

3D Evolution[®]

SOPHISTICATED
INTEROPERABILITY SOLUTIONS FOR
CAD | CAE | DIGITAL FACTORY

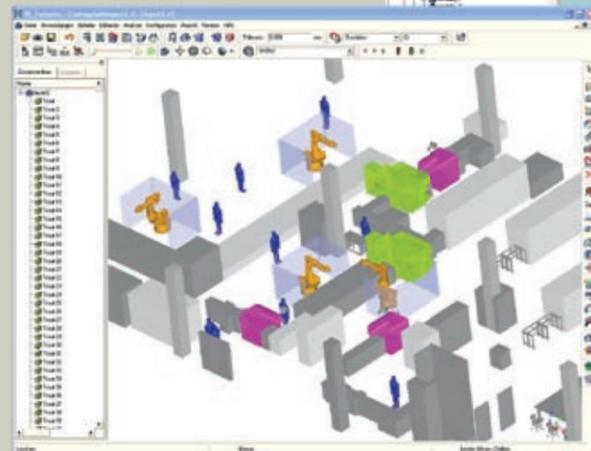
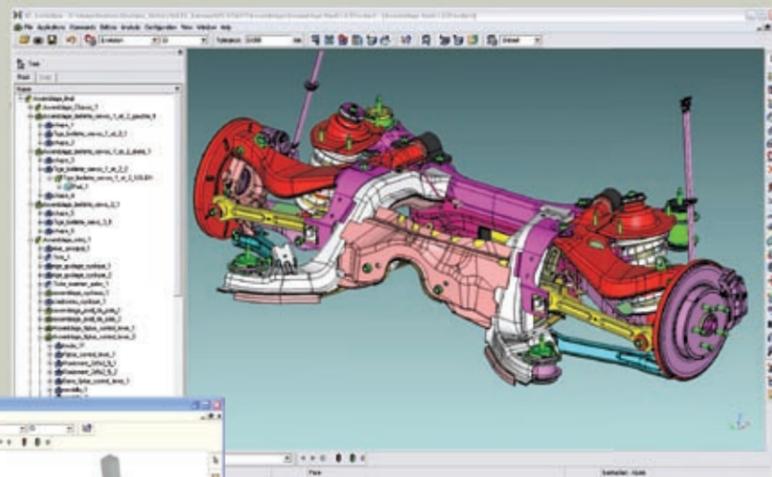


CONVERSION ENGINE

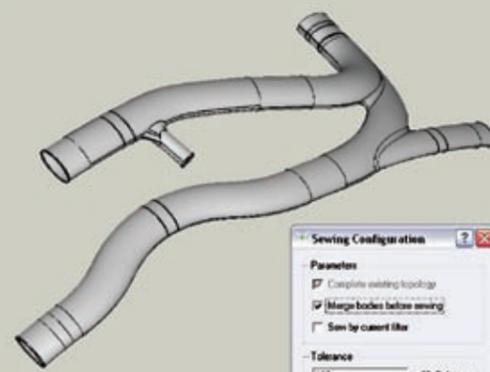
HIGH PERFORMANCE FOR COLLABORATION

The optimized Memory management makes it possible to convert even very large assemblies in one pass.

The assembly structure can also be loaded separately. Single subassemblies and parts can be loaded in a second step.



3D_Evolution® has specific interfaces for VR, robot-, and digital manufacturing systems.



The function "Merge Bodies" makes it possible to automatically merge single faces into bodies and solids.

The increasing competitiveness in the value-added design chain requires optimal interoperability, ensuring effective data conversion capabilities for all CAX-Systems involved. A time-saving and complete conversion of 3D models is an indispensable prerequisite for a successful integration of all systems involved, be it for CAD design, FEM calculation, CAM manufacturing and even the digital factory. The modular universal converter 3D_Evolution® has been especially developed for easy data exchange with customers, sub suppliers and engineering partners. The software supports all primary systems and data formats such as CATIA®, Unigraphics, ProEngineer, Ideas, SolidWorks, Robcad and many more.

