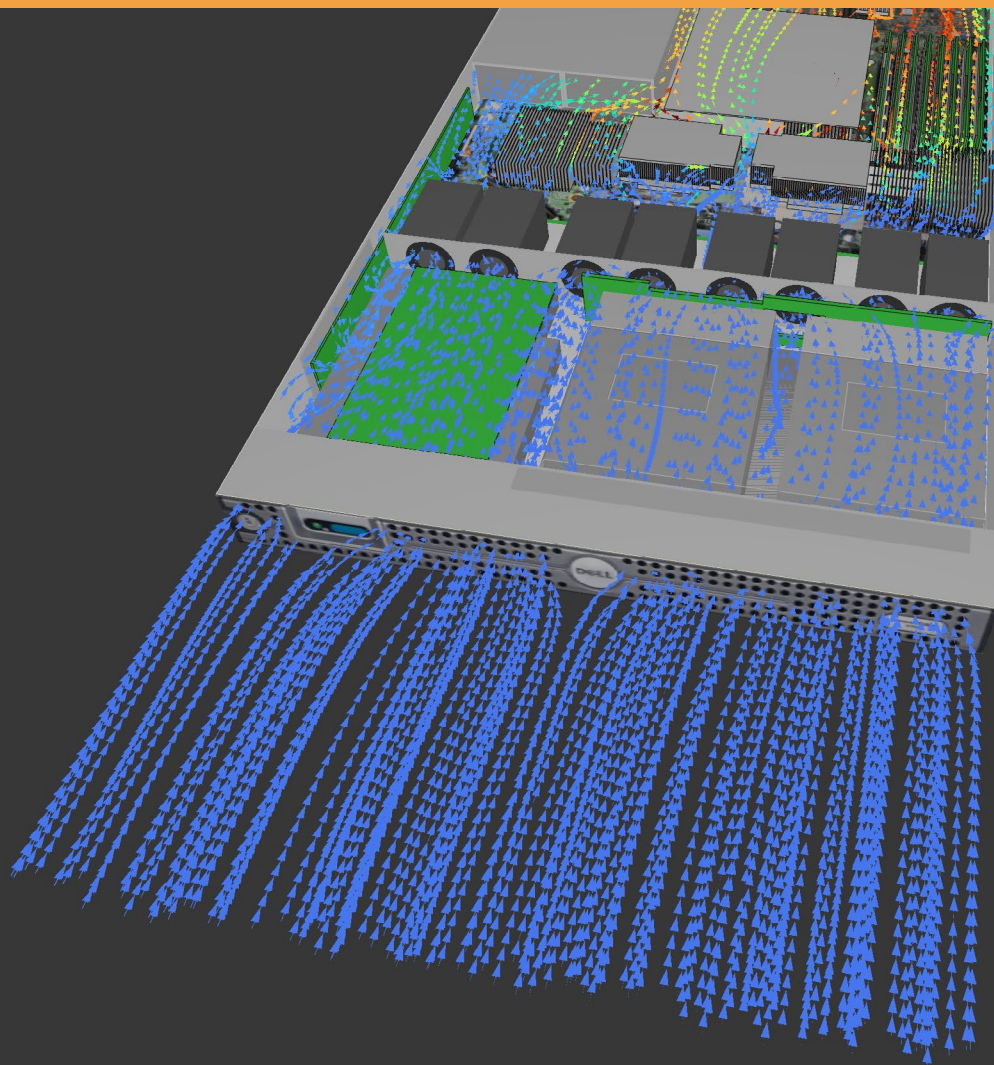
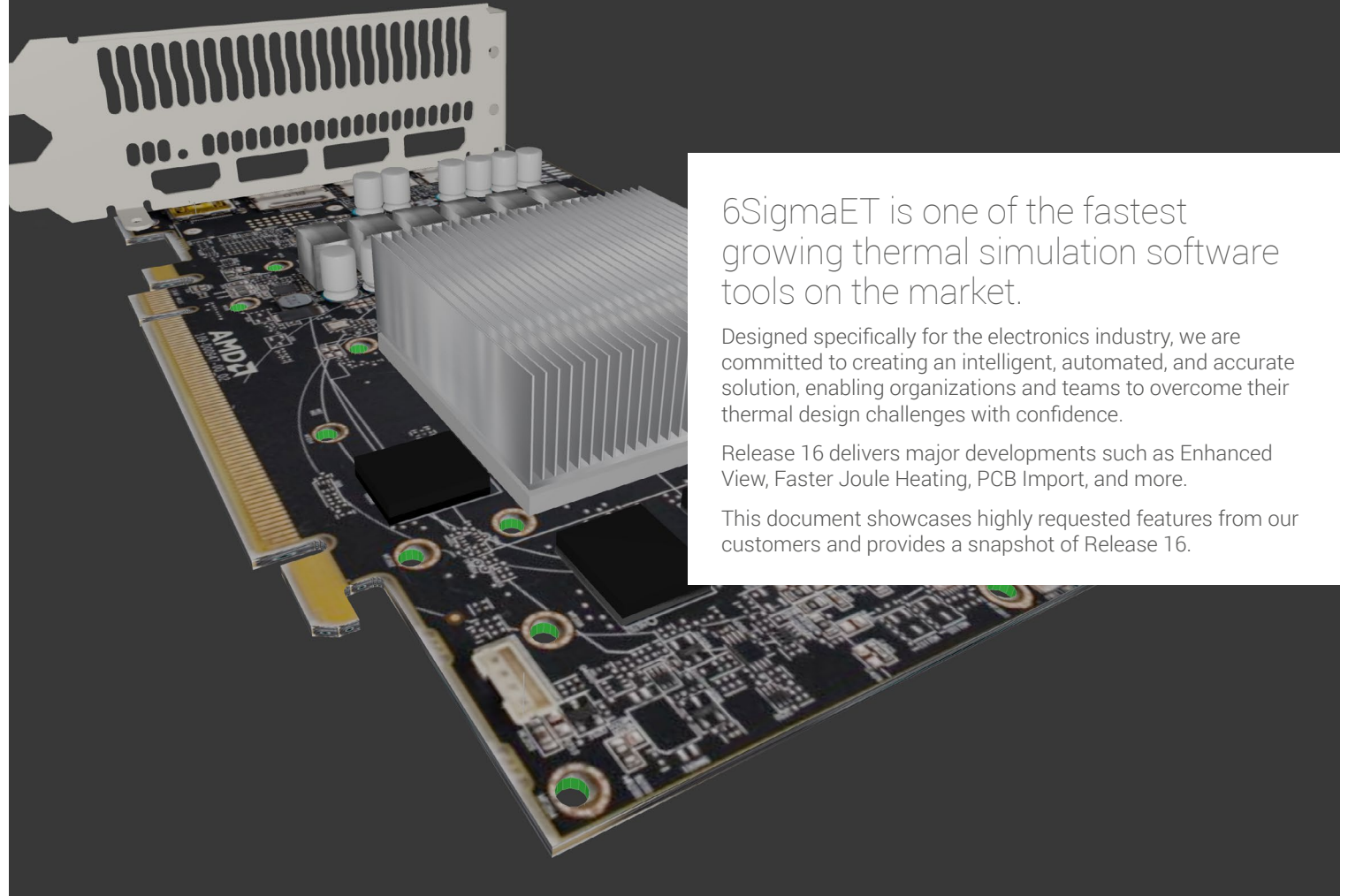


What's New in Release 16?



