

AutoCrear

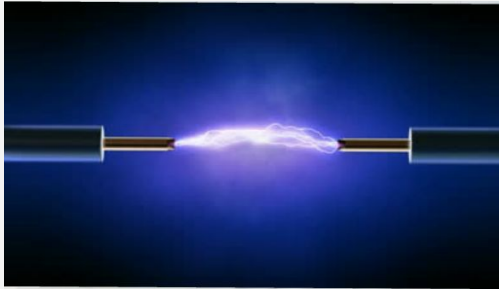
The state of the art creepage and clearance analysis tool
for mechanical and electrical CAD data

TECHNICAL PRODUCT INFORMATION

Introduction

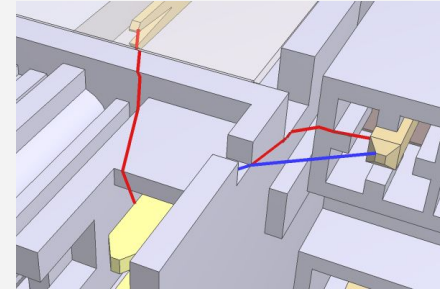
Problem: Creepage and Clearance

Electric assemblies must fulfill strong safety regulations regarding creepage and clearance distances in order to prevent hazards caused by electric sparks. However, these distances depend on many complex aspects and without a software tool, a designer has to resort to manual measurements and rough approximations. This is not only time consuming, but also highly inaccurate and often causes expensive loops in the production pipeline.



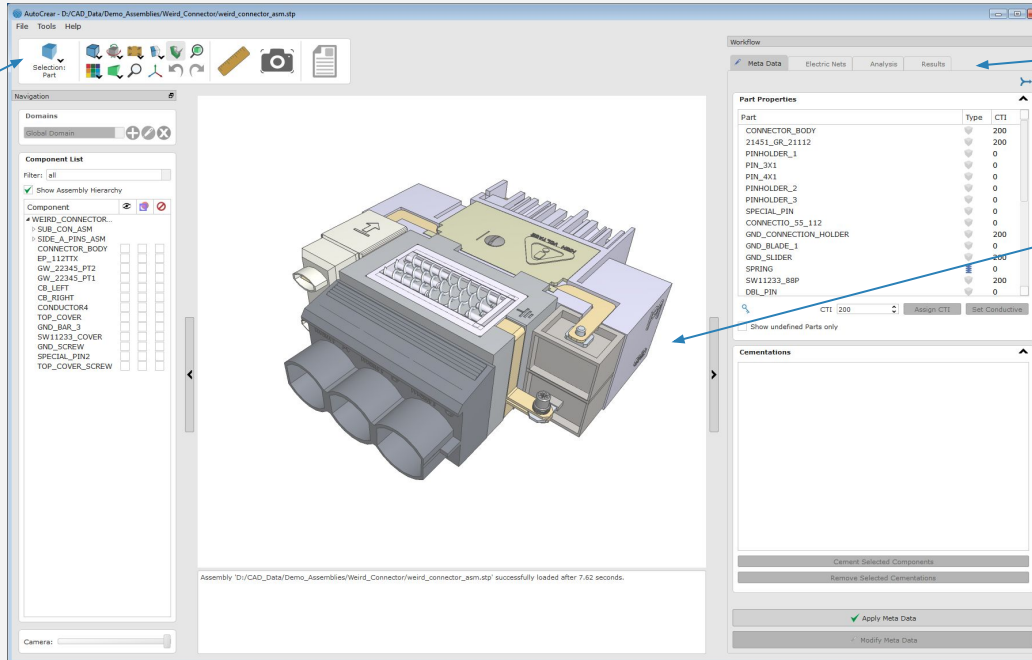
Solution: AutoCrear™

AutoCrear provides a robust and efficient software-based analysis of creepage and clearance. Based on over 5 years of research, it features novel state-of-the-art algorithms to handle the highly complex metrics of creepage and clearance paths and is capable of processing both, mechanical and electrical CAD data. This enables a designer to robustly detect and eliminate all safety violations in the early design stage and thus, significantly optimizes the production of electric assemblies.



