



CAD to ANSA Translators

CATIA, NX, JT, PTC Creo Elements/Parametric,
SolidWorks, Inventor, Parasolid, Rhino

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Section 1.

Introduction to the CAD to ANSA Translators & supported platforms

1.1. General

The CAD to ANSA Translators developed by BETA CAE Systems are a part of the complete BETA suite. The supported CAD-data formats handled by the CAD to ANSA Translators are listed below:

Source of CAD format data	File types
CATIA V5 (R7 – V5-R33) Catia Graphical Representation (tessellated data)	[.CATPart] and [.CATProduct] [.cgr]
CATIA V6 (2011x-2013x)	[.3Dxml]
3DEXperience (2014-2022x)	[.3Dxml]
NX (CT based, Unigraphics V11.0 – NX1957, NX CR 2306)	[.prt]
NX (UGOpen based, NX1953, NX1980, NX2007, NX2206, NX2212 and NX2306)	[.prt]
Parasolid (all-35)	[.xmt_txt], [.xmt_bin], [.x_b] and [.x_t]
Pro/ENGINEER (from WF 3 to WF 5) PTC Creo Parametric 2.0 M140 PTC Creo Parametric 3.0 M020 PTC Creo Parametric 3.0 M030 PTC Creo Parametric 3.0 M040 PTC Creo Parametric 3.0 M090 PTC Creo Parametric 4.0 F000 PTC Creo Parametric 5.0 – 10.0	[.prt] and [.asm] [.xpr] and [.xas]
SolidWorks (2007-2023)	[.sldprt] and [.sldasm]
JT (JTOpen Toolkit based, v8-v10.8)	[.jt]
Inventor (2010-2024)	[.ipt] and [.iam]
CoreTechnologie	[.ctp] and [.cta]
Rhino (up to v7)	[.3dm]
ACIS (R27)	[.sat]

CAD-data translation can be achieved through command-line, scripts or through a graphical user interface (GUI) that integrates the different translators and their respective options into a single environment. Details on these are given in later paragraphs.

1.2. Supported Platforms

The tables below show which translator executables are available for each platform:

		CATIA, PTC Creo Parametric, NX, SolidWorks, Inventor (CT based translation)	Translators' GUI	JT Open Toolkit	NX (NXOpen based translation)
		<i>ansa_cad.*</i>	<i>ansa_transl_gui.*</i>	<i>ansa_jt.*</i>	<i>ansa_ug.*</i>
Windows					
	64 bit	YES	YES	YES	YES
Linux					
	64 bit	YES	YES	YES	YES

1.3. Additional Requirements

Users of the CAD to ANSA Translators should have in mind the following:

NX (NXOpen based)

The translation of NX files with the use of NXOpen libraries requires a valid NX installation, which must be accessible by the machine performing the translation.

Parasolid (NXOpen based)

The translation of parasolid files with the use of NXOpen libraries requires a valid NX installation, which must be accessible by the machine performing the translation.

JT (NXOpen based)

The translation of JT files with the use of NXOpen libraries requires a valid NX installation, which must be accessible by the machine performing the translation.

JT

The translation of JT files on Windows systems requires the run-time components of the *Microsoft Visual C++ 2005 SP1 Redistributable Package*, version 8.0.50727.762 or any later updated version.

1.3.1. Notes regarding incompatibilities that may occur with some outdated Windows platforms

On some older or outdated Windows platforms, specific system errors may pop up when trying to perform a translation or even launching the translator user interface. These system errors usually inform the user for some missing system libraries. This is usually due to the fact that some **Microsoft Visual C++ Redistributable Packages** might be missing from the operating system. These need to be installed on the platform as well, and users are prompted to download these from Microsoft website:

Windows 64bit:

Do a search for "Microsoft Visual C++ 2005 Redistributable Package (x64)".

Do a search for "Microsoft Visual C++ 2008 Redistributable Package (x64)".

Do a search for "Microsoft Visual C++ 2010 x64 Redistributable Package".

1.3.2. Notes regarding specifying NX installation directories

When translation of NX files is set to be performed with the use of NXOpen libraries, the CAD to ANSA Translator searches for specific environment variables in the machine performing the translation, in order to locate these NXOpen libraries.

By default, the latest version of NXOpen libraries installed are used by ANSA. In case more than one NX versions are installed in the machine performing the translation, the UGII_BASE_DIR and UGII_ROOT_DIR environment variables can be edited and set to point to the desired NX version.

1.4. Licensing Issues

The licensing of the CAD to ANSA Translators features varies according to the CAD-data formats that the customer wants to translate. The following table summarizes the licensing requirements for each format:

	CATIA V4	CATIA V5/ ACIS/ CATIA V6	NX/ Parasolid/ Inventor	PTC Creo Parametric (Pro/ ENGINEER)	SolidWorks	JT	Core Technologie
Included in the Standard ANSA package (via ANSA File> Open); no extra license/ fee is required	YES	YES	YES	YES	YES	--	YES
Additional feature is required. See notes for details	--	YES feature adds an extra of 25 credits (not shared)	YES feature adds an extra of 100 credits (not shared)	YES feature adds an extra of 100 credits (not shared)	YES (requires the CATIA V5 feature) .	YES feature adds an extra of 25 credits (not shared)	--
Credits that need to be available at the time of translation (weight)	25 (pre-post package credits)	25 (extra credits) .	25 (extra credits)	100 (extra credits) .	25 (extra credits) .	25 (extra credits) .	25 (pre-post package credits)

Note:

All additional features are marketed separately upon request and require additional PO, fee and license keys.

1.4.1. Licensing of the CATIA V5 translation feature

An extra fee is required for the feature of CATIA V5 to ANSA translation (NEW_ANSA_CATIA_V5). License is prepared using the server information provided by the customer, as this is described in the respective documentation about beta_lm.

1.4.2. Licensing of the JT translator

An extra fee is required for the feature for the translation of JT files (ANSA_JT_OPEN). License is prepared using the server information provided by the customer, as this is described in the respective documentation about beta_lm.

1.4.3. Licensing of the PTC Creo Parametric (Pro/ENGINEER) translation feature

An extra fee is required for the feature of ProEngineer to ANSA translation (ANSA_PROE). License is prepared using the server information provided by the customer, as this is described in the respective documentation about beta_lm.

1.4.4. Licensing of the SolidWorks translation feature

Translation of SolidWorks files requires the feature for the translation of CATIA V5 files. Hence, the feature for the translation of CATIA V5 files (NEW_ANSA_CATIA_V5) must exist in the ANSA license file, in order for the translation of SolidWorks files to be executed flawlessly.

1.4.5. Licensing of the NX translation feature

An extra fee is required for the feature of NX to ANSA translation (ANSA_UG).

1.4.6. Licensing of the Inventor translation feature

Translation of Inventor files requires the feature for the translation of NX files. Hence, the feature for the translation of NX files (ANSA_UG) must exist in the ANSA license file, in order for the translation of Inventor files to be executed flawlessly.

Section 2.

Installation of the CAD to ANSA Translators

2.1. Installation of the CAD to ANSA Translators

The CAD to ANSA Translators are installed along with the BETA Suite [ANSA-EPILYSIS-META software products]. The entire BETA Suite is installed using a single installation file. The appropriate one must be selected for download, depending on the operating system on which the installation process will take place.

By default, all features of the suite are selected for installation (ANSA, CAD to ANSA Translation, ANSA NX Translation, ANSA JT Translation, META, etc.), but it is possible to selectively disable the unnecessary ones during the installation process.

Please refer to the *BETA Suite Set-Up Guide* pdf document for complete and detailed instructions on installing our complete software suite.

2.1.1. Notes regarding incompatibilities that may occur with some outdated Windows platforms

On some older or outdated Windows platforms, specific system errors may pop up when trying to perform a translation or even when launching the translator user interface. These system errors usually inform the user for some missing system libraries. This is usually due to the fact that some **Microsoft Visual C++ Redistributable Packages** might be missing from the operating system. These need to be installed on the platform as well, and users are prompted to download these from Microsoft website:

Windows 64bit:

Do a search for "Microsoft Visual C++ 2005 Redistributable Package (x64)".

Do a search for "Microsoft Visual C++ 2008 Redistributable Package (x64)".

Do a search for "Microsoft Visual C++ 2010 x64 Redistributable Package".

Section 3.