The comprehensive architecture of the 3D_Evolution kernel permits a single process conversion of assemblies, containing all possible types of 3D models

such as skins or solids with and without history, and even faceted data.

The basic module 3D_Evolution® Conversion Engine is the ideal, timesaving tool for an automatic conversion of large assemblies or even very complex geometries. Specific algorithms and memory management functions ensure the successful conversion and optimal process reliability. All native and standard interfaces have been exclusively designed by CoreTechnologie, allowing the user to access the data without the CAD-System's license.

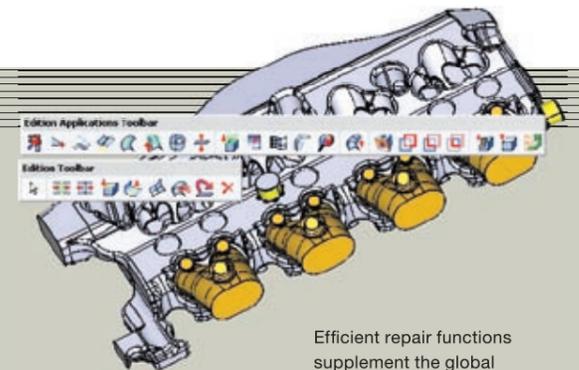
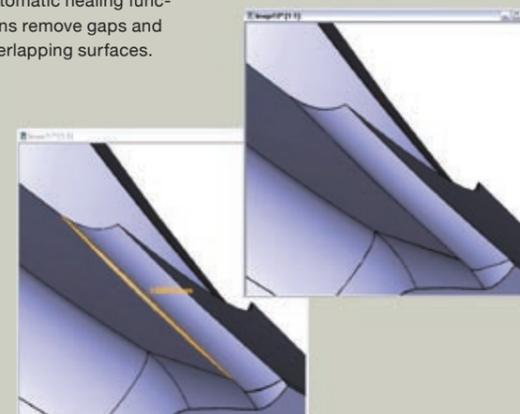
Thanks to the adaptive conversion process, the tolerance and mathematical description of the models are automatically adjusted to meet the requirements of the target system. During the conversion process, the intelligent kernel also detects canonical geometry such as cylinders, cones, tori and planar surfaces. Through healing functions,

structural and construction errors and inaccuracies like overlaps and gaps are corrected automatically. Single surfaces will be sewn together in order to create perfect solids of a user-defined accuracy. The result ensures topologically consistent models in the target system.

The powerful and easy to use graphical user-interface makes it possible to visualize, analyze and repair models of all systems and formats. Intelligent functions make complex geometry operations easy, allowing even sophisticated corrections within seconds.

The script language and the batch mode provide the process automation and integration with PDM systems. The flexibility and scalability offered by 3D_Evolution® means it is immediately ready- to-start in any PLM environment.

Automatic healing functions remove gaps and overlapping surfaces.



Efficient repair functions supplement the global healing. Semi-automatic functions for the correction of twisted faces, trimming, creation of faces as well as adjustment of gaps and edge curves are only a few of the highlights.

FEATURE BASED

INTEROPERABILITY WITH HISTORY AND PARAMETERS

The data structure of the 3D_Evolution[®] Feature Based kernel enables the representation of all feature types used by today's CAD-Systems. 3D_Evolution[®] native interfaces extract the construction history and parametrics directly from the binary data, without requiring access to a license of the source CAD-System.

By importing binary CAD data the complete information about the history parametrics can be retrieved. This technology also accelerates the reading process and enhances the flexibility for the user. A further highlight of 3D_Evolution[®] Feature Based is the history optimization during the transformation process, taking full account of the feature types available in the target system. If necessary, the software can also perform the linearization of the tree and the recognition of hole features.

After conversion, 3D_Evolution[®] FEC-Plug-ins in the target CAD-System automatically generate the model. The

CoreTechnologie FEC-format – Feature Enhancement Control – contains Meta objects and data such as assembly structure, features and the related parameters, attributes, B-REP geometries, as well as the optimized process exactly adapted for the respective target system. The process of creation is completely operated, controlled and logged by 3D_Evolution[®] Feature Based. Even when considering complex models, the conversion is accomplished within a few minutes.

