# 6SigmaET Release 15

## What's New Guide

ALPHA-NUMERICS

Reseller & CFD Consultant

**Specialist for Electronics Cooling**

6SigmaET by Future Facilities

## About 6SigmaET Release 15

6SigmaET is one of the fastest growing thermal simulation software tools on the market for a reason. Designed specifically for the electronics industry, we are committed to creating an intelligent, automated and accurate solution, so you can overcome your thermal design challenges with ease. Release 15 delivers major developments that speak to this commitment. *Get new insights, work more collaboratively across industry sectors and design better with 6SigmaET Release 15.*

## Release 15 Highlights

### Enhanced View

Analyze models quickly with photorealistic graphics, 60 fps model manipulation and our fastest-loading surface temperature plots yet.

### Optimize Liquid Cooling

Model complex liquid cooled systems efficiently with the only software offering a fully integrated connection between the 1D flow network and the 3D model.

### CAD Workflow Made Easy

Save time updating your model to the latest iteration by updating CAD rather than having to rebuild from scratch.

### Radiation on GPU — Now 100x Faster

6SigmaET provides one of the fastest GPU radiation calculations on the market, now with ray tracing technology.

### Save Time with Automated Features

Take advantage of 6SigmaCommander's new automation functionality: automate both model creation and post processing.

### Easy to Create and Share Reports

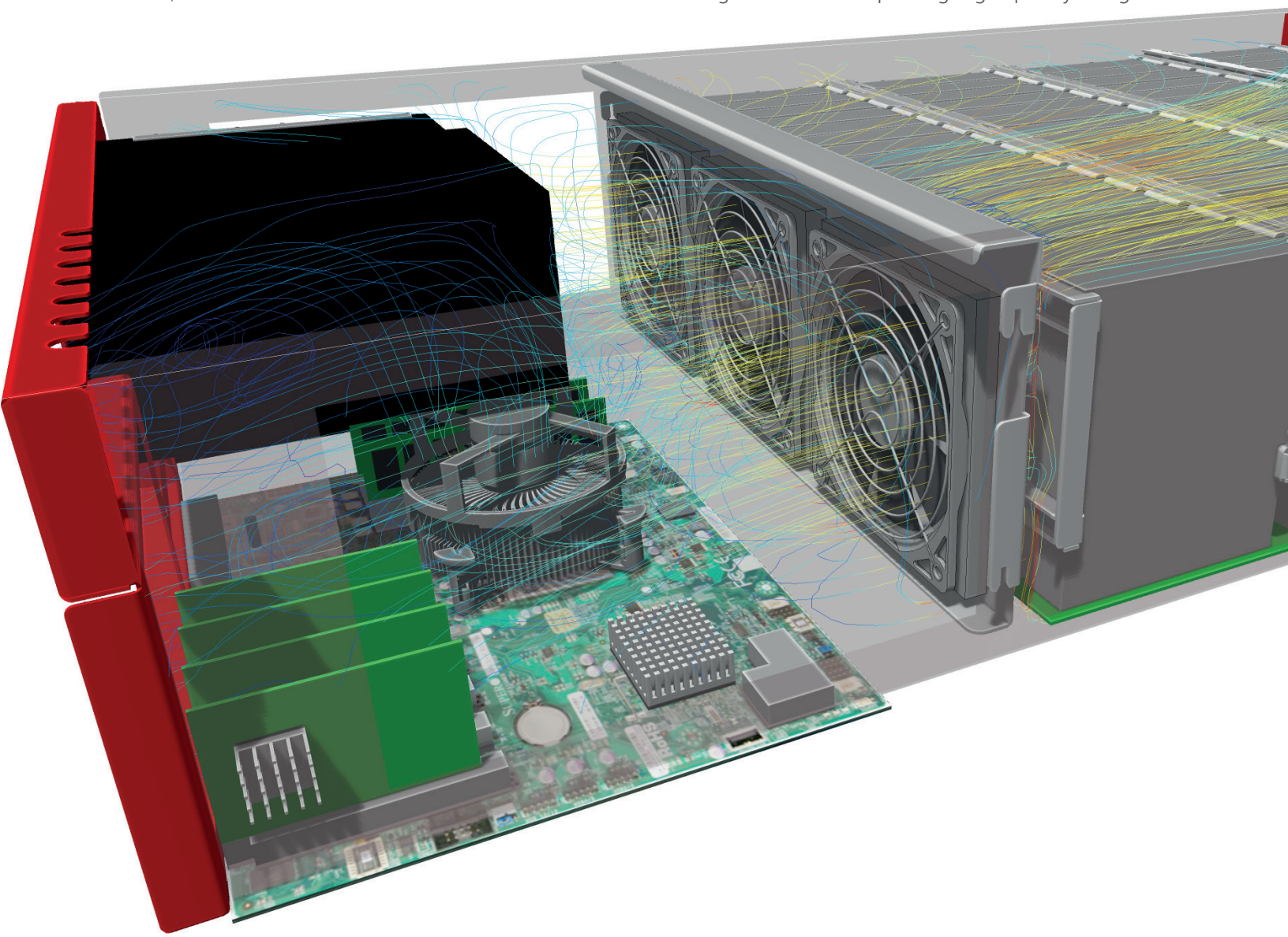
Accelerate your thermal design with our new reporting functionality: export images, text and tables in a format that can be opened directly in Microsoft Word and Google Docs.

