

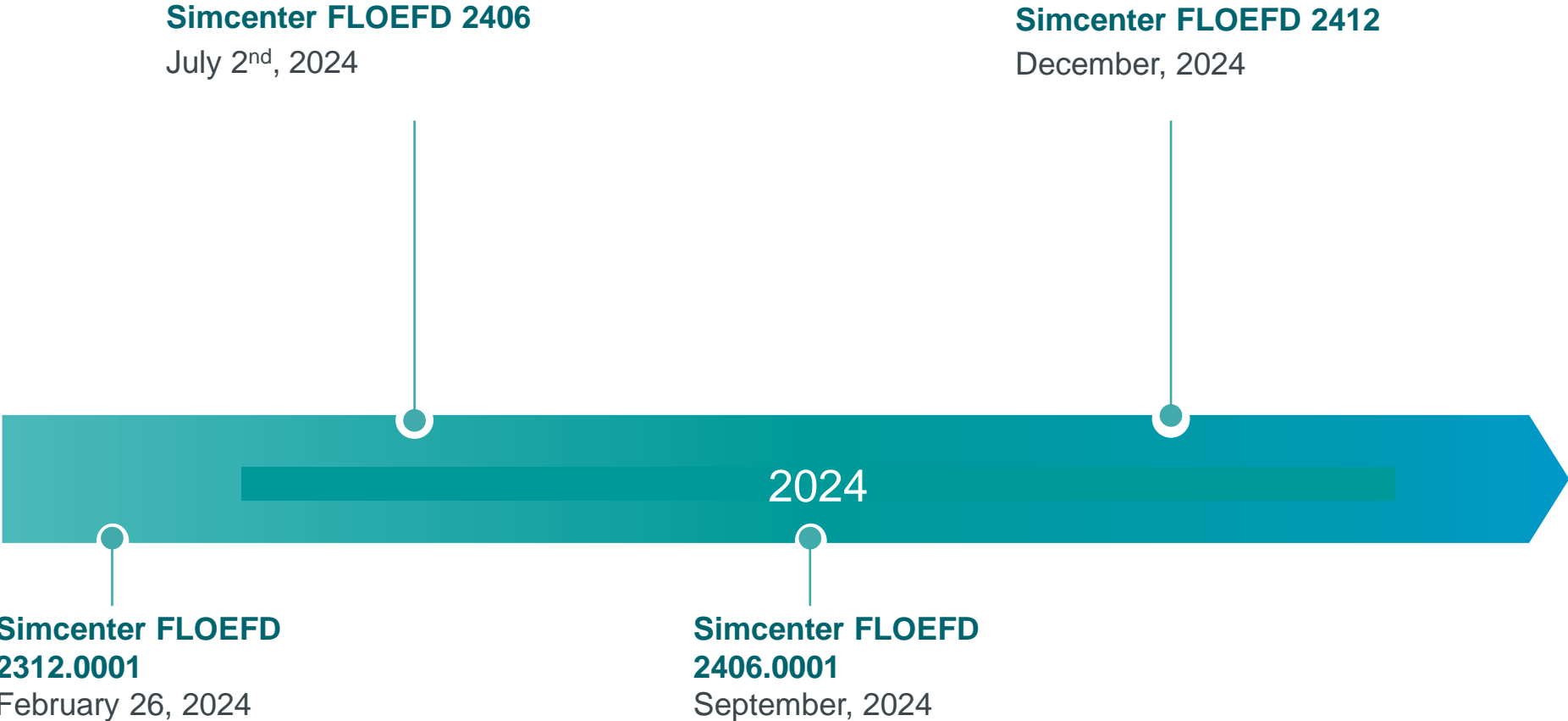
Simcenter FLOEFD 2406

What's New



Simcenter FLOEFD 2024 Release Schedule

Two releases at six-month intervals delivering a constant stream of new features and enhancements.





Model the complexity
Ensuring decision confidence



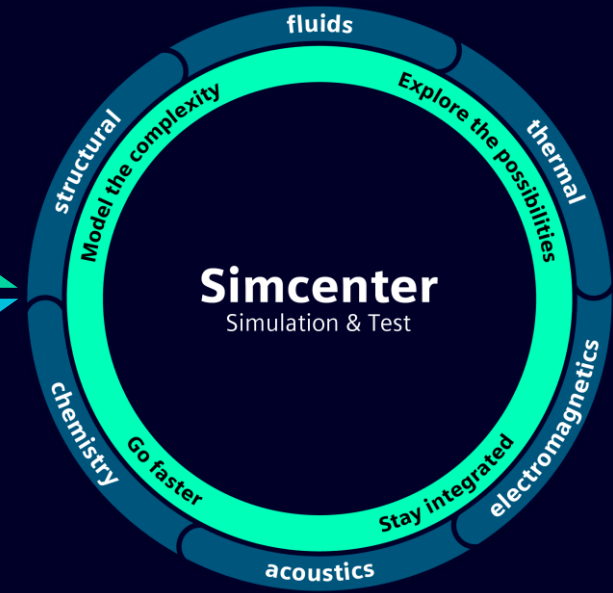
Explore the possibilities
Enabling insights



Go faster
Achieving speed and agility



Stay integrated
Connecting all activities



New Features in Simcenter FLOEFD 2406

Stay integrated

- Flotherm XT – to – FLOEFD: Model import
- PCB Exchange – Smart PCB support

Model the complexity

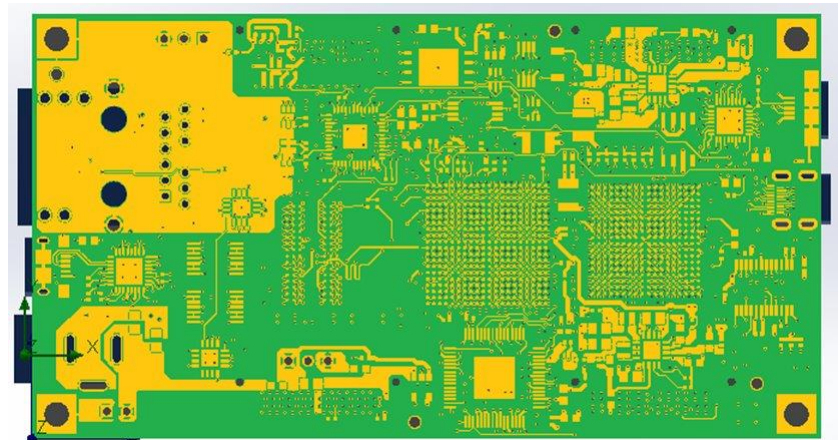
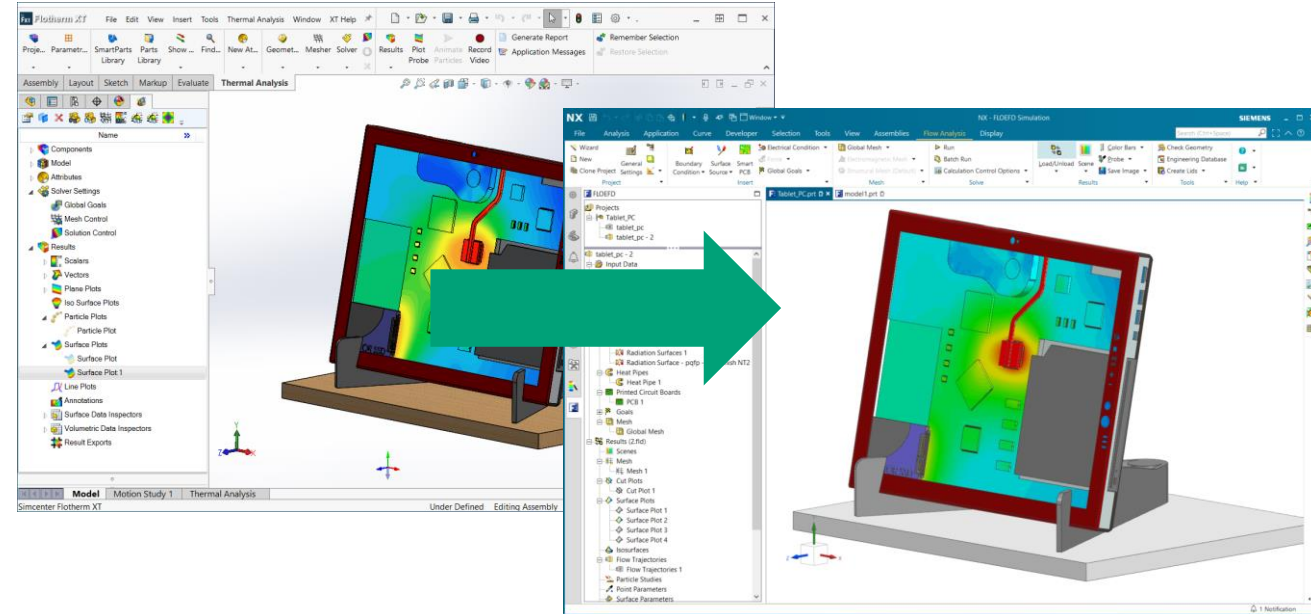
- EDA Bridge – Thermal vias
- Component Control: multi-edit
- Use local system for Point Parameters

