

Description

of the program **Geotrafo** Version 5.0.5
Stand: 2024-04-24



With **geotrafo** you can convert data between different coordinate systems.

The following functions are available in this version:

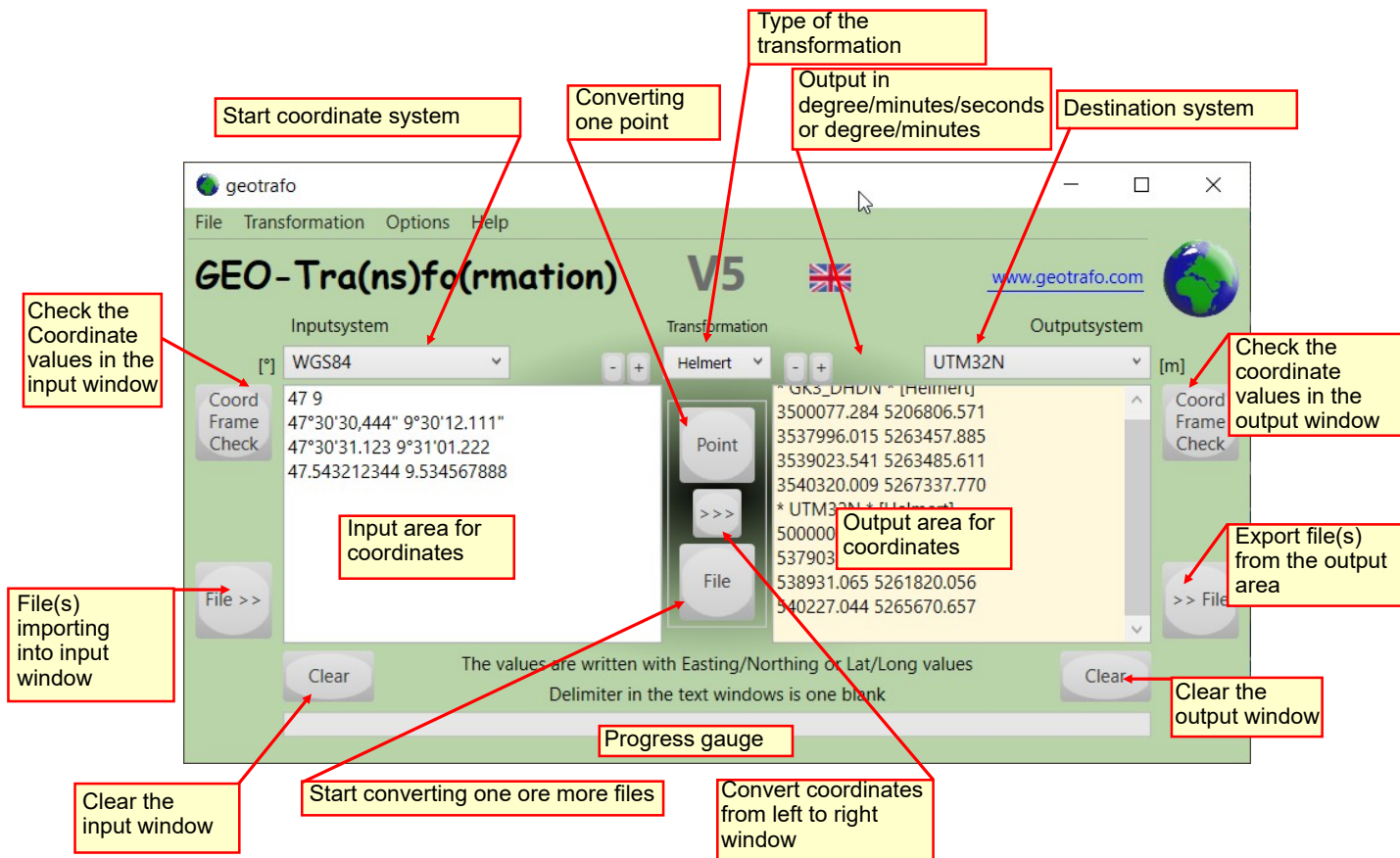
- Conversion of individual points after input in different input windows
- Conversion of the coordinate values from the left window to the right window.
- Checking the coordinate values of one of the windows with coordinate frames.
- Conversion of files from start to target coordinate system.
File formats: Shape, MapInfo, Tsircad, Text (.txt, .csv, ..)
- Import coordinates from files into the left window.
File formats: Shape, Tsircad, GPX, KML, Text
- Export the coordinates from the right window to files.
File Formats: Shape, MapInfo, Tsircad, GPX, KML, Text
- Use of NTV2 files for alternative conversion of the coordinates.
- Definition of own parameter sets (max. 99)
- Content menu in the two windows for searching and editing

A list of the available coordinate systems can be found on the homepage (www.geotrafo.com) or in the appendix.

This description was delivered with the software. Any updates and further information can be obtained from the website.

This version runs on Windows XP (with SP 2), Windows 7, 8 or 10 (with installed .NET Framework 4 or higher)

Overview of functions of the main mask:



Display of the values in the input or output window:

All lines beginning with * are comment lines and are remain unchanged during conversion and ignored by an export. Separators are one or more spaces. When converting coordinates, the first line in the output window is a comment line with the new system and selected type of transformation.

Coordinate values are written with Easting/Northing or Phi/Lambda. In general, a point or a comma can be used as a decimal point. MGRS coordinates consist of one value. Optionally, a point number (alphanumeric value) can be added as a 3rd value. It is also possible to add an attribute. This starts with "\$" and is appended to the line and can have any number of them (Sub)attributes contain. These are defined by the ; characters separated.

When importing some file formats, vectors can also be imported (See appendix).

The header for (poly)**lines** starts with *\$L followed by the number of vertices and optionally a csv attribute, which is written here without \$.