# What's New in Detail

Release 15 of 6SigmaET contains a range of new and improved features, the most significant of which are listed below for your information.

## Enhanced View

The new Enhanced View offers faster manipulation of models and more realistic graphics - including shiny materials, reflections and shadows - and is best used for viewing results and exporting high-quality images.



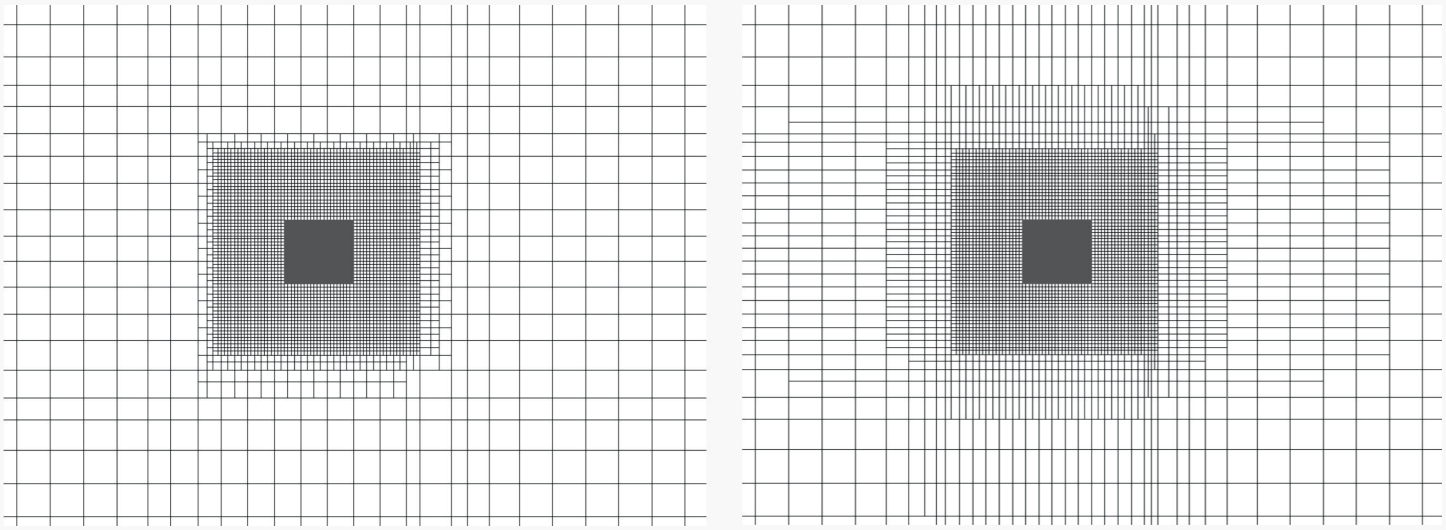
Enhanced View (shown above) is a technical preview, so you should use the standard Graphical View for model building and editing. We are working to add further functionality to the Enhanced View in later releases. Enhanced View also requires OpenGL 4.3 or later to run.