What's New in Release 16?



6SigmaET is one of the fastest growing thermal simulation software tools on the market.

Designed specifically for the electronics industry, we are committed to creating an intelligent, automated, and accurate solution, enabling organizations and teams to overcome their thermal design challenges with confidence.

Release 16 delivers major developments such as Enhanced View, Faster Joule Heating, PCB Import, and more.

This document showcases highly requested features from our customers and provides a snapshot of Release 16.

Release 16 Highlights

Here are our top 6 highlights in 6SigmaET:

1 Enhanced View
Enhanced View, 6SigmaET's new graphics view, is more comprehensive than ever. Evaluate results and generate reports with photorealistic graphics.

2 Faster Joule Heating
Our solver now offers up to 325 times faster Joule Heating calculations, reducing solve time for complex electrical calculations from hours to seconds.

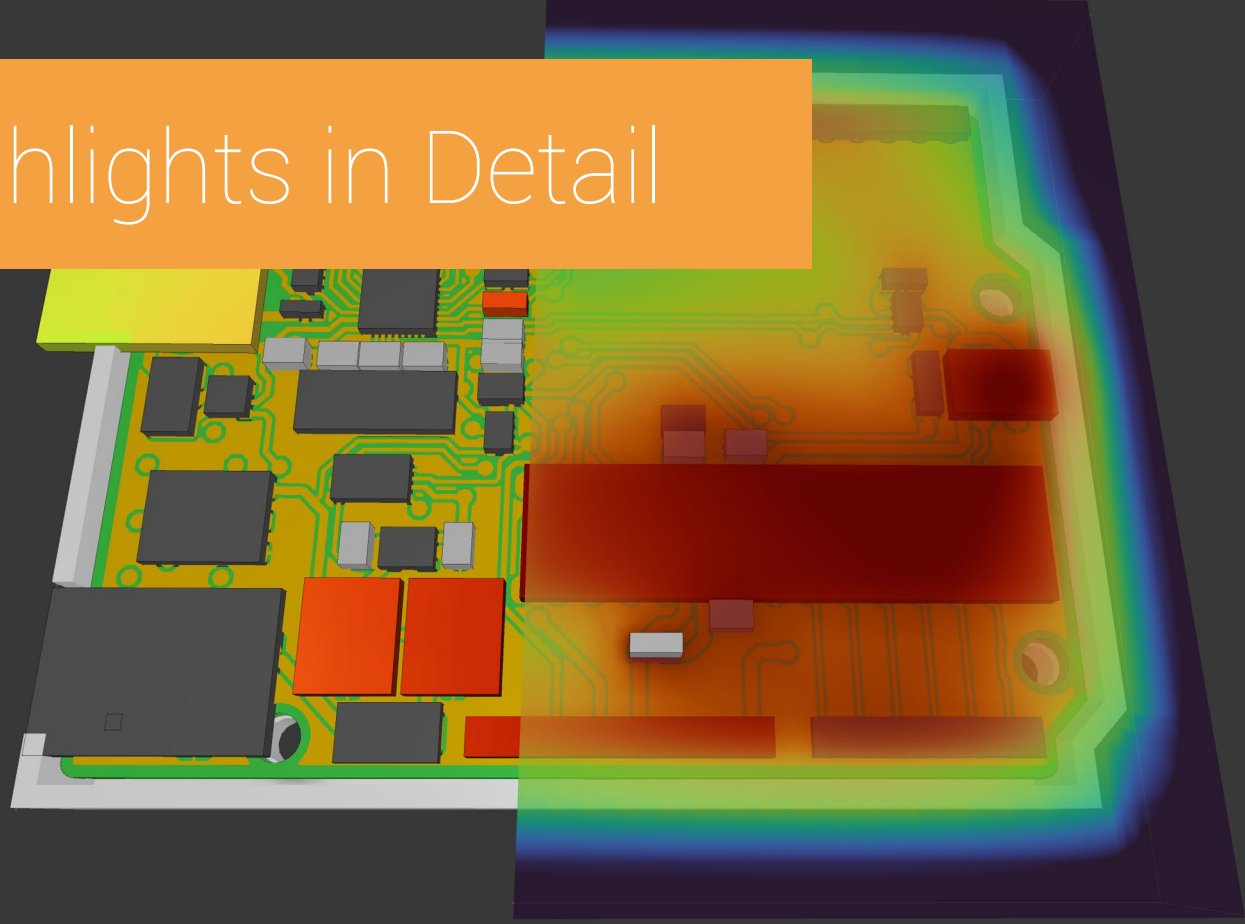
3 PCB Import
Users have more control with significantly faster, more streamlined PCB imports and the ability to decide the level of import detail for each PCB layer.

4 Reporting
New advanced reporting capabilities and features let your team generate reports using Enhanced View graphics, export multiple versions, personalize object viewing, and annotate directly in reports.

5 1D Flow Network
Improvements to the 1D Flow Network offer fast, accurate thermal flow analysis of electronic systems and servers.