Example: *\$L5 Attri1;Attri2;Attri3;... This is a line with 5 vertices

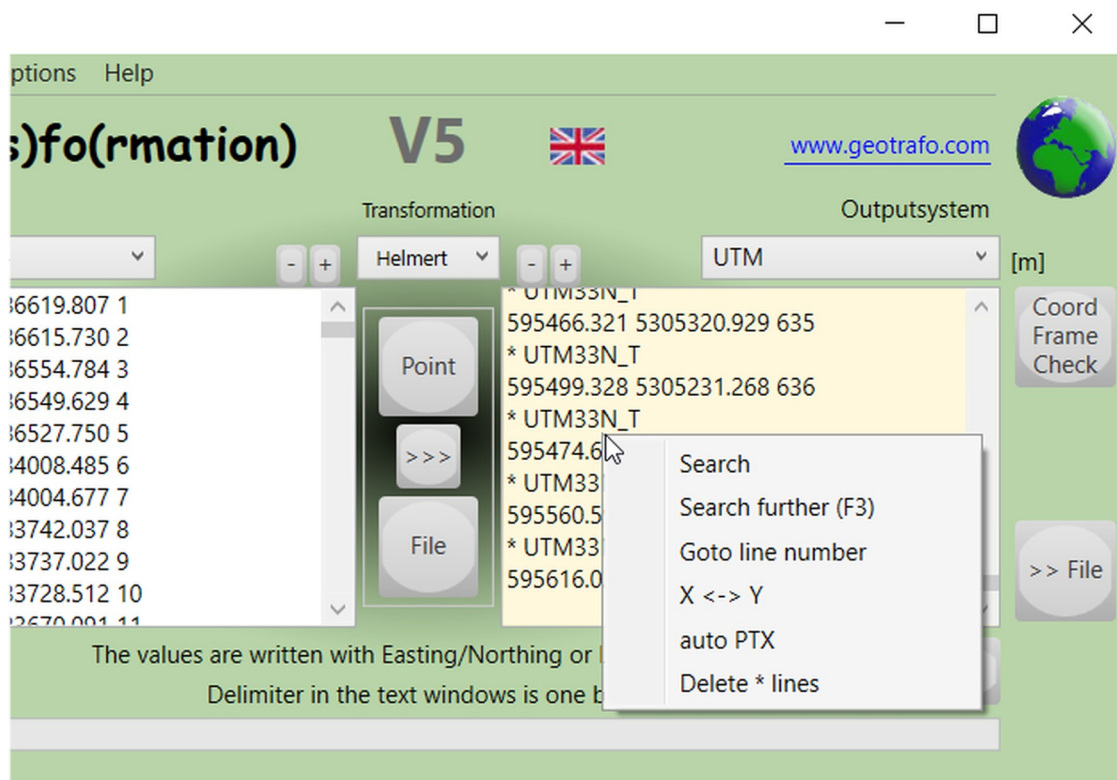
The header for **polygons** starts with *\$O followed by the number of support points and optionally a csv attribute, which is written here without \$.
Interior areas begin with Header *\$I and are embedded in the parent face.

Example: *\$O4 Attri1;Attri2;Attri3;... This is a polygon with 4 vertices

The character string *\$E- indicates erroneous elements during import.

Context menu of the text windows

A **context menu** is available for the input and output windows. This can be reached by pressing the right mouse button in the respective text window.



This can be used to **search** for expressions in the coordinate windows. **Find Next** (F3) uses the previously entered expression as the search text. **"Goto Line"** jumps to the specified line in the window. The data is then color-coded.

With the menu item **"X <-> Y"** the two coordinate values in a line are swapped, all other data remain unchanged. If rows have been chosen (selected), only these will be processed.

"autoPTX" automatically assigns point numbers - with any start value - for all correct coordinate pairs. If rows were selected previously, only these will be processed. Otherwise, all coordinate lines are provided with point numbers, any existing ones are overwritten.

The output window has a function that can be used to delete all comment lines (**"Delete * lines"**). This can be helpful if, for example, the UTM system is often written to with zone and sector when converting to *UTMauto*.

Entry of single points

First, the start and finish system must be selected.

Then press the **point** button in the middle area.

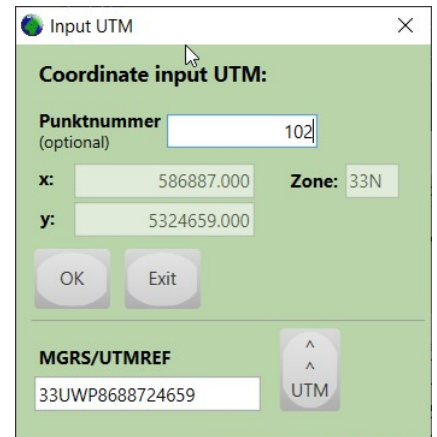
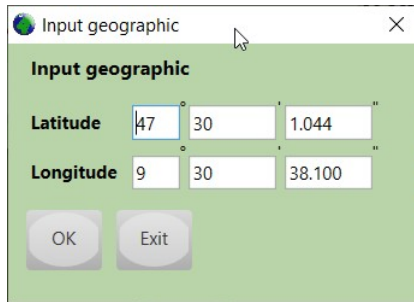
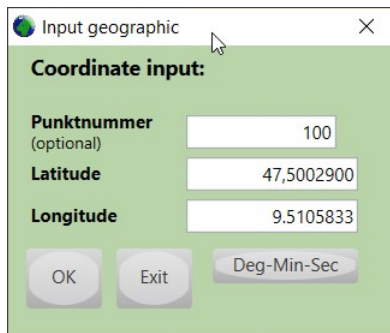
Depending on the type of coordinate system, the corresponding input masks appear.

Caution: In the case of projections(Gauss/Krüger or Krovak), the y-value is always the easting value. With UTM images it is exactly the opposite!

Geographic coordinates are entered either with decimal values or with degrees/minutes/seconds. This mask can also

have decimal minutes be entered.

MGRS entries are also possible in the mask for UTM.



The height value can be set in the **options** (->"reference height"). However, this is only a guideline and usually not necessary. The heights only affect the conversion with large values, this results in the conversion from M34 to WGS84 and a height difference from 1000m only 1cm(!) position deviation. The exact ellipsoid heights required for the conversion would be necessary are often also unknown ("undulation depending on the region"). It is therefore sufficient when working at greater heights to set the **reference height**.

As an alternative to entering a single point, it is also possible to enter directly in the **input field** coordinate values. These must have at least 2 numerical values (except MGRS) be separated by one or more blanks. The order is analogous to the single entry, i.e. y/x for Gauss/Krüger, Lambert or Krovak or x/y for UTM coordinates.

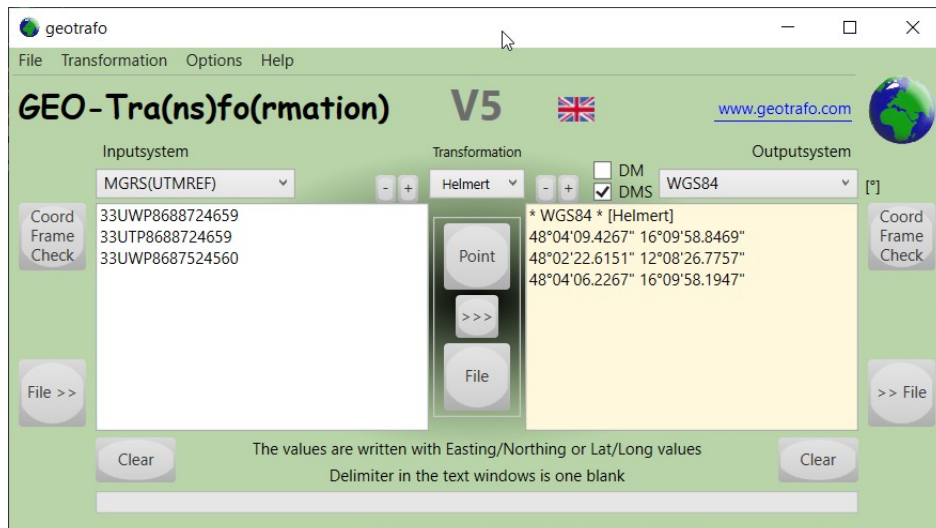
The (common) notation Phi/Lambda is always used for geographic coordinates.