Explore the possibilities

- EFD-API – Python support

Go faster

- Smart PCB: Memory consumption improvement
- Huge assemblies preprocessing speedup
- Material Priorities dialog speedup



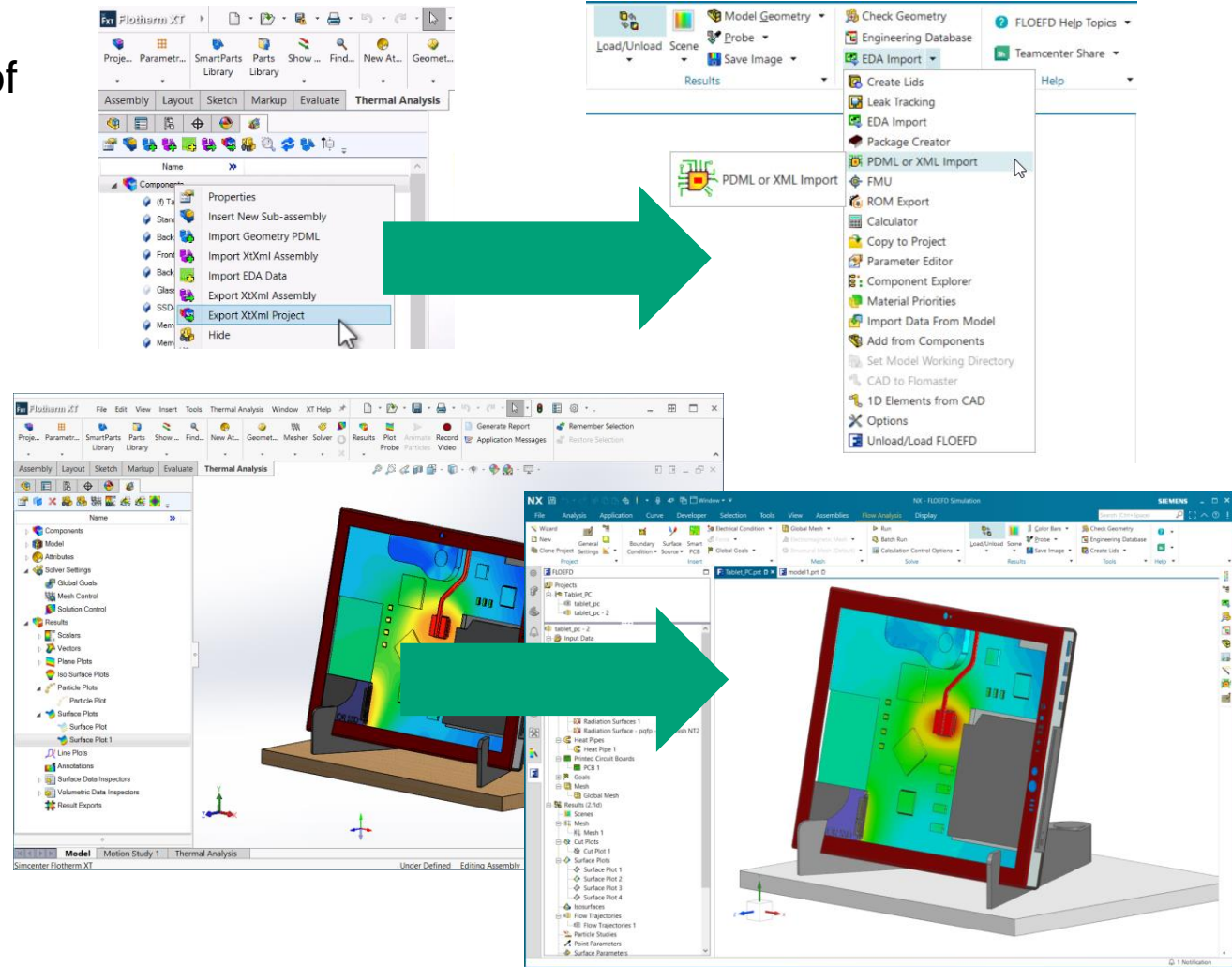
| Stay integrated

Simcenter Flotherm XT to FLOEFD Model Import

Transfer Flotherm XT projects to FLOEFD

Challenge: Customers would like to transfer models from Flotherm XT to FLOEFD to access capabilities of FLOEFD while leveraging original model setup from Flotherm XT

Solution: Simcenter FLOEFD can now import a Flotherm XT model/project through XTXML format



Simcenter Flotherm XT to FLOEFD



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Simcenter Flotherm XT to FLOEFD Model Import

Supported features:

- Model geometry
- Project settings:
 - Fluid
 - Time dependency
 - Radiation Properties
 - Initial and ambient condition
- Smart Parts:
 - Fans
 - TEC
 - Region
 - Enclosure
 - Heatsinks
 - Cuboid
 - Cylinder
 - Prism
 - Generic Smart Part
- Features:
 - Flow Openings
 - Porous media
 - Fans
 - Fluid Subdomain
 - Rotating Region
 - Perforated Plate
 - Solid Material
 - Surface and Volume Sources
 - Contact resistance
 - Radiation Surfaces
 - Heat Pipe (partial support)
 - Network Assembly
 - Electrical Condition
 - PCB
- Goals:
 - Point
 - Surface
 - Volume
 - Global
 - Difference
- PCB:
 - Smart PCB
 - Compact PCB
 - Detailed PCB