User Interface

AutoCreatr is a standalone application which combines the entire workflow of a creepage and clearance analysis in a single program independent of the CAD system.



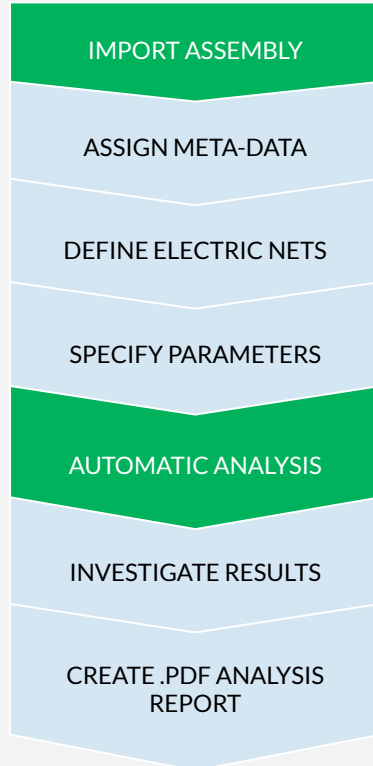
Basic visualization/
navigation features

Model Tree

Workflow-tab for performing
an analysis step by step

Integrated and powerful 3D
viewer

Workflow



With AutoCreat, you can perform a creepage and clearance analysis without requiring any external preparation of the CAD data.

All Required steps can be conveniently performed within AutoCreat:

- Assignment of meta data
- Definition of Electric Nets
- Specification of analysis parameters
- Result investigation
- Generation of an analysis report

 Video: [Program Walkthrough](#)

Re-using data

If the assembly is changed and re-loaded into a new AutoCreat Session, all the user input from a previous session can be automatically restored and must not be edited again.

Data Import

MCAD data

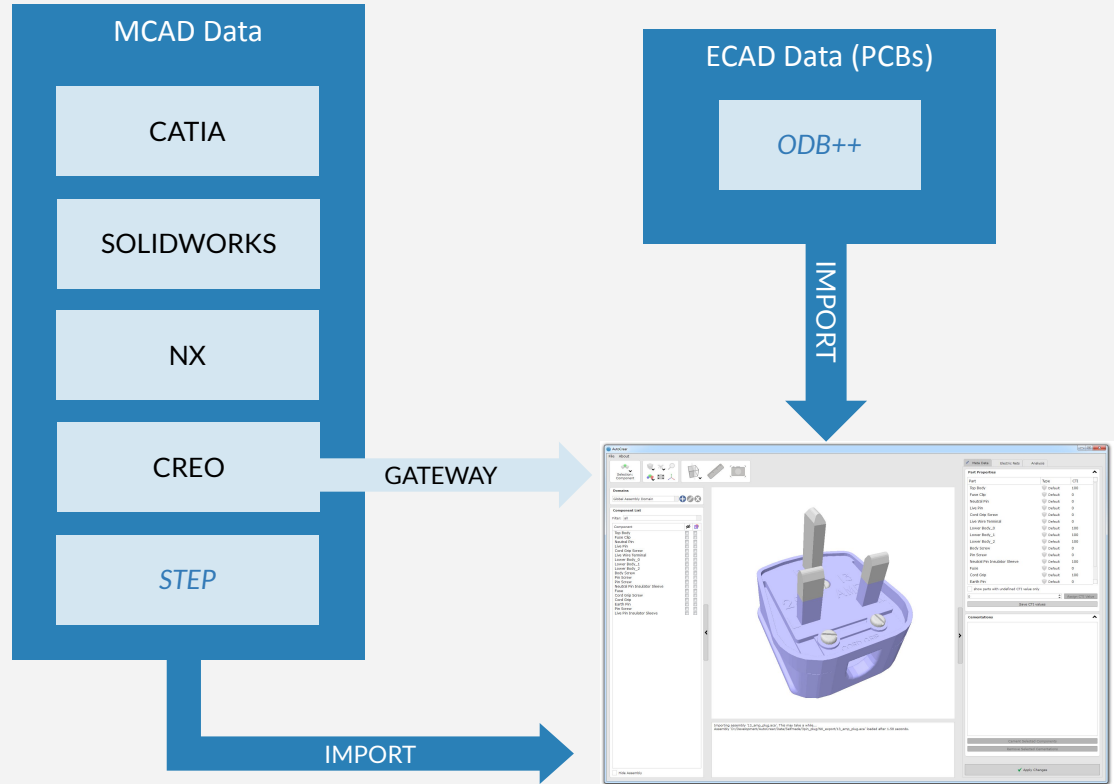
AutoCrear can import all common MCAD formats as well as the exchange format STEP.