Degrees/minutes/seconds can also be entered using the °, ' and " characters.

The entry of the (last) " character can be omitted.

Blanks **within** a coordinate value are not permitted.

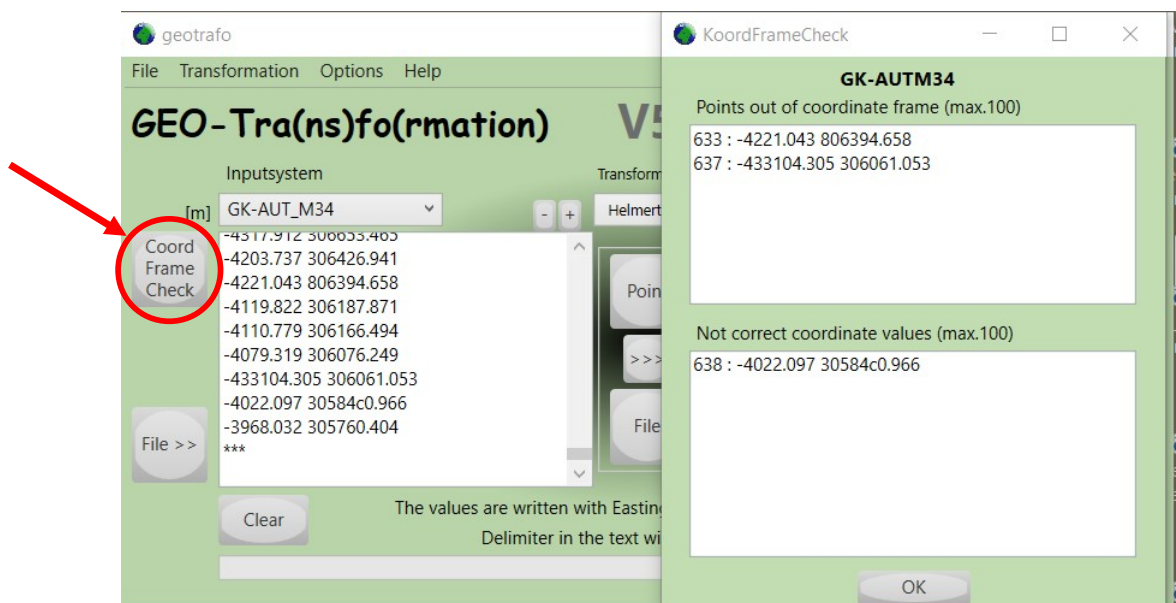
An MGRS coordinate always consists of a value **without** blanks or separators.



Coordinate frames

With **Koo-Frame-Check** you can see the entered values in the two windows to verify. Of course, the input or output system must be selected beforehand. Coordinates that are outside of the respective coordinate frame, are displayed in a separate window. Lines that do not contain correct coordinate values are also written. Each line begins with the line number of the respective window. Comment lines (*) are not checked.

The coordinate frame for the selected system can be called up, by pressing the right mouse button on the function button.



Left-right conversion

The conversion of the left window takes place after pressing the **arrow button (>>>)** in the middle button field.

After a header with the initial coordinate system and the type of conversion, the converted coordinate values are outputted. Any existing point numbers and the additional attribute (\$ attribute) are adopted unchanged. Comment lines (beginning with "*") were copied unchanged into the right window. Incorrect input data lines are not outputted.

If the result is far from the central meridian for cylindrical projections, or far from the intersection circles for conic projections, then the projected plane is far from the ellipse, so the result could be inaccurate.

When outputting in UTM (= UTMauto), the zone/UTM band is additionally written before each value (in a comment line).

For geographic results, the output can also be in degrees/minutes/decimal seconds or degrees/decimal minutes. To do this, please activate the **GMS** or **GM** check box.

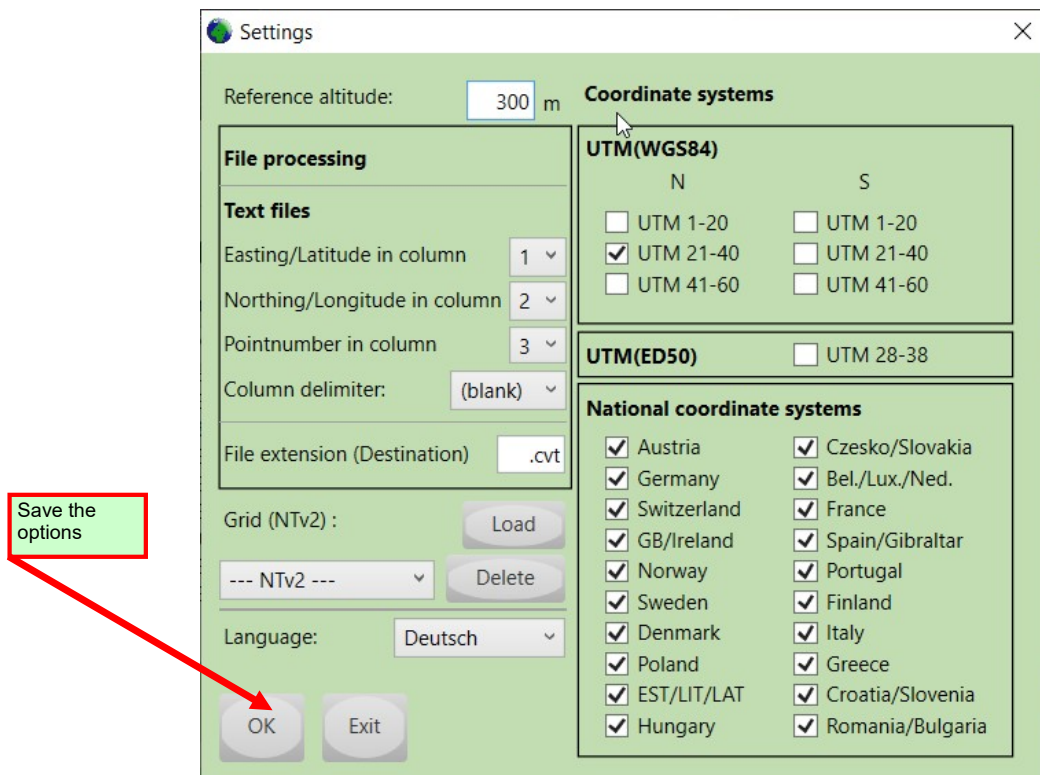
Settings

Some basic settings can be specified here, namely the reference height, the column layout and the column separator (Blanks, tabulator, comma, semicolon or 1 blank).

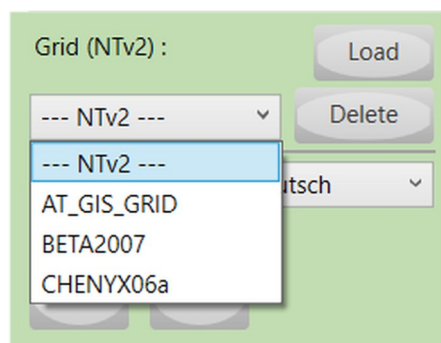
The columns are important for **textfile** conversion and text import into the input window.