Simcenter Flotherm XT to FLOEFD Model Import

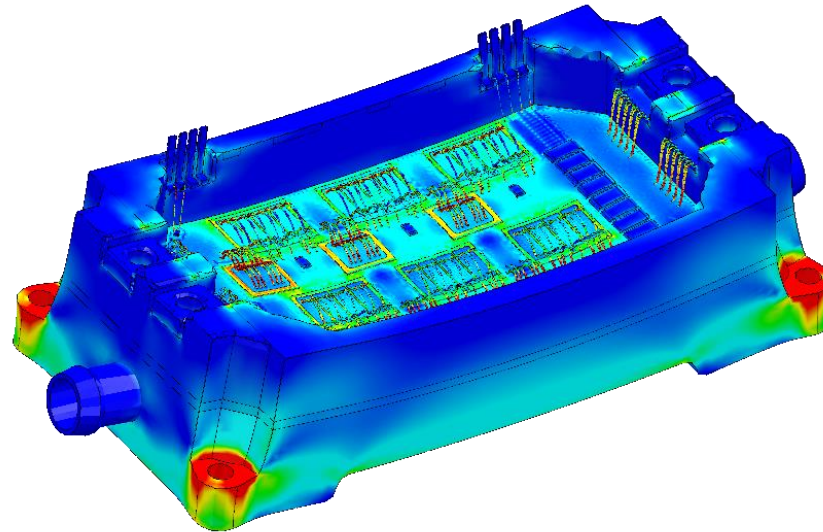
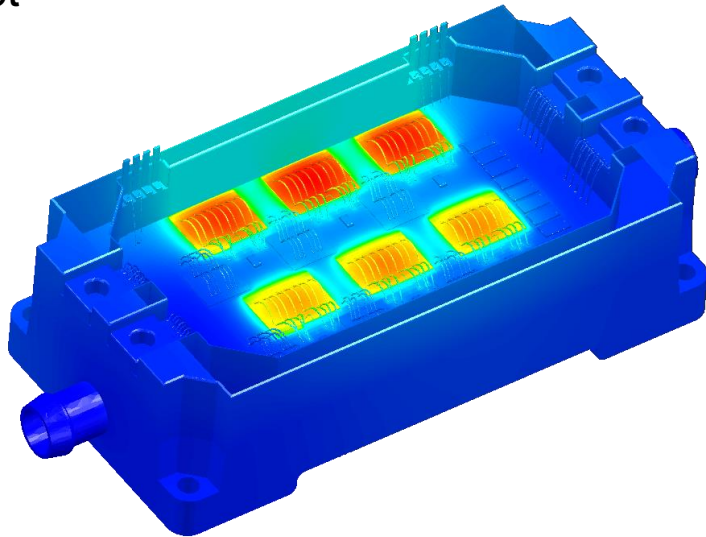
Known limitations

- **Mesh Settings.** Global and local mesh settings are not transferred
- **Heat Pipe.** Heat In and Out faces are not imported for heat pipes, you need to reselect them manually
- **Material/Component Priorities.** Flotherm XT considers component priorities when assigning material properties if components are overlapping, while FLOEFD uses material priorities. These two approaches are inconsistent and component priorities cannot be imported to FLOEFD. So for regions with overlapping components manual adjustments may need to be made using FLOEFD's Material Priorities approach
- **CATIA support.** XTXML project file cannot be imported to CATIA
- **Geometry transfer failed.** Some models cannot be transferred because of geometry issues
- **Smart Parts from old version.** Smart Parts made with older Flotherm XT versions cannot be exported, you need to resave them with newer Flotherm XT versions

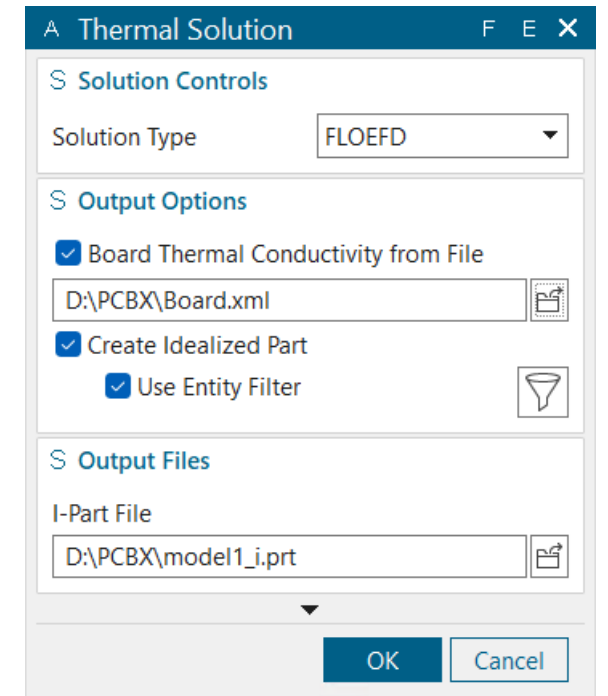
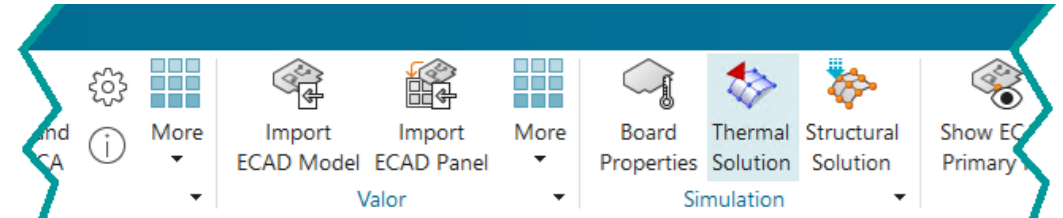
PCB Exchange integration

Challenge: PCB Exchange is an ECAD-MCAD bi-directional collaboration tool allowing users to create/modify NX models leveraging their EDA data, but cannot be used to set up a thermal analysis in Simcenter FLOEFD without manual work.

Solution: Integrate Simcenter FLOEFD with PCB Exchange tool, add capabilities to PCB Exchange to create FLOEFD project



FLOEFD project with Smart PCB can be created from PCB Exchange



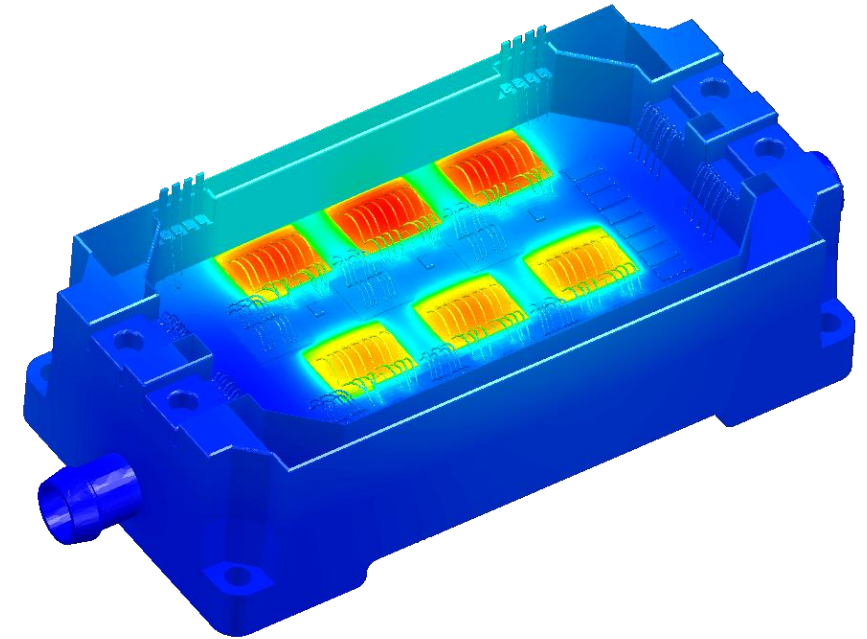
PCB Exchange integration: capabilities and limitations

Main capabilities:

- Simcenter FLOEFD project is created directly from PCB Exchange
- EDA data transferred as **Smart PCB**
- PCB Exchange supports **wirebonds**
- Available in Simcenter FLOEFD for NX and Simcenter FLOEFD SC

Limitations:

- Components are transferred without material properties and thermal model definitions



PCB Exchange integration: detailed workflow



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| Model the complexity

Component Control: multi-edit

Challenge: Simcenter FLOEFD's Component Control utility provides a convenient approach to disabling components in a model. Large assemblies, though, can require a burdensome amount of individual mouse clicks to achieve the desired result.