## Solution

We've improved the level of control you have over the solving process. Here's what's new:

### Grid Refinement Slowdown

We've added a new Refinement Slowdown property to Solution Control, allowing you to lengthen the transition from fine to coarse grid cells. Increasing the Refinement Slowdown can help to achieve greater accuracy of the solution in the finer regions.



Above left: Refinement Slowdown is set to 1. No additional cells are added, and so there is no lengthening of the transition from fine to coarse grid cells.
Above right: Refinement Slowdown is set to 5. The grid is repeated for an additional 4 cells before coarsening.

### Heat Radiation Calculations on GPU

We've added a new Ray Tracing heat radiation calculation option to Solution Control, which uses your machine's GPU to perform heat radiation calculations. The surface is split into many triangles, which are sampled in order to calculate the view factors. Using this option can speed up the calculation of view factors and absorption factors from hours to minutes. It is recommended for models where there are many surfaces, such as models containing several CAD shapes.

### Improved Heat Radiation Calculation on CPU

Calculating heat radiation on the CPU is also faster in Release 15; absorption factor calculation on the CPU is now up to 25 times faster than in Release 14.

### Solve Using Multiple Solution Regions

We've added the Multiple Solution Regions node in Solution Control, which contains settings to allow the solver to treat each flow solution region as separate. This can speed up solution for some models, such as those with long liquid-cooled pipes.

### Mixed Precision Solving

We've added the Use Mixed Precision option to Solution Control, allowing you to choose the level of precision used for model solving.

## Solve in Queue

We've added new Solve in Queue functionality to help you get results faster.

### View Progress in HPC Pack Job Manager

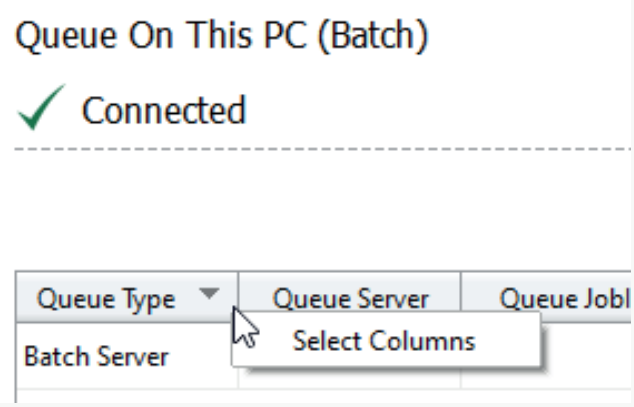
You can now view the progress of jobs in a HPC queue from the HPC Pack Job Manager. This functionality must be enabled with an environment variable - see the HPC Deployment guide for further information.

### See All Jobs in HPC Queue

When viewing a HPC Queue from the software or the 6Sigma Control Centre, you now have the option to view jobs in the queue submitted by all users. However, only users with Administrator or Job Administrator HPC roles can see other users' jobs; users with User or Job Operator HPC roles can only see their own jobs.

### Choose Information Displayed in View Queues Window

You can now choose which data you want to see for jobs in the View Queues window.




When you right click the grey header row of the jobs table (shown left), the Select Job Columns window opens. This lists all the column headings, which can be ticked to be displayed in the jobs table, or unticked to be hidden.