The **file name extension** is used for naming the target file during file conversion, with the text being placed at the end of the file name.

Furthermore, the coordinate system selection can be limited here. Only the systems belonging to the checked groups appear in the start and destination coordinate systems. Only WGS84, ETRS89, MGRS, WebMercator, UTMauto (at destination) and the user systems are always present in the selection boxes.



If you want to use **GRID-Shift** files, they can be imported or deleted if necessary. More on GRID-Shift (NTv2) on page 13.



The settings are saved with **OK**. These values are retrieved when the program is restarted.

File processing

One or more file(s) can be **directly** converted into (a) new file(s), but you can also import files into the input window (**File>>**), then possibly check, convert and, if necessary, use the export function (>>**File**) to create a new file.

Direct file conversion is started by pressing the "File" button in the middle button box. The start and finish system must be selected in advance.

Possible file types are:

- Shape
- MapInfo
- Tsircad
- Textdateien (.txt, .csv, ...)

The new files are created in the same directory and, as a supplement to the file name, are given the name extension that was defined in the settings.

For text files, a preview box appears for column selection.

With the **file import** (File >>) the file contents of the following file types are read:

- Shape
- Tsircad
- Textdateien (.txt, .csv, ...)
- GPX
- KML

In advance, settings for the projection type must be confirmed for shape files and attributes to be imported selected, if desired.

In the case of text files, the preview box for selecting the columns appears again.

The same file types can also be used for **file export** (>> file), whereby GPX and KML files are only possible in connection with WGS84; Since the setting of the selection box counts here, this restriction can be avoided ;-)
Comment lines (*...) or other values are simply outputted for text files, but ignored for the other file formats.

The appendix shows which objects can be used.

Files with MGRS coordinates cannot be converted and output directly.
But import is possible.

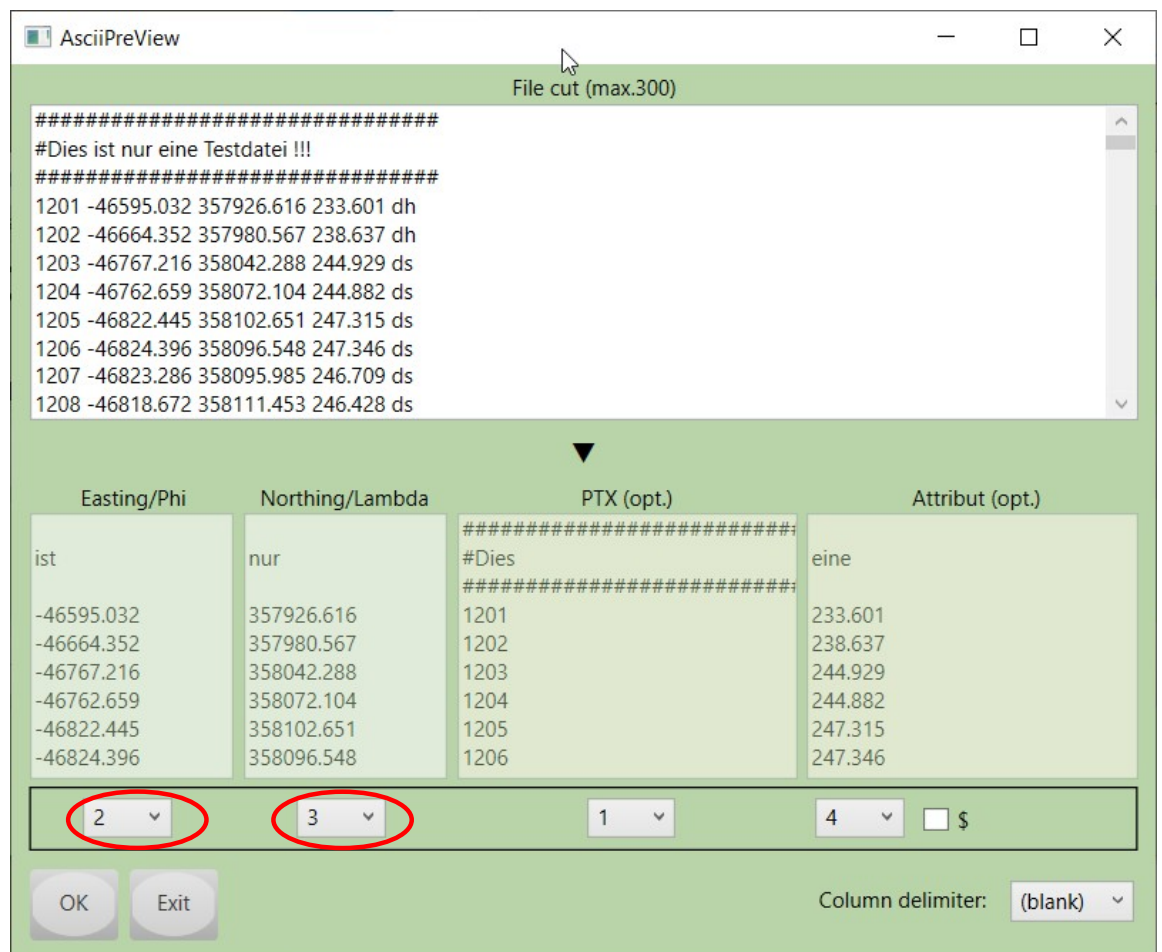
Coordinate values in degrees/minutes/seconds or degrees/minutes style can only be exported as a text file from the right window.

Text files

DIRECT CONVERSION

The basis is a text file with the initial coordinates in a uniform form, i.e. the values in the same order of the columns. Here, too, you first select the source and target systems.

Press the **"File"** button for direct conversion. Now search for the source(s) in the opening explorer. In the mask "AsciiPreView" enter the column separator and the column number for the Select Easting/Northing and Phi/Lambda. The columns for PTX and the attribute play no role in the file conversion. Only the texts of the selected columns are replaced, all other parts remain unchanged.



If multiple files are selected, the setting applies to all.

The generated converted file ends up in the same directory where the source are. As extension to the base filename, the files get the suffix that is saved once in the options mask.

The coordinate system and the type of conversion appears in the first line in the result file. Only correct pairs of numbers will be processed. Other lines are adopted unchanged.

