



swisstopo TRANSINT for FME

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1 Introduction

TRANSINT is a software for planimetric transformation and interpolation of points, designed for surveying and geodetic purposes.

This product supports several transformation and interpolation methods:

- Translations
- Translations and rotation
- Translations, rotation and scale (similarity)
- Affine transformation
- Interpolation with “TRANSINT” method, which considers the correlation between the adjustment points
- Interpolation with modified Shepard’s method
- Interpolation based on triangular networks (“FINELTRA”)
- Interpolation based on regular grids

TRANSINT is originally designed for the comparison of geodetic networks or adjustments with existing fixed points, but it can also be useful for local adjustments during the reference frame change LV03 to LV95.

TRANSINT supports several formats like ESRI Shape, Interlis, DXF, swisstopo LTOP, Topobase, Excel CSV, text) and can also be used as batch tool through command line.

For more information about TRANSINT software, please refer to our website:

→ <http://www.swisstopo.ch/geosoftware>

And for technical aspects about Swiss reference frames and particularly LV95:

→ <http://www.swisstopo.ch/lv95>

As explained above, TRANSINT supports several file formats. However, in order to allow the transformation of many additional file types and also to facilitate the transformation of geodata stored in databases or the integration in processing chains (like an online cartographic desk), swisstopo has developed a version for FME software. This tool is provided as a plug-in which adds a new manipulator/reprojector in the FME environment.

2 Minimal system requirements

- Hardware and operating system: same requirements as FME software (compatible with 32 and 64-bit OS)
- Software: Safe Software FME (“Feature Manipulation Engine”) Professional Edition (or extended, like ESRI, Intergraph or Oracle editions), Microsoft .NET Framework 4.0 (or further), Microsoft Visual C++ 2010 redistributable package, swisstopo TRANSINT DLL (provided free of charge with TRANSINT for FME) and optionally a PDF file viewer¹ for reading this manual on screen.

The TRANSINT plug-in has been successfully tested with 32bits versions of FME 2012 and 2013, but should be compatible with all versions since 2010.

3 Installation

Swisstopo delivers a standard MSI setup which installs all required files and automatically configures FME. You just have to execute the executable file you find on our website and follow the onscreen indications.

To optimise file size and download time, we did neither integrate the Microsoft Windows Installer engine, nor the Microsoft Windows .NET Framework, nor the Microsoft Visual C++ 2010 redistributable package. If they aren’t already installed on your computer, they will be automatically downloaded² and installed.

After the installation’s process, you’ll find a shortcut to a PDF version of this manual in the Windows start menu.

TRANSINT for FME is composed of two components: the TransintReprojector which is the FME plug-in (Manipulator) and the Transint Reprojector Manager which is an additional standalone configuration tool.

Please beware that there are separate installers for x86 (32-bit) and x64 (64-bit) versions of FME.

Note: if you can’t find the TRANSINT transformer like described below, it may be that setup couldn’t find the FME installation directory or that there is a file access restriction (e.g. not enough rights). In this case, you can install the plug-in manually:

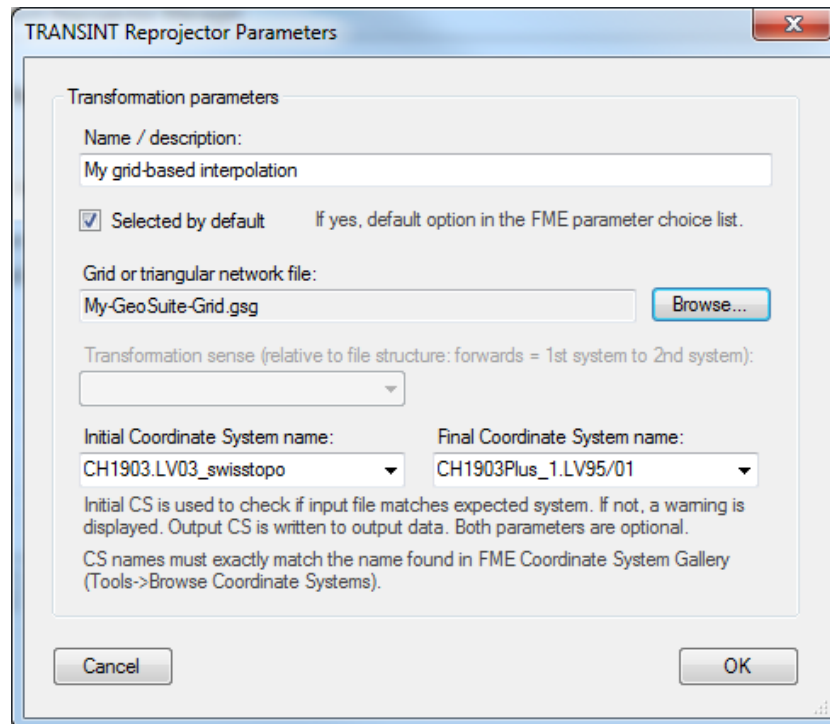
1. Copy the file “transintreproject.dll” from the TRANSINT plug-in installation directory to the “plugins” FME subfolder (by default: “C:\Program Files\FME\”)
2. Copy TransintReprojector.fmx” from the TRANSINT plug-in installation directory to the “transformers” FME subfolder
3. (Re)start FME