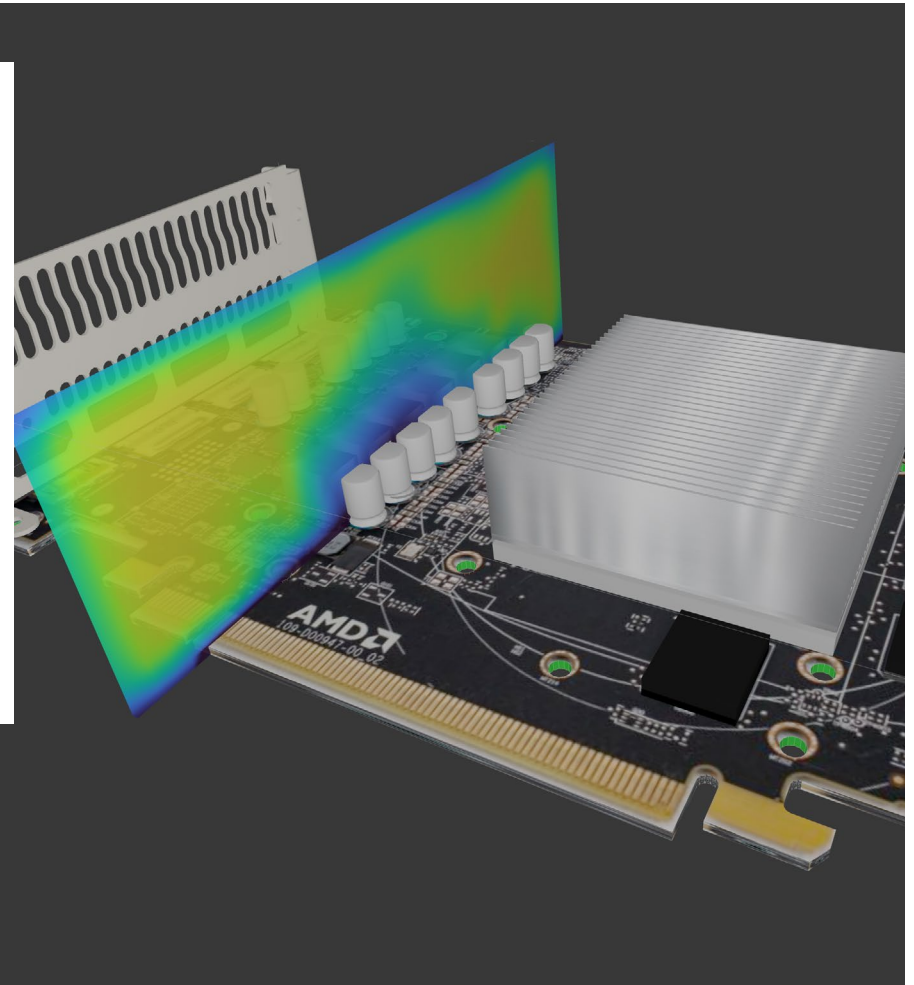
6 6SigmaCommander
Save time and automate model builds, edits, solves, and results generation with 6SigmaCommander. Your team can now automate CAD and PCB imports and updates, empowering them to combine with optimization software and in-house systems.

Highlights in Detail

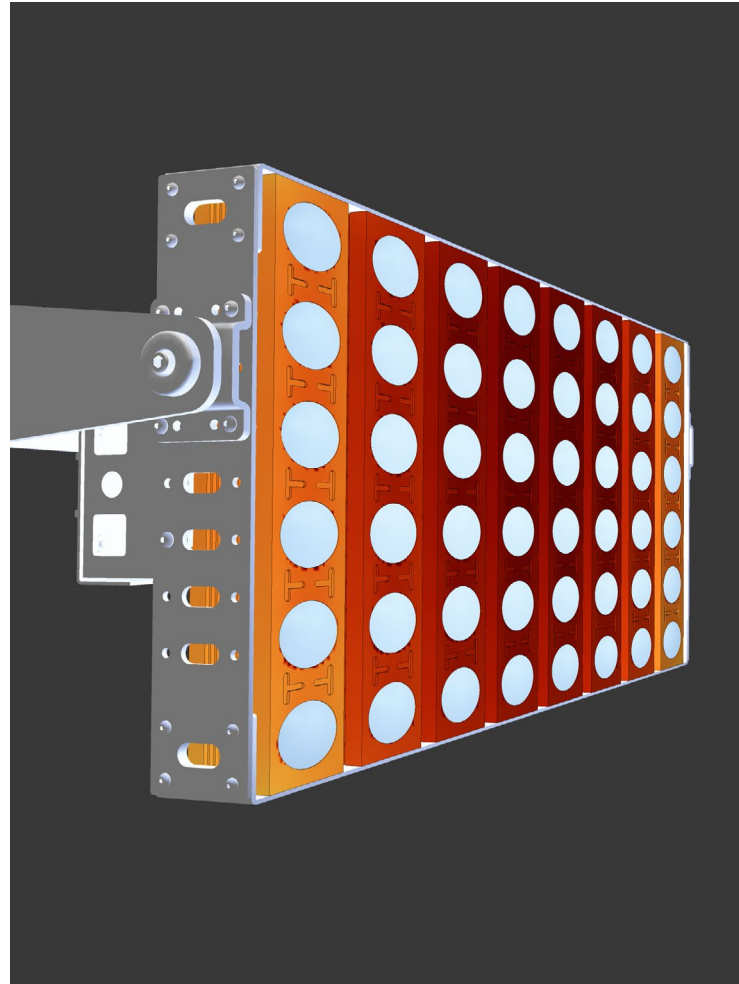


Enhanced View

Enhanced View offers photorealistic graphics and dramatically faster post-processing performance. Improvements include reflections, based on material properties, and shadows. Create stunning high-quality images and videos for technical reports or marketing material. Utilize the fast, agile model manipulation, customizable generated reports, and a range of animation options.



Enhanced View



Generate Reports in Enhanced View

You can now generate reports and export report images using Enhanced View in Release 16. This enables your team to utilize the view's realistic graphics in your generated reports.

Export High Resolution Enhanced View Images

We've made improvements to the image export functionality in Enhanced View, including the option to crop the image to the edges of the model. You can also choose whether to export result legends as separate image files or embed them at a specified location in the exported image. These options are available when exporting images using the Export Image button on the Export ribbon, and the Generate Images and Generate Report buttons on the Report ribbon.