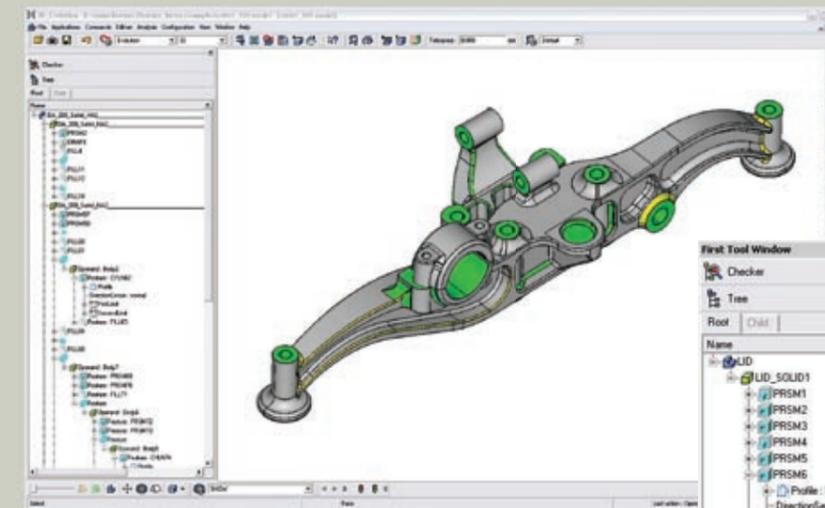
If parametric models contain skins for surface split operations or imported solids as starting geometries, the healing functions provide an optimal basis for subsequent operations.

Another part of the Feature Based module is the feature recognition for non-parametric models. Through feature recognition algorithms for holes, chamfers, fillets, patterns, pockets, and extrusions, a system generated history

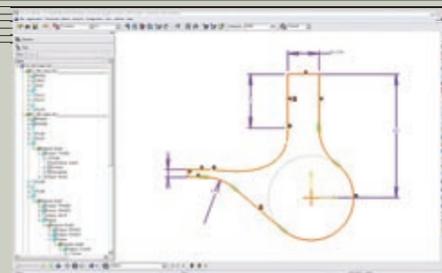
tree will be created automatically. Also, mixed models containing non-parametric elements can be re-parameterized by means of this technology.

During conversion, specific assembly functions also optimize the assembly structure for the specified target system, e.g. multi body parts can be changed into assemblies with an external reference.

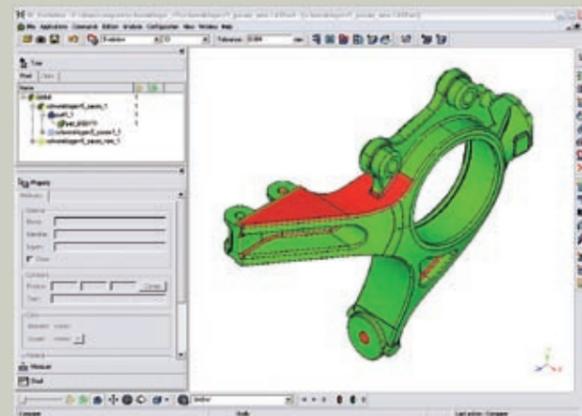
With the integrated compare function, the resulting geometry can be compared to the source model. Potential discrepancies greater than the user-defined tolerance are documented through a log file and will be highlighted in the graphical user interface of 3D_Evolution[®].