Using the CAD to ANSA Translators

3.1. Command-line driven translation

The CAD to ANSA Translators are launched by running the appropriate executable file. Depending on the platform open a command shell/ prompt and type in the following :

Platform	Command
Linux	
For CATIA V4, V5, NX (CT based), Pro/ENGINEER, SolidWorks, Inventor & CoreTechnologie translations	64bit: <code>ansa_cad.sh [-options] -i [CAD_data_filename] -o [ansa_filename]</code>
Windows	
For CATIA V4, V5, NX (CT based) Pro/ENGINEER, SolidWorks, Inventor & CoreTechnologie translations	64bit: <code>ansa_cad64.bat [-options] -i [CAD_data_filename] -o [ansa_filename]</code>

Platform	Command
Linux	
For NX (NXOpen based) translations	64bit: <code>ansa_ug.sh [-options] -i [ug_filename] -o [ansa_filename]</code>
For JT translations	64bit: <code>ansa_jt.sh [-options] -i [jt_filename] -o [ansa_filename]</code>
Windows	
For NX (NXOpen based) translations	64bit: <code>ansa_ug64.bat [-options] -i [ug_filename] -o [ansa_filename]</code>
For JT translations	64bit: <code>ansa_jt64.bat [-options] -i [jt_filename] -o [ansa_filename]</code>

where **-i** is the input CAD-data file and **-o** is the ANSA database filename to be saved (optional). The option **-odir** can also be used in order to state the directory where the ANSA files will be saved (optional). The default output directory is the same as the source directory.

The available **[-options]** are listed in a later paragraph.

Important Note:

On Windows platforms please make sure that the paths you insert in your command prompt do not contain blanks. In case your paths contain blanks then you have to include your absolute paths inside quotes (" "). Otherwise you will get an error and no translation will be performed.

WARNING:

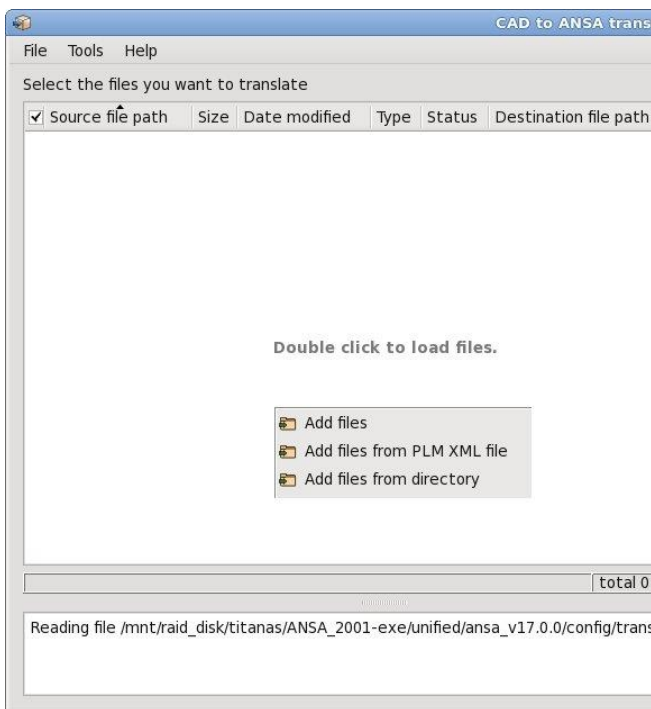
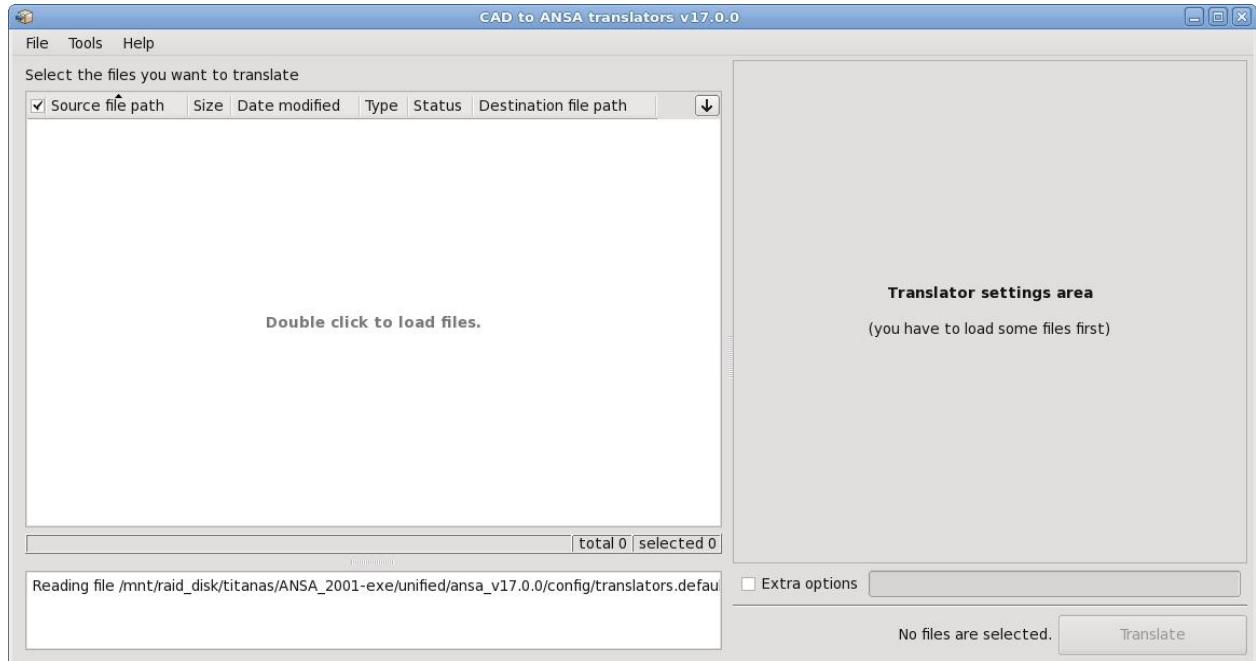
A directory named "work" is generated temporarily in the user's home directory everytime the *ansa_cad* executable is run. This directory is generated by our vendor's libraries (CoreTechnologie libraries) and its generation is necessary for the unhindered operation of the translator in conjunction with the CT libraries. The following environment variables are searched sequentially, in order to find a place for this directory to be temporarily generated:

TMP,
TMPDIR,
TEMP,
TEMPDIR,
HOME,
PWD

The first environment variable to be found is the location to be used for the temporary generation of this directory. Towards the end of the translation process, this directory is automatically erased by the translator. Therefore, it is highly unlikely for this directory to be noticed by the user as a left over from the translation.

3.2. GUI driven translation

The GUI provides an integrated environment for the translation of CAD or neutral data files. It integrates all translation modes along with their respective translation options into a single environment.



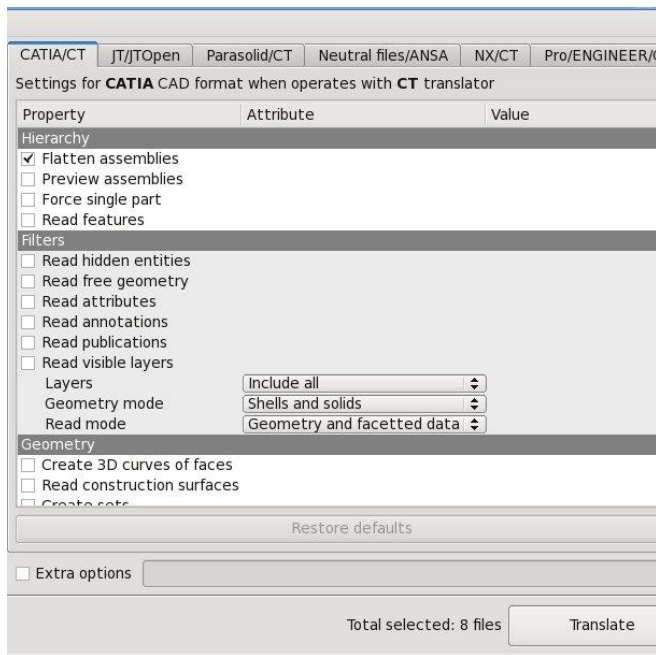
As derived from the image above, the graphical user interface is divided into a horizontal top menu and two vertical sections. The left vertical section provides the list of files to be translated and a window where all the translation output messages are printed. The list of files and the info window are both expandable widgets (pushing on the Shift button and dragging the mouse while keeping the middle mouse-button pushed will make the widgets expand).