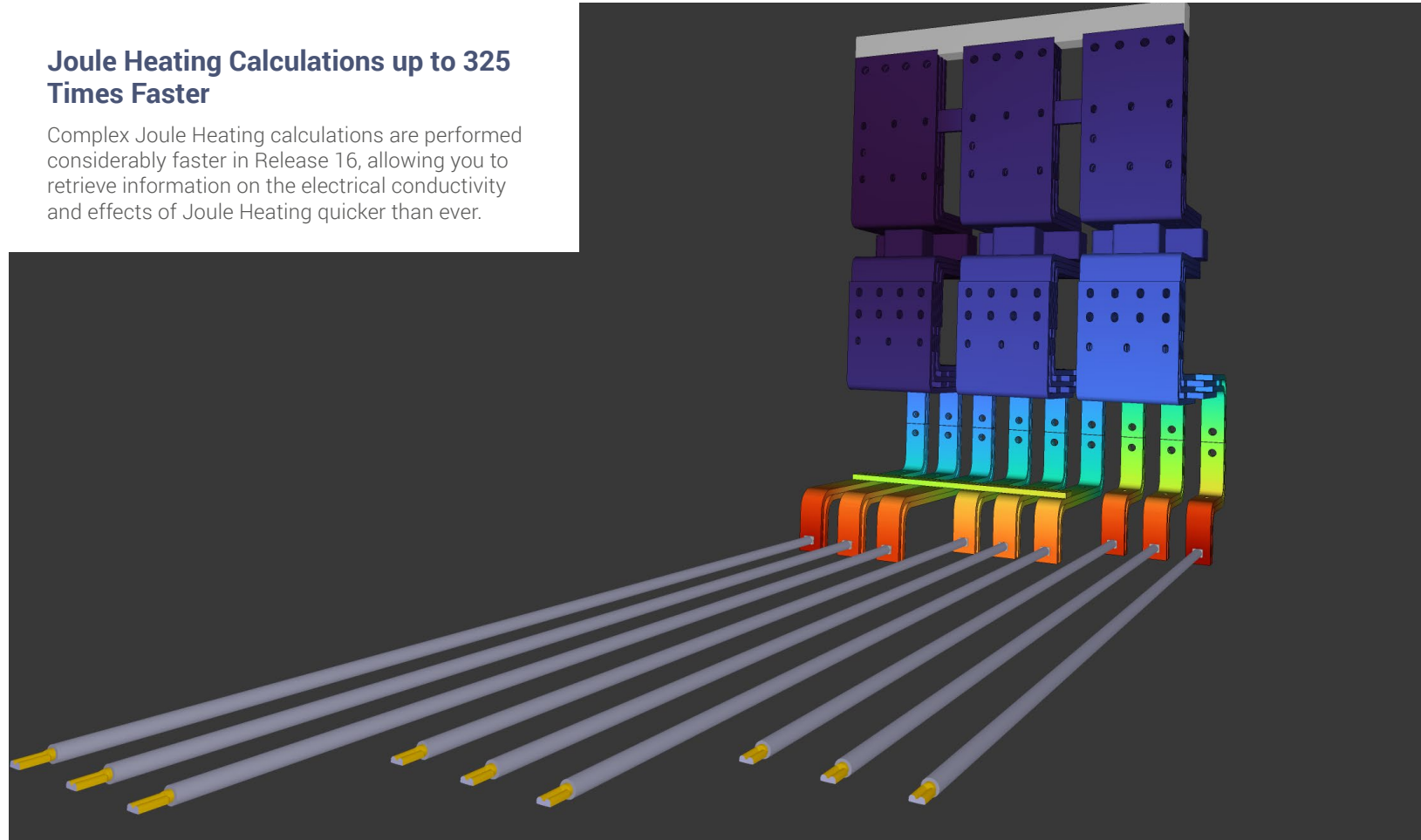
Animations in Enhanced View

Create realistic animations with moving plots to bring your models to life. New settings in the Animations ribbon allow users full control of animated walkthroughs, by selecting the order and placement of cameras. Additionally, a tick box for transient interpolation creates a smooth movement between cameras. This feature assists the creation of videos without the need for external video capture software, presenting results in lifelike view.

Joule Heating

Joule Heating Calculations up to 325 Times Faster

Complex Joule Heating calculations are performed considerably faster in Release 16, allowing you to retrieve information on the electrical conductivity and effects of Joule Heating quicker than ever.

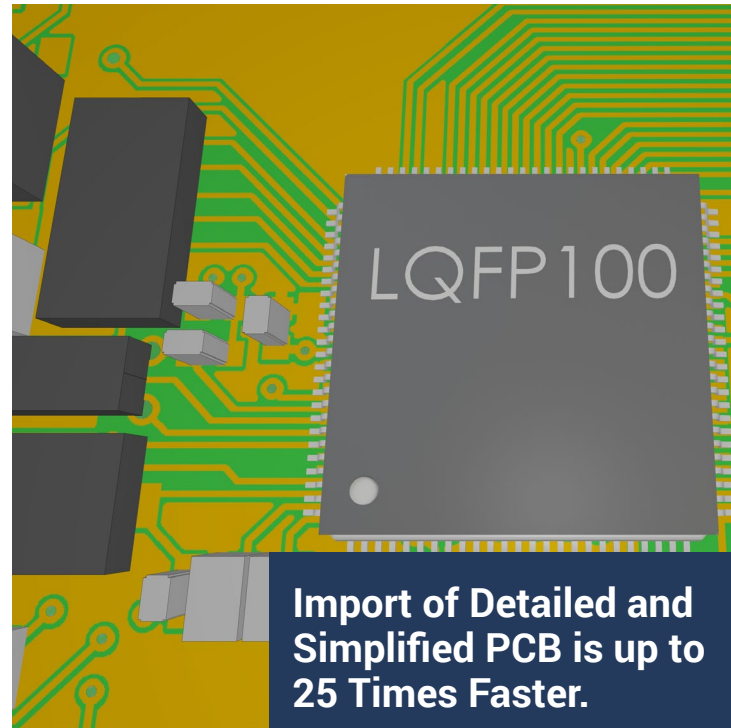


Current through a busbar.

PCB Import

Streamlined PCB Import

6SigmaET is continuously improving the automation of importing, including a large range of import file type options, fast import speeds and control over individual layer modeling, from simplified to highly detailed PCB models.



Import of Detailed and Simplified PCB is up to 25 Times Faster.

Detailed PCB imported into 6SigmaET from an ODB++ file.

Set Modeling Level for Individual Layers when Importing a PCB

When importing an ODB++ or IPC2581 file, you can now set separate modeling levels for each PCB layer, so that only some layers are modeled in detail.

The user can select the modeling detail of each layer of the PCB. The Detailed option means that each PCB conductor is explicitly gridded and the heat transfer through it is calculated. The Simplified option calculates an average percentage of copper in each area of the PCB layer, giving an excellent approximation and a faster simulation.

This feature allows users to determine the important PCB layers that need more detailed analysis, while simplifying other layers to speed up the process of simulation. This allows more user control of imported items.

Report Generation

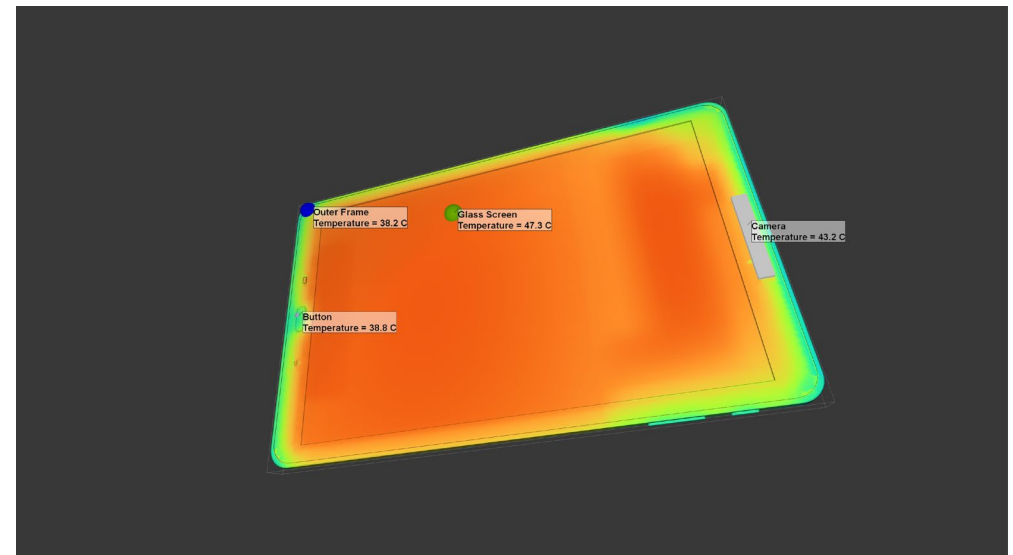
Release 16 builds on the new report generation tool release included in Release 15.