¹ Adobe Reader can be downloaded free of charge : <http://www.adobe.com/pdf>

² They can be obtained through the Windows Update service or downloaded manually : <http://www.microsoft.com/downloads>

4 Configure the TRANSINT transformer / define transformations

In order to be able to perform a calculation with TRANSINT in FME, you have to define one or more transformations/interpolations. This must be done with “**Transint Reprojector Manager**” application. A shortcut to this program can be found in the Windows Start menu (under “swisstopo” folder). Otherwise you can find the executable in FME home directory, under “\plugins\transint\”. This tool allows you to add, edit and remove transformations. You can also edit the order in which they will appear in the Reprojector parameters in FME.



The transformations that will be available in FME must be set with the “TRANSINT Reprojector Manager” application

Following parameters are available:

- Name / description:**
 The name or description of the transformation. This will be the text displayed in the FME TransintReprojector Parameters window, under “Transformation parameters”. This name should be unique and comprehensive for the FME user.
- Selected by default:**
 If this checkbox is checked, the current transformation will be set by default in FME: it will be the initial parameter when a TransintReprojector is added to a workspace.
- Grid or triangular network file:**
 The regular interpolation grid file in GeoSuite binary format (*.gsg) or the triangular network file in FINELTRA binary format (*.bin) that contains the definition of the transformation/interpolation to perform. The file will be copied to FME home directory.
- Transformation sense:**
 Only applicable if the transformation is based on a triangular network. This parameter defines the FINELTRA calculation sense. It depends on the systems definition order in the FINELTRA binary file (*.bin). “Forwards” means that the transformation goes from the first system to the second. Reverse for “Backwards”.

- **Initial Coordinate System name:**

Optional.

If the current transformation/interpolation should be applied only to data in a specific Coordinate system, you can define it with this parameter. If the reprojector input data (e.g. Reader) system doesn't match this setting, a warning will be displayed.

The value in this field must be a FME Coordinate System name, as listed in the "Coordinate System Gallery" (menu "Tools").

- **Final Coordinate System name:**

Optional.

If the current transformation/interpolation produces a Coordinate system change, you can define it with this parameter. The Coordinate System of the reprojector output data (e.g. Writer) will be updated to this value.

The value in this field must be a FME Coordinate System name, as listed in the "Coordinate System Gallery" (menu "Tools").

Click "Cancel" to quit without saving the changes, "OK" to commit the modifications to the FME TransintReprojector. If one or more transformations/interpolations have been set, they will be available in the FME TransintReprojector Parameters. **If FME is running, you will need to restart it to see the changes.**

If you are experiencing difficulties to validate changes, try to restart the Transint Reprojector Manager as administrator: some files must be updated in the FME installation directory, which is usually write-protected for standard users.

