

# GSF Outils ArcGIS

Additional Functionalities for ArcGIS 9.x & 10.x



**Groupe Système Forêt**

**Geomatics Specialists**

**MANUAL**



**VERSION 10.3**





**Groupe Système Forêt**  
Geomatics Specialists

# GSF OUTILS ARCGIS

## ADDITIONAL FUNCTIONALITIES



GSF Outils for ArcGIS  
Version 10.3  
Edition of July 27 2015

For ArcGIS versions 9.3 to 10.x

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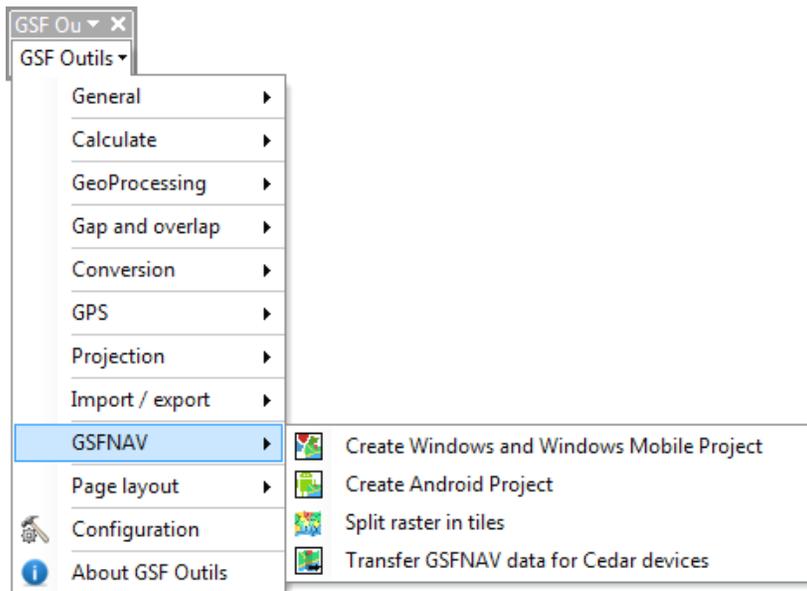
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## 1 NEW FEATURES IN GSF OUTILS 10.2

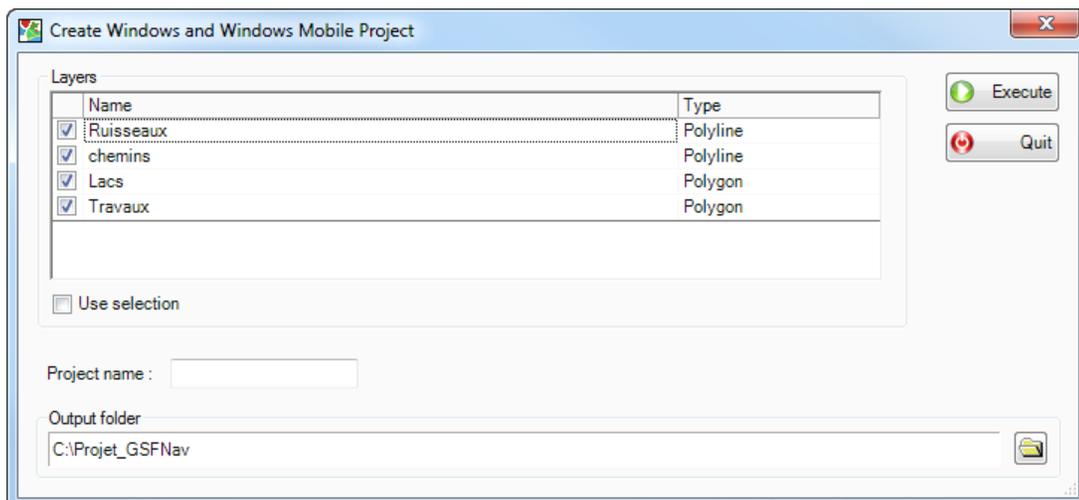
This section summarily shows the list of new features available in the GSF Outils 10.3 version. The chapters including those new features must be consulted to obtain more information.

GSF Outils 10.2.004 and GSF Outils 10.3 are **compatible with ArcGIS 10.3**.

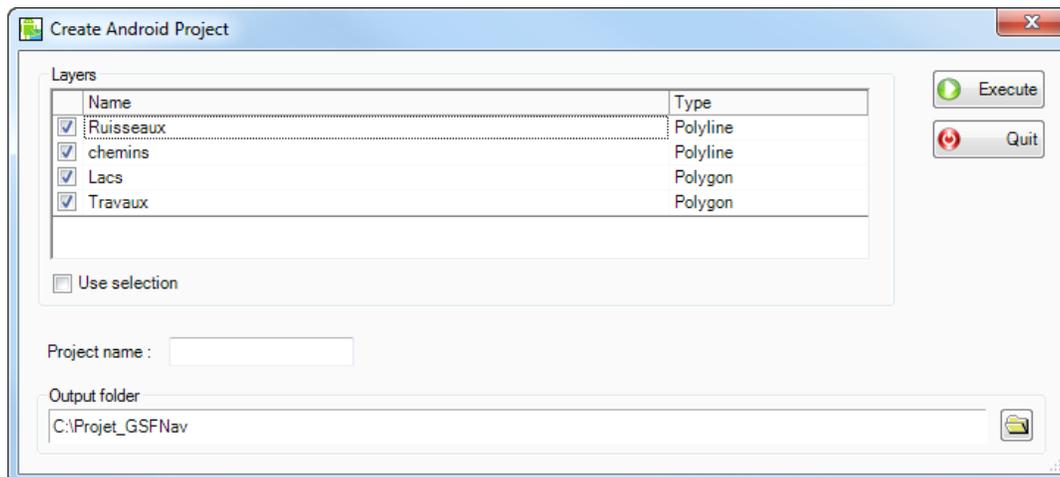
« GSFNAV », a new menu group, is now available. This menu contains specific functionalities for the GSFNAV application. It can be used to create a map for GSFNAV Windows, Windows Mobile or Android, to divide an image in « Tif » format to many tiles in order to accelerate the display in the Android device and to transfer the shapefiles for GSFNAV for Cedar devices.



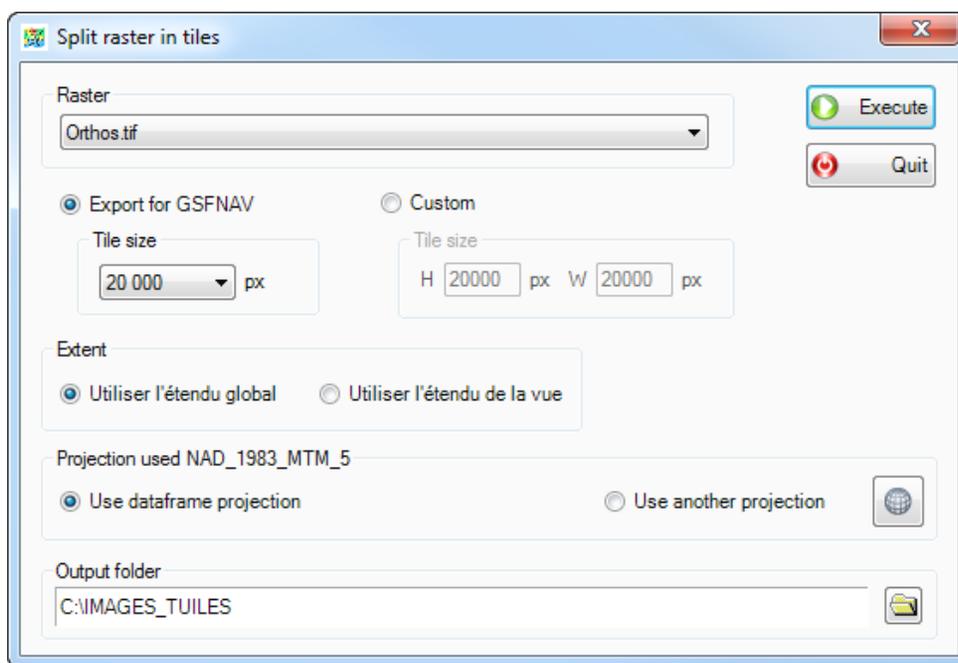
The « GSFNAV » menu contains the « Create Windows and Windows Mobile Project » function, for creating a map for GSNV by using the existing layers in the table of content and their symbology. Consult the 12.1 section at page 148 for more information.



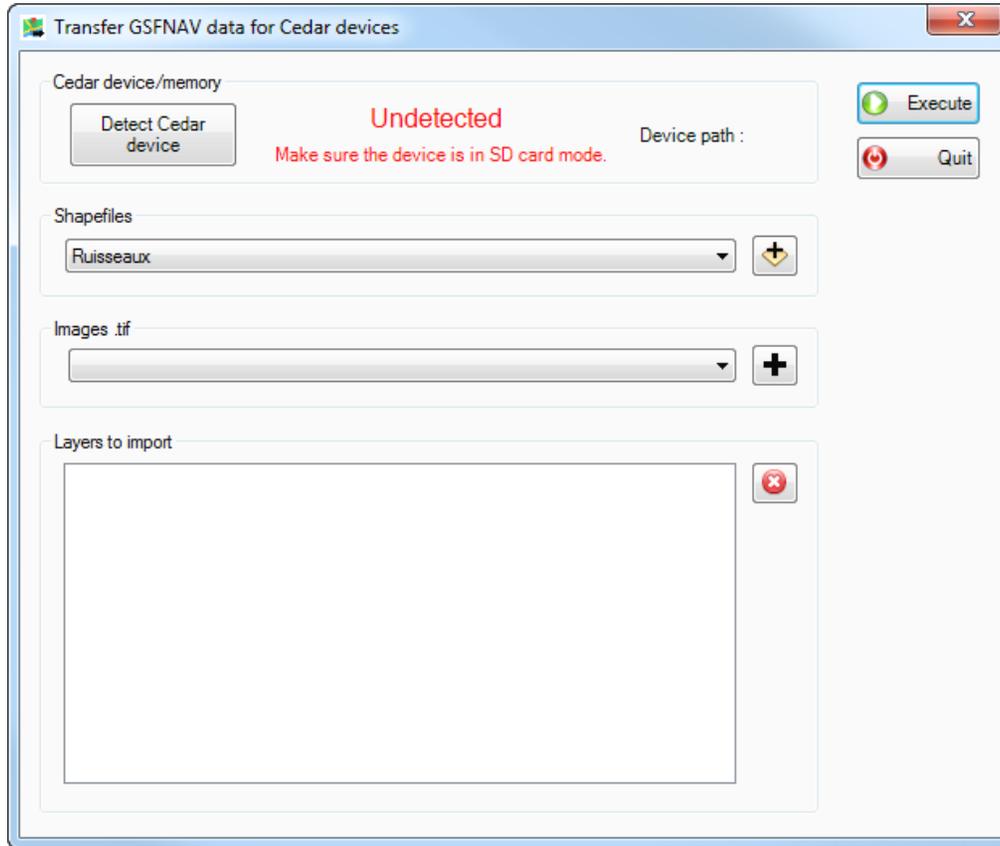
The « **GSFNAV** » menu contains the « **Create Android Project** » function which allows creating a GSFNAV map under the Android platform using the existing layers in the table of content and their symbology. Consult section 12.2 on page 149 for more information.



The « **GSFNAV** » menu contains the « **Split raster in tiles** » function that improves the « Tif » image display performance in the GSFNAV application for Android. This function divides the image in many images based on the number of pixels to split up the image. Look at section 12.3 on page 150 for more information.



The « **GSFNAV** » menu contains the « Transfert GSFNAV data for Cedar devices » function that allows transferring shapefiles and « Tif » images to the Android device. Look up section 12.4 on page 151 for more information.





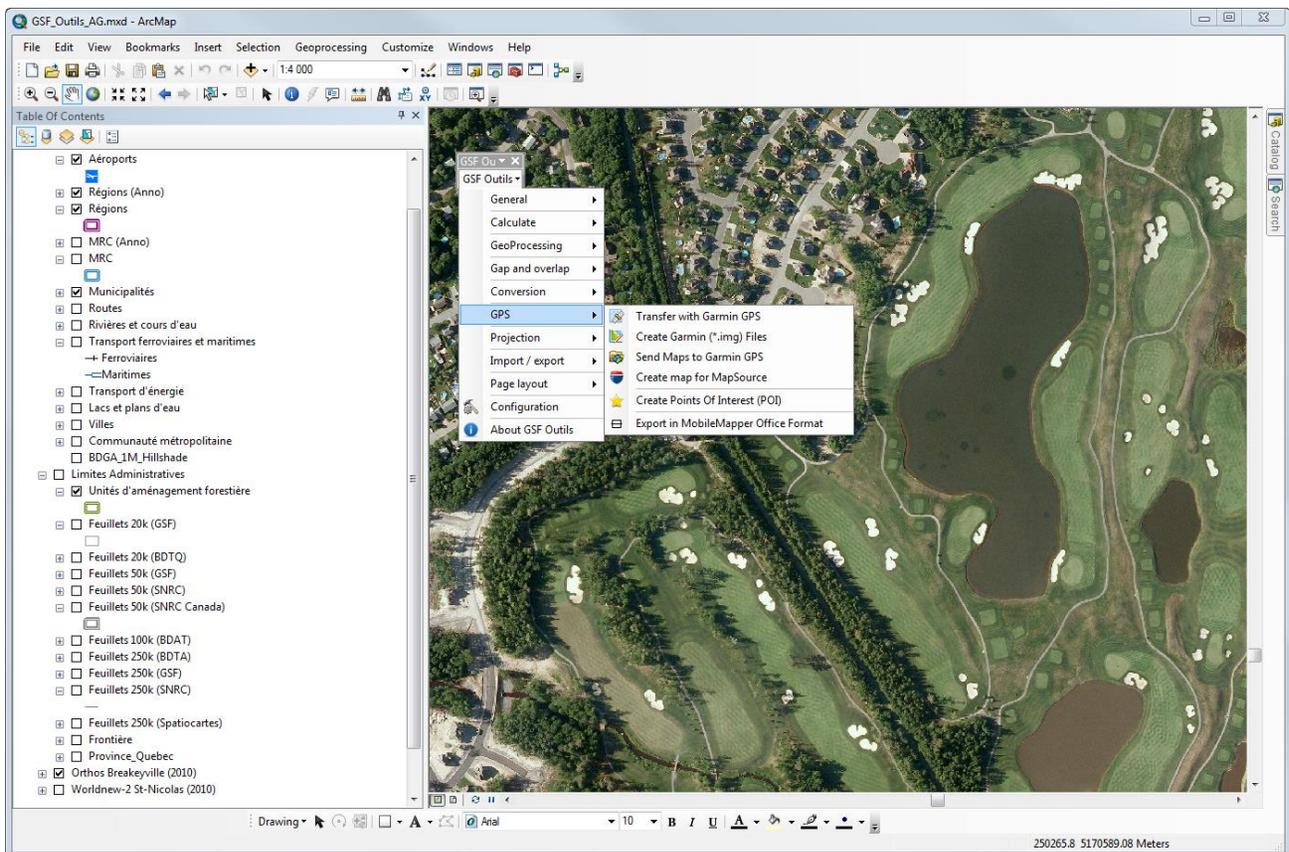
## 2 DESCRIPTION OF GSF OUTILS FOR ARCGIS

**GSF Outils for ArcGIS** is an extension to increase the functionality of ArcGIS Desktop via the application ArcMap. It adds a toolbar containing functions that facilitate tasks and routine operations Geomatics increasing opportunities for ArcMap.

The extension can be used in all domains: forestry, mining, municipal, etc. However, some functions are designed specifically for forestry such as "Tools PRAIF" function of the Geoprocessing menu. This function allows you to validate and correct digital data according to specific geometric standards on the development of plans and reports on forest interventions.

A group of functions allows the creation, transfer and management of base map for Garmin GPS files (\*.img) directly from these layers in ArcMap. The extension GSF Outils is the result of several years of development and support to our customers who submitted ideas and common problems to which we have developed solutions.

The evolution of the extension is still active and future releases will always contain new features and improvements. These will be available through an active annual maintenance.



## 2.1 EVALUATION VERSION

It is possible to evaluate the extension for a **period of 14 days**. This assessment allows the use of 100% of the tools with personal data in order to evaluate the extension. It is not permitted to produce commercial results with the evaluation version.

In evaluation mode, a window from the license's manager appears when using a function.

To evaluate the function, **click on the "Feedback" button**. A window will appear every time.

Note: Some functions have a restricted number of treatable records.



## 2.2 REGISTRATION OF GSF OUTILS

The extension GSF Outils is protected by a virtual key.

Following the installation of the components and the extension, it is necessary to register the extension by contacting Groupe Système Forêt (GSF) by email ([info@gsf.ca](mailto:info@gsf.ca)) or by phone **(418) 903-5488**.

**A unique product number of 12 digits specific to the computer and used hardware components will be generated.** It is necessary to provide the product number so that GSF generates the license number that also consists of 12 digits.

This number must be entered in the "About" window from the "GSF Outils" menu.



### 2.3 GPS GARMIN

The functions for the transfer of information and the creation of the file with Garmin are compatible with all models colors. However, some options must be enabled for GPS models Garmin marine type and those using the mass memory.

### 2.4 INSTALLATION AND UPDATES

The instructions for installing GSF Outils are detailed in the PDF document "Procedure Installation GSF Extensions" available at the link below:

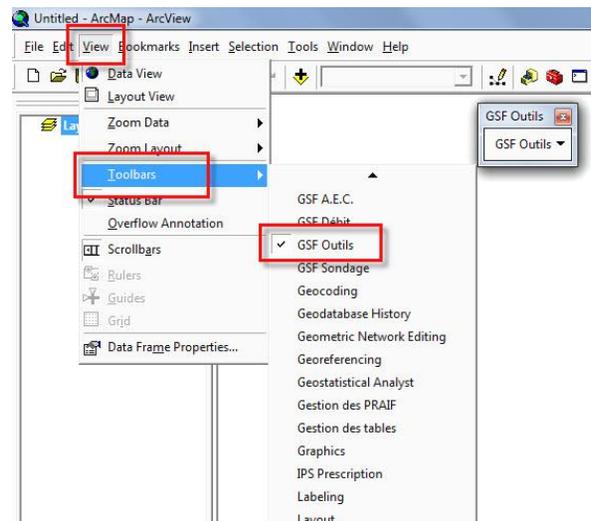
<http://www.gsf.ca/fr-ca/applications/gsf-outils-pour-arcgis.aspx>

### 2.5 ADD GSF OUTILS TOOLBAR IN GSF ARCMAP

GSF Outils for ArcGIS is presented in the form of a toolbar containing all the bar extension functions.

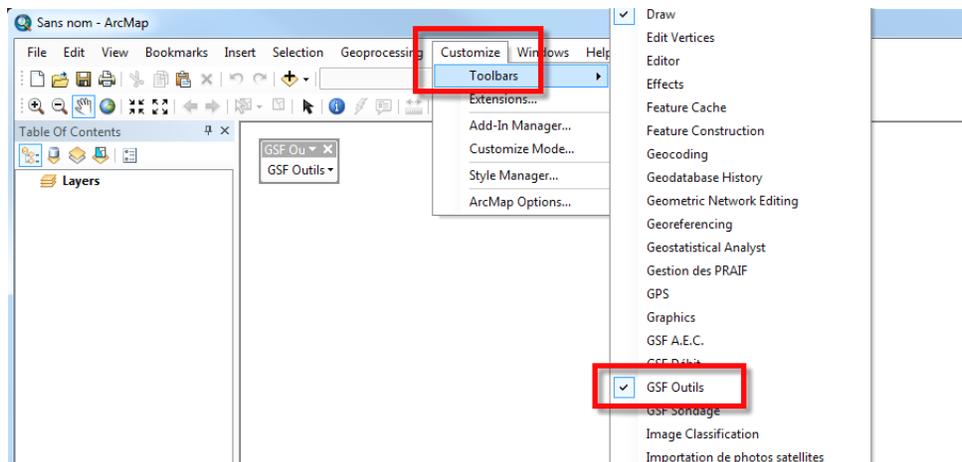
#### 2.5.1 ArcGIS 9.x

To View GSF Outils toolbar in ArcMap 9.x, select the **View, Toolbars** and **GSF Outils** menu.



#### 2.5.2 ArcGIS 10.x

To view GSF Outils toolbar in ArcMap 10.x, select the **Customize, Toolbars** and **GSF Outils** menu.





### 3 CONFIGURATION

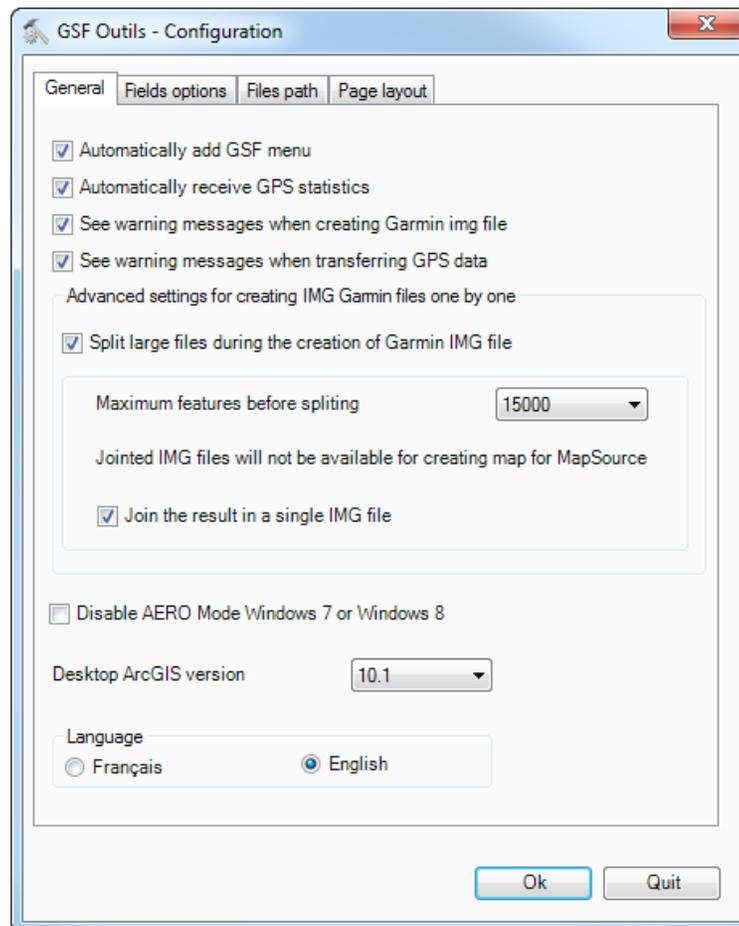
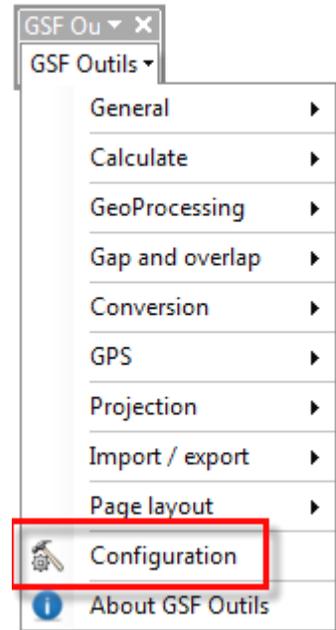
The **Setup** menu allows you to define parameters used in some functions, such as the name and structure of the field for calculation of coordinates or areas.

It also allows you to change the display of the extension to **English** or **French**. When you change the language, you will need to close and restart the ArcMap application.

Some functions require that the geoprocessing ArcGIS version used is specified (ArcGIS 9.2, 9.3, etc.). The **General** tab allows you to configure this setting.

GSF Outils can also use external applications (Google Earth, Microsoft Excel, etc.). However, it is necessary to specify their location.

Other parameters to add information on layouts can be configured here.



### 3.1 "GENERAL" TAB

#### 3.1.1 Add GSF Menu

This option enables the automatic addition of three GSF menus after using a first function of GSF Outils.

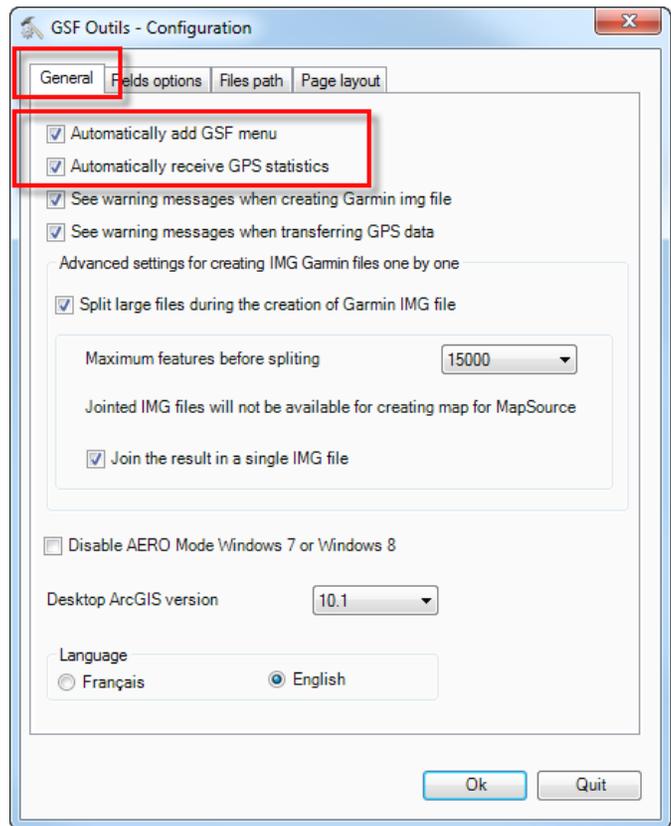
These menus add additional functionalities to the current session. Thus, they will not be saved when closing ArcMap.

GSF menus are present in three locations, in the context menu of a layer, the **Data Frame** and the **Options** table.

See Section 4.11 on page 49 for more information.

#### 3.1.2 Automatically Receive GPS statistics

This option configures the extension to automatically display the information contained in Garmin when it is connected to the computer and the GSF Outils "**Transfer GPS**" function is enabled. The Waypoints information, routes and tracks will be displayed.



However, for Garmin GPS models of older generation (GPSmap 60 , 76 , 276, eTrex Legend, etc.), it is recommended to disable this option if it contains lots of GPS points as this can cause a significant delay between initialization of the apparatus and ArcMap.

**It is also recommended to disable this option if the data transfer is made from a serial cable.** If it is possible to use a USB cable, this method will produce a much faster transfer rate than with a serial cable.

### 3.1.3 Warning message when creating IMG file

Some validations are performed during the creation of Garmin IMG files. In specific cases, these messages may be disabled when the user knows the conditions of the function and the results are about to be generated.

The messages could inform the user that there is no projection in the Data Frame or that it is better to create the IMG with the "**Build IMG files one by one**" option that uses **Levels**.

It is recommended to keep this option enabled.

### 3.1.4 Warning Message when transferring GPS data

Some validations are performed when transferring data from the GPS, such as paths or roads in inappropriate geometries, such as a layer of polygons.

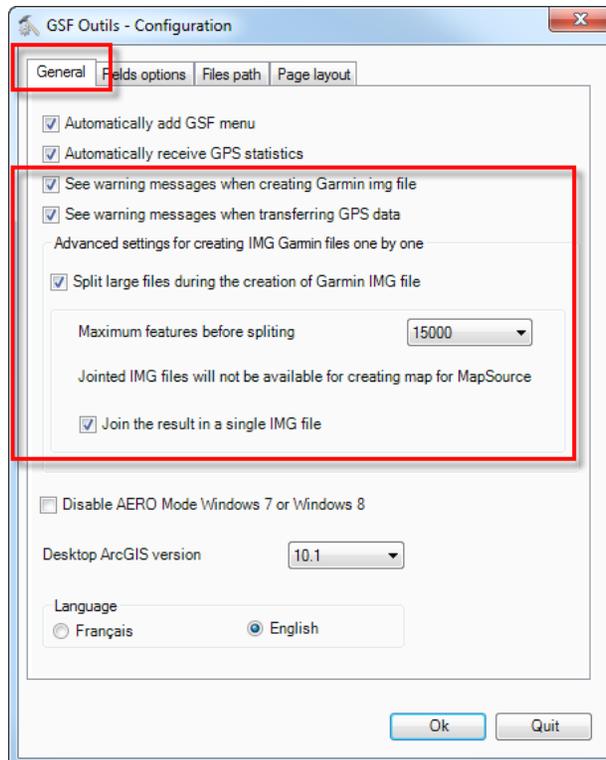
It is recommended to keep this option enabled.

### 3.1.5 Split large files during the creating IMG file

It is recommended to enable this option when the creating of IMG file covers a very large area and uses bulky layers (many registering) because it can split the registering layers by creating multiple image files.

By enabling this option, it will be possible to avoid the physical limitations of the components that are producing problems with too large number of registering.

The "**Join the result in a single IMG file**" option will automatically merge IMG images divided into one.



### 3.1.6 Disable AERO mode (Windows 7 & 8)

This option was added in order to avoid the problems encountered with importing Google Earth image. It must be enabled if the images are gray.

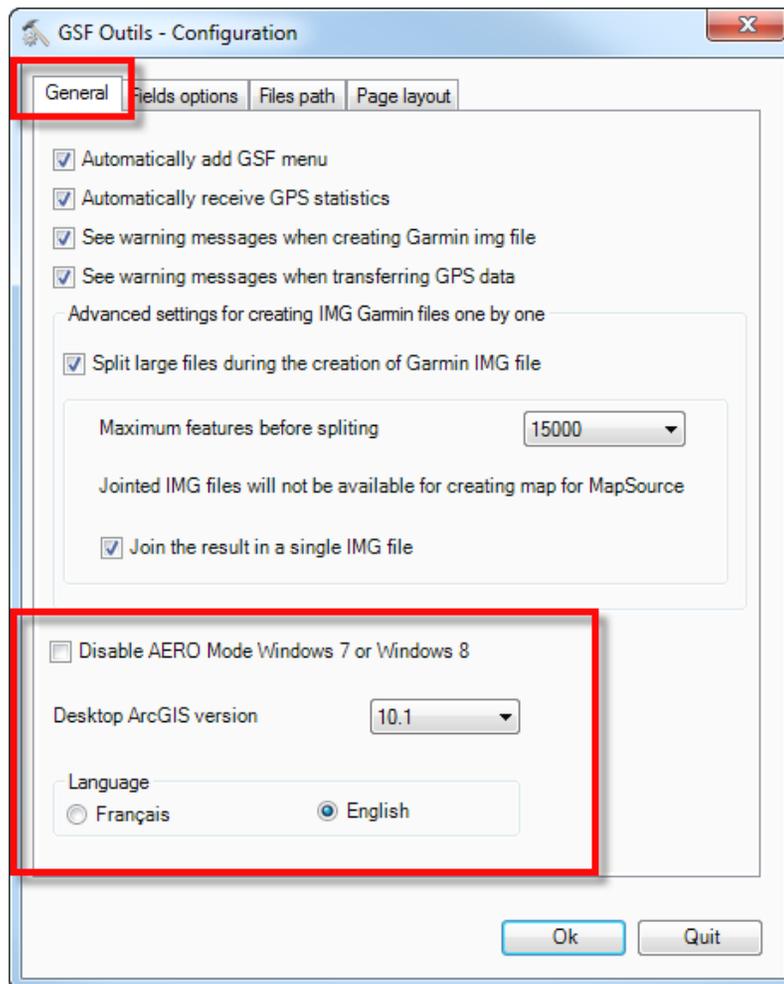
### 3.1.7 ArcGIS Version 5.1.7

This section specifies which object to take to the extension process during the geoprocessing. It is very important to specify the correct version. Do not confuse this number with the version of the GSF Outils extension.

### 3.1.8 Language (English or French)

The language display can be specifying for the extension in English or French.

When changing language, **it is necessary to restart ArcMap** to completely refresh the extension menus.

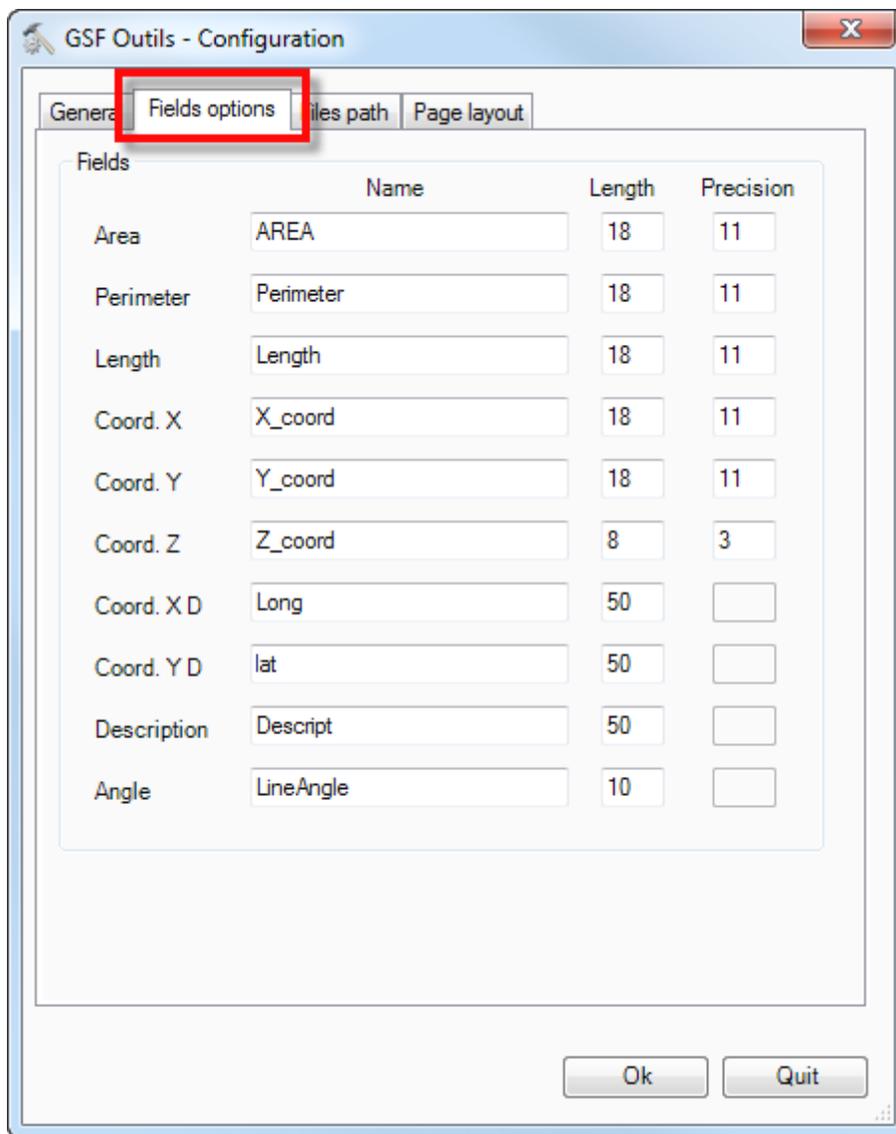


### 3.2 "FIELDS OPTIONS" TAB

This tab lets you specify the names and the structure of the fields used by some functions of the Calculation menu (**area and length** and **XY coordinates**). These structures are used to store calculated values. If these fields are not present, they will be created automatically during processing.

When creating fields, the length and number of decimal specified in this window, will be used as parameters of the new fields. These settings cannot be changed once the field is created. If the **Decimal** box is not available, it means that the field will be created in character types.

The **Coord.XD** and **Coord.YD** fields are used to store the X and Y coordinates in decimal degrees, degrees and decimal minutes or minutes seconds degrees (geographic system), when using the calculation function of the X , Y , Z coordinates. See section 5.2 on page 57.



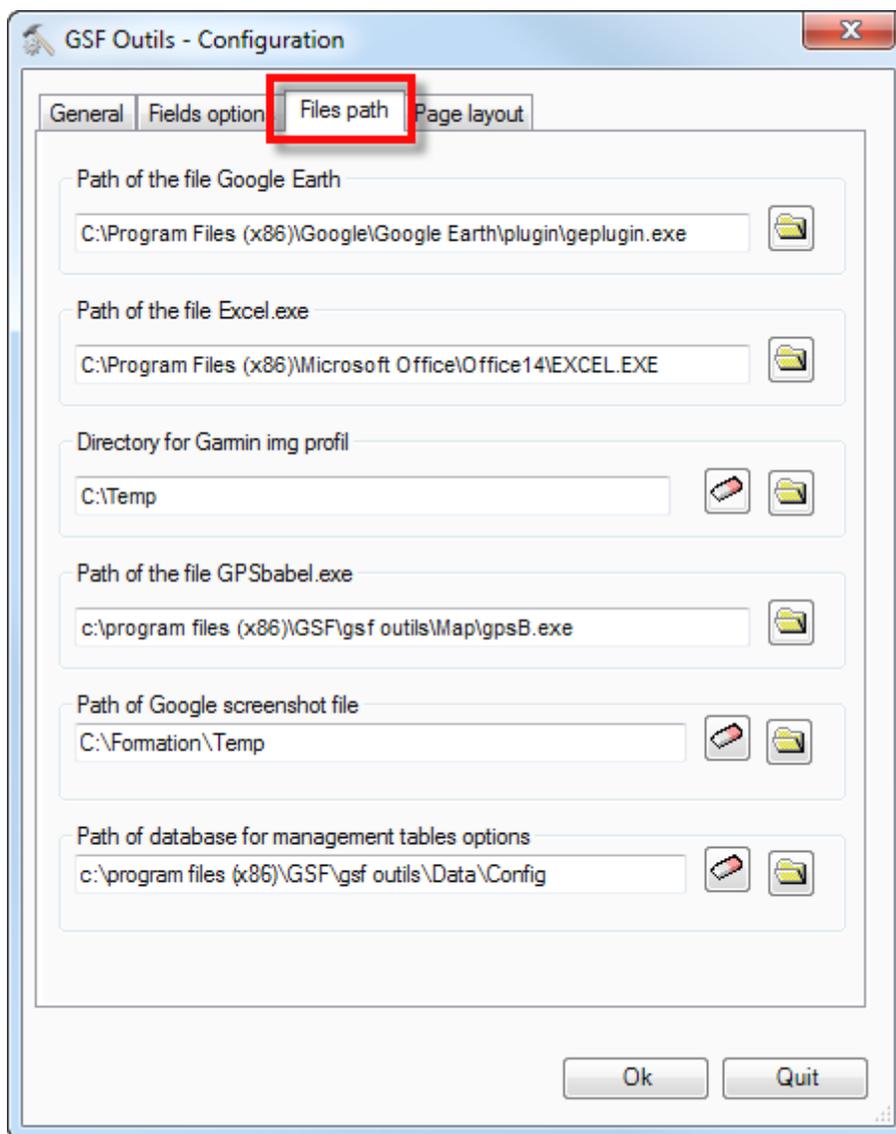
### 3.3 "FILES PATH" TAB

This tab allows you to specify the path of internal or external applications used by some functions of GSF Outils.

Some parameters are used for the transfer and the creation of Garmin files while others allow you to open and use external applications such as Google Earth and Microsoft Excel.

It is important to validate the link to the executable of Google Earth and Microsoft Excel.

The **Path of database for management tables options** section saves the settings specified when creating files \* Garmin. Img.



### 3.4 "PAGE LAYOUT" TAB

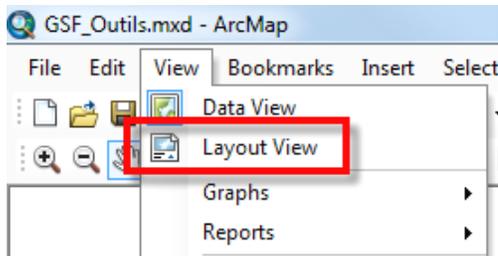
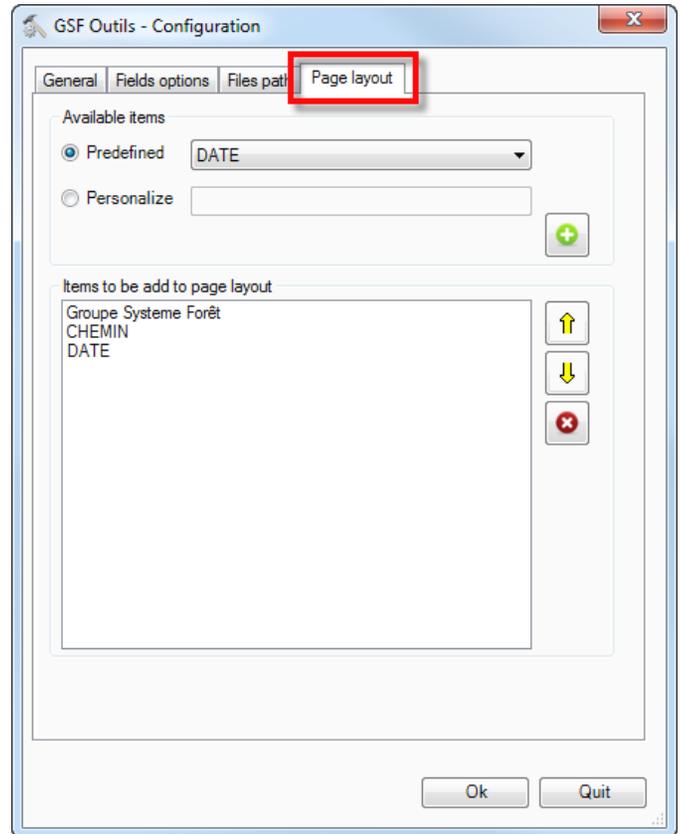
This tab allows you to specify predetermined elements that will be added to the page layout when using the function **Add multiple items** in the **Page Layout** menu of the GSF toolbar.

Some elements are predetermined and variables (date, path) while others can be customized to record information directly.

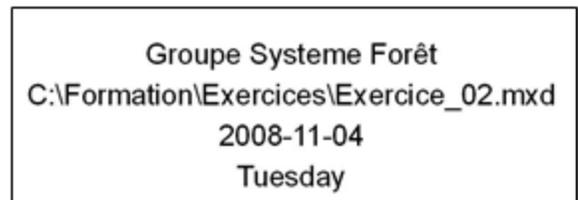
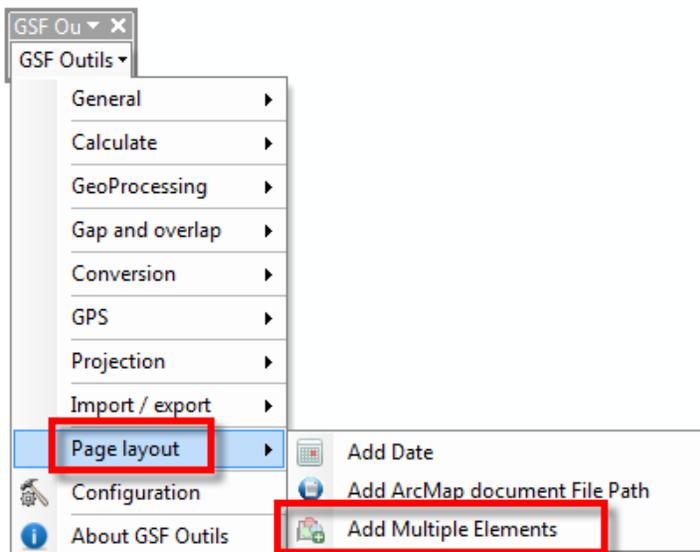
It is important to use the **Save** button before leaving this window to save the settings.

**A maximum of five (5) elements** can be defined. Even if a higher number is specified, only the first 5 items will be added.

These items will only be visible when the map document is in **Layout View**.



To add the items to the card, use the **Page Layout** menu and **Add Multiple Elements** of the GSF Outils toolbar.

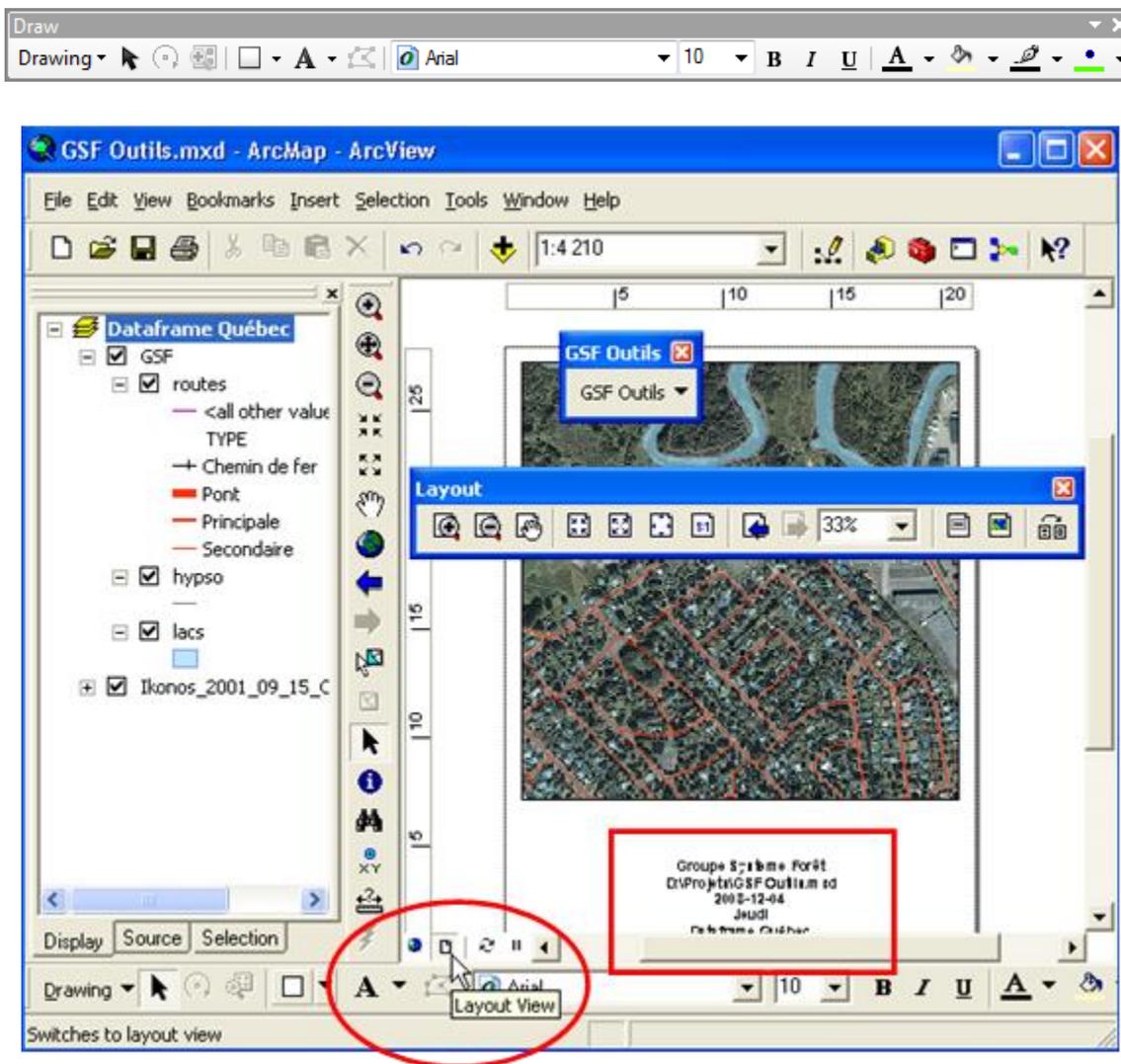


*Continued on next page...*

The table below describes the predetermined elements:

Elements	Description
DATE	Date according to Windows under year, month, day format (YYYY-MM-DD)
PATHWAY	Name and access pathway to the ArcMap document (*.mxd)
DAY	Day of the week (Monday, Tuesday, etc.)
DATA_FRAME	Name of the Data Frame when added

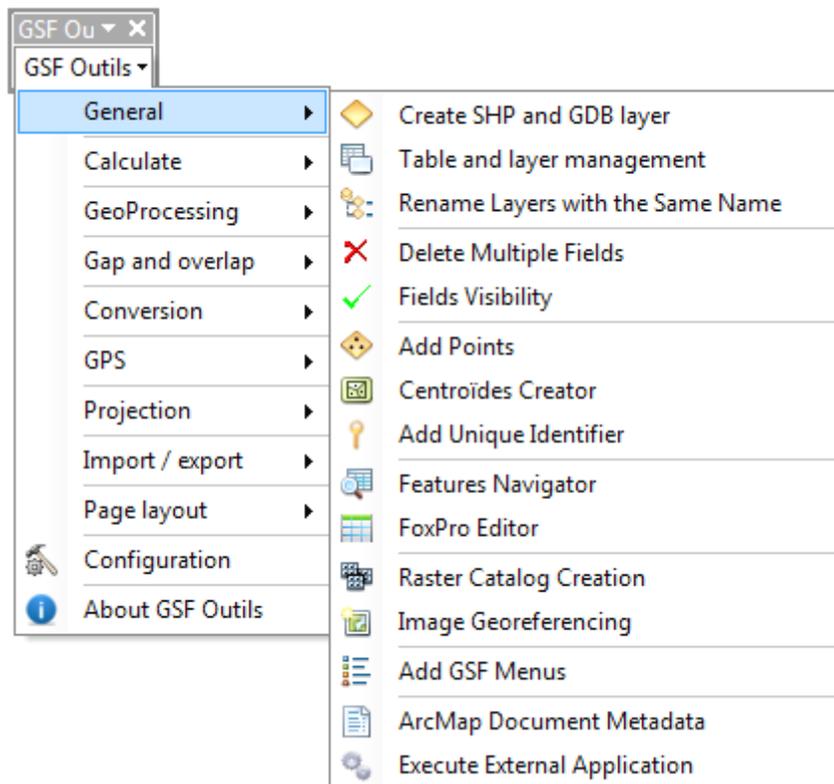
It is possible to change the text formatting (font, size, etc.) that was added with the GSF Outils function by using the "Drawing" toolbar. This toolbar is available through the **Customize** menu (ArcGIS 10) or the **View** menu (ArcGIS 9.x) in the **Toolbar** menu.



## 4 FUNCTIONS OF THE GENERAL MENU

The **General** menu provides features for various operations such as creating a layer (Shapefile, Feature Class of Geodatabase), creating an image catalog, managing fields in the attribute table and a records navigator in a layer.

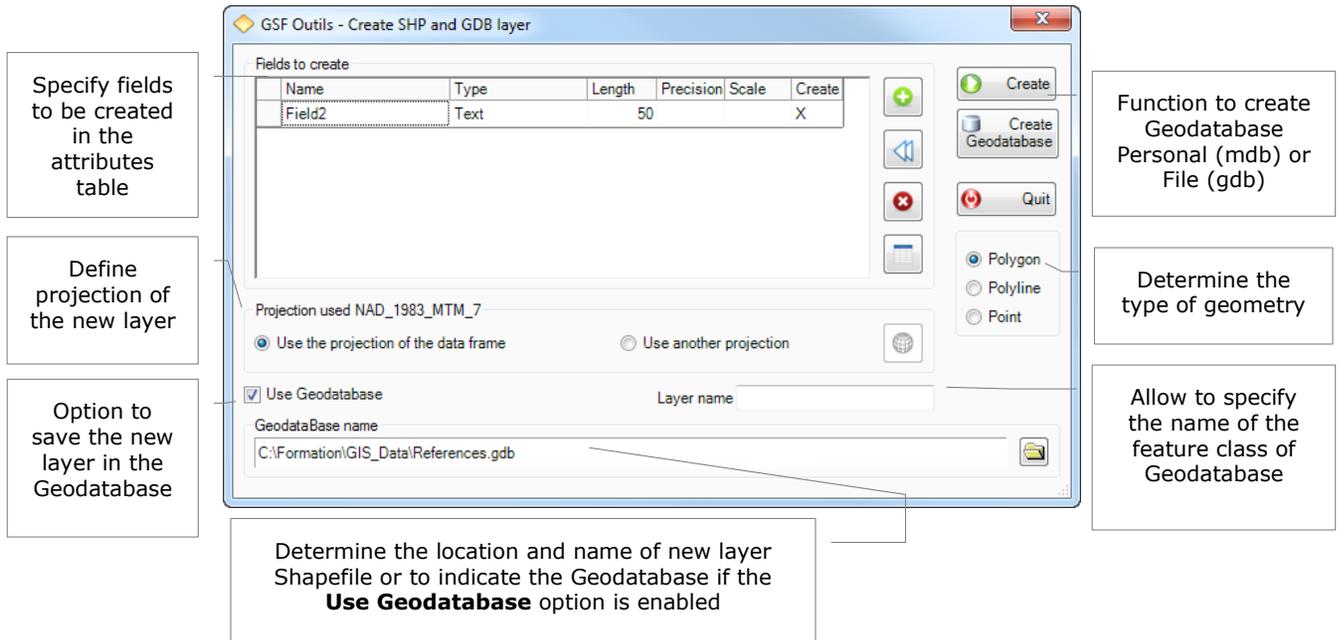
The following sections provide the details of each function.



#### 4.1 CREATE SHP AND GDB LAYER

This window allows you to create layers of geometric data of shapefile or geodatabase format (Personal [mdb] or file [gdb]) directly from a map document while specifying the fields to be created in the attribute table.

The function automatically adds the new layer to the active data frame.



The section on the right is used to specify the type of geometry (point, line, polygon) of the new layer.

The "**Fields to create**" section allows you to define the list of attributes to create the layer. The available fields are Short Integer, Long Integer, Float, Double, Text, and Date.

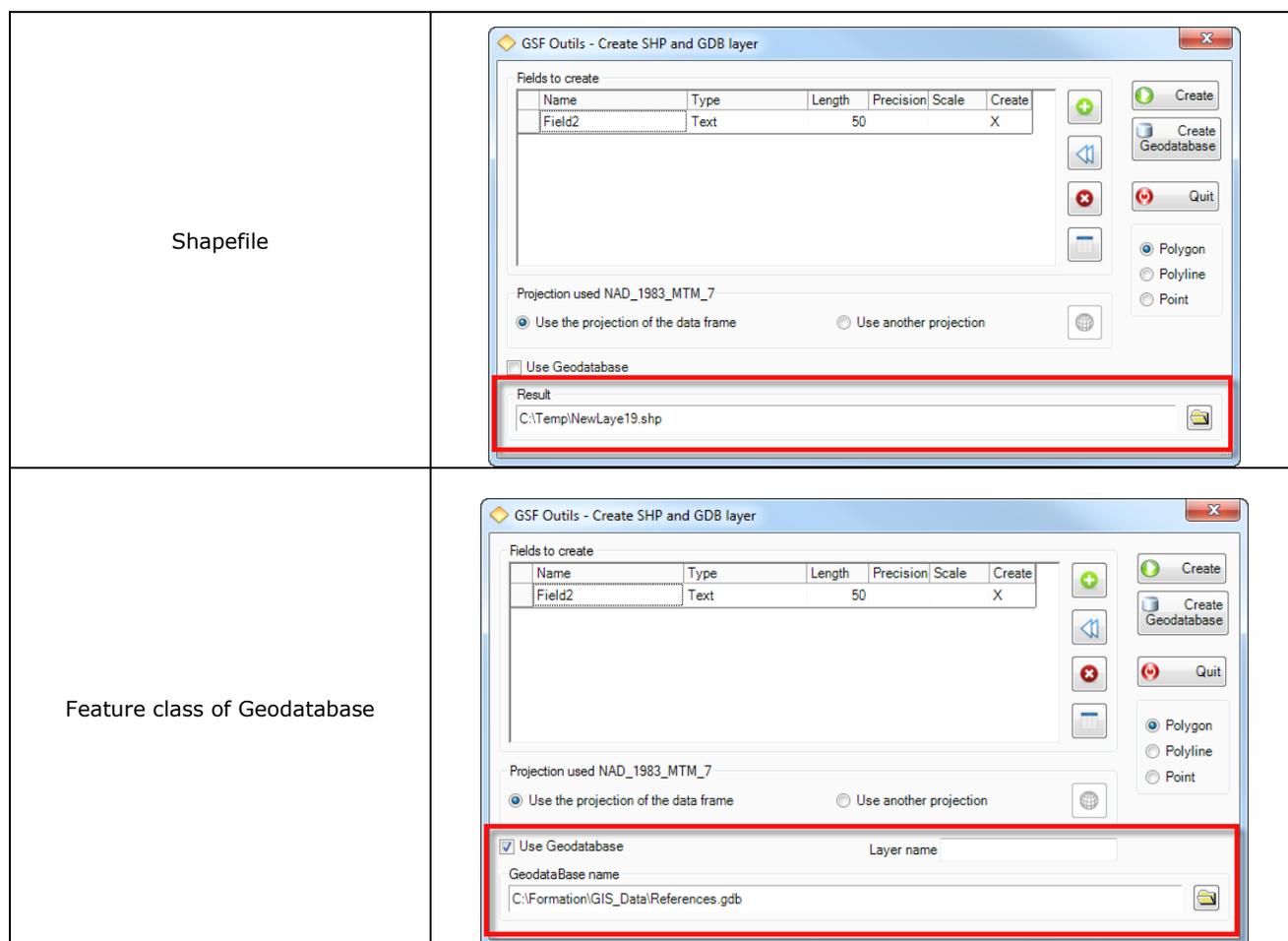
The description of the buttons in this section is specified in the table below:

	Add a new field to the grid, at the end of the list
	Insert a new field to the design grid according to the cursor position
	Remove a field from the design grid
	Import all the fields from another information layer.

The "**Projection used**" section identifies the coordinate system of the new layer. By default, the projection of the active Data Frame will be used. It is possible to select a different projection, however it is not recommended if the geometric editing has to be done.

The **Use Geodatabase** option allows you to create a new Geodatabase of Personal or File type and write the name of the new feature class. However, it is not possible to create a Feature Dataset or to create a new layer in a Feature Dataset.

The **Result** section sets the name of the new Feature Class while the **Result** and **Geodatabase name** section allows respectively to specify the path and name of the new Shapefile layer or for indicate the Geodatabase when "**Use Geodatabase**" option is enabled.



## 4.2 TABLE AND LAYER MANAGEMENT

"Table and Layer Management" function enables the management and structuring of attributes of a table or a vector layer using predefined attributes templates.

Each model contains a list of defined fields (name, type, length) and can be used to create a new layer or a new table, to check the structure of existing attributes or to correct structure with mismatches at the attribute level. The user can check if the attributes are consistent with a defined model and quickly identify errors in a layer or table.

The "Template" section contains a list of predefined templates and functions to manage the structure of the models. It is possible to manually create new structures or use an existing table fields selected in the bottom section (layers). It will also be possible to create a table or a layer from a model.

The "Layers and table" section displays the attributes of the selected layer or table in the dropdown menu. This section displays the structure, runs a check of the structure, generates a new model and a correction recreating a new layer or table with modified or added fields.

The "Projection used" section allows you to specify the projection of the new layer when activating the **Create a Layer** section.

The screenshot shows the 'GSF Outils - Table and layer management' dialog box. It is divided into several sections:

- Template:** A dropdown menu currently shows 'POL\_INT'. Below it is a table of predefined templates.
- Layers and table:** A dropdown menu shows 'EPC' and 'Geometry : Polygon'. Below it is a table of attributes for the selected layer.
- Projection used:** Radio buttons for 'Use the projection of the data frame' (selected) and 'Use another projection'.
- Interaction with the template:** Buttons for 'Import selected fields', 'Verify the fields structure', 'Add field(s) to the template', 'Save as model', and 'Apply correction'.
- Management buttons:** A vertical column of buttons including '+', '<', '>', '↑', '↓', and '×'.
- Other buttons:** 'New', 'Import', 'Save', 'Save as', 'Rename', 'Delete', 'Create a layer', 'Polygon', 'Create a table', and 'Quit'.