ECAD data

Electronic data can be directly imported in the format odb++, whereas a clean 3D model of the PCB is automatically generated. [Read more here](#)

Gateway solution for Creo

For Creo users, e-laborate Innovations offers a free plug-in, which allows to start an AutoCrear session directly from Creo. The current working assembly is thereby automatically imported.



Assigning Meta Data

The meta data required for an analysis can be conveniently specified in the AutoCreatr UI and can be re-used for any modified versions of the assembly. This is only required for mechanical data!

- CTI values can be easily assigned for each part.
- Also individual surfaces can be assigned CTI values.
- Direct visual feedback of the assigned CTI values in a special color mode.
- Also allows for keyword-based property assignment



Video: [CTI Values](#)

- Special part types such as screws or springs can be specified which trigger an automatic geometric optimization in order to remove rotation variance.

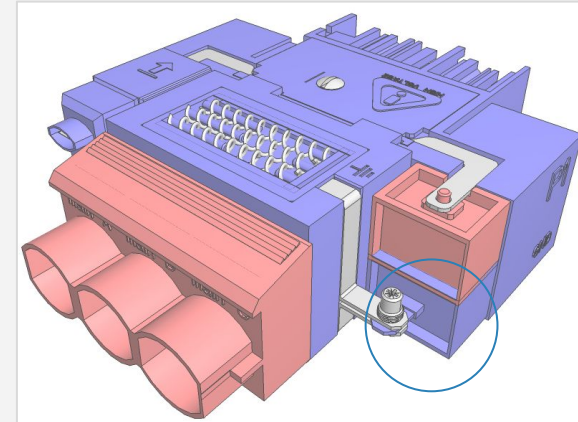
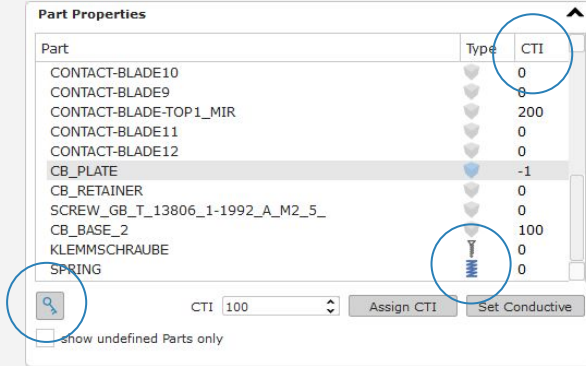


Video: [Special Part Types](#)

- Cementations between insulators can be specified.



Video: [Cementations](#)



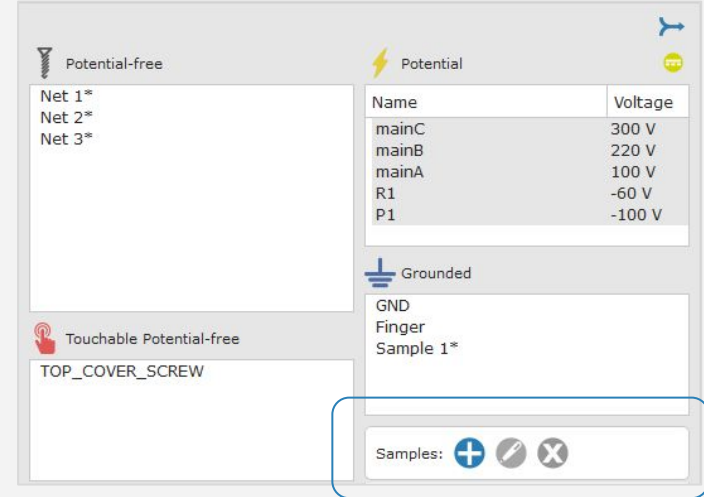
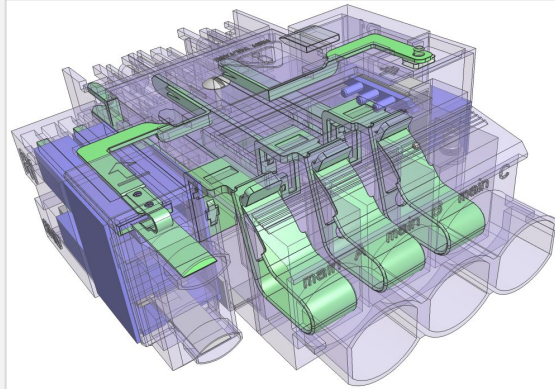
Defining Electric Nets