The layout of the left vertical section actually indicates the essential first step a user has to do when performing a translation process:

- To add selected CAD files in the list of CAD files to be translated. This can be done either by double clicking on the empty list or by right mouse button clicking and selecting "Add files", "Add directory" or "Add files from PLMXML file".

Notes:

1. - There is no restriction regarding the format of the selected CAD files. Different types of CAD format files can be selected at once and added in the list of files to be translated.
2. - Selecting to read a PLMXML file will automatically extract and add all the CAD files referenced in the PLMXML file in the list of files to be translated.



The right vertical section of the interface is where all the translation options will appear as soon as some CAD files are loaded in the list of files. In case files of different CAD formats are loaded, the translation options available for each CAD format will appear automatically in the form of tabs (the translation options available for each format are explained in detail in the following chapters).

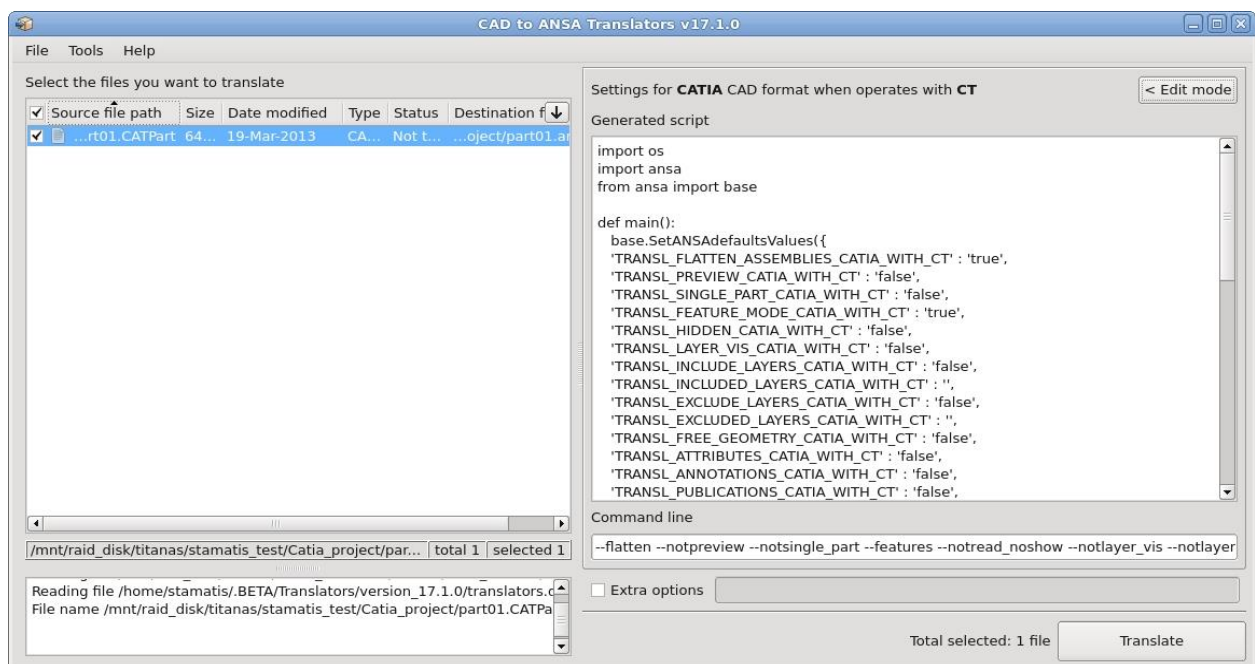
Notes:

1. - Please note that in the tabs, next to the CAD format, after the slash, there is also info about the library that the translator is going to operate with for translating this specific CAD format.
2. - There is the option to choose between two different libraries for the JT, the NX, the Parasolid and for the neutral format files.
3. - The libraries that the translator will be using for translating the above mentioned formats are recommended to be set prior the translation process. These can be set through the *File associations* card, which will be discussed further below.

Basically, the layout of the right vertical section actually directs the user to the final two steps he will have to go through when performing a translation process:

- the selection of the desired translation options and the
- push of the *"Translate"* button.

The equivalent python code and command line options to the selected translation options can be seen at any time simply by pressing the *"Script/Command >"* button. The automatically generated code snippet can be readily used inside an external python script and the command line options can be readily used in a command in the case the user is performing the same translation via a command prompt.



The translation options that have been selected can be saved in the **translators.defaults** file, so that they can be used again in future translation jobs. This can be done simply by pressing the *Save settings* button which exists in *Tools>Preferences*. The **translators.defaults** file is saved in the directory:
/home/user/.BETA/Translators/version_17.0.0/

and it is read everytime the interface is launched.

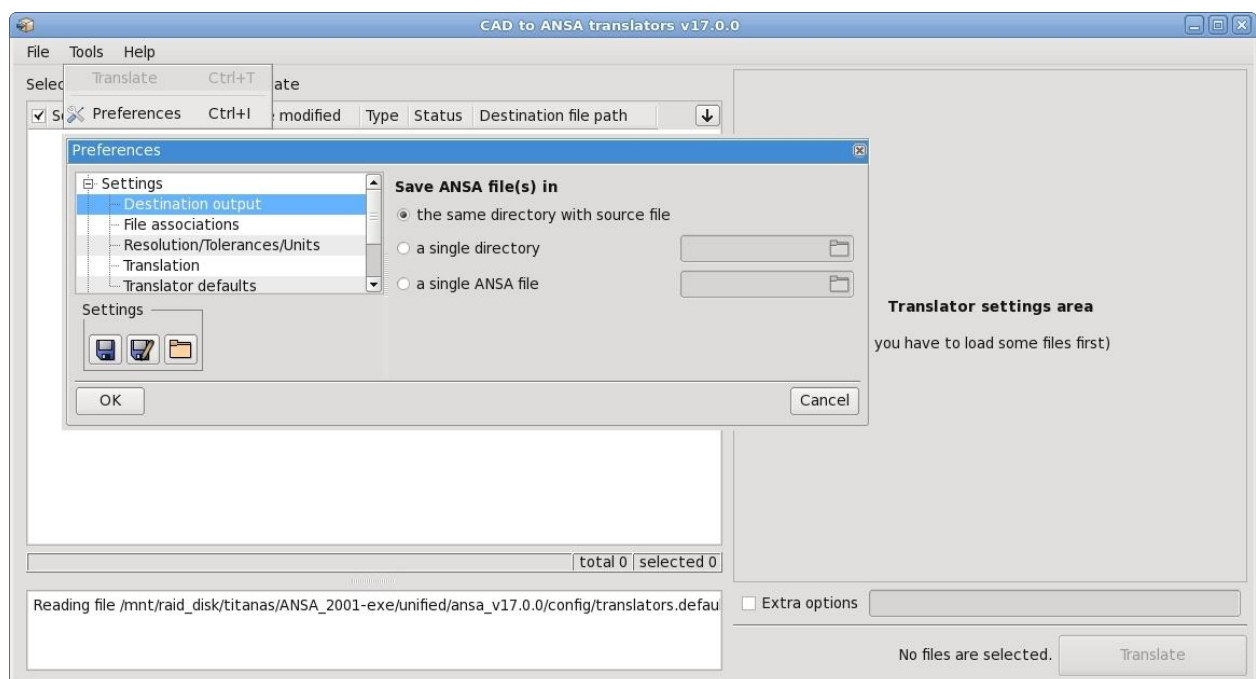
Moreover, the dimensions of the interface, size of windows, selected fonts etc., in other words the look and feel of the application's interface, is also automatically saved everytime the application is exited.