Select Objects Shown in Report Images

You can now create Image Content objects from a Multiple Objects view, allowing you to display a subset of model objects in your report.

Push Pins on Report Images

Push pins can now be added to report images to display results at specific points. This type of annotation will help identify specific values and locations of importance for more intuitive reporting.



1D Flow Networks

Continuous improvements are being made to the 1D Flow Network to enable fast simulation of air and liquid cooling in electronic systems.

The junction temperature of components can now be predicted, and the heat transfer to both a liquid-cooled cold plate and the air can be predicted in a single network.

Flow Networks can be solved independently or co-simulated in 6SigmaET. Additionally, a representation of simplified IT equipment can be modeled as a 1D Flow Network within 6SigmaET and then used in a 6SigmaRoom data center simulation to provide more detailed information on the server operating conditions.

Combined Air Side and Liquid Side Network

We have combined the Air Side and Liquid Side Networks from previous releases into the singular Flow Network object. All objects that could previously be added to these separate network types have also been combined. This new configuration allows you to model Flow Networks with any fluid (including air).

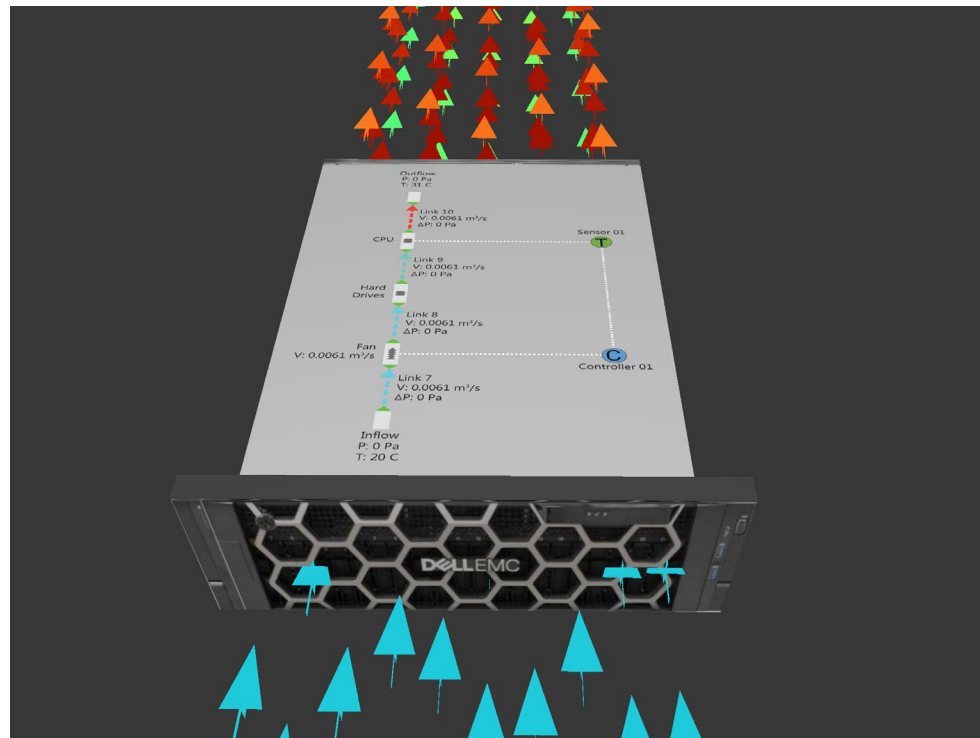
New 1D Component Object

We've added a new component object for Flow Networks, which can be used to calculate the junction temperature and pressure drop across an electronics component. It can also be connected to a 1D cold plate, enabling heat transfer between the two objects. A 1D temperature sensor can be attached to the 1D component so that the junction temperature can be used in control schemes.

1D Flow Networks

Connect IT Equipment Inflows/Outflows to Flow Network

We've added the Modeling Level property to the Cooling node of the IT equipment property sheet. When this property is set to Flow Network, a new Flow Network is created, with the IT equipment's inflows and outflows automatically added as domain boundary objects. This allows you to model the IT equipment's internals using the 1D Flow Network, with the 3D IT equipment object deriving its airflow and thermal properties from the modeled network.



Example of a 1D Flow Network from inflow to outflow.

New Valve Object

We've added a new controllable valve object for Flow Networks, which allows flow to be controlled in the network. There is also the option to configure it as a non-return valve, which only allows flow in one direction.

Mirror Flow Resistance Curve

We have added the option to mirror the flow resistance curve for Flow Network joins and pipes/ducts, allowing you to specify a non-directional resistance curve that does not depend on the direction of the flow.

View Flow Network Solution Convergence

When solving Flow Networks, you can now view the relative difference between the current and previous iterations of the Flow Network solution, which gives an indication of how well the solution has converged. The data for Flow Networks connected to the 3D model are displayed in the Solve On My PC window (or the Progress window for Solve in Queue), while the data for unconnected Flow Networks are displayed in the Flow Network Progress window.

6SigmaCommander

Export CAD Drawing Command

The Export CAD Drawing command has been added, which allows you to export your model as a CAD drawing in DWG, DXF, PDF, or SVG file format.

Import 3D CAD Command

The new Import 3D CAD command allows you to import a 3D CAD file in STEP, IGES, STL, or MOBJ format.

Import PCB Command

The new Import PCB command allows you to import a PCB file in IDF, IDX, ODB++, or IPC 2581 format.

Select Time Step Option

For transient cases, the new 'timeSteps' option can be used by the Generate Result Plane Plot, Generate Streamline Plot and Export Image commands to generate a plot or image at the specified time step(s).

Solve in Queue Command

The Solve In Queue command has been added, which allows you to solve your model in a Queue.

Submitting Jobs has become even quicker. Copying files over to a remote solving machine is now up to twice as fast. This is particularly useful to customers working remotely.

Add Attachments Command

The Add Attachments command has been added, allowing you to specify attachments, such as sensors, on an object.

Importing Files from a URL

Files can now be loaded or imported from a specified URL. Previously they were required to be specified with a file path.

Export Charts Command

The Export Charts command has been added, which allows you to export a bar chart view of the model in PNG or JPEG format.