Callout boxes provide the following descriptions:

- Allows you to select an existing template and displays the structure fields:** Points to the Template dropdown and table.
- Select an existing layer or table:** Points to the Layers and table dropdown.
- Specify the coordinate system of the new layer or table created:** Points to the Projection used section.
- Managetem plates and creating layers or tables:** Points to the management buttons.
- Interact with the model and the selected layer or table:** Points to the Interaction with the template buttons.
- Manage the list of fields:** Points to the vertical column of management buttons.

### 4.2.1 "Template" section

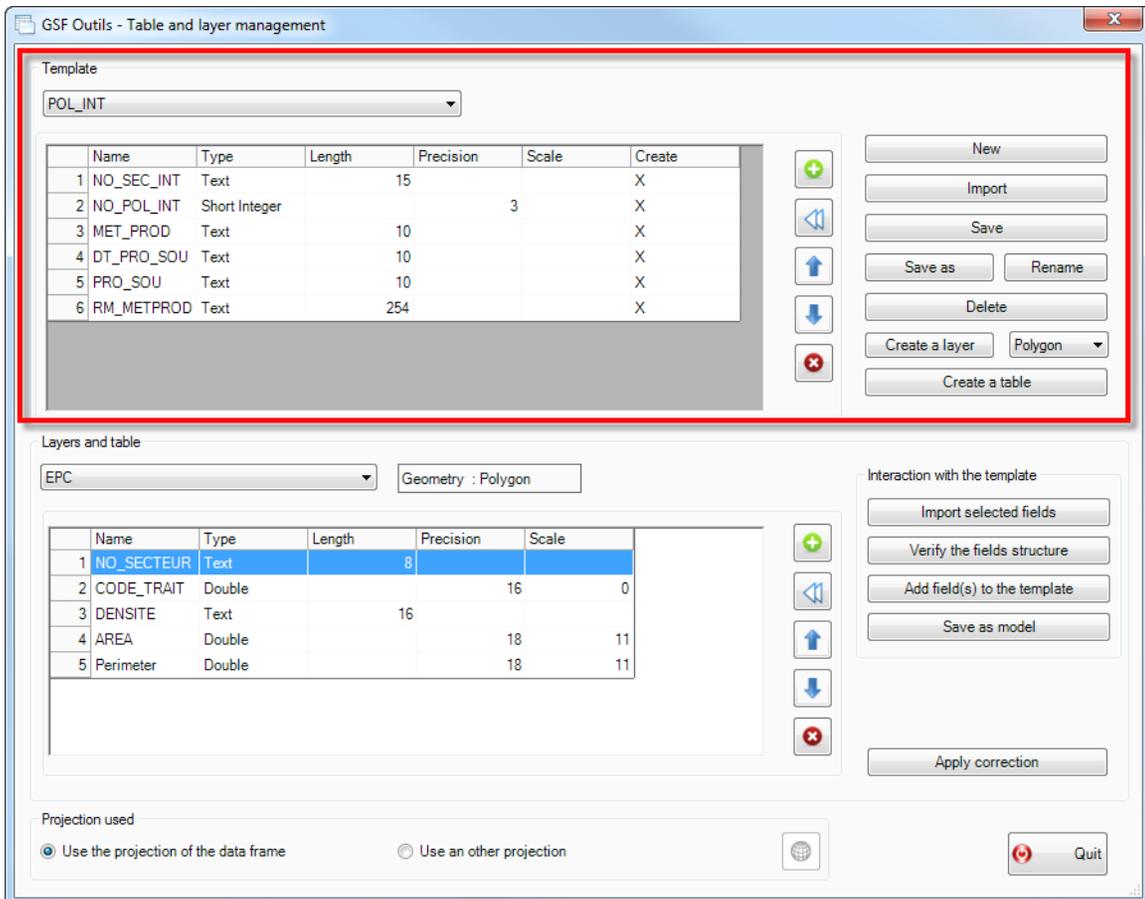
The "**Template**" section includes a list containing predefined templates and associated fields and functionalities for managing templates.

The models available are used in forestry and are added by default during installation of GSF Outils. These models can be deleted. It is possible to create new templates.

The **Name**, **Type**, **Length**, **Precision**, and **Scale** columns are used to define the structure of the field. It is possible to modify the fields items by clicking or double-clicking directly on the section with the fields. It is important to note that the field names should have a maximum of 10 characters.

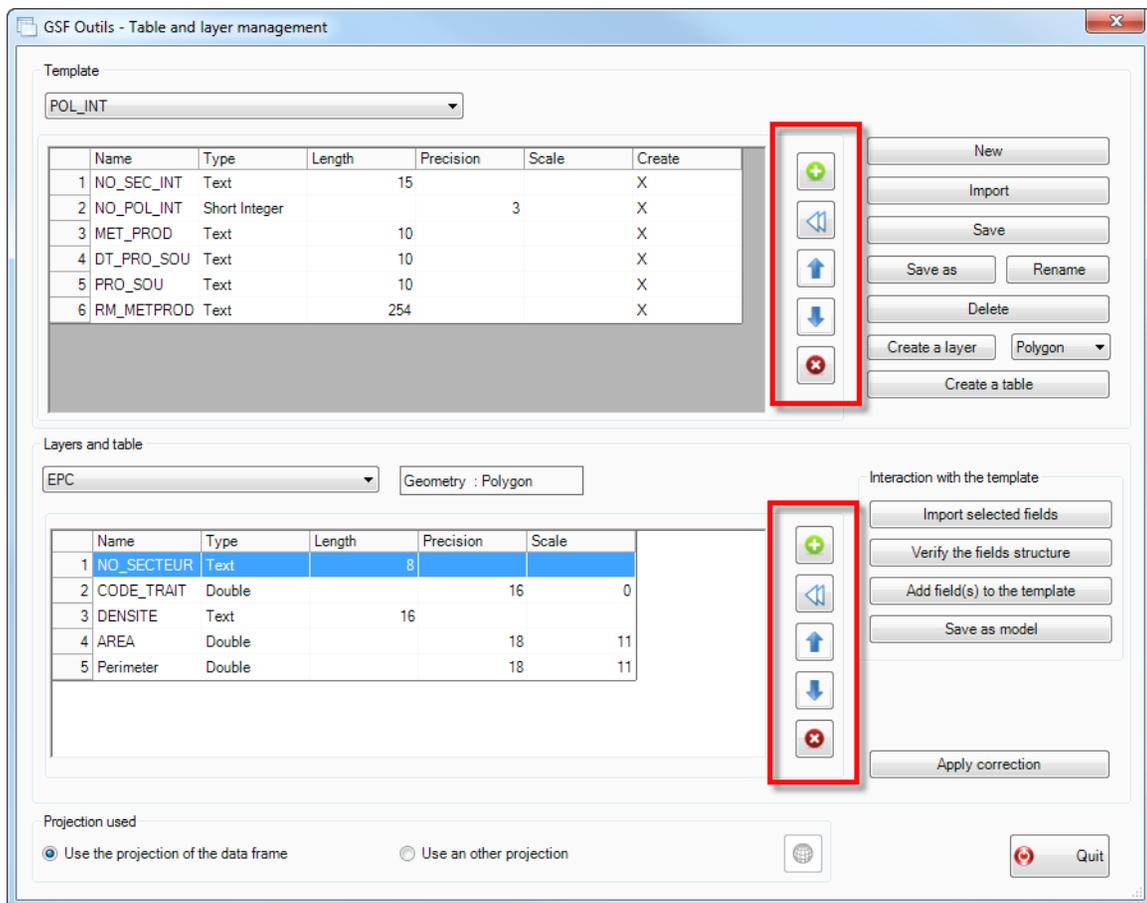
The **Create** column indicates whether the field should be used when creating a new layer or a new table.

Changing the attributes is done virtually and is retained in memory only if the "**Save**" button is enabled. If changes to the structure of the fields are completed and that the model is changed in the course without clicking on the **Save** button, the changes will be automatically forfeited.



The various buttons allow to manage add, insert, move or delete a model field. The table below shows the description of the different buttons.

	Add a new field to the last position
	Insert a new field at the position of the selected field
	Move up the position of the selected field
	Move down the position of the selected field
	Remove the model field



The "New" button creates a new blank model within which it will be possible to add fields.

The "Import" button selects a layer or an existing table to create a new model from the structure selected in the "Layer and tables" section element.

The "Save" button will save the current model and applied changes.

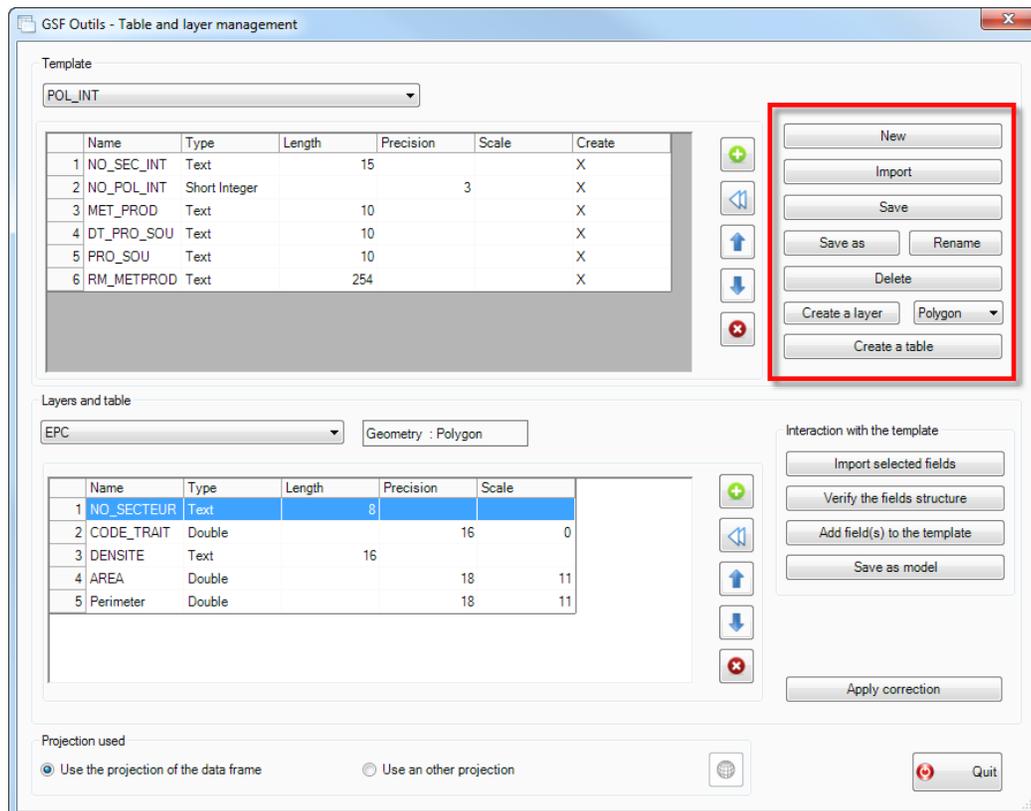
The "Save As" button copies of the model under another name.

The "Rename" button changes the name of the current model.

The "Delete" button erases the entire model and its defined field's structure. **This process cannot be canceled.** If a model is deleted, it is not possible to restore it unless you create a new model and import the structure of a table or an existing layer.

The "Create a Layer" button will generate a new layer to the type of geometry that is selected to the right of the button (Polygon, Line or Points). If the location of a file is a folder, the layer will be in a ESRI Shapefile format. It is possible to create a feature class in a **Personal** or **File Geodatabase** by browsing the desired location. However, it is not possible to create feature classes in a Feature Dataset.

The "Create a Table" button allows generating a new table in a dBase or in a geodatabase format. If the location is a folder, the table will be dBase format (\*.Dbf). It is possible to create a table in a Geodatabase (Personal or File) but only on the first level. The Geodatabase does not allow you to create tables within a Feature Dataset.



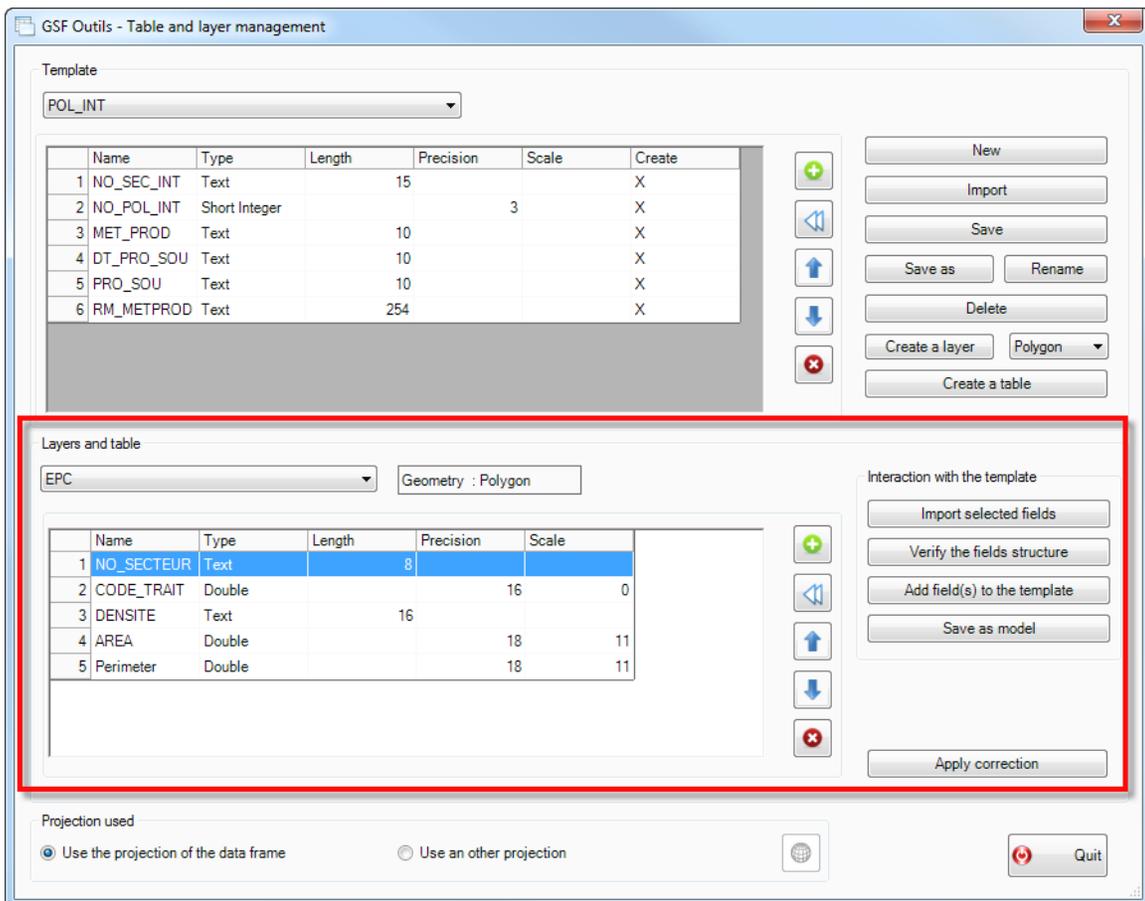
#### 4.2.2 "Layers and Tables " Section

The "Layers and Tables" section at the bottom of the window allows manipulating the structure of layers or tables in the active Data Frame. The table shows the attributes structure of the layer or selected table in the dropdown menu.

The "Interaction with the template" section contains the applicable operations on the structure of the attributes of an existing layer or table. These features create a new model, add fields to an existing model, check the structure of the selected layer in the top part model and apply a correction of the structure shown in the table in a new layer or table.

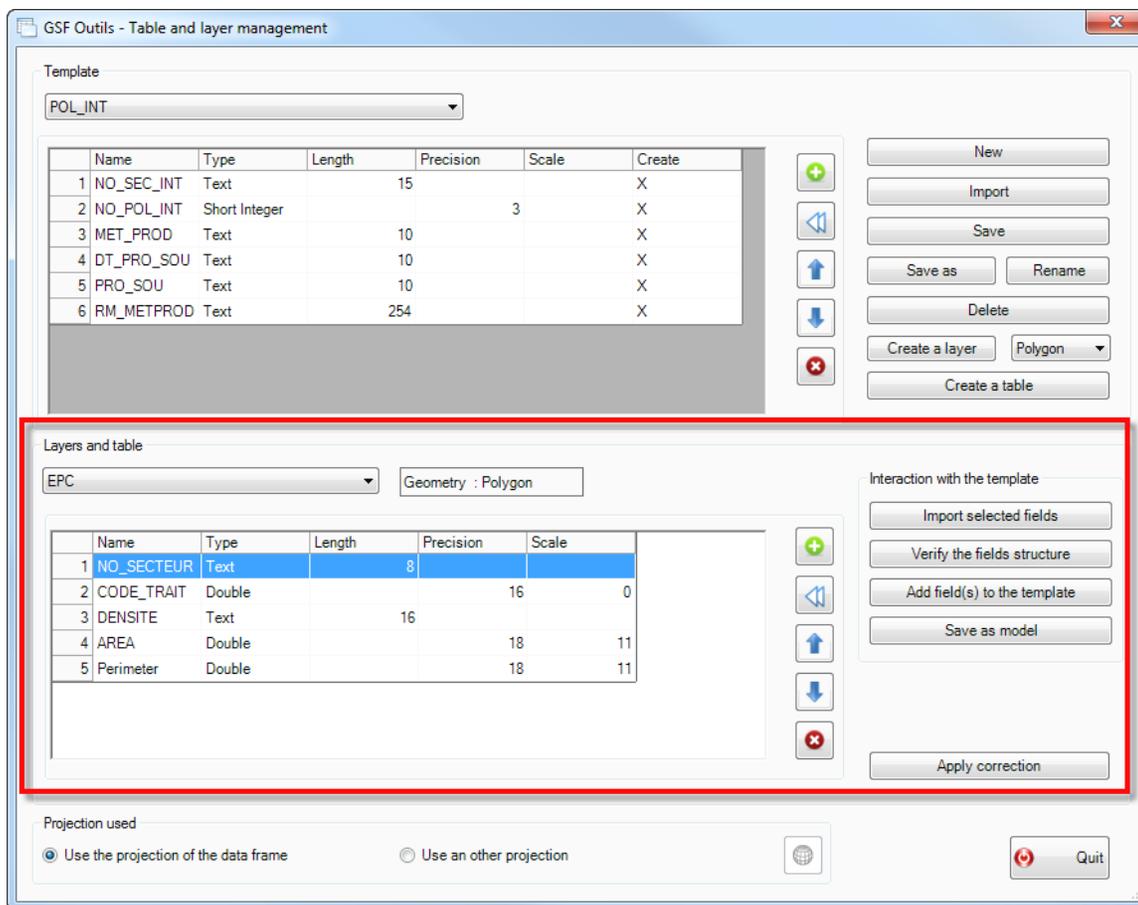
**The changes made in the table below are carried virtually and not directly applied to the table or the current layer. To keep the changes, it is necessary to click on "Apply correction" to create a new layer or a new table button. This operation eliminates the risk of corrupting a layer or table. Changes will always be applied to a new object and not in the current one.**

Because changes of the attributes structure of the layer or table in this windows are virtual, if no operation is performed ("Interaction with the template "section button) and the user changes the object that is selected in the dropdown menu, the changes disappear.



To modify the elements of the attributes structure, just click or double-click on a cell to specify the desired setting. Thereafter, to apply the changes, it is necessary to click on the **"Apply correction"** button to create a new layer or a new table.

Buttons arranged vertically can perform the same operations as those in the top section (add or insert a field, move and delete a field position). It is important to specify that **these are virtual operations and to apply these changes, it is necessary to click on "Apply correction"** to generate a new layer or a new table.

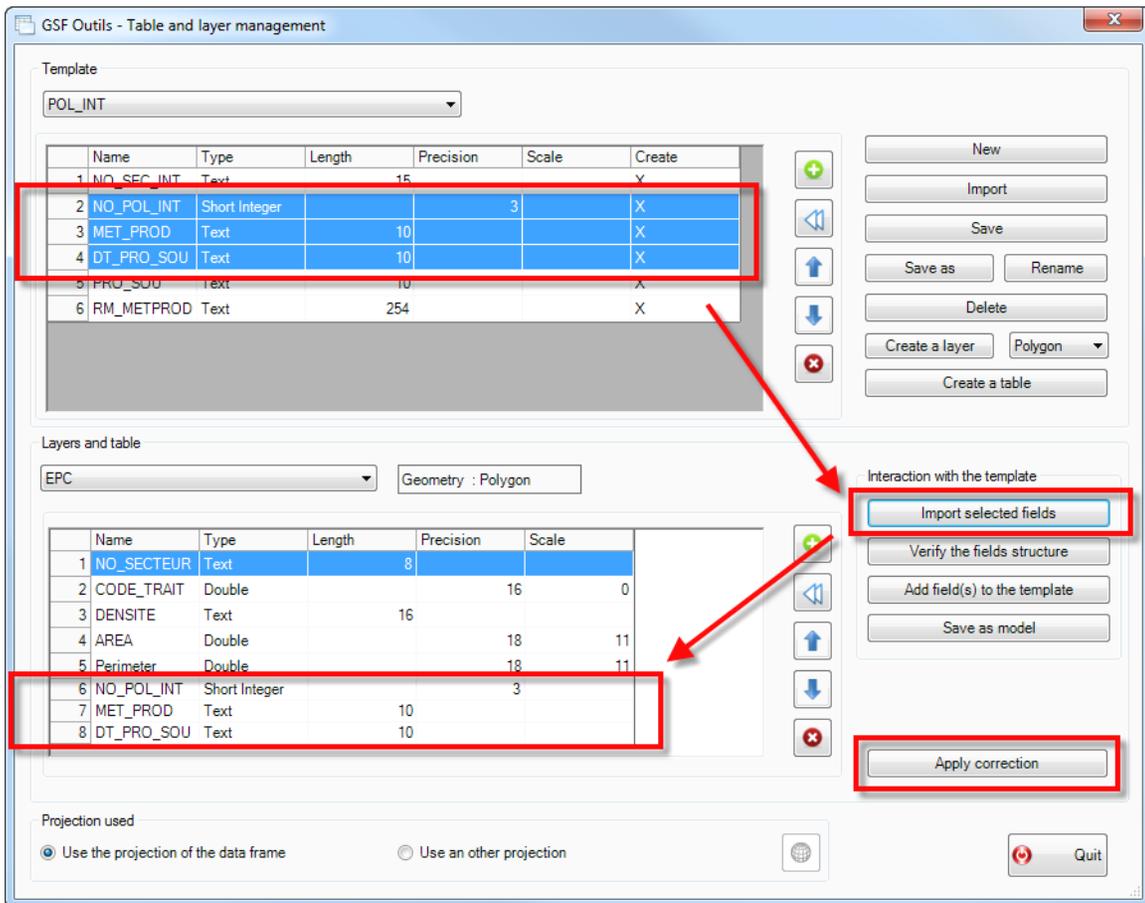


### 4.2.3 Import Selected Fields

This button adds a selected model (upper section) to the structure of the layer or table selected in the bottom half fields.

The fields must be selected (blue) in the "Template" section in order to import them into a layer or table. The selection is made by clicking on the gray square to the left of the field name. Multiple fields can be selected by combining the click of the mouse with the **Shift** or **Ctrl** keys.

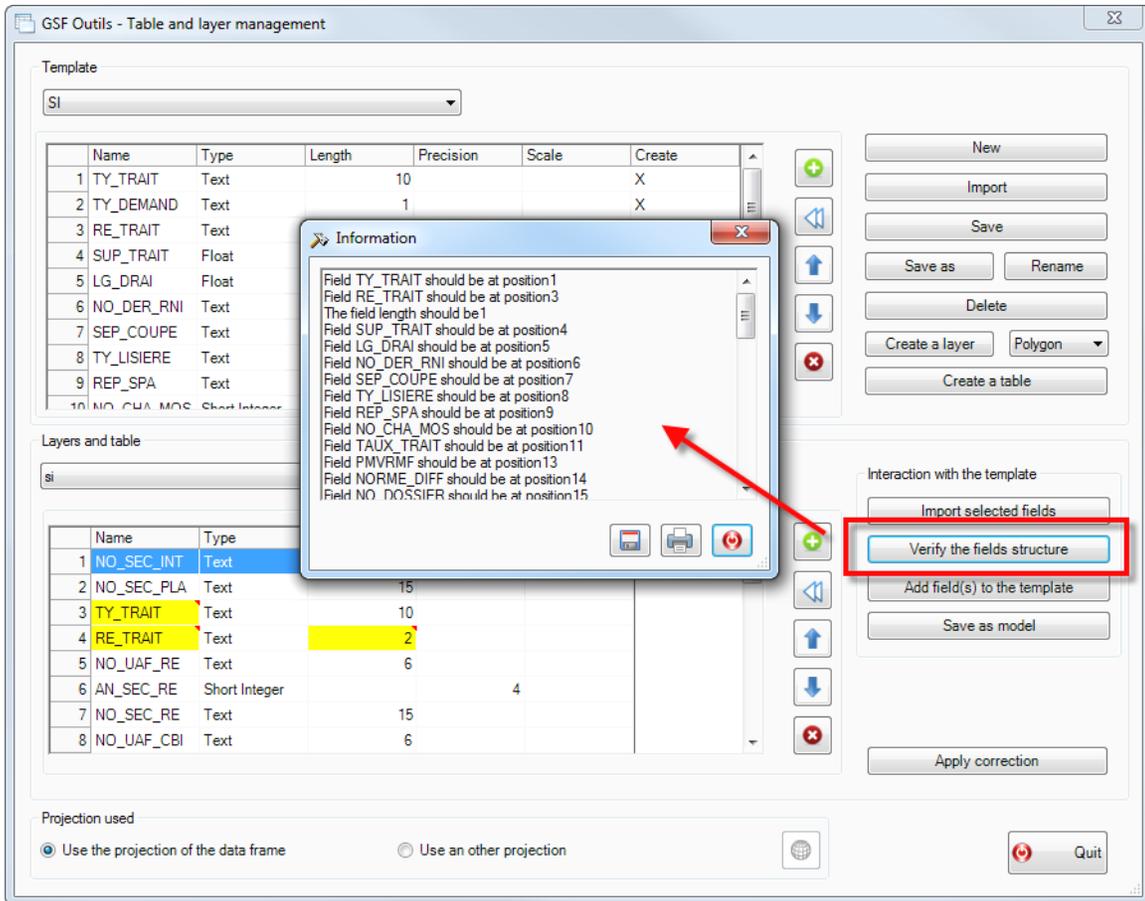
To keep the new structure of the layer or table, it is necessary to click on the **Apply the Correction** button to generate a new table or layer structure with attributes specified in the table below.



#### 4.2.4 Verify the Fields Structure

This function identifies discrepancies between the attributes of the layer or table presented in the bottom section with the model that is selected in the upper section.

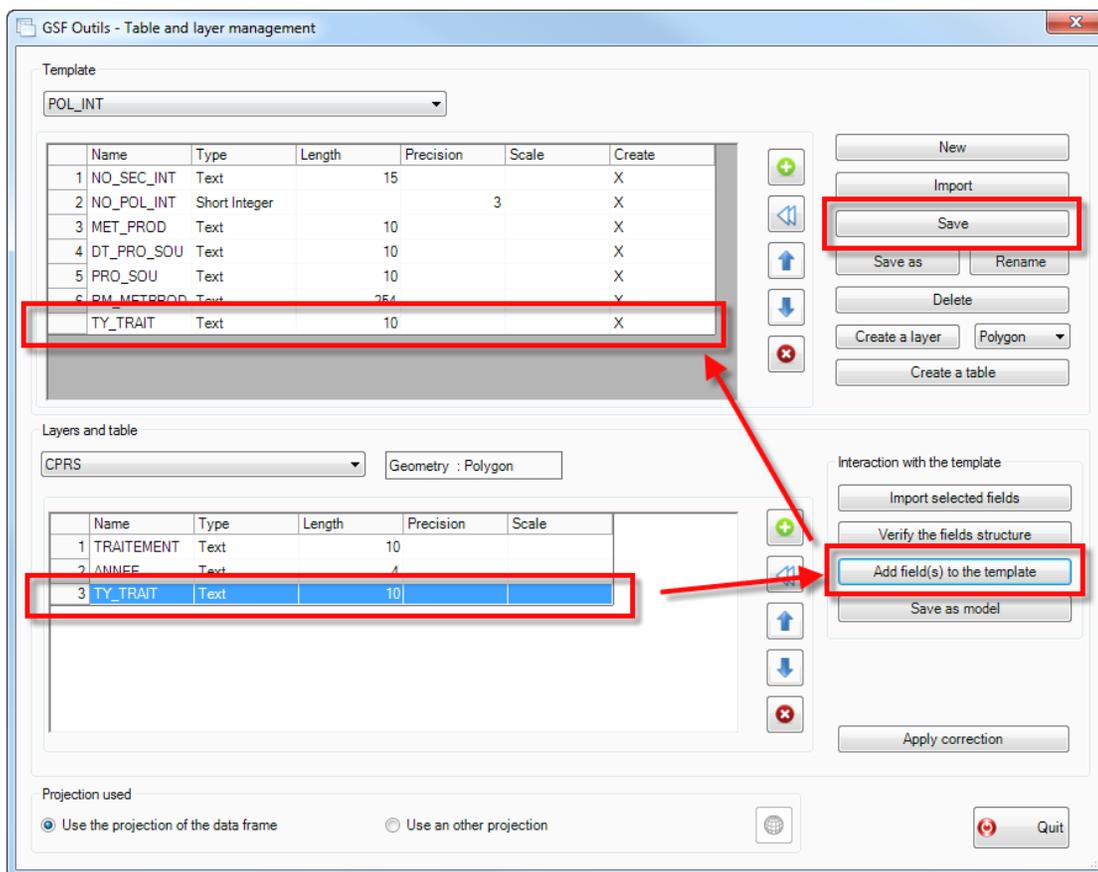
The result of the audit is presented in a window showing the missing fields or too. Comments can be added next to each cell when there is a mismatch structure. These cells have a small red rectangle. To see the discrepancy, simply select the cell with the mouse and wait 1-2 seconds for the retail displays tooltip.



### 4.2.5 Add Field (s) to the Template

This function allows adding the structure selected in the bottom part (layers and tables) to the template selected in the top part. However, it is necessary to click on the **Save** button to save these new additions.

The fields must be selected (in blue) in the "**Layers and Table**" section to add the selected template of the upper section. The selection is made by clicking on the gray square to the left of the field name. Multiple fields can be selected by combining the click of the mouse with the **Shift** or **Ctrl** keys.



### 4.2.6 Save as Template

This button allows you to use the entire field structure located in the bottom section (layers and tables) to generate a new template of attribute structure. By default, the name of the model will use the name of the layer or table.

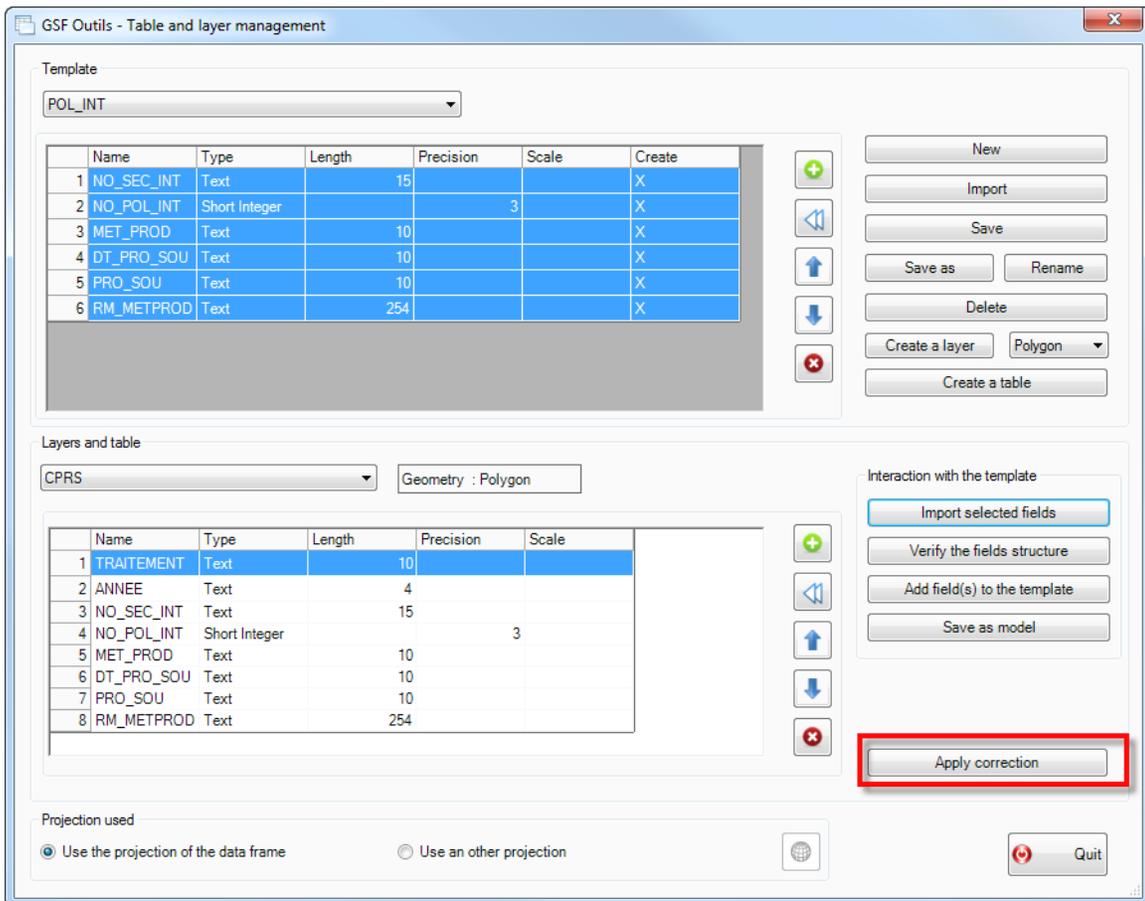
### 4.2.7 Apply Correction

This function creates a new layer or a new table (depending on the object type selected in the bottom section) producing an attribute structure as specified in the table. This structure can be changed by renaming fields and specifying a size or a different type.

The values present in the layer or table are transferred to the new layer or table. The result is automatically added to the active Data Frame in ArcMap.

**Important:** It is the responsibility of the user to ensure that the change in the structure of the attributes does not affect the values in the records of the new layer or table.

If the width of the field is reduced, the attributes may be truncated. In addition, if there is a change in the structure of the field, such as the transformation of a "Text" field to a "Integer" format, all attributes that are not only numbers (0123...) will be removed because the conversion is impossible.

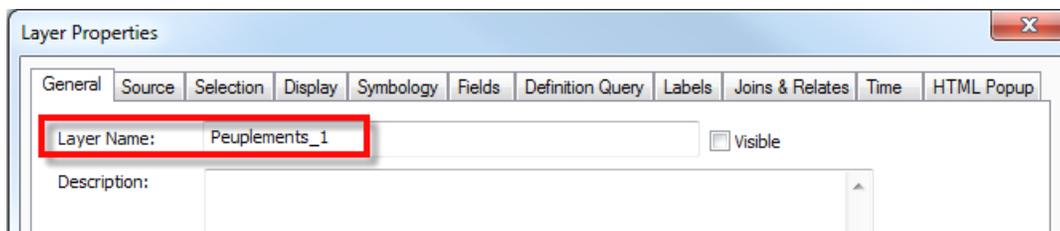
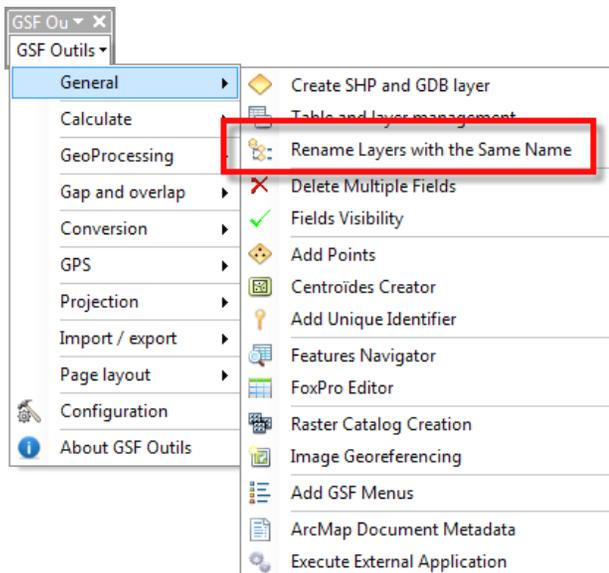


### 4.3 RENAME LAYERS WITH THE SAME NAME

This function allows you to temporarily rename the layers with the same name and that are contained in the same Data Frame.

This operation only changes the name that is displayed in the table of contents and in the properties of the layer. It does not change the original layer name or the path.

It may be required that each layer has a different name to execute geoprocessing in GSF Outils or ArcToolbox.



Before	After
<p>The 'Before' screenshot shows a table of contents with a folder named 'Couches'. Inside this folder, there are four layers, all named 'Peuplements'. Each layer has a checked box next to its name and a small colored square (green, blue, and blue) below it.</p>	<p>The 'After' screenshot shows the same table of contents, but the layers have been renamed. The first layer is 'Peuplements', the second is 'Peuplements_0', the third is 'Peuplements_1', and the fourth is 'Peuplements_2'. Each layer has a checked box next to its name and a small colored square below it.</p>

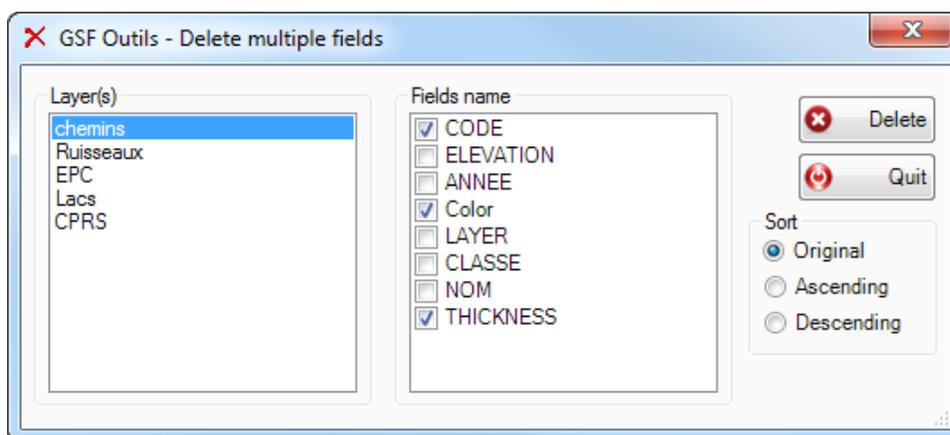
#### 4.4 DELETE MULTIPLE FIELDS

This function allows you to **permanently** delete one or more fields selected in the left section selected layer. Checkboxes next to the field names allow selecting the fields to delete. This function uses only the editable layers (Shapefile, Geodatabase).

Important: This process is irreversible, deleted fields cannot be restored!

The "**Sort**" section allows you to sort the list of field names in the original order of the table in ascending or descending sorting.

It is possible to use the combination of **CTRL** key and the left mouse button to select or deselect all fields. However, **it is not possible to delete ALL the fields**. The table of the layer must contain at least one field.

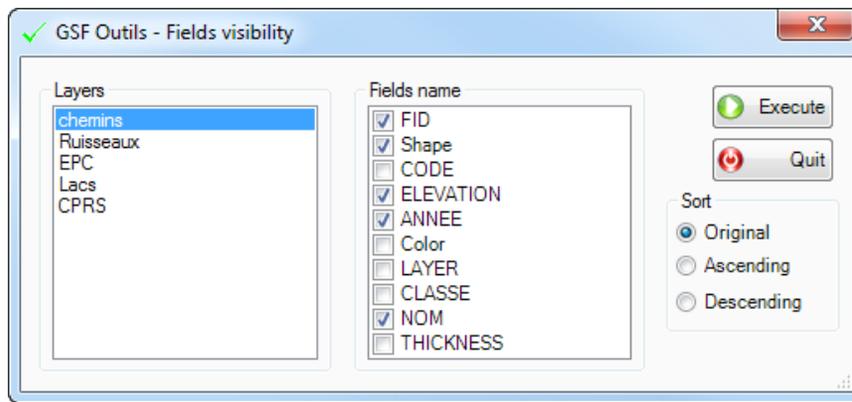


#### 4.5 FIELDS VISIBILITY

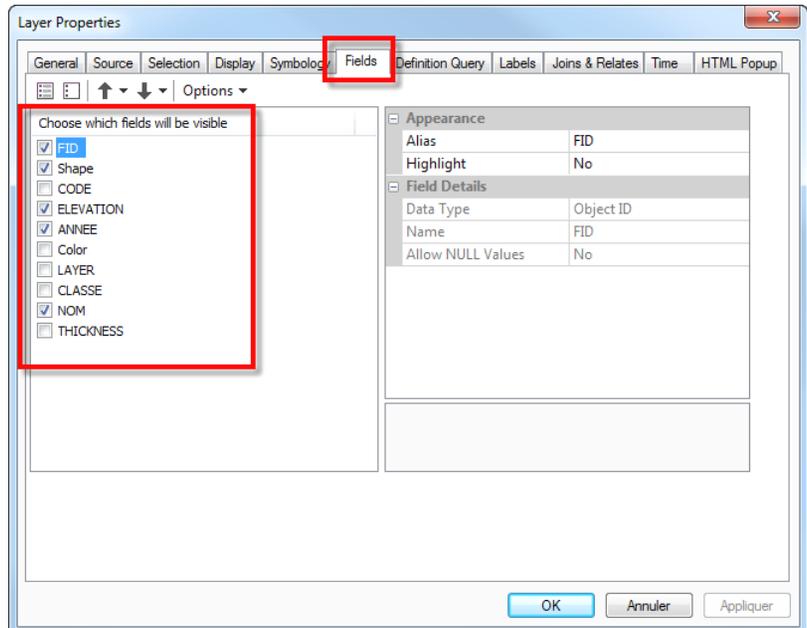
This function disables the display of certain fields in the attribute table in the properties of a layer. This operation does not delete fields, but allows you to reduce the number of columns in the consultation of the table or in the use of query tools and input attributes.

Layers present in the active Data Frame will appear in the left section and the right side displays the fields of the selected layer. Next to each field, boxes indicating whether the field is visible checked or not checked. To enable or disable the visibility of a field, just check or uncheck the box and press the **Execute** button.

The "**Sort**" section sorts the list of field names in the original order of the table or in ascending or descending sorting. This option only applies for this window. It is possible to use the combination of **CTRL** key and the mouse left button to select or deselect all fields.



This function is an alternative to the tab to configure the visibility of the fields in the properties of a layer.



#### 4.6 ADD POINTS

This function creates a point in an existing layer or as graphic as the X and Y coordinate entered manually. The coordinates can be in projected or geographic format.

The point is created in the projection defined in the properties of the layer even if they are not in the same system as the coordinates entered.

For geographical coordinates, it is possible to enter in the following formats:

- DMS for Degrees, Minutes and Seconds
- DM for Degrees and Minutes
- DD for Decimal Degrees

The "**Projection used**" section determines the coordinate system specified in the **Projected** section.

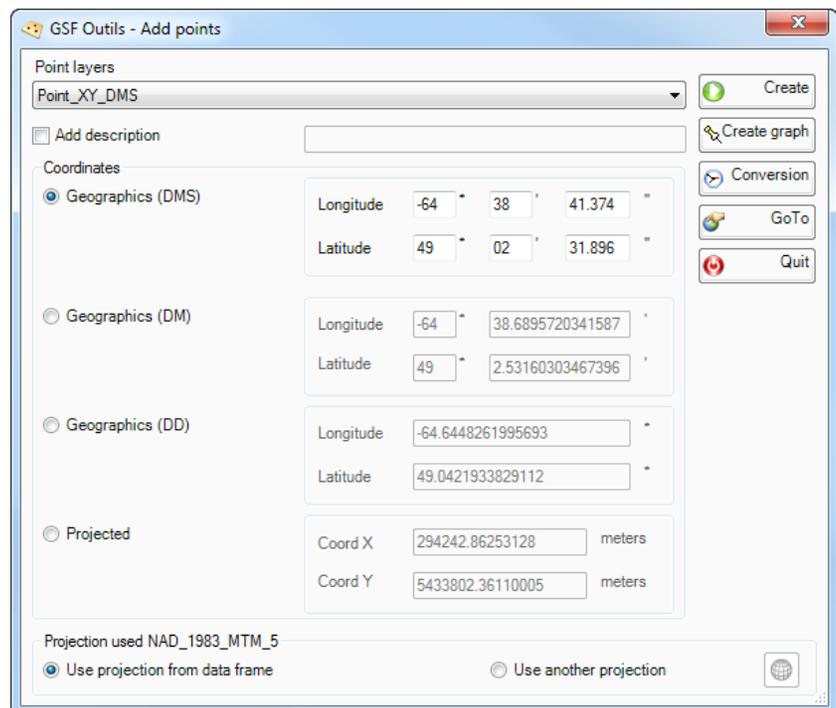
The "**Add description**" is used for recording up an attribute when the point is created in a layer by the "**Create**" function. The name of the used field is specified in the configuration of GSF Outils in the 3.2 section on page 23.

The "**Create**" button adds a record (point) in the point layer selected in the dropdown menu.

The "**Create Graph**" button adds a point in a graphical format in the Data Frame without changing the layer present in the dropdown menu.

The "**Conversion**" button uses the coordinates listed and calculates the equivalent values in other coordinate systems of the window. This function provides a projected seizure geographical position (DMS) coordinates. No points are added in the layer or in the graphic when using this option.

The "**Go To**" button moves the center of the display of the Data Frame to the coordinates entered in the interface. No points are added to the layer or graphic when using this option.



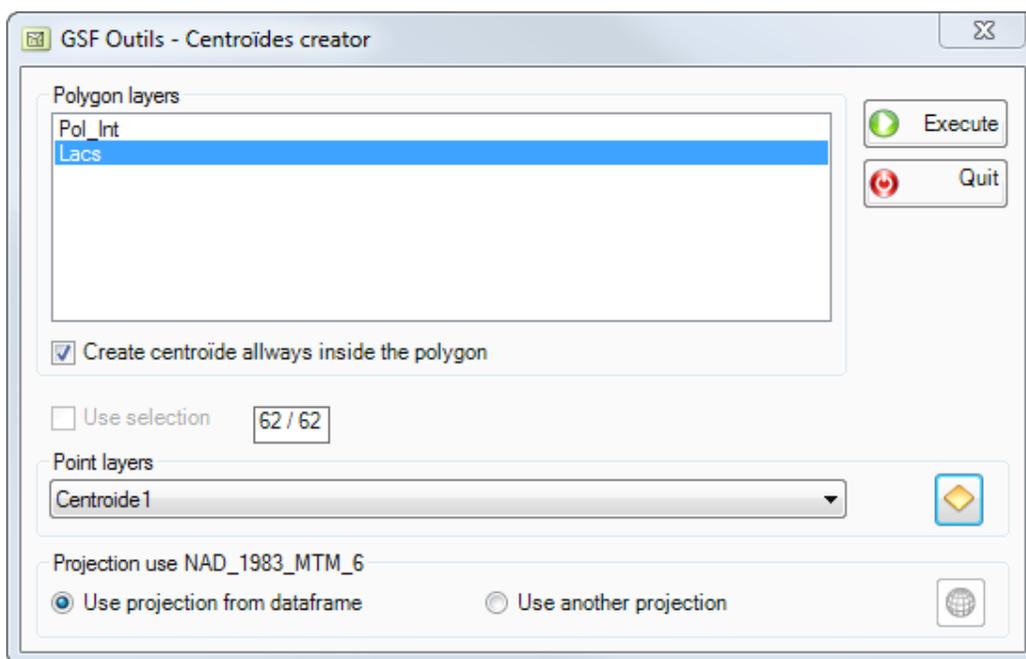
#### 4.7 CENTROIDS CREATOR

This tool allows you to create points in a feature class of points from the central position of a polygon layer.

The **"Create centroid always inside the polygon"** option forces the algorithm positioning so that the point is inside the polygon, even if it is irregular in shape (ex U shape).

The **"Use selection"** option creates points on the selected polygons.

The **"Point Layers"** section allows you to select the point layer or create a new layer.



Option enabled

Option disabled

Create the centroid inside the polygon



#### 4.8 ADD UNIQUE IDENTIFIER

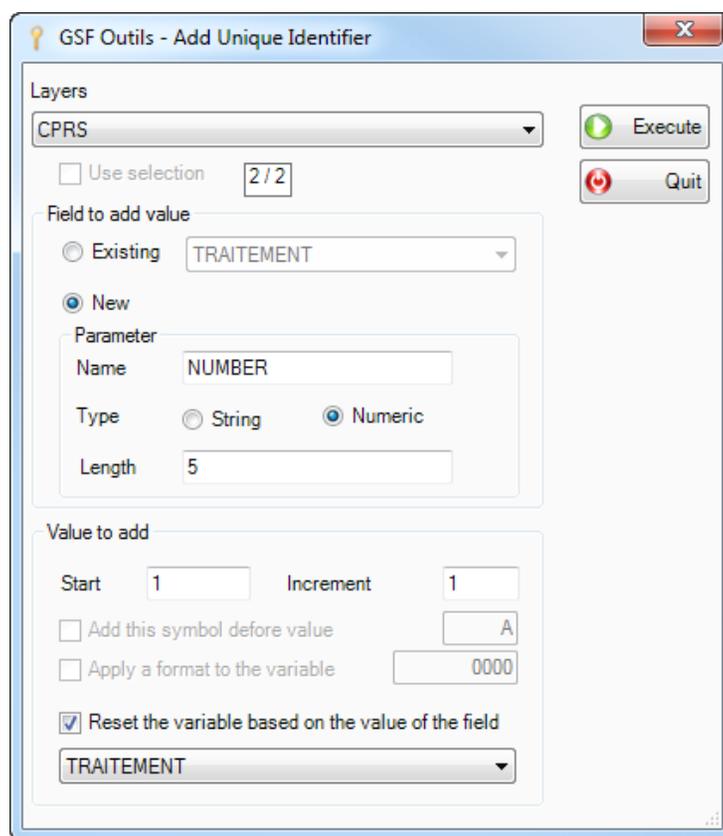
This function allows you to enter an incremental value (1, 2, 3...) in an existing field or a new field based on the order of record creation.

The "**Layers**" section allows you to select the layer or table entry.

The "**Field to add value**" section allows you to specify if the numbering must enroll in an existing field or a new field. When the latter option is selected, the name, type and length of the field must be specified.

The "**Value to add**" section allows you to enter the starting value and the increment. Two additional options are available when the field format is text. An option allows you to "**Add a symbol before the value**" and the other "**Apply a format to the variable**".

The "**Reset variable based on the value of the field**" option allows you to restart numbering records every change in value of the selected field.



### 4.9 FEATURES NAVIGATOR

This function allows you to browse geographically among the records in a feature class by setting the view of the geometry of the selected record.

For each record, a zoom is done to the geometry, allowing you to make a quick check of the geographic feature.

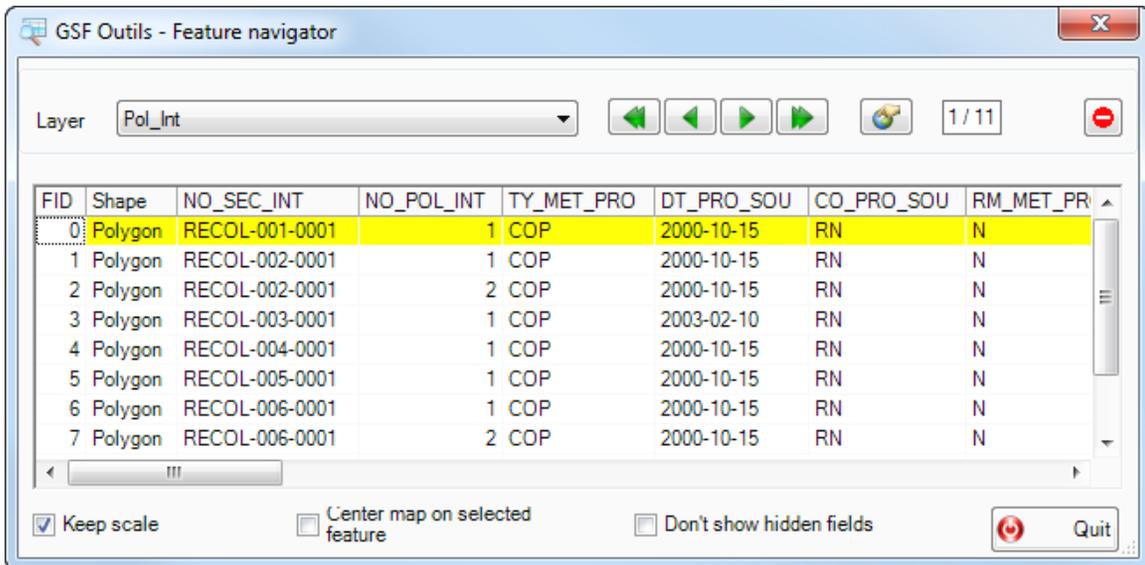
The window displays the selected fields located in the top left dropdown menu layer. **A single record is selected.**

The "Layer" section allows you to select the vector layer of the Data Frame on which navigation will be done. When changing layers, fields and records displayed in the bottom section will also be changed to those of the selected layer.

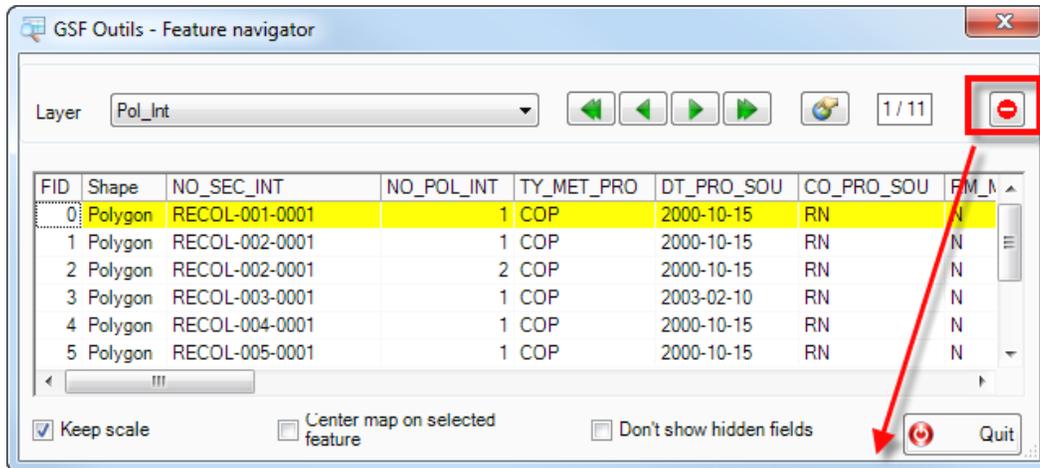
The buttons on the right represented by arrows, allow navigating from one record to another.

	Select the first record
	Select the previous record
	Select the next record
	Select the last record
	Select a specific record by placing in a window
1 / 1013	Display the number of the selected record in the total

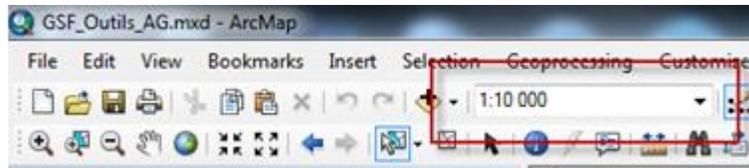
The frame indicates the number of records and the position of the selected one.



The button at the top right, allows you to minimize the navigation interface. The window will only display the selected layer and the navigation buttons. The red button is changed to a blue button to restore the complete interface window.

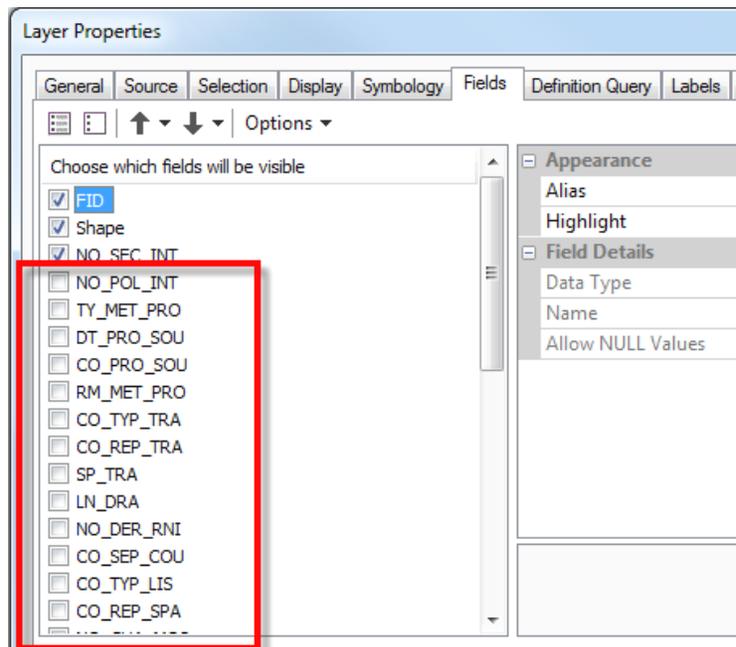


The "**Keep scale**" option maintains the current scale when navigating. If this option is not checked, the view is positioned at the full extent of the line or polygon.



The "**Center map on selected feature**" option frames the view of the selected feature.

The "**Don't show hidden fields**" option configures the window so that it only displays the visible fields specified in the Properties layer.



#### 4.10 FOXPRO EDITOR

This function allows manual changes of the values in the FoxPro (DBF) table's structure. This type of structure cannot be opened from ArcMap and requires a special editor to open and edit this type of file format. The "Foxpro Editor" tool will make the entry into the fields directly from the window.

Several tables can be open, but the recording will only be made on the active table.

When the changes are saved, the application makes a copy of the table by adding the **".dbf.backup"** extension in the name of the table. The latter can be recovered by only keeping the "DBF" extension.

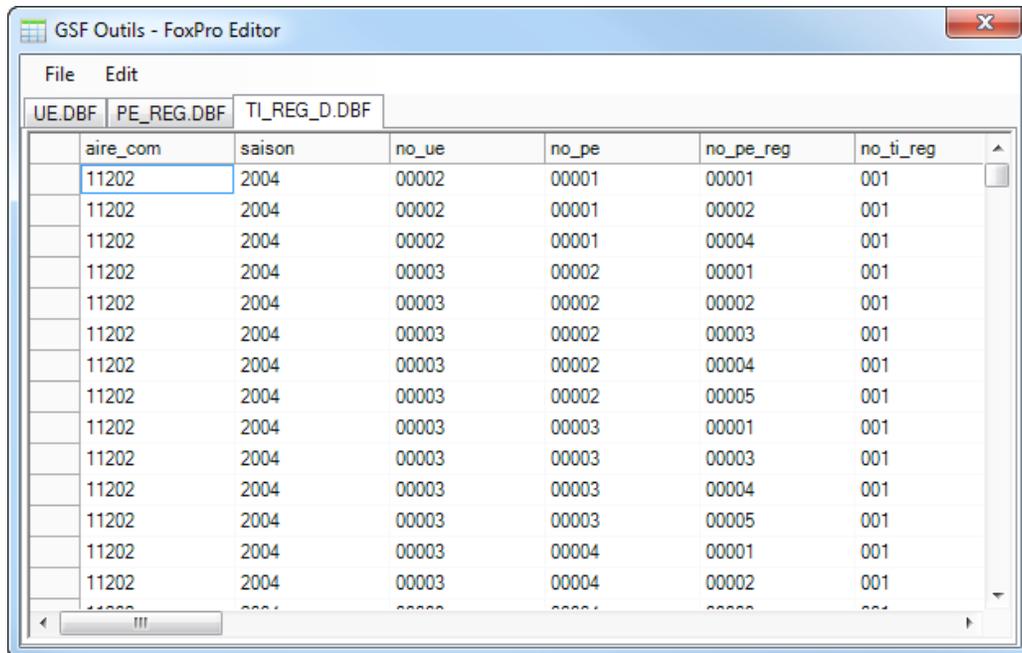
One or more records can be deleted in the table by selecting them from the gray squares on the left and use the **"delete"** key on the keyboard.