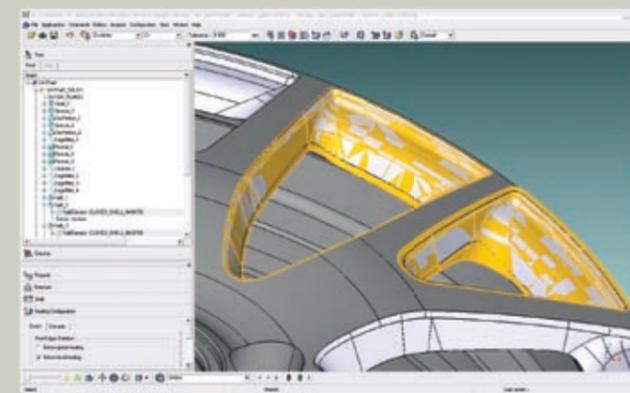
History and parameters of a CATIA[®] V4 Model can be read by 3D_Evolution[®]. Native files are loaded without requiring access to a CAD-License.



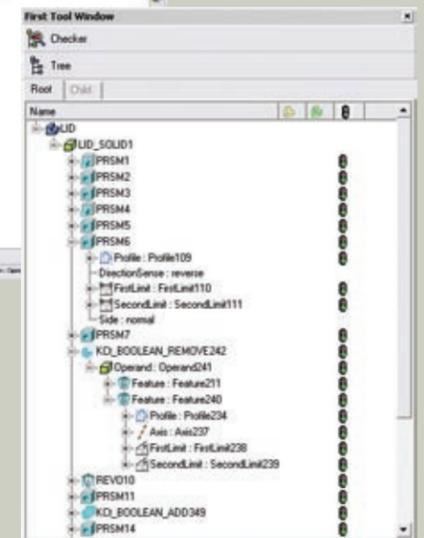
The sketches of the features and the constraints will be converted.



Models in different formats can be compared for accuracy. Discrepancies will be highlighted in a different color. This function is also used to validate the result of a parametric conversion.



Healing functions automatically sew and adjust the skins involved in surface split operations.



The symbols in the feature tree of 3D_Evolution[®] display the status and success of the creation process in the target system.



SIMPLIFIER

INTELLECTUAL PROPERTY PROTECTION THROUGH MODEL SIMPLIFICATION

At the push of a button the simplifier module is able to generate a bounding geometry of individual parts or assemblies. This is useful for protecting your intellectual property or generating simple and light models for use in mock ups and the digital factory. The simplification process can be executed either interactively or fully automated in batch mode. Details to be preserved during simplification can be selected by the user. During this process circles and axes - instead of the extracted

holes - can be generated for assembly positioning.

The result of the simplification is a bounding geometry in the form of a perfect solid that can be handled perfectly in every kind of target system. If desired, the individual parts can be merged in a second step through a special forced Boolean merge function to one volume. Simplified models are (fully) convertible in any B-Rep or tessellated formats. The output in CGR or JT in practice

allows a data compression of a factor around 100.

As with all other 3D_Evolution® functions, the simplifier can also run in batch mode and enables automatic simplification of even of very large assembly structures within the shortest space of time and without manual work.

FEM TOOLS

OPTIMIZED GEOMETRY FOR MESHING

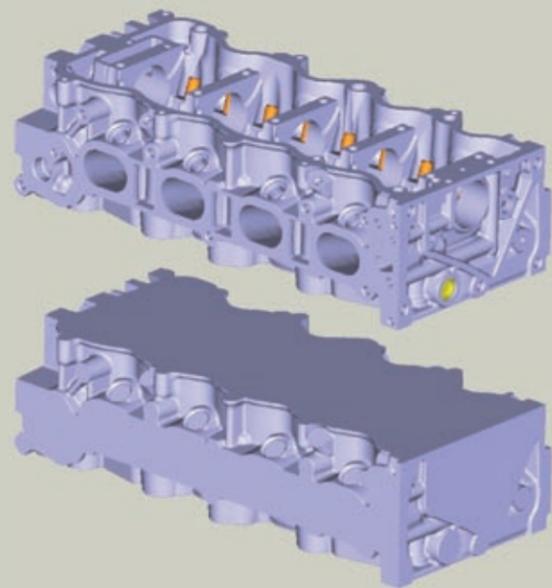
3D_Evolution® FEM tools are the ideal link for the seamless connection between the CAD and the FEM worlds. Models can be optimized and converted from all data formats for FEM analysis, irrespective of the CAD systems involved. The graphical user interface has effective and easy functions for the manipulation of CAD geometry. Also, the details regarding material, weight, center of gravity, volume and Tailored-Blanks can be directly extract-

ed from the native files, made ready to be handled in further processes.

