After making all these choices, click Save to create and store the file. Then the Layer Attributes dialog box opens.
- Click the Add button. This creates a new attribute with "Field1" as default name.



- You may add *pre-defined* or *user-defined* attributes.

  Pre-defined attributes (Picture, time, etc.) are simply selected from the Name scroll-down button.

  User-defined attributes are defined by first emptying and then typing a name in the Name field. But if in the Type field, you then choose "Image" or "Time", this amounts to reverting to a pre-defined attribute.

Predefined Attributes (All Attribute Types):

Predefined Attributes	Type	Additional settable parameter
Picture, Picture 1 to 4	Image	Mandatory (True) or not (False)*
Sound	Voice	Mandatory (True) or not (False)
Time	Time	Mandatory (True) or not (False)

*Mandatory=True means the MobileMapper Field user will be requested to describe this attribute when collecting data in the field otherwise the collected feature will NOT be saved.

Predefined Attributes Specific To Points:

Predefined Attributes	Type	Additional settable parameters
Satellites	Text	Width (number of digits used to save the number of satellites used)
PDOP	Text	Width (number of digits used to save the PDOP value)
Status	Text	Width (number of digits used to save the status report)
HRMS	Text	Width (number of digits used to save the HRMS value)
VRMS	Text	Width (number of digits used to save the VRMS value)

Additional Predefined Attributes Specific To Lines:

Predefined Attributes	Type	Additional settable parameters
Length	Numeric	• Width: Total number of characters used to save this attribute. • Digits: Number of decimal places.

Additional Predefined Attributes Specific To Polygons:

Predefined Attributes	Type	Additional settable parameters
Perimeter	Numeric	• Width: Total number of characters used to save this attribute. • Digits: Number of decimal places.
Area	Numeric	• Width: Total number of characters used to save this attribute. • Digits: Number of decimal places.

User-Defined Attributes (All Attribute Types):

User-Defined Attribute Type	Name	Additional settable parameters
Text	Free naming (10 char. max.)	• Width: Total number of characters not to be exceeded to describe this attribute. • Mandatory (True) or not (False).
Numeric	Free naming	• Width: Total number of characters not to be exceeded to describe this attribute. • Digits: Number of decimal places. • Mandatory (True) or not (False).
Yes/No	Free naming	• Mandatory (True) or not (False).
Menu (and sub-menu)	Free naming	• Width: Total number of characters not to be exceeded to describe each item. • Mandatory (True) or not (False). • Menu items (in the right pane). Enter each item one after the other, pressing the Enter key in between. • Submenus: Enable Depends on ... when adding the second menu, then enter submenu items for each parent menu item (see also *page 6*).

- Define as many attributes as needed by clicking Add after completing the definition of each attribute.
- Click OK when you are finished with the creation of layers. This closes the dialog box. The name of the new layer can now be seen in the layers list on the left.

Reading Aspect and Content of Layers

- Selecting a layer in the left-hand pane allows you to read or change the visual aspect (color, symbol, style, fill, scale) of all the features pertaining to that layer (features shown in the central pane, if any) and read the details of each of its attributes in the right-hand pane.

  To view the attributes of a layer, click anywhere within the Attributes row in the right-hand pane, then click ... in the rightmost cell. This opens the Layer Attributes dialog box showing the definition of all the attributes pertaining to that layer. These definitions are shown in the same way as when you created them.
- Selecting a feature in the central pane allows you to read the values of all its attributes in the right-hand pane.

Other Functions in MobileMapper Office

Undo Processing

If the post-processing results do not meet your expectations, you can reverse to the original SHP files by selecting the Undo Processing command.

Zoom Settings

In addition to the zoom buttons in the menu bar and on the map screen, MobileMapper Office offers another useful way of adjusting the zoom setting. Double-click on a feature in the map screen. This takes the feature to the center of the map screen. You can then adjust the zoom setting around the feature, which stays at the center of the screen, using the mouse wheel (turn forward to zoom in, turn backward to zoom out).

Viewing the Background Map

Background maps are seen as layers in the project. Use Add Layer>Select Existing. In the Open dialog box, choose "Raster file" as the file type and then select the background map file. MobileMapper Office supports the following raster formats: bmp, gif, tif, jpg, jp2 and ecw. Select a raster file and click Open. Only previously geo-referenced raster files are supported.

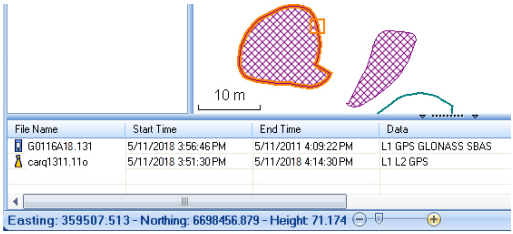
If this is the first layer inserted in the job, MobileMapper Office will ask you to define the coordinate system used. At this point, you can choose the linear unit used in the coordinate system (meters, feet or survey feet).