Solution: Add multi-edit capability - you can select a range of components with SHIFT key and change their status with one mouse click. Now available in:

- Component Control
- Check Geometry

You can switch on and off hundreds of components instantly



Component Control: multi-edit



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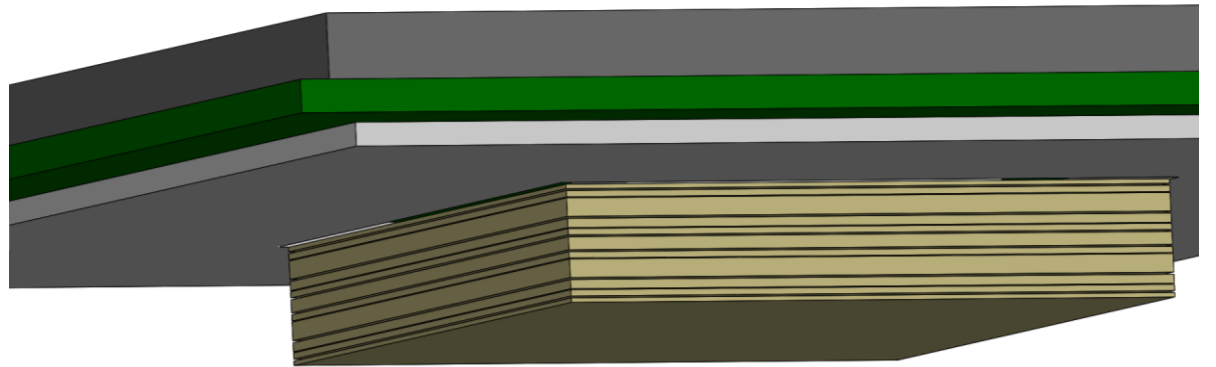
EDA Bridge - Adding thermal vias

Challenge: Require investigation for the effect of thermal vias added to PCB design.

Solution: Add thermal vias below selected component through EDA Bridge

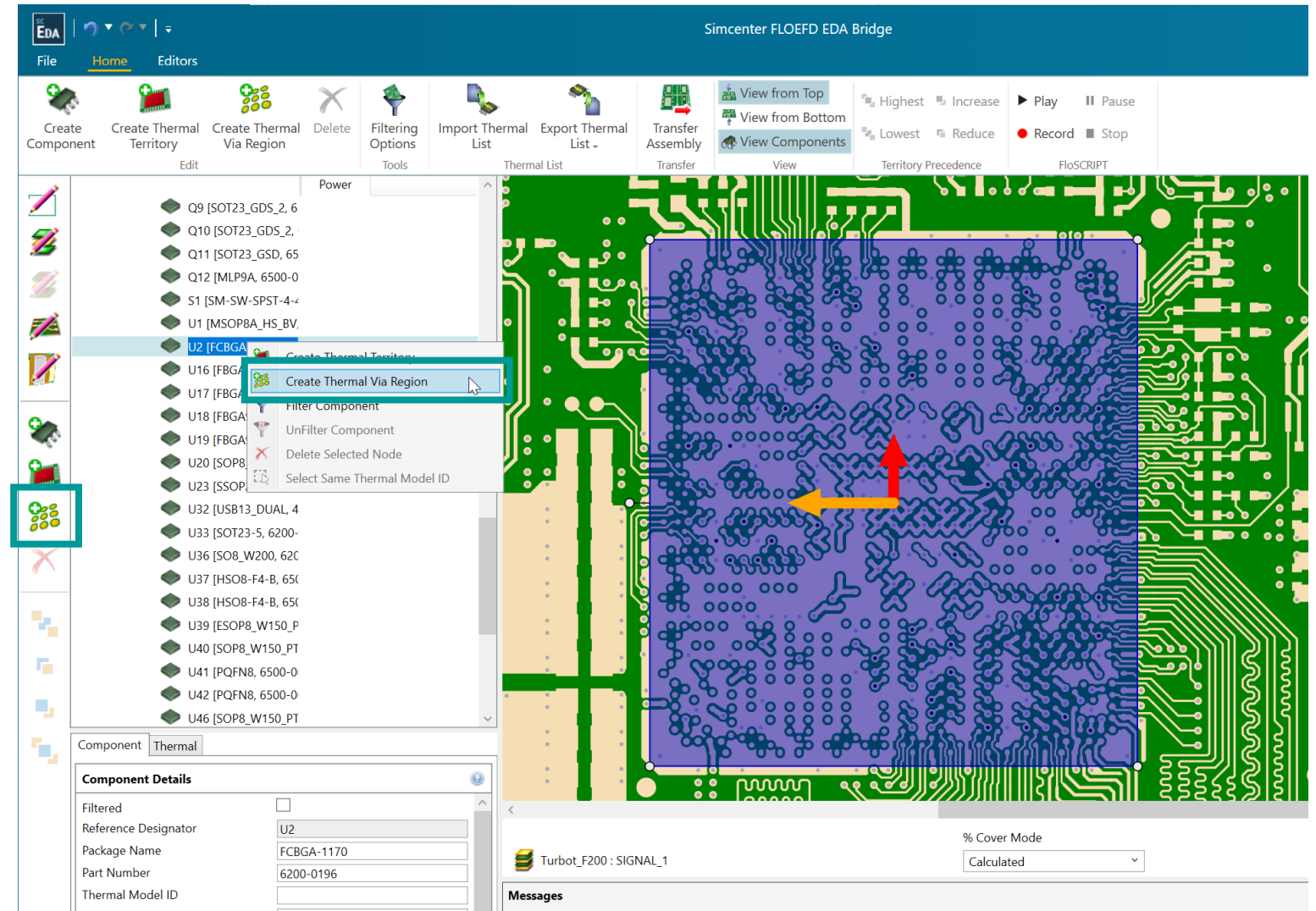
- Define array of thermal vias below a component
- Modelled as cuboidal geometry with effective conductivity
- Only possible with detailed (layered) PCB option at this time.