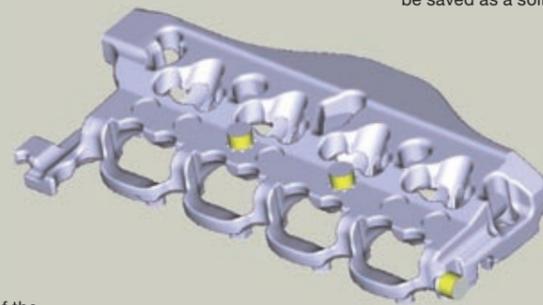
Mini patches and their basic surfaces can be merged through the metaface function within user-defined tolerances. Furthermore, the metafacing process can be run fully automated or interactively. The elimination of problematic mini patches and long thin faces brings a faces reduction of approximately 40-70%. The resulting geometry comprises

fewer elements and can be meshed and handled much easier in the next process.

Through intelligent semi-automatic "defeaturing" functions for geometry simplification, features such as holes, rounds, chamfers or other irrelevant details can be eliminated from the models within seconds, without any specific CAD know-how.

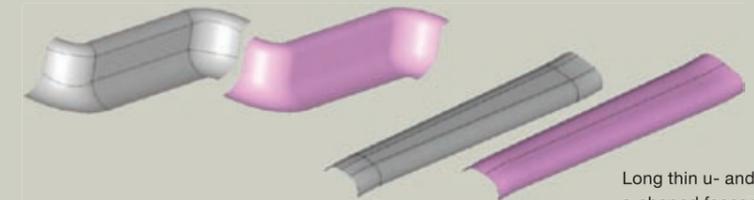
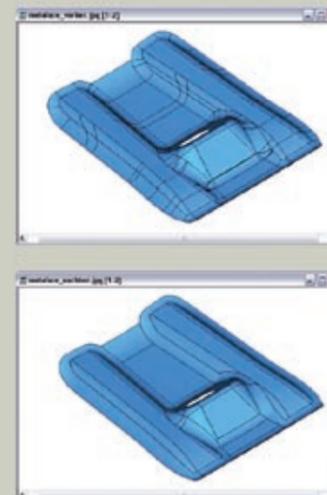


The result of the automatic simplification is a bounding geometry and it is a perfect solid.

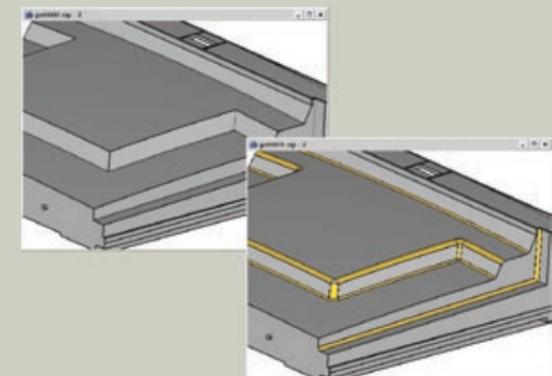


Also the automatically extracted inner geometries displayed here (e.g. the water jacket of the cylinder head) can be saved as a solid.

Mini-faces will be merged with the adjacent faces and the related surfaces will be merged.



Long thin u- and s-shaped faces will be merged into one entire swept face.



For the removal of rounds and holes the software provides efficient semi-automatic functions.