If a layer already exists in the project when you import a raster layer, there may be a message warning you about the coordinate system used by the background map, if not exactly the same as the one used in the layer. You may choose to go on anyway if the two systems are not very different. If you accept a background map using a very different coordinate system, its resulting location on the map screen will be inaccurate.

Status Bar

The status bar is located at the bottom of the main window. Whatever the feature selected on the map screen, the status bar displays the coordinates of the selected point.

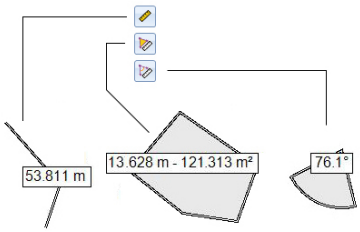
For a line or polygon feature, the status bar additionally shows a sliding bar allowing you to move the cursor on the map screen from one point to the next or previous point using respectively the "plus" or "minus" button at the two ends of the sliding bar.



The location of the cursor on the sliding bar is representative of the position of the selected point in the line or polygon.

Measuring Distances and Angles and Areas

Use the three icons in the right-upper corner. The upper one is for distances, the second one for areas and the lower one for angles.



For each tool, the first click on the icon will activate the tool and change the cursor shape. The second click will turn off the tool and the cursor will recover its initial shape. You may also press the right-hand mouse button to deactivate the tool.

Distance measurement:

- Click on the first point from where to start the distance measurement.
- Click on the second point defining the first measured segment. Any new click on the map will create a new segment from the previous point. From the second point, the indicated distance value stands for the total distance measured from the start point.
- Anticipate the end of measurement by double-clicking on the last point. This will freeze the distance measurement.
- Click on  to quit the distance measurement tool.

Area measurement: Same as distance measurement. The area measurement is effective only after you have defined

three points on the map. The value of perimeter is also provided.

Angle measurement:

– Click successively on the first then on the second point defining the segment providing the reference direction. The tool then draws the angle measured and gives its current value as you move the mouse cursor on the map screen. If you click anywhere, the tool freezes on the angle defined by this last click and gives its value.

– Click on  to quit the angle measurement tool.

Deleting Features

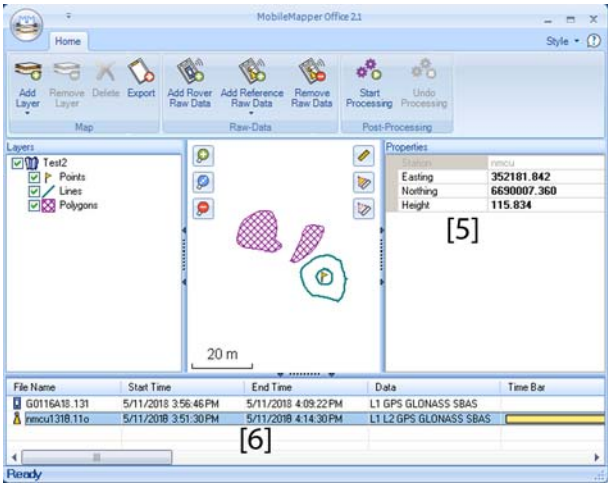
Select a feature on the map screen that you want to delete, and then click on the Delete button in the menu bar. Click Yes to confirm that you want to delete this feature.

Adding Base Raw Data from a File

This function is convenient when the useful base raw data files have already been downloaded from the Internet or if they come from a reference station that is not connected to the Internet. In either case, click on Add Reference Raw Data>From File and select the base raw data files.

Editing the Coordinates of the Base Station Used

You may need to edit the coordinates of the base station before starting the post-processing. As shown on the screen below, just click in the row (in the lower panel (**[6]**) containing the base data file. You can then edit the base coordinates in the right-hand panel (**[5]**)



When downloading the raw data of a reference station over the Internet, a default position is assigned to the station, which can be read in the *<Network>.stations.xml* file, saved locally. The file path is:

...\Program Files (x86)\Common Files\Ashtech\CORS\

If you know the true coordinates of the reference station (or you have more accurate coordinates available), you can edit the file, using any text editor (xml files are text files). In this case, make sure you just change the coordinates in the xml file, and nothing else.

Removing a Layer from a Map

Select the layer in area [3] on the screen and press the Del key or click on Remove Layer. This action removes the layer from the project but the corresponding shp file is still present in the folder where you saved it.