The window contains five functions presented in two menus.

The **"File"** menu includes a function to **"Open"**, **"Save"** and **"Close"** the current table.

The **"Edit"** menu is used to **"Undo"** and **"Redo"** task being performed.

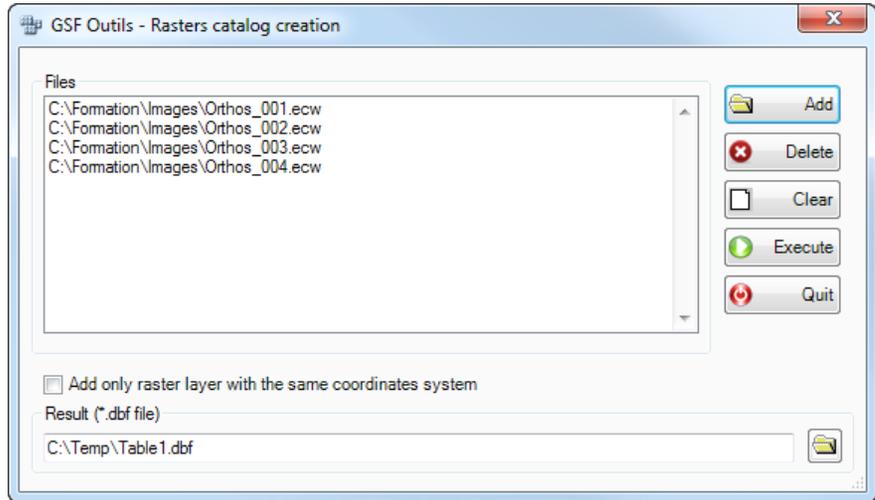
Closing the window is done by clicking on the red **"X"**.



#### 4.11 RASTER CATALOG CREATION

A raster catalog is a central layer comprising several individual images to disk. The catalog can be compared to a mosaic but without the creation of a very large global file, which merge all images.

The result produces a dBase file (DBF) containing the file path of each image included in the catalog.



In the database, each image is analyzed when creating and the extend XY is entered in the table. The table allows you to quickly determine the images to be displayed in a geographical move in the view. This table displays several continuous images without having to add each image in the Data Frame. It is typically used to manage large territory covered by a large number of images.

OID	IMAGE	XMIN	YMIN	XMAX	YMAX
0	C:\Formation\Mosaic_ECW\Orthos_001.ecw	284093.92222	5346117.352246	291092.92222	5352633.952246
1	C:\Formation\Mosaic_ECW\Orthos_002.ecw	285873.352817	5343634.517778	292869.952817	5350161.917778
2	C:\Formation\Mosaic_ECW\Orthos_003.ecw	287645.081748	5341163.238691	294643.181748	5347683.738691
3	C:\Formation\Mosaic_ECW\Orthos_004.ecw	271683.541912	5330903.561445	275530.141912	5336704.961445

The "Add", "Delete" and "Clear" buttons manage the list of images to be included in the catalog.

An option allows you to "Add only raster layer with the same coordinates system".

The "Execute" button analyzes each image and creates a dBase file (\*.Dbf) which will form the catalog.

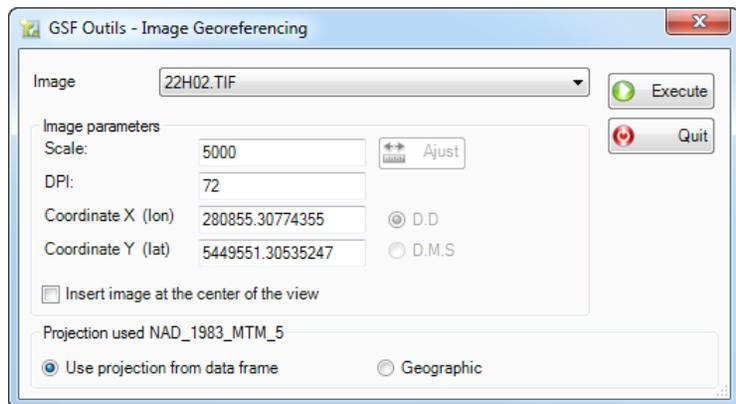
**Important:** The raster formats that can be integrated in the catalog with this function are: **ECW**, **TIFF**, and **JPG**.

#### 4.12 IMAGE GEOREFERENCING

This feature allows you to place an image layer geographically Format (TIF, JPG, BMP) that has no information about its position.

Unlike the tools of ArcMap toolbar "Geoprocessing" which allows to georeference an image function; GSF Outils does not create a new image file.

The tool produces a simply positioning file that is associated with the picture used. These files are called positioning World File.



Depending on the image format, the file will have a **TFW** extension for a **TIF** format, **JPGW** for a **JPG** format and **BMW** for a **BMP** format.

Some parameters are important:

- The extension remembers the last scale used.
- The DPI of the file is read automatically when selecting the image. If the DPI is not available, the value must be entered manually.
- The X and Y coordinates must match the contact details at the top left corner of the image. These coordinates can be entered manually by the projected coordinate system or geographic (decimal minute degree or second degree).
- The "**Insert image at the center of the view**" option allows you to position the image in the center of the current view in the specified zoom.

The "**Adjust**" button allows adjusting the scale at a distance previously manually measured. The observed distance (in measure) is combined with a desired value, corresponding to the actual distance on the ground. These two values allow the tool to automatically calculate the correct scale.

In the example below, the extent of the image gives an initially positioned distance of 200 meters. However, the actual distance is 75 meters. By entering the values in the window, the scale will automatically update in the main interface. The measurement should be done before opening the main window of the tool.



### 4.13 ADD GSF MENUS

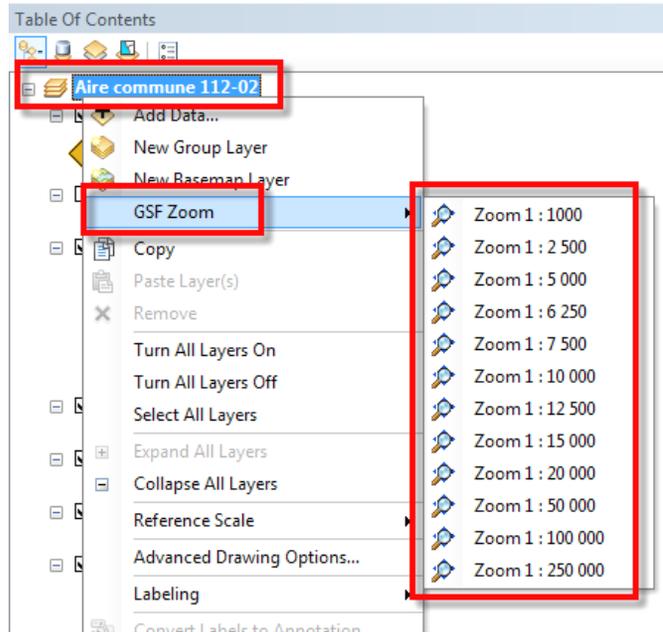
This function adds three GSF menus in different places. These menus contain additional functions related to the object to which the menu will be used.

These menus are only present during the ArcMap session. The menus are removed after closing the application. When opening ArcMap, it is necessary to enable this function to add new menus by the GSF Outils toolbar.

#### 4.13.1 GSF Menu on Data Frame

The addition of GSF menu on the Data Frame provides access to predefined zoom that will change the current display.

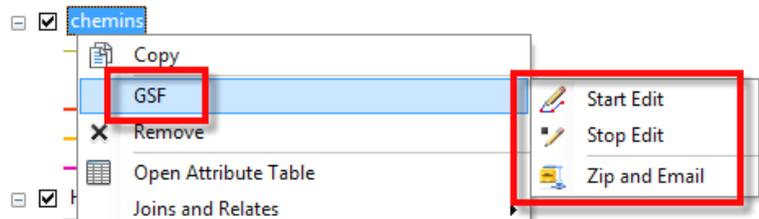
The menu is only accessible by clicking on the right mouse button on the Data Frame in the table of contents.



#### 4.13.2 GSF Menu for vector Layers

The GSF menu is also available to a vector layers and contains three functions:

- Start Edit
- Stop Edit
- Zip and Email



The "**Start Edit**" function opens an editing session on the layer and also on the other layers present in the Data Frame that comes from the same source (working environment) than in publishing.

If an edit session is in progress on other layers, the function ends it and asks the user whether to save the changes.

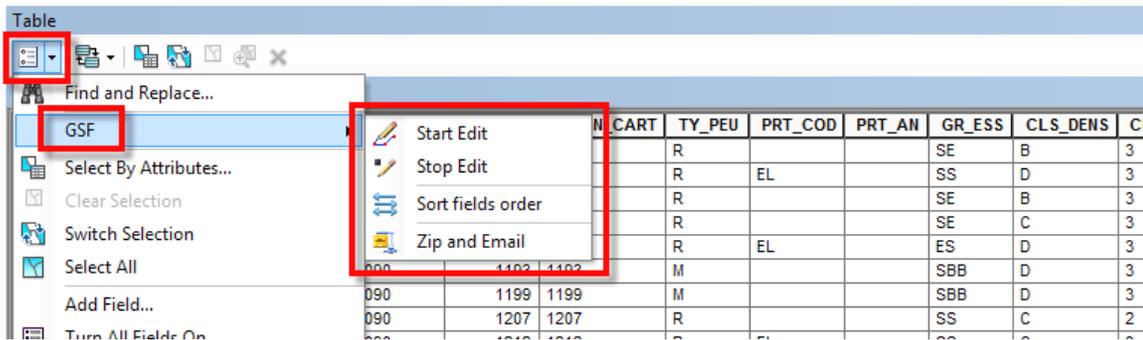
The "**Zip and Email**" function allows making a copy of the layer in Shapefile and embed within a ZIP file. Subsequently, a message will offer the user to add the file to an email and transfer the information in the messaging software.

### 4.13.3 GSF Menu in Tables

The GSF menu is also available in the tables by the **Options** menu in ArcGIS 10 (located top left) or the Options button in ArcGIS 9.x, located at the bottom right.

The menu will contain functions for:

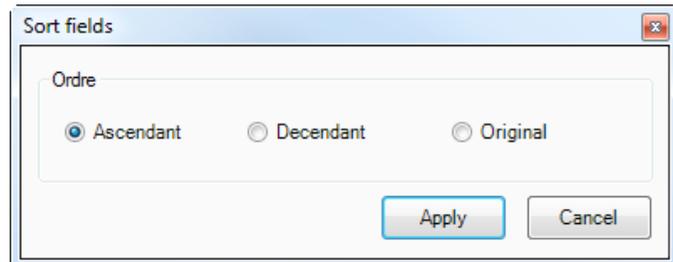
- Start Edit
- Stop Edit
- Sort the fields to move the order of the columns in ascending or descending order
- ZIP and Email



When **starting editing** a table, if it comes from a vector layer then the geometric edition will also be available. If there are other layers present in the Data Frame from the same environment (Workspace), they will also be in edition.

If an edit session is in progress on other layers, the function ends it and asks the user whether to save the changes.

Use the **"Sort fields order"** to move the order of the columns in the table by making an ascending or descending order to more easily search a field. This operation is recorded in the MXD document. The original field order in the table structure is not move.

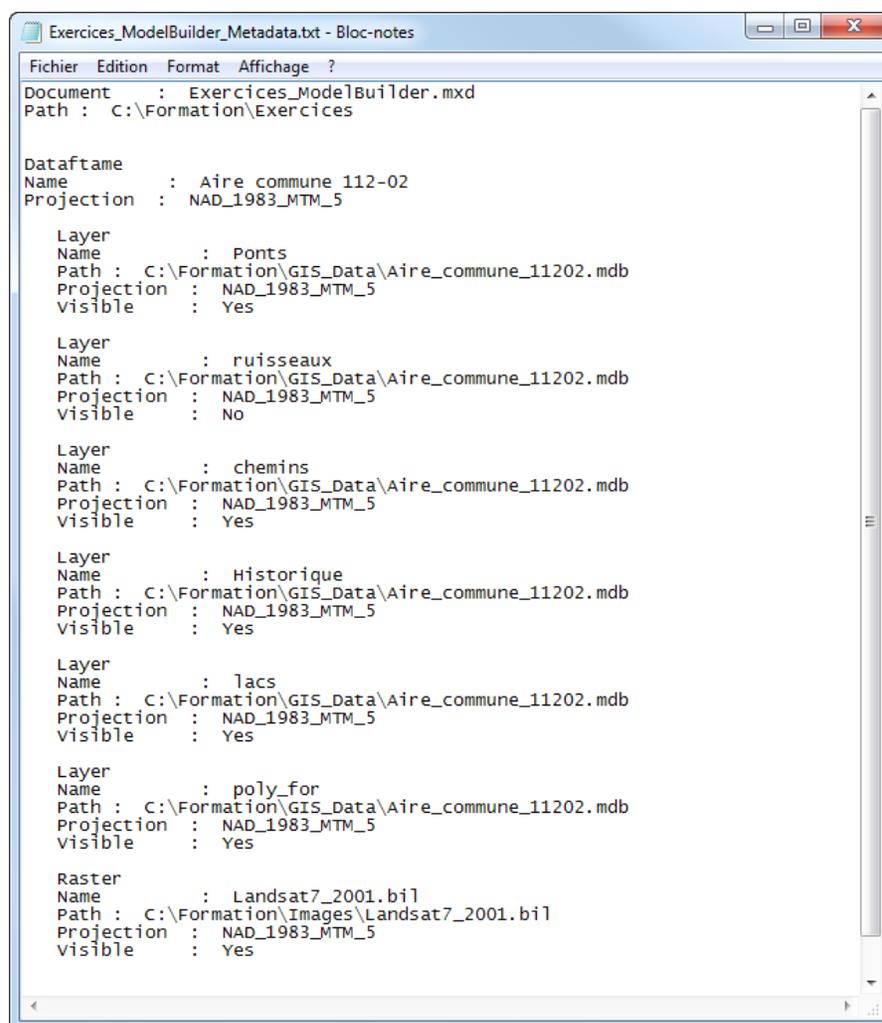
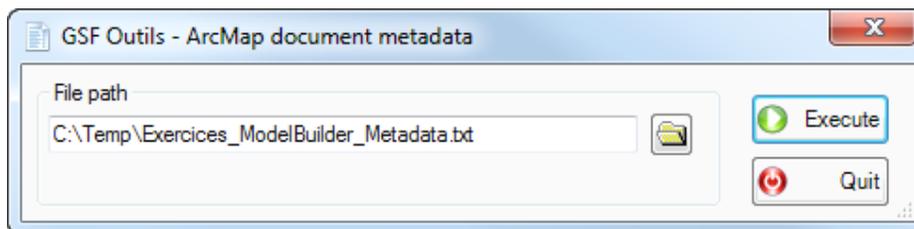


The **"Zip and Email"** function allows you to make a copy of the table in dBase (DBF file) and embed them in a ZIP file. Subsequently, a message will offer the user to add the file to an email and transfer the information to the software messaging.

#### 4.14 ARCMAP DOCUMENT METADATA

This function creates a text file containing information on several ArcMap document.

- Name and location of the document on the disk,
- The name, the content and the projection of the Data Frame,
- The layer name, location, projection and visibility in the map document.



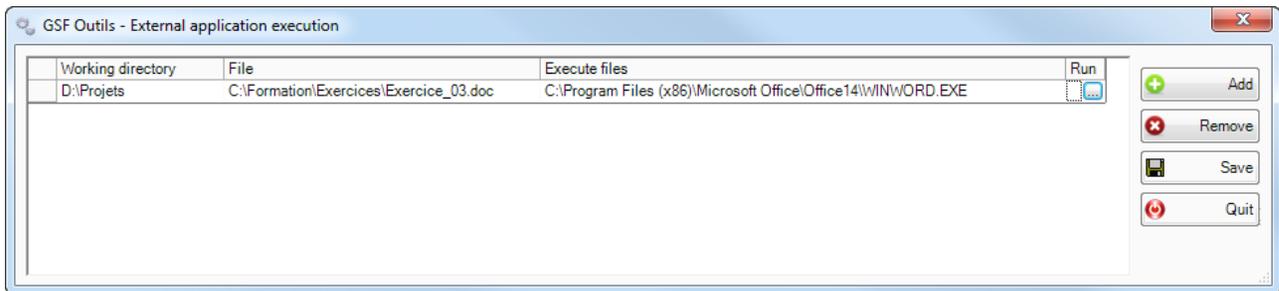
#### 4.15 EXECUTE EXTERNAL APPLICATION

This function allows opening pre-set document directly from ArcMap by reproducing a shortcut to an existing document to open it quickly.

In this window, the document location must be specified as well as the need to open this document and the working directory to create temporary files generated by certain applications program.

It is necessary to specify the valid elements in the **Working directory**, **File** and **Executable** columns. If an element is not physically present on the disc, it will not be possible to launch the application and open the document. Even if the application does not generate temporary files, the directory must be specified and physically exist.

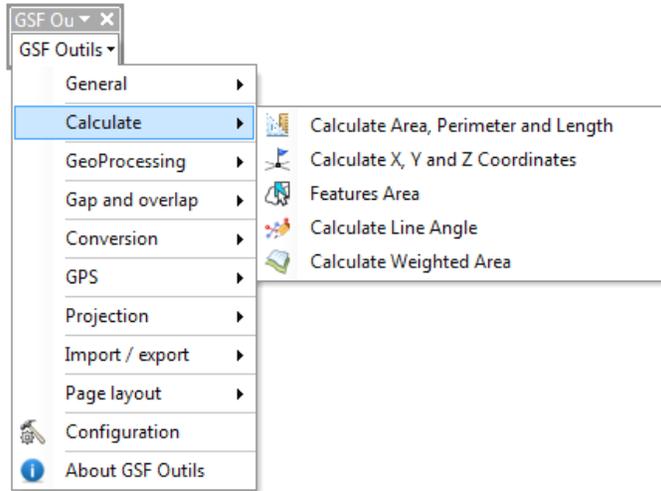
The **Run** column enables the start of the application (executable) and open the document specified in the left column. If the application creates temporary files will be created in the directory specified by the working directory column.



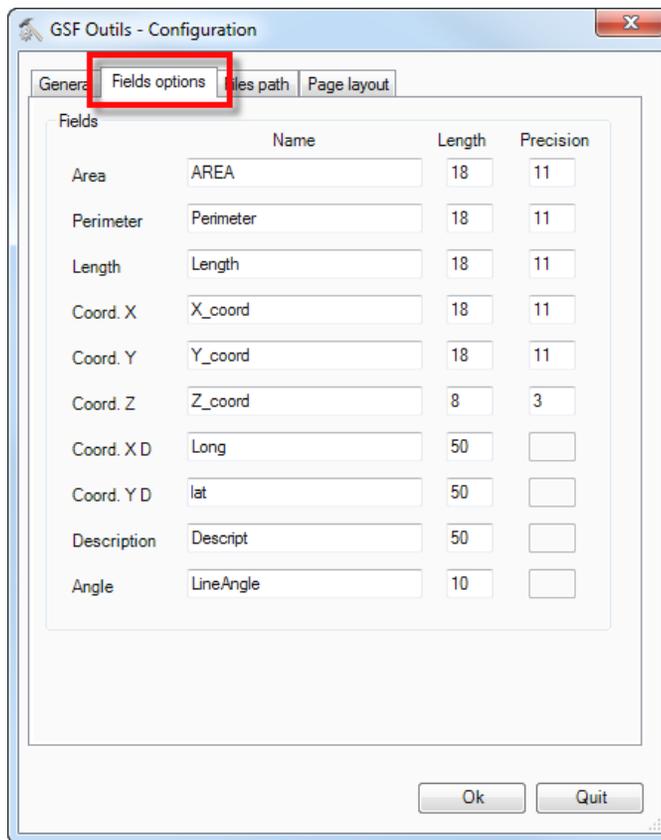
## 5 FUNCTIONS OF THE CALCULATE MENU

The "**Calculate**" menu contains functions to update the attributes of layers using their geometry, position, or the ratio of surface area to perform a weighting.

These functions process the information directly in the attribute tables by entering the result in one or more fields.



The field names used are those specified in the **Configuration** interface in the **Fields Options** tab. If the fields are not present in the table used, they will be created automatically based on the structure defined in this interface. For more details, see Section 3.2 on page 23.



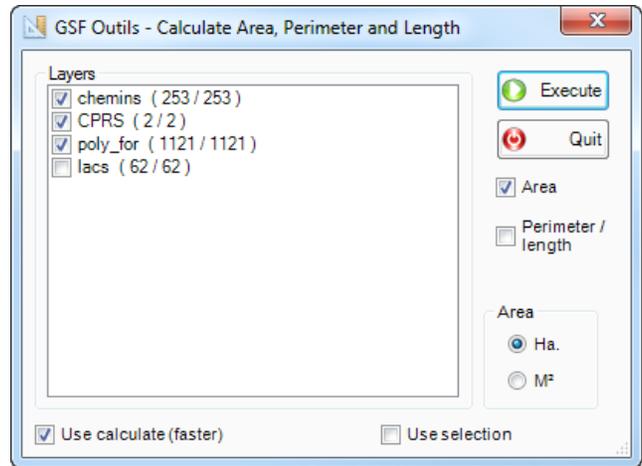
### 5.1 CALCULATE AREAS, PERIMETER AND LENGTH

This function allows you to calculate the area and perimeter for polygon layers and layers length lines. The operation can be launched simultaneously in several layers even if they are of different geometries.

The checkbox to the left of the layer name indicates that the treatment will be applied to it. You can select or deselect all the layers by combining the CTRL key and click the mouse button.

The options to the right allow you to turn on the calculation of the **Area** or **Perimeter and length**.

For the area, it is possible to calculate the values in hectares (ha) or square meters (m<sup>2</sup>).

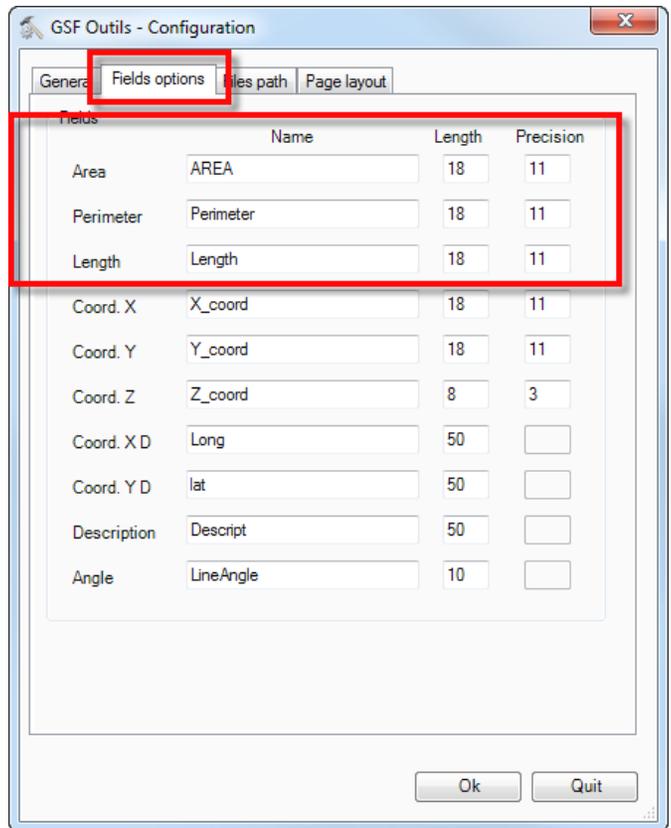


These values are entered in the fields specified in the configuration, as shown below against. If these fields are not present, they will be created automatically.

The **"Use Calculate"** option speeds up the process by taking a straightforward process on the attribute table.

The **"Use selection"** option calculates the selected features; otherwise the treatment will be made on all records layers.

The digits to the right of the layer name and parentheses indicate the number of records that will be processed on the total number present. If there is a selection from the layer, then the first digit will indicate the number of selected which will apply the treatment records.

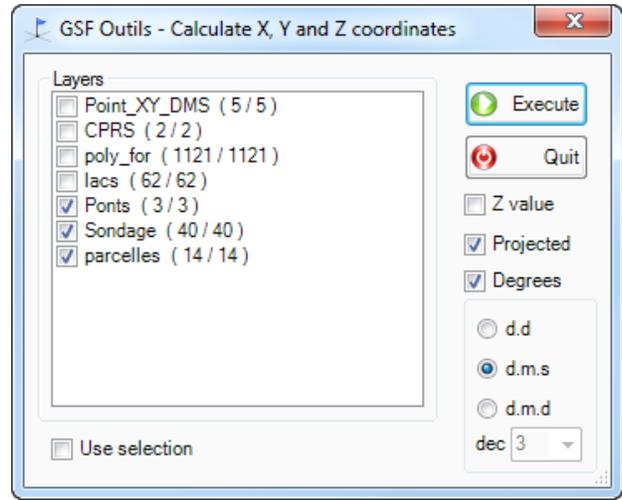


## 5.2 CALCULATION OF COORDINATES X, Y, Z

This function calculates the X and Y coordinate for point layers and polygons. For the polygons layers, the coordinates of the position come from the centroid of the label placement.

By default, the **"Projected"** option is enabled to calculate the coordinates in meters from MTM, UTM or other systems using a projection system in meters. These variables are stored in fields **Coord. X** and **Coord. Y** defined in the configuration.

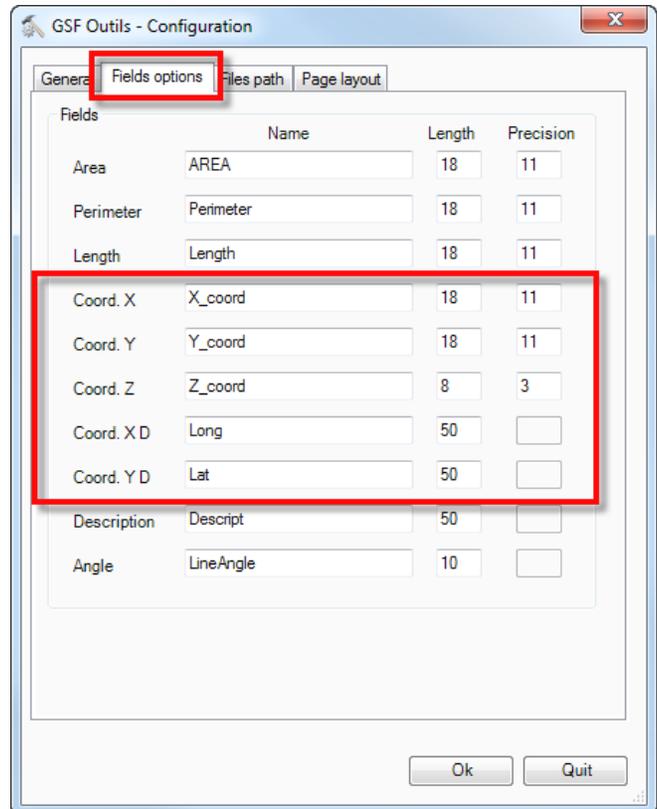
The **"Z Value"** option is used to extract an elevation coordinate that is stored in the geometry (ShapeZ) and entering it in the field **Coord. Z** defined in the configuration. This option cannot determine the elevation from other layers such as MNT or level curve. The elevation must exist in the geometry.



The degrees option can be enable for calculate the geographic coordinates system in latitude and longitude. For **DD** coordinates, variables are stored in fields **Coord. X** and **Coord. Y**. For **DMS** and **DMD** coordinates, variable values will be stored in fields **Coord. XD** and **Coord. YD** defined in the configuration. For this option, it will be possible to get the coordinates in three formats:

- **D.D.** (decimal degrees)  
(-66.986453 ° 45.876544 °)
- **D.M.S** (degrees, minutes, seconds)  
(-66 ° 59 ' 11.231 ", 45 ° 52' 35.558 ")
- **D.M.D.** (degrees and decimal minutes)  
(-66 ° 59.18717 ', 45 ° 52.59264 ')

The third option allows you to specify the number of decimal places desired by a dropdown menu.



The processing can be performed on one or more layers. The fields will be added if they are not present in the table. If a selection is enabled, a message will prompt the user to confirm the fulfillment process on the selection. If there is no selection, all records of the layer will be calculated. The number in parenthesis indicates the number of records that will be processing on total.

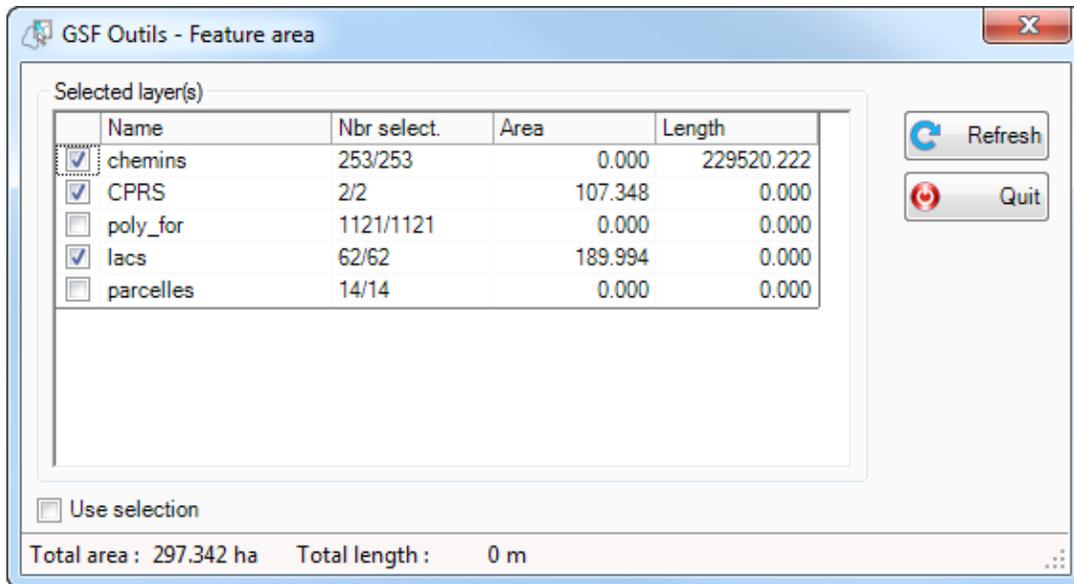
### 5.3 FEATURE AREA

This function calculates the areas and lengths of records for one or more layers. The calculations are done interactively and are recalculated automatically if the selection change is done in the active data frame.

The "**Refresh**" button is to force a refresh of the calculation if it seems wrong.

The "**Use selection**" option only allows the calculation on the selected records and for all layers checked in this window. The calculation is not compiled for layers with no selection.

The bottom section of the window displays the cumulative sum of the areas and lengths of all layers enabled for the calculation.

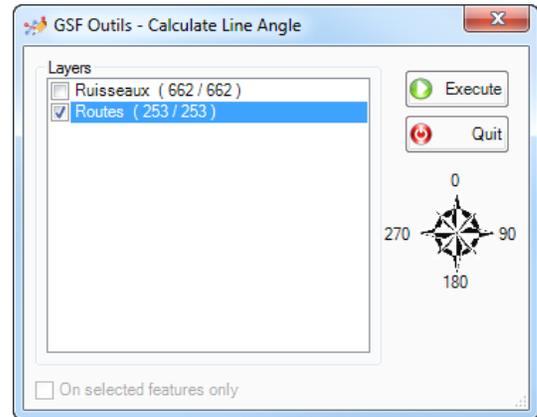


### 5.4 CALCULATE LINE ANGLE

This function allows you to determine the azimuth of each line of a layer by calculating the angle between the first and the last peak of the line.

The function included angle in the attribute table in the "**LineAngle**" field. If it is not present in the table, it will be created automatically. The field name is defined in the interface Configuration Options tab fields.

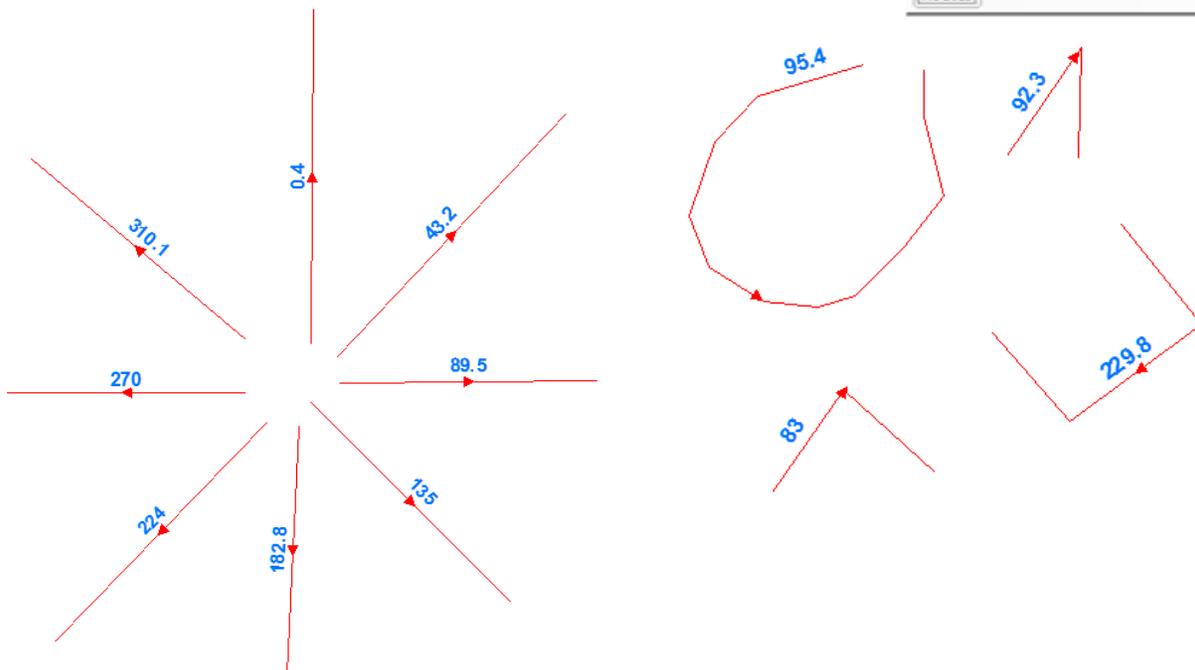
It is not possible to execute the function when the film is being edited.



The examples below will see the results produced by the function. Labels blue represents angle of each line between the first and last vertex of the line.

When a line has several segments, the result does not calculate the angle of each segment but the angle between the first and last vertex.

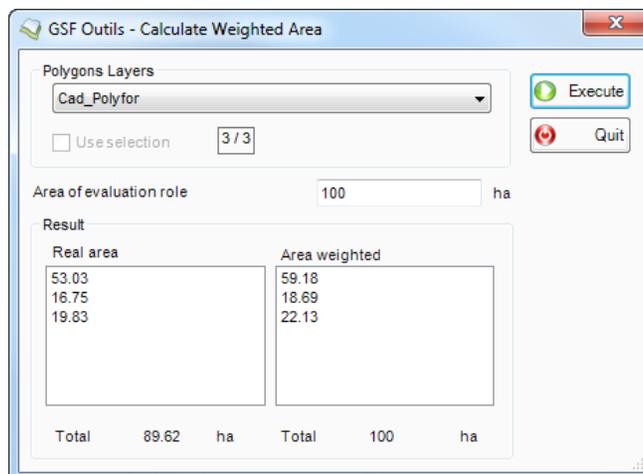
FID	Shape *	Id	LineAngle
0	Polyline	0	0.4
1	Polyline	0	43.2
2	Polyline	0	89.5
3	Polyline	0	135
4	Polyline	0	182.8
5	Polyline	0	224
6	Polyline	0	270
7	Polyline	0	310.1
8	Polyline	0	83
9	Polyline	0	229.8
10	Polyline	0	92.3
11	Polyline	0	95.4



### 5.5 CALCULATE WEIGHTED AREA

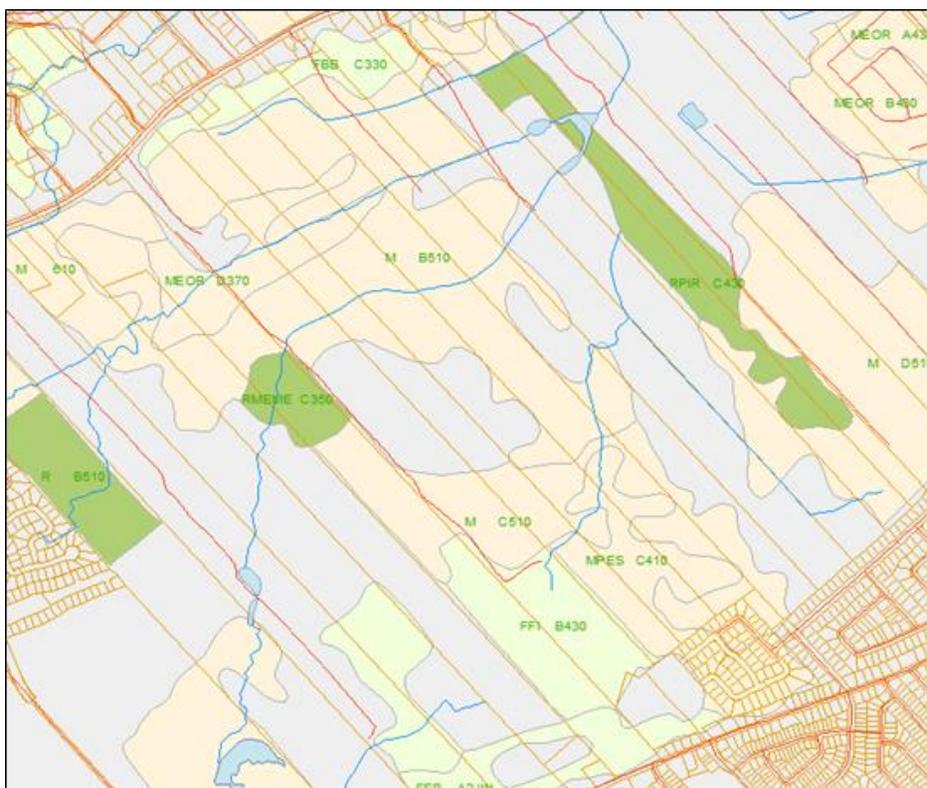
This function calculates the weighted area (ha) of forest stands (polygons) based cadastral lots (polygons).

The lots have a formal area from the municipal assessment roll and the land registry office, and it may be slightly different from that produced with the data and geospatial tools. The tool performs the weighting according to the percentage of area of each polygon on the total area to define the area of the latter based on a value manually entered by the user and which comes from the assessment roll.



Generally, the layer used must come from an intersection of forest stands with polygons lots.

Thus, each polygon contains the logging information and the lot number. It is easily possible to select a lot and apply a weighting to each of the polygons representing the logging information.

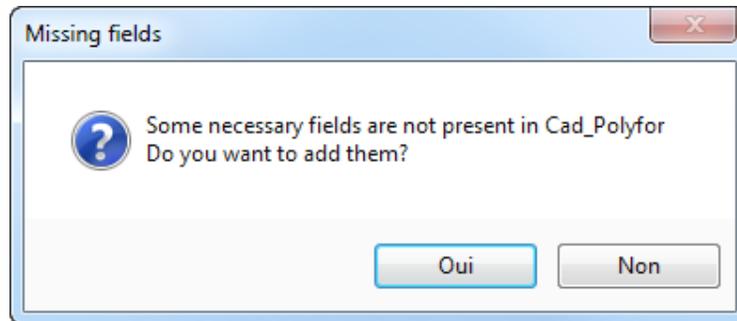


### 5.5.1 Fields used by the function

The function uses the names of specific fields. If they are not present, they will be created automatically. It is not possible to specify different names for these fields through configuration. The names and the structure of the fields are defined in the programming code. The table below describes the fields that will be created and used:

Field	Type	Description
Area	Float 6.2	Calculated area in hectares
Area_Pond	Float 6.2	Balanced area in hectares
Num_Peup	Entier long	Numeric identifier, no value is entered by the function
Desc	Texte (30)	Description, no value is entered by the function

At the launch of the weighting function, if some fields are not present, the following window will prompt the user for permission to create them. If he refuses, the treatment will not be performed. It is important to note that the name of the layer displayed is the one defined in the properties of the layer in ArcMap.



### 5.5.2 Formula weight

The weighting formula uses the area (in hectares) manually entered, or that corresponding to the assessment roll, and divide by the total area (in hectares) selected to obtain a ratio of weighted polygons.

Subsequently, the area of each polygon is multiplied by this ratio to obtain a weighted area.

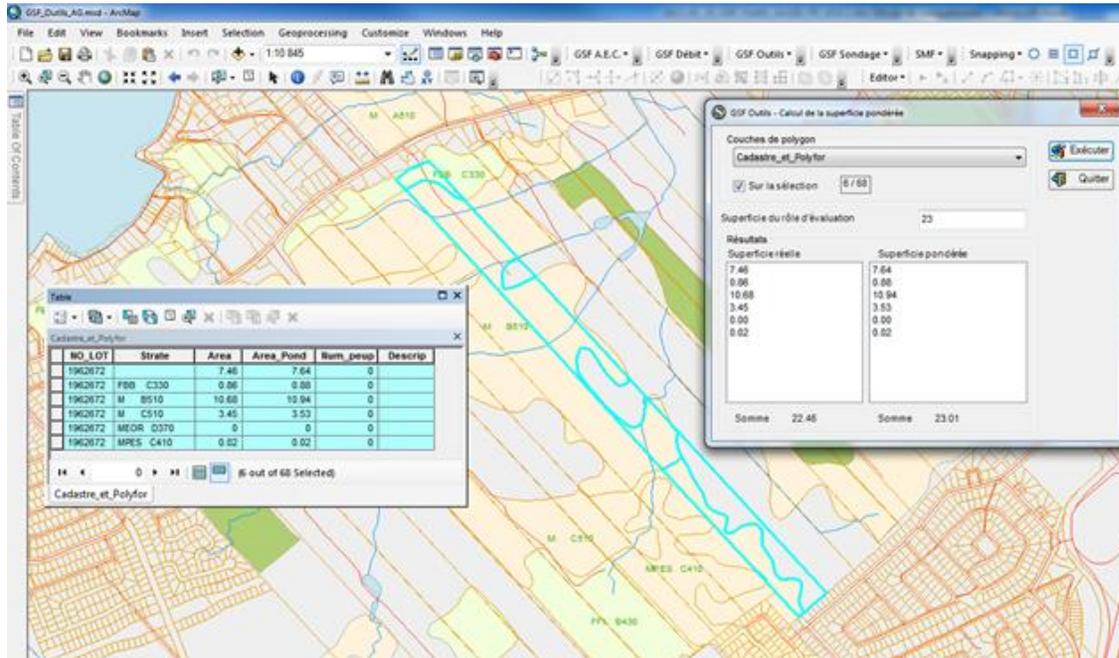
### 5.5.3 Unit calculation of areas

All units of this tool are calculated in acres. It is therefore necessary to include an area of the role of evaluation hectares.

### 5.5.4 Example

In the example below, the prize consists of 68 polygons, 5 of which are forests. The actual total area of 22.46 ha, but indicated that the role is 23.00 ha.

The result shows in the left section the actual area calculated by ArcGIS for each polygon and right weighted result. These values are also listed in the attribute table of the layer.



### 5.5.5 Processing Steps

To weight the area of polygons, follow the steps below:

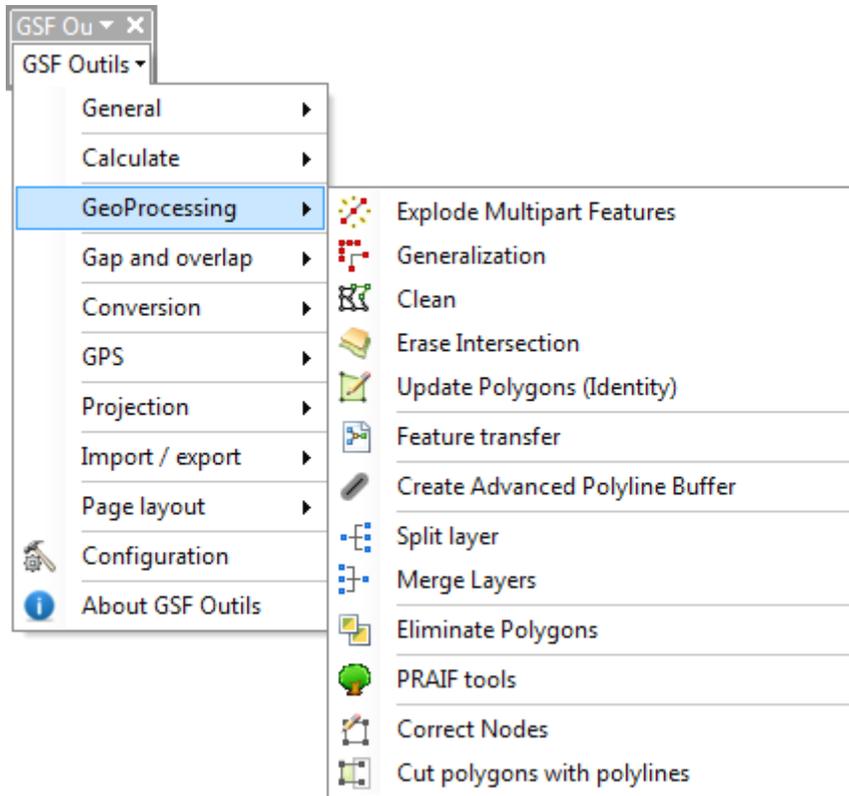
- 1) Select the polygons before opening function of GSF Outils.
- 2) Open the tool and select the layer in the upper section.
- 3) If the processing is done on the selected records, make sure the option is checked in the window.
- 4) Enter the size of the assessment (in hectares) in the appropriate box.
- 5) Click on Run.
- 6) If the fields are not present, a window will prompt the user for permission before adding them.
- 7) The results will be presented in the window and also in the attributes of the layer table.
- 8) To perform another calculation of weight, it is necessary to close the tool window.

## 6 FUNCTION OF THE “GEOPROCESSING” MENU

The "GeoProcessing" menu contains processing capabilities that create new layers by performing various geometric operations.

Some functions will be linked to specific types of geometries including "Create Advanced Polyline Buffer" available only to the layers of lines.

Most tools can be used in all areas of activities with the exception of the "PRAIF Tools" function for treatment and own analyzes forestry. This tool performs a geometric correction data to meet the standards of delivery of digital data PRAIF MNR.



## 6.1 EXPLODE MULTIPART FEATURES

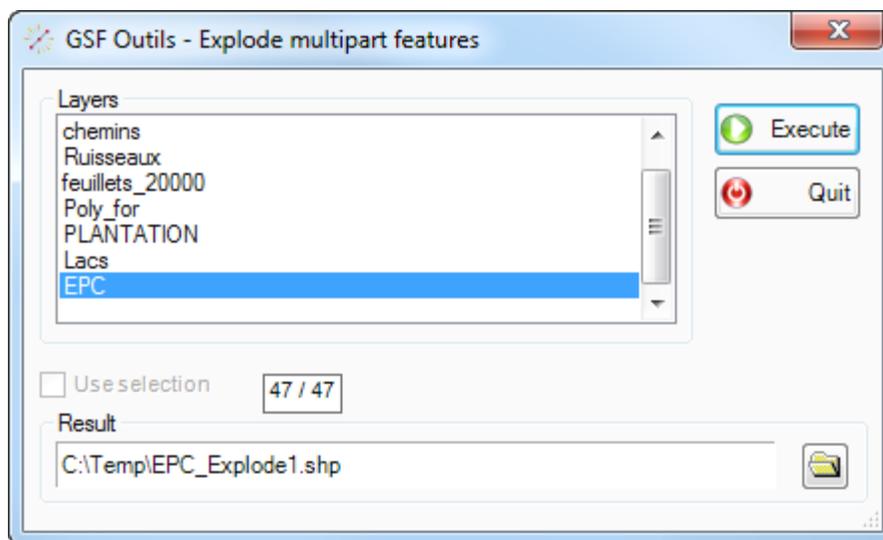
This function creates a copy of the layer separating the records containing geometries merged and connected to a recording of the attribute table. This type of element is called multipart.

The attributes of the new layer table will contain the same attributes as the source table. However, for shapefiles, it is necessary to update the areas and lengths so that the separation process makes a copy of the attributes.

If "Use selection" option is enabled, the resulting layer will contain only the explosion of the selected records in the source layer.

The result is saved in a new layer of the same geometry as the layer used. Only the geometry of lines and polygons can be treated.

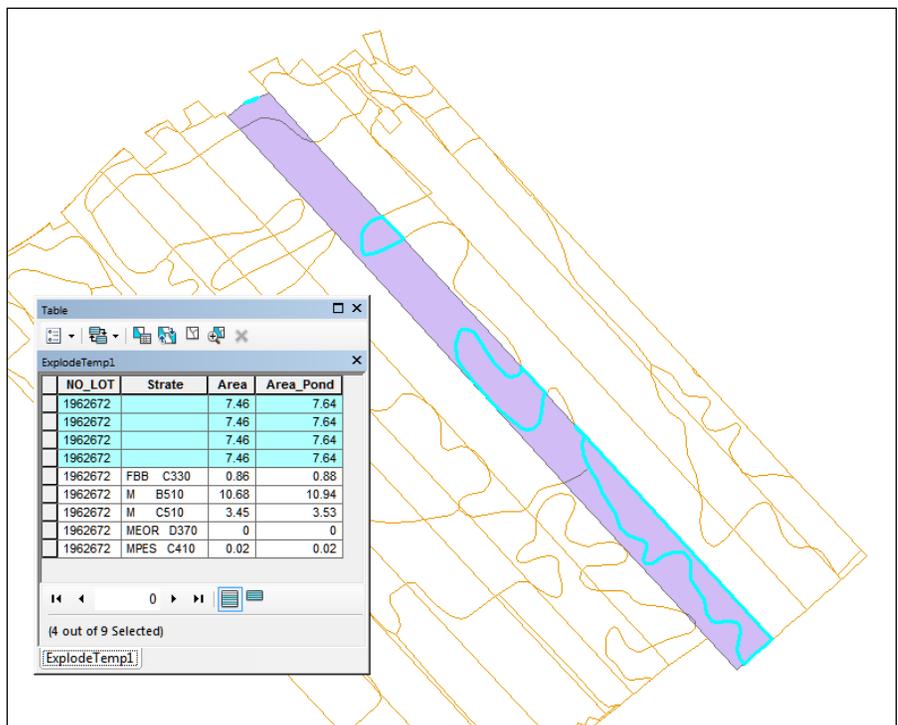
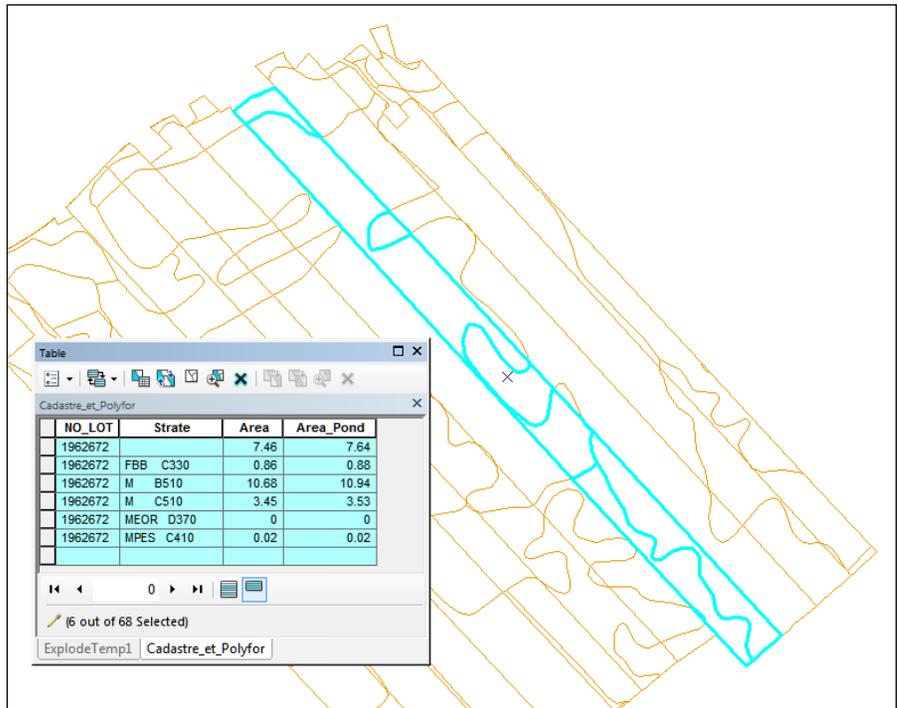
If there is no multipart, records will be recreated entirely in the resulting layer. The next page shows the result of treatment.



In the example below, the table of the polygon layer contains six selected records.

When the "**Explode Multipart Features**" function is performed, the result below shows the recording with no stratum (see the field of the same name in the table) is ultimately composed of four non-adjacent polygons. The function duplicates the values enshrined in the initial registration of the four polygons.

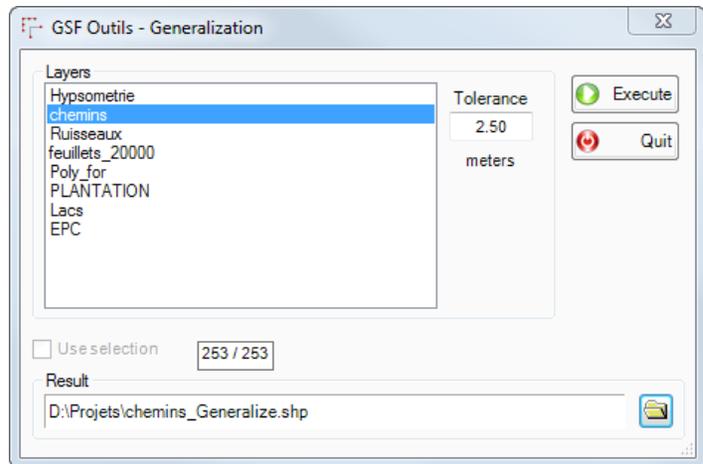
If a field contains information about the area of the polygon or length of a line, it is necessary to recalculate the size and length to get the value associated with each new entity.



## 6.2 GENERALIZATION

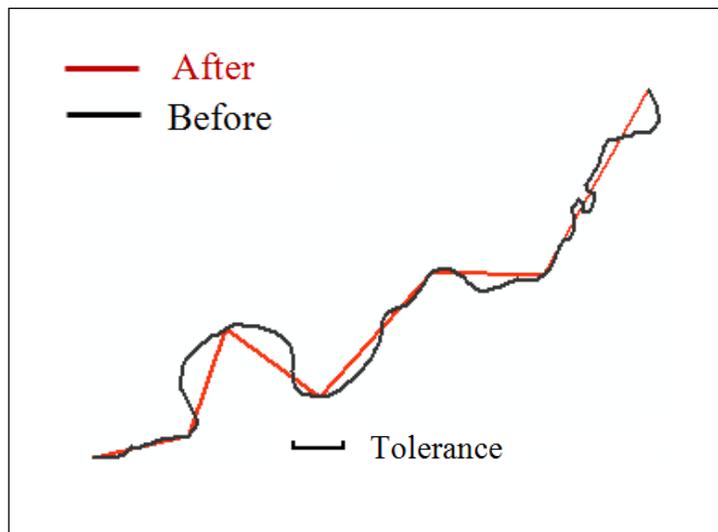
Generalization eliminates vertices in a maximal tolerance of lateral displacement for layers of lines or polygons. **Tolerance** is the maximum distance that the new line or the edge of a polygon can be moved laterally by removing vertices.

**Tolerance** is not the distance between the vertices because the technique uses generalization algorithm "Douglas Peucker." This algorithm creates new segments from the initial vertices ensuring that the perpendicular distance between the new and the old segment is less than the tolerance specified by the user.



The image below shows the result against the generalization with the line before treatment and after the red line generalization in black.

It is important to specify that the generalization of a polygon layer can cause topological errors overlays or gaps between adjacent polygons. The common border will not necessarily be generalized in the same way.

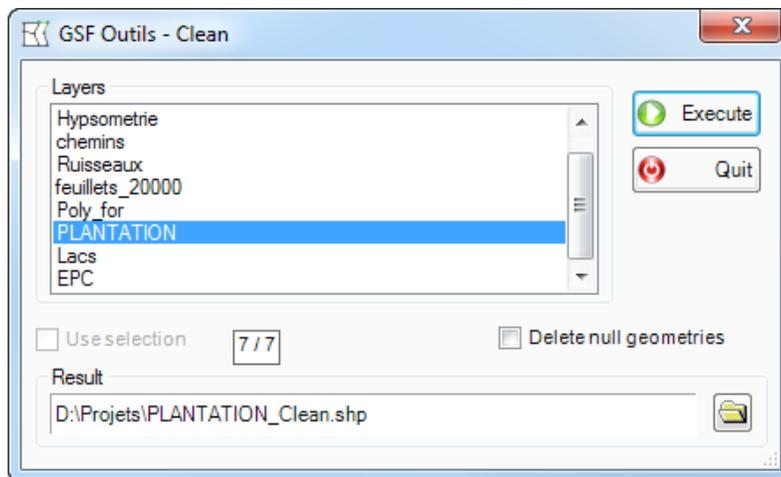


The generalization of a polygon layer can cause an inaccuracy between the tops of two adjacent polygons. It will be necessary to carry out tests to check the topological overlay or holes (GAP) (see section 7 on page 83).

The result is saved in a new layer of the same geometry as the layer used either Geodatabase or Shapefile format. This function can be executed for different data formats for reading in ArcGIS (Cover, DXF, DWG).

### 6.3 CLEAN

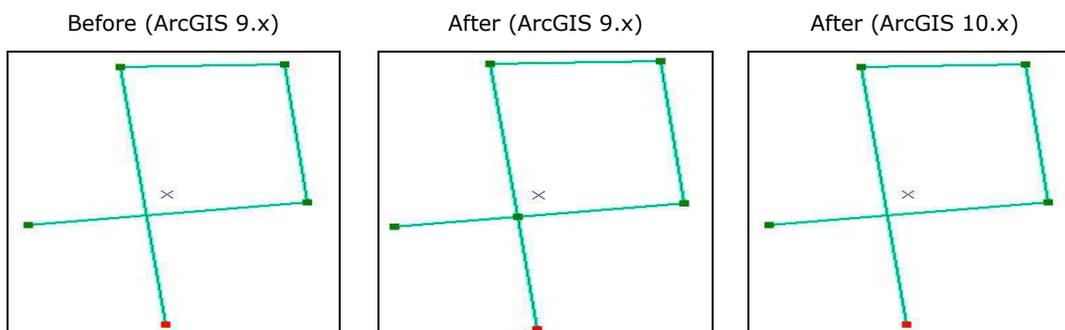
This feature allows improving and in some cases correcting geometries with issues for a layer of lines or polygons. Cleaning creates a new layer of the same geometry as the layer used. It is possible to start processing on the selected records.