Investigate thermal management options quickly and easily



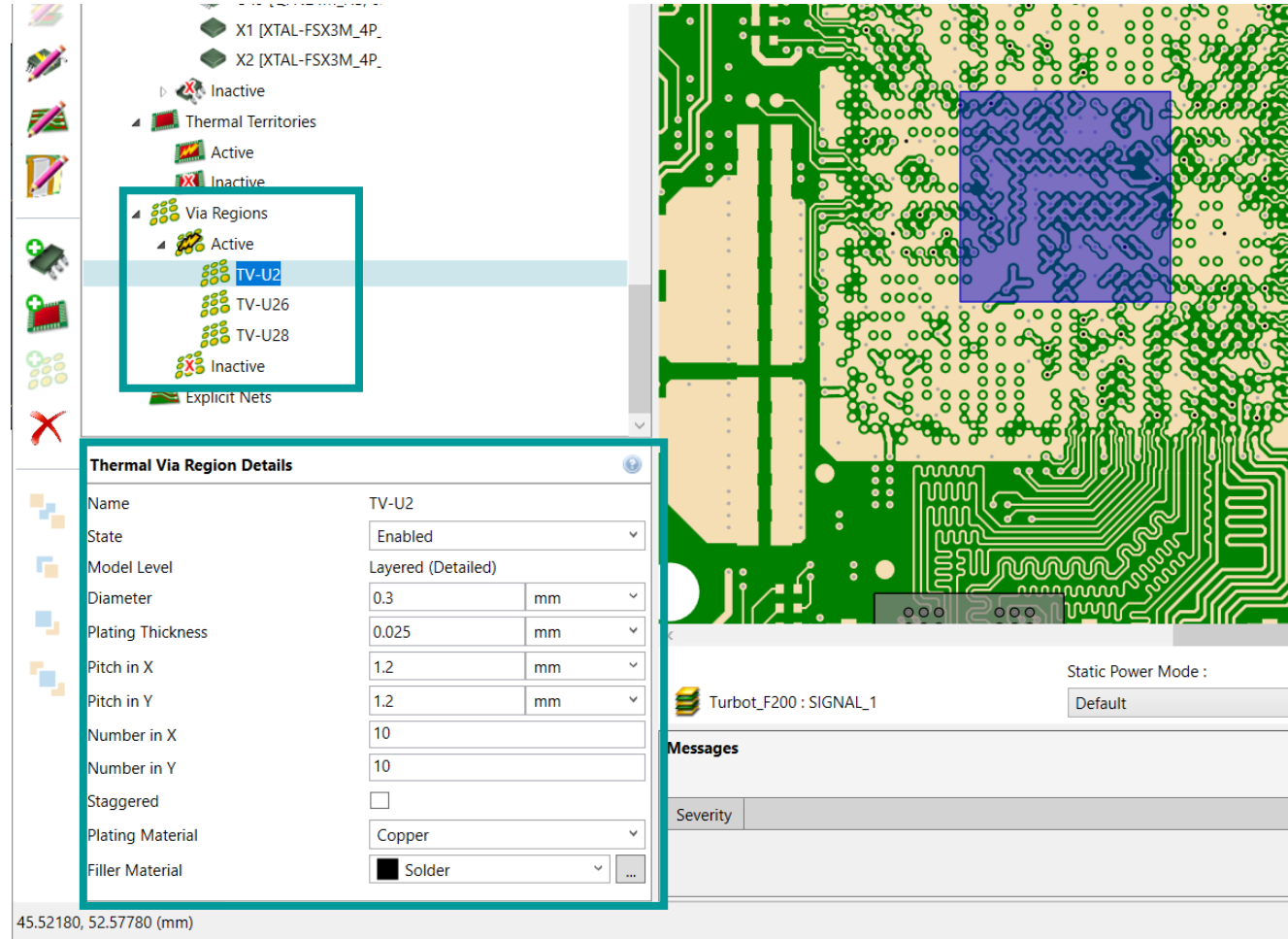
Adding thermal vias

- Select component
- Then add thermal via



Adding thermal vias

- Via Region created under Via Region section
- Edit properties for each region
 - Set default properties in preferences
- Components with a via region indicated by icon change



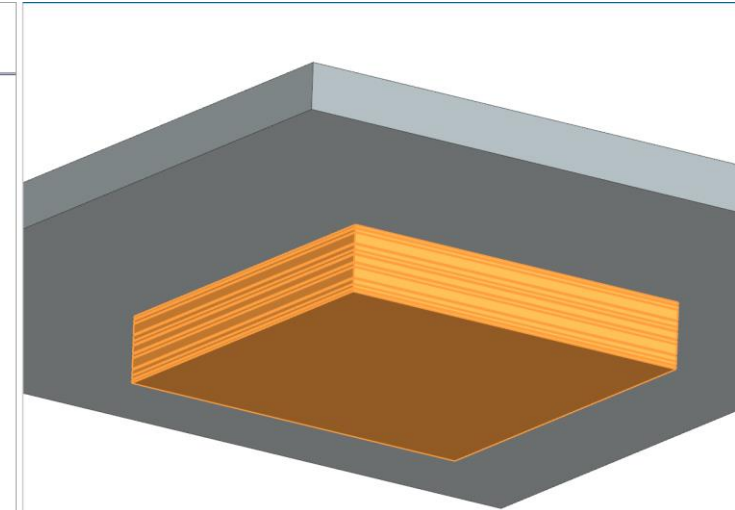
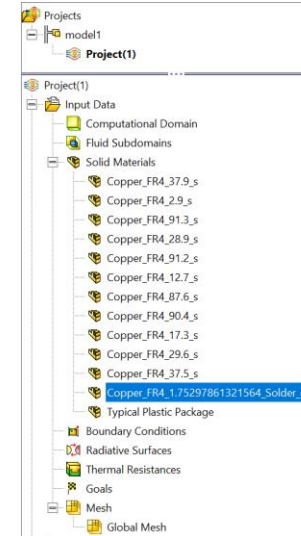
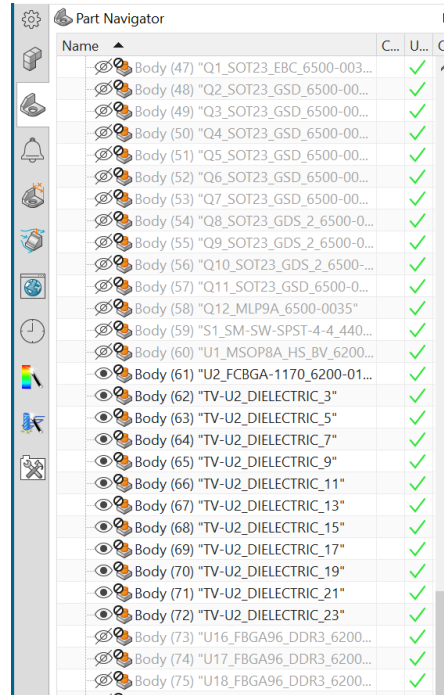
The screenshot displays the Siemens Simcenter FLOEFD software interface. On the left, a tree view shows the project structure, including 'Thermal Territories' and 'Via Regions'. The 'Via Regions' section is expanded, showing 'Active' regions: 'TV-U2', 'TV-U26', and 'TV-U28', and 'Inactive' regions. A blue box highlights the 'TV-U2' region. Below the tree view, the 'Thermal Via Region Details' dialog box is open, showing the following settings for 'TV-U2':

| Property | Value |
|-------------------|--------------------------|
| Name | TV-U2 |
| State | Enabled |
| Model Level | Layered (Detailed) |
| Diameter | 0.3 mm |
| Plating Thickness | 0.025 mm |
| Pitch in X | 1.2 mm |
| Pitch in Y | 1.2 mm |
| Number in X | 10 |
| Number in Y | 10 |
| Staggered | <input type="checkbox"/> |
| Plating Material | Copper |
| Filler Material | Solder |

The main workspace shows a PCB layout with a blue highlighted area representing the via region. The bottom status bar indicates the dimensions: 45.52180, 52.57780 (mm).