Text files (continued)

Example:

```
19000_Punkte_ASCII.txt - Editor
Datei Bearbeiten Format Ansicht ?
#####
#Dies ist nur eine Testdatei !!!
#####
1201 -46595.032 357926.616 233.601 dh
1202 -46664.352 357980.567 238.637 dh
1203 -46767.216 358042.288 244.929 ds
1204 -46762.659 358072.104 244.882 ds
1205 -46822.445 358102.651 247.315 ds
1206 -46824.396 358096.548 247.346 ds
1207 -46823.286 358095.985 246.709 ds
1208 -46818.672 358111.453 246.428 ds
1209 -46820.184 358111.885 247.344 ds
1210 -46874.611 358139.709 248.705 ds
1211 -46880.019 358129.866 248.963 ds
1212 -46885.404 358115.782 249.134 ds
1213 -46887.678 358115.559 250.362 ds
```



```
19000_Punkte_ASCII.txt.cvt - Editor
Datei Bearbeiten Format Ansicht ?
--- Start:GK-AUT_M34 -> Ziel:WGS84
#####
#Dies ist nur eine Testdatei !!!
#####
1201 48.35788497 15.70337690 233.601 dh
1202 48.35836497 15.70243555 238.637 dh
1203 48.35891234 15.70104070 244.929 ds
1204 48.35918080 15.70109886 244.882 ds
1205 48.35945103 15.70028873 247.315 ds
1206 48.35939601 15.70026308 247.346 ds
1207 48.35939103 15.70027812 246.709 ds
1208 48.35953047 15.70033865 246.428 ds
1209 48.35953424 15.70031820 247.344 ds
1210 48.35978038 15.69958068 248.705 ds
1211 48.35969147 15.69950881 248.963 ds
1212 48.35956442 15.69943773 249.134 ds
1213 48.35956224 15.69940707 250.362 ds
```

FILE IMPORT

When importing the file, the point text (PTX = point number) can optionally be read.

Additional attributes from a column, or if present a so-called \$-attribute can be used. The entire line content after the \$ sign is considered an attribute. This means that blanks, for example, are also possible within the attributes. The separator between individual attributes is a semicolon.

Before the import, a file section is displayed again in order to make the necessary column settings. First, this values are taken from the settings. If they are adjusted now, this applies temporarily to the one import process. General changes are to be made in the settings.

FILE EXPORT

When exporting files, the \$ in front of the attributes can be written or not.

This setting is done again in the preview mask.

The sequence of the items, written in the destination file can be defined by selecting the column numbers.

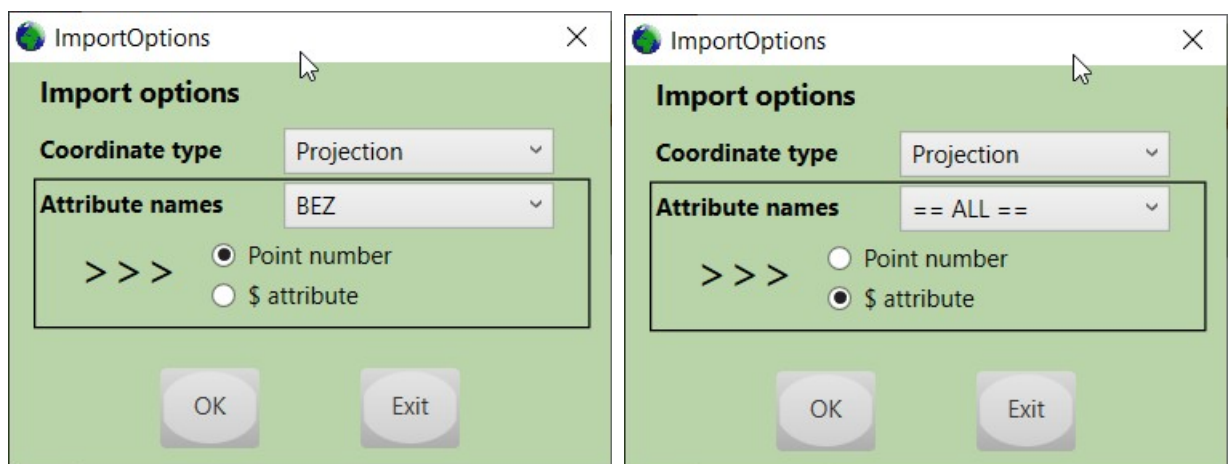
Shape/MapInfo files

When DIRECTLY CONVERTING the files, no special settings are required. The coordinate values are converted according to the settings of the input and output systems. The other data remain unchanged (.dbf/.mid).

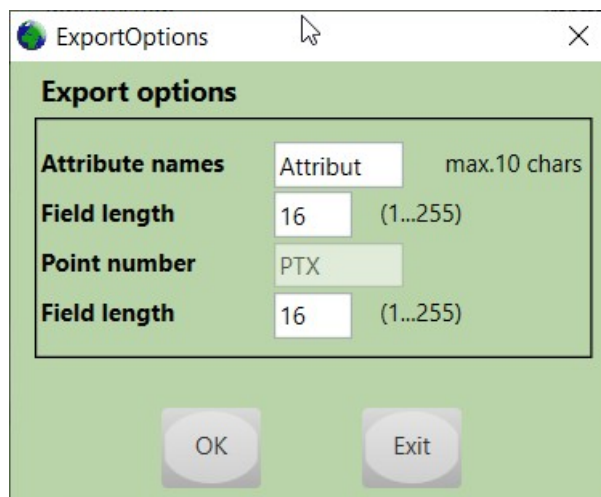
The IMPORT of shape files requires information about the coordinate type. Geographic coordinates are the phi/lambda values of the ellipsoid. Projection means coordinates that lie on the plane of cylinder, cone projection, etc., i.e. consist of x/y or y/x . This setting is taken from the prj file, but should be checked.

If factual data is available, it can be read in, either one attribute by selecting the attribute name in the selection box, or all by selecting ==ALL==. The attribute is placed after the coordinate values either as a point number (PTX) or as a \$ attribute. If all attributes are selected, they are separated by a ; cut. When importing vector data, these values precede the point data (e.g.: *\$L4 or *\$O5).

MapInfo files cannot currently be imported.



An attribute name and the field length must be specified for EXPORT. All data from the rows with \$ attributes (if any) are stored in this attribute. Any existing point numbers are saved as the "PTX" attribute. If neither point numbers nor additional attributes are used, you can simply confirm this mask with OK. The attributes then remain empty. The further processing of the factual data can then possibly take place with other programs (e.g. FME).



GPX/KML- files

The coordinates in these file types are stored in WGS84, so these files cannot be converted directly. IMPORT and EXPORT is possible. No additional information is necessary.

Waypoints, routes and tracks are read from GPX files. When writing, routes or waypoints are created (no tracks). Exporting polygons is not possible. Under the tag <name> is the point number (PTX) and under the <desc> tag the \$ attribut data is stored.

Point, LineString and Polygon are read from KML files. Additional data can also be saved during EXPORT. The point number (PTX) is then stored under the <name> tag and the \$ attribute is stored under the <description> tag.

Tsircad-files

DIRECT CONVERSION

All points in a Tsircad file are converted, including all vertices. All other data remain unchanged.

IMPORT

Since these files contain all the necessary information, they can be imported without any additional information. However, only isolated points are currently possible, i.e. no support points for the other elements.

Point numbers (PTX) are also imported, if available. But reading in the additional data information (\$ attribute) is not possible.

EXPORT

During the file export, all information in the data lines is evaluated, including point numbers (PTX) or the \$ attributes (if available). Point elements are then created in a layer that is supplied with standard attributes. The interface description for Tsircad (.cir) is documented in the appendix.