### Hold Job in Batch Queue

When submitting a job to a batch queue, you can now specify a future date and time at which you would like the job to begin solving.

### Specify Runtime for Solve Queues

When submitting a model to a Microsoft® HPC Pack Cluster, IBM® Spectrum LSF Cluster, Rescale Solve Queue or Batch Solve Queue, you can now limit the solve runtime. This means that you can specify a period of time after which you want to stop the solve and begin post-processing, giving you greater freedom when automating solve tasks.

### Submit To and Retrieve From Queues in 6Sigma Control Centre

You can now submit models to, and retrieve them from, any solve queue via the 6Sigma Control Centre interface.

### Reduce Data Sent and Retrieved When Solving in Queue

We've added two new options to reduce the amount of data sent and received when solving a model in a queue. The Files Sent Optimization property allows you to choose how much model data to submit to the queue, while the Files Stored property sets how much of the results data should be saved with the model.

### Set Job Priority in Batch Queue

When submitting a job to a Batch Queue, you can now set the priority the job should be given in the queue. Jobs are first ordered by priority and then by submit time. Once jobs have been prioritized, the Batch server checks that the job can run on the specified CFD server and that any specified hold time has elapsed. If the job can run on the CFD server but there are not enough cores available, none of the jobs in the Batch Queue are sent to the CFD server. The CFD server will not start a new job until there are enough cores available to run the first job.

### Faster Restarting of Jobs in Queue

We have optimized the number of files sent when a job in a solve queue is restarted, meaning the job can be restarted much faster.

### Updated Rescale Priority Settings

When submitting a job to a Rescale queue, you can specify a Service Level to determine the job's priority in the queue. This option follows Rescale's own On Demand/On Demand Pro settings to determine job priority.

### Edit Settings on Queueing Jobs

You can now edit the settings of jobs in the queue that have not yet started solving. Modifying a job's settings temporarily removes it from the queue and resubmits it, which affects the job's position in the queue.

### Continue Solving From Specific Time Step

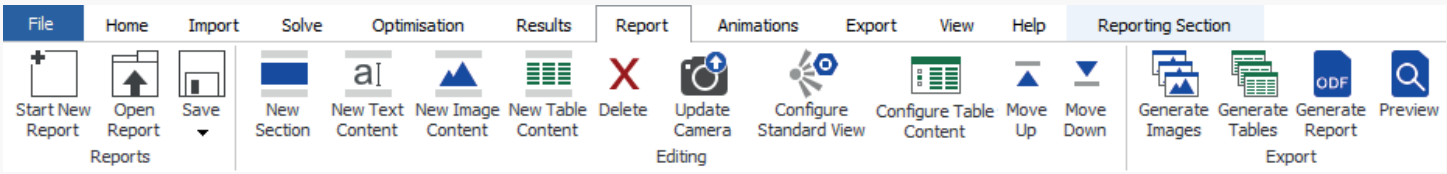
When performing a transient solution in a queue, you now have the option to continue the solution from a specific time step.

# Results

The way in which your solved model appears, and the options that you have to display the results and create new views and reports, have all been enhanced in Release 15.

### New Report Ribbon

The new Report ribbon allows you to compile a report containing images and table data from your model, along with your own text. This new tool offers greater functionality and flexibility than the report tool from previous releases, and is intended to replace it. Both reporting options are available in Release 15; however, the old report functionality will be removed in later releases.




The Reports ribbon is divided into three sections - Reports, Editing and Export - to help guide you through the steps needed to create a full report. You can add Sections, Text Content, Image Content and Table Content to build the report, then generate specific parts (images or tables) or generate the report in full. Reports are generated in Open Document format for maximum compatibility with other applications.

### Resize Result Planes

You can now edit the dimensions of result planes, allowing you to create planes that run through a section of the model.