The tool performs the following operations:

- Overlapping vertices are eliminated.
- The order of the vertices of the geometry is redefined clockwise.
- The Z undefined values in a 3D geometry will be assigned the value 0.
- Lower tolerance segments will be removed.
- The parts of a polygon overlap are dissolved.
- Non-closed polygons in the rings are connected to the last vertex.
- The vertices are added to the intersections of lines and polygons (ArcGIS 9.x only).

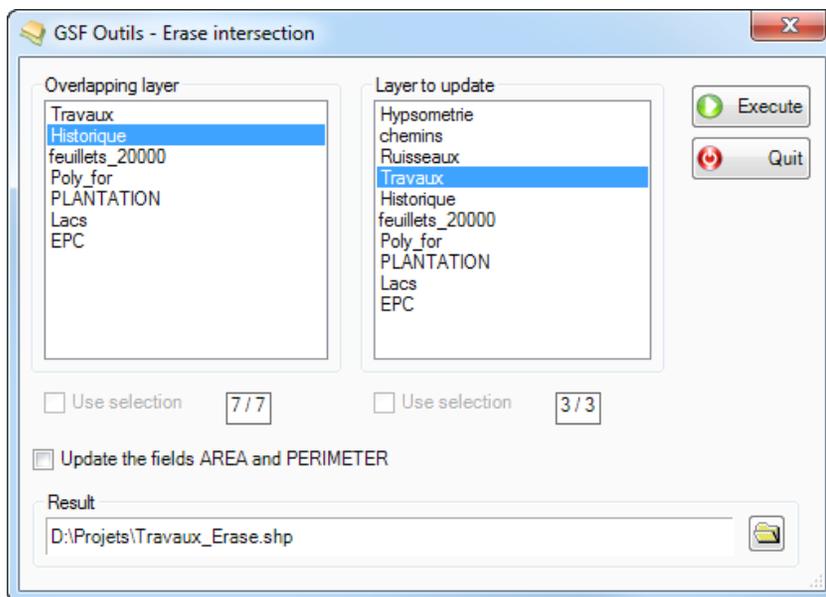
There is a difference between the ArcGIS ArcGIS 9.x and 10.x for the treatment of a layer, which contains lines of self-intersections. The image below shows the result of a self-made line intersected with ArcGIS 9.x versus ArcGIS 10.x. In version 9.x, a summit was added at the intersection but not in Version 10.x.



### 6.4 ERASE INTERSECTION

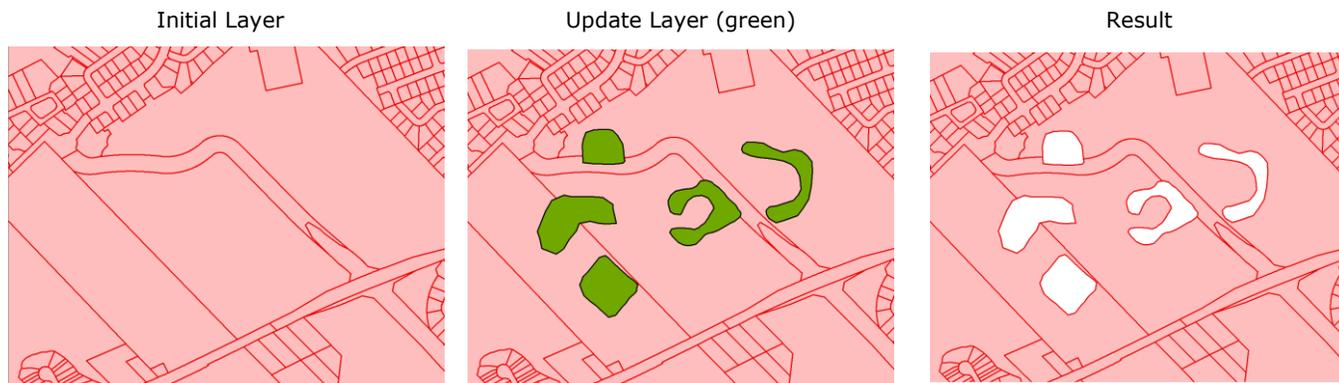
This function clears the geometrical features in a layer of lines or polygons using polygons of another layer. This process generates new layer geometry identical to the source and retains the original attributes. It is possible to update the area and perimeter in the new layer created. The fields used for this update are those defined in the configuration.

If geometric features of the layer that will be updated are fully covered by the polygon overlay layer, then the records will be deleted from the layer result.



The function may generate multiple geometries with portions (connected to two or more geometric recording portions). It is possible to separate the geometric parts and create one for each record in the attribute table using the "**Explode Multipart Features**" function.

The images below show the results of the treatment

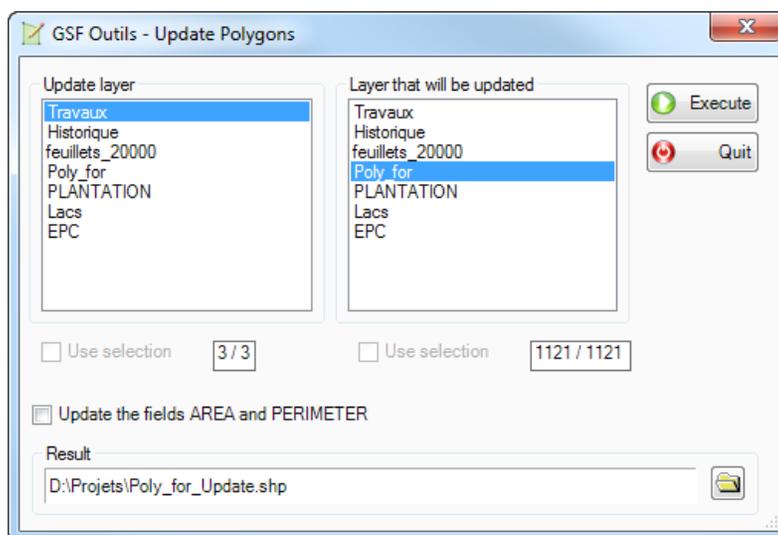


## 6.5 UPDATE POLYGONS (IDENTITY)

This function uses a polygon layer to update the geometry and attributes of another layer of polygons. When the geometries of the two layers overlap, the tool replaces the features and field values with those of the overlay layer. The result is saved in a new polygon layer.

Selected in the **Update Layer** section (left) layer cutting geometries and replaces the attributes of the selected layer in the section that will be updated (right) layer. The valid field structure of the two layers function used to ensure that those with the same name are also of the same type. If there are differences, an error message is displayed and the process cannot be achieved.

The **Update fields Area and Perimeter** option calculate geometry in the new layer. The fields used for this update will be those defined in the configuration.



The function may generate multiple geometries with portions (connected to two or more geometric recording portions). It is possible to separate the geometric parts and create one for each record in the attribute table using the "**Explode Multipart Features**" function.

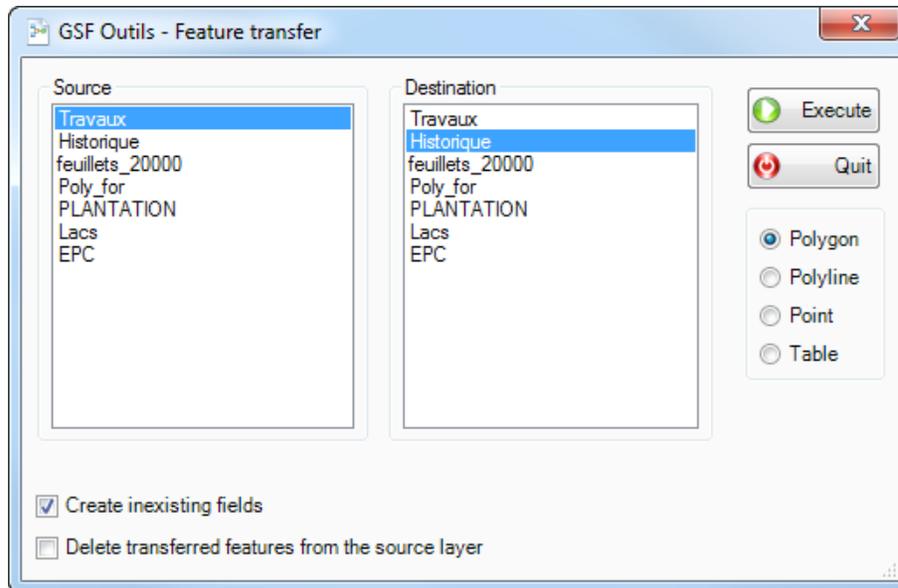
The images below show the result of the process.



## 6.6 FEATURE TRANSFER

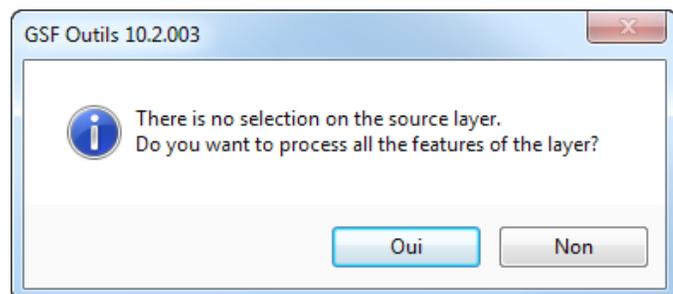
This function allows you to copy the features and attributes in another layer. The process can be performed on layers of points, lines or polygons. **Source** and **Destination** lists are grouped according to the type of geometry and can be changed by clicking on the option buttons at the bottom right.

The "**Create inexisting fields**" option ensures that **all attributes are transferred** to the destination layer. When the option is disabled, only the attributes of the same name fields will be copied to the destination layer.



The "**Delete transferred features from the source layer**" option should be used with caution because this operation is irreversible. The tool does not use the possibilities of the editor to store in memory the cuts and allow the cancellation. If the option is enabled and the process is started, **it will not be possible to restore the deleted records.**

The tool uses the selected source layer to transfer them to the destination layer features. When there is no selection, the following message appears to confirm if the transfer must be made on all the records. If the answer is no, then no process will be made.



## 6.7 CREATE ADVANCED POLYLINE BUFFER

This function only applies layers of lines to generate a buffer. It allows specifying different distances to the left and right side. The result is saved in a new layer.

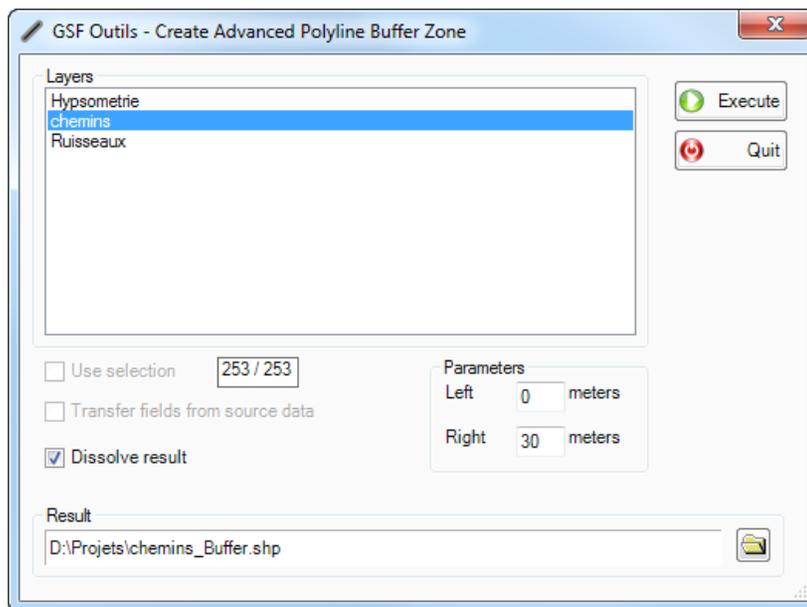
The scanning order determines the right side and the left side of the line. The symbol of the line can be changed for the arrow to see the orientation of the lines faster.



The **Parameters** section allows you to enter the buffer distance applied to each side

The "**Transfer fields from source data**" option allows adding these two elements in the layer result.

The "**Dissolve result**" option merges buffers to remove overlays.



Lines Layer



Buffer Zone Results



## 6.8 SPLIT LAYER

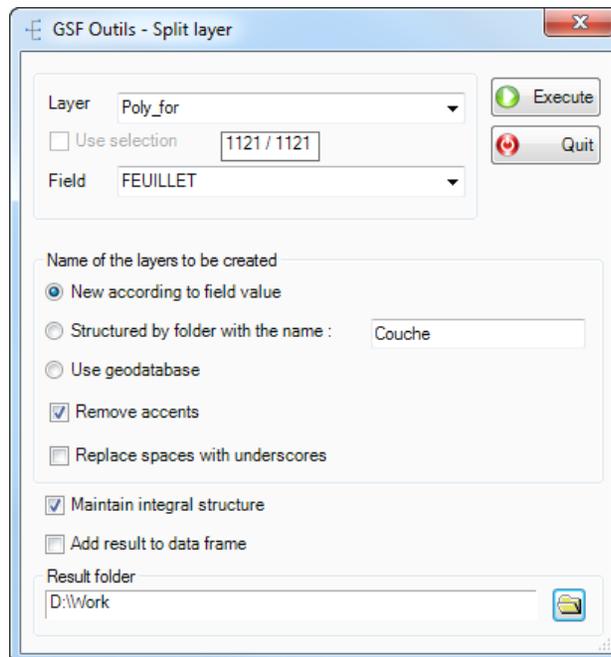
This function exports through an iterative process, features of a layer based on several attributes of a field.

Two methods are available to create new layers. It is possible to save all the layers in a folder named as the attribute value, or create multiple folders whose name is unique for all new layers.

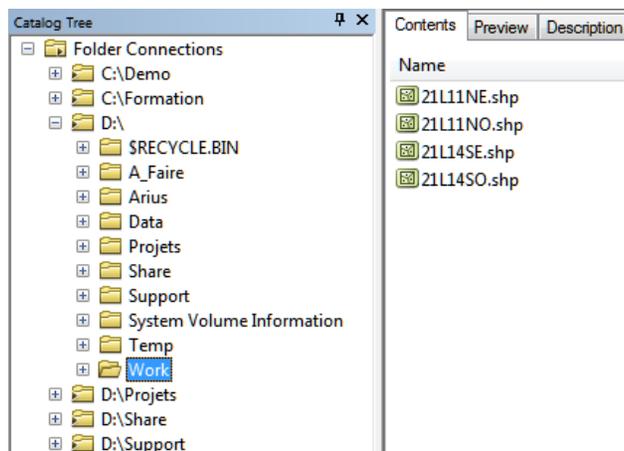
The "**Layer**" section allows you to select the layer to divide.

The "**Field**" section is the parameter that divides the features according to the unique values in the field. Records of the same attribute are exported to a new layer.

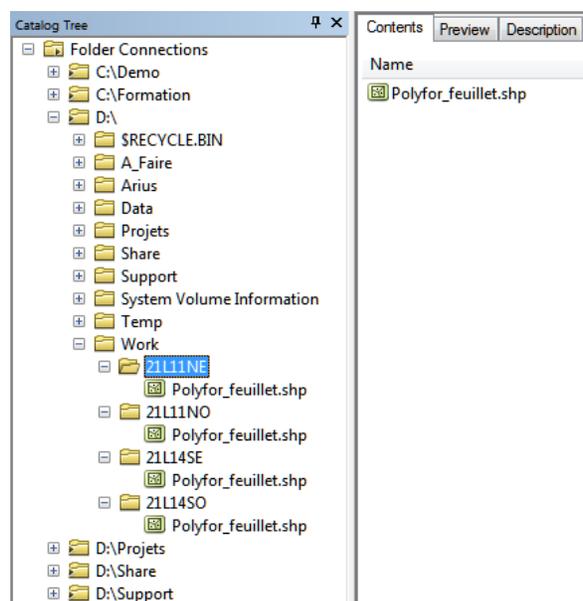
The "**Name the layers to be created**" contains parameters to define the name of the layer.



The "**New according to the field Value**" option save the new layers in the same folder and assign the value of the field in the name of the layer. Each layer will have a different name.



The "**Structured by folder with the name**" option saves the new layers in different folders whose name matches the attribute value. However, all new layers have the same name.

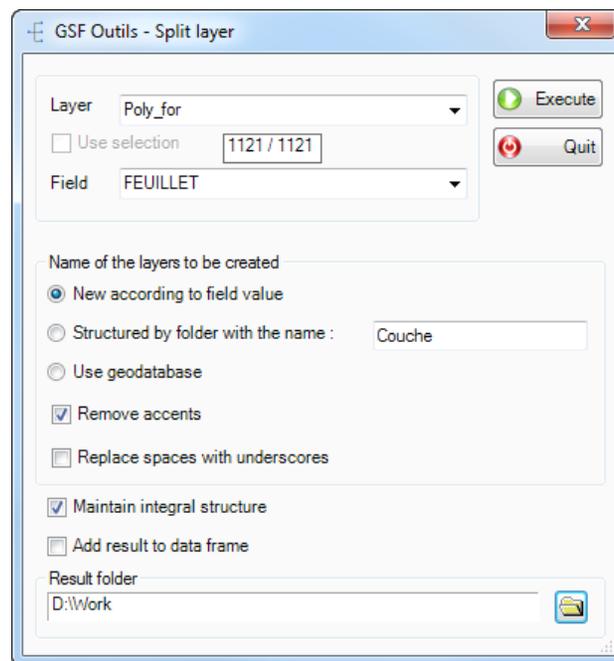


The "**Use a geodatabase**" option saves the new layers to the root of the geodatabase whose name of the feature class corresponds to the field value. Validations are carried out to ensure compliance of the structure.

Two additional options allow you to make changes to the name of the new layer, which are "**Remove accents**" and "**Replace spaces with underscores**".

The "**Add results to Data Frame**" option must be enabled to view the new layers in the Data Frame because it is not checked by default. It is important to consider the number of layers that can be created before enabling this option.

The "**Result Folder**" section allows specifying the location where to save the result.



### 6.9 MERGE LAYERS

This function allows grouping multiple layers having the same geometry in a new layer by combining the attributes of all sources. Layers can be added to the list of process from the current Data Frame or directly from the hard drive.

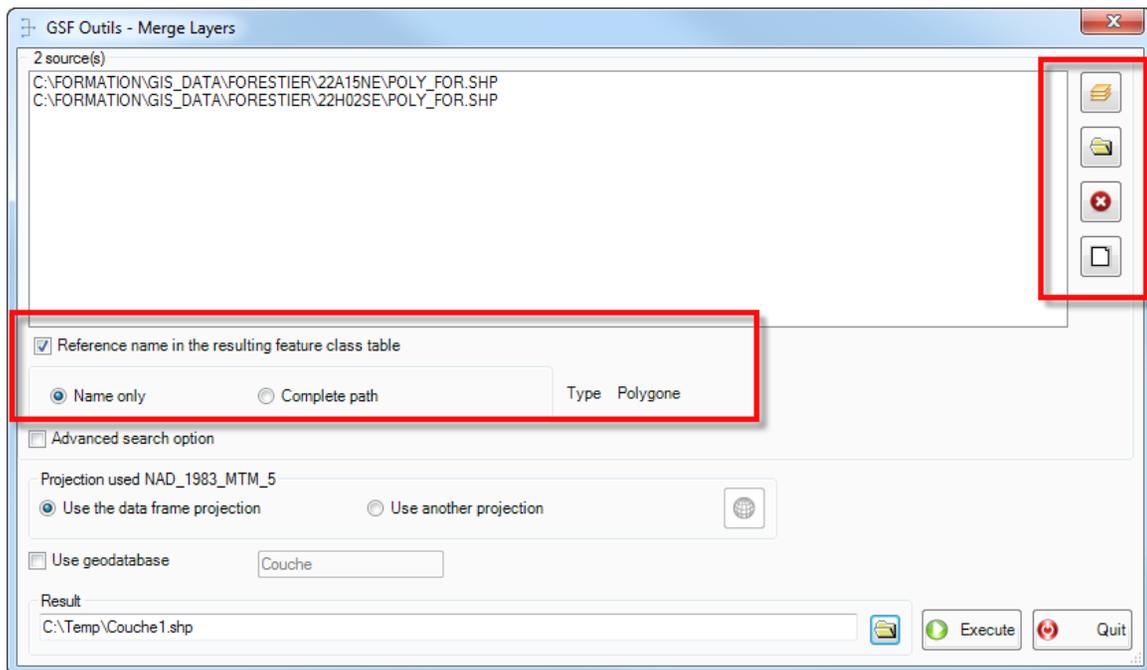
The result will create a new layer either in a geodatabase feature class or in a Shapefile format. The projection of the new layer can be of different data sources and must be determined in the "**Projection used**" section.

Layer names must be different except if added from the "**Browse**" button.

The "**Type**" section indicates the type of geometry processing. The first layer added in the list of data source determines the type of geometry to group. **It is not possible to combine different geometries (Points, lines or polygons)**. All layers added to the list must have the same geometry.

The "**Reference name in the resulting feature class table**" option automatically adds a field (FICH\_NOM) in the new layer that will contain the reference to the source of each record which are **Name Only** or **Full Data Path** source as " C: \ Folder \ couche1.shp ."

Fonction	Description
	Add layers from the Data Frame
	Add layers from the specify folder
	Remove Layer from the list
	Empty the List



**6.10 ADVANCED SEARCH OPTION**

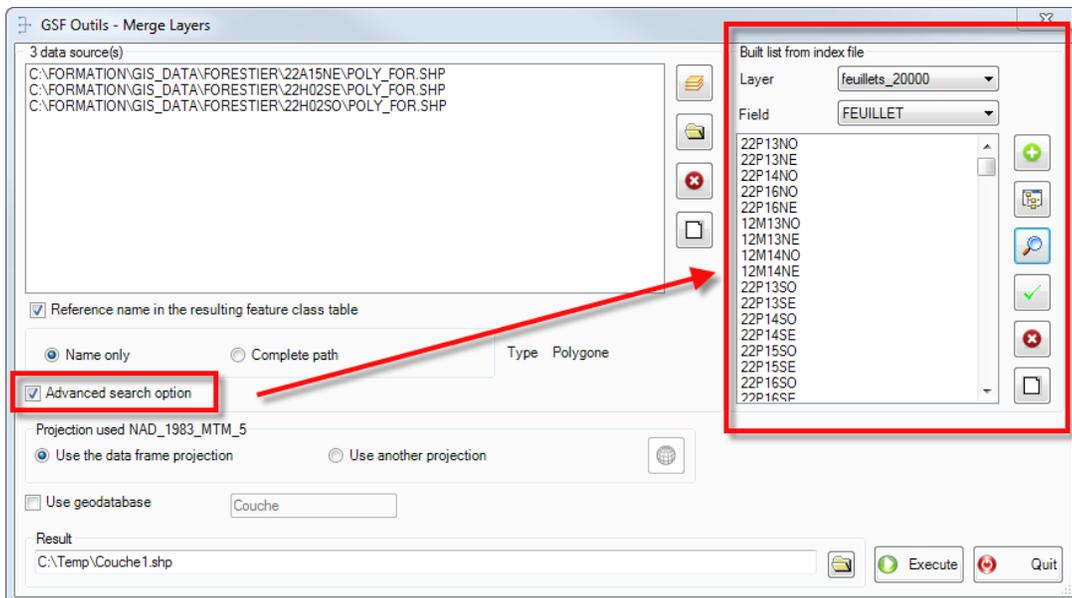
This option allows adding data source in large quantities and most importantly, very quickly. These features have been developed to use layers with the same name stored in different folders. These folders must be at the same level for automatic detection of data sources.

The first step is to specify the **Layer** and the **Field** containing the list of variables to search. Afterwards, a **list of unique values** should be generated from the button of the same name or manually.

When the list of unique values is identified, the **"Search for serial data sources"** button must be used to specify the first layer. The function will look for layers of the same name in folders at the same level.

If the list of variable filter is empty and the user uses the magnifier button, a global search will be performed in all cases at this level to find the name of the specified layer. It is not necessary to use the sorting function.

Function	Description
	Add a value manually
	Generate a list of values unique from the selected field. This list will be used to filter the search of data for the serial addition.
	Search structured serial database by repertory by specifying a first layer. The function will search to find other layers of the same type located in the same level repertory. If there is a list of values defined at the bottom, these will be used to filter the search.
	Verification of the values from the list by the data source.
	Remove data source selected in the list
	Empty the list of data source.



### 6.11 ELIMINATE POLYGONS

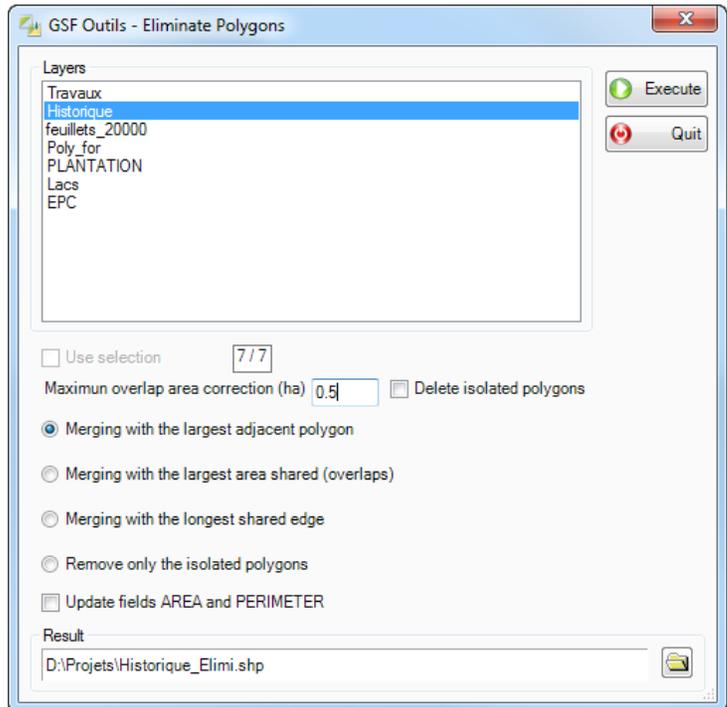
This feature eliminates the polygons by merging with neighboring polygons that occupy the largest area or have the longest shared border. This function allows you to delete micro polygons.

The "**Delete isolated polygons**" function removes the non-adjacent polygons and the ones below the maximum area to be proceed. This option may be used with the three functions available for the fusion.

The "**Remove only the isolated polygons**" function only handles the polygons non-adjacent and below the maximum area to be process.

The "**Merging with the largest adjacent polygon**" function only handles adjacent polygons having an area less than the one indicated and merges the polygon having the largest area.

The "**Merging with the largest area shared**" function only processes overlaps polygons with an area less than that indicated and merges the polygons with the most area.



The "**Merging with the longest shared edge**" function handles adjacent polygons area less than the maximum area to be process, by merging the polygons that have the longest shared border.

Function	Example
Merging with the largest adjacent polygon.	
Merging with the largest area shared (overlaps)	
Merging with the longest shared edge	

## 6.12 PRAIF TOOLS

This function allows to launch one or more process analysis and geometric correction based on the parameters of the digital standard of the Ministère des Forêts, de la Faune et des Parcs (MFFP) in Quebec. It can be used for other applications.

For each process, a point layer is created and added to the Data Frame when errors are detected. This layer makes it easier to make the correction because it locates errors. More Layers can be created depending on the items selected.

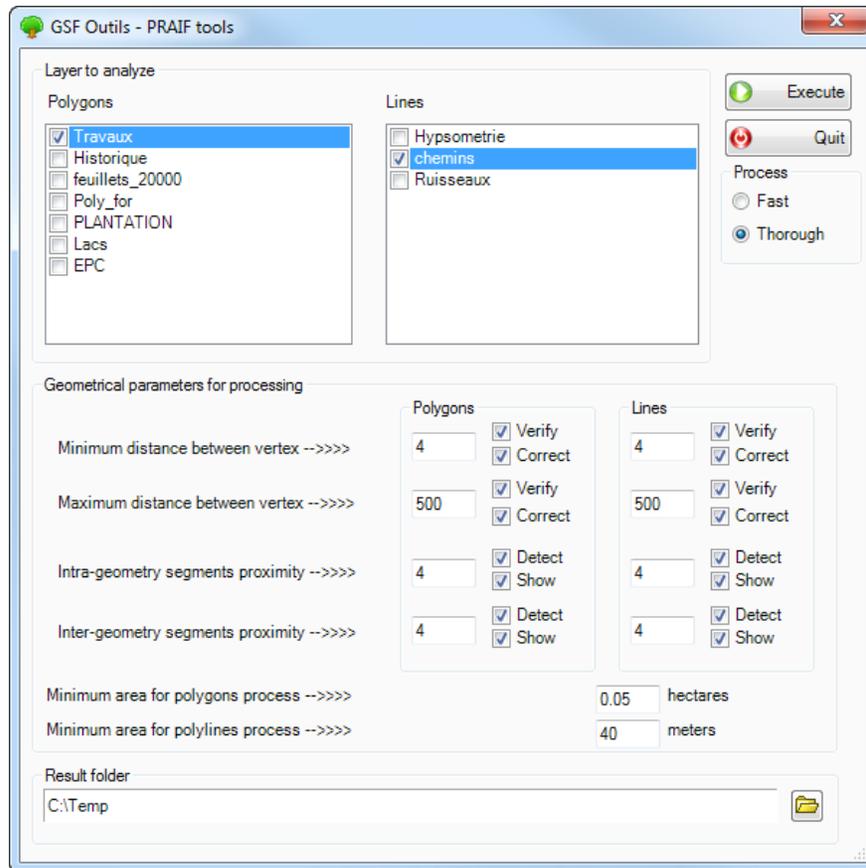
The "**Layers to analyze**" section allows select the polygon layer and/or layer lines to deal with. It is possible to process two geometry type layer simultaneously.

The "**Process**" section offers two types of analysis or **Fast** or **Thorough**. The **Thorough** process is the longest but provides a better analysis.

The "**Geometrical parameters for processing**" section contains four types of geometric analysis required in digital standards MFFP. The next page explains these parameters.

The "**Minimum area and Length for polygons and polylines process**" sections are applied directly to the analysis layer. The length is in meters and the minimum size for the analysis and processing of polygons in hectare.

The "**Result folder**" section allows specifying the location of all the layers created by this function.



### 6.13 GEOMETRICAL PARAMETERS OF THE PROCESS

Additional algorithms on geometric analysis have accelerated process.

Settings distances specified in this section are in meters.

The first two parameters (**Minimal distance** and **Maximal distance between vertex**) generate a results layer corrected while the other two (**Segments Proximity**) require to manually correct various errors.

These parameters can be performed individually or in groups. **It is suggested to perform geometric analysis individually** to facilitate process and use the last result to check other settings.

The name of the layers produced by the results contains the name of the process layer and the information on the type of analysis.

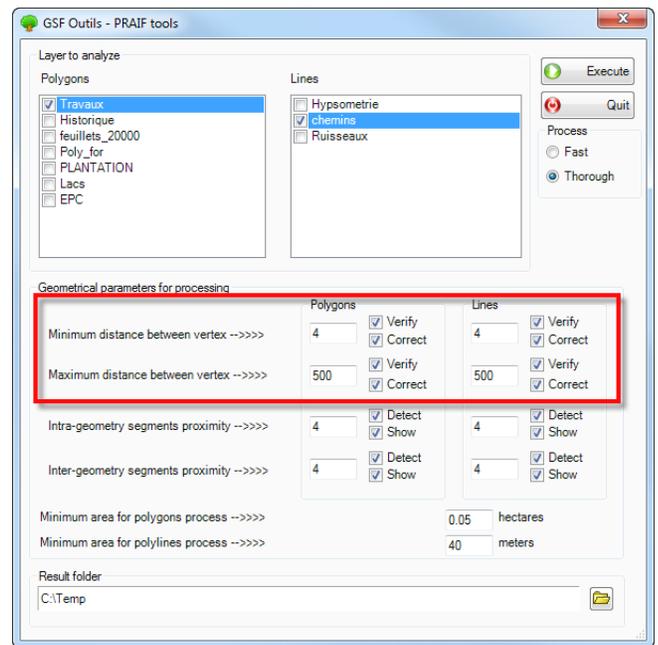
- Travaux sylvicoles\_Corriger1
- 
- Travaux sylvicoles\_ERR1

The following example contains the term **"\_Correct1"** to indicate that the patches are applied to the layer initially process while the term **"Err1"** is used for the point layer containing all errors detected.

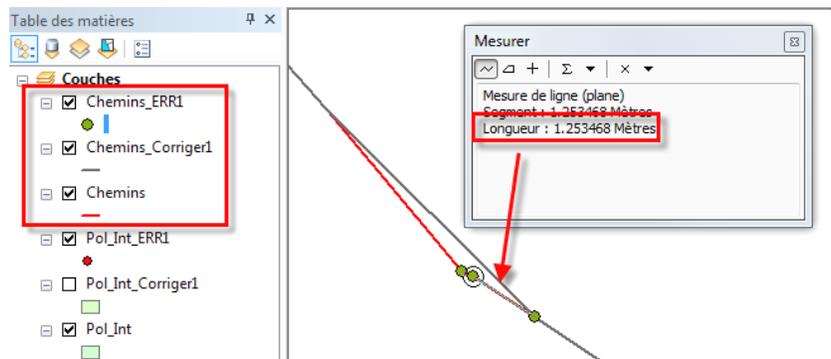
The **"Minimum distance and maximum distance between vertices"** parameters are based on a linear distance between two vertices. These sections contain two options.

The **"Verify"** option is used to detect errors and save them in a layer of points.

The **"Correct"** option automatically corrects the layer and save the result in a new layer.

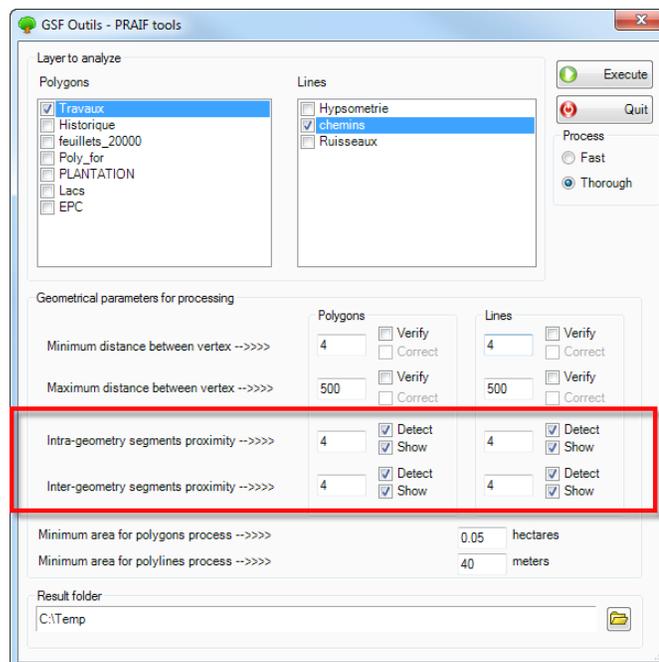
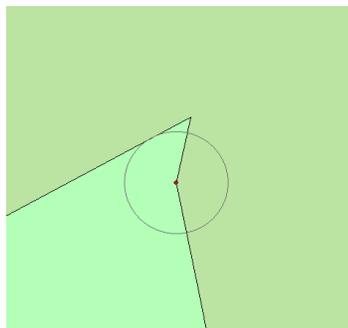


The following image illustrates the removal of vertex positioned at less than a 4 meters linear distance. The black line corresponds to the path realignment.



The "**Intra and Inter geometry segments proximity**" setting is based on a ray to detect errors.

When the "**Show**" option is enabled, a circle close to the size of the parameter will be displayed as a graph, thus enabling a better visualization of the error.



These processes are only detected and errors must be **corrected manually** as only a layer of points is created. **Feature Navigator** function available in the **General** menu of GSF Outils allows navigating each of the errors and making the correction in edit mode.

When corrections are made, it is suggested to re-analyze the final result to get no error.

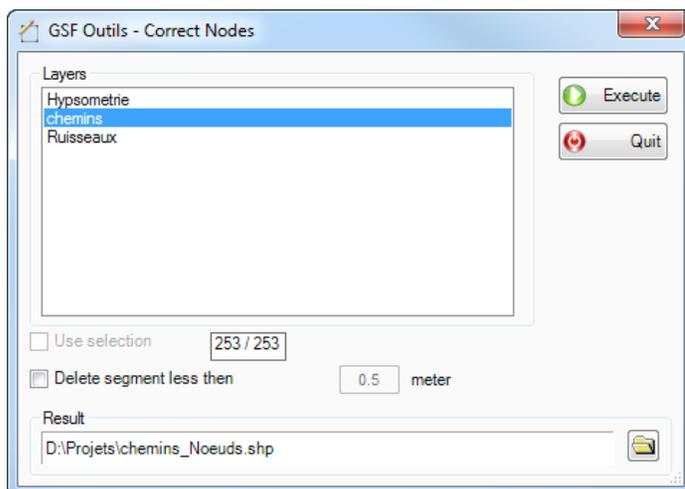
### 6.14 CORRECT NODES

This function is only applicable to linear layers. It eliminates the intersections of lines to eliminate overlaps.

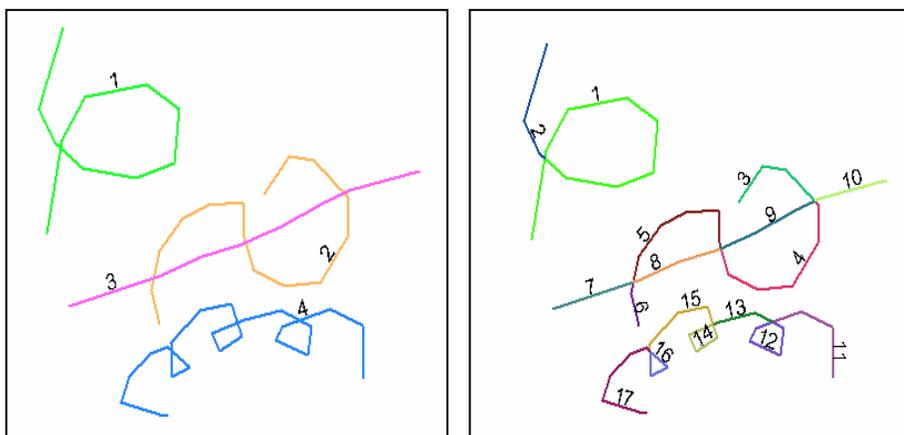
The result is saved in a new polyline layer containing all the attributes of the source layer.

The **"Use Selection"** option allows starting the process on selected features.

The **"Delete segment less than"** option removes the lines having a length less than specified. This is irreversible.



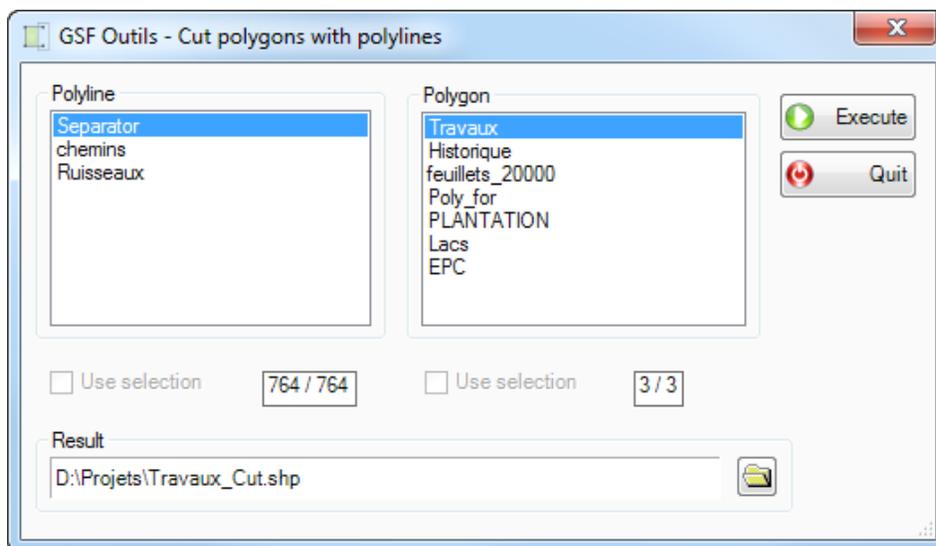
The image below shows the results of this function.



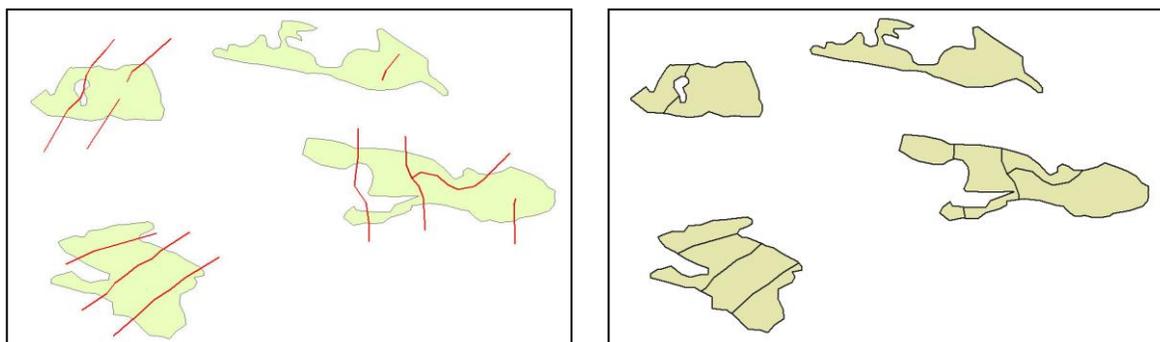
### 6.15 CUT POLYGONS WITH POLYLINE

This function allows cutting a polygon layer from a linear layer. The lines should pass completely through the polygons in two places to make their cutting.

The function will create a new polygon layer containing the attributes of the layer polygon source.



The image below shows the results and limits of this function



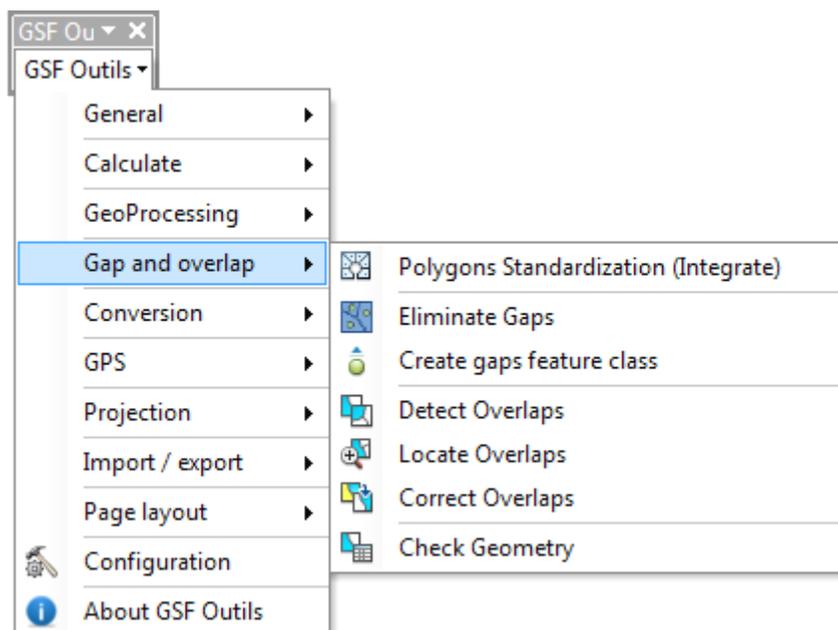


## 7 « GAP AND OVERLAP » MENU

The "**Gap and overlap**" menu processes the functions of the topology. This term defines the geometric coherence between elements in terms of connectivity, overlays, etc. These functions generate new layers and focus on the issues of gaps and overlaps polygon layers.

The "**Polygons Standardization**" function corrects imperfections, overlays or minimal gaps.

The "**Check Geometry**" function produces a DBF file containing the code and the reason of the defect geometries containing errors.



### 7.1 POLYGONS STANDARDIZATION

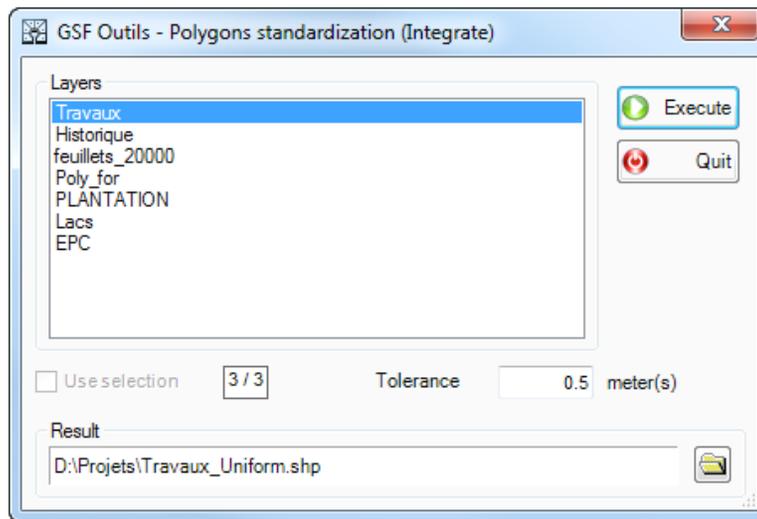
This function corrects imperfections, overlaps and gaps and minimal vertex on a polygon layer. The processing performs standardization based on an XY tolerance.

It corresponds to the **Integrate** function of ArcToolbox but saves a new layer for the data processing.

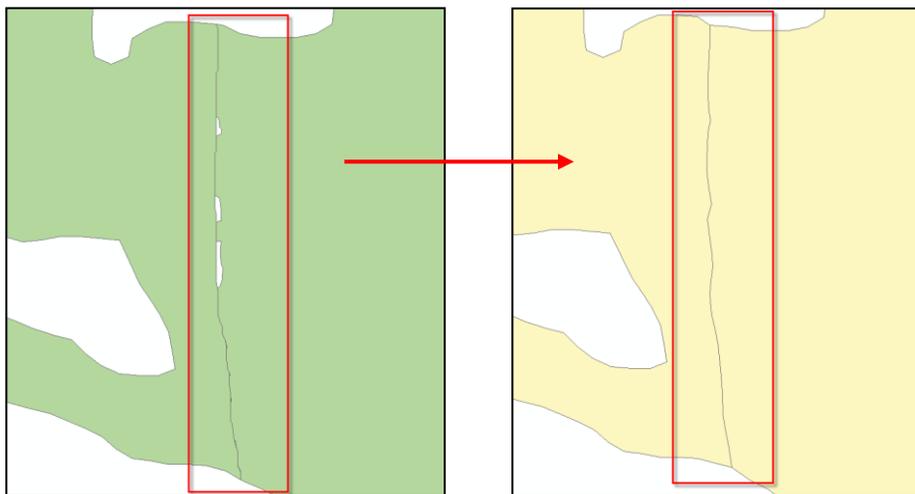
The standardization processes data at the Vertex. Therefore, the specified tolerance value corresponds to the distance between the melting Vertex. A specification of too much tolerance can modify features that should not be merged. It is advisable to indicate a **small tolerance to minimize errors**.

**Caution too high tolerance (+ 2) may deform the geometry.**

The function will create a new polygon layer containing the attributes of the polygon layer source .



The image below shows the result of process by applying a tolerance of 2 meters.



## 7.2 ELIMINATE GAPS

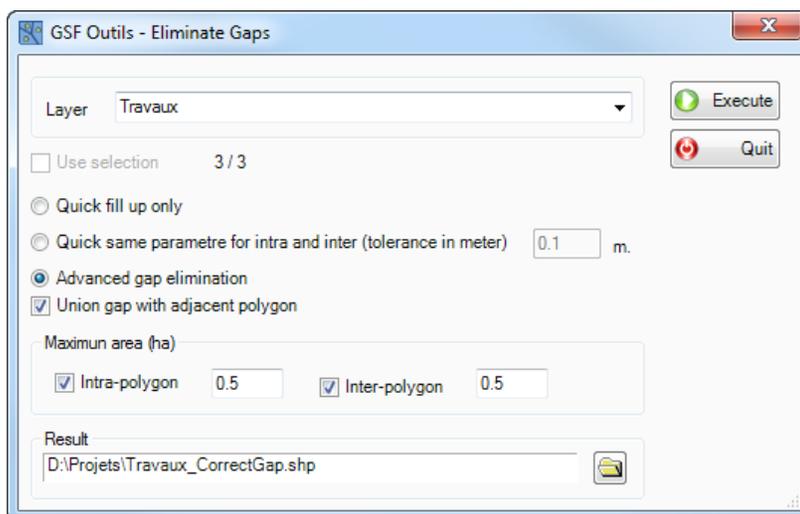
This function eliminates gaps located within polygons (intra-polygon) or gaps between treated polygons and those adjacent (inter-polygon) based on maximum area to be process.

The "**Quick fill up only**" option only fills the gaps by creating a polygon. No merger between polygons is performed.

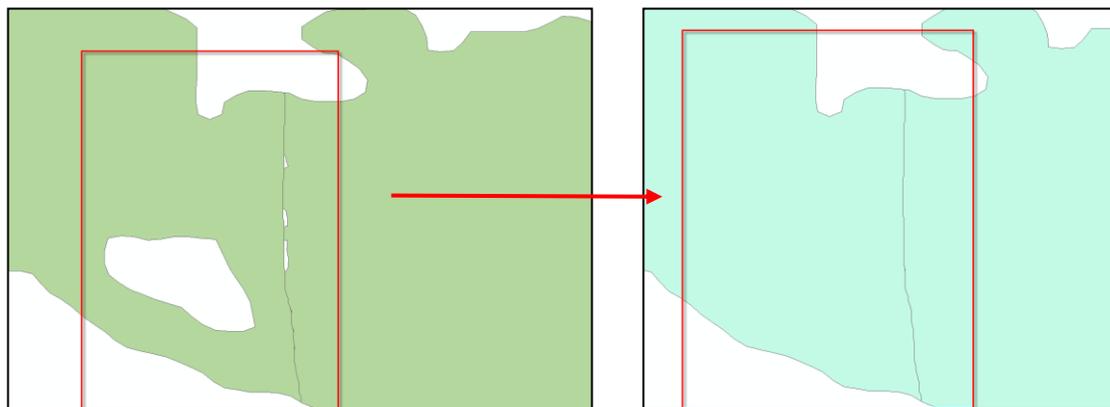
The "**Quick same parameter intra and inter (tolerance in meter)**" option is used to apply a small adjustment between polygons. It is useful to finish processing when the result always contains some minor corrections.

The "**Advanced eliminate Gaps**" option offers the possibility of merging the gaps to adjacent polygons by specifying a maximum area for intra-and inter polygon geometry.

The function will create a new layer containing the attributes of the source layer polygon.



The image below shows the result of the processing applying the fusion of adjacent polygons intra and inter-polygon.



### 7.3 CREATE GAPS FEATURE CLASS

This function completely fills all of the holes or specifies the minimum and / or maximum (ha) size of the gaps to create. The result is saved in a new layer containing only polygons with holes.

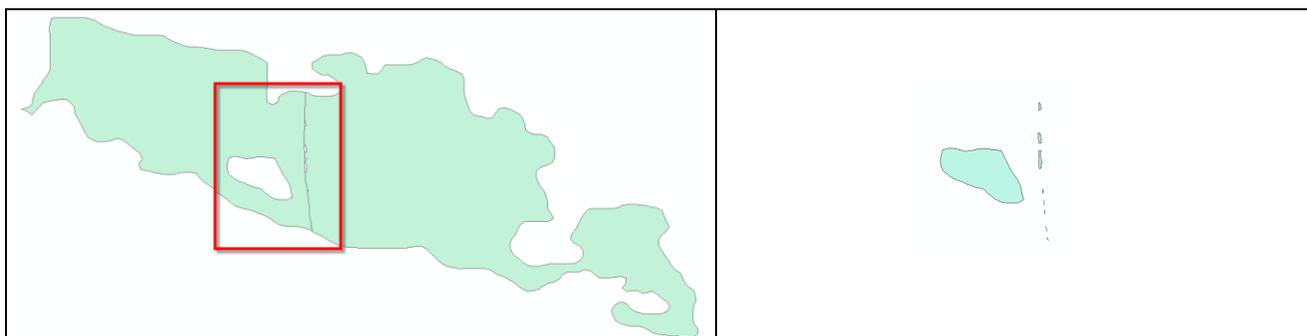
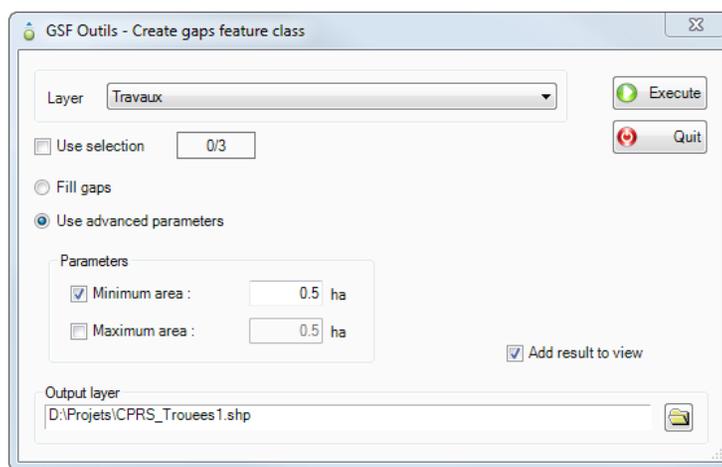
The "**Use Selection**" option is only used to treat the selected features.

The "**Fill Gaps**" option creates polygons for all the holes contained in the layer.

The "**Use Advanced Parameters**" option specifies the minimum or maximum area (ha) to consider when developing the gaps. Both options can be enabled simultaneously.

The "**Add to Result View**" option is enabled by default. This option lets you specify whether the result should be added to the current data frame.

The "**Output Layer**" section identifies the location and name of the result layer.

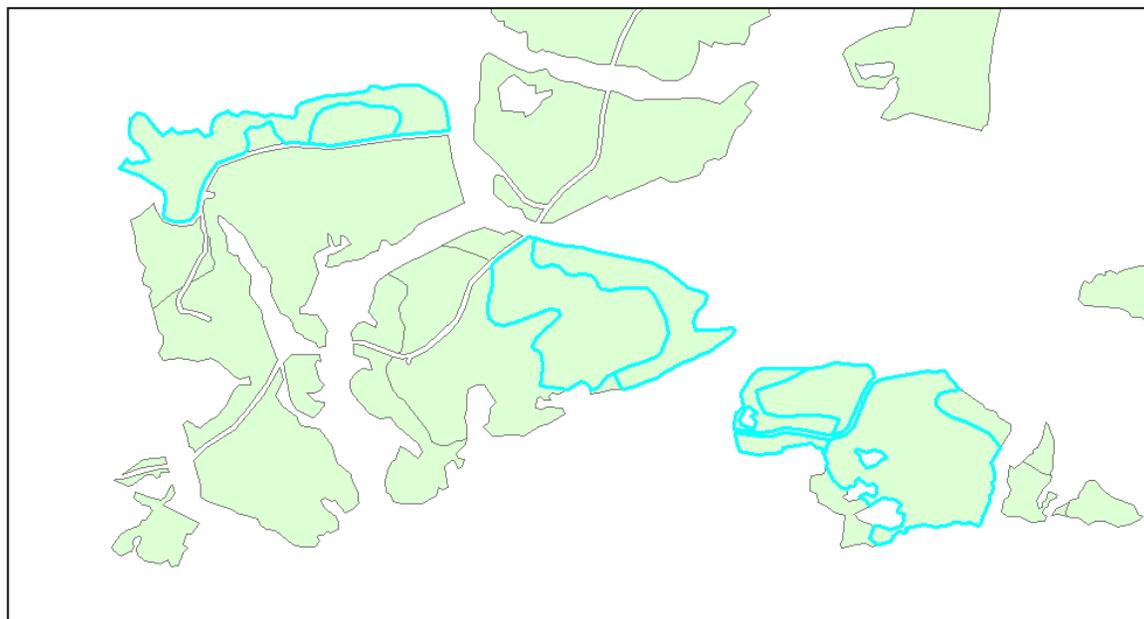
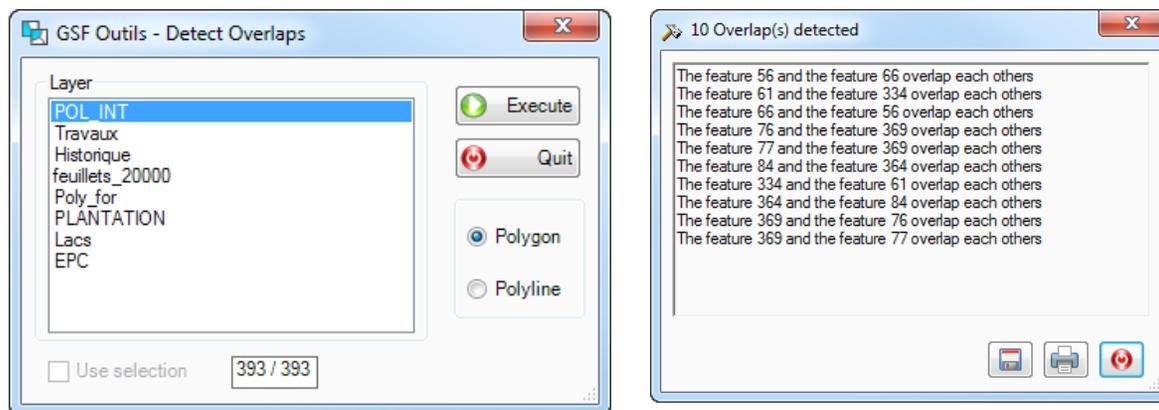


## 7.4 DETECT OVERLAPS

This function is used to identify features that overlap a layer of polygons or lines.

The "Use Selection" option allows performs processing on the selected features.

The process selects features that overlap and shows in a window, the identifier "FID" numbers or "ObjectID" of these features. The list can be saved in text file (txt) or printed.