Shortcuts

From Windows Explorer, double-clicking a map file (*.map) will directly open the file in MobileMapper Office. All the files that can potentially be layers in MobileMapper Office can be dragged & dropped in the open map file (equivalent to selecting Add Layers>Select Existing)

Appendices

Recording Raw Data

Here are a few key points that will help you understand how the raw data logging function operates.

- A raw data file is created per job. It is saved in this folder: ...\Download\<Job_Name>\.
- With the Record raw data option on, raw data logging will start automatically when enough satellites are received (>3). Raw data logging is effective when ◘ is displayed in the Android status bar (see also *Settings on page 17*).

  NOTICE. It is a good practice to wait about 1 minute from the time at least 4 satellites are received and the PDOP is less than 3 before you start logging your first feature. (You don't need to be static during this wait time). The amount of extra raw data will advantageously be used in MobileMapper Office to secure the post-processing of your features.
- During raw data collection, even if you are not logging any feature but just moving from one feature to another, remember you should keep holding the receiver correctly so that it can continue to receive satellites in the best possible conditions.
- Always collect raw data for at least 10 minutes, including for those projects where GIS feature collection can be completed in less time. Remember the more you collect raw data for a given project, the better the results of the post-processing will be.
- A warning message will pop up if the memory goes low while collecting raw data.

The recorded raw data file will then be found in the *...\Download\<job_name>* subfolder.

- In an SP20, the file name will be in the form:

  G<Unit _ID><Index><Year>.<Day>
  Where:
  G: Raw data file identifier.
  <Unit_ID>: Unique number generated by Android from Android ID number and Device ID number (a 4-digit hexadecimal number).
  <Index>: "a" for first raw data file recorded in current day, "b" for second, etc.
  <Year>: The last two digits of current year (e.g. "18" for 2018).
  <Day>: Day number in year (1-366) used as extension in file name.

  Another file, related to the raw data file, is also created when exporting a job. This file links the vector files (SHP, MIF, CSV) to the raw data file. It uses the same naming

convention as the raw data file, but has a different header (A):

A<Unit_ID><Index><Year>.<Day>
e.g.: If "G3277a18.179" is the recorded raw data file, the exported companion file will be "A3277a18.179".

This file will be used when post-processing a job in MobileMapper Office.

- In a MobileMapper 50, the file name will be in the form:

  XXXXYYMMDDZZ.urw
  Where:
  XXXX: Unique number generated by Android from Android ID number and Device ID number (a 4-digit hexadecimal number).
  YYMMDD: Year, month, day.
  ZZ: Session number in day (01, 02, 03, etc.).
  urw: File extension.

  Another file, related to the raw data file, is also created when exporting a job. This file links the vector files (SHP, MIF, CSV) to the raw data file. It uses the same naming convention as the raw data file, but has a different extension (crw):

  XXXXYYMMDDZZ.crw

  This file will be used when post-processing a job in MobileMapper Office.

Recording GPX Data

Understanding GPX Data Recording in MobileMapper Field

MobileMapper Field allows you to save all the instantaneous positions computed by your receiver to a GPX file. Here are a few key points that will help you understand how the GPX data logging function operates:

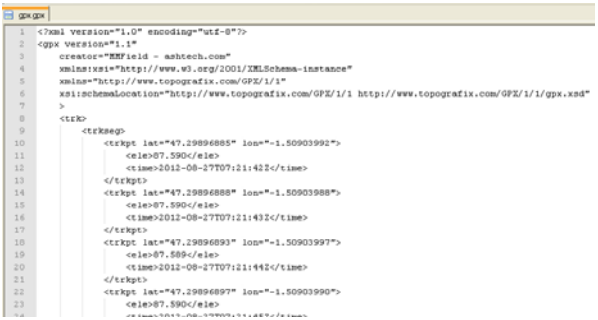
- As soon as GPX data recording is enabled, every single position computed is unconditionally saved to a "YYYY-MM-DD_hh_mm_ss.gpx" file stored in *\Download\MMField_GPX*.

  Where:
  YYYY: Current year (e.g. 2018)
  MM: Current month (1-12)
  DD: Current day (1-31)
  hh_mm_ss: Hours, minutes and seconds of beginning of GPX recording.
  gpx: File extension

  The recording rate is 1 second. Each position is saved as a distinct waypoint, irrespective of whether this position is

part of the point, line or polygon feature you are currently collecting.

- As long as GPX data recording goes on, all instantaneous positions are saved as waypoints belonging to the same track segment.
- GPX data recording may be interrupted either by intentionally disabling this function during a working session or by quitting MobileMapper Field. If you re-enable the function during the same working session, or if you-re-start MobileMapper with the function enabled, then the next positions computed by the receiver will be saved as waypoints belonging to a new track segment.
- The gpx file is an endlessly concatenated file. It should be transferred to your office computer whenever needed. Starting a new GPX file implies that the current one should be deleted.
- GPX data collection is job-independent. Changing job during a working session has not impact whatsoever on the recording function.
- A sample of GPX file format is given below.