QUALITY CHECKER

CERTIFIED GEOMETRY CHECKER FOR ALL CAD FORMATS

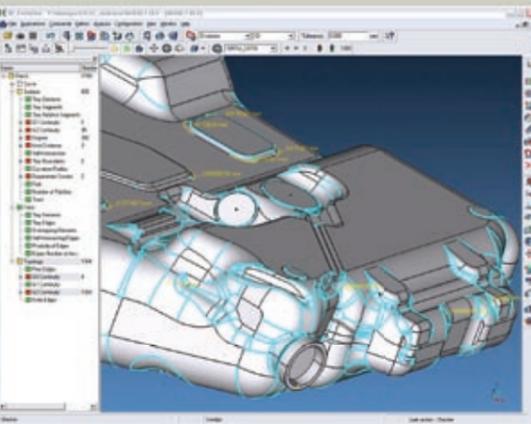
The certified 3D_Evolution® Quality Checker verifies all 3D geometries irrespective of the CAD format. It is the only conversion tool with healing functions that is certified in accordance with SASSIG/PDQ and VDA 4955/2 specifications.

Depending upon the application or customer requirements, testing profiles containing the relevant testing criteria can be saved. The result is in conformity with SASSIG/PDQ and

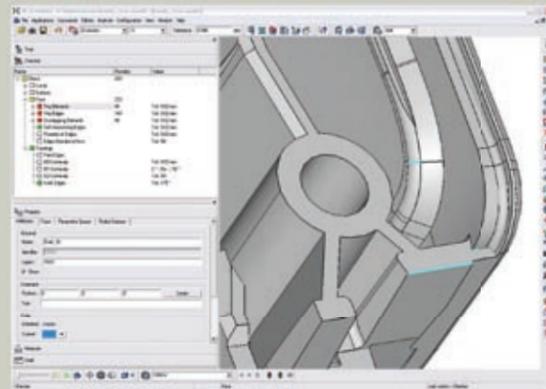
VDA 4955/2 specifications and can be saved in an html format. Similar to all other modules, the Quality Checker can be applied for individual parts or assemblies and runs also in batch mode.

Failures are visualized and accurately displayed on the model. The listing of error types in the Checker's tree structure allows for the systematic selection of the geometries and error clearings. Specific advanced repair functions allow for easy and fast corrections of

double surfaces and twisted faces, gaps and overlapping surfaces, mini elements as well as other typical errors on complex 3D geometries. Furthermore, 3 D_Evolution® is able to switch from surface to solid mode at the push of a button.



For different customers and requirements specific checker profiles can be defined and saved.



Geometry errors are displayed on the models. Special advanced repair functions provide the power to correct the problem.

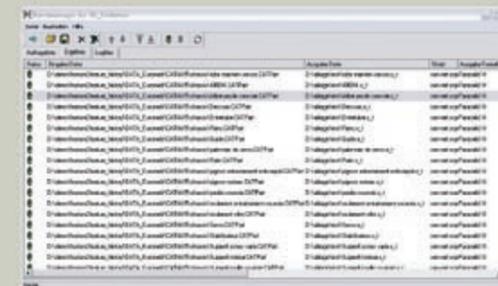
ENTERPRISE BATCHMANAGER

WEB SERVICE AND PROCESS AUTOMATION

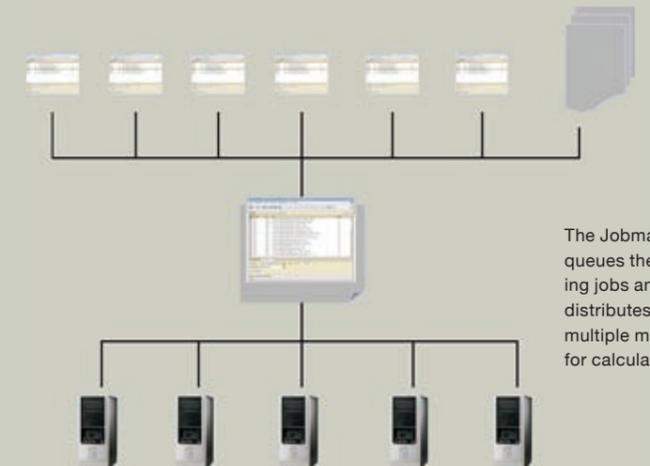
The Enterprise Batchmanager allows all users in a company network to access the 3D_Evolution® batch mode. Also, users of different Windows, Linux and Unix operating system environments are free to individually define their conversion tasks being processed in the central job list.