Electric nets are sets of conductive parts which carry the same electric potential. Initially, AutoCreat automatically combines all adjacent conductive components to common nets and assigns basic parameters to them.

The user can further combine nets, specify names and assign a type to each net.

Note that this step is only necessary with MCAD data! ECAD data is automatically equipped with the electric information from the odb++ files.

 Video: [Electric Nets](#)



Additional geometric elements, so-called „Samples“, can be added as electric nets (e.g. points, surfaces or Test Fingers) in order to compute clearance and creepage paths to or from these elements.

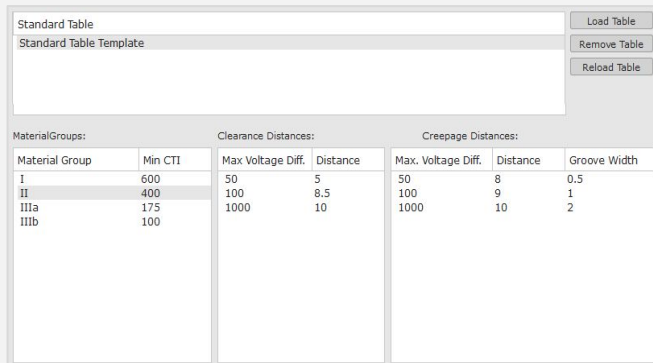
 Video: [Samples](#)

Specifying Analysis Parameters

The analysis engine of AutoCreat must know which distances have to be fulfilled between the net pairs and which groove width should be applied for creepage. This information can be handed to the computation in two ways:

1. **Using Standard Tables:** Tables, which map a voltage difference and an insulation class to a distance value can be defined and to applied in AutoCreat.
2. **Import Distance Matrices:** Tables or matrices, which carry the required distances between each pair of electric nets can be automatically imported.
3. **Custom Parameters:** The distance values can be specified directly between each net pair. This allows to check for individual distances apart from any industry standard.
4. **Import ECAD definitions:** Requirements for PCBs, which are already defined in an ECAD system, can be imported into AutoCreat via proprietary exchange files (e.g. .mtx for Zuken)

 Video: [Analysis Parameters](#)



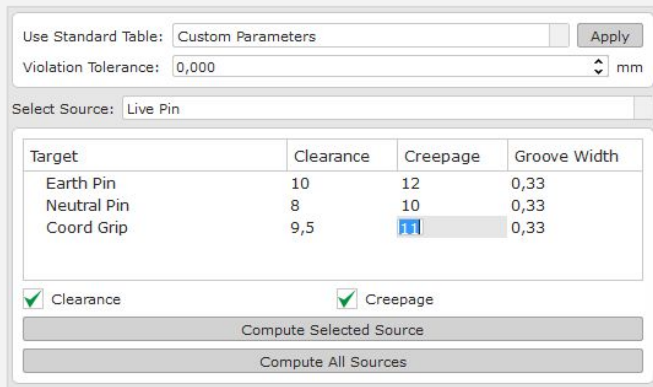
Standard Table

Standard Table Template

Load Table Remove Table Reload Table

Material Groups:		Clearance Distances:		Creepage Distances:		
Material Group	Min CTI	Max Voltage Diff.	Distance	Max. Voltage Diff.	Distance	Groove Width
I	600	50	5	50	8	0.5
II	400	100	8.5	100	9	1
IIIa	175	1000	10	1000	10	2
IIIb	100					