These preferred GUI settings are saved in an xml file, named **translators.xml**. This xml file is also created automatically in the directory:

/home/user/.BETA/Translators/version_17.0.0/

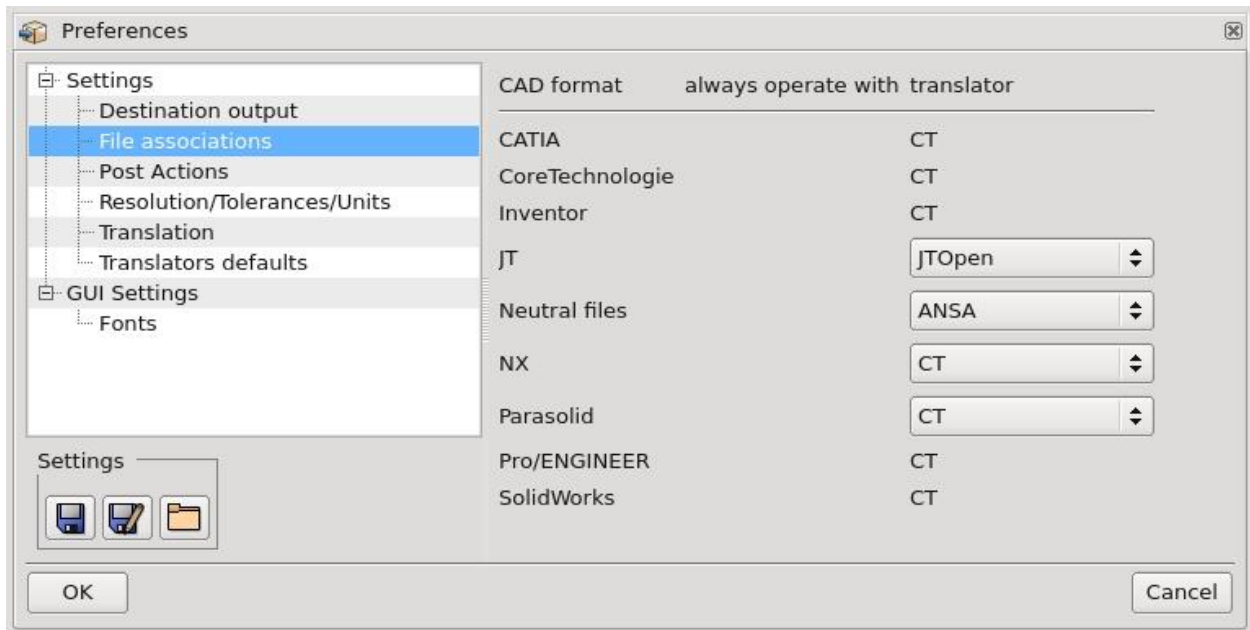
Additional settings which affect the translation process can be found under *Tools>Preferences*.

These "preferred" settings are not directly accessible like the translation options, since they may not be frequently changed between translation jobs. For example, specifying the location where the translated files are going to be saved. By default, the translated files are saved in *"the same directory with source file(s)"*, but there is also the option to specify a different destination directory (*"a single directory"*) or a single output file (*"a single ANSA file"*).

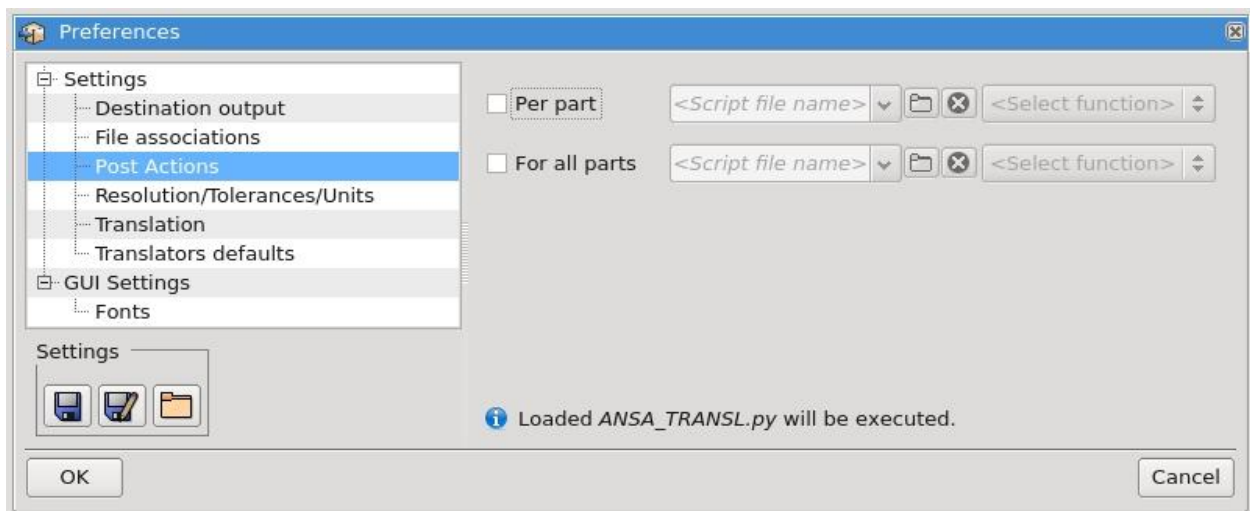


The destination directory can also be specified by directly editing the line fields under the *"Destination file path"* column. If the *"Destination file path"* column is edited directly, then this takes precedence over the setting in the *Preferences>Settings>[Destination output]* card.

As already mentioned, the translator offers the option to translate several of the supported CAD formats with different translation libraries. The preferred libraries that the translator will be using for the translation of these formats must be set prior the translation process through the **File associations** card.



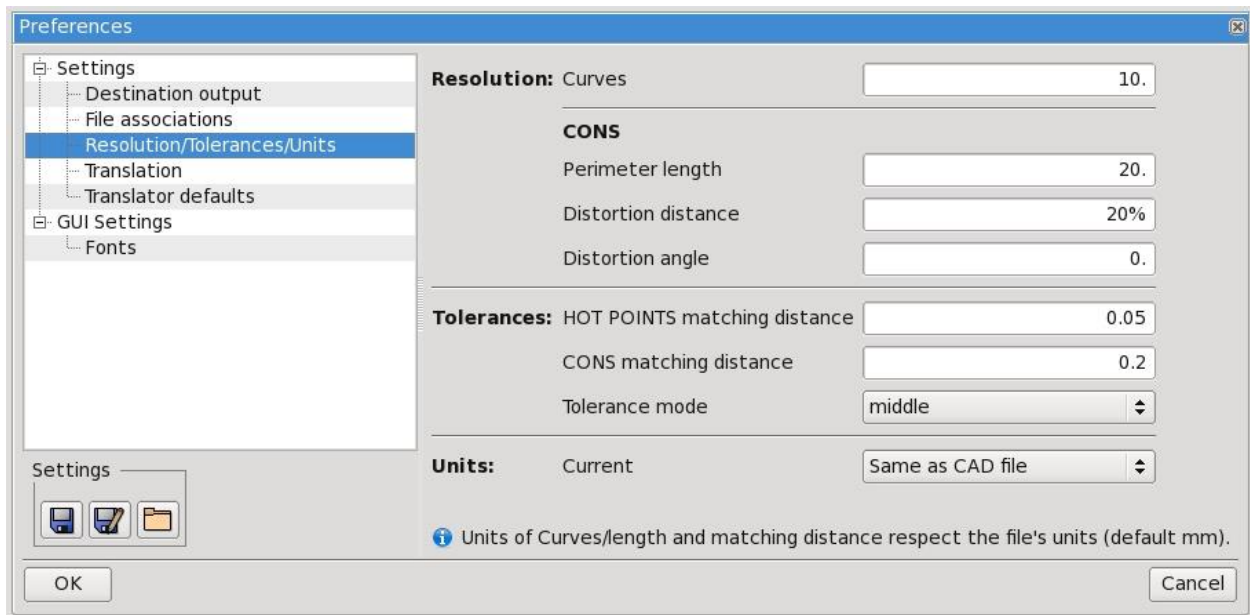
Moreover, the interface offers the option to set up additional actions to be executed after the translation of each part file or to be executed once after all part files have been translated. These additional actions must be in the form of script functions described in script files. These custom scripts can be loaded through the **Post Actions** card.



Accordingly, if additional treatment needs to be performed after the translation of each part file, then the user would have to activate the *"Per part"* option, load the script file and finally select the function to be executed. The list of available functions is automatically populated as soon as the script file is loaded. In this case, the post script function needs one single argument, the part itself.

If additional treatment needs to be performed only once after all part files have been translated, then the user would have to activate the *"For all parts"* option, load the desired script file and finally select the function to be executed. The list of functions is automatically populated as soon as the script file is loaded. When using this option the post script function needs no arguments at all.

Additional settings, which affect the database that will be finally saved are the *Resolution*, *Tolerances* and *Units* values. These can be found in the **Resolution/Tolerances/Units** card.



In case a translation process needs to be performed with specific resolution and tolerances values, then the preferred values need to be set here before the translation process starts.