The job manager on the batch server distributes the conversion tasks from the job list and PDM-system on one or more machines defined for the computation. By the utilization of this technology, multiple network computers can be used to convert extensive data. Since no idle time occurs between computations, the maximum performance coupled with optimal use of resources is guaranteed.

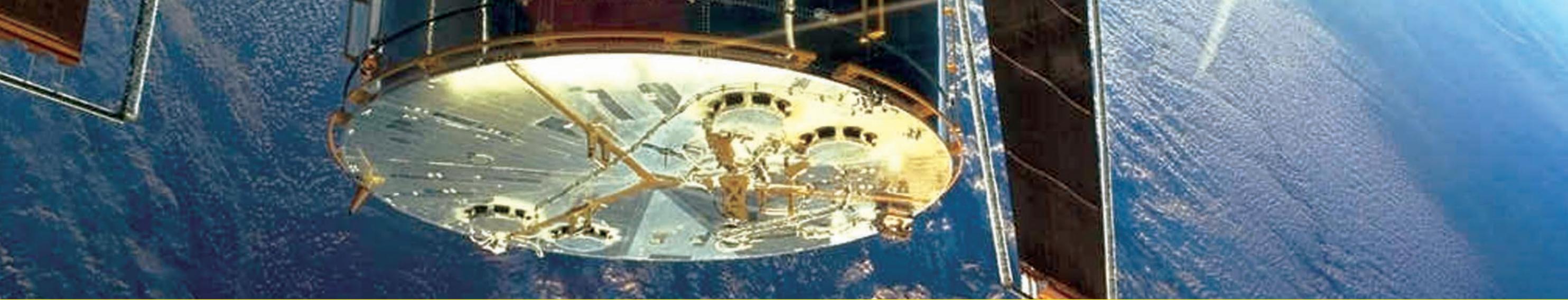
The Enterprise Batchmanager also supports global conversion tasks that automatically convert CAD data from source directories into predefined specific formats. If the function is activated, a process (Daemon) monitors the directory contents regularly. As soon as a dataset is moved in one of the directories, the conversion process starts automatically.



The Batchmanager also works in heterogeneous Windows-/Linux environments.



The Jobmanager queues the incoming jobs and distributes them to multiple machines for calculation.



VIEWER

VISUALIZING AND ANALYZING 3D MODELS

Equipped with powerful graphics and fast interfaces, the viewer is able to load and analyze all CAD formats with impressive speed. Functions like the generation of dynamic sections with transparent section plane, filtering of layers and colors, printing, as well as a detailed assembly-structure presentation help the user optimize the communications with business partners in heterogeneous CAD landscapes.

The high end interfaces of the viewer, also deployed in the Conversion Engine, are able to read CATIA V5 mixed models and tolerance information, CATIA V4 sessions, piping elements, as well as many other special data formats and information. The viewer works with the exact surface description of the models, allowing for precise measurement and exact calculation of body properties like surface, volume, mass, center of gravity and moments of inertia.

Furthermore, the quality analysis function gives the user an overview regarding the quality of the models. With the optional FlexLM Company-license, the Viewer can be used throughout the entire company.

OEM SOLUTIONS

INTEGRATED READERS WITH GEOMETRYKERNEL

The CT-Kernel-IO is the first mathematical geometry kernel with API, especially designed for CAD data import. The architecture of the intelligent kernel is based on the leading CAX converter 3D_Evolution® and handles solids, surfaces and faceted models. The interrogation functions are standardized for all formats, allowing the access to all parameters in the C++ classes. Thanks to the CT-Kernel-IO, powerful functions such as healing, assembly management, high-precision