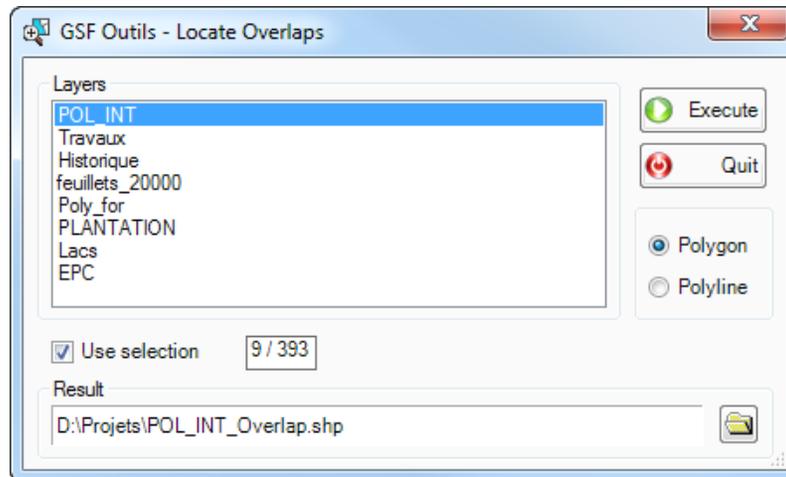


### 7.5 LOCATE OVERLAPS

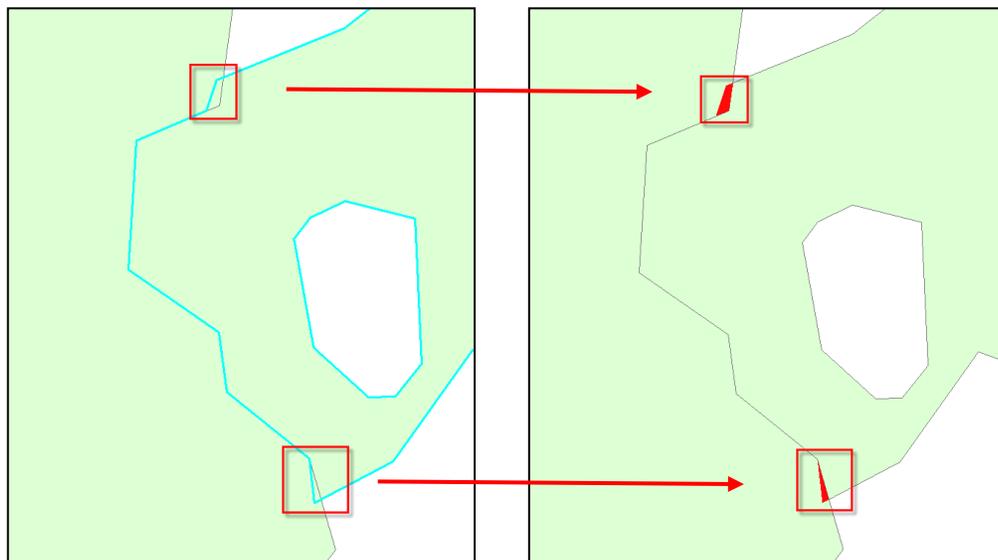
This function locates the overlap areas for a layer of polygons or lines and saves the result in a new layer.

Overlapping areas are generally small areas. This process can be performed on selected features from the **"Detect Overlaps"** function to accelerate the process.

The **"Use Selection"** option allows performing processing on the selected features.



The image below shows the result of the superposition's localisation.



## 7.6 CORRECT OVERLAPS

This function corrects the superposition of a layer of polygons according to a maximal area to be processed. The function will create a new layer containing the attributes of the source layer.

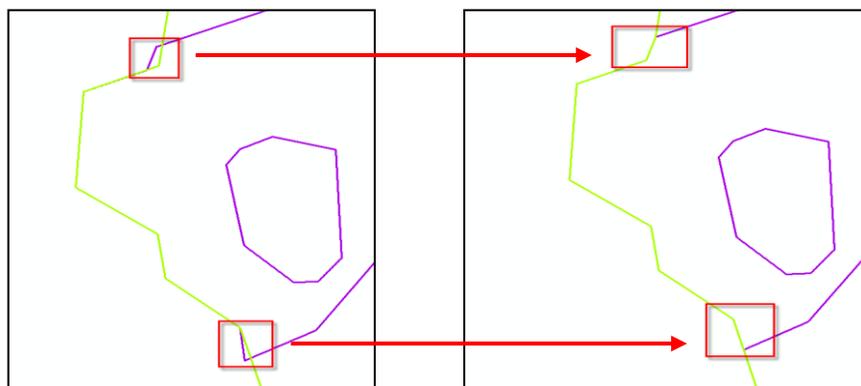
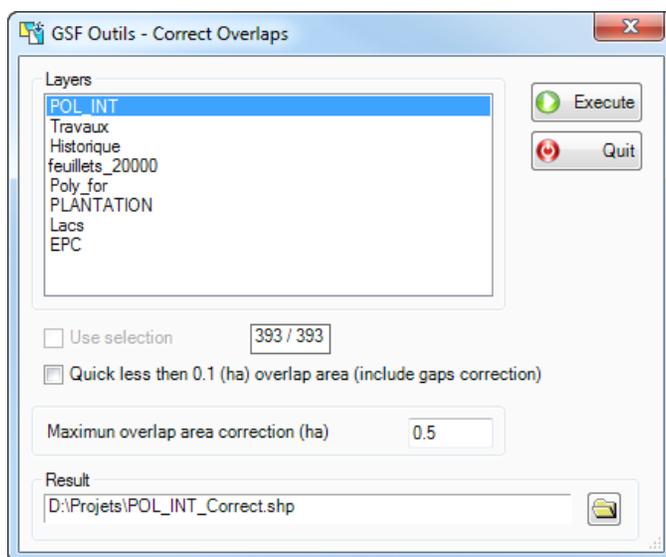
A message informs the user at the end of process if overlaps have not been corrected.

The **"Use Selection"** option allows you to perform processing on the selected features.

The **"Quick least 0.1 (ha) overlap area (include gaps correction)"** option corrects minor overlaps and gaps. This function should be initiated before a large processing because the correction on a greater part of the defects slows processing.

The **"Maximum overlap area correction"** section allows you to enter the overlap area in hectares to correct during processing.

The **"Result"** section specifies the location and name of the new layer.

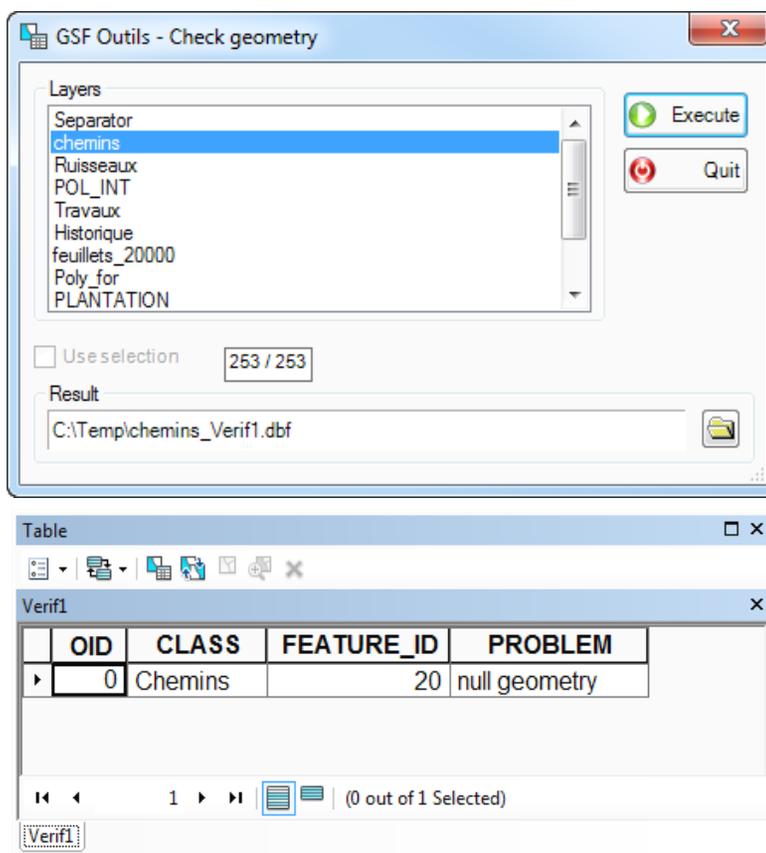


### 7.7 CHECK GEOMETRY

This function performs an advanced process to detect problems in the geometry of the target layer. The result is stored in a DBF file.

The output table contains the following fields:

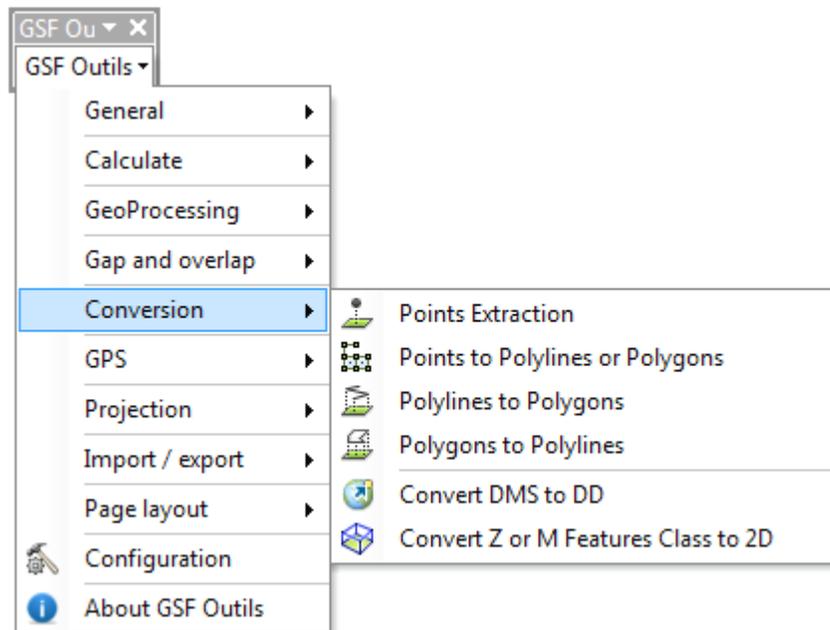
Field Name	Description
Class	Path and name of the layer
Feature_ID	FID or ObjectID
Problem	Description of the problem



## 8 « CONVERSION » MENU

The "**Conversion**" menu offers four functions to convert the type of geometric features to another type, a function to convert a coordinate format and another to convert ZM to 2D values.

Some processes generate new layers.



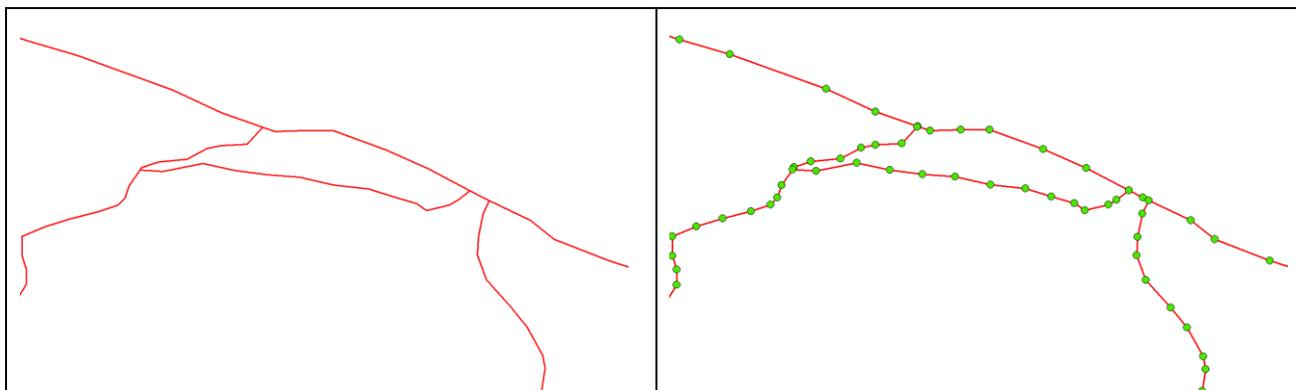
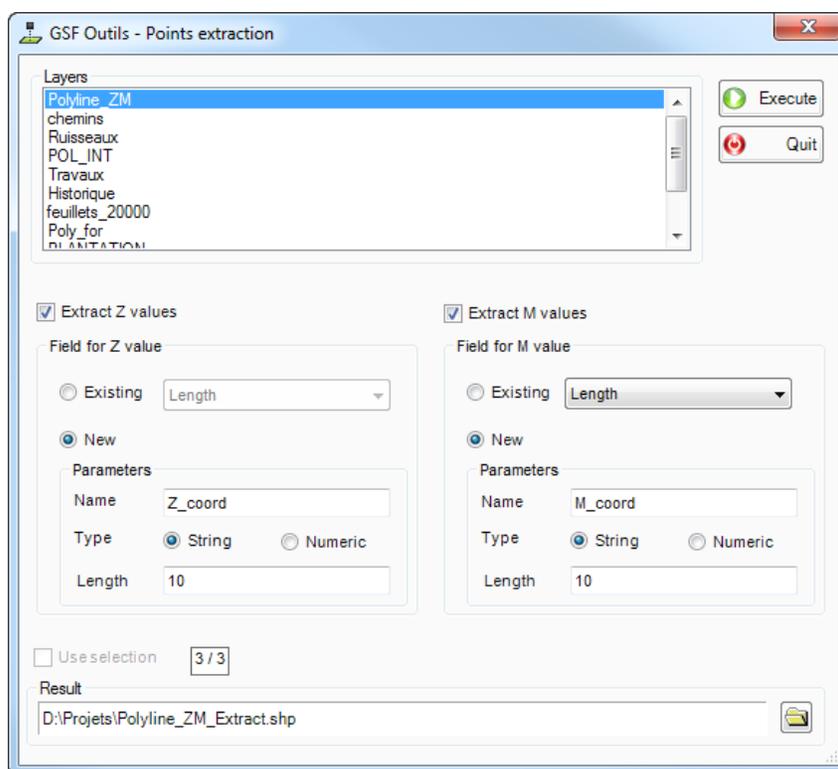
## 8.1 POINTS EXTRACTION

This function generates a new point layer containing all vertices of a line or polygon layer. If the layer has ZM geometry, the values can be extracted and included in specific fields.

The **"Extract Z values"** and **"Extract M values"** options become available when the selected layer comprises ZM geometries. The values can be entered in an existing field or a new field. When the latter option is enabled, it is necessary to specify the name, type and length of the field. Values were set by default.

The **"Use Selection"** option performs processing on the selected features.

The attributes of records in the source layer will be transferred to the result.



## 8.2 POINTS TO POLYLINES OR POLYGONS

This function allows the creation of geometry lines or polygons from a point layer, by connecting the vertex between them in the order of creation.

The "**Result**" section should indicate the type of desired geometry for the new layer (**Polyline** or **Polygon**).

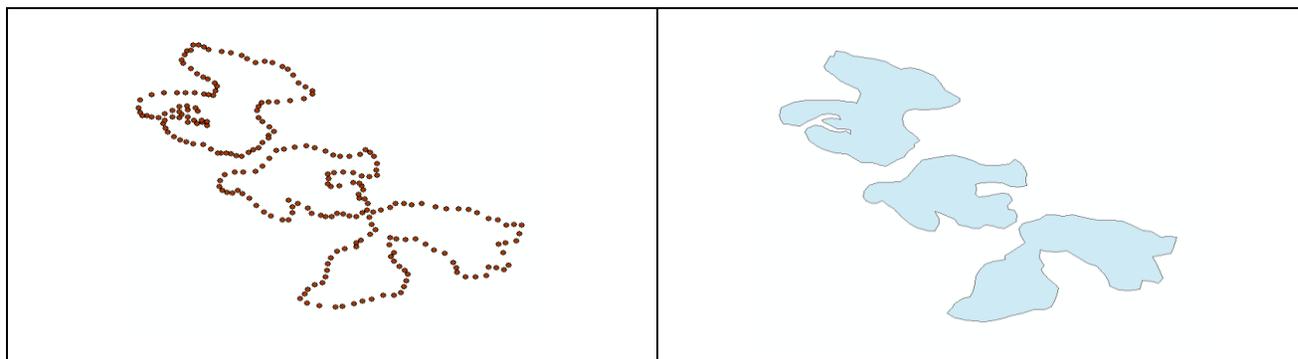
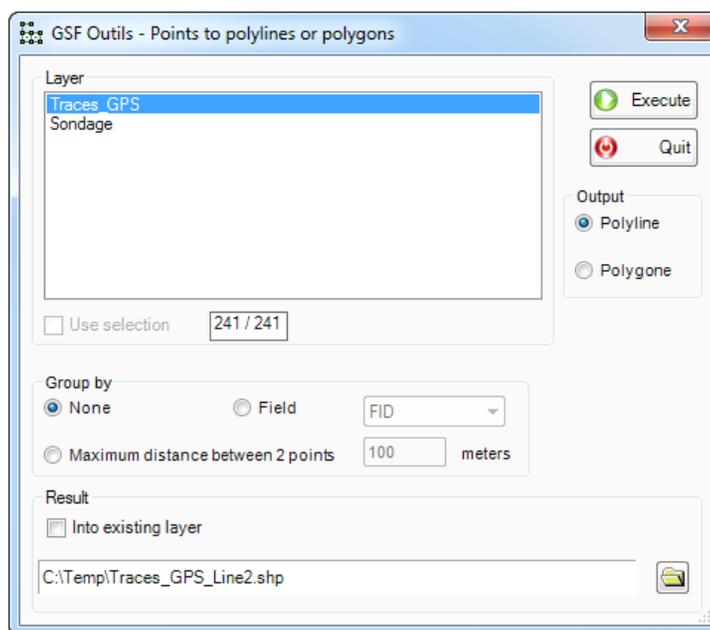
The "**Use Selection**" option allows performs processing on the selected features.

The "**Group By**" section contains two options for grouping points to separate features and avoid multi-party features. The "**None**" option generates multi-party features.

The "**Field**" option allows creating simple party features based on the attributes of a field to group.

The "**Maximum distance between two points**" option allows you to create simple party features when the distance between two points is greater than specified. To use this option, it is necessary that the coordinate system of the layer is projected and not geographic.

The **result** can be saved in a new layer or **into existing layer**.



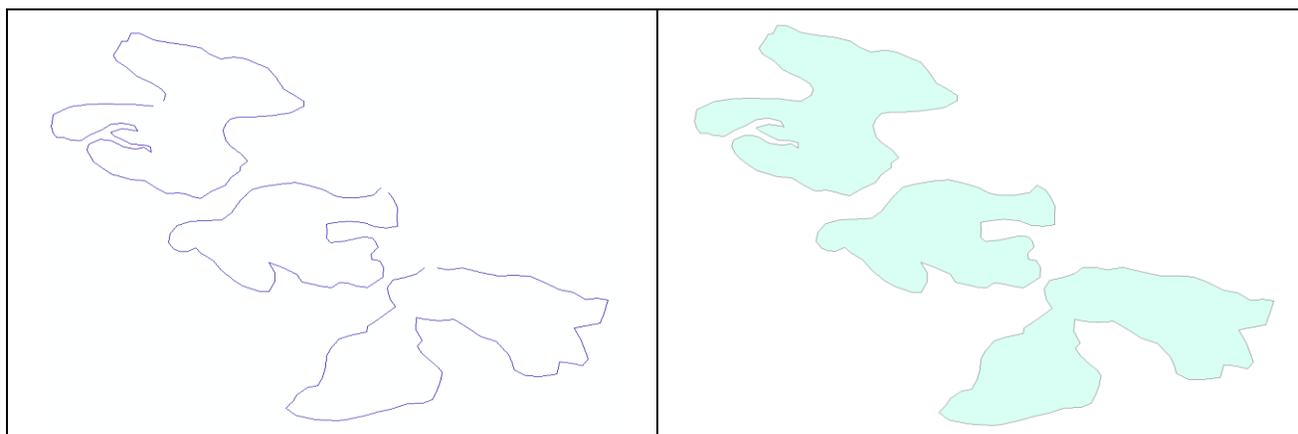
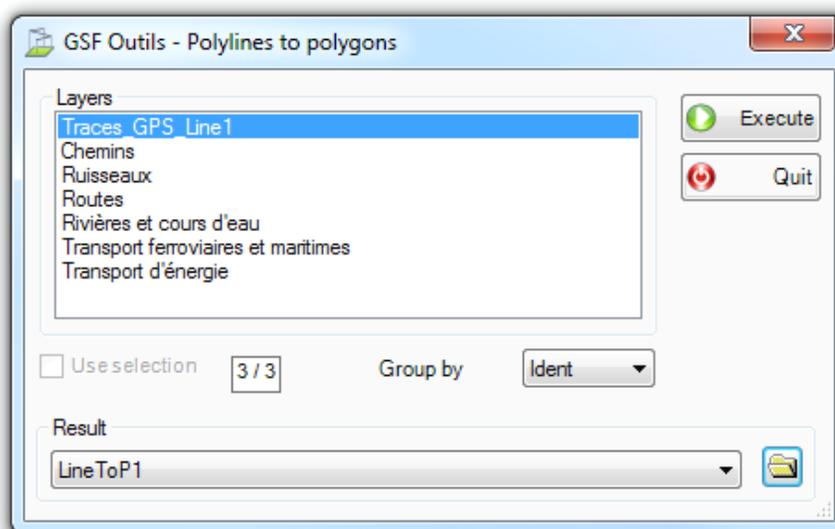
### 8.3 POLYLINES TO POLYGONS

This function creates a new polygons layer from a polylines layer. The latter can contain multiple segments, but it will be necessary to use the **Group** option to generate separated features.

The **"Use Selection"** option allows performs processing on the selected features.

The **"Group"** option groups the rows with the same attributes to generate a polygon. If no field is specified, the layer results contain multi-party features.

The **"Result"** option creates polygon features in an existing layer by selecting it from the dropdown menu, or save the result in a new **Shapefile** layer by activating the **"Browse"** button.

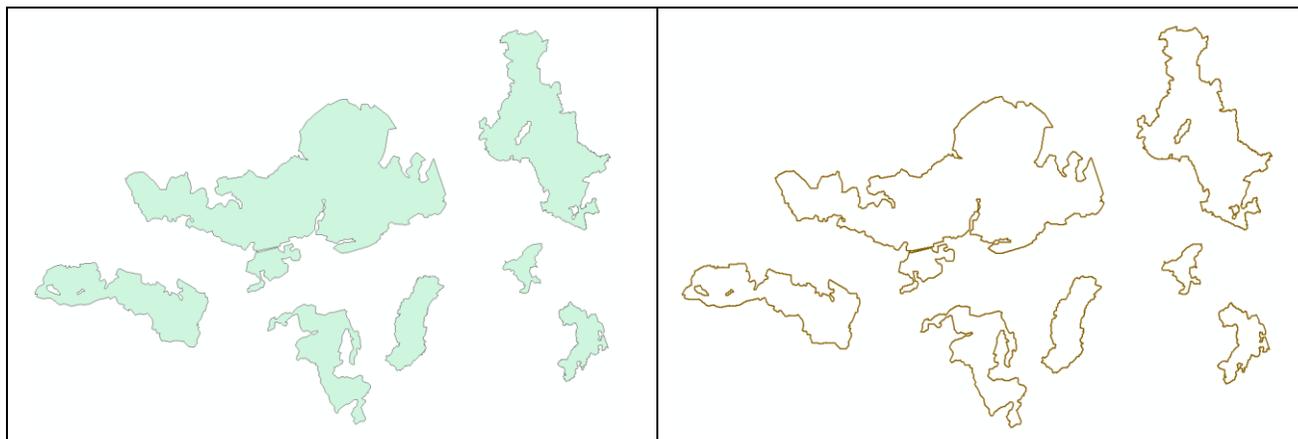
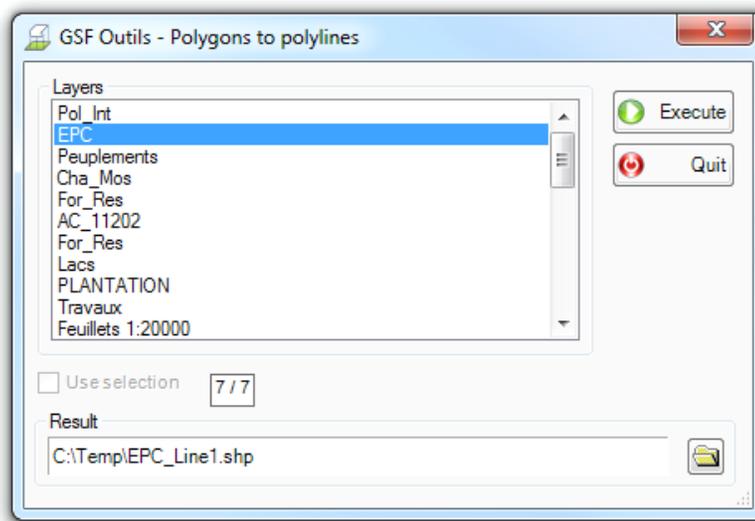


### 8.4 POLYGONS TO POLYLINES

This function creates a new polyline layer from a polygon layer. The attributes of records in the source layer will be transferred to the result.

The "**Use Selection**" option performs processing on the selected features.

The "**Result**" section creates a new **Shapefile** format layer.



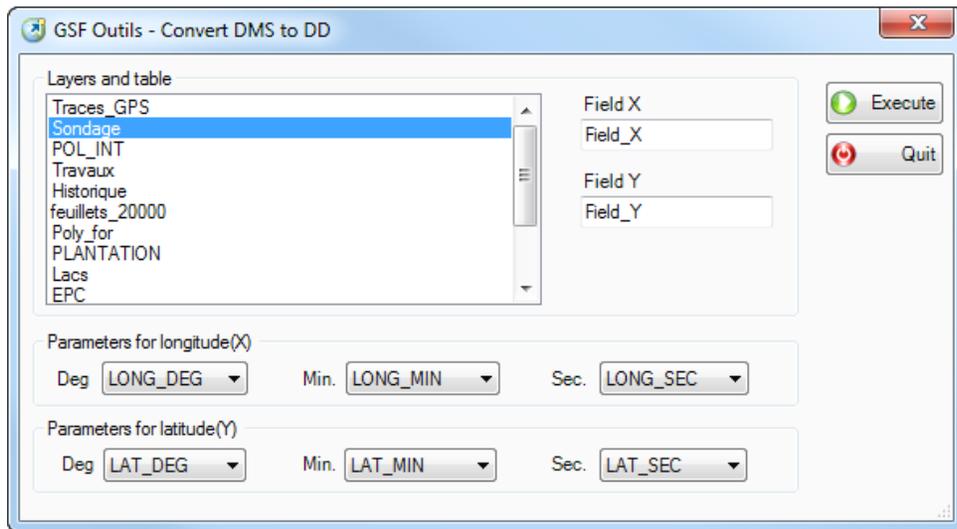
### 8.5 CONVERT DMS TO DD

This function converts the values entered in the fields of longitude and latitude (degree, minute, second) into decimal degrees coordinates.

The **"Decimal Degrees"** coordinates will be entered into the fields specified in **"Field X"** and **"Field Y"** sections. A check is performed to validate if the fields are present or not. If the fields are not present in the attribute table, the function will create them.

The **"Parameters for longitude (X)"** and **"Parameters for latitude (Y)"** sections select the fields containing the values of degrees, minutes and seconds to the longitude and latitude. Fields can be of character or numeric type. Fields of character type must not contain symbols and letters to perform this function.

For data collected in Quebec, to the west of Greenwich, longitudes must have a negative sign (-70) in order to designate the west.



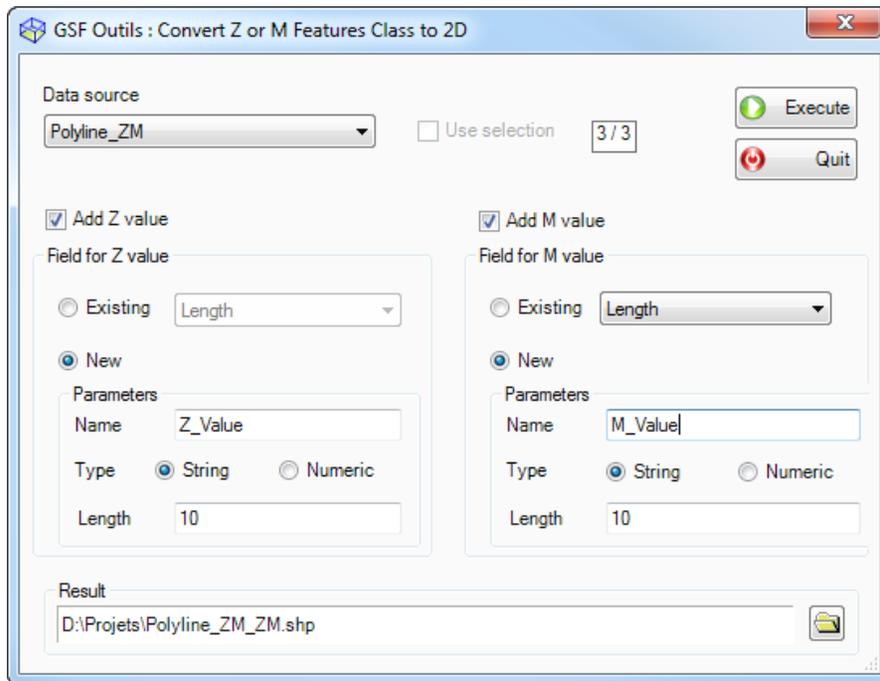
OID	NO_PE	AIRE_COM	SAISON	NO_UE	LONG_DEG	LONG_MIN	LONG_SEC	LAT_DEG	LAT_MIN	LAT_SEC	Field_X	Field_Y
0	1	11202	2009	00001	-64	42	19.485	49	2	46.153	-64.705412	49.046154
1	5	11202	2009	00001	-64	42	9.583	49	2	33.221	-64.702662	49.042561
2	4	11202	2009	00001	-64	42	9.609	49	2	39.696	-64.702669	49.04436
3	3	11202	2009	00001	-64	42	9.635	49	2	46.171	-64.702676	49.046159
4	2	11202	2009	00001	-64	42	9.662	49	2	52.645	-64.702684	49.047957
5	9	11202	2009	00001	-64	41	59.76	49	2	39.713	-64.699933	49.044365
6	8	11202	2009	00001	-64	41	59.786	49	2	46.188	-64.699941	49.046163
7	7	11202	2009	00001	-64	41	59.811	49	2	52.663	-64.699947	49.047962
8	6	11202	2009	00001	-64	41	59.837	49	2	59.137	-64.699955	49.04976
9	12	11202	2009	00001	-64	41	49.91	49	2	39.73	-64.697197	49.044369
10	11	11202	2009	00001	-64	41	49.936	49	2	46.205	-64.697204	49.046168
11	10	11202	2009	00001	-64	41	49.961	49	2	52.679	-64.697211	49.047966
12	14	11202	2009	00001	-64	41	40.086	49	2	46.221	-64.694468	49.046172
13	18	11202	2009	00001	-64	41	30.236	49	2	46.238	-64.691732	49.046177
14	17	11202	2009	00001	-64	41	30.261	49	2	52.713	-64.691739	49.047976
15	22	11202	2009	00001	-64	41	20.386	49	2	46.254	-64.688996	49.046182
16	26	11202	2009	00001	-64	41	10.512	49	2	39.755	-64.686253	49.044387
17	25	11202	2009	00001	-64	41	10.536	49	2	46.27	-64.68626	49.046186

### 8.6 CONVERT Z OR M FEATURES CLASS TO 2D

This function converts three-dimensional data (PointZM, PolylineZM or PolygonZM) in a 2D format.

The "Z" coordinates or "M" measures can be stored in the table of the new layer by selecting the "Add Z value" or "Add M value" options. These values can be stored in an existing field or a new field.

CAD files (DGN or DWG) are the type of format that can contain ZM geometries. When converting polylines and polygons layers, "ZM" geometry is converted to 2D but in the attribute tables, the ZM values are "0".



FID	Shape	Length
0	Polyline ZM	2100.964626
1	Polyline ZM	1485.679285
2	Polyline ZM	2998.779445

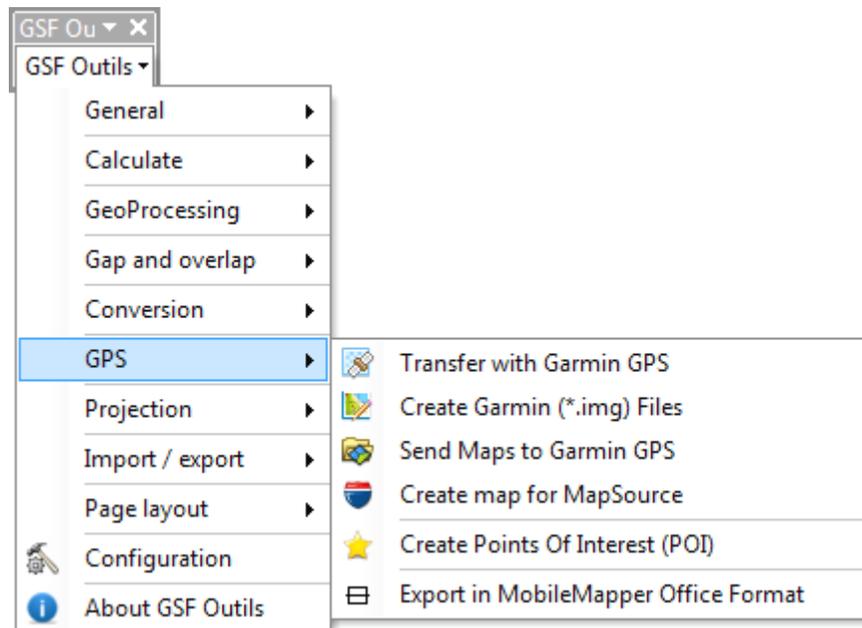
FID	Shape *	Length	Shape_Leng	Z_VALUE	M_VALUE
0	Polyline	2100.964626	2107.861873	0	0
1	Polyline	1485.679285	1490.55847	0	0
2	Polyline	2998.779445	3008.602736	0	0



## 9 « GPS » MENU

This menu contains functions related to Garmin GPS and Mobile Mapper Office software.

It includes the transfer of GPS data, the creation of Garmin IMG files, the transfer of several IMG files and the importation of a map to MapSource. It also includes a feature to create points of interest in a Garmin GPS.

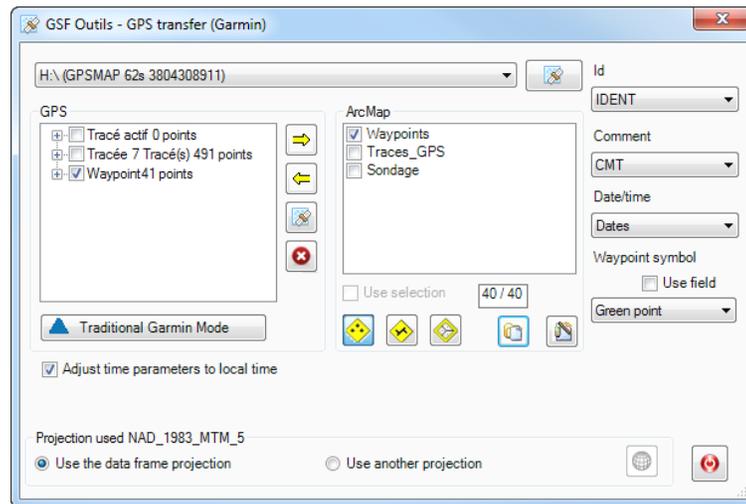


### 9.1 TRANSFER WITH GARMIN GPS

This function allows transfer of data (waypoints and tracks) in both directions between a Garmin and ArcGIS GPS. The imported data will be stored directly in a layer of points, lines or polygons present in the Data Frame.

To use this feature, the Garmin GPS must be connected to serial or USB port. The communication protocol of various types of GPS (Map60 Series, Map76, Map62, Map78, Oregon, Montana and Etrex) is automatically detected. If the NMEA format is selected in the device, the function does not detect the GPS.

If it is not possible to establish connections with the GPS, check that the cable is connected between the GPS and the computer. If the problem persists, verify that the USB drivers are installed on the GPS ([www.garmin.com](http://www.garmin.com)) and updated in the computer, make sure that the communication port is enabled and it appears in the Control Panel and also check the format of the GPS transfer to make sure it is at **Garmin** and not NMEA.



#### 9.1.1 Buttons Description

Function	Description
	Transfer the GPS data to an ArcMap layer
	Transfer features from one layer to waypoints or GPS tracks
	Receives data from the GPS
	Deletes the selected files from the GPS
	Type of geometry (point, line, polygon)
	Create a new layer
	Fields Settings

### 9.1.2 Interface

The interface is split into two main sections. The **"GPS"** section contains the number of points (Waypoint) and Track from the GPS. The **"ArcMap"** section displays the layers by geometry type present in the current Data Frame. GPS data can be transferred to an existing layer or a new layer created from this interface.

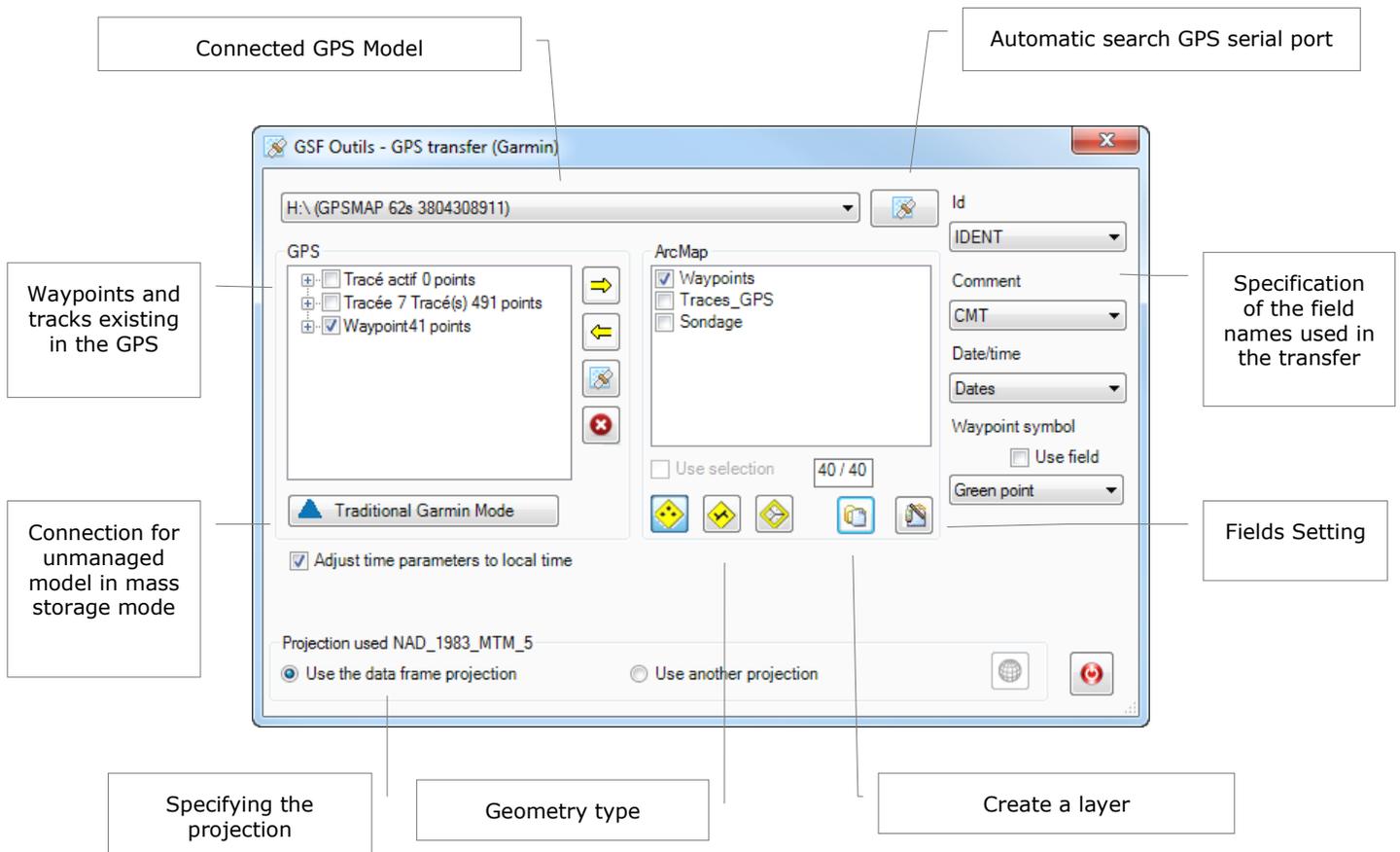
The first step is to identify the **"Projection used"** before enabling the transfer of data or create a new layer. By default, the function indicates the projection of the Data Frame, but it can be changed from the **"Use another projection"** button.

The **"ArcMap"** section displays all the layers of the Data Frame according to the type of geometry (point, line, polygon). GPS data can be transferred to an existing layer or a new layer. The geometry type must be selected before activating the **"Create a layer"** command.

The **"Identifiers"**, **"Comments"** and **"Date and time"** sections display by default the fields specified in the **"Field Configuration"** control when they are presents in the selected layer. These fields can be redefined from the dropdown menu.

The **"Use Selection"** option transfers only the selected units of the layers of points, lines or polygons to the GPS.

The data transfer is done by activating a yellow arrow in the desired direction.



### 9.1.3 Field Identification

The identification fields in the ID, Comment and Date/Time sections are required before performing the GPS transfer. The **"Fields Configuration"** button allows registering the names of fields to create when creating a layer from this window.

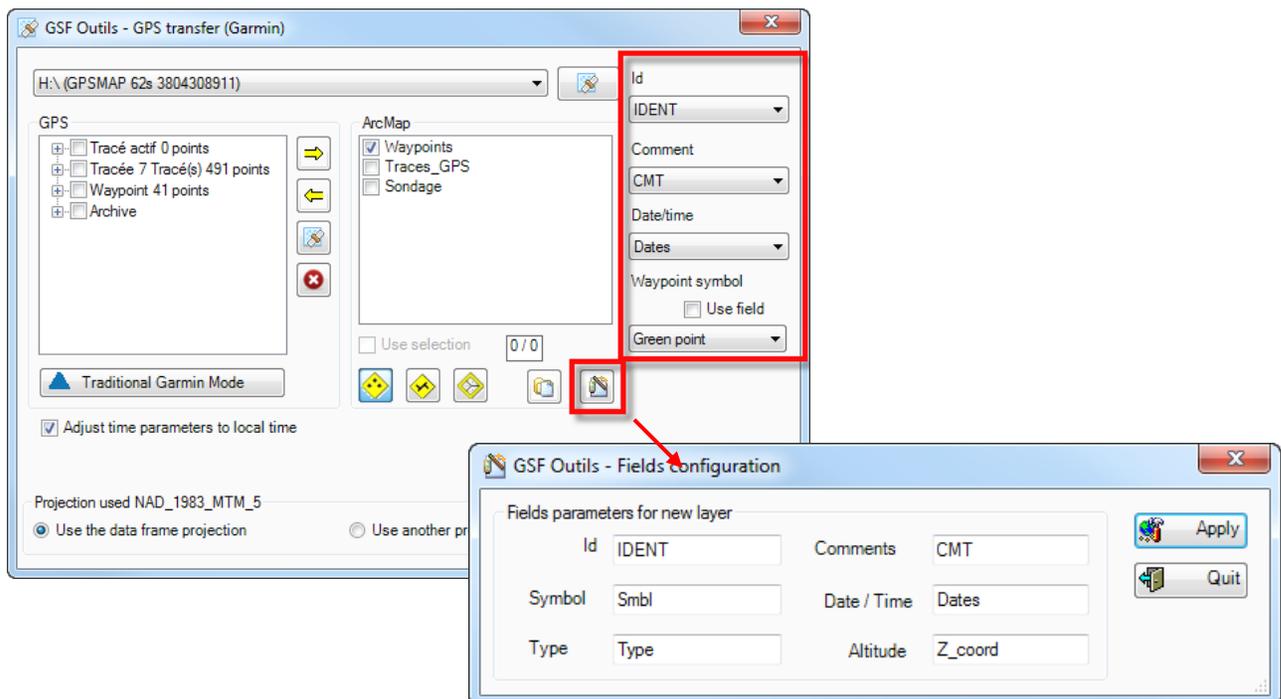
The table below shows the structure of the fields that can be created in the layer; they are not present when transferring the Garmin GPS to the layer.

Field Name	Type	Width
IDENT	Text	50
SMBL	Text	50
TYPE	Text	50
CMT	Text	50
TIME	Text	50
Z_COORD	Numeric	18, 0

To transfer features from one layer to the Garmin GPS, the ID field will assign the name of the Waypoint or of the track. If the selected field contains double values, the transfer can rename a Waypoint and only leave the last stroke of the same name. The result is different depending on the GPS model used. If there is no scope of unique identification, it is advisable to choose the "FID" field or "OBJECTID" during the transfer to the GPS.

The **"Fields Configuration"** option is connected with the **"Create Layer"** option. It sets the field names relating to the id, Comment, Date / Time and Symbol Waypoint section.

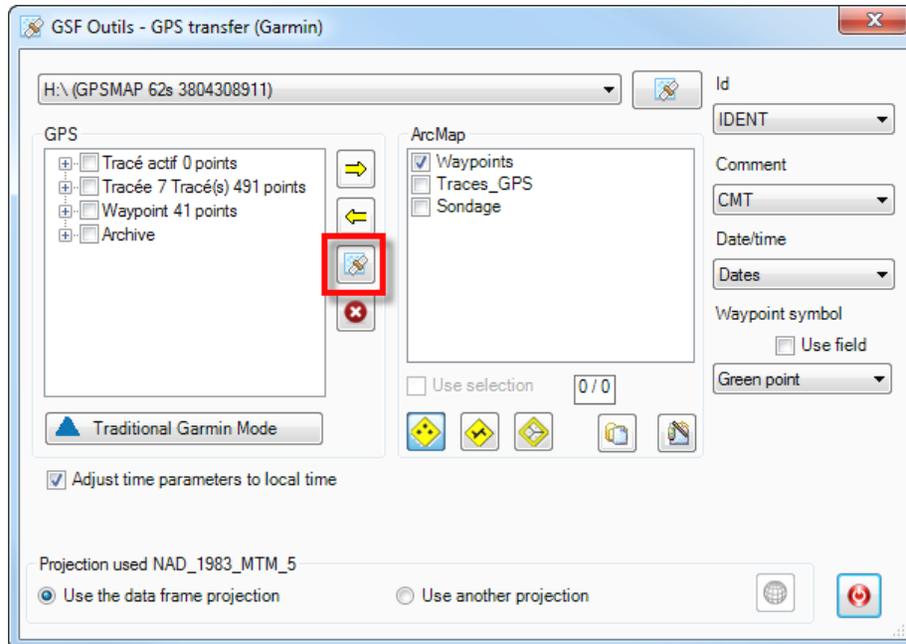
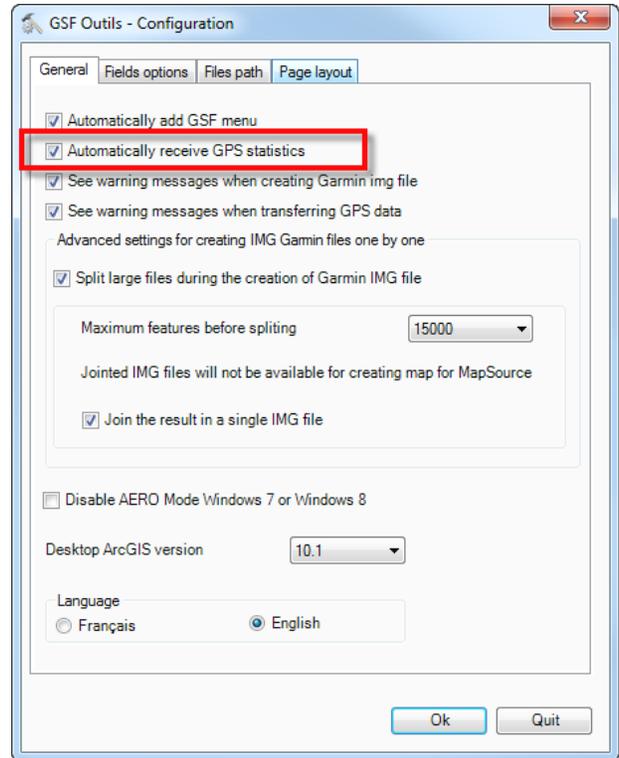
The **"Waypoint Symbol"** option is only available for the transfer of data to ArcMap GPS and allows assigning a symbol to Waypoints.



### 9.1.4 GPS Statistics

In the "Configuration" menu of GSF Outils, the "Automatically receive GPS statistics" option is enabled by default, which can slow down the connection when the GPS contains several points in the track log.

It is recommended to disable this option and use the "Statistics GPS" control in the "GPS Transfer" menu to update the number of records present in the GPS.

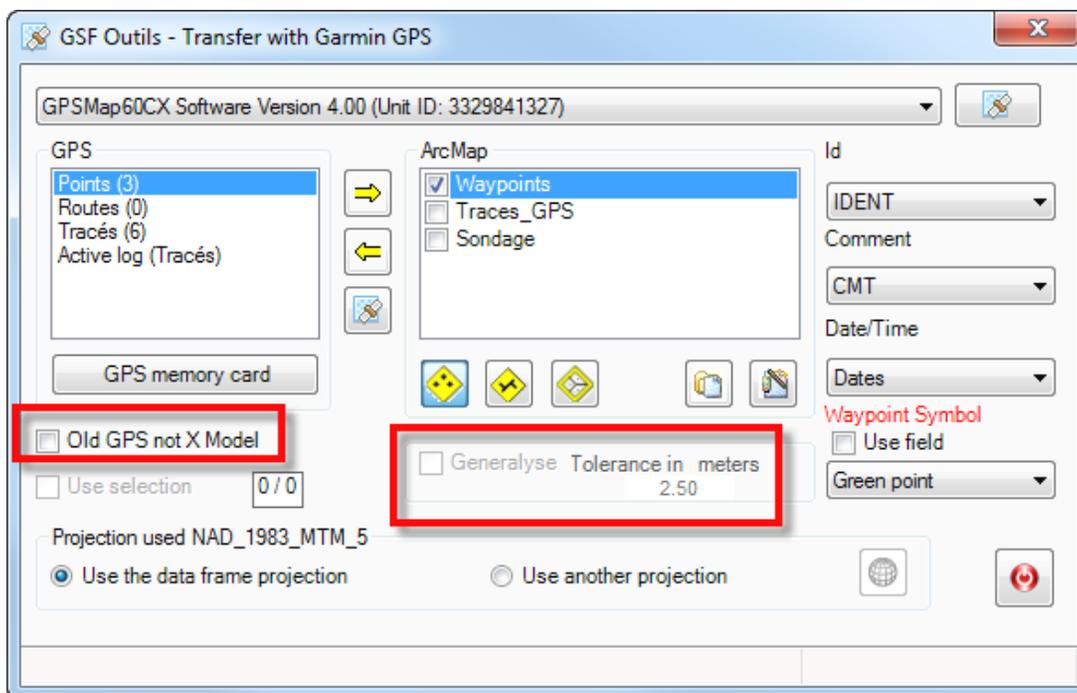


### 9.1.5 Traditional Garmin Mode

The traditional mode contains two additional options.

The "**Old GPS not X Model**" option establishes a connection with the old 60 and 76 models who are not identified as a "X" model.

The "**Generalize**" option eliminates the vertex in a specified metric to alleviate the display when converting geometry to the GPS tolerance.



**9.2 CREATE GARMIN \*.IMG FILE**

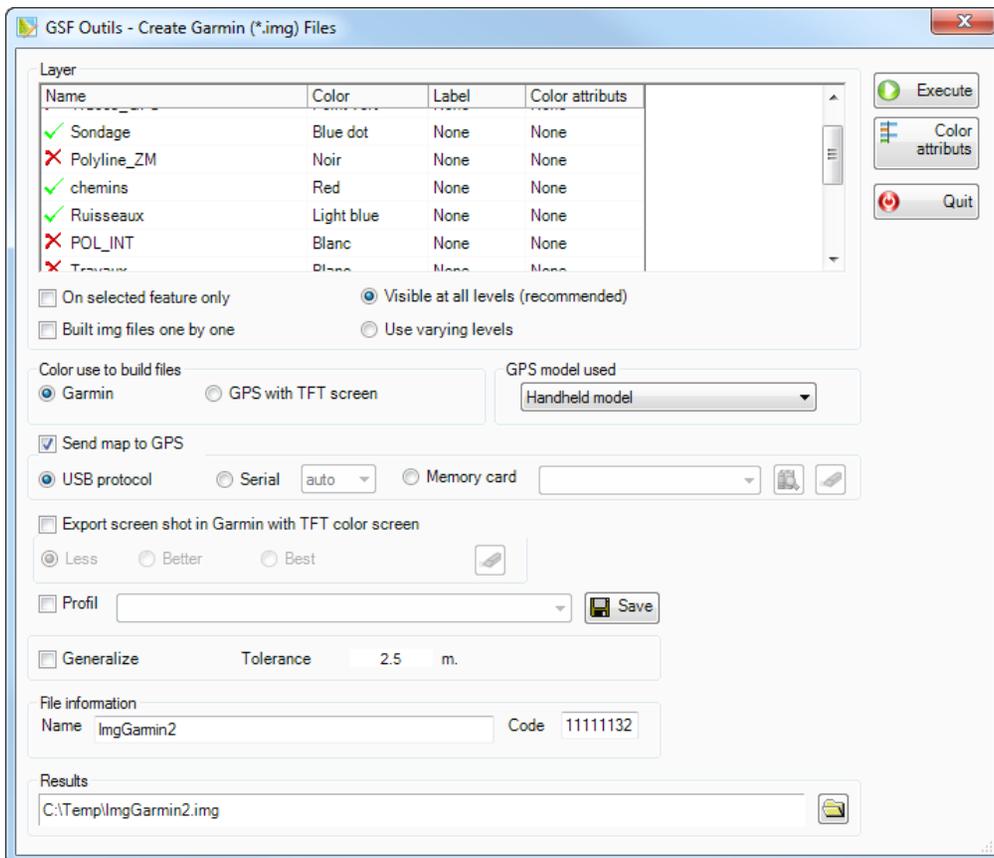
This function creates a Garmin \*.IMG format file used as base maps for **Garmin GPS**, from vector layers present in the current Data Frame.

There is one option to send files directly to the GPS. However, the existing maps in the GPS will be deleted for Map60 and Map76 series models.

The **"Color use to build files"** and **"Send map to GPS"** sections should be defined according to the GPS model type. The table below shows the parameters for the different models.

GPS model	Suggested color	Shipped to GPS	GPS model
Map60 series, 76 and former model	Garmin	USB protocol	Hand model
Map62 series, 78, Oregon, Etrex, Montana, new generation	Color TFT screen	Memory card	Hand model
3005, 3006, 3010, 3205, 3206, 3210	Garmin	by MapSource	3000 Series
421, 526, 720 and all new generation marine models	Garmin	Memory card	marine

The **"Result"** section should not contain spaces or special characters (accents etc.) for the path and name of the file.



The "**Layer**" section allows select the layers to be included in the creation of the IMG file, specify the color and labels. Layer should have a green checkmark to be included in the IMG file and becomes active by double clicking on the layer name.

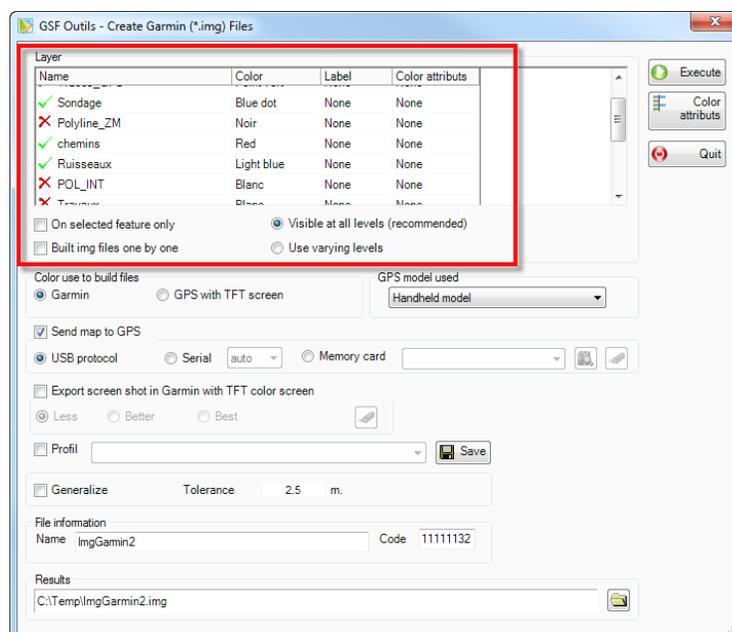
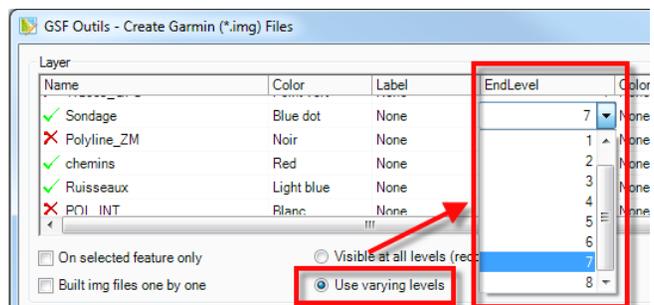
The "**On selection features only**" option creates an image only using IMG layers with selected features. If activated layers have no choice, they will not be included in the IMG file.

The "**Built img files one by one**" option allows creating different images for each of the selected layers. The "**IMG**" file name will be the same name as the layer. However, for the **Map62, Map78, Oregon, Montana** and **Etrex** new generation models, if this option is enabled and the files are sent directly to the GPS, the application will only create an image. To keep the images one by one in these GPS models, "**Send maps to Garmin GPS**" should be used.

The "**Visible at all levels**" option makes the IMG file visible on all scales of GPS. This option is recommended.

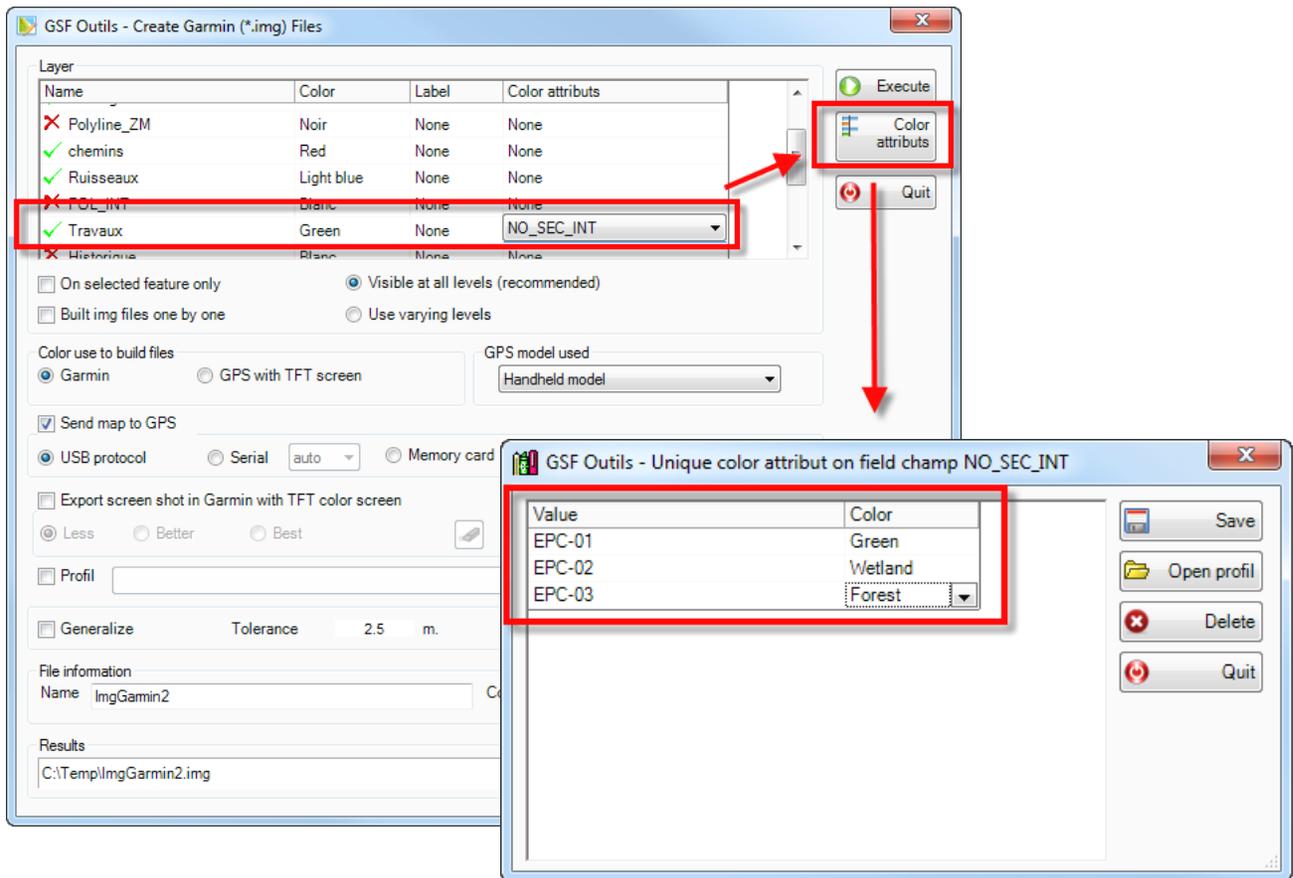
The "**Use varying Levels**" option determines the display scale. The table below indicates the approximate visible scales for Etrex model.