Important Note:

These values are different from the Resolution and Tolerances values used by ANSA. The values set here are used only whenever a translation process is taking place, whether the translation is performed when a CAD file is opened in ANSA or whether the translation process is performed via a script.

3.3. Available options for the translation of CAD data

The list of available options for the translation of CAD data is given in this section. These options affect the outcome of the translation process in the following way:

Important Notes:

1. - The options that affect the translation are the options used in the command-line plus the options that are set within the *translators.defaults* file.
2. - The following terminal command brings up a list of all the available translation options:

On Unix platforms:

```
../ansa_v17.0.0/ansa64.sh -help --cad-options  
or  
../ansa_v17.0.0/ansa_cad.sh -help --cad-options
```

On Windows platforms:

```
../ansa_v17.0.0/ansa64.bat -help --cad-options  
or  
../ansa_v17.0.0/ansa_cad64.bat -help --cad-options
```

3.3.1. Options controlling *file I/O*

Command-line option	Description	I/O
[-o outname]	The ANSA database filename to be saved (optional).	
[-i modelname]	The input CAD-data file (required) .	
[-idir indirname]	CATIA ONLY: where to read CATIA files from.	
[-odir outdirname]	The directory where the ANSA files will be saved (optional) (Default directory is the same as the source directory).	
[-timeout <minutes>]	Terminate translation after given minutes.	

3.3.2. Options controlling *what to read from the CAD data file*

Command-line option	Description	What to read from the CAD file
[-read_noshow]	Read hidden entities.	
[-notread_noshow]	Do not read hidden entities (default) .	
[-layer #ln1,#ln2,...]	Read entities only from these layers. (ie. -layer 1,2,3)	
[-xlayer #ln1,#ln2,...]	Do not read entities from these layers. (ie. -xlayer 1,2,3)	
[-layer_vis]	Read entities only from visible layers.	
[-notlayer_vis]	Read entities from all layers (default) .	
[-read_attr]	Read any extra attributes of entities, which may have been defined in the native CAD files.	
[-notread_attr]	Do not read any extra attributes of entities, which may have been defined in the native CAD files. (This is the default for all entities except from ANSA Parts and Properties. The attributes of Parts and Properties are read by default.)	
[-read_anno]	Read annotations which may have been defined in the model.	
[-notread_anno]	Do not read annotations (default) .	
[-publications]	CATIA option only : Read any CATIA publications which may exist in the CATIA file.	
[-notpublications]	CATIA option only : Do not read CATIA publications (default) .	
[-freegeom]	Read free geometry (free surfaces).	
[-notfreegeom]	Do not read free geometry (free surfaces) (default) .	
[-categories #c1,#c2,...]	NX option only : Specify which categories to read from an NX file. Only the entities from the specified categories will be read.	
[-read_mode geometry]	Read only geometrical information.	
[-read_mode facettted_data]	Read only facettted data.	
[-read_mode both]	Read both geometrical information and FE data (default) .	
[-facettted_data all]	JT option only : Read all data which exist in the facettted data container (read facets, points and curves).	
[-facettted_data facets,points,curves]	JT option only : Read specified data from the facettted data container (ie. -facettted_data points,curves will translate only the points and curves from the facettted data container). The default is to read only the facets from the facettted data container. (ie. -facettted_data facets).	
[-layer_filters default]	JT option only : Translates only the parts in the default JT layer filter.	
[-layer_filters all]	JT option only : Translates all parts from all JT layer filters which may exist in the file (default) .	
[-layer_filters "specific filters"]	JT option only : Translates only the parts of the specified JT layer filters. The names of the JT layer filters must be inside " " (double quotes) and separated by comma (,).	
[-geom_mode solids]	JT option only : Read only the solids of an XTBrep model.	
[-geom_mode shells]	JT option only : Read only the shells of an XTBrep model.	
[-geom_mode both]	JT option only : Read both the solids and the shells of an XTBrep model (default) .	

[-read_lod all]	JT option only : Read all the LODs, where LOD is an abbreviation for Level Of Detail.
[-read_lod (number)]	JT option only : Read user specified LOD (default is -read_lod 0). This information needs to be reported to the CAE analyst by the CAD designer who exported the JT files.
[-wireframe]	JT option only : Read the Wireframe data of the model.
[-notwireframe]	JT option only : Do not read the Wireframe data of the model (default).
[-read_pmi]	JT option only : Read Product Manufacturing Information as attributes.
[-notread_pmi]	JT option only : Do not read Product Manufacturing Information (default).

3.3.3. Options controlling *how to read* the contents of the CAD data file

Command-line option	Description
[-cur3d]	Create a 3d CURVE for every CONS.
[-notcur3d]	Do not create a 3d CURVE for every CONS (default).
[-read_construction_surfaces]	Create faces from construction surfaces.
[-notread_construction_surfaces]	Do not create faces from construction surfaces (default).
[-col2pid]	Create a separate PID for each color.
[-notcol2pid]	Do not Create a separate PID for each color (default).
[-part2pid]	Create a separate PID for each part (default is to create a PID for each Body or Open Shell)
[-notpart2pid]	Do not Create a separate PID for each part (default).
[-lay2pid]	Create a separate PID for each layer (default is to create a PID for each Body or Open Shell).
[-notlay2pid]	Do not Create a separate PID for each layer (default).
[-singlepid]	Assign the specified PID for all geometry.
[-notsinglepid]	Do not create a single PID for all geometry (default).
[-flatten]	Create a single file for assemblies.
[-notflatten]	Create multiple files for assemblies (default).
[-preview]	Create a single file for assemblies containing only hierarchy (no geometry)
[-notpreview]	Do not create a single file for assemblies containing only hierarchy (no geometry) (default).
[-features]	Read in FEATURES mode (geometric sets/publications).
[-notfeatures]	Do not read in FEATURES mode (default).
[-single_part]	Create a single part database even for assemblies
[-notsingle_part]	Do not create single part database for assemblies (default).
[-volumes]	Create volume entities of CATIA solids (default).
[-notvolumes]	Do not create volume entities of CATIA solids
[-create_sets]	Create sets of named entities.
[-notcreate_sets]	Do not create sets of named entities (default).
[-ANSAcOLOR]	Assign a different color to each body PID. Let ANSA decide what colors to use for PIDs.
[-notANSAcOLOR]	Use the CAD color for each body PID (default).
[-layer_thic #In]	The layer where the thickness lines are.
[-notlayer_thic]	Do not use layer thickness lines for orientation of faces (default).
[-use_orient_vec #In]	The layer where the material orientation vector lies.
[-notuse_orient_vec]	Do not try to identify a vector for the orientation of faces (default).
[-matvec]	Use a specific line (curve) in CATIA to get thickness and orientation information.
[-notmatvec]	Do not extract thickness / orientation information (default).

How to treat the contents of the CAD file

IMPORTANT:**1.- Regarding the [-flatten] flag:**

- If active, then a single ANSA DB will be created containing the parts of the CATIA Session/Product file in the correct position and with all instances.
- If not active, then each part referenced in the CATIA Session/Product file will become a separate ANSA DB. In addition one more "master" ANSA DB will be created having the name of the Session/Product file. This "master" ANSA DB is empty of any geometry, and contains only the assembly structure described in the Session/Product file. In this case, if a user desires to recover the complete assembly of the Session/Product file, he should follow these actions:
 - (a) open the "master" ANSA DB
 - (b) merge the ANSA DBs of the individual parts into the "master" ANSA DB, activating the "auto position parts" flag
 - (c) open the Part Manager and "synchronize" the merged parts in order to get the correct instantiation.

2.- The [-layer] and [-xlayer] options are mutually exclusive.**3.- The [-singlepid], [-lay2pid], [-col2pid], [-part2pid] options are mutually exclusive.**

4.- The [-free_geom] and [-read_construction_surfaces] options must be used to translate CATIA V4 files that contain free surfaces with "no loops" (which are essentially untrimmed surfaces). Otherwise the message "Faces with zero loops" appears and no face is created and the result might be empty ANSA databases.

5.- In NX assemblies, a Part having the name of the *prt file plus the word "GEOM" at the end, specifies the geometry lying in an assembly or subassembly. NX permits the use of geometry within an assembly file together with links to other parts.