Additional Features
New to Release 16

Performance

Powerful Solar Radiation Calculations in R16

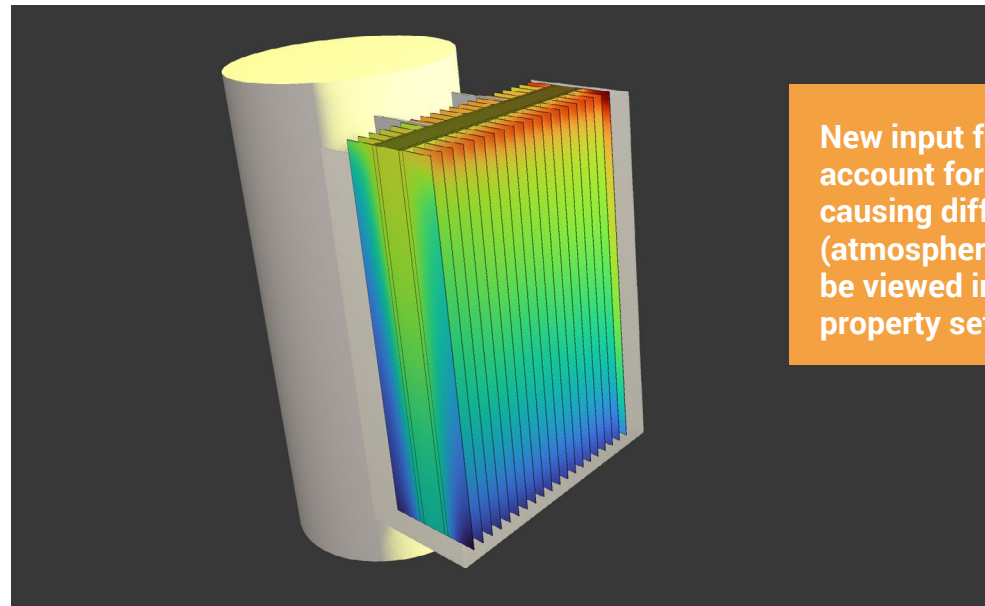
Up to 30 times faster with our back tracing method.

Back Tracing Solar Radiation Calculation Method

We've developed a new back tracing method for solar radiation calculations, which uses rays traced back from the object's surface to the solar source to check whether solar radiation hits the surface. The back tracing method is between 3-30 times faster than the old solar radiation calculation method.

Specify Diffuse Radiation for Solar Calculations

We've added the Diffuse Irradiance option to the Solar Radiation node of Solution Control. Diffuse Irradiance allows you to specify a value for the solar radiation which is scattered by the Earth's atmosphere. If this value is set to greater than zero, an additional energy source term will be applied for solid object surfaces.



Telecommunications base station exposed to solar radiation.

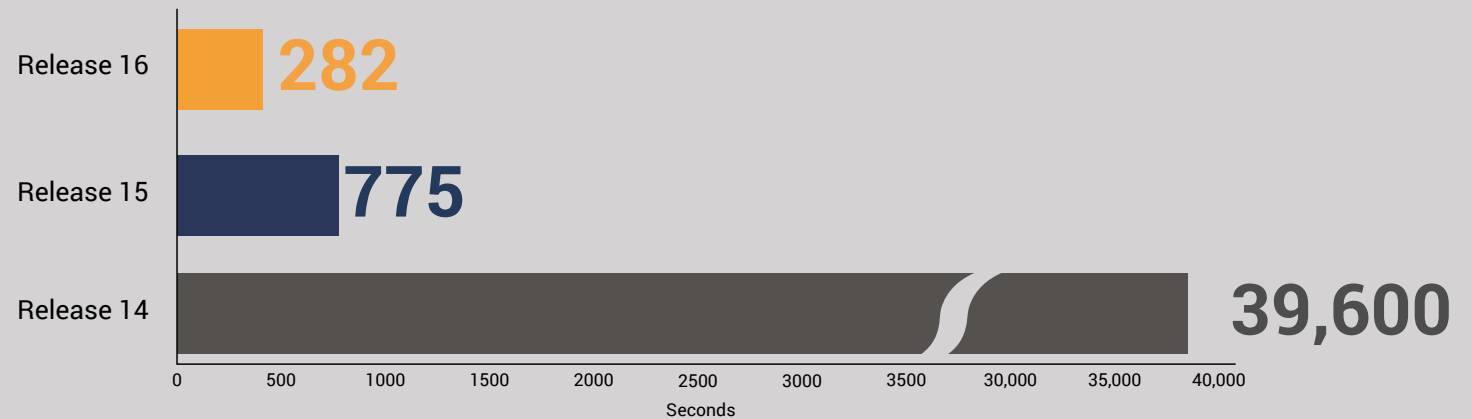
New input for 'diffuse solar intensity' will account for the effects of the sky dome causing diffuse radiation on surfaces (atmosphere scattered radiation). This can be viewed in a result plane with its Variable property set to Diffuse Solar.

Performance

Radiation Calculation Performance Improvements

We've improved the performance of the software's heat radiation calculation. Solving a model that includes heat radiation calculations now uses less disk space.

In each release we continue to increase the performance of our software. Heat radiation calculations on the GPU are now 2.75 times faster in Release 16 than in the previous releases (Release 14 and Release 15).



Time taken to calculate heat radiation on a complex model in R14, R15 and R16.

Geometry Preparation Speed Improvements

The calculation of geometry outlines for heat radiation is now performed in parallel, improving the accuracy and speed of these calculations.

Modeling Improvements

Number of Generated Grid Cells for Individual Objects

The number of solid grid cells and surface faces generated for individual objects is now reported in the Results tab of the property sheet. This currently applies to PCBs, components, and solid obstructions.

Specify Axial Flow Angles on Radial Fans

You can now specify an Axial Flow Angle on Radial Fans. This property allows you to specify the angle between the radial and axial components of the fan, giving more accurate results.

Liquid Cooling Template

We've added a new Liquid Cooling template, suited for models that utilize liquid cooling. This template uses Hybrid Cells and Region Solver.

Convert Subassembly to Component

It's now possible to convert a subassembly into a detailed component. This is useful when importing ECXML files from other thermal simulation packages. Converting subassemblies that represent components into detailed components will ensure that the part is gridded appropriately, and simulation results are correctly reported.

Switch Axes on a Component

The new Switch Axes button can be used to resolve orientation problems occurring when an imported component has been designed and created following a different coordinate system to that of 6SigmaET.

Exclude Non-Plated Vias from ODB++ Import

We've added a new Import Non-Plated Vias checkbox to the ODB++ Import Options page, allowing you to specify whether any Non-Plated Vias should be included in the import, or not.

Auto Layout Resistor Networks

We've added a new Auto Layout Resistor Network button to the View Tools ribbon, which automatically positions all nodes in a resistor network according to node type in such a way that there are no overlapping nodes.