### Surface Variable Plots for Additional Objects

You can now view surface variable plots for the heat exchanger, porous obstruction, vent, vent opening and perforated obstruction objects.

# Model Building & Editing

We've worked on the following features to provide you with enhanced or improved model creation and manipulation capabilities.

### Compact Cold Plate

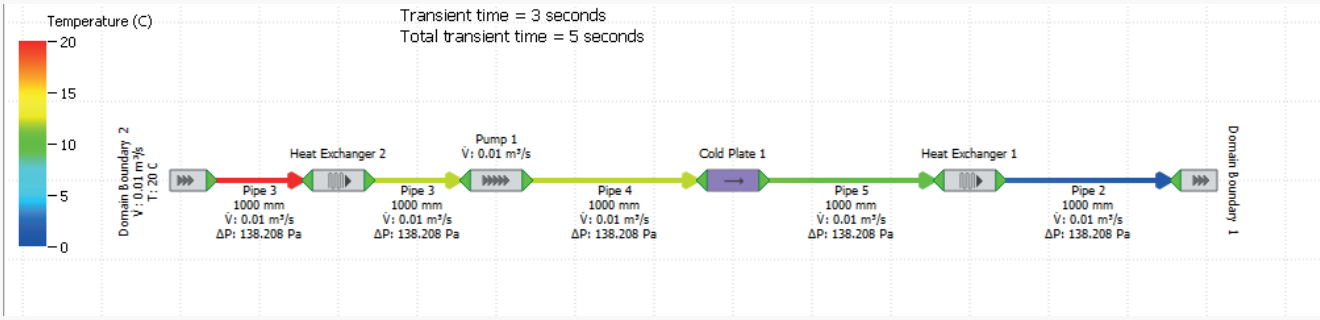
We've added a compact modelling level to the cold plate object, which uses a specified flow rate and temperature to calculate how effectively the cold plate is removing heat from the component.

### Use Mathematical Operators in Property Sheets

You can now use the add, subtract, multiply and divide operators in any numerical field in the property sheet. For example, you can type 2*7 into a numerical field to set its value to 14. Parentheses can also be used when entering mathematical expressions.

### 1D Flow Networks

You can now create a 1D flow network of piping and flow devices, giving you a visual illustration of how air or water flow is directed around your model. Flow networks can be connected to your 3D model, with flow rate and temperature information being supplied to the 3D model from the flow network.




You have the option to model either air or liquid side flow networks. The flow network in the image above is a liquid side network, with the 1D cold plate object colored purple to indicate that it is connected to a cold plate in a 3D model. Standalone flow networks can be quickly solved using the dedicated Flow Network solver, while flow networks that are connected to a 3D model will be solved using the main solver.

### New Snap Options

We've added new options to the snap settings, allowing you to include or exclude a range of object types when snapping.

### Convert Solid Obstructions to Radial Fans

You can now convert solid obstructions to radial fans.

### Capacitor Encapsulant

We've added a new Model Capacitor Encapsulation option to the capacitor object. When this option is activated, the capacitor will model the encapsulant using the specified material, which surrounds all sides of the capacitor except the bottom.

### Additional Flow Rate Options for Flow Devices, Pumps and Vents

We've added some additional flow rate options to the flow device, pump and vent objects in 6SigmaET. You can now specify the flow rate for these objects as a curve, and their operating speed can be set by a controller.

### Temperature Dependent Heat Extraction Option for Pumps and Flow Devices

We've added a new Temperature Dependent option to the Heat Specification property of pumps and flow devices, allowing you to set the rate of heat transfer by a heat transfer coefficient and coolant temperature.

### QFN Added to Package Builder Tool

You can now create a QFN component using the Package Builder tool. The QFN can be configured to have either an exposed die paddle or a die paddle resting on embedded leads.