3.3.4. Options controlling the build-up of the ANSA database

Command-line option	Description
[-perf_topo]	Perform topology actions. Same as using TOPO in ANSA.
[-notperf_topo]	Do not perform ANSA topology (default).
[-layer_topo]	Paste FACES that belong in different PIDs.
[-notlayer_topo]	Do not paste FACES that belong in different PIDs (default).
[-parts_topo]	Perform topology between different parts.
[-notparts_topo]	Do not perform topology between different parts (default).
[-clean_geo]	Try to clean the geometry.
[-notclean_geo]	Do not try to clean the geometry (default).
[-respect_file_topo]	Respect the topology info found in the CAD file (default).
[-notrespect_file_topo]	Do not respect the topology info found in the CAD file.
[-heal]	Force healing of model. Currently NOT saved in the <i>ANSA.defaults</i> file.
[-noheal]	Do not use any healing function. Currently NOT saved in the <i>ANSA.defaults</i> file (default).
[-log]	Create log file, named as: <name of file>_<unique system id>.log. (default) See note.
[-notlog]	Do not create log file.
[user options]	Options listed here are passed to ANSA_TRANSL and can be used to call user defined functions that affect the translation. See note.
[-preview] / [-notpreview]	When used, an ANSA file containing the assembly structure but NO geometry will be created. (default is -notpreview).

What to consider in building the ANSA database with the translated data

Note on Extra Options:

Extra Options should be used in conjunction with the script function **ProgramArguments()**. When this function is called in an ANSA_TRANSL file, it returns all options used for the translation of the CAD-files, including the user options that were written in the "Extra Options" field. In this way, the user can signal to the ANSA_TRANSL file the execution of a specific code.

For example, imagine that a user has developed a routine called "my_routine" and has placed it inside an ANSA_TRANSL file. Then, the user can selectively execute "my_routine" when a specific flag is used in the "Extra Options" field, for example "do_it". To achieve this, the user should type "do_it" in the "Extra Options" field and use a small piece of code inside the ANSA_TRANSL, in order to read the "do_it" flag:

```

m = ProgramArguments();
len = MatLen(m);
for(i=0;i<len;i++)
{
    Print(m[i]);
    if(MatchString(m[i], "do_it"))
        my_routine();
}

```

Note on log files:

Log file names are formed by the translator execution script. Log files are named after the names of the files to be translated plus a unique system id after the name. A log file is written for every time the translator is initiated/run. In the case of an assembly file (.CATProduct, .asm, top body, etc.), only one log file will be written containing all the information messages for each part/file participating in the assembly.

Log files are always saved in the home directory of the user and only when the HOME environment variable is not set, then they are saved in the current working directory.

3.3.5. A note on the orientation of translated parts/faces

The orientation information of parts/faces generated in CATIA V4 & V5 can be read directly from the CAD source data during the translation, so these parts/faces will appear in ANSA having uniform and correct orientation. This is achieved provided that the designer has taken extra care so as to use specific design rules within the CATIA file.

Orientation information can be extracted in various ways:

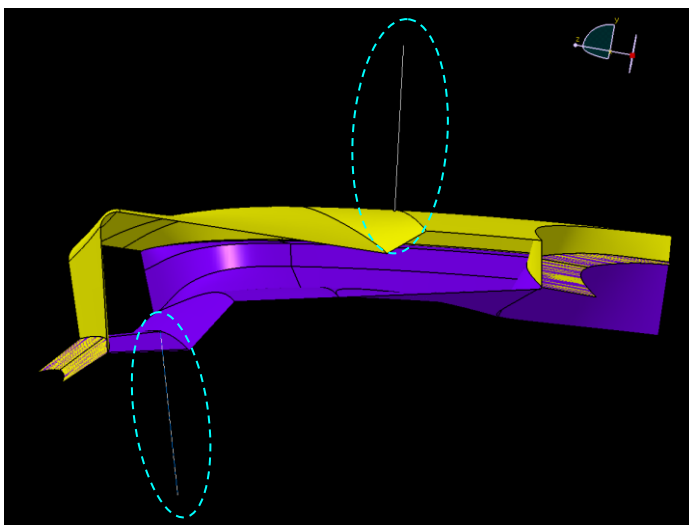
- (a) using the material vector information
- (b) using thickness lines from a specific layer, and
- (c) using the orientation vector from a specific layer

IMPORTANT:

During CATIA to ANSA translation, the translator will "connect" individual faces using the topological information (if any) already described in the CATIA file, and then will apply uniform orientation based on the rules above. However, in case of doubt about the existence of topology information within the CATIA file, it is strongly suggested to use the [-perf_topo] option in order to get uniform orientation.

The orientation options are discussed in this paragraph with the aid of the following three examples:

Example 1 - Material Vector, option [-matvec]



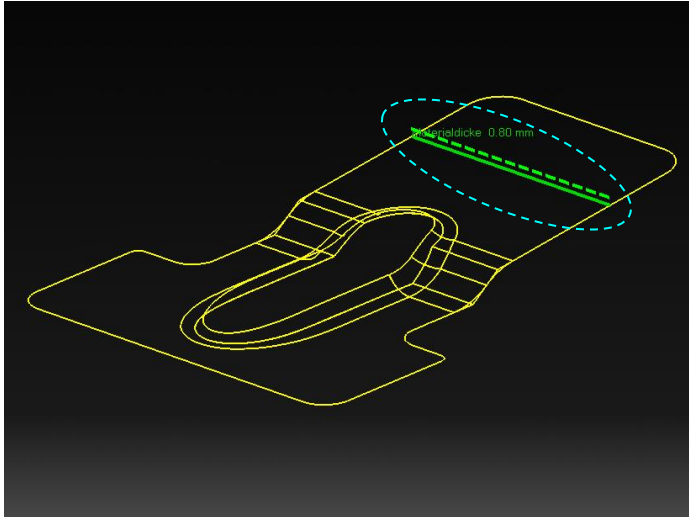
The design rule behind the "use material vector" option works only for open shell descriptions. If this option is active, the user is prompted to specify the name of the curve that corresponds to the material vector.

Then:

- The translator will search within the CATIA model file to partially match the given name with the name of a curve. Note that if no name is given, then by default the translator looks for a curve named "**Materialstaerken-Vektor**" in the CATIA model file.
- The outward direction of the above curve indicates the orientation of the face and the 1/100 of its length indicates the thickness of the part.

Warning:

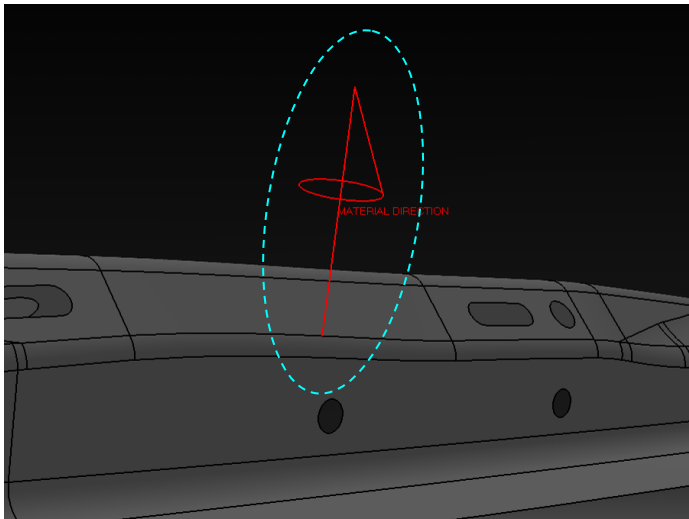
The orientation of faces might be applied incorrectly, if the material vector is found near the edges of a face and not in the middle of the face.

Example 2 - Thickness Lines, option [-layer_thick xx]

The design rule for this option uses two parallel lines: the first line lies on the actual surface of the face and the second extends parallel to it at a specific distance. The direction vector from the first line to the second indicates the orientation of the face. If this design rule exists on layer **xx**, then the option [- layer_thic **xx**] will extract this info and orient the respective face accordingly.

Note:

The distance between the two parallel lines indicates the thickness of the part.

Example 3 - Orientation Vector, option [-use_orient_vec xx]

The option works on the following design rule: the CATIA designer can draw an arrow-shaped curve on a specific layer, like the one shown on the picture on the left. The arrow-shaped curve is supposed to start on the surface of the part and extend towards the orientation of the part.

For example, if this design rule exists on layer **xx** and the [- use_orient_vec **xx**] option is used during translation, then the translator will read the curves from this layer as orientation vectors. Then it will check to which face each vector belongs to, and if the vector has the opposite direction compared to the geometry orientation, then the face is inverted.