Standard Tables



Use Standard Table: Custom Parameters Apply

Violation Tolerance: 0,000 mm

Select Source: Live Pin

Target	Clearance	Creepage	Groove Width
Earth Pin	10	12	0,33
Neutral Pin	8	10	0,33
Coord Grip	9,5		0,33

☒ Clearance ☒ Creepage

Compute Selected Source

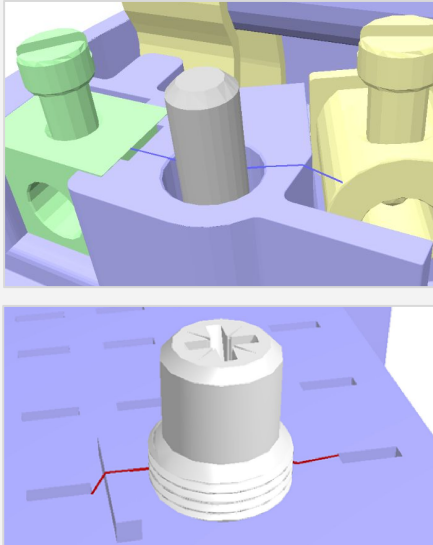
Compute All Sources

Direct Input via Custom Parameters

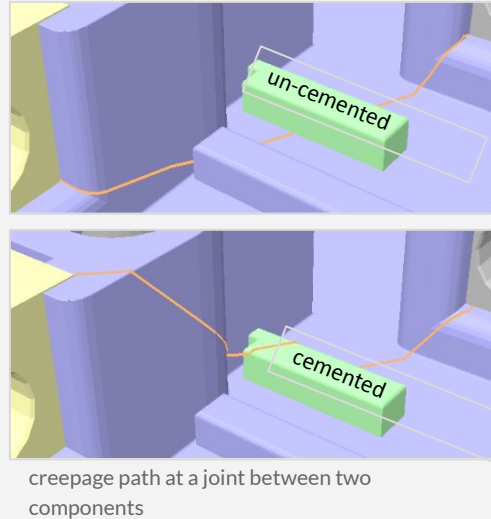
Automatic Analysis

The computation of the creepage and clearance paths is automatically performed using the specified parameters and considers all relevant factors:

Shortcuts through potential-free nets (e.g. screws)

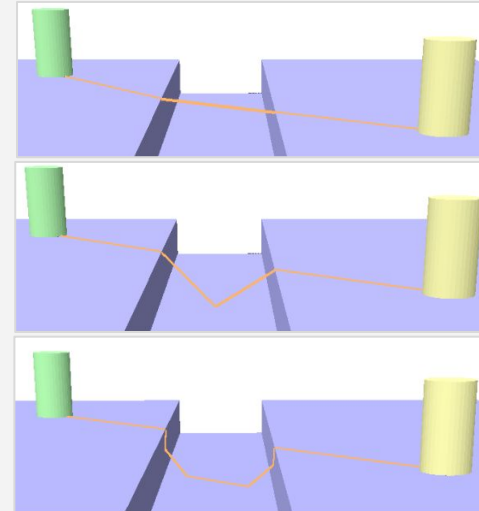


Consideration of cemented joints.



creepage path at a joint between two components

Groove width parameter for creepage.



1.2mm gw

0.9mm gw

0.4mm gw

creepage over a 1.0mm groove with different groove width parameters

Results Investigation

After the analysis, all path between the net pairs which fall below the specified distance (plus tolerance) are available for visualization and further processing.

A list of all target nets with respect to a selected source containing indicators for the worst violation found between a respective net pair:

-  Major violation
-  Minor violation
-  No violation

Select Source: Live Pin

Target	Cl.	Cr.	Clearance	Creepage
Shortest Paths			All Paths	All Paths
Earth Pin			5,36	6,22
Neutral Pin			6,43	6,63
Coord Grip				7,11
Sample 1				7,14

Filter Options

Clear Results

Path Info

Electric Nets: Live Pin to Earth Pin
 Violation Distance: 7 mm, 1 mm groove width
 Creepage: 6,21568 mm (worst CTI: 100)
 Comments:

Mr. Clearance (2017/11/09 14:14:56):

not my problem!