These files can be further processed in the **TSIRCAD** program.

More information about TSIRCAD can be found on the Homepage.

Manual parameter entry

Any system can be defined here, which is defined by the datum parameters, the ellipsoid and the projection.

Any system can be defined here, which is defined by the **datum parameters**, the ellipsoid and the projection. When entering the datum parameters, make sure you use the correct sign. With the so-called position-vector rotation, the sign of the angle of rotation is exactly reversed to the coordinate-frame rotation.
(Dx,Dy,Dz : unit [m], Rx,Ry,Rz : unit [°], S: unit [ppm])

With "**Flip**" then the transformation direction can be reversed. However, this only refers to the display of the values. In the gtp files then generated, the data is always stored in Coordinate Frame and "WGS84 -> User".

Parameter settings

User - parameterinput (WGS84 -> User) Flip

JAD69
Netz77-BRD_GK3
Soldner_Berlin
Soldner_Berlin_Bessel

Datum

Parameter Bursa-Wolf

Dx -612.4
Dy -77
Dz -440.2
Rx -0.054
Ry 0.057
Rz -2.797
M 0.99999745
S

Coordinate Frame
 PositionVector

Ellipsoid

Bessel 1841

Name Bessel 1841
sAxis Ra 6377397.155
sAxis Rb 6356078.96282
Inv.Flat 299.152813

Projection:

CassiniSoldner

Central meridian: 13.62720366667
Latitude of origin: 52.41864827778

False Easting: 40000
False Northing: 10000

Name of the Parameterset
Soldner_Berlin

Save gtp Load
Delete Exit

Using the file manager, any number of parameter sets can be defined and saved in the User subfolder (in "ProgramData") with the "Save" button. Existing ones can be copied by loading them into this folder and thus used in the program. Delete removes selected *user files* from the folder.

All user sets saved in the directory are then available within the program as input and output coordinate systems and are displayed in the selection boxes. Maximal 99 of this user files (.gtp) are usable.

Manual editing of the user files is possible, but this can lead to problems when using/managing them (no blank lines, no comments, ..).

Grid-Shift

Instead of using the Helmert transformation for the datum transformation the use files with grid-shift data is usable with the software. The method was developed in Canada and is called NTV2 and can currently be used in Geotrafo for the following systems (datums):

DHDN90 (Germany), MGI (Austria), CH1903 (Switzerland), NTF (France), ED50 (Spain), OSGB36 (UK), TM75 (Ireland), DATUM73, DATUMLX, DATUMLXB (Portugal)

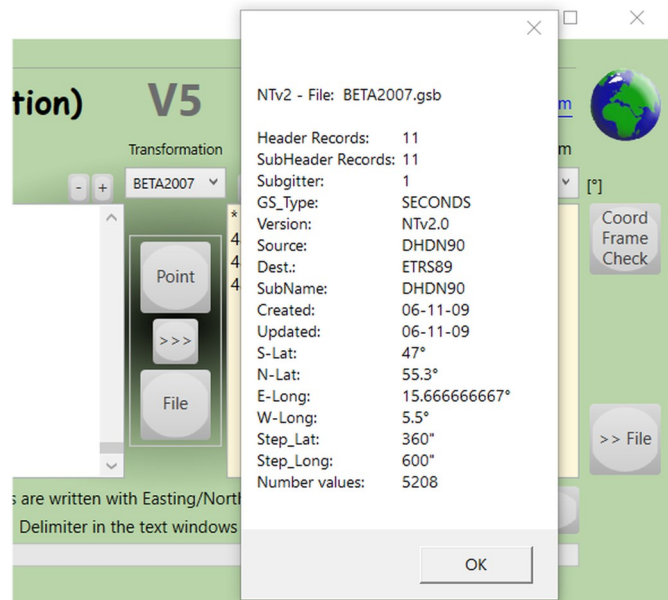
Files are accessed in which there are shift values between the National date (DHDN,MGI,...) and ETRS89 stored in a grid. In the case of Switzerland, the grid between CH1903 and the new CH1903+ applies. In BeTA2007 the shift values are in the complete range (see **coordinate frame**) while in the AT-Grid there are only values within Austria's national borders existing.

These (binary) files can be obtained free of charge on the Internet, for example for Germany at EU-CRS, for Austria on a BEV page, and for Switzerland on Swisstopo. (Links are on the home page)

Under Options, these files can be loaded into the program.
(eff. into the ProgramData directory)

Then you can use this variant if as **transformation type** the desired method is selected.

With a right mouse click on the selection box you get information to the respective file.



For example, you can convert CH1903 to GK-AUT-M28 definitely improve with GridShift, CH1903 is first converted to ETRS89 and then converted to GK-AUT with AT-Grid. Or using CHENYX06 from CH1903 to GK-AUT-M28 (CH1903 becomes CH1903+ converted and then calculated in the target system via ETRS89). However, only one GRID-Shift variant can be used at a time.