Coordinates are always expressed in longitude, latitude and elevation, regardless of the coordinate system used in the open job. The time of computation is also provided for each position.

Enabling/Disabling GPX Data Recording

- Select  , then Settings, then activate or deactivate Record GPX.

Georeferencing A Raster Map

When adding a background map from a non-georeferenced raster file (see *page 17*), MobileMapper Field will display a calibration screen on which you can define reference points, to make the raster file a valid background map, which you can later display on the map screen. Follow the instructions below to do this:

- Drag the map so that the crosshair precisely coincides with your first reference point.
- Touch , enter the known coordinates of this point and then touch OK. By default the dialog box displays the last computed coordinates of your location.
- Repeat the previous two steps for your other reference points, each time entering their known coordinates.
- Touch to validate all your points. Let MobileMapper Field complete the georeferencing of the raw raster file.

  MobileMapper Field then returns to the list of background maps where you can now ask for showing or hiding the newly created background map on the map screen using the Show/Hide switch on the right.
- Touch twice to return to the map screen.

Using a Range Finder

You may need a range finder when collecting GIS data, and more especially when collecting offset features.

MobileMapper Field allows you to control a range finder through a Bluetooth connection.

Turn on the range finder and activate Bluetooth in this equipment. Then do the following:

- Open a job.
- Touch and select a layer.
- Touch and select Connect rangefinder. MobileMapper Field then automatically starts scanning for new Bluetooth devices.
- Select the range finder's Bluetooth device and then let MobileMapper Field establish the Bluetooth connection with the range finder.
- To get data from the range finder, you first need to perform a measurement, and then open the Offset screen in MobileMapper Field. When you perform a measurement, the range finder will return the message "Offset measured", meaning that MobileMapper Field has well received the measurement.

The range finder will provide bearing and distance to any point, and distance to any line or polygon.

When you are finished with the range finder, touch  and select Disconnect rangefinder.

Geotagging a Picture

When adding a picture attribute, you will be prompted to launch the embedded camera.

After doing so, you will need to drag the screen from left to right to have access to the camera settings menu, in which you will then see the geotagging option. Activate this option if you want to allow the mobile device to add geolocalization information to any of the photos you will take.

After activating this option, dismiss the camera settings menu, whose icon will then stay permanently visible on the screen, as if you had run the camera application from Android.

NOTE: The very first time you power on your mobile device, you will normally be asked whether you wish to tag your photos with the locations where they were taken. If you answer “Yes”, you won’t have to go through the above procedure.

A Summary of Files Handled by MobileMapper Field

Importing Layers	Where to Store the Files before Import	Supported input formats
to the open job	...\Download\	dxf, shp, mif
as a background map	...\Download\	tif, bmp, gif, jpg, ecw, kml, shp

Exporting job	Folder where exported file is saved	Choice of export formats
from the open job	...\Download\<job_name>	2D SHP, 3D SHP, MapInfo MIF, CSV, DXF

See details of all the generated files in the table on *page 16*.

Job Files	Folder where job files are saved	File Format extension
(mmd files)	...\MM Field\	mmd and mmd-journal

Rover Raw Data Files Required for Post-Processing

MobileMapper Office needs two files (a raw data file and a companion file) to post-process the data collected by a mobile device running MobileMapper Field. The name and extension of these files depend on the type of equipment running MobileMapper Field.

The raw data files are generated either by internal or external Spectra Precision GNSS receivers, delivering G files, or by third-party receivers, delivering urw files.

Companion files are respectively A* files for G* files, and crw files for urw files.

The table below summarizes the different typical scenarios possible and which files are actually used.

Raw data recorded by	Raw data file	Companion file
SP20	G<Unit _ID><Index><Year>.<Day>	A<Unit _ID><Index><Year>.<Day>
MobileMapper 50 alone	XXXXYYMMDDZZ.urw	XXXXYYMMDDZZ.crw
MobileMapper 50 controlling SP60	G<Unit _ID><Index><Year>.<Day> (1)	A<Unit _ID><Index><Year>.<Day> (2)
MobileMapper 120 (uses Windows Mobile OS, not Android).	G<Unit _ID><Index><Year>.<Day>	A<Unit _ID><Index><Year>.<Day>

(1) Generated by SP60 but saved to MobileMapper 50 memory.
(2) Locally generated by MobileMapper 50.

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MobileMapper Field & Office Software

User Guide

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