Mr. Creepage (2017/11/09 14:13:11):

This is a huge violation! someone has to do something about it!

Add Comment

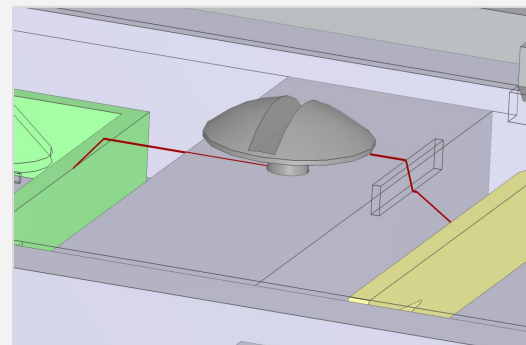
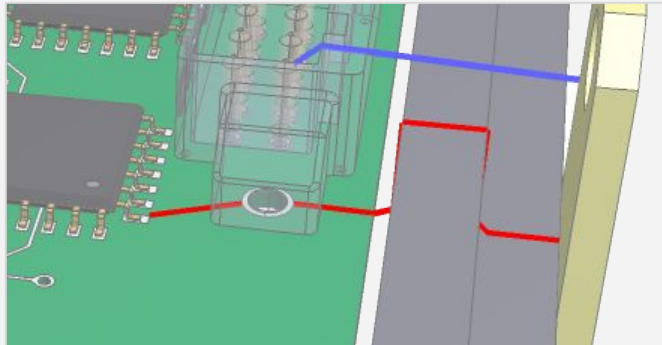
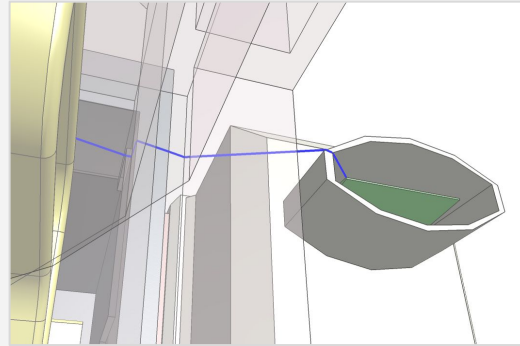
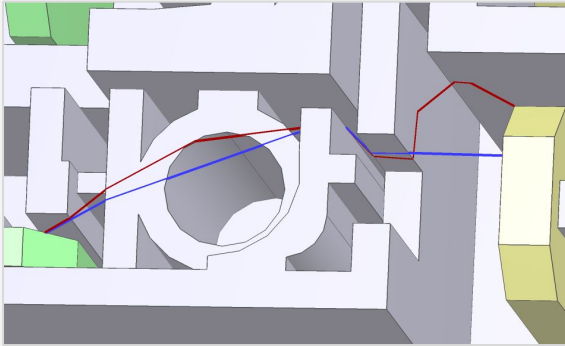
A list of paths between the selected source/target net pair in ascending order with the possibility to set certain tags for each path

Detailed information about a selected path

Possibility to leave comments for a path. Each comment is automatically equipped with the date and the user name.