0	<120 m
1	<300 m
2	<500 m
3	<800 m
4	<2 km
5	<3 km
6	<5 km
7	<12 km
8	<20 km



The "**Color attributes**" option is only available when the color is used with **Garmin**. It assigns a specific color based on the values of a field. The procedure is to select the field and activate the "**Color attributes**" button.

In the "**Unique color attribute on field**" window, the **Value** column contains the unique values of the selected field and the **Color** column to select the color that will be applied during the creation of the IMG file. The changes should be saved before leaving this window. This option stores the colors associated with the name of the field that allows using this profile to another layer with the same field name. If an attribute value is not present in the list, the application assigns the color defined in the "**Layer**" section.



The "**Export screen shot in Garmin with TFT color screen**" option applies to Map62, Map78, Oregon, Etrex and Montana new generation models. It sends maps to the GPS as an image, even if the view contains satellite images or ortho rectified. This option requires that the GPS is in mass storage mode and a drive letter is assigned to it.

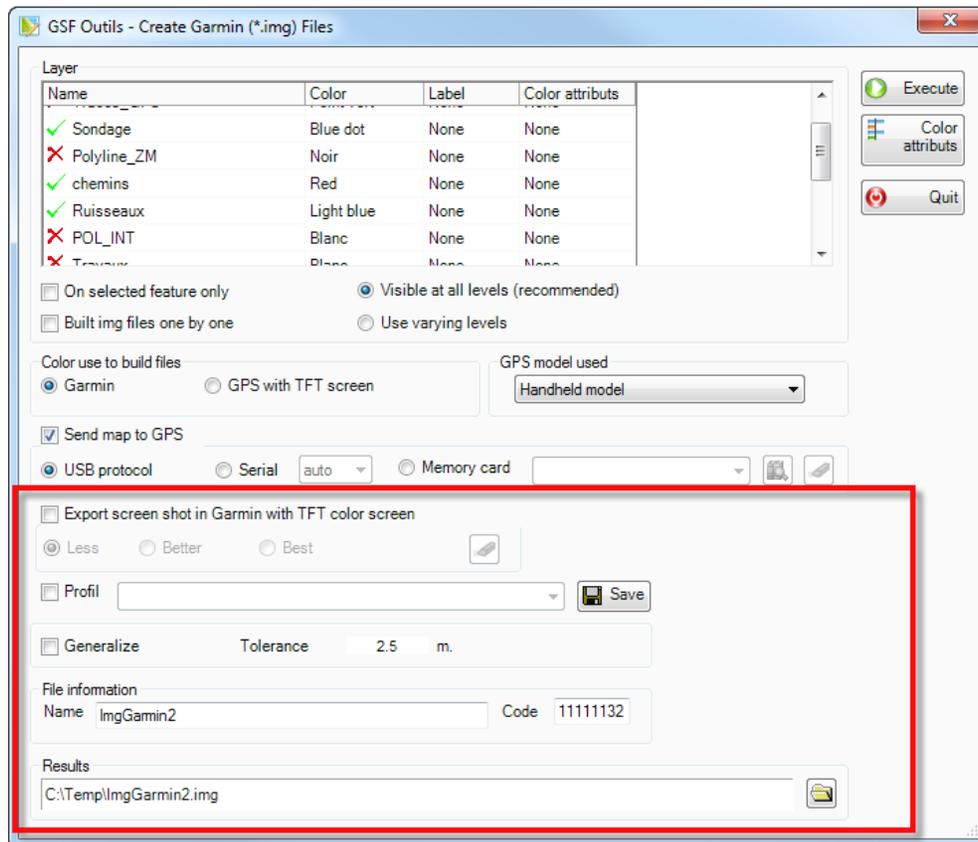
The process divides the image into tiles to get a better view in the GPS. It is advisable to define the projection of the Data Frame in geographic (decimal degrees) to improve the connection between the tiles.

The "**Less**", "**Better**" and "**Best**" options determine the resolution at which the image will be created. The image created cannot be better than the current view on the screen, using the very close zoom can give quite poor results if the original image is not good. Another important factor is the use of the "**Best**" option affects the file size which can slow screen refresh GPS.

The "**Profile**" option saves the colors defined for future use. This option improves the speed of image preparation.

The "**Generalize**" option reduces the number of vertex and accelerates the display of the GPS IMG file.

The "**Result**" section allows specifying the location and name of the IMG file. The name will be automatically entered in the "**File Information**" section if the "**Built IMG files one by one**" option is disabled. The "**Code**" number is incremented by the application and is necessary when serial transferring of numerous IMG files. This number can be changed by the user.



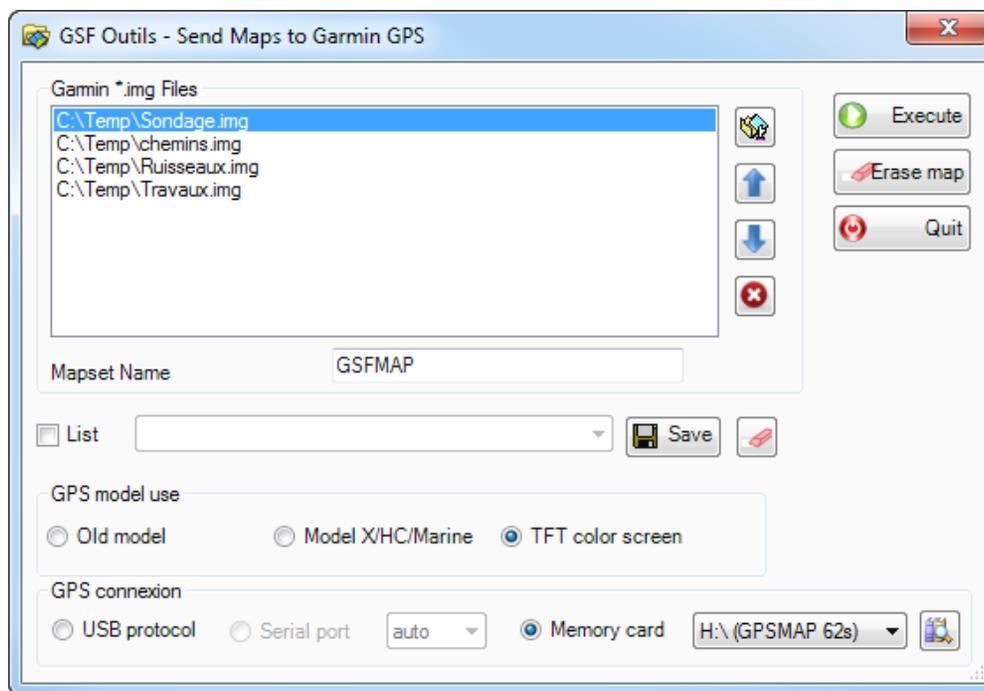
### 9.3 SEND MAPS TO GARMIN GPS

This function allows sending multiple IMG files to a Garmin GPS. The layers order is important to avoid obscuring details. The uppermost layer of the list will be the layer of the foreground map. The displacement of the layers in this window is possible by using the arrows.

IMG files should be added to this window from the Browse button. The choice of an option in the in the "GPS Model use" and "GPS Connexion" sections is determined by the type of GPS model used.

For the GPS mass memory models (Using memory cards), it is necessary to select the search button available in this window, if the GPS does not appear in the list.

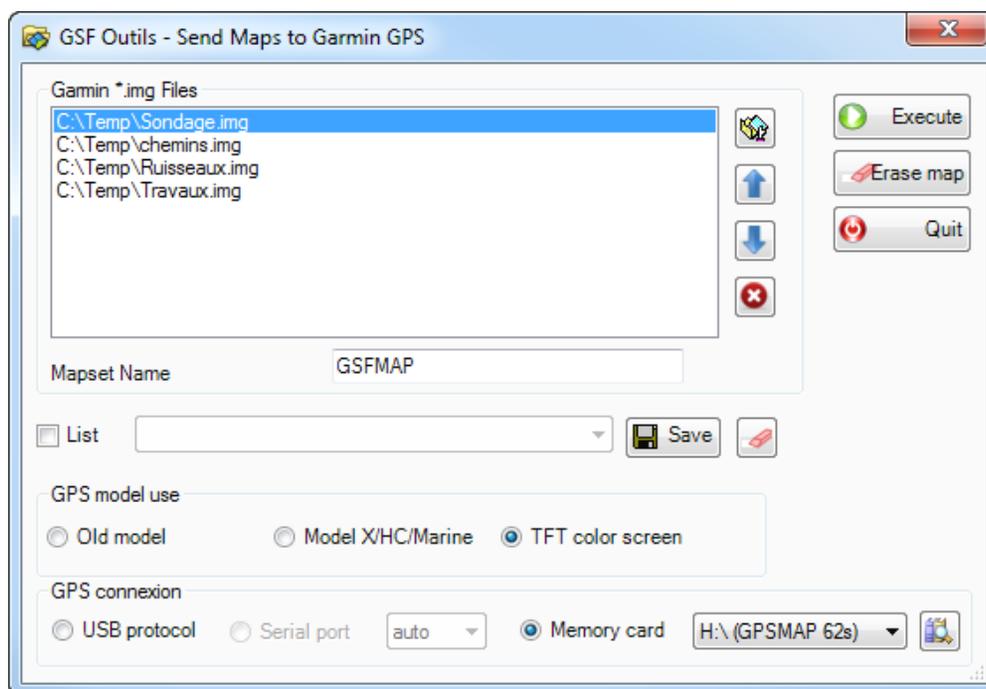
Garmin GPS	GPS model used	GPS connection
Older models	old GPS	USB or serial protocol
Map60x, 76x	Model x / HC / marine	USB protocol
Oregon	Model x / HC / marine	Memory card
Map62, 78, Etrex new generation and Montana series	Color TFT screen	Memory card
3005, 3006, 3010, 3205, 3206, 3210		by MapSource
421, 526, 720 and all new generation marine models	Model x / HC / marine	Memory card



The "List" option allows saving the list of images added in a profile to accelerate the addition of files.

Maps already present in the Map60 and Map76 GPS series and older models will be replaced by the models shipped.

Command	Description
	Browse button to search IMG file
	Arrows to set the display order
	Remove a file from the list
	Remove one or more profiles
	Detection of the GPS



## 9.4 CREATE MAP FOR MAPSOURCE

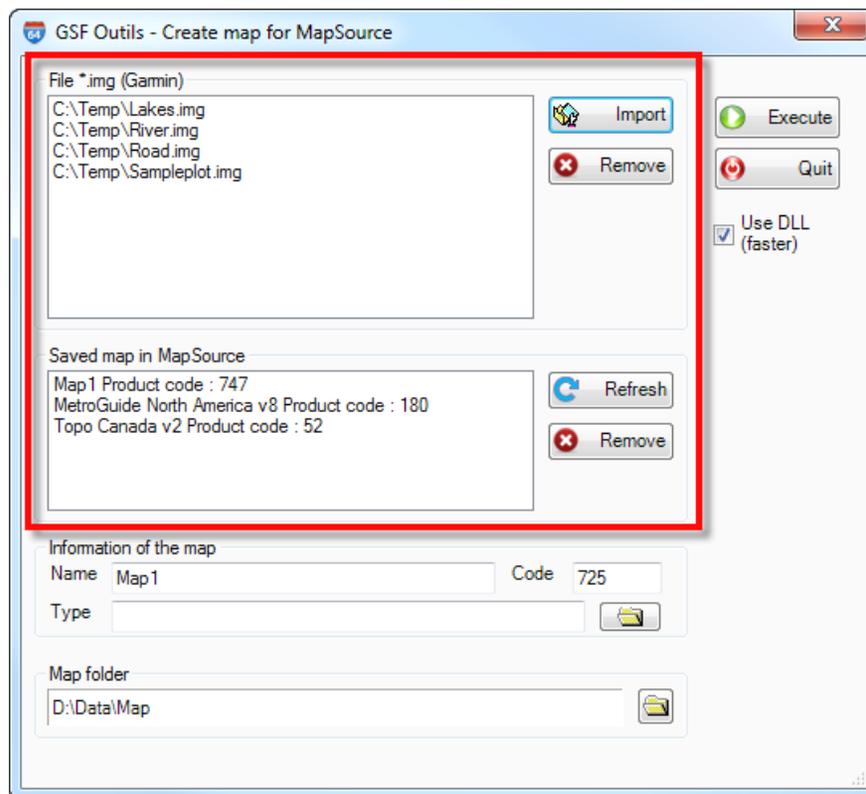
This function integrates the IMG files in the Garmin MapSource software. It is necessary for some types of devices such as Garmin GPS Series 3000.

The "**File \*.img (Garmin)**" section imports IMG files to include in the map. The order of files is important to avoid masking the details. Since the window contains no command to set the order, it is necessary to add them chronologically from the **Import** button. The file at the top of the list is displayed in the foreground in the map.

The "**Saved map in MapSource**" section manages IMG MapSource maps included in establishing the list of available maps. Custom maps are saved in the registry and it is necessary to delete, update or move from this window and not from MapSource.

If custom maps are deleted from MapSource, it will show an error message later at the opening of the software and it will be necessary to open the "**Create map for MapSource**" window function to be able to open MapSource.

The "**Remove**" button removes the selected card in the list. **If the card is not removed this way, MapSource will cause an error to open and close.**



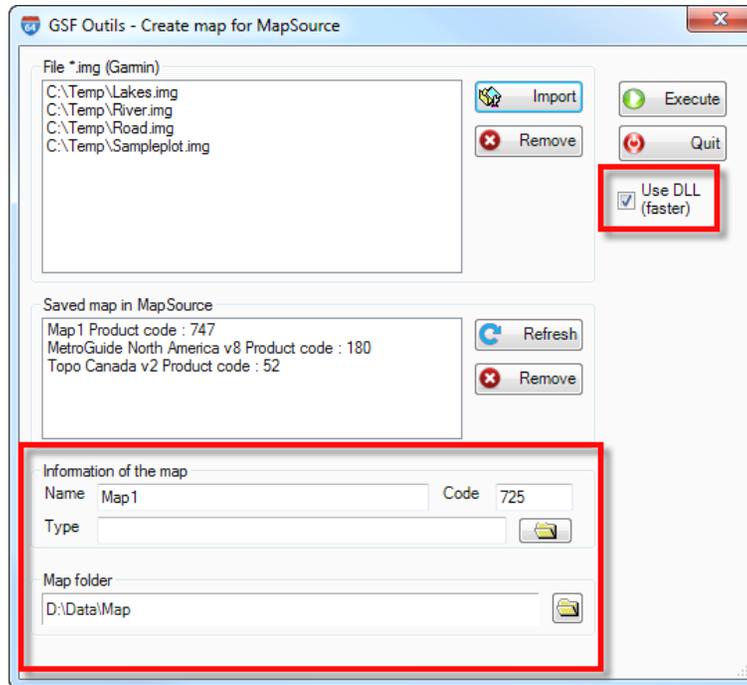
The "**Information of the map**" section allows entering the name of the map in MapSource. Type corresponds to the specification of "**TYP**" file created from the "**Use colors from view**" function in "**Create Garmin IMG files**".

The "**Code**" number is incremented automatically by the application and is necessary when transferring IMG files serial number. This number can be changed by the user and must contain three unique characters.

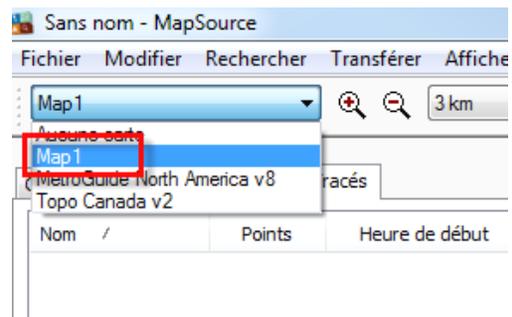
The "**Map Folder**" option specifies the location and name of the IMG file. The name is automatically entered in the "**Information IMG**". The directory must be an empty folder. The files will be copied to this directory and map will be created automatically and stored in the registry to be used by MapSource.

The file name and directory names must not contain spaces or accented characters. It is suggested to use the underscore "\_" to replace spaces.

The "**Use DLL (Faster)**" option is enabled by default for faster processing. It can be disabled when error messages appear when processing.



The personalized map will be displayed in the MapSource scrolling list. It must be selected to view it.



### 9.5 CREATE POINT OF INTEREST (POI)

This function allows creating points of interest (POI) for Garmin GPS mass storage models types (62, 78, Montana, Nuvi etc.). The file generated by the process creates a file with the ".Gpi" extension.

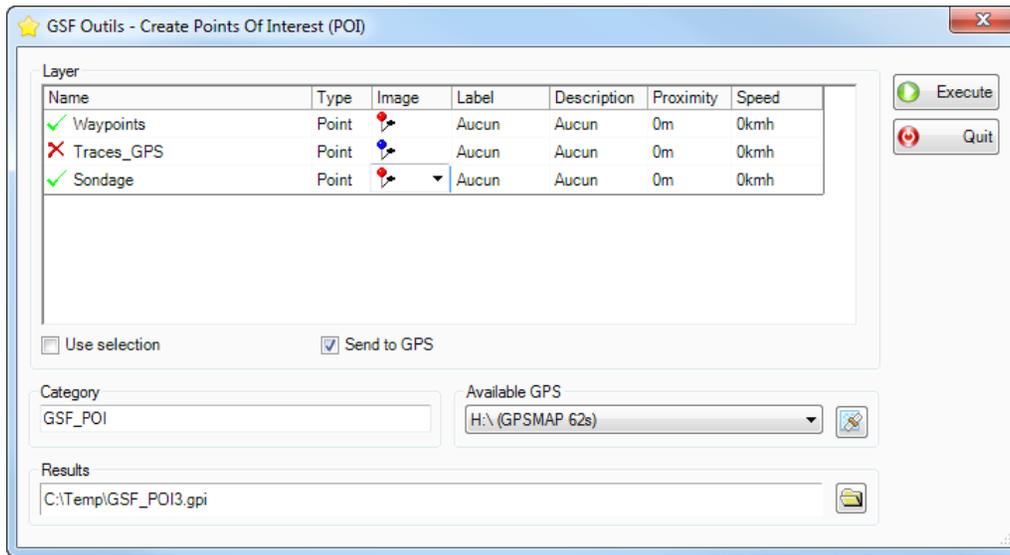
The "Layer" section allows selecting the layers of items to be included in the creation of the POI file, select the symbol (Image) and specify the corresponding fields in the label and the description. Proximity and speed can also be set. Layer should have a green checkmark to be included in the POI file and becomes active by double clicking on the layer name.

The "Use selection" option only uses the layers having selected features to create the POI file. If activated layers have no selected entity, they will not be included in the POI file.

The "Send to GPS" section allows copying POI files directly into the GPS or memory card.

The "Category" section contains the name associated with all points of interest sent to the GPS band.

The "Result" section shows the location and name of the POI newly created file.



Column Name	Description
<b>Image</b>	Select the symbol to represent the point of interest in the GPS
<b>Label</b>	Specifies the name of the POI
<b>Description</b>	Description related to the point
<b>Proximity</b>	Warning distance to the POI proximity
<b>Speed</b>	Indicates the maximal speed not to exceed in the POI area

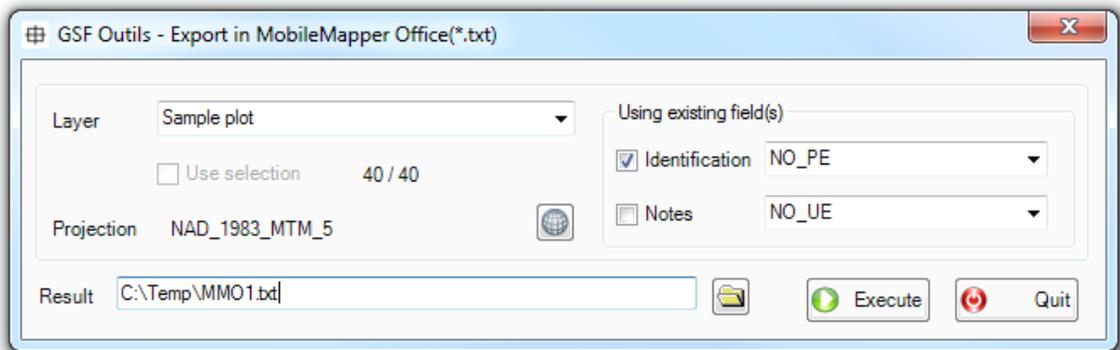
## 9.6 EXPORT IN MOBILEMAPPER OFFICE FORMAT

This function generates a **"text"** file from a point layer representing **"Waypoints"**. This text file can be used in MobileMapper Office software for managing GPS MobileMapper Pro, CE and CX Magellan Professional.

The **"Layer"** section allows select the point layer to export in **"Waypoint"** in MobileMapper Office.

To use this function, it is necessary that the coordinate system is defined in the Data Frame properties so that the X and Y coordinates of each point are obtained by Geographic for export. If the projection is not defined, it is possible to specify it using the button in the **"Projection"** section.

The **"Using existing field(s)"** section allows selecting the fields in which it is needed to label the points and assign specific notes. The fields must be in text format. The **"Identification"** field should contain a maximum of 8 characters while the **"Notes"** field should contain a maximum of 30 characters. If the values of these fields exceed the required number, the values will be automatically truncated. When these options are not selected, the name of the points will be represented by the WPT0001 WPT002 value, etc. and notes will remain empty. It is always possible to change these values in the MobileMapper Office software.

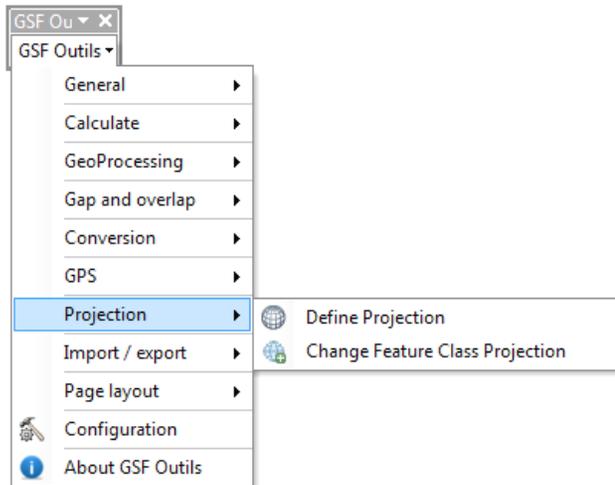


## 10 « PROJECTION » MENU

The "**Projection**" menu contains two operations that define and change the projection layers.

Only the Shapefile files can be used with these functions.

Deleting PRJ files can run through the window of projection change.



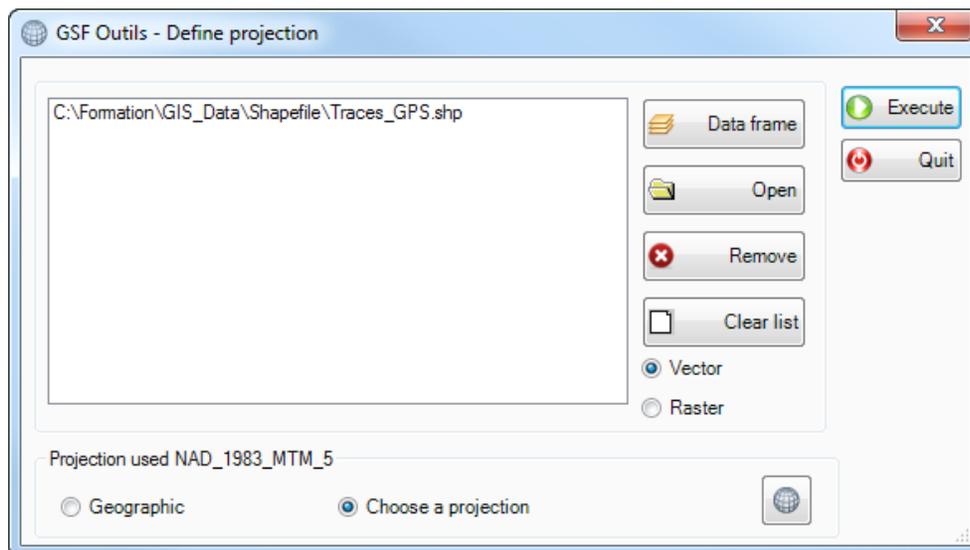
### 10.1 DEFINE PROJECTION

The "**Define projection**" function is used to define the projection of a single vector or raster or more.

This function only displays the layers whose projection has not been defined.

Adding file can be made from the Data Frame or from the "**Open**" button for images.

The "**Projection used**" section detects the coordinate system defined in the properties of the Data Frame and it will be used to define those layers. For data in geographic coordinates (decimal degree), the "**Geographic**" option must be enabled.



## 10.2 CHANGE FEATURE CLASS PROJECTION

This function changes the coordinate system of the layer by recording the result in a new layer in Shapefile format. Projection layers must be defined prior to this process.

Layers to be process can be added from the **"Data Frame"** or **"Open"** button.

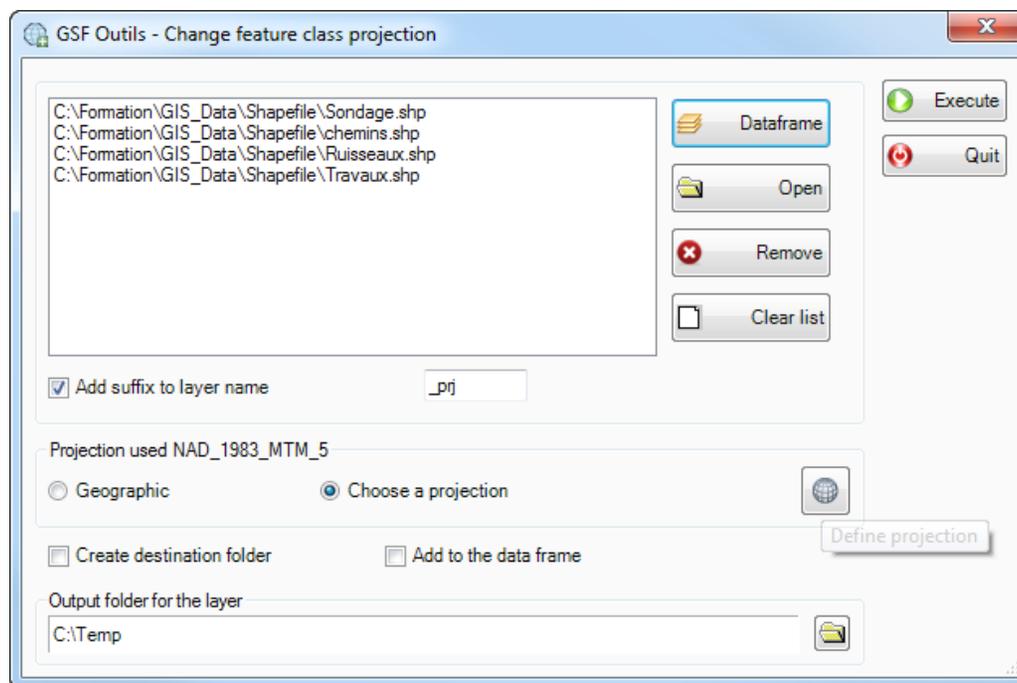
The **"Add Suffix to layer name"** option changes the name of the Shapefile product by adding a suffix to the new name so that the default names of the resulting layers do not have the same name as the source.

The **"Projection used"** section allows you to specify the coordinate system to be applied to the new layer. For a geographic projection, the **"Geographic"** box should be selected while the **"Choose a projection"** button will select another projection.

Two additional options can be enabled.

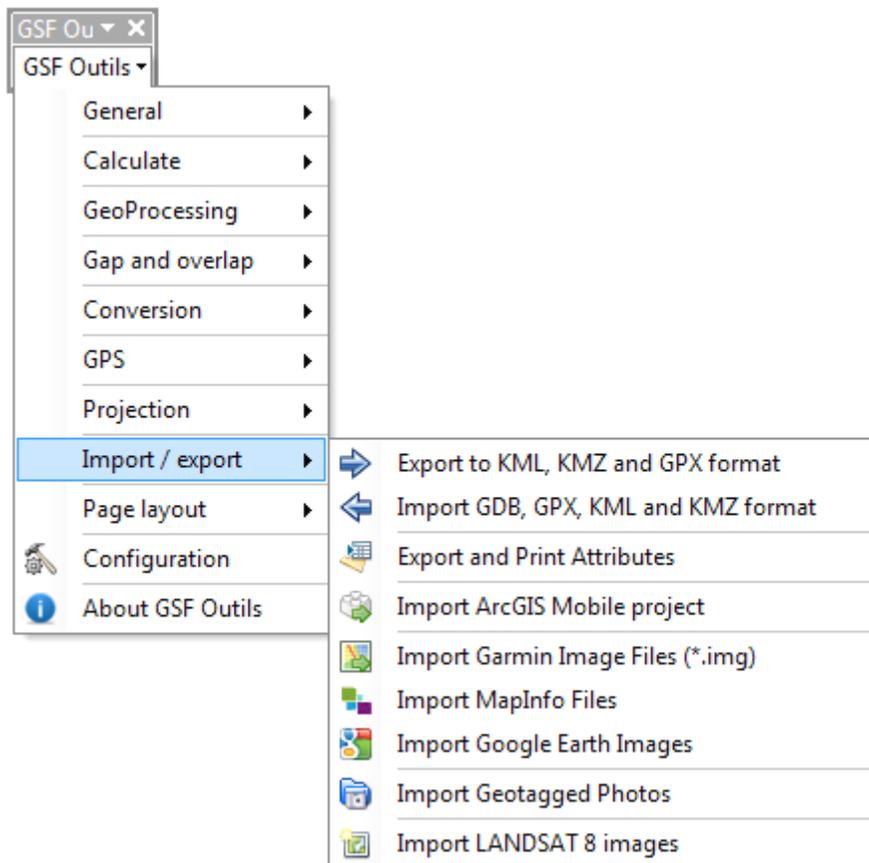
The **"Create destination folder"** option keeps the directory name or the geodatabase source to create a new folder in the location specified in the **"Output folder for the layer"** section.

The **"Add to the Data Frame"** option is used to add the results to the current Data Frame.



## 11 « IMPORT/EXPORT» MENU

This menu contains functions to export and import data and attribute tables, import ArcGIS Mobile projects, Garmin files, MapInfo, Google Earth images and geotagged photos.



### 11.1 IMPORT GDB, GPX, KML AND KMZ FORMAT

This function imports GDB (MapSource), GPS Exchange Format (GPX), KML and KMZ format files in a layer of points, lines or polygons. The interface is split into two main sections.

The **"Files"** section allows adding files to import of GDB, GPX, KML and KMZ format. The user can filter the types of imported data among the Waypoint, Routes and Tracks (Tracks).

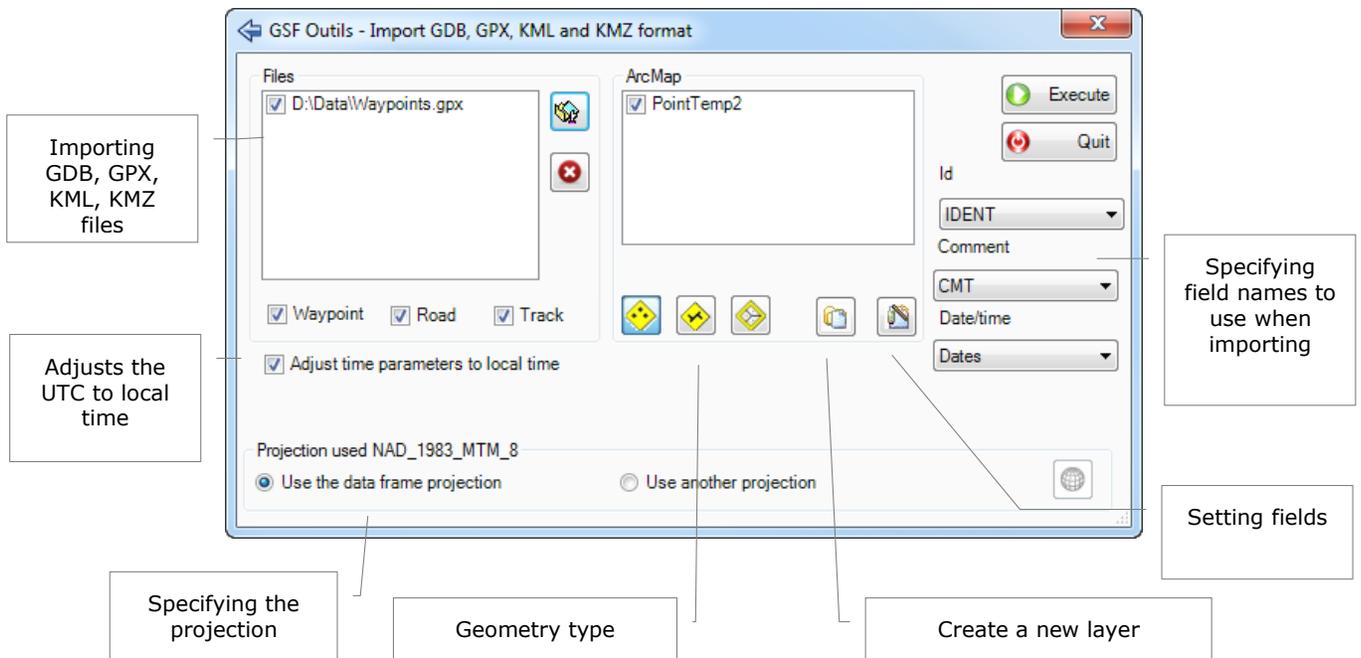
The **"ArcMap"** section displays the layers present in the current Data Frame according to its type of geometry (point, line or polygon). The data can be imported into an existing layer or a new layer created from this interface.

The first step is to identify the **"Projection used"** before activating the import file or create a new layer. By default, the function indicates the projection of the Data Frame, but it can be changed from the **"Use another projection"** button

The **"ArcMap"** section displays all the layers of the Data Frame according to the type of geometry (point, line, polygon). Files can be imported into an existing layer or a new layer. The geometry type must be selected before activating the **"Create a new layer"** command.

The **"Identifiers"**, **"Comments"** and **"Date and time"** sections display by default the fields specified in the **"Field Configuration"** when they are present in the selected layer. These fields can be redefined from the dropdown menu.

The **"Adjust time parameters to local time"** option applies to certain types of files that use UTC (Coordinated Universal Time).



## 11.2 EXPORT TO KML KMZ (GOOGLE EARTH) OR GPX (GPS EXCHANGE) FORMAT

This function exports the layers of active Data Frame in Google Earth format (KML, KMZ) or GPS Exchange (GPX) format.

**This function cannot be used to create a GPX file for Garmin models accepting this type of file.**

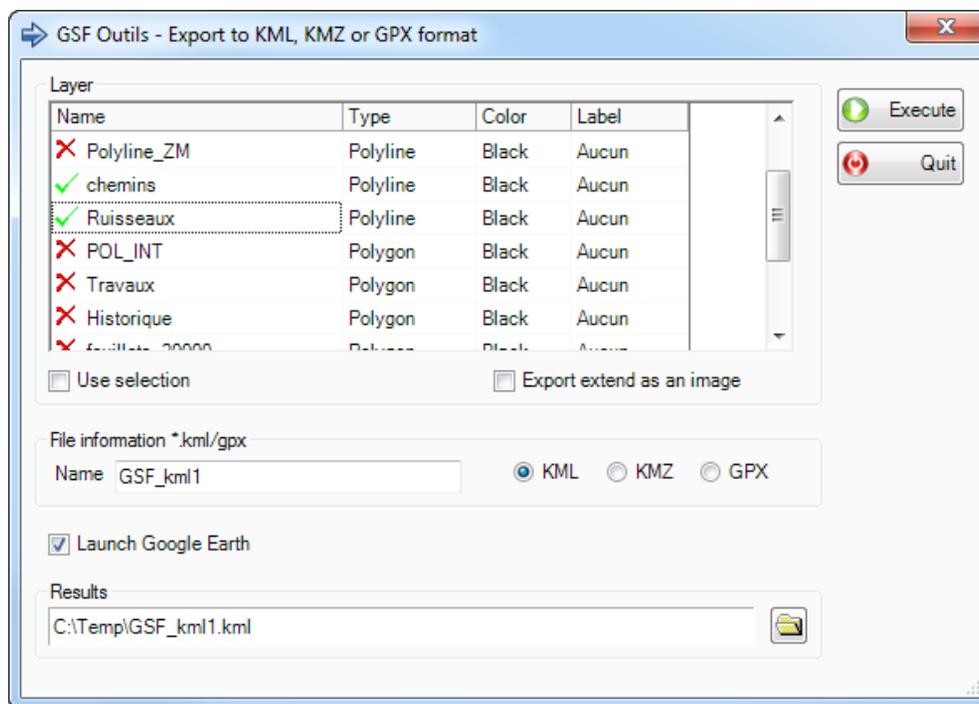
The "**Layer**" section allows selecting the layers to be included in the file to produce and to specify the color and labels. The layer should have a green checkmark to be included in the file and becomes active by double clicking on the layer name.

The "**Use selection**" option allows creating the file using only the selected features.

The "**Export extent as an image**" option exports the extent of the Data Frame in a JPG format.

When "**Launch Google Earth**" is activated, Google Earth will be launched once the process is completed to check the results. It is possible to obtain this free software at <http://www.google.com/earth/>.

The "**Results**" section allows specifying the location and the name of the **KML**, **KMZ** or **GPX** file. The name will automatically be entered in the "**File Information**".



### 11.2.1 Buttons Description

Function	Description
	Add the GDB, GPX, KML, KMZ files
	Remove the selected file from the list
	Type of geometry (point, line, polygon)
	Create a new layer
	Setting fields

### 11.2.2 Identify the fields

The identification of the fields in the **Identifiers, Comments and Dates and Time** sections is required before importing the files. The **"Field Configuration"** button registers the names of fields to be created when creating a new layer from this window.

The table below shows the structure of the fields that can be created in the layer; they are not present when importing files to the layer.

Name	Type	Width
IDENT	Text	50
SMBL	Text	50
TYPE	Text	50
CMT	Text	50
TIME	Text	50
Z_COORD	Numeric	18, 0

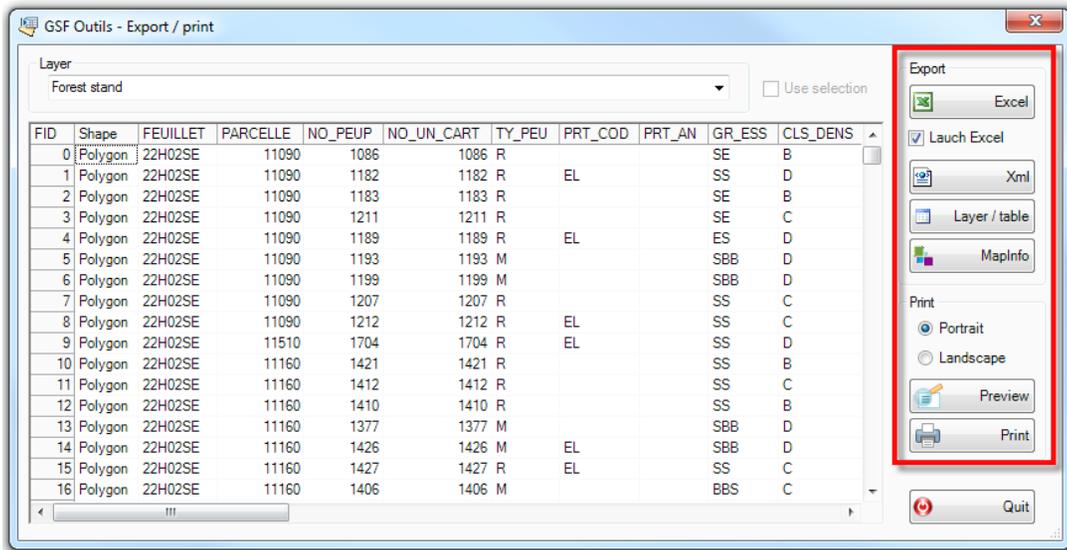
The **"Field Configuration"** option is connected with the **"Create Layer"** option. It allows you to set the names of the fields for the **Identifiers, Comments, Date and Time** section.

### 11.3 EXPORT AND PRINT ATTRIBUTES

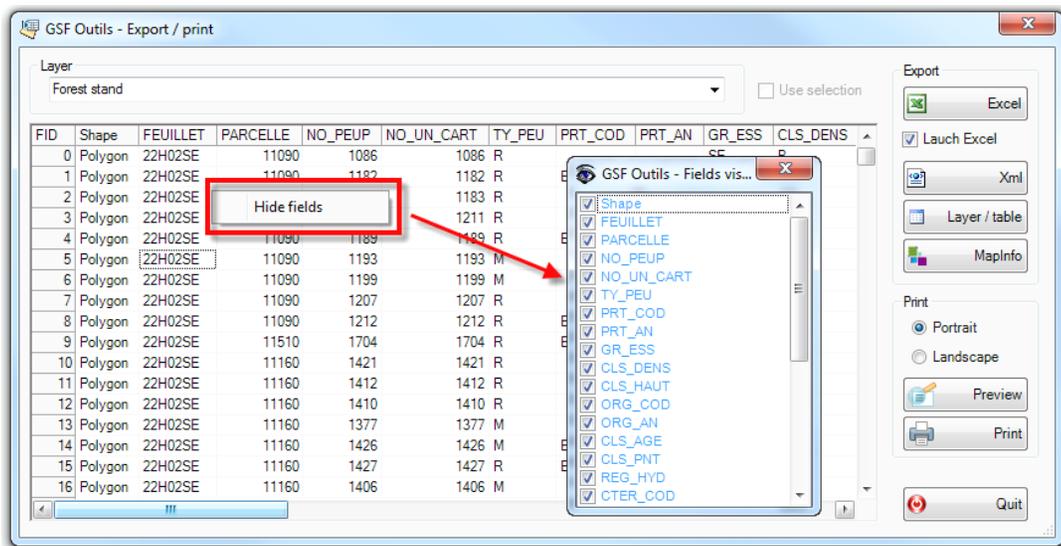
This function allows printing the contents of a table of attributes (layer) or export in the following formats: Excel, XML, MapInfo layer or table.

The table or layer to be process must be indicated in the "**Layer**" section. The option "**Use selection**" allows the operation on a selection of records.

Specific parameters are defined in the "**Export**" and "**Print**" section. If exporting, the file location is requested prior to the operation. If printing, it is possible to perform a print preview and set the paper orientation.



By default, all fields are present in the window. To only display the desired fields, the "**Field Visibility**" option must be enabled from the context menu. Fields can be sorted in increasing or decreasing order by clicking on the name of the column in the grid.



### 11.4 IMPORT ARCGIS MOBILE PROJECT

This function imports one or more layers included in ArcGIS Mobile project and synchronize with the data used to create the ArcGIS Mobile document.

The procedure opens the map in ArcGIS Mobile, selects the layers to import, defines the group of data to import and specifies the output location.

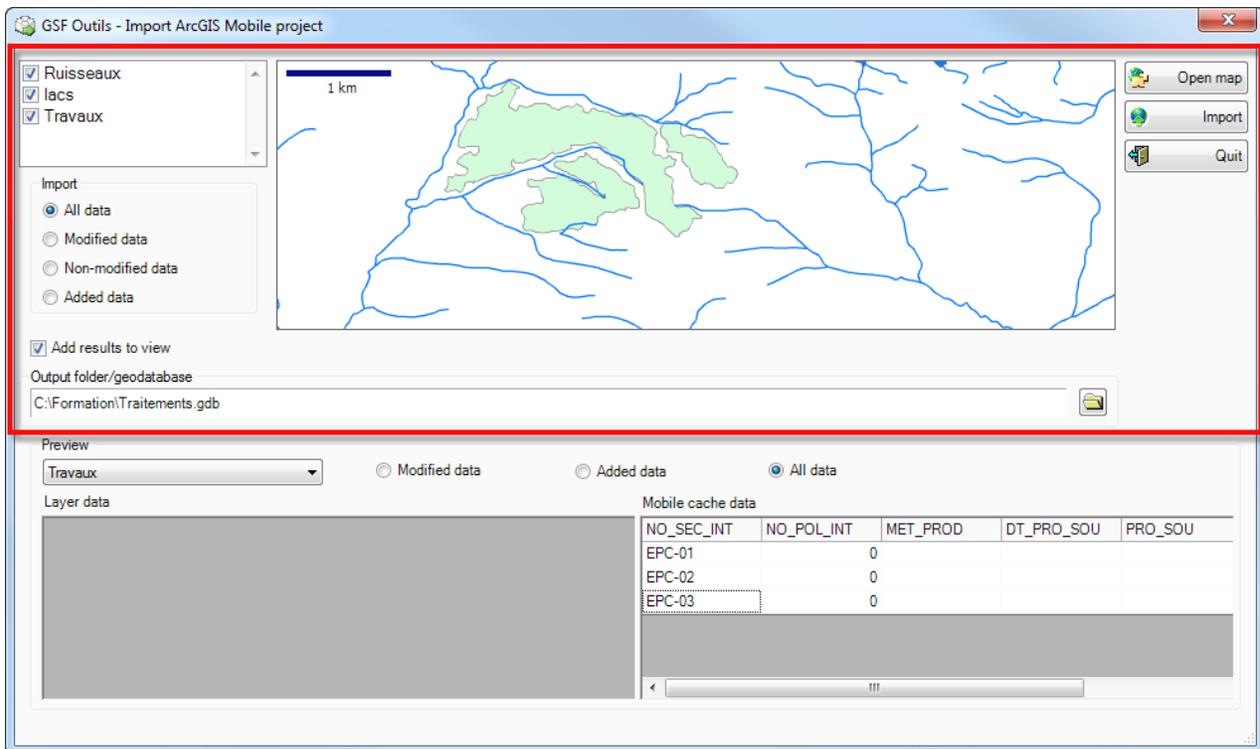
The **"Open Map"** button selects the ArcGIS mobile project. The names of the layers of the project are listed in the left section and must be checked to be imported.

The layers must be checked for the import.

The **"Import"** section allows you to target items to be imported.

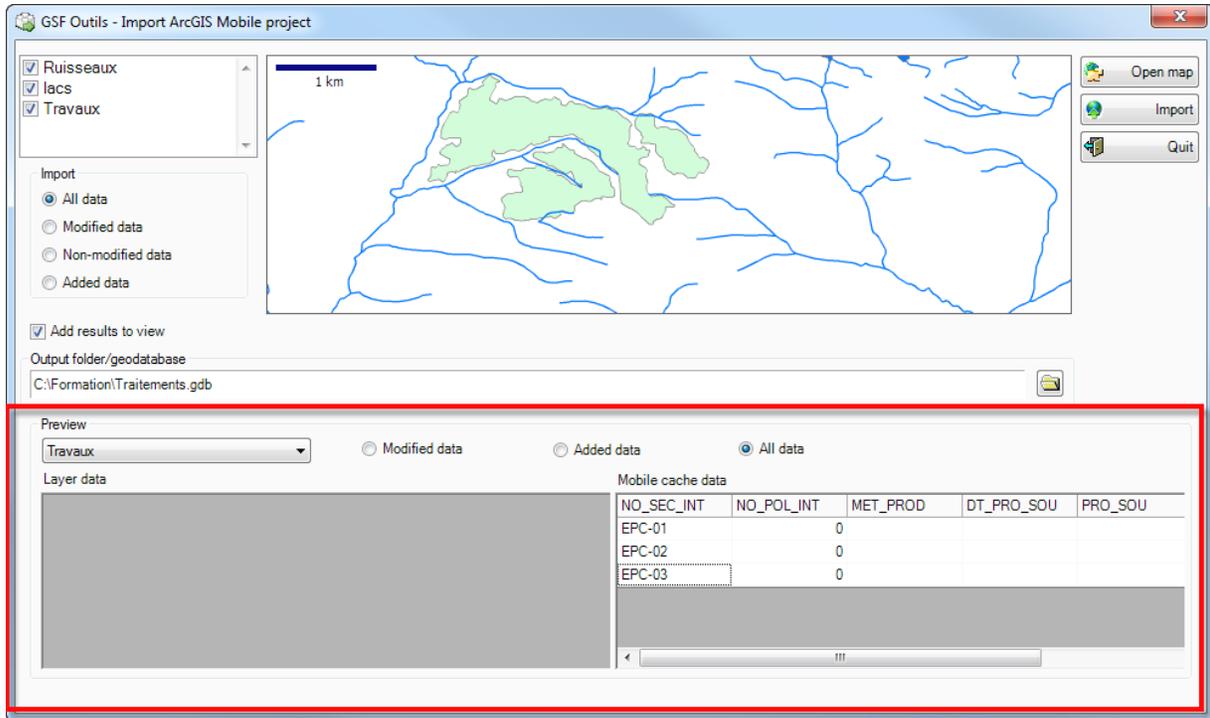
The **"Add Results to View"** option adds the results to the current data block.

The **"Output Folder/Geodatabase"** specifies where to store the updates of the imported layers.



The "Preview" section allows you to view the geometry and attributes of "Modified Data", the "Added Data" or "All Data" of this section in the selected layer.

The "Import" button executes the import.



### 11.5 CREATE MOBILE CACHE

Cette fonction permet de créer un cache mobile pouvant être visualisé dans l'application Mobile Project Center d'ArcGIS Mobile ou utilisé par GSFNAV.

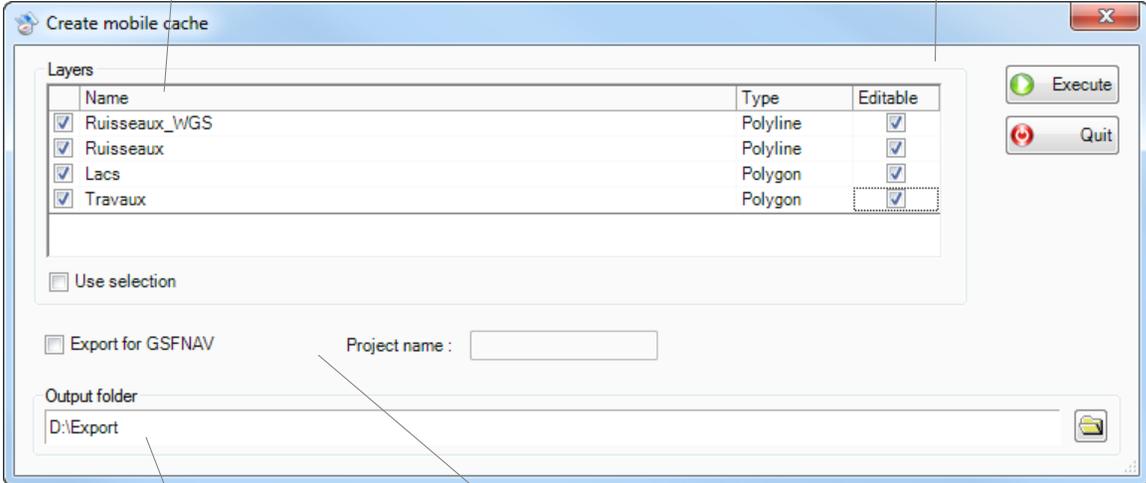
La section « **Layers** » permet de sélectionner les couches à inclure dans le cache mobile et d'identifier les couches pouvant être éditées.

La section « **Use sélection** » permet de créer le cache mobile en se basant uniquement sur les entités sélectionnées.

L'option « **Export for GSFNAV** » crée un cache mobile et un fichier « Nav » spécifique pour GSFNAV. Consulter le document GSFNAV pour obtenir plus d'informations.

La section « **Output folder** » permet de spécifier l'emplacement où seront enregistrés les fichiers du cache mobile. Un dossier doit contenir uniquement un cache mobile.

-  MapSchema.bin
-  MobileCache.db
-  MobileCache.db-journal



The screenshot shows the 'Create mobile cache' dialog box with the following sections and callouts:

- Layers:** A table with columns 'Name', 'Type', and 'Editable'. It lists 'Ruisseaux\_WGS', 'Ruisseaux', 'Lacs', and 'Travaux'. Callout: 'Permet de sélectionner les couches à inclure dans le cache mobile'.
- Use selection:** A checkbox. Callout: 'Sélection des couches éditables dans le cache mobile'.
- Export for GSFNAV:** A checkbox and a 'Project name' field. Callout: 'Création du cache mobile et du fichier NAV'.
- Output folder:** A text field containing 'D:\Export'. Callout: 'Emplacement où seront enregistrés les fichiers'.

Buttons for 'Execute' and 'Quit' are also visible.

### 11.6 IMPORT GARMIN IMAGE FILES (\*.IMG)

This function imports the IMG files created from "Creating Garmin IMG file" in GSF Outils in Shapefile format layers.

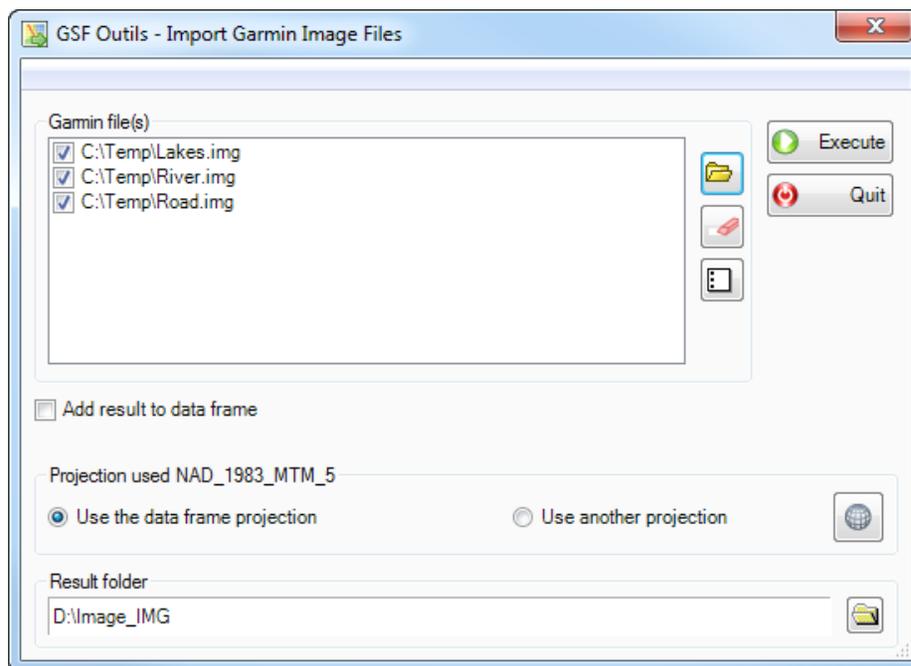
The "Garmin File" section allows add files of IMG format to import. It is recommended to only import one file at a time for better results.

The "Add results to Data Frame" option allows adding new layers in the table of contents.

The "Projection used" section identifies the coordinate system to be applied on new layers created by this function. By default, the function indicates the projection of the Data Frame, but it can be changed from the button "Use another projection".

The "Result Folder" section allows to specify or to record new Shapefile layers. A polyline and a polygon layer will be created for each IMG file.

Function	Description
	Adds the IMG files
	Removes the selected file from the list
	Empty the list of Garmin files



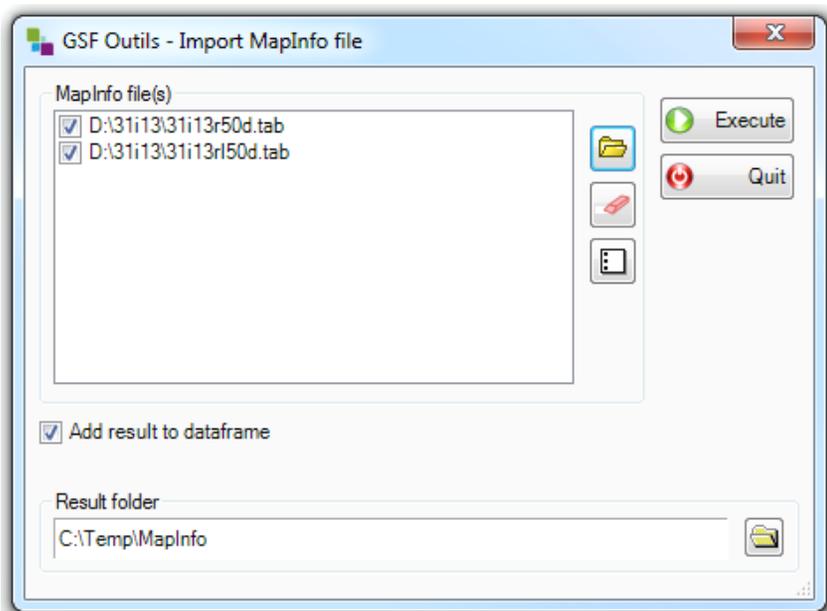
### 11.7 IMPORT MAPINFO FILE

This function imports the file of MIF and TAB type from MapInfo mapping software to convert in Shapefile format.

The "Add results to Data Frame" button allows adding new layers in the table of contents.

The "Result Folder" section allows specify or be recorded new Shapefile layers.