Adding thermal vias

- Once transferred Thermal Via bodies created within CAD assembly
- Body name includes TV-
"Component Designator"
- Geometry created for each dielectric layer
- Negligible change for conducting layer so not included.
- Material with effective biaxial conductivity calculated from via region properties



Use local system for Point Parameters

Challenge: Using local coordinate systems to define point parameter locations

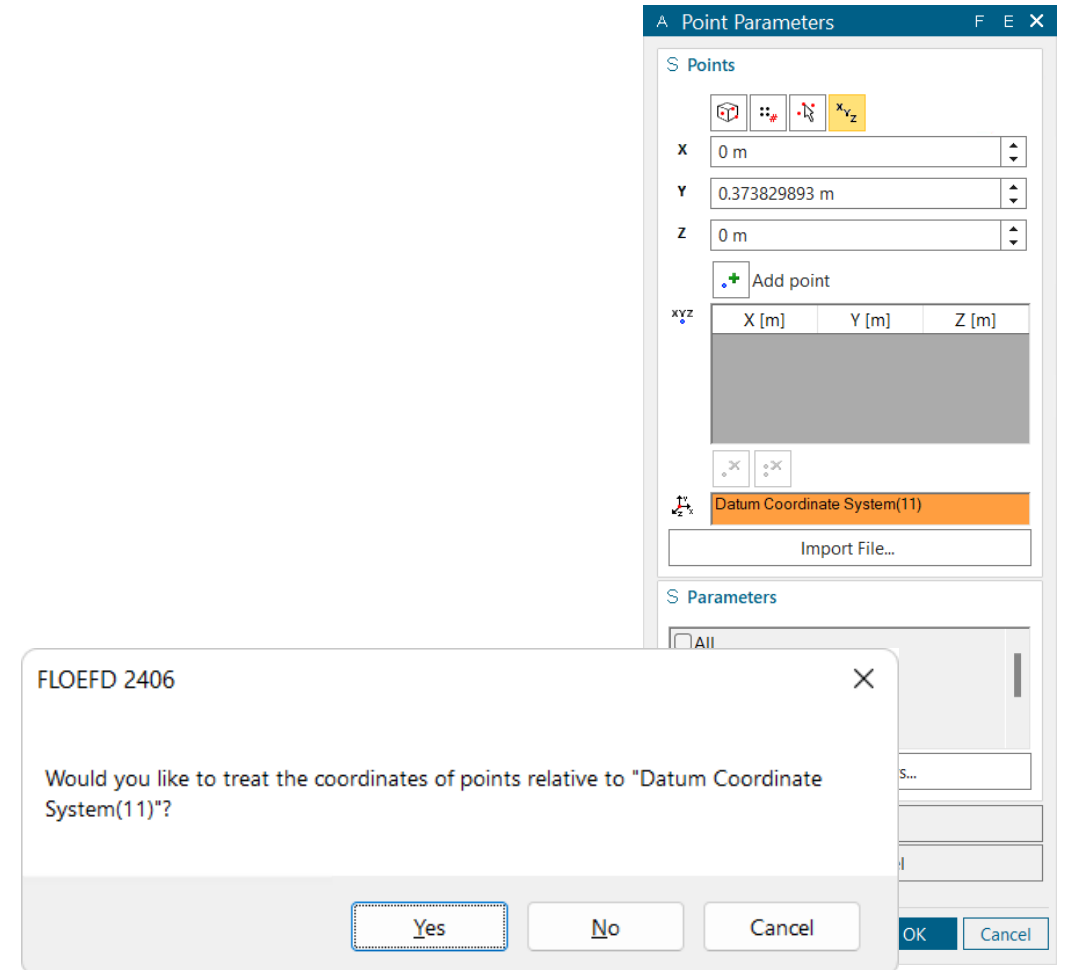
Solution: Convert coordinates if needed

Simcenter FLOEFD prompts user to convert coordinates from local system to the global one.

- Select local coordinate system
- Paste coordinates from table or import them from file.
- Message appears asking how coordinates should be treated

Note: Point coordinates will be displayed in Global Coordinate system in dialog even if choosing option to treat coordinates relative to a local system during import process

Convert coordinates to Global Coordinate System



| Explore the possibilities

EFD-API: Improve API and automation

Challenge: Many customers would like to automate Simcenter FLOEFD with Python. Also, access to additional FLOEFD capabilities is needed.

Solution: Enhance FLOEFD API with following improvements:

- Support Python for FLOEFD API
- Fix issues with existing functions
- Add capabilities to satisfy customer requests
- Update Support Center documentation with Python code examples

Automate Simcenter FLOEFD with Python

```
1 import win32com.client
2 from array import *
3
4 ProjID = "EFDapiSrv.EFDLauncher.4.2406"
5 ModelPath = "C:\\Model\\model1.prt"
6 efdEDBGas = 2
7 efdEDBSolid = 5
8 efdGas = 1
9 efdVelocityX = 9
10 efdTemperature = 1
11 efdSolidTemperature = 46
12
13
14 SRV = win32com.client.Dispatch(ProjID)
15 App = SRV.RunProduct()
16 CAD = App.GetCAD()
17 Model_Doc = CAD.OpenDoc(ModelPath)
18 Model_Conf = Model_Doc.GetActiveConfiguration()
19 Doc = App.GetActiveDoc()
20
21 App.SetSilent()
22 Project = Doc.CreateProject(None)
23 Project.LoadTemplate(rf"{App.GetProjectsTemplatesDir()}\\Reflow.fwp")
24 Project.SetName("My Project")
25 Doc.AddProject(Project, Model_Conf.GetName())
26 App.ResetSilent()
```

EFD-API: Improve API and automation

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EFD-API: Improve API and automation

Support Center article *Simcenter FLOEFD API Examples* update

- All examples provided with VBA and Python code
- New examples added:
 - Create Project from Template
 - Clone Project
 - Component Control
 - Enumerate Components and Create Multiple Solid Material
 - Network Assembly
 - Export files for command line run
- New capabilities are used in examples
 - Save Project
 - Set Time Step value as a dependency on Iteration
 - Attach to running instance without PID