Air-to-Air Heat Exchanger

The Heat Exchanger object can now be configured to use Air-To-Air cooling. In this new cooling configuration, air is used as the coolant.

Face Velocity vs Pressure Drop Curve for Heat Exchangers

You can now create a flow resistance curve for heat exchangers using face velocity (the fluid velocity at the heat exchanger's inlet or outlet) and pressure drop data.

View Generated Resistance Curve for Heat Exchangers

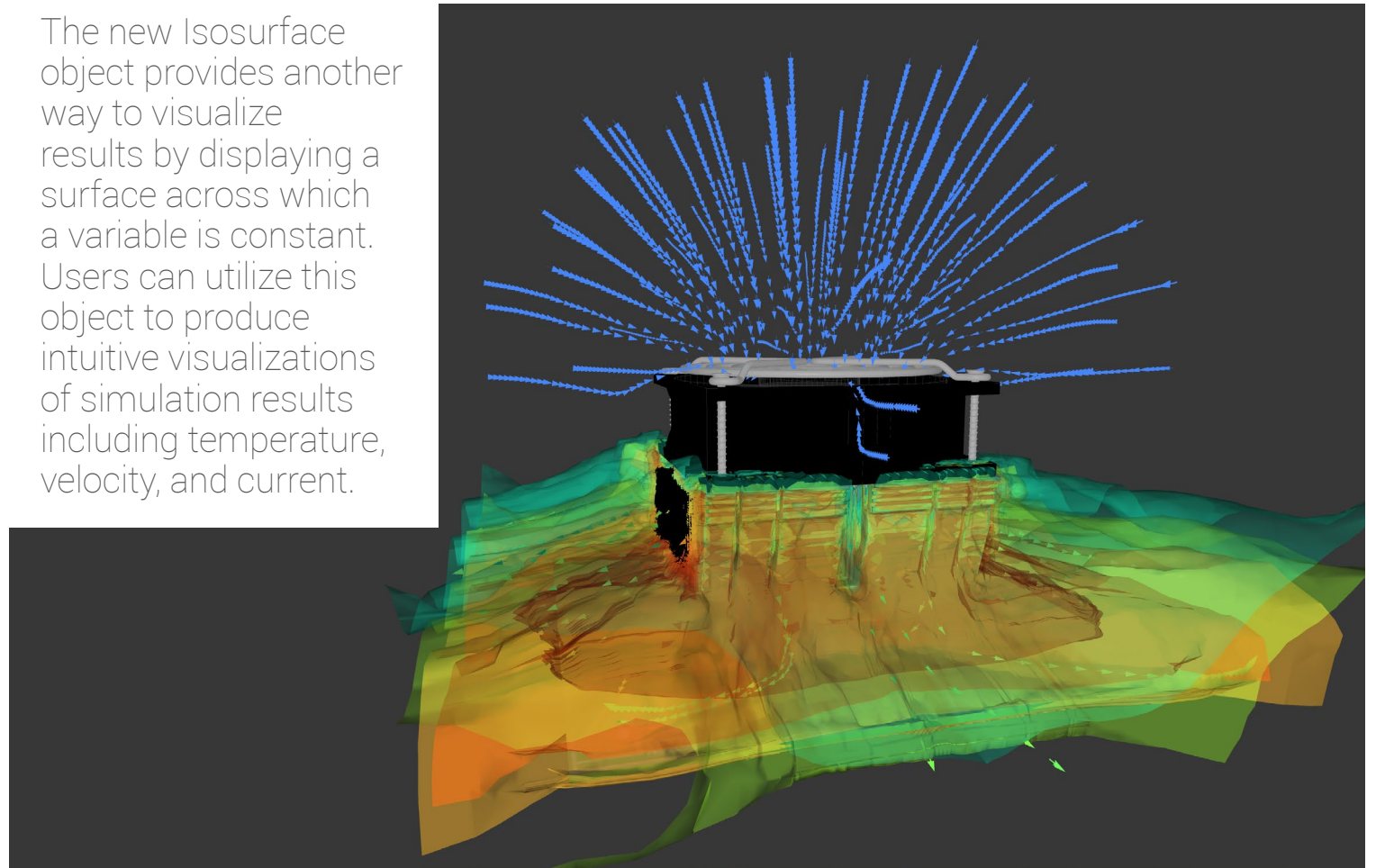
We've added the option to view the air flow resistance vs pressure drop curve that is generated from the user-specified flow resistance data for heat exchangers.

Via Blocks for Modeling a Group of Vias

Vias can now be modeled as a via block, which represents multiple vias occupying a specified region of the PCB.

Isosurfaces

The new Isosurface object provides another way to visualize results by displaying a surface across which a variable is constant. Users can utilize this object to produce intuitive visualizations of simulation results including temperature, velocity, and current.



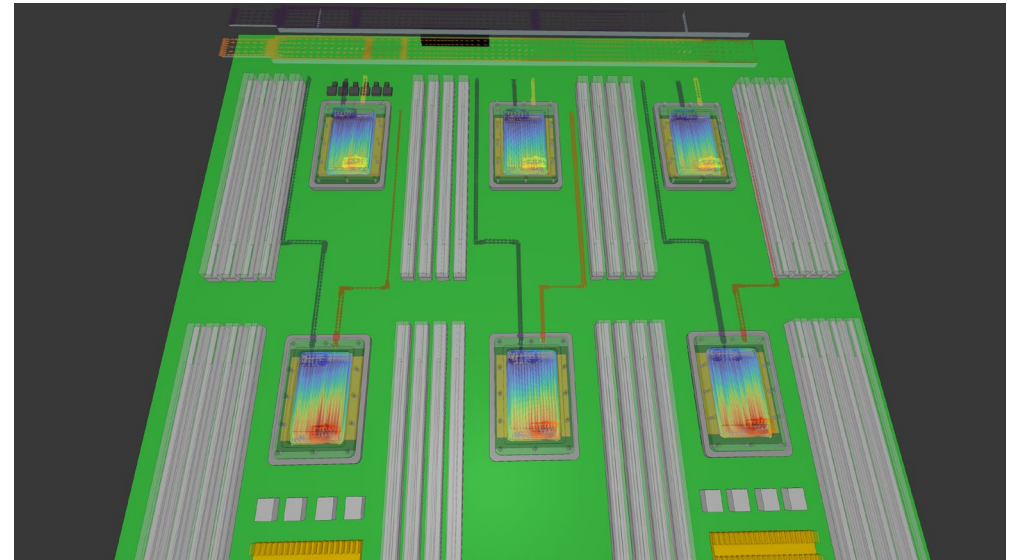
Layered Isosurfaces of constant temperatures for flow through a fan.

Enhancements to Result Plane

We've made the following improvements to 6SigmaET result planes:

Show Material and/or Fluid Results on Result Planes

We've updated the Cell Type option on the result plane object, allowing you to select a material and/or fluid for which to view results.