3.3.6. A note on the extraction of thickness information

The thickness information of Catia files (if any such information actually exists in your Catia file) can also be extracted through the material vector, which is invoked through the option [-matvec]. The respective script function to be used is the function **MatVecThickness**. It accepts no arguments and returns the thickness as defined in the cad file. This script function actually returns the 1/100 of the length of the specified material vector curve. After getting the value, extra care must be taken in order to pass this information into the appropriate fields of a PSHELL card.

3.3.7. A note on the translation of NX files by using the NXOpen based translator

In order for the NXOpen-based translator to work properly with assemblies, you need to inform the translator about which directories to search, in order to find the files that make up the assembly. There are three ways of specifying the search directories:

- a) By defining the `UGII_SEARCHDIRS` environment variable. Lists all the directories, just like windows paths.
- b) By defining the `UGII_DIRFILE` environment variable, i.e. specifying the name of a file which contains the directories (one directory in each line of the file).
- c) By specifying the directories through the graphical user interface of the translator. Option named **"Directories"**.

The translator tries these three options sequentially. The first time it succeeds, it stops looking for the next option. That is, if the `UGII_SEARCHDIRS` environment variable is found, the translator does not look for the `UGII_DIRFILE` environment variable.

3.3.8. A note on reading extra attributes, which have been defined inside native CAD files

This information is usually extra attributes like names of Parts, Properties, Materials, Curves and Points.

The attributes of Parts and Properties are always read by the translator by default. For all other entities (free geometric entities), the user must use the option **"Read attributes"** in combination with the option **"Read free geometry"**. The equivalent shell command options are `[-read_attr]` and `[-freegeom]`. These extra attributes will be written into the **"Comment"** field of the corresponding ANSA entity card with the form:

```
...
ATTRIBUTE: sample filled in text
Value: sample filled in text
...
```

By using an `ANSA_TRANSL` script file, the user can then retrieve the value of interest from the **"Comment"** field and assign it to the respective field of the corresponding ANSA entity card. For further details and examples of `ANSA_TRANSL.py` script files, please also refer to the *API documentation* which is available within ANSA in the form of *html* pages.

3.4. The existence of the *translators.defaults* file

The *translators.defaults* file contains all settings that ANSA considers as being "defaults" when reading a CAD-data file. The keywords (without postfix) along with their respective default values are given below:

```

TRANSL_FLATTEN_ASSEMBLIES      = false
TRANSL_PREVIEW                 = false
TRANSL_LOG                     = true
TRANSL_SINGLE_PART             = false
TRANSL_FEATURE_MODE            = false
TRANSL_HIDDEN                  = false
TRANSL_LAYER_VIS               = false
TRANSL_INCLUDE_LAYERS         = false
TRANSL_INCLUDED_LAYERS        =
TRANSL_EXCLUDE_LAYERS          = false
TRANSL_EXCLUDED_LAYERS        =
TRANSL_INCLUDE_CATEGORIES      = false
TRANSL_INCLUDED_CATEGORIES     =
TRANSL_FREE_GEOMETRY           = false
TRANSL_ATTRIBUTES              = false
TRANSL_ANNOTATIONS             = false
TRANSL_PUBLICATIONS            = false
TRANSL_GENERATE_3D_CURVES      = false
TRANSL_CONSTRUCTION_SURFACES   = false
TRANSL_ANSACOLOR               = false
TRANSL_PART2PID                = false
TRANSL_LAYER2PID               = false
TRANSL_COLOR2PID               = false
TRANSL_SINGLEPID               = false
TRANSL_SINGLEPID_VALUE         = 1
TRANSL_CREATE_VOLUMES          = true
TRANSL_CREATE_SETS             = false
TRANSL_ORIENT_VEC              = false
TRANSL_ORIENT_VEC_VALUE        = 1
TRANSL_THICKNESS_LINES         = false
TRANSL_THICKNESS_LINES_VALUE   = 1
TRANSL_MATERIAL_VECTOR         = false
TRANSL_MATERIAL_VECTOR_VALUE   =
TRANSL_EXTERN_HEAL             = false
TRANSL_PERFORM_TOPOLOGY        = false
TRANSL_TOPO_BETWEEN_LAYERS     = false
TRANSL_TOPO_BETWEEN_PARTS      = false
TRANSL_RESPECT_FILE_TOPO       = true
TRANSL_GEOMETRY_CLEAN_UP       = false
TRANSL_TIMEOUT                 = false
TRANSL_TIMEOUT_VALUE           = 1
TRANSL_EXTRA_OPTIONS           = false
TRANSL_EXTRA_OPTIONS_VALUE     =
TRANSL_REPRESENTATION          = COMPARE
TRANSL_FILTERS                 = all
TRANSL_READ_MODE               = both
TRANSL_LOD                     = 0
TRANSL_GEOM_MODE               = both
TRANSL_WIREFRAME               = false
TRANSL_PMI                     = false
TRANSL_FACETTED_DATA           = 1, 0, 0

TRANSL_NTOLERANCE              = 0.05
TRANSL_CTOLERANCE              = 0.02
TRANSL_TOLERANCE_MODE          = middle
TRANSL_CURVES_RESOLUTION       = 10
TRANSL_PERIMETER_LENGTH        = 20
TRANSL_DISTORTION_DISTANCE     = 20%
TRANSL_DISTORTION_ANGLE        = 50

```

The above default settings can also be edited from within ANSA (*Windows>Settings>Translators*) by selecting the preferred options and by clicking on the *Save settings>[Translators]* button.

The effect of the *translators.defaults* file is reflected in two levels: (a) in a level that refers to "what is read from the CAD-file" and (b) in a level that refers to "topology actions taken in ANSA":

(a) The *translators.defaults* settings that control "what is read from the CAD-file" are:

	<i>translators.defaults</i> setting	GUI-driven translation option	Command-line translation option
1.	TRANSL_LAYER_VIS	"Read visible layers"	[-layer_vis] / [-notlayer_vis]
2.	TRANSL_HIDDEN	"Read hidden entities"	[-read_noshow] / [-notread_noshow]
3.	TRANSL_ATTRIBUTES	"Read attributes"	[-read_attr] / [-notread_attr]
4.	TRANSL_ANNOTATIONS	"Read annotations"	[-read_anno] / [-notread_anno]
5.	TRANSL_PUBLICATIONS	"Read publications"	[-publications] / [-notpublications]
6.	TRANSL_FREE_GEOMETRY	"Read free geometry"	[-freegeom] / [-notfreegeom]
7.	TRANSL_INCLUDED_CATEGORIES	"Categories"	[-categories] ie. <i>-categories <c1>,<c2>,...</i>
8.	TRANSL_FILTERS	"Layer filters"	[-layer_filters default] / [-layer_filters all] (default) / [-layer_filters "specific filters"] names of specific filters must be inside ("double quotes") and separated by comma (,))
9.	TRANSL_READ_MODE	"Read mode"	[-read_mode] "geometry" reads geometry only, "facets" reads facets only, "both" reads both (default)
10.	TRANSL_LOD	"Level of detail (LOD)"	[-read_lod] "all" reads all the LODs, "number" reads the specific LOD
11.	TRANSL_GEOM_MODE	"Geometry mode"	[-geom_mode] "both" reads both the solids and the shells of an XTbrep model (default), "solids" reads only the solids of an XTbrep model, "shells" reads only the shells of an XTbrep model
12.	TRANSL_WIREFRAME	"Read wireframe"	[-wireframe] / [-notwireframe]
13.	TRANSL_PMI	"Read PMI"	[-read_pmi] / [-notread_pmi]
14.	TRANSL_FACETTED_DATA	"Read facets" "Read curves (from facetted data container)" "Read points (from facetted data container)"	[-facetted_data all] "all" reads all data which exist in the facetted data container (i.e. facets, points and curves). [-facetted_data facets,points,curves]

For the above settings any options that are given through the command-line take precedence over the equivalent settings in the *translators.defaults* file. This means that:

The options given in the command line take precedence over the equivalent settings in the *translators.defaults* file. For example, consider a command-driven CATIA-file translation where the TRANSL_HIDDEN in the *translators.defaults* is set equal to true, but the user types the [-notread_noshow] option in the command line. In this case, the hidden entities will not be translated. On the other hand, if the user does not add any option concerning the hidden entities, then these will be translated as dictated by the *translators.defaults* setting.