Visualisation of Results

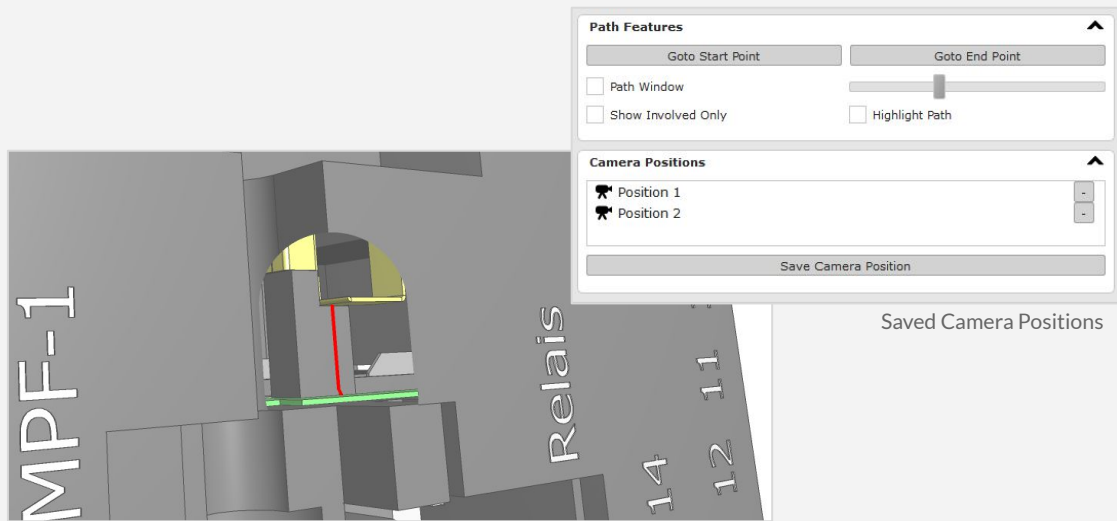
Each path can be visualized as line strip in the 3D viewer. Here are some examples:



Localisation of Results

In many cases, paths are located deep inside the assembly, covered by several components. AutoCrear offers various features in order to quickly identify such paths.

- Automatic movement of the camera position to the start/end point of the paths
- Default hiding of components which are not involved in the path
- Setting a highlight around the path
- Activation of the “Path Window”
- For every path, the relevant camera positions can be saved in order to efficiently browse the results. The saved camera positions are also used for the automatic screenshot generation of the documentation feature.



Example of a Path Window. A section around the displayed path is automatically cut out of the assembly to see through occluding components

Creating an Analysis Report

You can automatically create a customizable analysis report from the results, either as pdf or as html document. Beside custom items, the following contents can be automatically included:



- Title page including a company logo
- List of all components of the assembly
- List of all electric nets
- Analysis summary
- Detailed list of all paths

All contents are automatically equipped with screenshots. The document layout is temporarily or permanently customizable depending on your requirements.



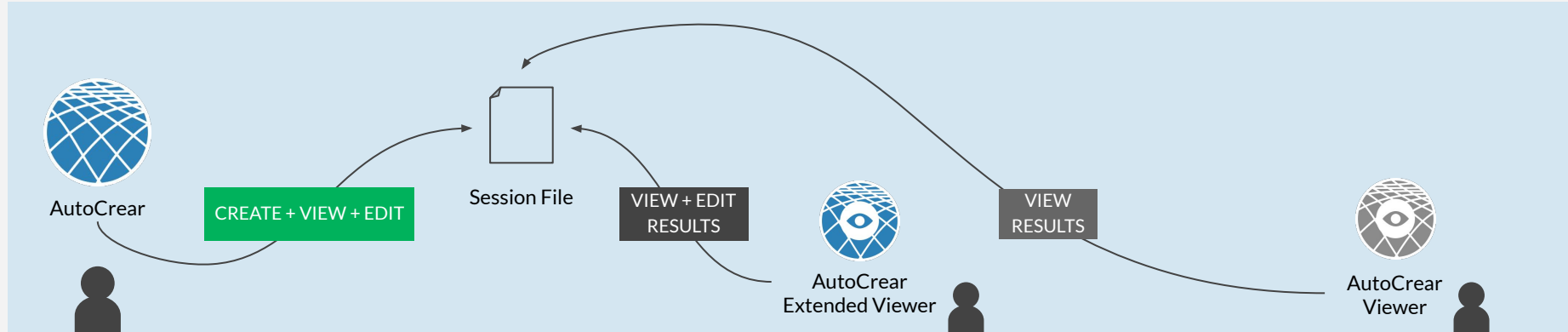
Video: [Automatic Documentation](#)

Results Management

At any stage of the workflow, an AutoCrear Session file (.acs) can be saved. This file includes all required information to restore and continue the session at any time without requiring the original CAD data.