5 Using the TRANSINT transformer in the FME workbench

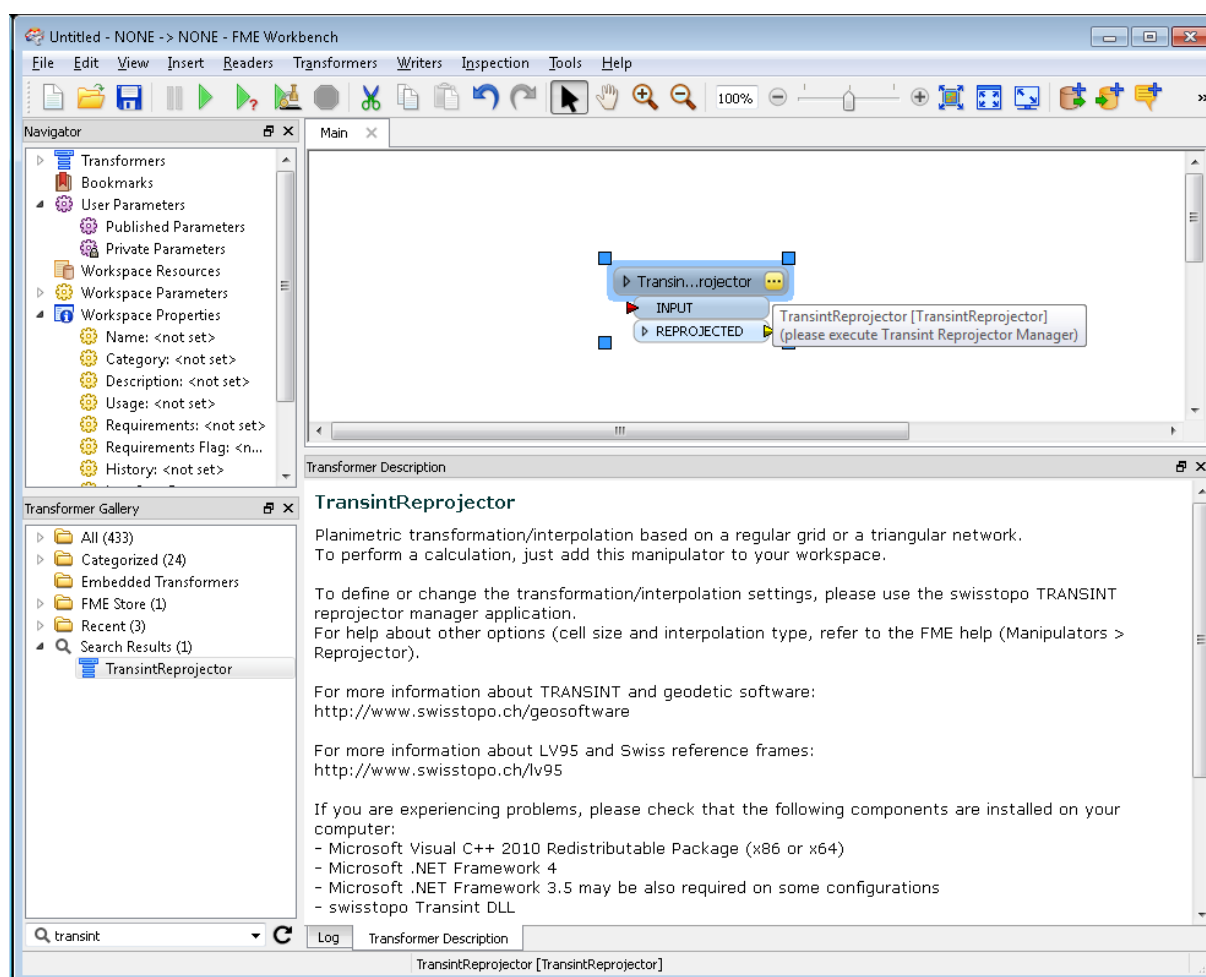
5.1 Add a new transformer

The easiest way to add a TRANSINT transformer in a workspace is to get it from the "transformers" panel (menu "View - Windows - Transformer Gallery"). **You can find it in the "Manipulators" category, with the name "TransintReprojector".**

The fastest way to get it is to enter "transint" in the "Search" textbox at the bottom of the panel and press "Enter" (or "Find" button).

You can double-click on the "TransintReprojector" item or drag and drop it to the Main view, and you are ready to use it!


In order to integrate a TRANSINT transformation in your project you just have to connect it with input and output data or other transformers, as you do for every FME standard component.