Function	Description
	Adds MIF or TAB files
	Removes the selected file from the list
	Empty the list of existing files

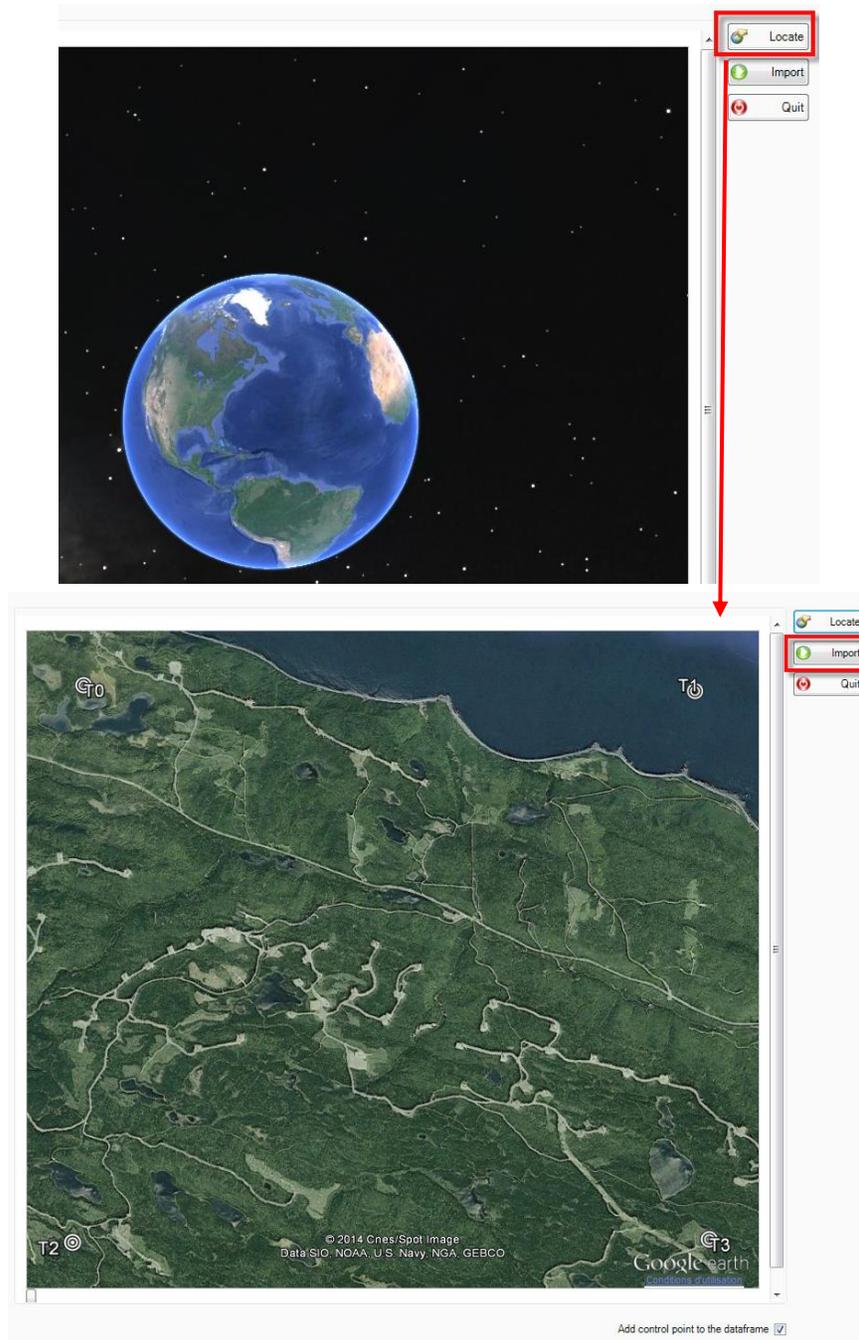


### 11.8 IMPORT GOOGLE EARTH IMAGES

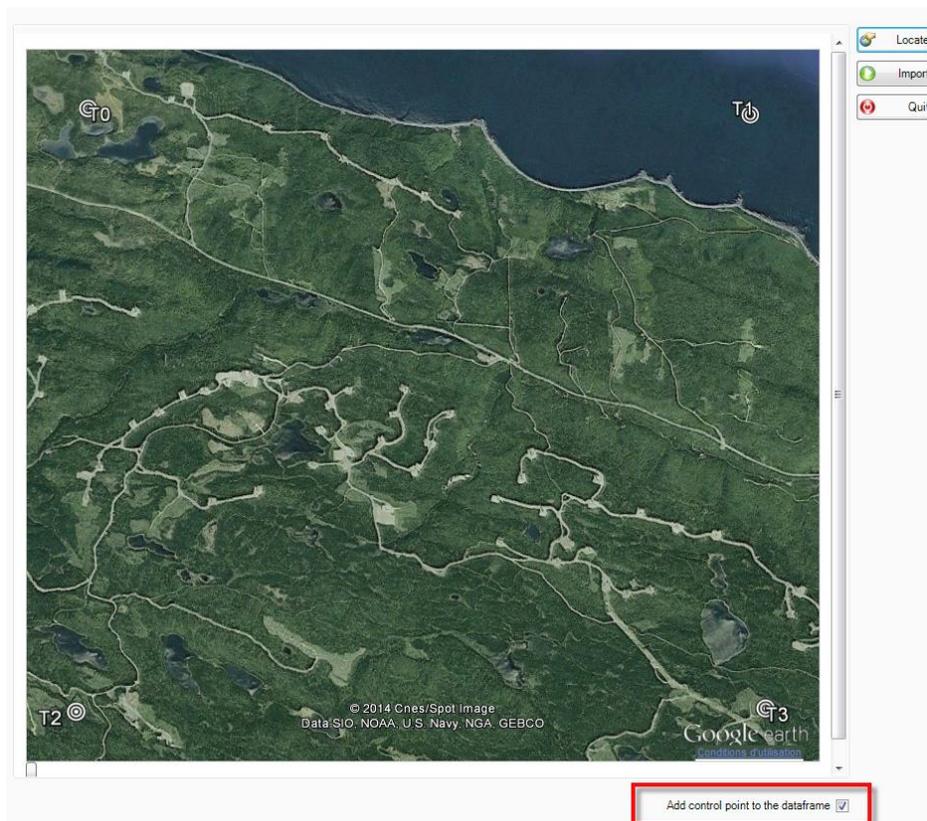
This function is based on the extent of the active view to import an image from **Google Earth**. The computer must be connected to an Internet service to use this feature.

The image quality depends on the Google Earth image resolution and on the scale specified in the ArcMap data view. For best results, it is advisable to fit the view on a large scale (1:10 000, 1:5 000 etc.).

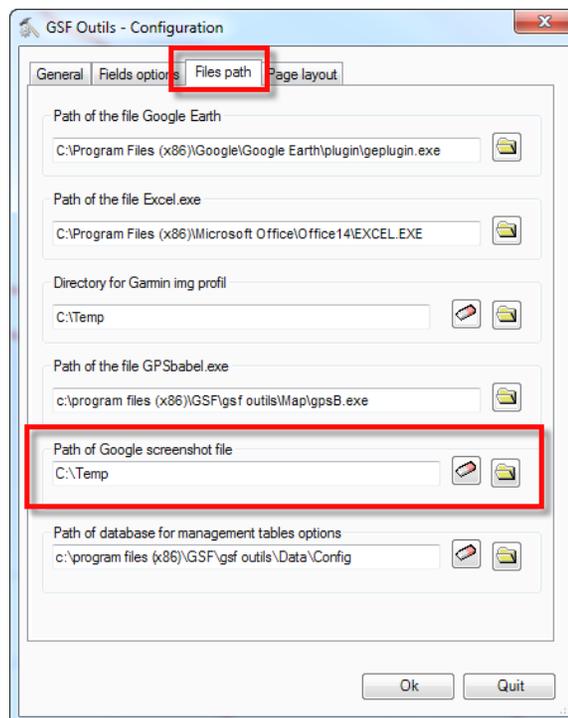
When the window is initialized, the **"Locate"** button will zoom in the same location as the data view. Thereafter, it is very important for the image to be clarified before pressing the **"Import"** button.



The "Add control points to Data Frame" option adds four points to the graphics for ArcMap and four points on the image from Google Earth. These points can be used to refine the correction of the image with the "Georeferencing" toolbar.



The image from Google Earth is saved in the "Path of Google Earth screenshot file" specified section of the file "Files Path" in the Configuration GSF Outils menu tab.



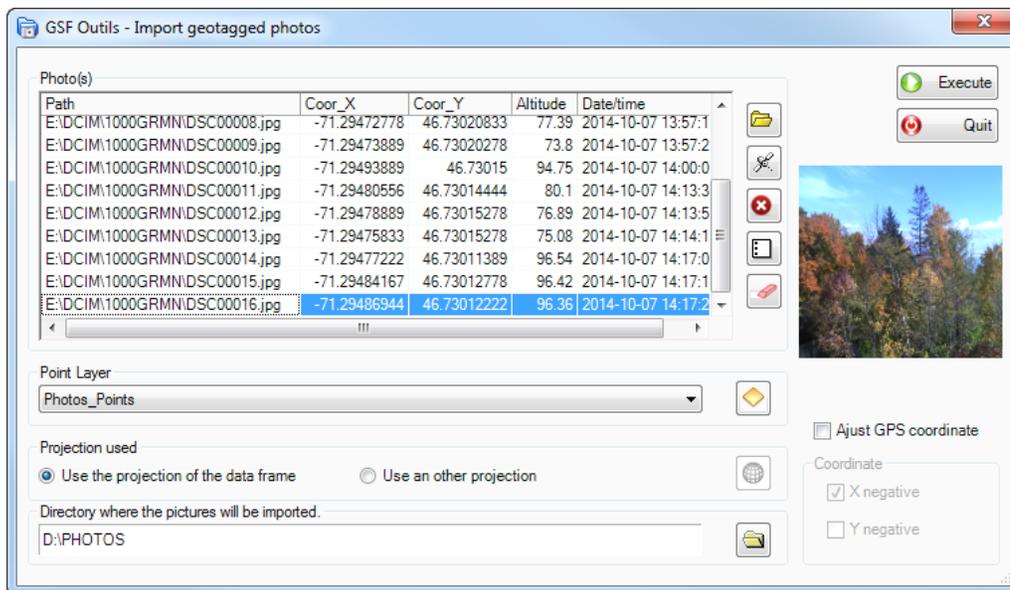
### 11.9 IMPORT GEOTAGGED PHOTOS

This function imports digital photograph captured with cameras using GPS positioning to include X and Y coordinates in the file. The appliance must be connected to the local computer to import the images from the GPS.

A feature point will be created for each photograph. The importation can be stored in an existing layer or a new layer.

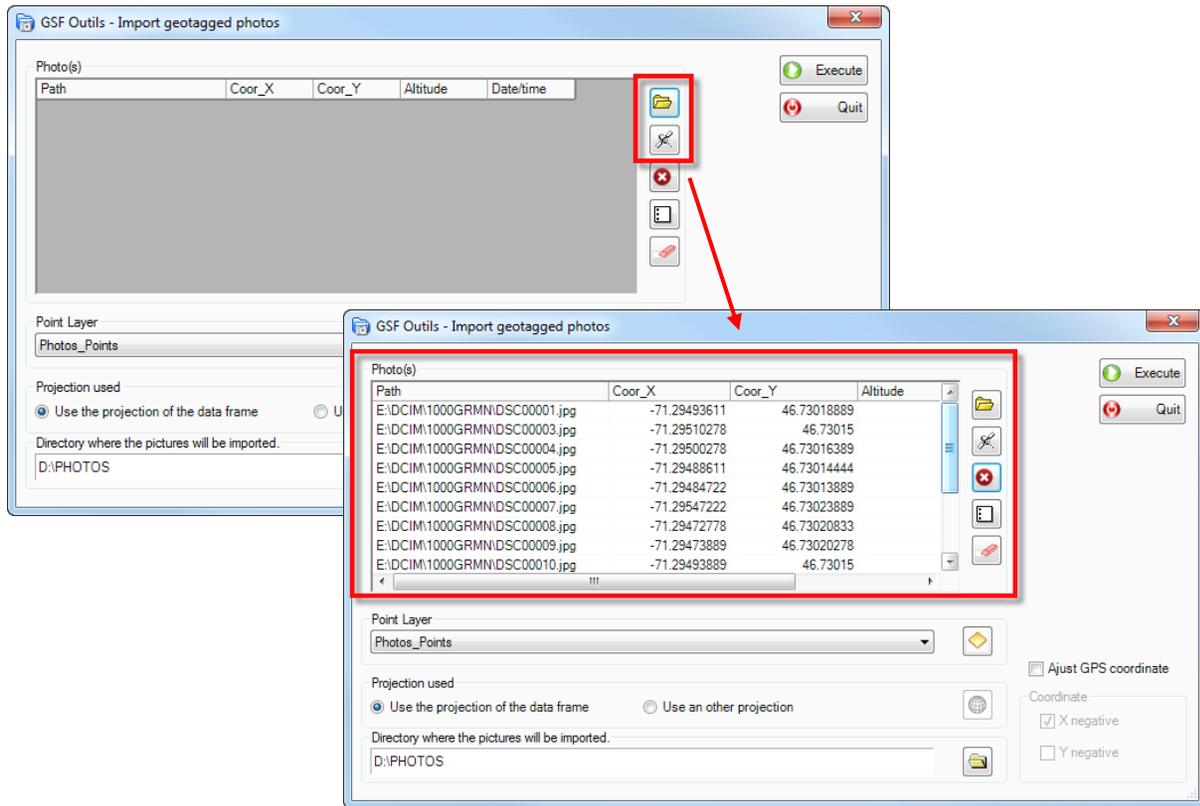
By default, the function indicates the coordinates to the west of Greenwich (negative coordinates) and north of the equator (positive coordinates). This setting can be changed from the "Adjust GPS Coordinates" option.

The "Projection used" section should indicate the projection of the selected layer in the "Layer Points" section.



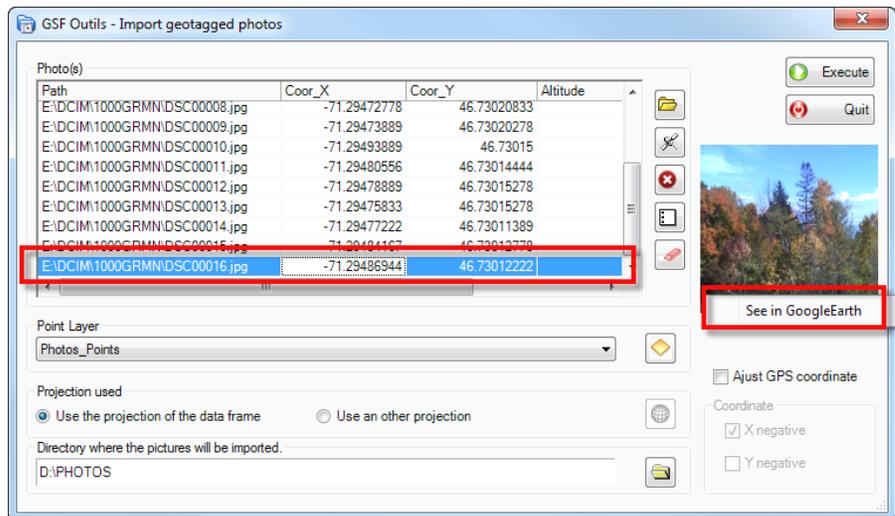
Functions	Description
	Add the photos to a folder
	Retrieve photos directly from the GPS
	Remove selected files from the list
	Empty the list
	Delete the selected images on the disc or GPS
	Create a new point layer

The first step is to add the photos to import using either the **"Browse"** button or the **"Import GPS"** button. The **"Photo"** section specifies the path and name of the photo, the XYZ coordinates and date / time of taking the photo path.



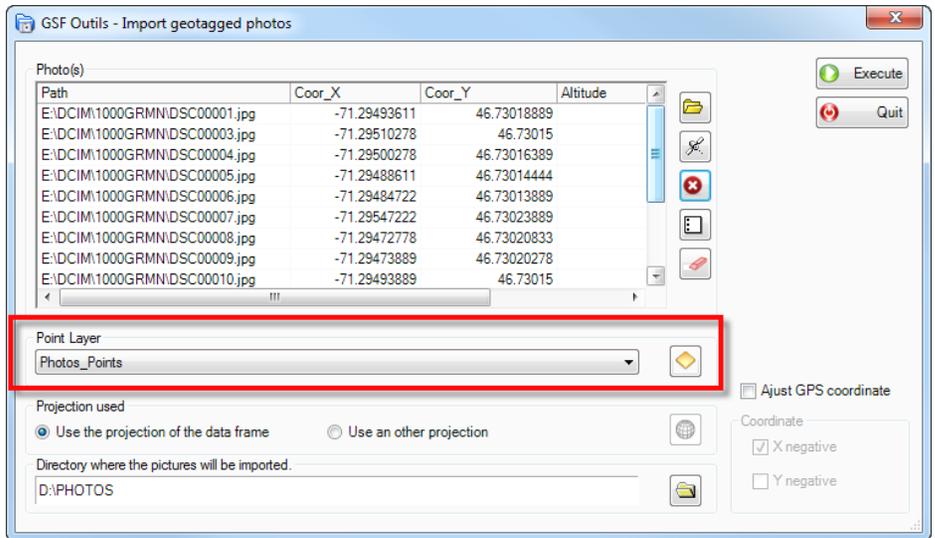
Photos added to the list can be displayed in this window by double-clicking directly on the recording.

It is possible to see the result in Google Earth by clicking on the right mouse button on the Playback Control button.



The "**Points Layer**" section allows to select a point layer or to create a new layer.

A feature point is created for each photo imported.



If the digital photography does not have X and Y coordinates, no points will be created and the photograph will not be imported.

It is important to check the projection shown in the "**Projection Used**" section before creating the new layer.

The "**Adjust coordinates**" option must be enabled when the type of GPS generates the X or Y coordinates (without negative signs).

The "**Directory where the pictures will be imported**" section identifies the folder where the pictures will be saved. The path is automatically added in the table.

A field named **PhotoLink** is automatically added to the table and includes the full path of the photo. The ArcGIS hyperlink can then be used to view photos taken by GPS position.

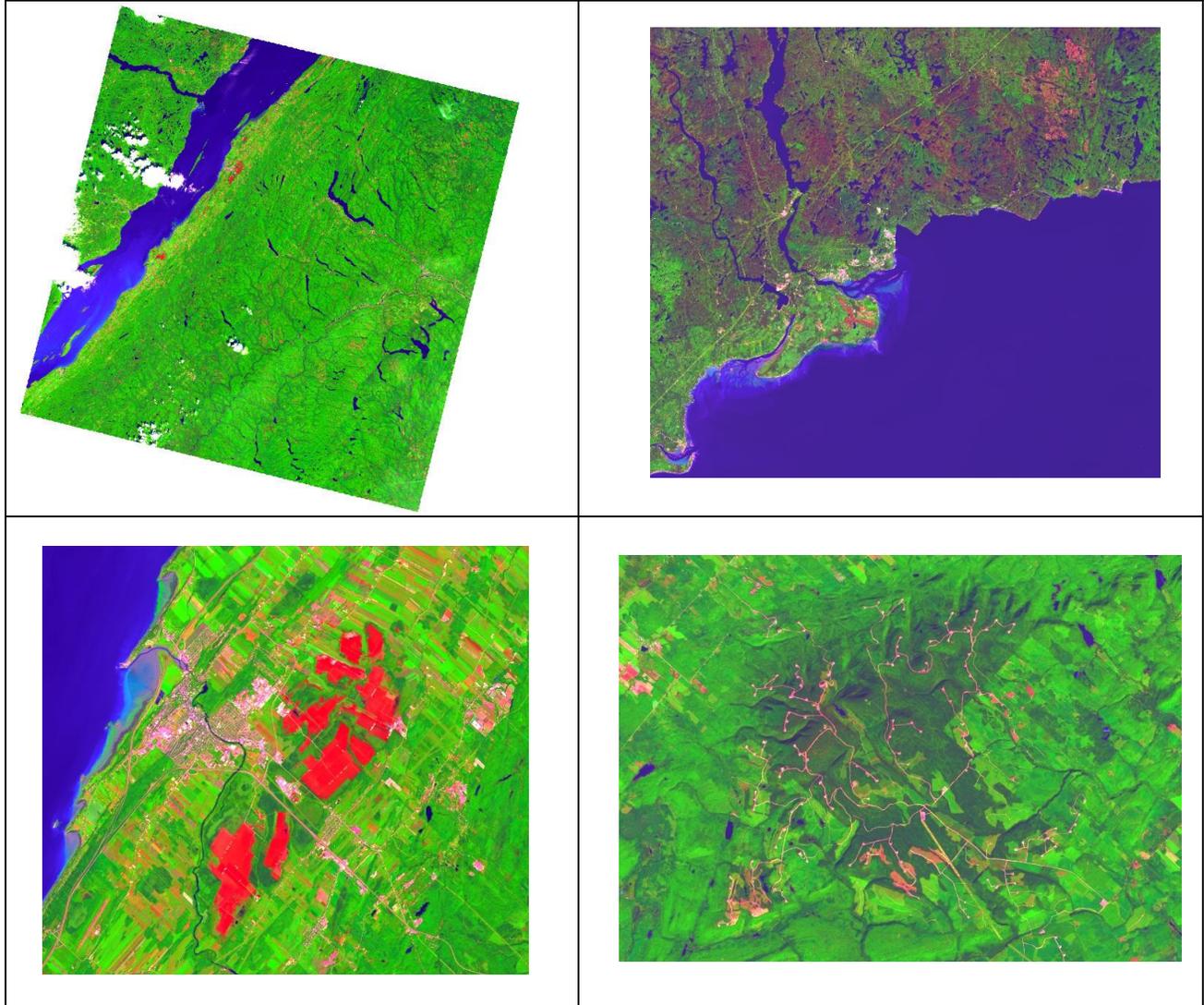
FID	Shape	FICH_NOM	X_coord	Y_coord	IDENT	CMT	Dates	PhotoLink
0	Point		-71.294936	46.730189		192.94	2014-04-09 14:06:24	D:\PHOTOS\IDSC00001.jpg
1	Point		-71.295103	46.73015		55.69	2014-08-13 12:07:43	D:\PHOTOS\IDSC00003.jpg
2	Point		-71.295003	46.730164		89.51	2014-10-07 11:23:29	D:\PHOTOS\IDSC00004.jpg
3	Point		-71.294886	46.730144		89.52	2014-10-07 11:23:40	D:\PHOTOS\IDSC00005.jpg
4	Point		-71.294847	46.730139		89.32	2014-10-07 11:23:59	D:\PHOTOS\IDSC00006.jpg
5	Point		-71.295472	46.730239		84.35	2014-10-07 11:26:17	D:\PHOTOS\IDSC00007.jpg
6	Point		-71.294728	46.730208		77.39	2014-10-07 13:57:19	D:\PHOTOS\IDSC00008.jpg
7	Point		-71.294739	46.730203		73.8	2014-10-07 13:57:29	D:\PHOTOS\IDSC00009.jpg
8	Point		-71.294939	46.73015		94.75	2014-10-07 14:00:07	D:\PHOTOS\IDSC00010.jpg
9	Point		-71.294806	46.730144		80.1	2014-10-07 14:13:33	D:\PHOTOS\IDSC00011.jpg

### 11.10 IMPORT LANDSAT 8 IMAGES

In order to be used, this function requires downloading the Landsat 8 images that are available on the USGS website <http://earthexplorer.usgs.gov/>. The “**Procedure to Import Landsat 8 Images**” offers all the details on the Landsat 8 image download. It can be found on the following Web page.

[http://www.gsf.ca/en-ca/images-satellites/landsat-\(30-m-couleurs\).aspx](http://www.gsf.ca/en-ca/images-satellites/landsat-(30-m-couleurs).aspx)

This function imports Landsat 8 images while also assigning an image enhancement image for a general use. The “**Tif**” files are extracted from the “**Tar.Gz**” format and a combination of the bands is made to obtain a single “**Tif**” image.



The "**Data to import**" section manually selects the « Tar.Gz » files or adding all the files in a specific folder. The selected images in the list can be deleted from the list. The images to be imported should be checked in the grid.

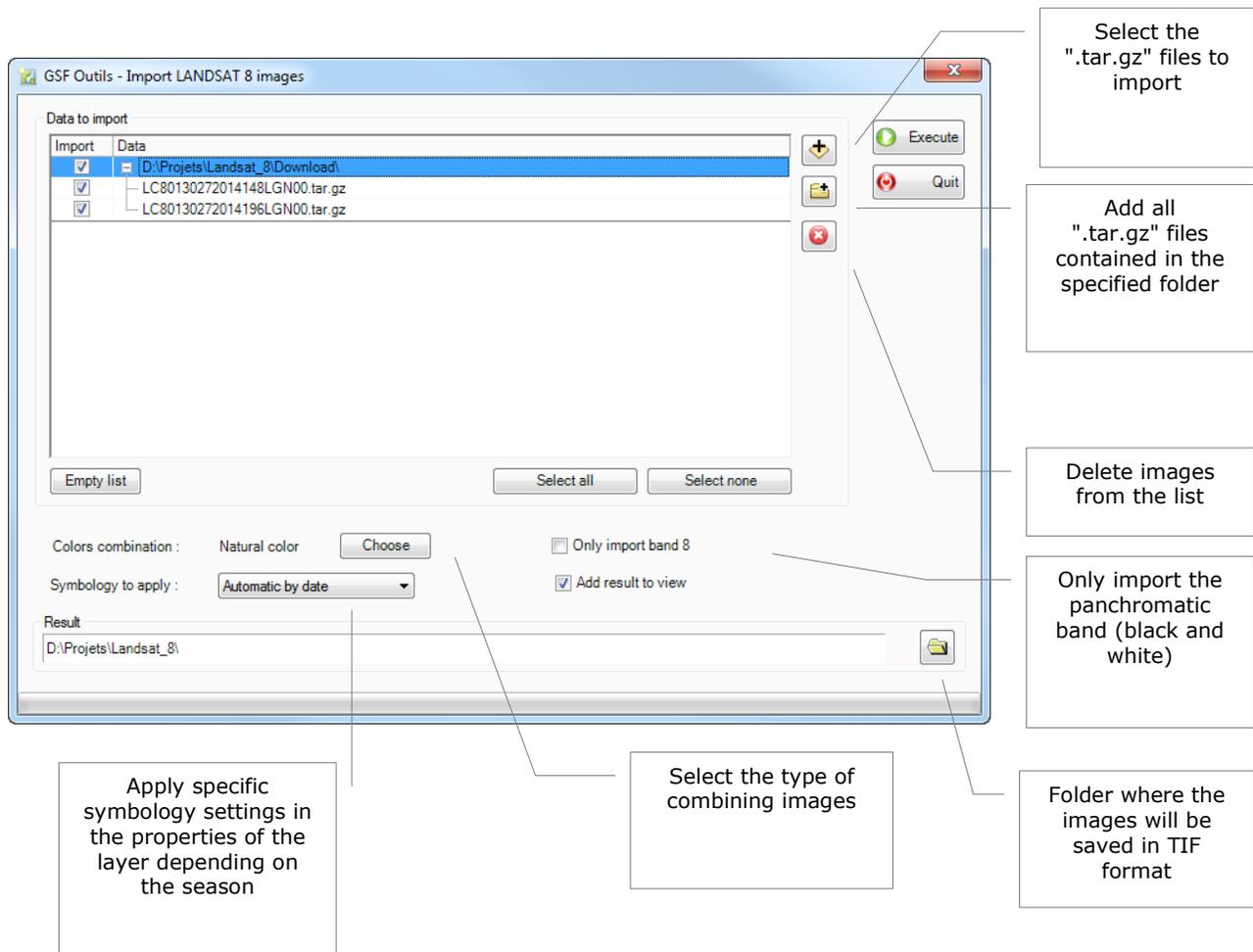
The "**Colors combinations**" section contains different combinations of bands for the presentation of the image. The 11.10.1 on page 134 illustrates the possibilities of combination of colors.

The "**Symbology to apply**" section indicates the the "Automatic by date" default method. This method checks the file date and automatically applies a symbology in the properties of the layer depending on the season. The drop-down menu also contains a method for pictures taken in the "Winter" or "Summer" season.

The "**Only import band 8**" imports the panchromatic band (black and white).

The "**Add result to view**" option is enabled by default.

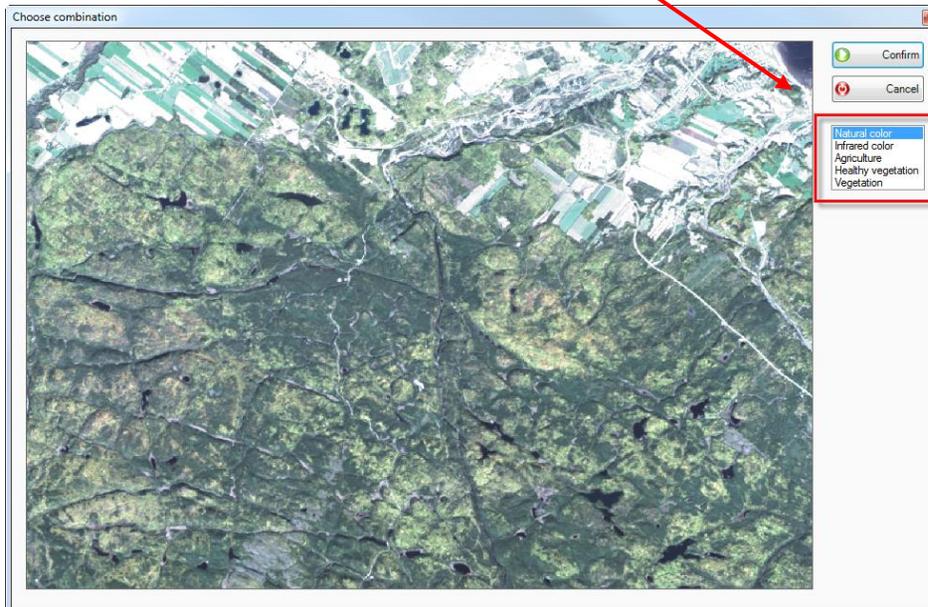
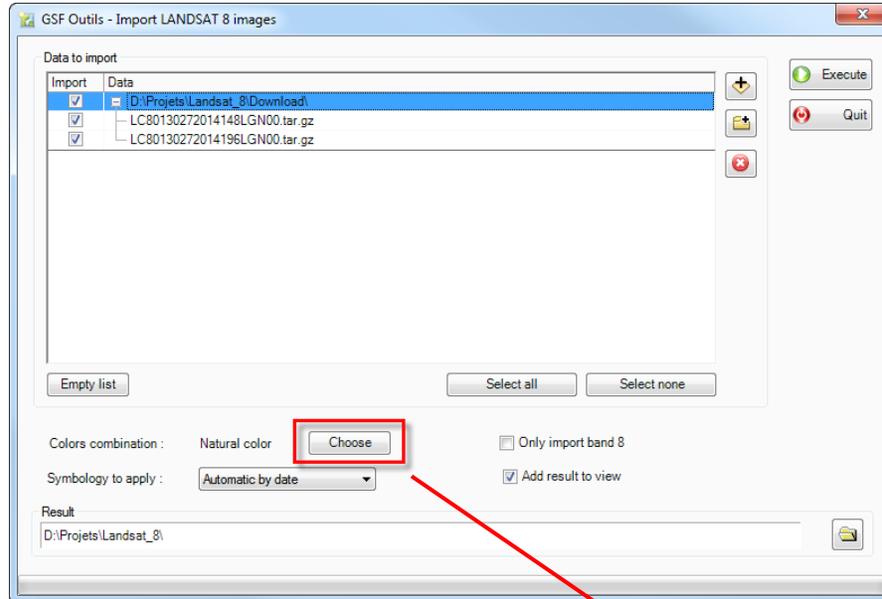
The "**Result**" section specifies where to store the images in the "Tif" format.

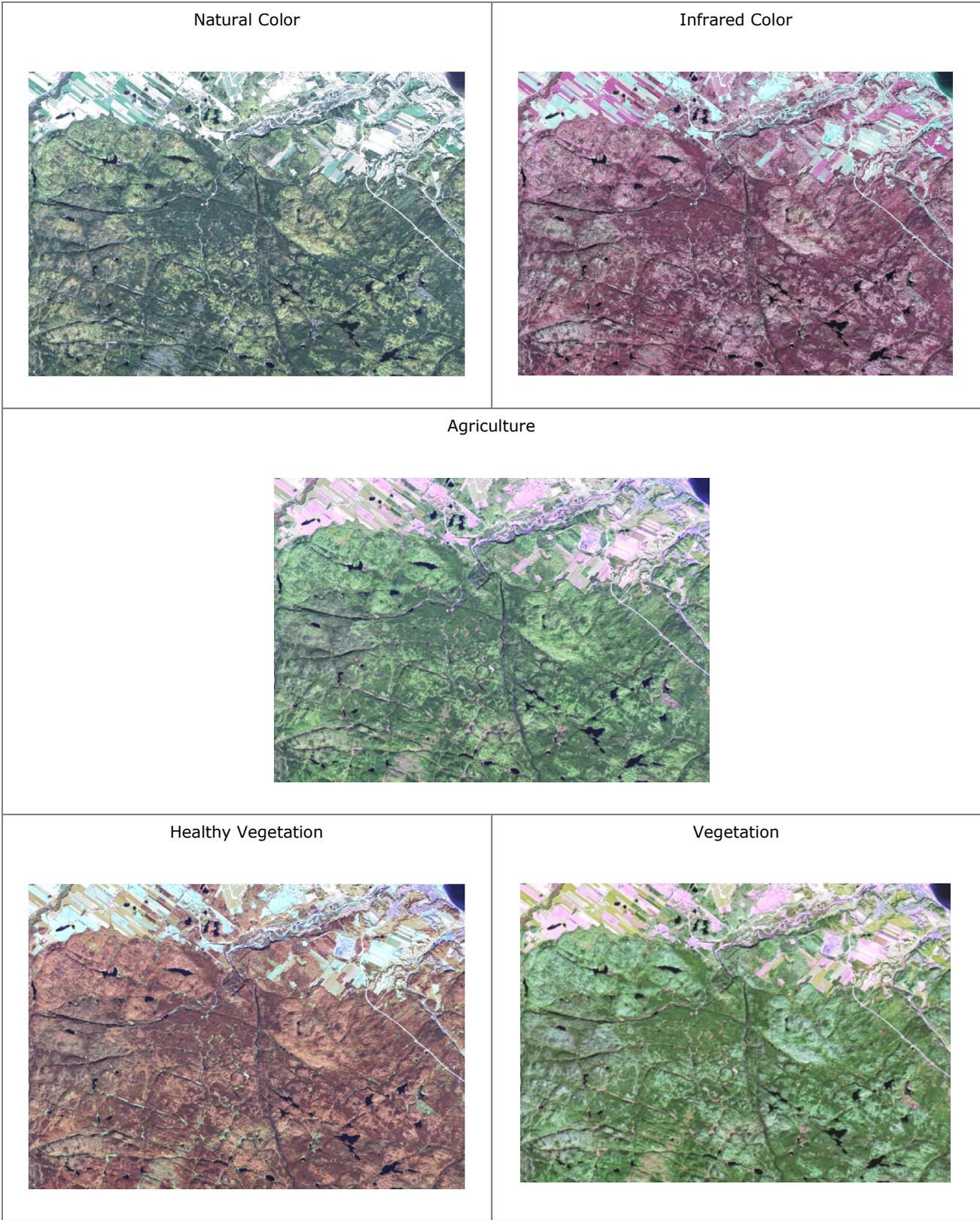


### 11.10.1 Color combo

The "**Color Combo**" section allows you to "**Select**" the type presentation among five choices. It is necessary to activate the "**Confirm**" button to keep the selection.

The next page shows the different handsets.





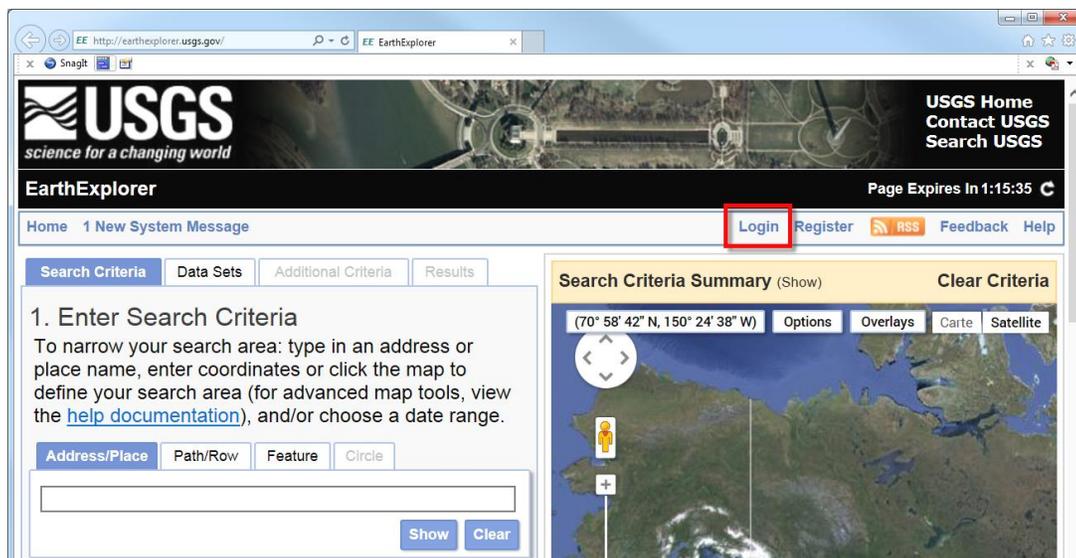
### 11.10.2 Downloading images Landsat 8

Landsat 8 images can be downloaded for free from the USGS Web site.

<http://earthexplorer.usgs.gov/>

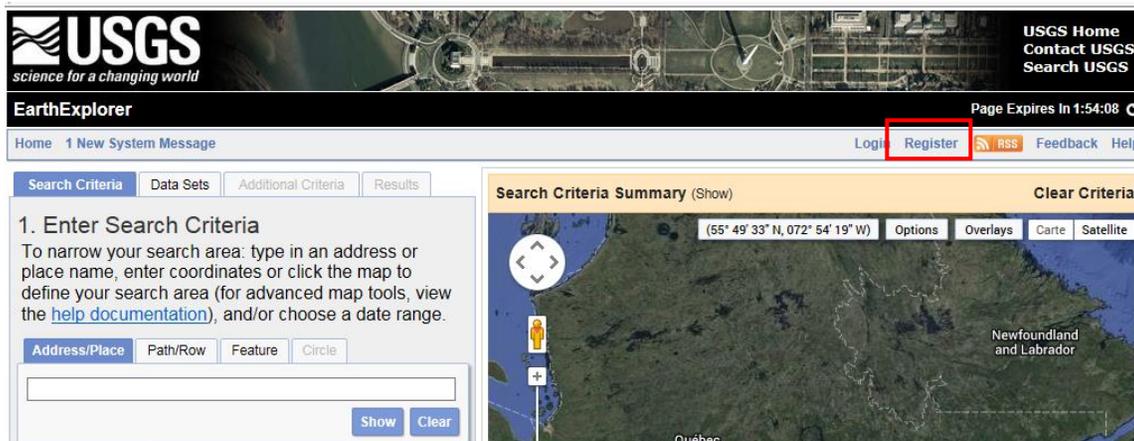
The main steps are to:

- Create a user account or to open the account
- Find images using on the available methods
- Download the Landsat images from the USGS website;
- Import Image from GSF Outils for ArcGIS;
- Perform image enhancement.



11.10.2.1 New user

To create a user account, enable the « **Register** » command.



It is required to type in a username, password and the text, as seen in the picture, in the appropriate text boxes. Follow any useful tips that are given on this page about username and password.

All fields must be completed before accessing the following pages.

**Login Information**

*Password must be between 8 and 16 characters long, and contain at least one alphabetic and numeric character.*

**Username:**  Nom d'utilisateur

**Password:**  Mot de passe

**Confirm Password:**

You may wish to use your email address for your user name.



no CAPTCHA™

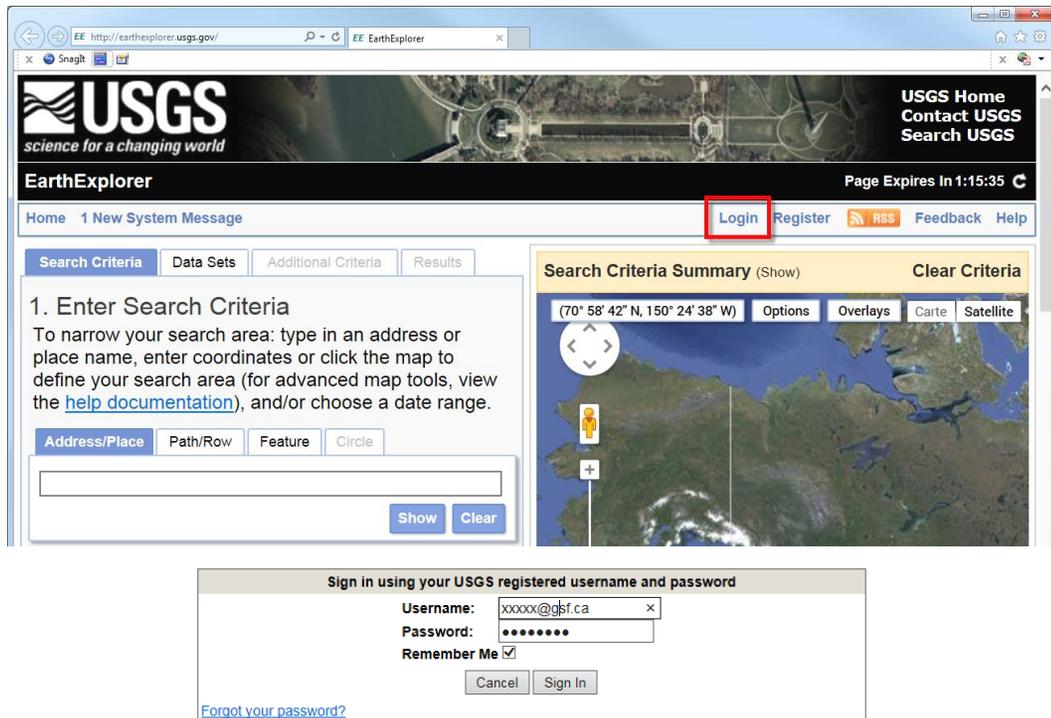
Texte de sécurité Privacy & Terms

**Note: All fields are required.**

### 11.10.2.2 Registered users

For existing users, user account information must be specified by clicking on the "Login" command.

It is possible to check the "Remember Me" option to save time on the next login.

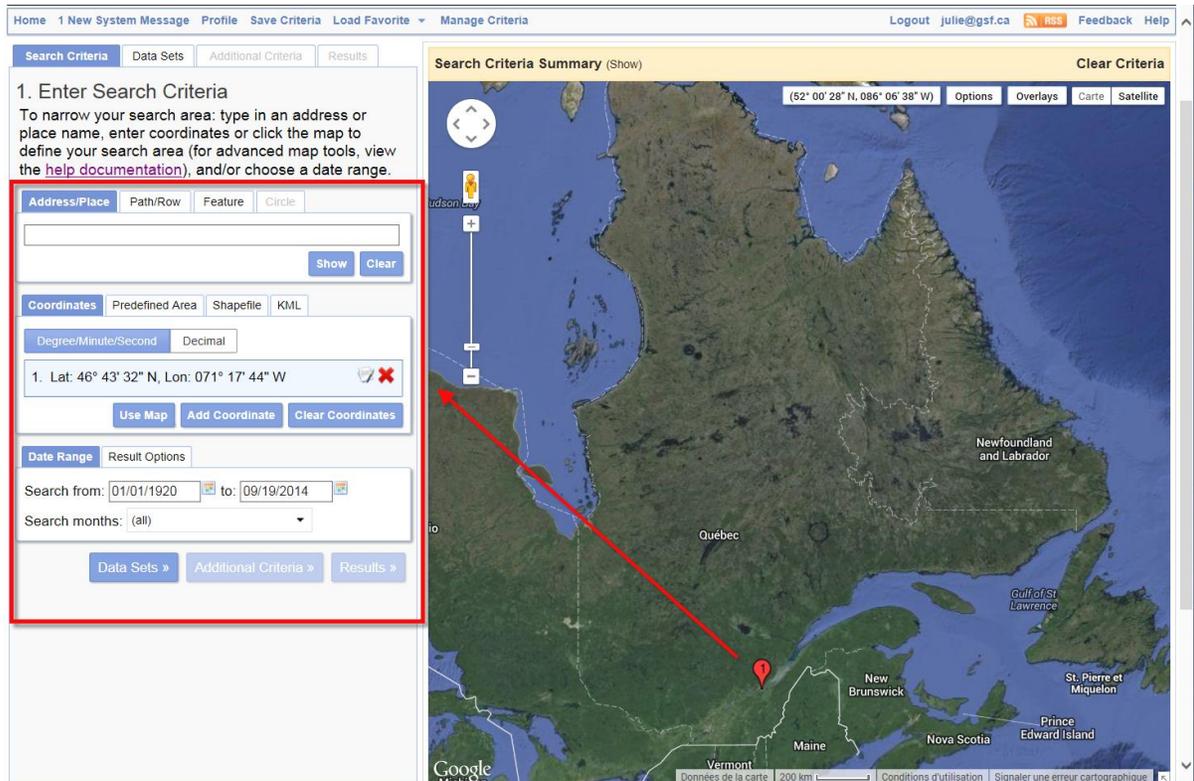


11.10.2.3 Determine the search area

Image search can be done using different methods. The location can be directly point on the map, specify coordinates or a mailing address or enter the number of satellite overpass.

The example below searches for images available for precise location by pointing the cursor directly on the map.

Whatever the method used, it is necessary that the research be done to continue the steps for downloading.



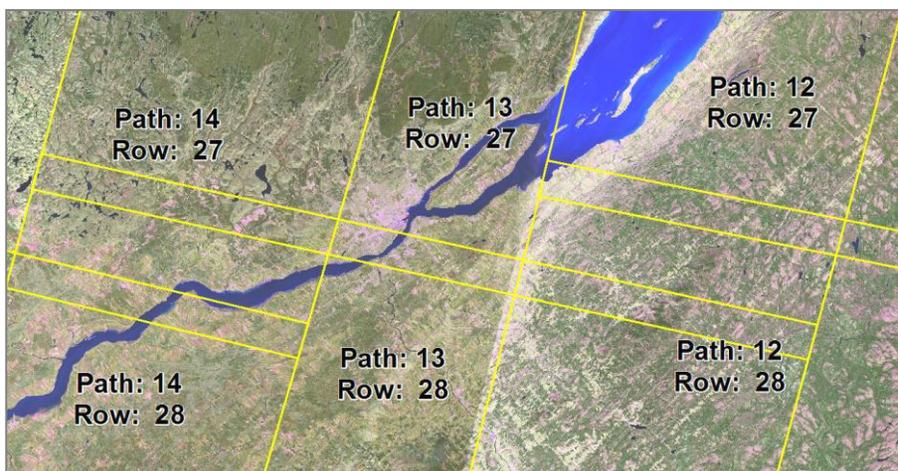
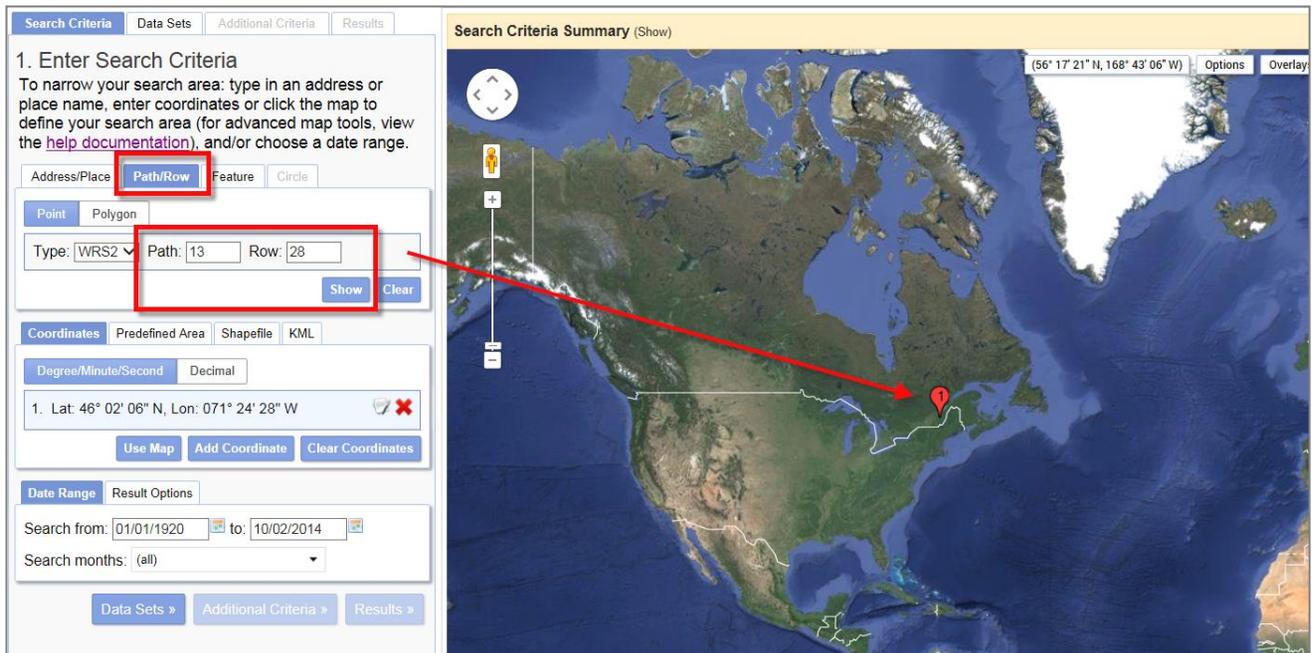
11.10.2.4 Search area based on the passage number of the satellite

The images are divided by scene, each of which is numbered for reference to "**Path / Row**". If this method is used, it is necessary to download the layer containing the index passage numbers available at the link below:

[http://www.gsf.ca/distribution/Landsat/Index\\_Landsat\\_8/Index\\_Landsat\\_8.zip](http://www.gsf.ca/distribution/Landsat/Index_Landsat_8/Index_Landsat_8.zip)

The passage number must be entered in the "**Path / Row**" tab and "**Show**" button should be enabled to continue the steps to downloading. The search can also be refined by specifying a group of dates.

The image below shows an example of a search for a number of transition in the region of Quebec.



11.10.2.5 Acquisition of images calendar

The links below can be found to get the planned or archived Landsat 8 Calendar of the passage of the satellite.

Planned Calendar

[http://landsat.usgs.gov/tools\\_L8\\_acquisition\\_calendar.php](http://landsat.usgs.gov/tools_L8_acquisition_calendar.php)

Archived Calendar

[http://landsat.usgs.gov/tools\\_pend\\_acq\\_l8.php](http://landsat.usgs.gov/tools_pend_acq_l8.php)

**USGS**  
science for a changing world

**Landsat Missions**

**Home** **Landsat 8 Acquisition Calendar**

View the paths scheduled for acquisition on any day. You can also view paths scheduled for [Landsat 7](#).  
This calendar requires Macromedia Flash version 5 or higher. Click [here](#) to download the current version of Macromedia Flash.  
Instructions: Click the date you want to view. The paths for that date appear in a list to the right and in a map below the calendar.

**LANDSAT 8**  
16 Day Acquisition Calendar

October 2014

Instructions For Use:  
Click on the date you wish to view - the paths for that date will show at the right and graphically below.

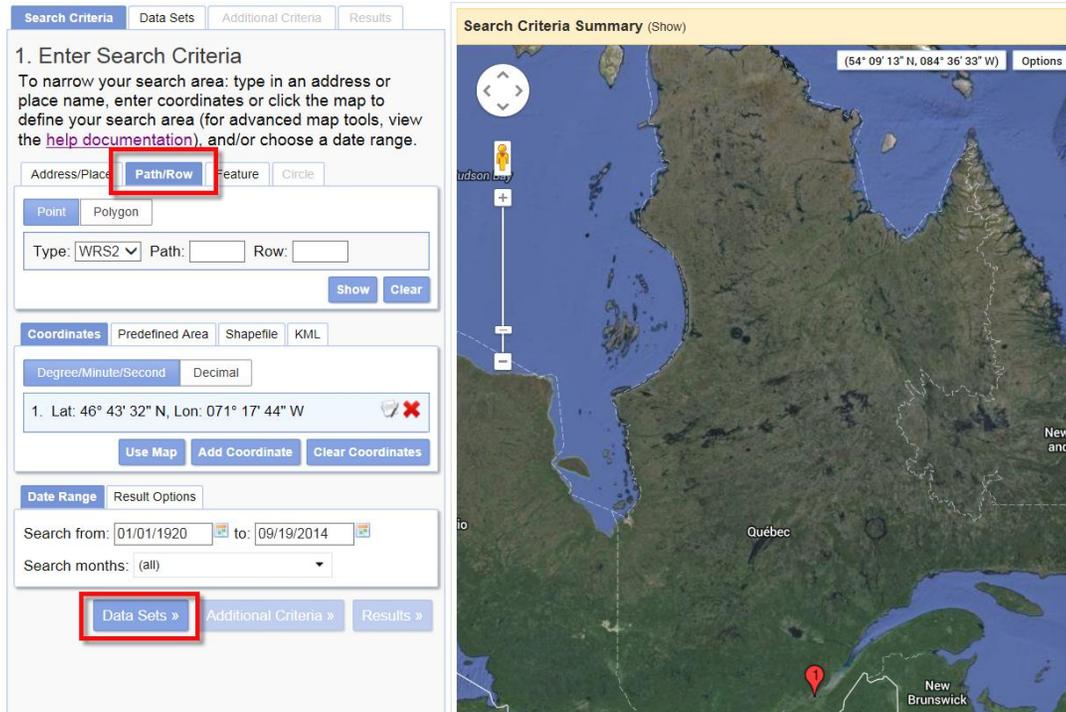
	Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3	4
	5	6	7	8	9	10	11
278	11	279	12	280	13	281	14
12	12	13	14	15	16	17	18
285	2	286	3	287	4	288	5
19	20	21	22	23	24	25	
292	9	293	10	294	11	295	12
26	27	28	29	30	31		
299	16	300	1	301	2	302	3

Paths on Cycle Day 3

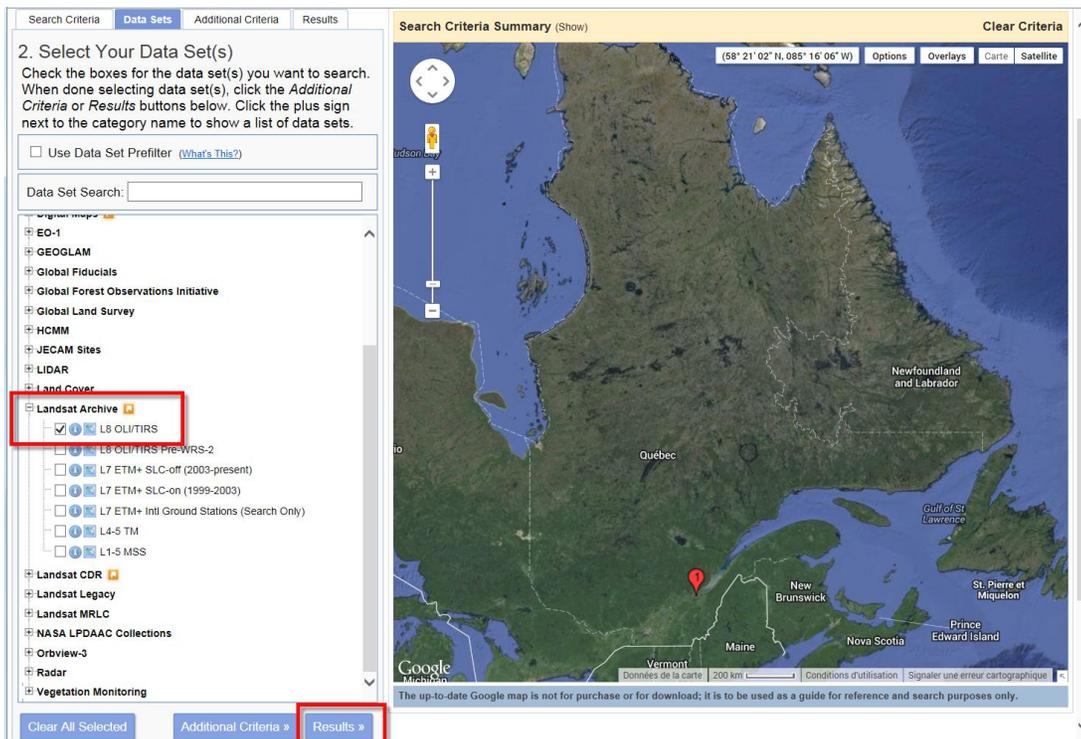
- 108
- 124
- 140
- 156
- 172
- 188
- 204
- 220
- 3
- 19
- 35
- 51
- 67
- 83

11.10.2.6 Other elements to specify

When the location is determined, the **"Data Sets"** command in the **"Path / Row"** tab must be enabled for a list of all available images.

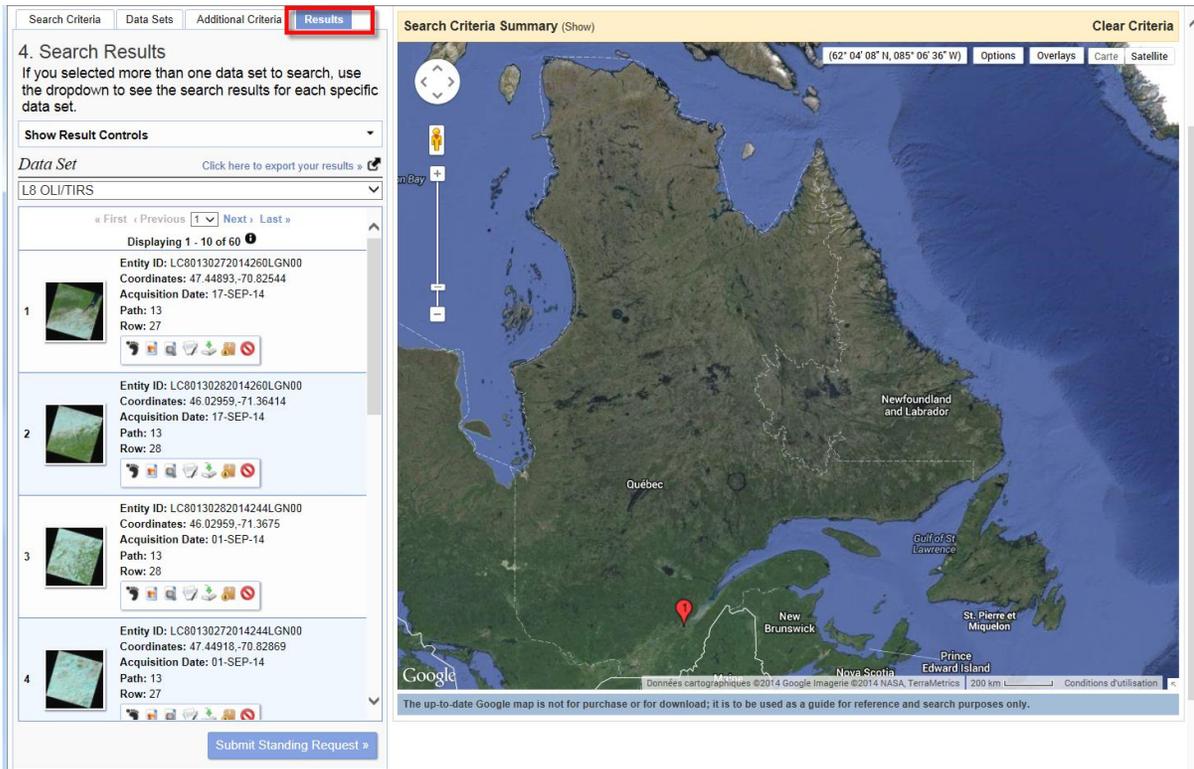


In the **"Landsat Archive"** section, open the **"L8 OLI / TIRS"** option and activate the **"Results"** command.