Appendix

Koordinatensysteme

WGS84	--- France NTF NTF I NTF II NTF IIE NTF III NTF IV NTF I Carto NTF II Carto NTF III Carto NTF IV Carto LAMB93 CC42 CC43 CC44 CC45 CC46 CC47 CC48 CC49 CC50 RGF93	--- Sweden RT90 RT90-2.5 gon V 0:-15 RT90-7.5 gon V RT90-5 gon V RT90-2.5 gon V RT90-0 gon RT90-2.5 gon O RT90-5 gon O SWEREF99-TM SWEREF99_14_15 SWEREF99_15_45 SWEREF99_17_15 SWEREF99_18_45 SWEREF99_20_15 SWEREF99_21_45 SWEREF99_23_15 SWEREF99_12_00 SWEREF99_13_30 SWEREF99_15_00 SWEREF99_16_30 SWEREF99_18_00	--- Italy ROMA40 ROMA40-Roma ROMA40-West ROMA40-East ROMA40-Sicily ROMA40-Sardinia ROMA40-Suedtirol --- Poland S42/58-PL S42/58-Zone_I S42/58-Zone_II S42/58-Zone_III S42/58-Zone_IV S42/58-Zone_V EUREF89-Zone5 EUREF89-Zone6 EUREF89-Zone7 EUREF89-Zone8 EUREF89-CS92 --- Greek GGRS87 GGRS87-Grid GREEK --- Estonia/Latvia/Lithuania Baltic93-TM EST92-LB LT-LKS94-TM LV-LKS92-TM Pulkovo42(EST) Pulkovo42-Zone34 Pulkovo42-Zone35 --- Bosnia/Croatia/Slovenia MGI1901 MGI1901-Zone5 MGI1901-Zone6 HDKS HDKS-Zone5 HDKS-Zone6 HTRS96 HTRS96-TM D48 D48/GK D96/TM --- Hungary HD72 EOV --- Romania S42(ANCPI) S42(ANCPI)-ST70 DealulPiscului30 Stereo33 DealulPiscului70 Stereo70
--- Österreich MGI GK-AUT_M34 GK-AUT_M31 GK-AUT_M28 BMN34 BMN31 BMN28 LAMB-AUT			
--- Deutschland DHDN GK2_DHDN GK3_DHDN GK4_DHDN GK5_DHDN S42/83 GK3_S42/83 GK4_S42/83 GK5_S42/83	--- GreatBritain/Ireland OSGB36 OSGB36-TM OSGB36-Grid IRELAND65 IRELAND75-TM IRELAND75-Grid IRELAND-ITM	--- Denmark DK-ED50 DK-ED50-TM32 DK-ED50-TM33 DKTM1 DKTM2 DKTM3 DKTM4 KP2000J KP2000S KP2000B	
--- Schweiz/Liechtenstein CH1903+ CH1903+/LV95 CH1903 CH1903/LV03-M LIECHT/LV03-C	--- Spain/Gibraltar ES-ED50 ES-TM-9 ES-TM-3 ES-TM+3 BAL-ED50 BAL-TM ZNW-ED50 ZNW-TM GIBR-ED50 GIBR-TM	--- Finland KKJ KKJ-Uniform KKJ-Zone0 KKJ-Zone1 KKJ-Zone2 KKJ-Zone3 KKJ-Zone4 KKJ-Zone5 ETRS-TM35FIN ETRS-GK19FIN ETRS-GK20FIN ETRS-GK21FIN ETRS-GK22FIN ETRS-GK23FIN ETRS-GK24FIN ETRS-GK25FIN ETRS-GK26FIN ETRS-GK27FIN ETRS-GK28FIN ETRS-GK29FIN ETRS-GK30FIN ETRS-GK31FIN	
--- Cesko/Slovensko S-JTSK Krovak S-JTSK(SK) Krovak(SK)			
--- Belge BD72 LB08 LAMB72			
--- Luxembourg LUREF-TM LUREF	--- Portugal D73 D73-TM D73-TM-M DLX DLX-TM DLX-TM-M DLB DLB-TM PT-TM06 PT-TM06-M		
--- Nederland AMERSFOORT RD(EPGS 28991) RIJKSDRIEHOEKS			
--- Europe ETRS89-LCC ETRS89-LAEA ED50-UTM28-36(38)	--- Norway NGO1948 NGO1948-Oslo NGO-GK1 NGO-GK2 NGO-GK3 NGO-GK4 NGO-GK5 NGO-GK6 NGO-GK7 NGO-GK8	--- Italy ROMA40 ROMA40-Roma ROMA40-West ROMA40-East ROMA40-Sicily ROMA40-Sardinia ROMA40-Suedtirol	
--- World MGRS(UTMREF) UTM01N-UTM60N UTM01S-UTM60S WebMercator			

Transformationsparameter

for the Helmert-Transformation, the values are for Coordinate-Frame-Rotation (Signs!)

WGS84 -> Datum (rx,ry,rz,Dx,Dy,Dz,m)

MGI: (5.1366, 1.4742, 5.2970, -577.326, -90.129, -463.919, 0.9999975768)
DHDN: (0.202, 0.045, -2.455, -598.1, -73.7, -418.2, 0.9999933000)
DHDN-Süd: (0.894, 0.068, -1.563, -597.1, -71.4, -412.1, 0.99999242)
DHDN-Mitte: (0.105, 0.013, -2.378, -584.8, -67.0, -400.3, 0.99998971)
DHDN-Nord: (-0.796, -0.052, -3.601, -590.5, -69.5, -411.6, 0.99999170)
S42/83: (-0.063, -0.247, -0.041, -24.9, 126.4, 93.2, 0.9999989900)
CH1903+: (0, 0, 0, -674.374, -15.056, -405.346, 1.0)
CH1903: (0, 0, 0, -674.374, -15.056, -405.346, 1.0)
S-JTSK: (4.99825, 1.58663, 5.26114, -570.6934, -85.6936, -462.8393, 0.99999645699705)
S-JTSK(SK): (7.786, 4.398, 4.103, -485, -169.5, -483.8, 1.0)
BD72: (0.33657, -0.456955, 1.842183, 106.868628, -52.297783, 103.723893, 1.0000012747)
LUREF: (-0.410, -2.933, 2.688, 193, -13.7, 39.3, 0.999999570)
AMERSFOORT(RD): (-0.4069, 0.3507, -1.8703, -565.24, -50.01, -465.66, 0.9999959188)
NTF: (0, 0, 0, 168, 60, -320, 1)
OSGB36: (0.1502, 0.2470, 0.8421, -446.448, 125.157, -542.060, 1.0000204894)
GB-ED50: (0, 0, 0, 86, 96, 120, 1)
IRELAND65: (-1.042, -0.214, -0.631, -482.5, 130.6, -564.6, 0.9999918501)
ES-ED50: (-1.244, -0.020, -1.144, 131.0, 100.3, 163.4, 0.9999906101)
ZNW-ED50: (0.540, -0.532, -0.126, 178.4, 83.2, 221.3, 0.9999788004)
BAL-ED50: (0.144, 0.492, -0.394, 181.5, 90.3, 187.2, 0.9999824303)
GIBR-ED50: (0, 0, 0, 116.8, 106.4, 154.4, 1)
D73: (0.615, -0.198, 0.881, 231.034, -102.615, -26.836, 0.999998214)
DLX: (-1.529, 0.145, -0.890, 282.066, 72.188, -119.953, 0.999995542)
DLB: (1.09, -4.445, -4.487, -631.39, 66.551, -481.44, 0.99999557)
NGO1948: (7.889, 0.050, -6.610, -278.3, -93, -474.5, 0.99999379)
RT90: (-0.855, 2.141, -7.023, -414.1, -41.3, -603.1, 1)
KKJ: (4.80109, 0.34546, -1.37645, 96.0610, 82.4298, 121.7485, 0.99999850349)
DK-ED50: (0.48488, 0.02436, 0.41321, 81.0703, 89.3603, 115.7526, 1.0000005406)
ROMA40: (0.971, -2.917, 0.714, 104.1, 49.1, 9.9, 1.00001168)
ROMA40-Sicily: (-0.374, -0.679, -1.379, 168.6, 34.0, -38.66, 1.00000948)
ROMA40-Sardinia: (-0.690, -2.012, 0.459, 50.2, 50.4, -84.8, 1.00002808)
ROMA40-Südtirol: (-0.353, -2.843, -1.535, 117.232, 29.243, 7.956, 1.000017962)
S42/58-PL: (-0.359, -0.053, 0.844, -33.4, 146.6, 76.3, 1.00000084)
MGI1901: (5.80967, 2.07902, -11.62386, -550.499, -164.116, -475.142, 1.00000554176)
HDKS: (5.905, 2.074, -11.510, -546.616, -162.375, -469.482, 1.00000444)
D48: (4.91, 4.49, -12.42, -426.9, -142.6, -460.1, 0.9999829)
HD72: (-0.3120, -0.1063, -0.3729, -52.684, 71.194, 13.975, 0.9999989809)
S42(ANCPI): (-0.30924979, 0.32482188, 0.49730012, -2.3283, 147.0416, 92.0802, 0.999994310955)
DealulPiscului30: (0, 0, 0, -103.25, 100.4, 307.19, 1)
DealulPiscului70: (0, 0, 0, -28, 121, 77, 1)
GGRS87: (0, 0, 0, 199.87, -74.97, -246.62, 1)
Pulkovo42-EST: (-0.99548, -0.58147, -0.24180, -21.53219, 97.00027, 60.74046, 1.000004598121)
ED50: (0, 0, 0, 84, 97, 117, 1)
WGS84 = ETRS89