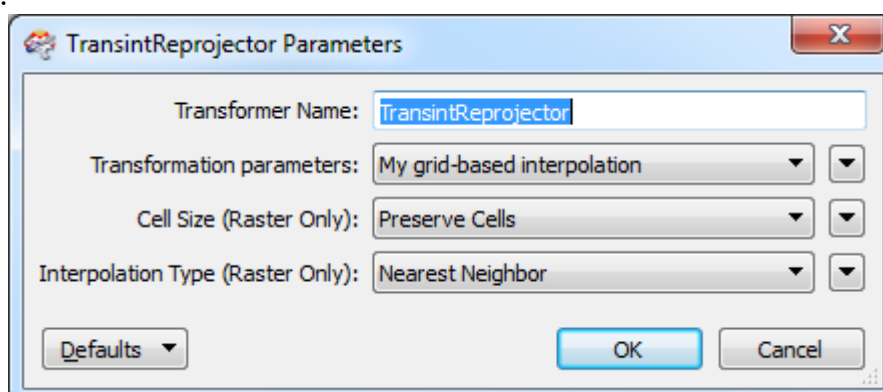


The TRANSINT plug-in is installed as a manipulator named “TransintReprojector”

5.2 TRANSINT parameters

You don't have to set any parameter before starting a computation (except you want to process image data): there is no transformation/interpolation setting, except the name of the transformation/interpolation to apply. The list can be managed with the “Transint Reprojector Manager” application, which is external to FME. Refer to chapter 4 for more information.

You can access the configuration dialog by clicking on the  button or selecting “Properties...” in the contextual menu. The button stays in yellow as long as you haven't edited the parameters and clicked “OK”.



TRANSINT transformation parameters

The TRANSINT transformer provides 4 processing parameters:

- **Transformer Name:**

The name of the object which will be displayed in the workbench and used in the mapping file (*.fme). This is a standard FME setting and it doesn't have any influence on the computation.

- **Transformation parameters:**

The transformation/interpolation to be applied to your source data. This parameters shows the names of the transformations that have been previously defined with the Transint Reprojector Manager. Refer to chapter 4 for more information.

If the Coordinate System has to be changed (for example from CH1903/LV03 to CH1903+/LV95), it will be automatically be done, if it has been set in the Reprojector Manager. A message is added to the log file if the input data doesn't match the required Coordinate System.

- **Cell Size:**

There is a standard FME Reprojector setting, only for raster features. Refer to the FME help (Manipulators > Reprojector) for more information.

Available choices:

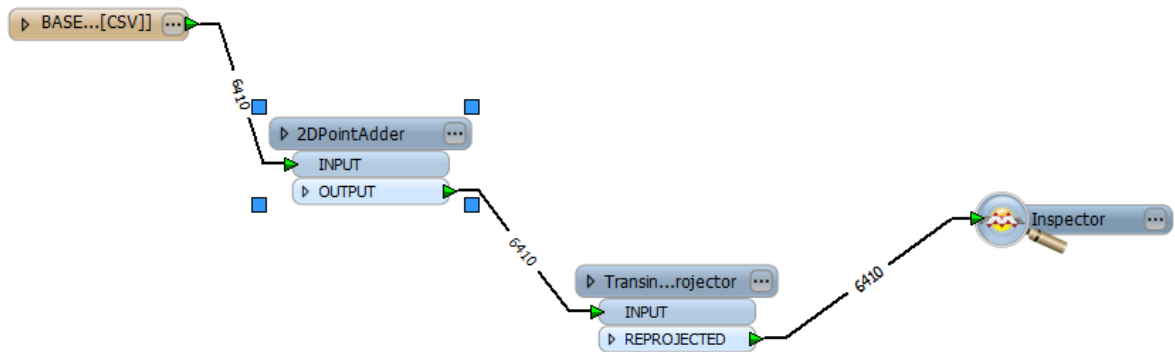
- **Stretch Cells:** The cell size of the raster will be adjusted to maintain the same number of rows and columns in the reprojected raster as in the input raster.
- **Square Cells:** The number of rows and columns as well as the spacing will be changed to maintain approximately the same cell ground area and form square cells where the horizontal and vertical cell sizes are equal.
- **Preserve Cells:** Like Square Cells option, this will change row and column numbers as well as spacing to maintain cell ground area, but it will also try to preserve the original cell aspect ratio, taking into account any warping caused by the reprojection.

- **Interpolation Type:**

There is a standard FME Reprojector setting, only for raster features. Refer to the FME help (Manipulators > Reprojector) for more information.


Available choices:

- **Nearest Neighbor:** The fastest method but produces the poorest image quality.
- **Bilinear:** Provides a reasonable balance of speed and quality.
- **Bicubic:** Slowest method but produces the best image quality.
- **Average 4:** Has a performance similar to Bilinear and is useful for numeric rasters such as DEMs.
- **Average 16:** Has a performance similar to Bilinear and is useful for numeric rasters such as DEMs.