Video: [Session Management](#)

In the end, the session file can be seen as a digital 3D document of the analysis and can be loaded and viewed by any other team member using the free **AutoCrear Viewer**. The Original CAD data is not required as the geometry is stored in the session file. The cost-efficient **AutoCrear Extended Viewer** additionally allows to edit the results.





BETA PHASE

The ECAD Interface

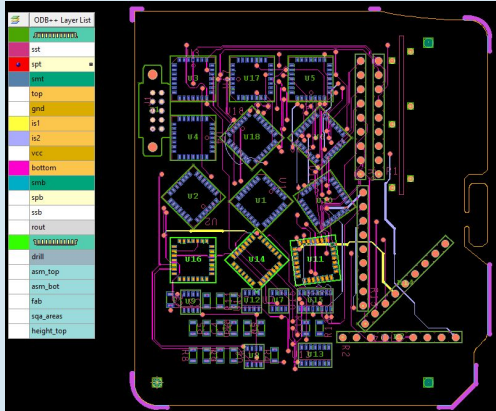
... enables you to analyse single PCBs or complex electromechanical assemblies containing multiple PCBs!

Import of PCB data

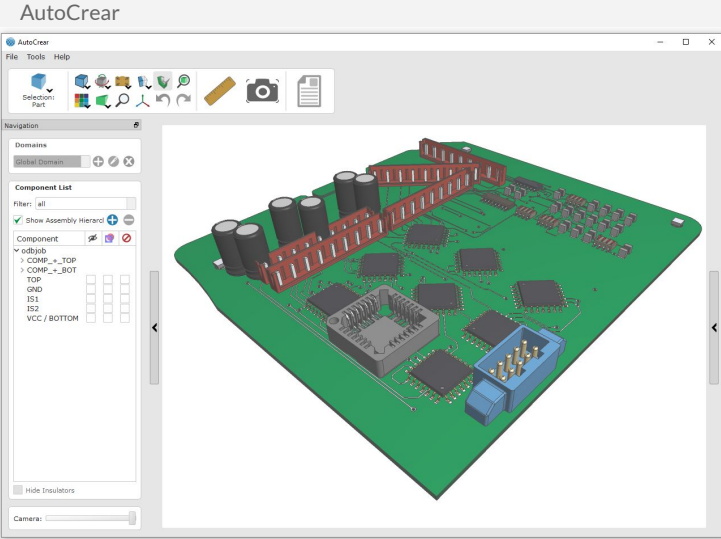
In order to transform the 2D PCB layouts into clean 3D models, AutoCreat relies upon the ODB++ file format. The widely known and lossless exchange format for PCBs can be exported from almost all EDA Software.

**BETA
PHASE**

ODB++ Data



IMPORT



About BETA Phase

The clearance and creepage requirements for mechanical objects and for the PCB are of course different.

AutoCreat can handle those **different requirements** in one session, but with the next major ECAD Release, we want to give you **more ease and better usability** to specify these during your workflow.

Apart from that, we continuously improve **the robustness of the import** of the ODB++ data. So far, we made good experiences with the EDA Series of **Zuken, Altium, Siemens** (formerly Mentor Graphics) and **Cadence Allegro**.



**BETA
PHASE**



Zuken



Altium



Siemens
(Mentor
Graphics)



Cadence
Allegro

AutoCrear Product Family - Functional Details

FUNKTION	 AutoCrear	 AutoCrear Extended Viewer	 AutoCrear Viewer
Importing CAD data	✓	-	-
Loading AutoCrear session files (.acs)	✓	✓	✓
Saving AutoCrear session files	✓	✓	-
3D Viewer	✓	✓	✓
Assigning meta data	✓	-	-
Defining electric nets	✓	-	-
Performing creepage and clearance computations	✓	-	-
Display creepage and clearance paths	✓	✓	✓
Tagging, commenting, deleting paths	✓	✓	-
Configure and export documentation	✓	✓	-

System Requirements

	Minimum	Recommended
Operating System	Windows 7	Windows 7 or higher
RAM	4 GB	32 GB
CPU	1 Core	8 Cores
Display Resolution	1024 x 768	1920 x 1080
Graphic Card API	OpenGL 3.3	OpenGL 4.5

Get in Touch



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