Temperature of coolant through a liquid cooled server.

Display Wall Distance and Reynolds Number

You can now enable the calculation of Wall Distance and Reynolds Number so that these values can be displayed on a result plane.

Job Submission

6SigmaSolver Server – Replaces 6SigmaCFD and 6SigmaBatch Server

6SigmaCFD server and 6SigmaBatch server have been replaced with a single service 6SigmaSolver. This reduces complexity and improves reliability, without changing the user experience of solving in queue.

Solve Button

The Solve button now launches the solve directly from 6SigmaET instead of sending to a queue. This is a simple solve option for a single user solving one job on the local machine, removing the need to set up permissions for the 6SigmaSolver (formally 6SigmaCFDserver). If more than one user uses a machine for solving, the “Solve in Queue” button should be used.

Generate Grid, Verify Model, and Calculate Radiation Remotely

We’ve expanded the range of tasks that can be performed on a remote machine to include grid generation, model verification, and radiation calculations.

Send HPC Pack Jobs to Queues on Linux Nodes

You can now submit jobs to a HPC Pack Queue running on Linux nodes. Go to 6SigmaControlCenter > Settings > Queue Settings > HPC Queue > Advanced Options, then check the Linux Support option to allow this behavior.

Improvements to Solve On My PC Window

We’ve made some improvements to the Solve On My PC (or Progress Window for Solve in Queue), including the ability to zoom in on a section of the information graph. You can also select which data plots should be visible in the information graph.

Solve Rescale Jobs on Beta Core Types

When solving in a Rescale queue on demand, you now have the option to enable the On-Demand Economy (ODE) service level for jobs on core types that are in beta.

Further Improvements

Pressure Difference on Fixed Flow Fans

In the Results tab of the fan property sheet, you can now view the pressure difference across a fan whose Flow Rate option is set to Fixed.

View License Peak Usage and Denials Log

You can now view the peak license usage and number of denials for all licenses on a selected server over a defined date range.

Rotate and Flip Buttons in Component Power Map Editor Window

When importing a power map for a component, you can now rotate and flip the power map using two new buttons in the Component Power Map Editor window.

Improved Results Compression

We have added the Field Compression Method option to File > Options > Data, with a new Uniform Distribution option for results compression. The Uniform Distribution option may offer improved resolution of compressed results, especially for pressure results plots. The Uniform Range option is the old default method for previous releases and may still be appropriate for some cases.

New File Formats for Importing and Exporting 2D CAD Drawings

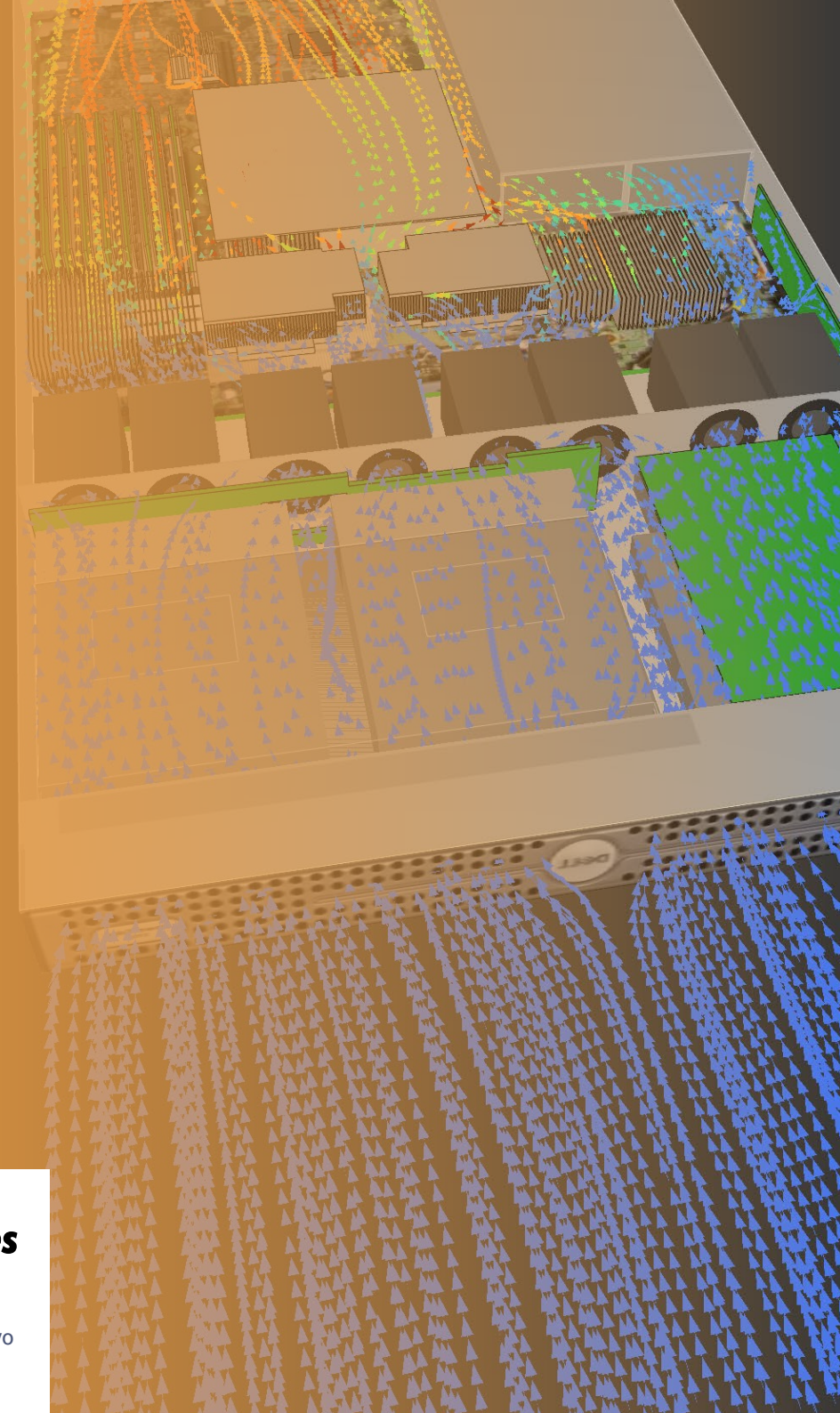
You can now import a 2D CAD drawing from a PDF file and export a model as a CAD drawing in DXF, SVG, and PDF file formats.

Update to SpaceClaim 6SigmaCFD Add-in - Support .mobj Files

We now support the export of .mobj files from SpaceClaim 2020 R2 using the 6SigmaCFD add-in.

Putting Customers First

6SigmaET's software development is driven by industry trends and customer input. As such, we are always keen to hear our customers' feedback on how we can continue to improve the 6SigmaET user experience. Please let us know if you have any comments or concerns by emailing info@futurefacilities.com.



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