FME Workbench main view: transformation of a CSV text file with TRANSINT and display of the transformed points with the FME Universal Viewer

5.3 Run the transformation

As soon as source data, the TransintReprojector transformer and destination data are properly configured and connected, you can run the transformation by clicking  button or select “Run Translation” in “File” menu.

You can follow the processing status in the “Log” panel. Some information about the TRANSINT transformation will be displayed:

- Plug-in version
- Selected transformation (dataset used)
- Coordinate System performed
- Optional warning messages (e.g. unexpected Coordinate System for source data or transformation exception)
- Number of features transformed

If an input coordinate is outside the transformation dataset (interpolation grid or triangular network) a warning will be displayed, but the processing will be continued. For all fatal exceptions (dataset not found, incorrect setting, etc.) an error message is displayed (“Translation FAILED”) and the procedure is interrupted. If all the processing ends correctly, the message “Translation SUCCEEDED” is displayed.

```

Log
Loaded module 'TRANSINTREPROJECT' from file 'C:\Program Files (x86)\FME\plugins\TRANSINTREPROJECT.dll'
FME API version of module 'TRANSINTREPROJECT' matches current internal version (3.7 20121025)
Transint Reproject Engine Manager has been created.
TRANSINT transformation/interpolation (@ swisstopo 2014)
Transformation dataset: 2013_07_02_definitives_Gitternetz_LV03-LV95.gsg (regular grid)
Coordinate System change: CH1903.LV03_swisstopo->CH1903Plus_1.LV95/01
The source coordinate system CH1903.LV03_swisstopo defined in the transformation dataset does not match the actual source coordinate system , CH1903.LV03_swisstopo
Storing feature(s) to FME feature store file 'C:\Users\U80787-1\AppData\Local\Temp\wb-xtate-1394204983279_7584_160943\inspector.ffs'
Storing source feature(s) to FME feature store file 'C:\Users\U80787-1\AppData\Local\Temp\wb-xtate-1394204983279_7584_160943\inspector.facs'
Reading source feature # 2500
Reading source feature # 5000
TRANSINT interpolation error at coordinates 642313.740000/302718.360000: outside dataset definition. No change applied.
TRANSINT interpolation error at coordinates 591294.420000/255778.260000: outside dataset definition. No change applied.

```

Some information is added to the Log. Warnings are displayed in blue, fatal errors in red.

5.4 Transform coordinates which are saved as attributes

By default a TRANSINT transformer is applied to the geometry of all the features which are found in the source file. It is also possible to transform coordinates that are stored as attributes, e.g. a centroid definition or a label position, or transform a text file without geometry (e.g. CSV text file) using a standard FME manipulator: “2DPointReplacer” or “3DPointReplacer”.

With such a component, you can generate a 2D or 3D geometry from two or three attributes or columns: you just have to connect it to the source data and edit the parameters to define the X, Y and optionally Z values. After that, you connect a “TransintReprojector” manipulator to the PointReplacer; the attributes will be automatically recognized as coordinates and transformed according to the TRANSINT parameters.

Note: the PointReplacer generates geometry objects from attributes or text values. If you want to update or create attributes in destination data, or generate a new text file (e.g. CSV), you'll have to convert the geometry back to attributes. This can be done with a “CoordinateExtractor” calculator: it will generate 3 attributes (x/y/z) from the input geometry (point or vertex of a polyline or polygon). Refer to your FME documentation to find more information about “2DPointReplacer”, “3DPointReplacer”, “CoordinateExtractor” or other calculators or manipulators.

6 Using TRANSINT transformer with the FME Universal Translator

Everything that can be carried out in the FME workbench can be done in the FME universal translator as well. The easiest way to see how the “TransintReprojector” transformer has to be configured in the command file, is to prepare a sample project in the workbench and then save it to a FME Mapping file (*.fme).

The parameters to be set are:

1. Transformation/interpolation dataset to use and optionally the Coordinate System change to perform. This setting should not be changed or “personalised”, because the results would not match the official Cantonal transformation or could be erroneous.
2. Standard FME Reprojector settings: Interpolation Type and Cell Size

For more information about FME Universal Translator or the “@Reproject” command, please refer to your FME help and documentation.