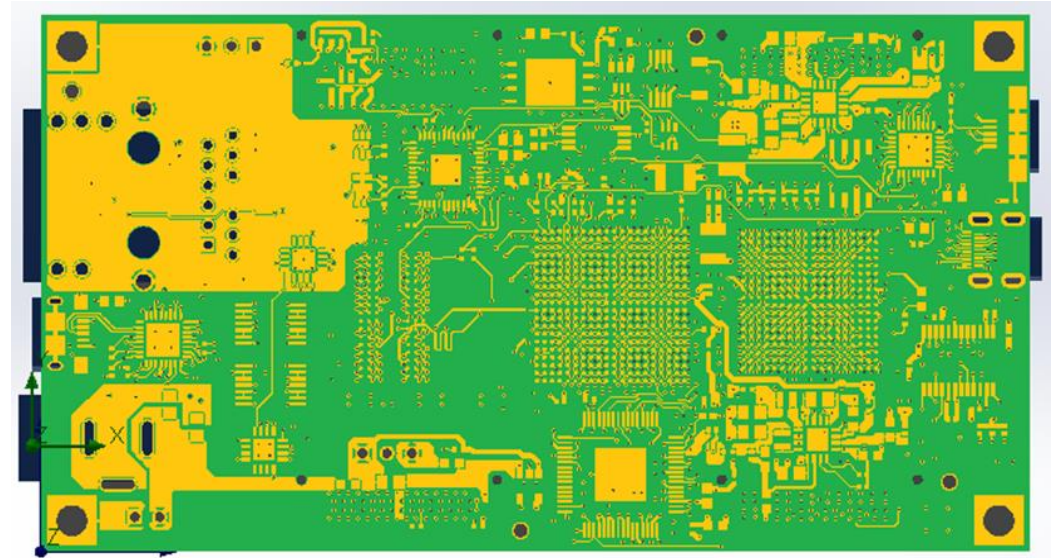
| Go faster

Smart PCB: Memory consumption improvement

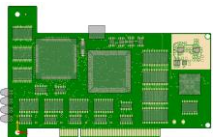
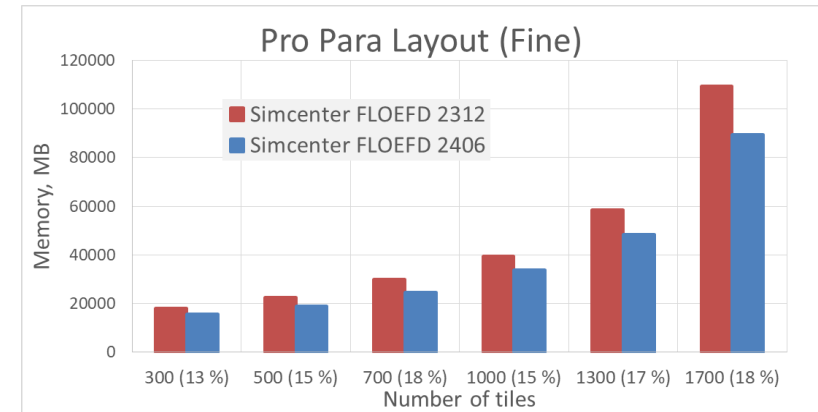
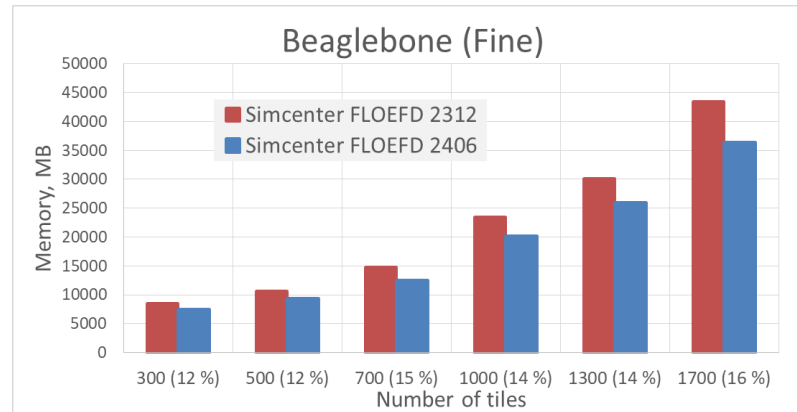
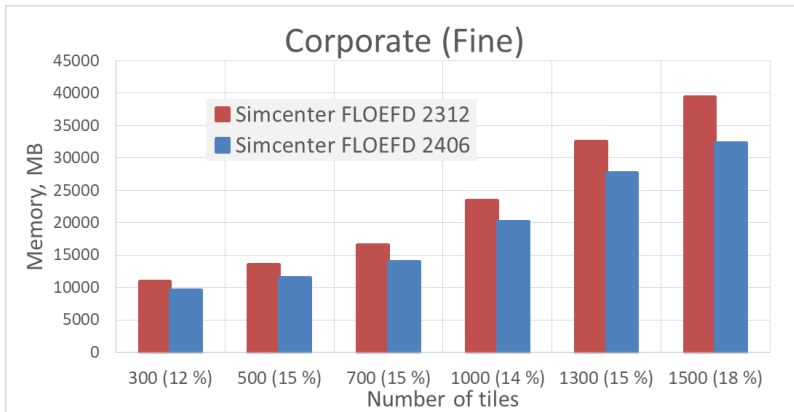
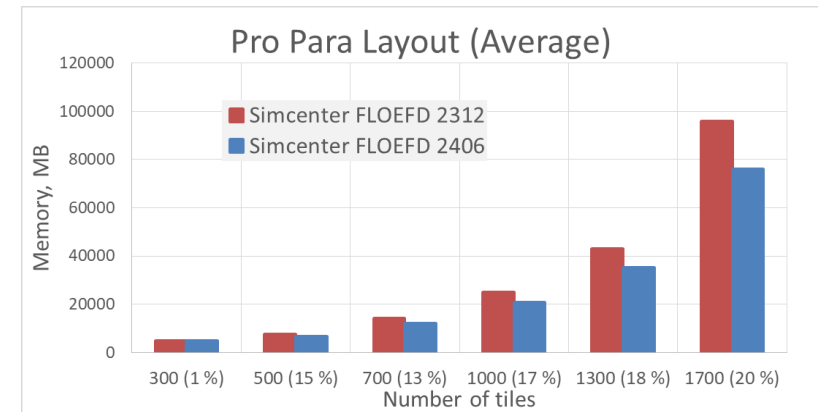
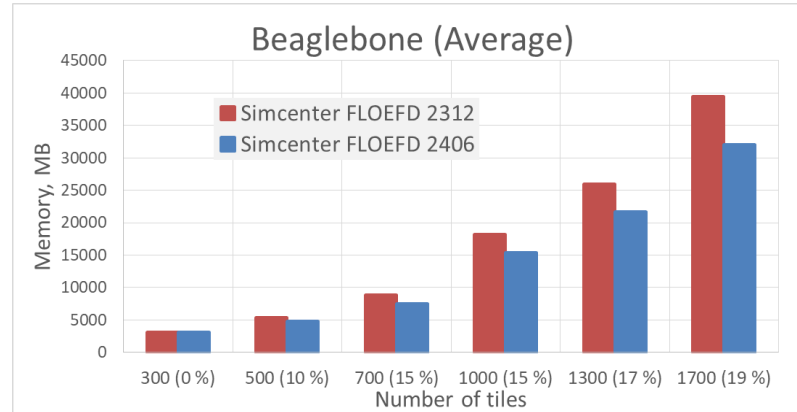
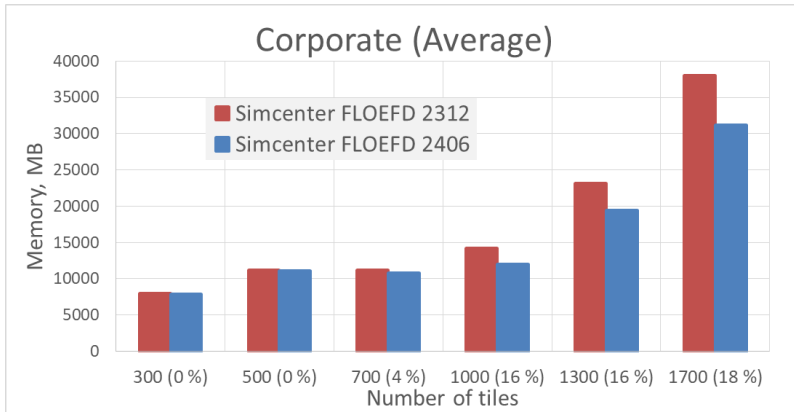
Challenge: Thermal analysis of Smart PCB can be memory consumptive

Solution: Optimize solver to reduce memory needed for thermal analysis in Smart PCB

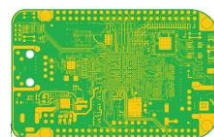
Reduce hardware resource requirements for Smart PCB thermal analysis



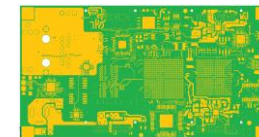
Smart PCB: Memory consumption improvement



Reduction up to 18 %



Reduction up to 19 %



Reduction up to 20 %

Huge assemblies preprocessing speedup

Challenge: Basic operations like model opening, project creation and cloning can take hours if conducted on an assembly with 100K+ components