Dataprocessing features:

Shape		Reading		Converting		Writing	
		accepted	dbf data	shp data	dbf data	writable	dbf data
shp/dbf							
0	NullShape	x	-	x	x	-	-
1	Point	x	x	x	x	x	PTX + Att.
3	PolyLine	x	x	x	x	-	-
5	Polygon	x	x	x	x	-	-
8	MultiPoint	s	x	x	x	-	-
11	PointZ	(x)	x	(x)	x	-	-
13	PolyLineZ	(x)	x	(x)	x	-	-
15	PolygonZ	(x)	x	(x)	x	-	-
18	MultiPointZ	(s)	x	(x)	x	-	-
21	PointM	(x)	x	(x)	x	-	-
23	PolyLineM	(x)	x	(x)	x	-	-
25	PolygonM	(x)	x	(x)	x	-	-
28	MultiPointM	(s)	x	(x)	x	-	-
31	MultiPatch	-	-	-	-	-	-

Att. : one attribute behind blank or all in the form \$att1;att2;..

(x) Z- and M- data is not used

- not supported

s splitted in individual points

MapInfo		Reading		Converting		Writing	
		readable	mid data	mif data	mid data	writable	mid data
mif/mid							
	NONE	-	-	x	x	-	-
	POINT	-	-	x	x	x	PTX + Att.
	LINE	-	-	x	x	-	-
	PLINE	-	-	x	x	-	-
	REGION	-	-	x	x	-	-
	ARC	-	-	x	x	-	-
	TEXT	-	-	x	x	-	-
	RECT	-	-	x	x	-	-
	ROUNDRECT	-	-	x	x	-	-
	ELLIPSE	-	-	x	x	-	-

KML		Reading		Converting		Writing	
		readable	CDATA			writable	CDATA
kml							
	Point	x	x	-	-	x	PTX + Att.
	LineString	x	x	-	-	x	-
	Polygon	x	x	-	-	x	-

GPX		Reading		Converting		Writing	
		readable	CDATA			writable	CDATA
gpx							
	Waypoints	x	x	-	-	x	PTX + Att.
	Routes	x	-	-	-	x	-
	Tracks	x	-	-	-	x	-

TSIRCAD		Reading		Converting		Writing	
		readable	\$data	graphic	\$data	writable	\$data
cir							
	Points	x	-	x	x	x	x
	Polylines	-	-	x	x	-	-
	Polygones	-	-	x	x	-	-
	Texts	-	-	x	-	-	-
	Symbols	-	-	x	-	-	-
	Journal	-	-	x	-	-	-

Dataprocessing features (continued):

ASCII Textfile	Reading		Converting	Writing	
	readable	\$data		writable	\$data
Point	x	x	x	x	x
	Lat/Easting		Lat/Easting	Lat/Easting	
	Lon/Northing		Lon/Northing	Lon/Northing	
	(Pointnumber)			(Pointnumber)	
	(Attribut)		all other Text remain	(Attribut)	
	Columns 1-9 with delimiters:		blanks		
			,		
			;		
			tab		
			blank		

TSIRCAD-Format (.cir): Dataformat v5

Header (100 Byte):

*\$H	Header	
2 Byte	Versionsnumber	(short little Endian)
6 Byte	Coordinate System	(z.B. "AT3400")
8 Byte	Center of actual screen (x)	(double little Endian)
8 Byte	Center of actual screen (y)	(double little Endian)
8 Byte	Factor of actual screen (f)	(double little Endian)
4 Byte	Number of layers	(integer little Endian)
61 Byte	Reserved	

----- for each layer in layerList:

Layerattributes :

*\$X	Header	
x Byte	Layername	(variable)
4 Byte	Pointcolor	(integer little Endian)
4 Byte	Linecolor	(integer little Endian)
4 Byte	Polygoncolor	(integer little Endian)
4 Byte	Pointsize	(integer little Endian)
4 Byte	Textcolor	(integer little Endian)
4 Byte	Textheight	(integer little Endian)
4 Byte	Linewidth	(integer little Endian)
4 Byte	Opacity of Polygons	(integer little Endian)
4 Byte	Schemenumber	(integer little Endian)
\$	Delimiter	

Points :

*\$P	Header	
4 Byte	Number of points	(integer little Endian)
----- for each point in plist		
8 Byte	X-value	(double little Endian)
8 Byte	Y-value	(double little Endian)
8 Byte	H-value	(double little Endian)
4 Byte	Flag	(integer little Endian)
x Byte	Text	(variable)
\$	Delimiter	

Attributes :

*\$A	Header	
4 Byte	Number of points	(integer little Endian)
----- for each point in plist		
x Byte	Text	(variable)
\$	Delimiter	

Lines :

*\$L	Header	
4 Byte	Number of lines	(integer little Endian)
----- for each line in lineList		
4 Byte	Number of points in line	(integer little Endian)
4 Byte * n	Point reference	(integer little Endian)
\$	Delimiter	

Attributes :

*\$A	Header	
4 Byte	Number of lines	(integer little Endian)
----- for each line in lineList		
x Byte	Text	(variable)
\$	Delimiter	

TSIRCAD-Format (.cir) - continued:

Polygons :

*\$O	Header	
4 Byte	Number of polygons	(integer little Endian)
----- for each poly in polyList		
4 Byte	Number of points in polygon	(integer little Endian)
4 Byte * n	Point reference	(integer little Endian)
\$	Delimiter	

Attributes :

*\$A	Header	
4 Byte	Number of polygons	(integer little Endian)
----- for each poly in polyList		
x Byte	Text	(variable)
\$	Delimiter	

Symbols :

*\$Y	Header	
4 Byte	Number of symbols	(integer little Endian)
----- for each symbol in sylist		
8 Byte	X-value	(double little Endian)
8 Byte	Y-value	(double little Endian)
8 Byte	Angle	(double little Endian)
4 Byte	Flag	(integer little Endian)
x Byte	Symbolname	(variable)
\$	Delimiter	

Journal :

*\$J	Header	
4 Byte	Number of journalEntries	(integer little Endian)
----- for each entry in the journal		
4 Byte * n	Entry Item (x Items in entry, max.3)	(integer little Endian)
\$	Delimiter	

----- for each layer in layerList (END)

Schema :

*\$S	Header	
4 Byte	Number of schemes	(integer little Endian)
----- for each scheme in the list		
x Byte	Schemename	(variable)
4 Byte	Number of attributes in the list	(integer little Endian)
----- for each attribute in scheme		
x Byte	Attributename	(variable)
\$	Delimiter	