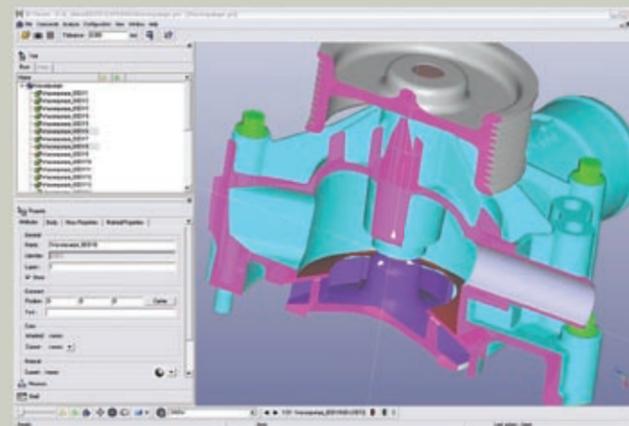
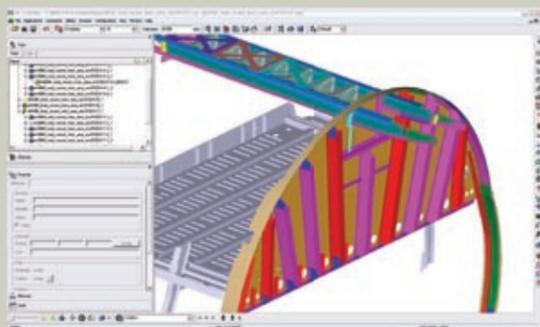
tessellation, metaface, or automatic model simplification can be deployed and available in your software quickly. The API is based on programming language C++ and on the Compiler VisualStudio.NET. The software comes with complete documentation and programming examples.

The product CT Convert_EXE is a compact 3D model "loader" that provides very easy integration in your software solutions. Convert_EXE is based on the

reliable 3D_Evolution® interfaces for the import of all current CAD data formats. The script language provides further options such as automatic data corrections, filtering, or specific assembly functions.

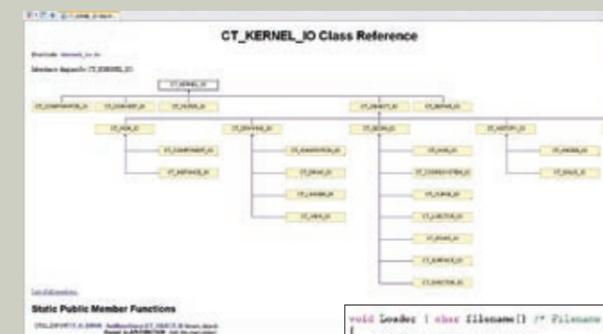
Like all other 3D_Evolution® products, Kernel_IO and Convert_EXE are available for Windows 2000 and XP, as well as for Linux operating systems.

By means of optimized memory handling and high performance interfaces very large models can be read rapidly.



Sections can be created also on assemblies. The transparent section

plane can be dynamically moved using the mouse.



The detailed documentation in HTML-Format includes a complete description of all functions and samples of "C++" code to assist with API usage.

```

void Loader ( char filename[] /* filename to load */
{
    CT_SHOW_ID main_group_id;
    CT_ERROR ct_error = CT_KERNEL::loadFile(filename,main_group_id);
    if ( ct_error || !main_group_id ) return;
    const* main_name;
    int show, material_index, layer_id;
    ct_error = CT_KERNEL::GetAttributes(main_group_id,show,material_index,layer_id,main_name);
}

ct_error = CT_KERNEL::Check(main_group_id,number_of_ingredients,number_of_free_edges,max_ingredient);
    
```



CT CoreTechnologie is the leading global provider of 3D CAD data conversion software. Our mission is to optimize MCAD interoperability in the value-added design chain and to develop customized solutions for PLM integration and process automation. The 3D_Evolution® product-line comes with the most innovative CAD translation technology available on the market today. Our Libraries for the integration in OEM-software are deployed in many well known CAX-solutions.

Car manufacturers and sub-suppliers, aerospace, consumer goods, as well as plant engineering and construction industries are our main customers, benefiting from the sophisticated knowledge incorporated in 3D_Evolution®. Utilize our extensive experience to optimize your business process and secure the success of your company in the future.



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