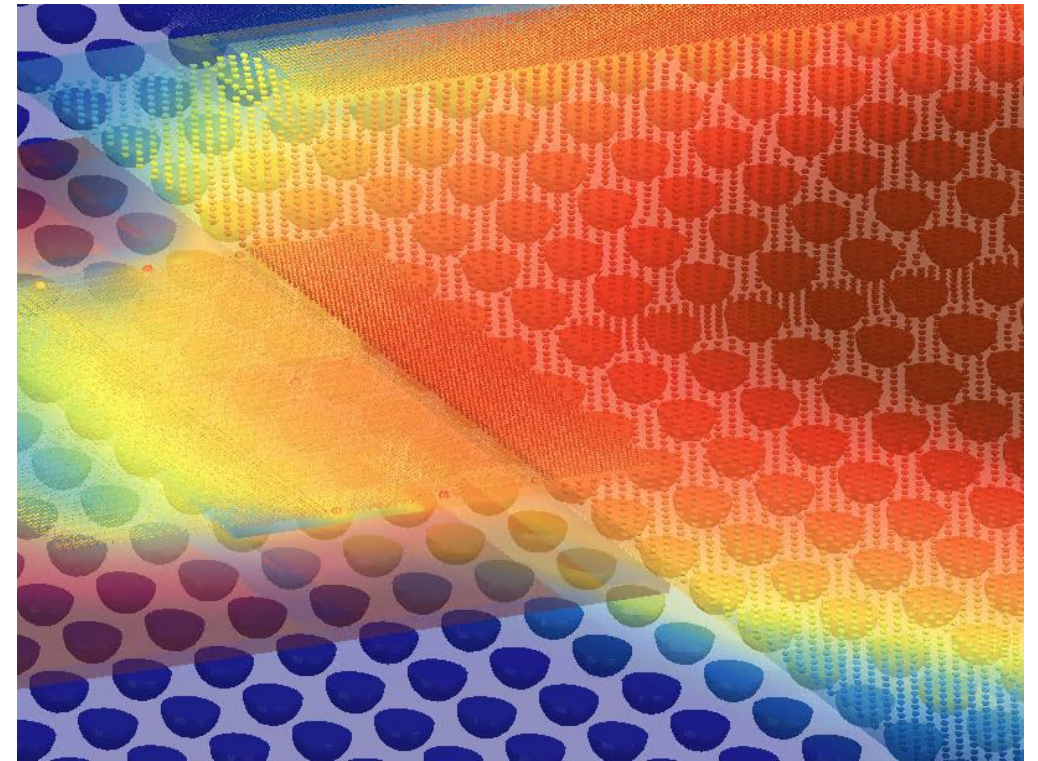
Solution: speedup key stages of the workflow:

| Operation | 45K* | 125K** |
|---------------|-----------|-------------|
| Open model | 1.5 times | ~ 100 times |
| Open wizard | 3 times | 150 times |
| Finish wizard | 5 times | > 100 times |

*45K – ECU with ~ 45K components (mainly unique components)

**125K – Advanced Package with ~ 125K solder balls (instances of few unique components)

More easily work with extremely large assemblies in FLOEFD



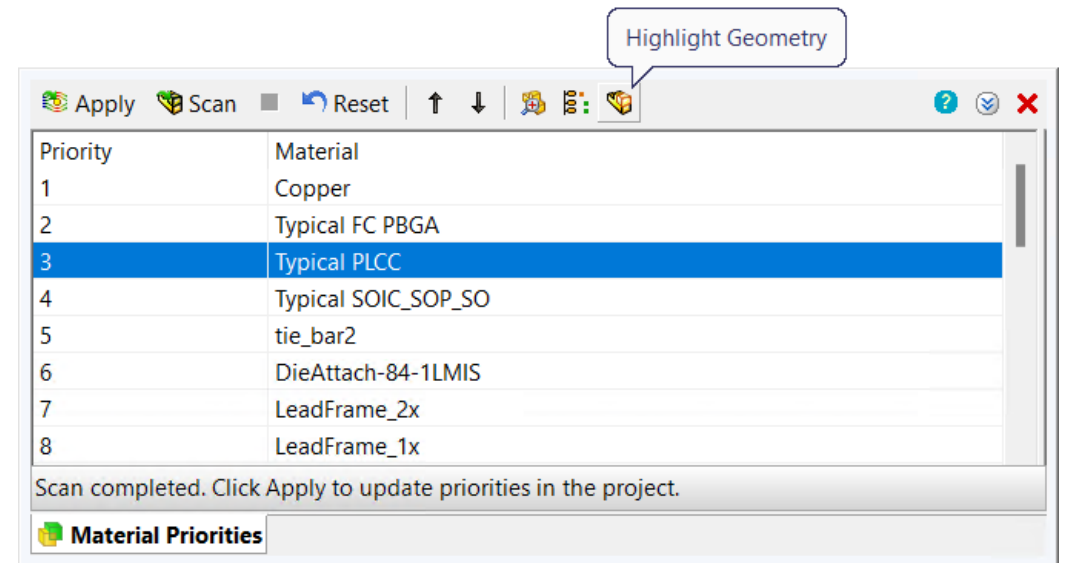
Material Priorities dialog speedup

Challenge: Simcenter FLOEFD can deal with overlapping bodies very efficiently, resolving these regions with Boolean operations. Material priorities are used to specify how interfering regions should be treated, but for very large assemblies with thousands of bodies the Material Priorities dialog can be quite slow to launch. Additionally, highlighting geometry associated with materials can take significant time.

Solution: optimize Material Priorities dialog:

- Speedup dialog opening time and related operations (up to **20 times**)
- Make geometry highlighting feature optional (OFF by default)

You can manage material priorities much faster

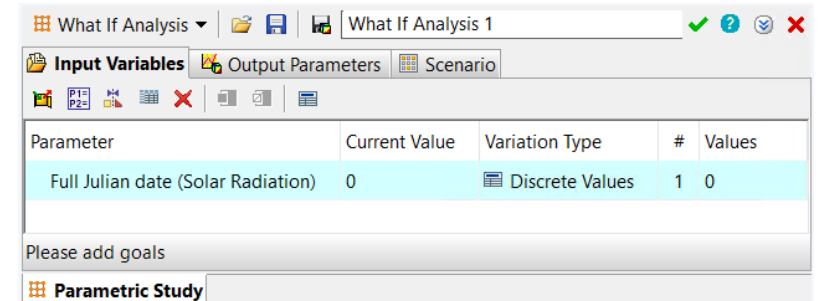


| Miscellaneous

Miscellaneous

- **Relative path to FLD file in XMLconfig.** Link to results file with initial field is now relative in the XMLconfig file, allowing you to export files for a command line run and use it without editing on a Windows or Linux computer
- **Full Julian Date in Parametric Study.** Full Julian Date value is available for varying in Parametric Study. This parameter is needed for thermal analysis with On-Orbit Solar Radiation
- **Default material for Smart PCB project.** Typical Plastic Package is now applied to all components as the default material, you can overwrite thermal model for any of component without a conflict

```
<ExcelParameterDependencyType value="10"/>  
<ExcelParameterFormula value=""/>  
<ExcelParameterGoalID value=""/>  
<ExcelParameterLinkedSubId value=""/>  
<ExcelParameterPathToFile value="${CONFIGDIR}\1\1.fld"/>  
<ExcelParameterPeriodic value="0"/>  
<ExcelParameterType value="999"/>  
<ExcelParameterValue value="10"/>
```



| Parameter | Current Value | Variation Type | # | Values |
|------------------------------------|---------------|-----------------|---|--------|
| Full Julian date (Solar Radiation) | 0 | Discrete Values | 1 | 0 |

Please add goals

Parametric Study

| Thank You