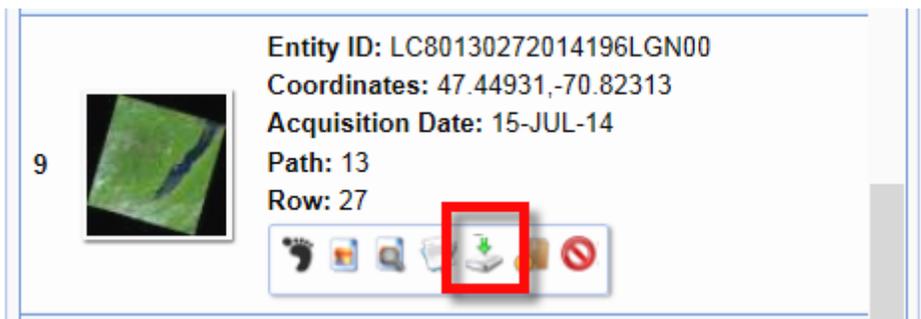
### 11.10.2.7 Download Images

The **"Results"** tab contains all images in the search. In the presentation of the images available for download, the first image in the list is the most recent.

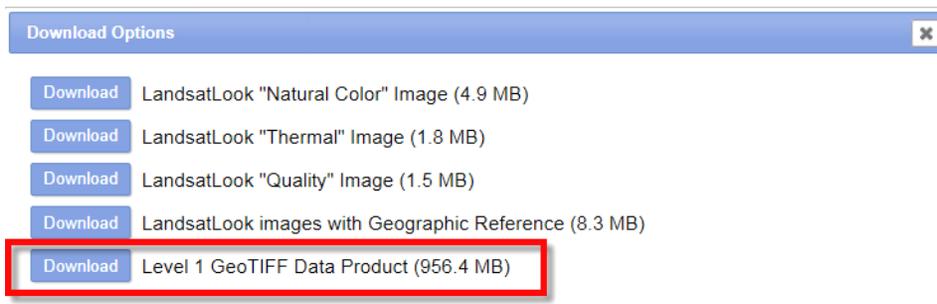


### 11.10.2.8 Single image download

To download an image, the **"Download/options"** function must be activated.

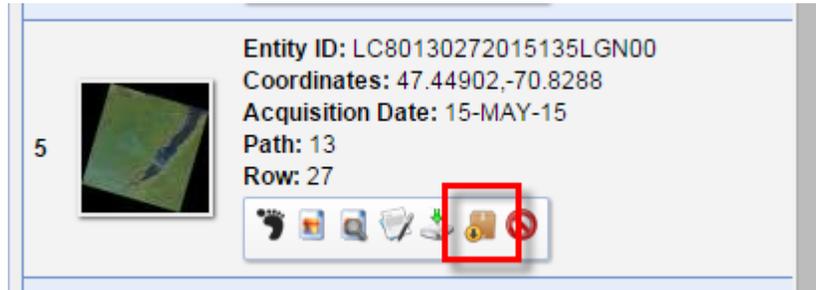


In the download options, select **"Level 1 Geo Tiff Data Product"** and click on the **"Download"** command. Save the image by specifying a folder.

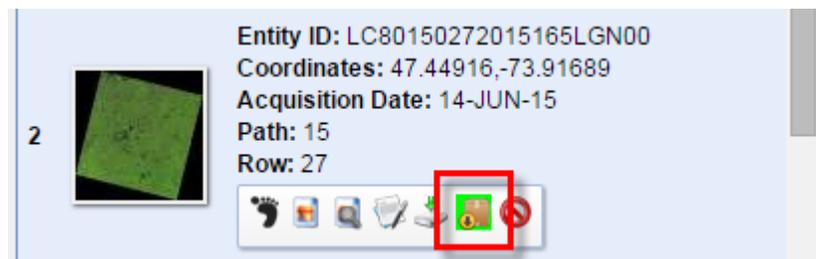


11.10.2.9 Bulk download

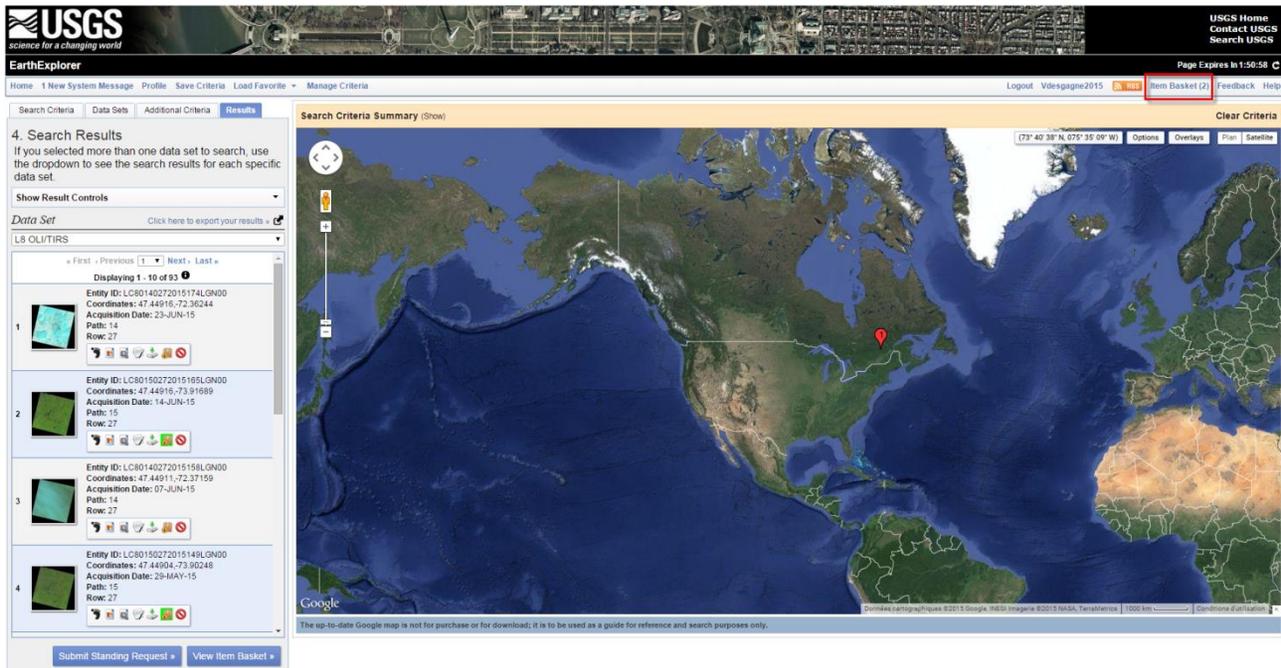
To download multiple images at the same time, the “Add to bulk download” function must be activated.



The background behind the box will turn green once the image has been added to the basket (order).



When all desired images have been selected, the “Item Basket (\*)” command must be used. The star shows how many pictures has been added to the order.



The detailed description to download multiple images is available in the document « Procedure import Landsat 8 images under the link below :

<http://www.gsf.ca/fr-ca/applications/gsf-outils-pour-arcgis.aspx>

### 11.10.3 “Tif” Image Name

The “tif” images created by the Import Landsat 8 Images function possess a particular name. They follow the code described below.

IMG\_ppp\_rrr\_YYYY\_MM\_DD.tif

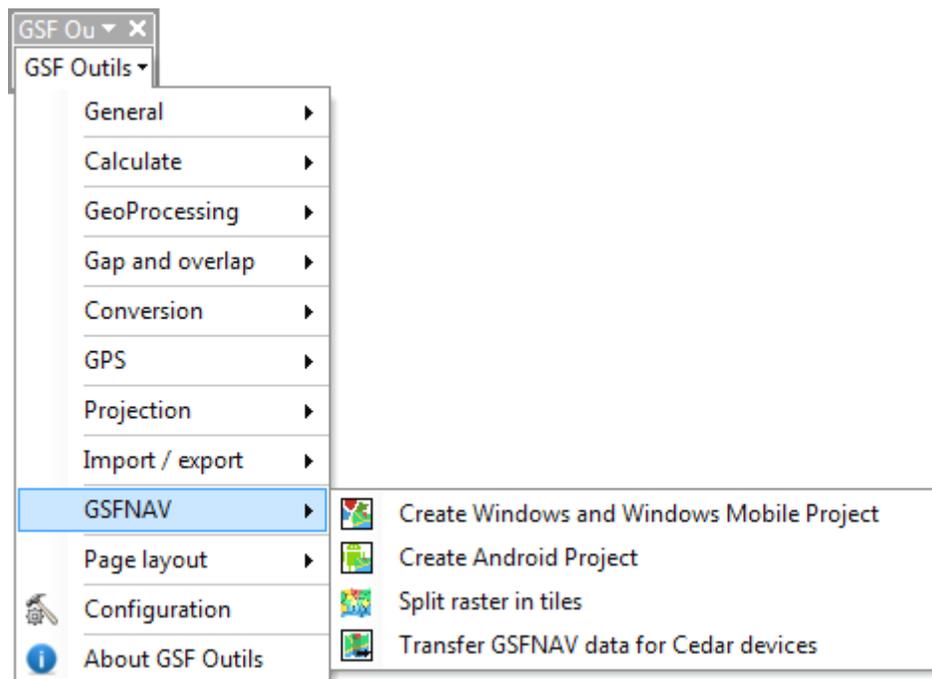
Identifier	Description
IMG	Image
ppp	Satellite position referring to the path
rrr	Satellite position referring to the row
YYYY	Acquisition year of the image
MM	Acquisition month of the image
DD	Acquisition day of the image
.Tif	File extension (.tif)

This allows for an easier way to compare images covering the same area at different dates.



## 12 « GSFNAV » MENU

This menu contains specific features for the GSFNAV application. These functions create a map for GSFNAV Windows, Windows Mobile or Android, to divide the image in 'Tif' format in many tiles in order to accelerate the shifting of the images to the Android device or to transfer the Shapefiles to GSFNAV Android.



### 12.1 CREATE WINDOWS AND WINDOWS MOBILE PROJECT

This function creates a map for GSFNAV Windows or Windows Mobile.

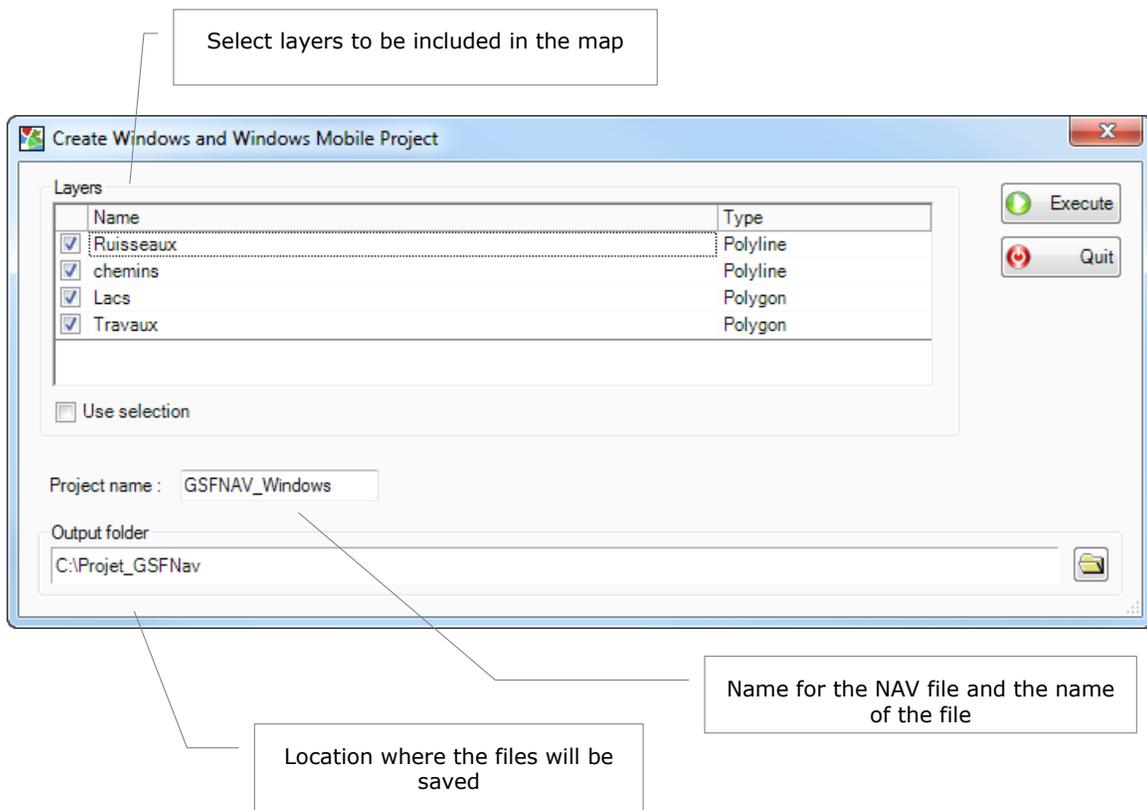
The ‘Layer’ section allows to select the layers to be included in the map. The layers of the map will have the same symbology as the ones from the properties of the layer except for the complex symbology.

The ‘Use selection’ option creates the map based only on the selected entities.

The ‘Name of the project’ is essential to name the NAV file and the file.

The ‘Output folder’ section specifies the location where the files will be saved. The file can only contain a single map.

The function saves the “NAV” file and other files needed for the map to a folder with the same name as the project. This folder must be copied to the device in the following location « C:\Projet\_GSFNav ».



## 12.2 CREATE ANDROID PROJECT

This function creates a map for GSFNAV Android.

The ‘**Layer**’ section selects the layers to be included in a map. The map layers will have the same symbology as the ones of the properties of the layer except for the complex symbology.

The layers should have the same coordinate system as the data frame.

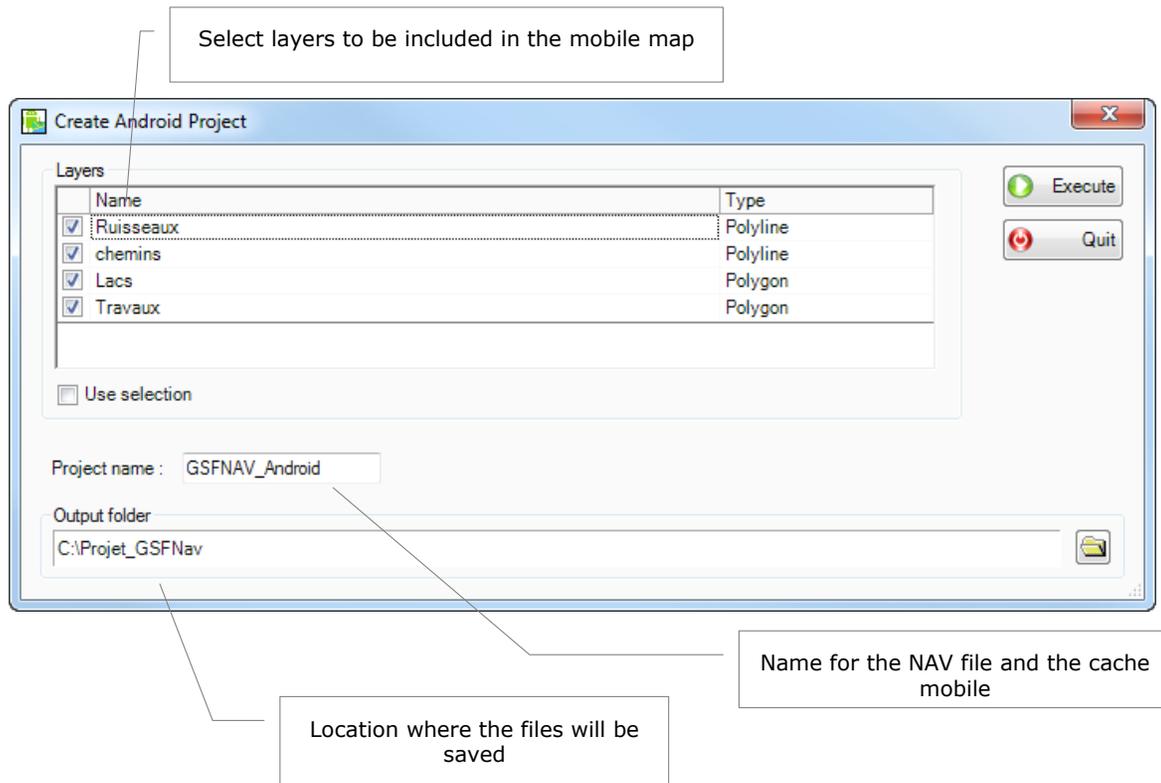
The ‘**Use selection**’ option creates a map based solely on the selected entities.

The ‘**Project Name**’ is essential to name the NAV file and the folder.

The ‘**Output Folder**’ section specifies the location where the files will be saved. The file can only contain one map.

This function generates two files with the extension « .NAV » and « .GEO ». These two files will be copied into the folder « GsfMaps » directly on the device Cedar.

Consult the « GSFNAV for Android » document for more information on the transfer of the map.



### 12.3 SPLIT RASTER IN TILES

The « **Split raster in tiles** » function improves the display performance of an uncompressed image for GSFNAV or for any other application. The original image can be in Tif, Bil ou ECW format.

This function divides the image into several other smaller images based on a number of pixels to split the image. The number of pixels defines the size of the tiles.

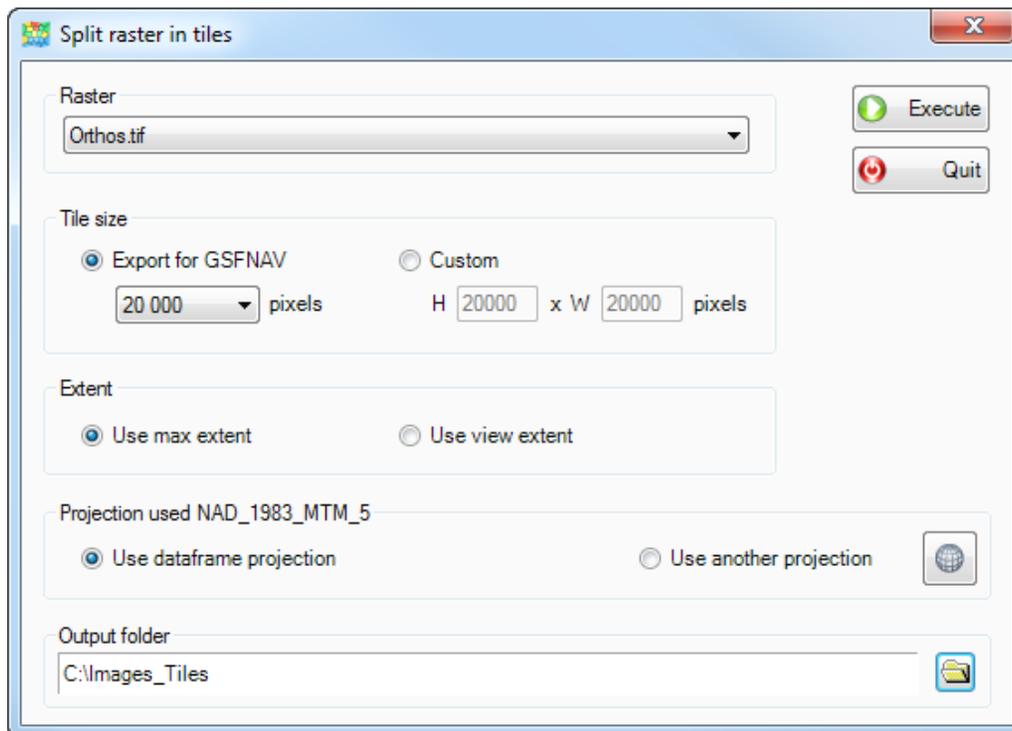
The '**Raster**' section selects the image to be treated.

Two methods are available to split the image. The **Export to GSF NAV** method contain three sizes of tiles (10000, 15000 or 20000 pixels) while the **Custom** method can manually identify the number of pixels that must contain an image in height (H) and width (W).

The "**Extent**" section determines the size of the image to be processed. The image may be divided using the maximum extent of the image or the extent of the view.

The "**Projection used**" section determines the coordinate system of the resulting images. For GSFNAV, it is necessary that the projection is the same as the maps because no layer is projected on the fly.

The "**Output folder**" section is to specify the folder where the images will be saved. These will be contained in a folder named "**Tiles**". A new folder is automatically created when the function is executed a second time.



**12.4 TRANSFER GSFNAV DATA FOR CEDAR DEVICES**

The « **Transfer GSFNAV Data** » function transfers shapefiles and « TIF » images to the Cedar device. The device must be on for this function to be used and to be used in mass storage mode.

The projection of the layers and images must correspond to the projection of the map and the device Cedar map.

The "**Cedar device/ memory**" section automatically detects if the device is connected to the computer before opening this function. The "**Device Path**" section displays the letter of the port.

The « **Detect Cedar device** » button must be activated if the connexion wasn't established.

The procedure is to select shapefiles and images in the dropdown menu and to activate the command to add them to the "Layers to import" sidebar.

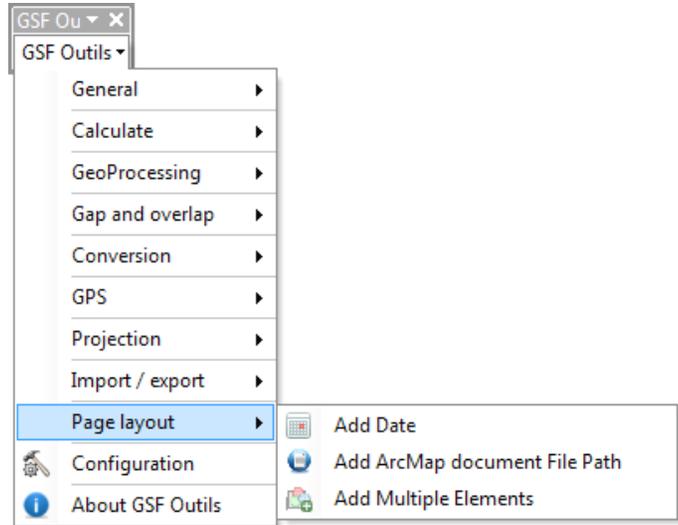
Buttons	Description
	Adds the selected layer in the sidebar to import it to an Cedar Android device
	Removes the layer from the list



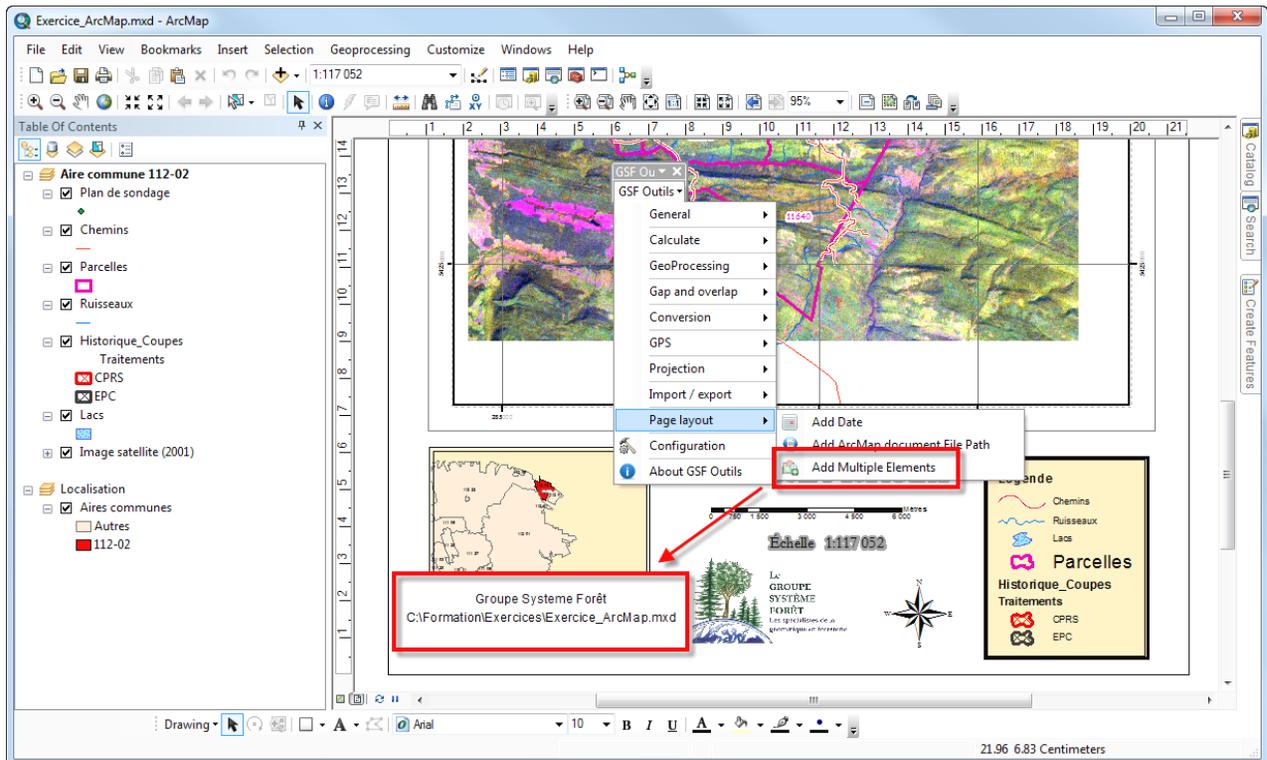


### 13 « PAGE LAYOUT» MENU

The "Page Layout" menu contains three features to automatically add the predetermined layout text of a map. Since ArcGIS 10, these parameters are available in dynamic text in the "Insert" menu.



The elements are positioned on the left bottom corner of the layout. It is possible to select and move with the black slider. Their font, size and format can be changed manually since they are graphic objects.



### 13.1 ADD DATE

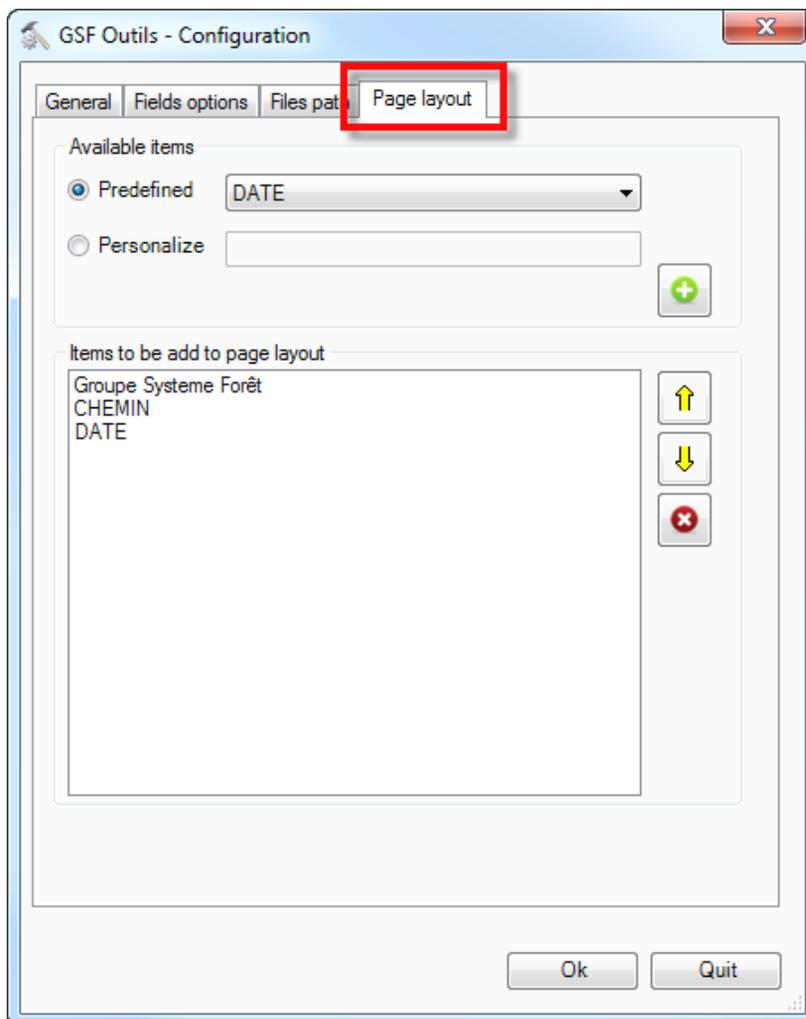
The date is added to the layout in the year-month-day (YYYY-MM-DD) format.

### 13.2 ADD ARCMAP DOCUMENT FILE PATH

This function adds the path and name to the ArcMap document (\*. Mxd) of the current map path.

### 13.3 ADD MULTIPLES ELEMENTS

This function adds the elements identified in the Setup menu in the **"Layout"** tab. This section is detailed in section 3.4 on page 25.



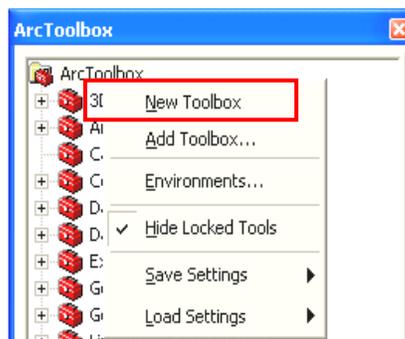
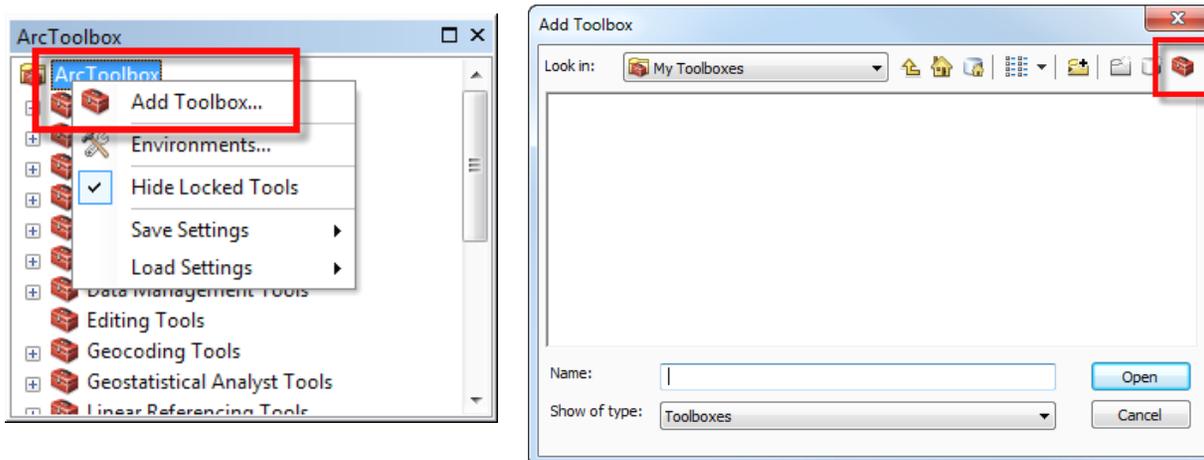
## 14 ARCTOOLBOX FUNCTIONS

Some features of GSF Outils will eventually be available as a tool in ArcToolbox. Currently, only the **"Erase intersection"** function has been converted.

The tool must be added to a custom toolbox to make it available in ArcToolbox.

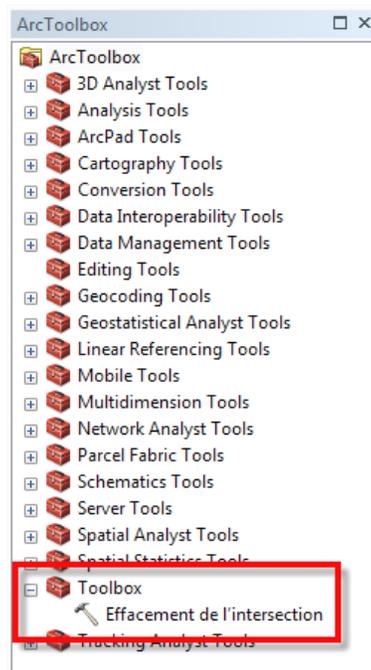
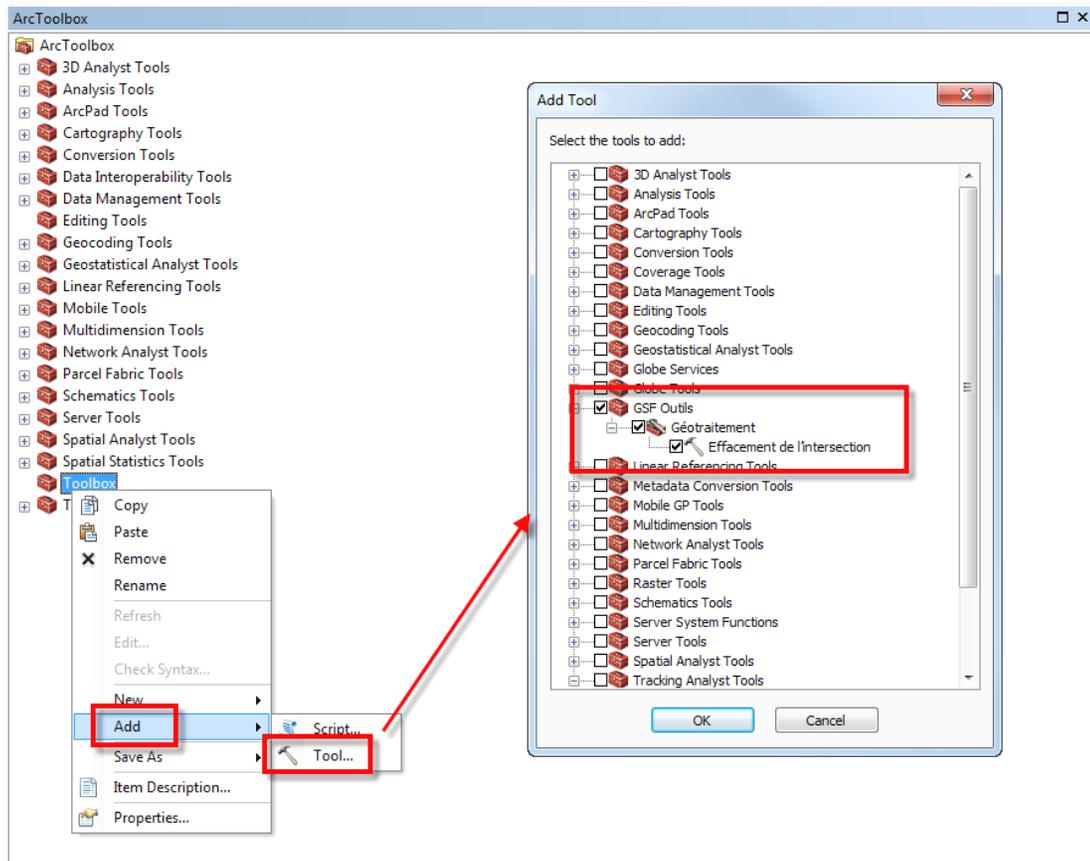
In ArcGIS 10.x, creating a new toolbox is carried out in the window **"Add a toolbox"**.

In ArcGIS 9.x, the **"New Toolbox"** function is available in the context menu of ArcToolbox.



Thereafter, open the context menu in the toolbox and select **Add and Tools** to add the "Erase intersection" tool written in French (Effacement de l'intersection).

In the list of available toolkits, "GSF Outils" must be checked in to add the function in the custom toolbox.

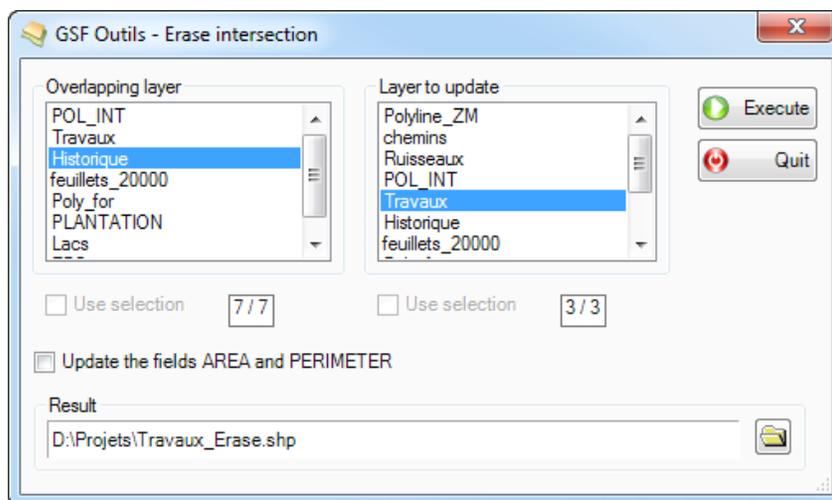
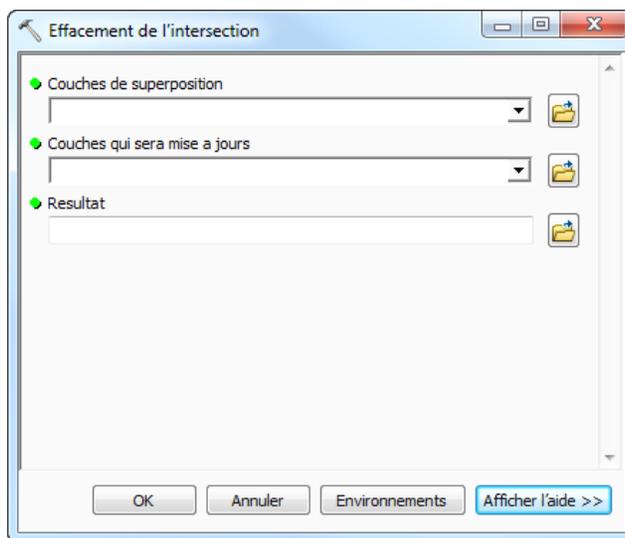


The tool parameters are the same as the functions available in the "Geoprocessing" GSF Outils menu.

The "Overlay Layer "(Couches de superposition) section allows you to select the layer that will be used to remove features to another layer.

The "Layer that will be updated" (Couche qui sera mise à jour) section corresponds to the layer whose features or parts of features should be deleted.

The "Output" (Resultat) section specifies the location and name of the new layer.





## 15 PROBLEMS AND SOLUTIONS

### 15.1 GPS GARMIN DOES NOT CONNECT

When using functions requiring the transfer with a Garmin GPS, several causes can interfere with the connection. Please proceed to check in the following order:

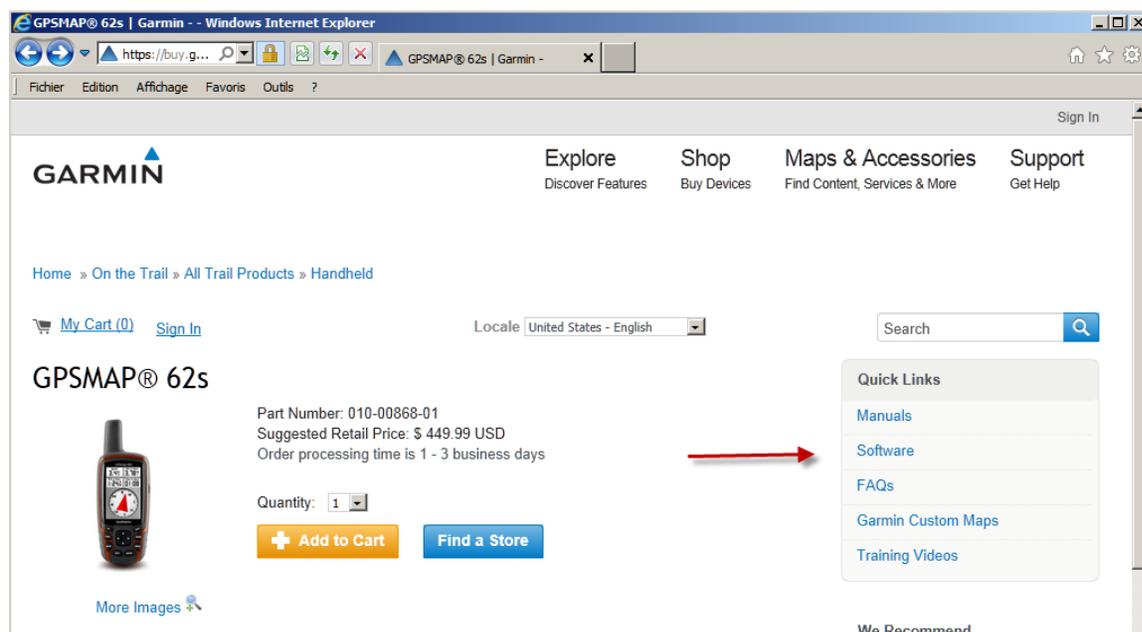
- Check the connection type specified in the function parameters (USB or serial port)
- If the GPS uses a USB connection, check if the drivers on your computer are up to date by downloading from the manufacturer's website, the most recent drivers. If you are not sure of the current version, proceed to the installation anyways.
- Check the type of interface that is defined in the GPS for the transfer. It must be in the GARMIN format. To change or check, choose **Settings, Interface and Serial Data Format** into "Garmin."



## 15.2 PROBLEM WHEN TRANSFERRING THE GPX

If you get problems when transferring GPX file, it is important to check the firmware version that is in the GPS. It is possible that installing the latest version solves the problem.

To check the version of your firmware, press the **Menu, System and About** keys. Thereafter, see the section about GPS model on [www.garmin.com](http://www.garmin.com) and then the Software section. On this page there should be the latest firmware version of GPS software and links to the update.



## 16 VERSIONS

### 16.1 VERSION 8.3 (MAY 27 2003)

- Modification of the development for the use of the library objects. NET.
- Added function "Calculation of X and Y coordinates."
- Added the "Update polygons" function.
- Added the "Clearing the intersection" function.
- Changes the Transfer GPS function
  - Add the option « Generalization of lines and polygons».
  - During the transfer to ArcMap, deleting the message points or lines that are not all transferred.
- Windows GSF Outils always stay ahead of the ArcMap window.

### 16.2 VERSION 8.3.1 (JUNE 2003)

- Added the "Transferring features" function.

### 16.3 VERSION 8.3.2 (APRIL 2004)

- Added the "Deleting multiple fields" feature.
- Added the "Visibility fields" function.
- Fixed the issue where there was a raster in the first row in the table of contents.
- Acceleration of GPS connection.

### 16.4 VERSION 8.3.3 (AUGUST 2004)

- Fixed the problem where the file extension (DLL) did not record automatically.
- Fixed the problem where the fields have an alias in the "Visibility fields" function.
- In the "Deleting fields" function, deleting fields detects if there is an opened editing session.
- Correction of the problems caused by the French supplement by checking if the layer was a Shapefile or feature class (a Geodatabase) ArcGIS.
- GPS transfer:
  - Improved the graphic interface
  - Transfer via USB, auto-sensing serial port more efficient
  - Validate data sent to the GPS to avoid the transfer of erroneous data
  - Added a progress bar to indicate the evolution of data transfer
  - Added a GPS preferences menu

### **16.5 VERSION 9.1 (JANUARY 2005)**

- Windows interface redrawn according to a standard of quality to maintain consistency and better understanding of users.
- Added icons to the main menu.
- Test functions on ArcGIS 9 and modify are not compatible functions.
- Management of ArcInfo, CAD and other layers read-only mode.
- Validate the "Clearing the intersection" function and add a check box to recalculate the perimeter and area.
- Activate the function "Update polygons" and add a check box to recalculate the perimeter and area.
- GPS Transfer (Garmin) :
  - Add better management of the "ID" and "Comment" fields connected between the GPS and the Shapefile in the function.
  - Add the color of draw option when sending a GPS color.
  - Add a management of the symbols displayed during the transfer of the Waypoint to the GPS.
  - Sends a path directly into the GPS "Active Log".
- Add the "Detection overlays" function.
- Add the "Creating Shapefiles" function.
  - Import fields from another Shapefile or ArcInfo coverage.
  - Makes possible to determine a projection or use the projection of the Data Frame.
- Allows including or excluding residual layer update layer that will be updated in the "Update polygons" function area.

### **16.6 VERSION 9.1.2 (JANUARY 24 2005)**

- GPS Transfer:
  - Enables the function of transferring directly to the "ACTIVE LOG" GPS.
  - Management of the values "NULL" when transferred to the GPS.
  - Allows the backtracking on the Shapefile design grid.

### **16.7 VERSION 9.1.3 (FEBRUARY 11 2005)**

- Possibility of a generalized vertex on a layer without projection.
- Improved the detection of layers with non-editable data.
- Added the function "Area of elements"
- Added the management of the "Esc" key to stop ongoing treatment.

### **16.8 VERSION 9.1.4 (JULY 27TH 2005)**

- Added the "Division of a layer" function.

**16.9 VERSION 9.1.5 (SEPTEMBER 30TH 2005)**

- Added a toolbar in ArcCatalog containing a function to import domain of unique values.
- Added the possibility to calculate the area in square meters or hectares.
- Verify the projection of the Data Frame before calculating the "Area/length" and "X and Y coordinates" and in all functions that update the size of elements to avoid to get results in decimal degrees.
- Validation during the creation of layers to avoid an error in the results when two or more fields have the same name. Two or more fields may have the same name as the seed layer from a GeoDatabase and the first 10 characters of some fields are the same and the result is stored in Shapefile format. The field names of the Shapefile must not exceed 10 characters.
- Added the "Metadata ArcMap document" function.
- Added validations for compatibility fields in the "Transferring entity" function.
- Fixed problem when reading the layers inside a group layer.

**16.10 VERSION 9.1.6 (JANUARY 19TH 2006)**

- Added the "Tool PRAIF" function.
- Added the "Correction of gaps (GAP)" function.
- Added the "Correction overlays" function.
- Added the "Creating buffer zones" function.
- Added a function to include the "GSF" menu to the context of the layer menu.
- Changed the management projections in the GPS transfer function.

**16.11 VERSION 9.1.7 (MARCH 29 2006)**

- Added the "Grouping layers" function.
- Validation for the permission to publish a layer according to the data type (Shapefile, GeoDatabase, EPS).
- Fixed a problem in the "Transfer of features" function against possible null values in the data.
- Validation for empty fields and special characters in the field value when creating layers results for the "Division of layers" function.

**16.12 VERSION 9.1.8 (APRIL 12TH 2006)**

- Added export function in MobileMapper Office format.
- Fixed a problem in the explosion of multiple geometries function, the area was calculated even for a line layer, which is impossible.
- Fixed a problem in the simplification of certain geometries in ArcGIS 8.2 and ArcGIS 8.3.

**16.13 VERSION 9.1.9 (MAY 16 2006)**

- Changed the menu to combine the functions of GSF Outils by type.
- Added the "Locating overlays" function.
- Updated the "Transfer GPS" function to the 60Cx, 60CSx, 76Cx and 76CSx models.
- Fixed a problem of simplification of results in the "Detection overlays" function and allows the treatment on selection.
- Correction of the "Elimination of gaps" function to ensure that all polygons are processed.
- Verify if there is a set on the Data Frame in the "Tools PRAIF" function to avoid possible errors when processing projection.

**16.14 VERSION 9.1.10 (JUNE 19 2006)**

- Fixed a problem when opening the interface of the Garmin GPS transfer function.
- Added the "Browser records" function.
- Correction of the "Elimination of gaps" function.

**16.15 VERSION 9.1.11 (AUGUST 10 2006)**

- Added an import function in MapSource maps.
- Added a function to create raster catalog.
- Added a configuration interface.
- English / French (choice available from the configuration interface).
- Correction of the transfer in the Garmin GPS function:
- Detecting the availability of the port to prevent unexpected closure of ArcGIS.
- Detection of the projection of the layer in relation to the block of data causing incorrect positioning of the elements transferred.

**16.16 VERSION 9.1.12 (SEPTEMBER 19 2006)**

- Added the projection definition function.
- Added the change of projection function.
- Added the Export / print function.

**16.17 VERSION 9.1.13 (OCTOBER 16 2006)**

- Added a function to create a Garmin file.
- Fixed the GPS function to transfer X models from Garmin, the traces are no longer connected to each other.

**16.18 VERSION 9.1.14 (NOVEMBER 24 2006)**

- Added a function to create a Google Earth KML file.
- Added the ability to obtain the result of calculation of XY coordinates in decimal degrees or degree minute second.
- Fixed an issue for Garmin image creation connected to the use of a long file name.
- Improved the management of the use of the comma as a decimal separator.

**16.19 VERSION 9.1.15 (JANUARY 15 2007)**

- Added the "Corrections nodes" function.
- Added "Ship file \*. Img GPS" function.
- Correction and improvement of multiple functions.
- Management of definition queries.
- Better management of the audit writing permissions in the output directories.
- Added different width line in Garmin imaging function.

**16.20 VERSION 9.2.1 (APRIL 23 2007)**

- Migration of the programming of objects to the 9.2 version of ArcGIS.
- Implementation of geoprocessing functions to improve processing speed.
- Added options in the functions of gaps elimination and overlays correction.
- Added an option in the calculation of area length function.
- Function area of interactive elements.
- Added the "Standardization of polygons" function.
- Added the "Checking geometry" function.
- Added the "Import GPX file" function.
- Added the "Calculation of the angle of a line" function.
- Added the "Cut polygon with line" function.
- Correction of the "Creating buffer zone" function, improved execution speed.
- Remodeling of the main interface, grouping of menus according to the categories of tools.
- Fixed problems in the functions of elimination of gaps and correcting overlays.
- Verification of the compatibility with ARCGIS 9.2 service pack 2.

**16.21 VERSION 9.2.2 (AUGUST 23RD 2007)**

- Fixed a problem related to the creation of Garmin image on layers of polygons with holes or multiple geometries (multi parts).
- Fixed a problem in the functions "Erasing intersections" and "Updating polygons" when using paths of long temporary folder.
- Added a parameter to delete segment in the "Correction nodes" function.
- Added an expert mode in the creating Garmin image function to manage the display of features according to a predetermined level in the GPS.
- Added a layout menu including three predetermined items that can be added to the layout of a map-> Date, Path and Adding multiple configurable items in the setup menu.
- Fixed a GPS connexion problem in the "GPS Transfer" menu depending on the version of ArcGIS.

**16.22 VERSION 9.2.3 (FEBRUARY 18 2008)**

- Better management of gaps when creating a GARMIN picture.
- "Creating a \*. Garmin img"
  - Added the option to select a GPS model to manage the colors on the model of GPS.
  - Added a profile management function to save the colors chosen by the name of selected data layers.
  - Fixed an issue related to the use of generalization when creating a Garmin file
- Added a function in "Ship GPS maps" to manage GPS mass storage models such as Garmin Colorado model.
- Added an option to create GPX in the KML creation function.
- Added the Delete intersections function that it is accessible by the ArcToolbox tools.
- Added the "Insert Image" function to insert an image file in a view in its scale and its coordinates.
- Added an "Edit" menu in the Context of the data layers menu to start editing the context menu.
- Fixed a problem when adding the date in layout mode.
- Fixed a problem in "Exporting and Printing" function when moving the field containing the FID or the ObjectID.
- Added an insert button in the field of creation of Shapefile function.
- Fixed a problem in the "Calculation of angles" function.
- Added management of projections in the "Grouping layers" function.
- Change in the "About" window for an easier reading of the license number.
- Better management when using multiple levels of group layer (layer group).

**16.23 VERSION 9.2.4 (DECEMBER 12 2008)**

- Added the calculation of the length of strings in the "area of elements" function.
- Added a checkbox "Add results to the view" in "Dividing a layer."
- Change of Icon in the "Transfer GPS" window for better management.
- In the "Create Image Garmin" feature:
  - Added the checkbox "Create images one by one."
  - Added the checkbox "Use the colors of the view."
  - Added the color management function according to a single attribute in a selected field.
- Added the profile management which can save a list of files to send to the GPS function in the "Ship a \*. Img GPS."
- Added a custom color management function in the "Import a MapSource map" function.
- Support the 6.14.x version of MapSource.
- Fixed a problem related to the import and export of GPX file.
- Added the "Run external application" function.
- Added the option of calculating the elevation (Z) in the "Calculation of X / Y coordinates" function.
- Added the option "Hide non visible fields" in the Navigator Records function.

**16.24 VERSION 9.2.5 (OCTOBER 7 2009)**

- Added the creation of personal Geodatabase Shapefile in the creating function.
- Added the "Rename layers of the same name" function.
- Added the "Creating Garmin interest points" function.
- Added the "Importing MapInfo File" of MIF and TAB files function.
- Added the possibility to export MapInfo format in the "Export/print" function.
- Added the "File Import Garmin" Img file created by GSF Outils from the 9.2.5 release.
- Corrected a problem related to the layers of points on the 9.3 version of ArcGIS in the "Browse records" function.
- Added a function that reduces the interface to the minimum in "Browse records".
- Added the "Sort Fields" function in "Add GSF menu".
- Added the "Stop editing" function in "Add GSF menu".
- Applied the "Add GSF menu" tables.
- Added the "Clearing polygons" function including the elimination of isolated polygons.
- Added the "Converting DMS in DD" function in Degree minute second in decimal degrees.
- Changed the "Create a file (\*. Img) Garmin" function to increase the speed of execution on large files.
- Changed the "Create a file (\*. Img) Garmin" interface to select the GPS communication port.
- Changed the "Ship maps GPS (Garmin)" interface to select the GPS communication port.
- Changed the "Creating map for MapSource" function to increase the speed of execution on large files.
- Added the option to export in KMZ format in the "Export to Google Earth KML / KMZ / GPX" function.
- Added the possibility to export the ARCGIS view in image in the "Export to KML / KMZ / GPX Earth" function.
- Added options to import KMZ and KML format in the "Import GPX / KML / KMZ file" function.

**16.25 VERSION 9.2.6 (FEBRUARY 8 2010)**

- Added the "Add points" function.
- Added the "Creating centroid " function.
- Added the "Compress and send" function to the GSF menu.
- Added the "Calculation of weighted area" function.
- Added the "Merge with the longest shared outline" option in the "Removing polygons" function.
- Added the interface that can communicate with the Garmin Oregon and Colorado in the "GPS Transfer" function.
- Change in the "GPS Transfer" function and added the possibility to transfer data across multiple GPS.
- Added the "Export the image view" function in the "Garmin Imaging" interface to ship satellite imagery to the Oregon, Dakota and Colorado GPS.
- Fixed a problem of split view when creating maps for MapSource.
- Additions to the "Import photos" function to import images files containing GPS coordinates of a point layer.
- Additions to the "Importing Google image" feature to add an image (screenshot) from Google Earth to the active ArcMap view.
- Changed the "Converting Online Point" function to add the option to convert into polygons from the point layers
- Added an option that can combine the items in a maximum distance between two points in the "Converting online point/polygon" function.
- Added the server mode to work with the Windows Server mode.

**16.26 VERSION 10.0.1 (MAY 16 2011)**

- Updated the interface for ArcGIS 10.
- Fixed the location of the latitude and longitude informations in the interface to add points.
- Fixed issue in "Creating raster catalog" when adding image without projection.
- Added the option degree, minute, decimal in the function of calculation of X, Y, Z.
- Fixed a problem in PRAIF tools in the detection of inter-geometry proximities.
- Changed the description of the options in the Elimination of polygons function.
- Improved the polygon line function, possibility of interactive mode and adding the result to a layer already present, improving the algorithm of process.
- Improved interface for the communication with Garmin GPS new generation.
- Addition of the option Transfer of the symbology point and adding symbology correspondence between former X models and the new generation of GPS in GPS transfer function.
- Corrected the problem when importing GPS and GPX, when the paths name were not transferred.
- Corrected a problem of communication with older GPS serial models and USB (not the X model).
- Adding a marine GPS mode for the new generations ex: 521, 421, 526, etc. (Forest machinery) in the Garmin image creation function.
- Improve the management of the customized colors in the Garmin image creation function.
- Improved the management of layers levels display in the Garmin image Creation function.
- Improved the shipping of maps to the GPS functions.
- Fixed a problem of Garmin image numbering when created frame by frame.
- Improved the shipping of the GPS map interface.
- Added the shipping map management to the Garmin new generation.
- Fixed an issue when creating Garmin maps, images were not all transferred to the card.
- Fixed the import of the name of track in the import GPX function.
- Added the GDP import file (MapSource file) in the GPX import function.

**16.27 VERSION 10.0.2 BETA 2 (SEPTEMBER 8 2011)**

- Problematic importing GPX and GPS transfer (GPX file):
  - Change the method to accelerate the transfer under 9.2 and more recent versions and allow reading all styles of GPX files using the new firmware.
  - Solve the problem of decimal separator for GPX and others.
- Fixed the problem of creating buffer on line by adding a validation of multi-parties.
- IMG file creation:
  - Validation of the GSF colors on the 62, 78 models and other new firmware.
  - Changed the width of lines because they were too thin and one or two colors were not corresponding anymore.
  - Adjustment for the Garmin GPS Oregon color because it was not corresponding to 62 and 78.
- PRAIF Tools:
  - Added a quick and thorough method for intra and inter geometry.
  - For the inter-geometry result, the error is at the center between the two polygons in default.
  - The result suggests a small intra-geometry polygon that fills the part in error.
- Ship card to the GPS:
  - When deleting cards for the GPS new generation, add an option to choose which cards to erase while validating that this is not official Garmin cards (BaseMap).

**16.28 VERSION 10.0.2 BETA 3 (JANUARY 2012)**

- Integration of the Tables Management application in the main menu.

**16.29 VERSION 10.0.3 (FEBRUARY 2013)**

- Compatibility with version 10.1 of ArcGIS and Windows 8.
- Added tooltip on the menu functions.
- Fixed a problem in the "Create Feature Class" function related to the use of GeoDatabase files.
- Fixed various issues related to the "Managing tables and layers" function.
- Added Rename function in the "Managing tables and layers" interface.
- Fixed a problem when sorting fields in the Delete and Visibility of the fields function.
- Fixed a problem when adding the identifier to a new field in the "Add unique identifier" function.
- Fixed an issue related to the use of the Import Google Earth image function and the French versions of Windows.
- Fixed an issue related to the use of the "Calculation of area, perimeter and length" function on the selected features.
- Added a validation of the use of the Data Frame projection.
- Added the Validation of current editing session when using functions.
- Fixed a problem in the "Detection overlays" function, the identifiers (ID) of the features were not well defined.
- Fixed issues related to the use of Windows username containing accents or special characters.
- Improved the algorithm of the "Creating buffer zone line" function.
- Improved the algorithm of the "Elimination of polygons" function.
- Fixed problems on the "Tools PRAIF " function, the vertex were removed in double when correcting geometry.
- Improved the algorithm of the function "Elimination of gaps".
- Fixed an issue related to the use of data layer's name with special characters.
- Fixed a problem with the "Convert feature class Z or M to 2D" function.
- Fixed a problem in the "GPS Transfer" function and "Import GPX files" function on defective GPX files.
- Fixed a problem in the "GPS Transfer" function to import point Z.
- Added configuration options to maximize the creation of very large Garmin file data layers.
- Added new colors of polygons and lines to create Garmin file using the marine model option.
- Changed the interface of the "Exporting and printing attributes" function.
- Fixed an issue related to the use of layer name that were longer than 30 characters when exporting to Excel on the "Exporting and printing attributes" function.
- Fixed an issue related to the use of the Windows temporary folder and ArcGIS 10.1.

**16.30 VERSION 10.2 (AUGUST, 29 2014)**

- New function "Editor FoxPro" in the « General » menu
- New function "Create a gaps layer » in the « Geoprocessing » menu
- New function "Import images Landsat 8" in the « Import/Export » menu
- In the function "Transfer Features", add transfer to tables
- Fixed some problems in some functions
- New function Create mobile Cache
- GSF Tools 10.2.004 is compatible with ArcGIS 10.3

**16.31 VERSION 10.3 (JULY, 20 2015)**

- Adding a new group Menu « GSFNAV »
  - New function « Create Windows and Windows Mobile Project ».
  - New function « Create Android Project ».
  - New function « Split raster in tiles »
  - New function « Transfer GSFNAV data for Cedar devices »