(b) The *translators.defaults* settings that control the "topology actions taken in ANSA" are:

	<i>translators.defaults</i> setting	Command-line translation option
1.	TRANSL_PERFORM_TOPOLOGY	[-perf_topo] / [-notperf_topo] (default)
2.	TRANSL_TOPO_BETWEEN_LAYERS	[-layer_topo] / [-notlayer_topo] (default)
3.	TRANSL_TOPO_BETWEEN_PARTS	[-parts_topo] / [-notparts_topo] (default)
4.	TRANSL_RESPECT_FILE_TOPO	[-respect_file_topo] (default) / [-notrespect_file_topo]
5.	TRANSL_GEOMETRY_CLEAN_UP	[-clean_geo] / [-notclean_geo] (default)
6.	TRANSL_EXTERN_HEAL	[-heal] / [-noheal] (default)

Settings 2 to 5 follow the general rules given earlier. This means that any options that are given through the Command-line take precedence over the equivalent settings in the *translators.defaults* file.

Setting No. 1 has a GLOBAL effect: it determines whether ANY topological actions will be taken AT ALL when the native CAD files are translated into ANSA databases. During this "topology" step, ANSA decides on the connectivity of the geometric entities, so that adjacent Faces are connected along their common boundaries. The result of this action depends also on the current tolerance settings.

IMPORTANT:

By default, the **TRANSL_PERFORM_TOPOLOGY** setting is set to "false". This means that ANSA will not take any actions with respect to topology, regardless of options 2 to 5 being set to true. Hence, if any "connectivity" is seen in the ANSA database, it is not a result of ANSA topology actions, but it was already prescribed in the native CAD file itself.

3.5. Messages during translation

When a translation process is initiated by pressing the "Translate" button, a series of messages start to appear in the text window on the bottom left of the graphical interface. This is where the translator prints all error and warning messages and all information necessary for monitoring the progress of a translation process. The same messages appear in the command window.

The messages printed in the text window can be categorized in the following:

- (a) checking license on server
- (b) system info
- (c) ANSA version info

```
Trying 6007@ansa_srv ....
Found License daemon on ansa_srv
-----
System Info
System name: Fedora
System version: 12
Kernel version: 2.6.31.12-174.2.3.fc12.x86_64
Architecture name: x86_64
System type: Linux
Architecture type: X86_64
-----
A N S A
version: 16.1.1, compiled: Jan 22 2016, 02:31:14
built: 64-bit, sn: d932e69c940d
platform: Linux x86_64 2.6.31.12-174.2.3.fc12.x86_64 little-endian
company: BETA CAE Systems S.A.(cell)
-----
```

- (d) existence of *ANSA.defaults* and *translators.defaults* file
- (e) existence of *ANSA_TRANSL* and *ANSA_TRANSL.py* file
- (f) messages related to the progress and the result of the translation process

Items d) to f) are discussed in the following paragraphs.

3.5.1. Messages about the existence of the *ANSA.defaults* and *translators.defaults* file

The translator will look for the *ANSA.defaults* file and the *translators.defaults* file in all designated locations and the relative messages will be displayed. Regardless of this, the translation process will continue normally, ignoring any settings that were to be found within the *translators.defaults* file.

```
-----
Reading file /mnt/raid_disk/titanas/ANSA_2001-exe/unified/ansa_v16.1.1//config//ANSA.defaults
Reading file /home/stamatis/.BETA/ANSA/version_16.1.1/ANSA.defaults
Reading file /mnt/raid_disk/titanas/ANSA_2001-exe/unified/ansa_v16.1.1//config//translators.defaults
Reading file /home/stamatis/.BETA/translators/version_16.1.1/translators.defaults
```

Note the detailed information on the effect of the *translators.defaults* settings to the result of a translation process given in paragraph 3.4.

3.5.2. Messages about the existence of the *ANSA_TRANSL* and *ANSA_TRANSL.py* file

The ANSA script loader will look for the *ANSA_TRANSL* and *ANSA_TRANSL.py* file in all designated locations, in order to read any extra information for the manipulation of the CAD-data contents or any additional instruction for the handling of the CAD files to be translated.

This additional info or instruction goes into an *ANSA_TRANSL* file in the form of scripts. Additionally, post-translation functionality may also be included in an *ANSA_TRANSL* file.

For further details and examples of *ANSA_TRANSL* files, please also refer to the *API documentation* which is available within ANSA in the form of *html* pages.

IMPORTANT:

- If an ANSA_TRANSL or ANSA_TRANSL.py file is not found in any of the designated locations, then a NOTICE message will appear. This notice is irrelevant to the progress of the translation process, which will continue normally, ignoring any scripts that were to be found in an ANSA_TRANSL or ANSA_TRANSL.py file.

```
-----
NOTICE: script [/mnt/raid_disk/titanas/ANSA_2001-exe/unified/ansa_v16.1.1//config/ANSA_TRANSL] not found
NOTICE: script [/home/stamatis/.BETA/ANSA/version_16.1.1/ANSA_TRANSL] not found
NOTICE: script [/home/stamatis/ANSA_TRANSL] not found
NOTICE: script [/mnt/raid_disk/titanas/ANSA_2001-exe/unified/ansa_v16.1.1//config/ANSA_TRANSL.py] not found
NOTICE: script [/home/stamatis/.BETA/ANSA/version_16.1.1/ANSA_TRANSL.py] not found
NOTICE: script [/home/stamatis/ANSA_TRANSL.py] not found
```

3.5.3. Messages related to the settings, progress and result of the translation process

The translation options selected for the current translation job are printed in the info window as "Current options" in the form of a list.

```
read_version: /home/packager/bcs_v16.1.1/betaworks/betaworks-common/std/a_adb.c:611 goto NOT_ANSA_DATABASE
Reading file :
/mnt/raid_disk/titanas/stamatis_test/Catia_project/part01.CATPart
```

Current options

```
-----
Create log file      : No
Flatten             : Yes
Preview             : No
Force single part   : No
Read geom sets/publications : No
Read noshw          : No
Read visible layers : No
Including layers     : No
Excluding layers    : No
Read free geometry  : No
Read attributes     : No
Read annotations    : No
Create 3D curves    : No
Read construction surfaces : No
Use ANSA colors     : No
Convert layers to PIDs : No
Convert parts to PIDs : No
Convert colors to PIDs : No
Use single PID      : No
Create volumes      : No
Create sets         : No
Geom mode           : both
Read mode           : both
Read orientation vector : No
Read thickness lines : No
Read material vector : No
Perform topology    : No
Heal geometry       : No
Timeout             : No
Working Units       : Use File Units
Extra Options       : No
```

Moreover, messages about the progress of the translation phases are also printed. Finally, information about the contents of the saved database is also displayed, along with the location path where the ansa database is saved.

```

General info
-----
Toolkit type   : Core Technologie
Toolkit version : CT CoreTechnologie - 3D_Kernel_IO 4.0 Sp2 (Linux 64)[build:147//cote-rotie-02-07-2015]

File version   : CATIA V5R9 SP0 HF0

File type      : CATIA_V5

License file    : /mnt/raid_disk/titanas/ANSA_2001-exe/unified/ansa_v16.1.1/lib/CT_2015_SP2/libCT.key

Translation phases
-----
Initialization
  Completed
File loading
  Completed
  Reading file
    Completed

Reading file. Please Wait.
Please Wait. Saving Database

Save Completed

Database info
-----
Surfaces :8
Faces    :8
Curves   :0
Points    :0
Coords    :0
Facets    :0

Additional info
-----
Output file   : /mnt/raid_disk/titanas/stamatis_test/Catia_project/part01.ansa
Log file path : /home/stamatis/part01.CATPart1453739168.log

Status
-----
File successfully translated!

Translation finished on 25/01/2016 at 06:26:08 pm

```

The above translation output messages may differ slightly depending on the format of the CAD file and the library selected to accomplish the translation. Note that the same output messages can also be seen in the terminal window.

3.5.4. Additional messages and Exiting Codes

Additional messages related to licensing as well as warnings/errors related to the progress of the translation process are displayed. At the end of the process, the translator returns the following exiting codes:

Exit Code	Description
-1	Licensing related problems: server down, no valid/expired license etc.
0	OK: Translation process terminated normally.
1	No input filename or error in reading the input file.
2	Unsupported input file format.
3	Translation library initialization errors.