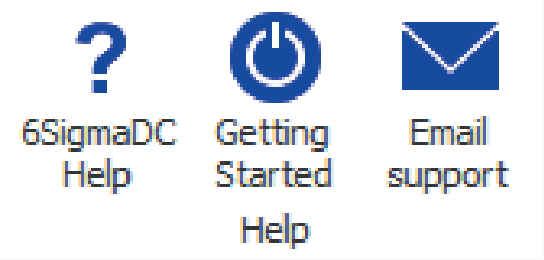
## User Interface

Release 15 of 6SigmaET brings the following changes to the user interface.

### New Help Ribbon

We've added a new Help ribbon, allowing you to quickly access a range of resources to help you use the 6SigmaET software.

The Help ribbon offers quick links to the software help, the new User Support site, and Future Facilities' engineering support team.




### Change Batch Server File Transfer Ports

You can now specify a port range to use for transferring files to and from the Batch server.

### Import and Merge Versions

You can now import an edited model version into the Version Tree, and merge its changes with the model version from which it was originally exported. Once complete, you can see a list of which changes were merged in the List Changes window.

### List Changes Improvements

We've improved the List Changes functionality, which allows you to view a summary of all changes associated with versions in the model. We've added the Version History table, which displays the data in a clear format and allows you to filter or export it.

## PAC Study Improvements

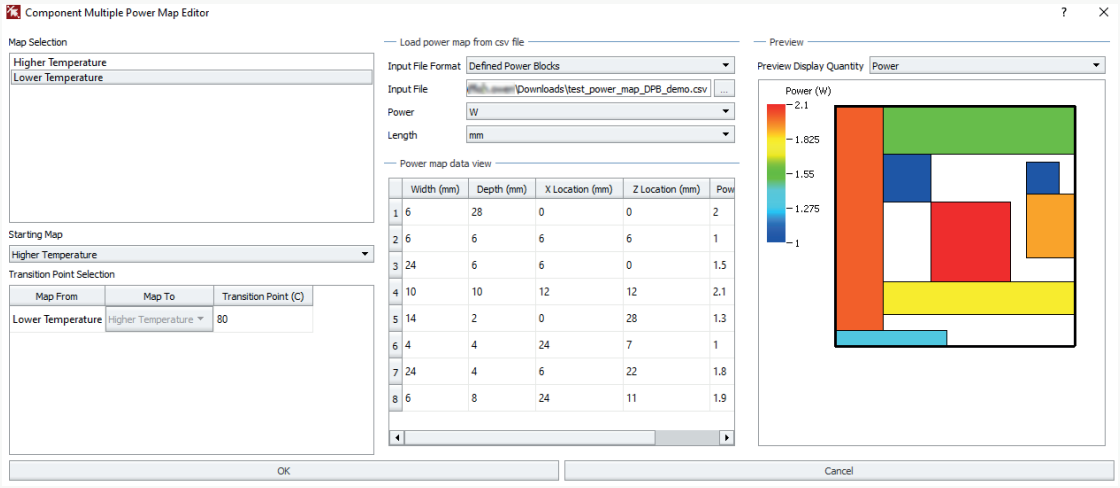
We've made some improvements to the PAC Study process. A new End PAC Study button has been added to the Optimization ribbon, allowing you to end a PAC study without completing it. When you click the End PAC Study button, the Delete PAC Alternates checkbox appears, which you can check to quickly delete any alternates which were created as part of the PAC study. You can also right-click alternates in the PAC matrix to delete them.

## Update 3D CAD Model

You can now update a solid definition in your model with a newer 3D CAD file.

## Power Map Import Improvements

We've made some improvements to the power map import process. You can now import power map files that define the map in blocks of varying sizes instead of across a uniform grid. You can also generate a preview image of your power map before finishing the import.




The new Preview section of the Power Map Editor generates a preview image of the currently selected power map. The power map previewed in the image above utilizes the new Defined Power Blocks functionality, with blocks of varying size.

## Change Units on Imported Power Maps

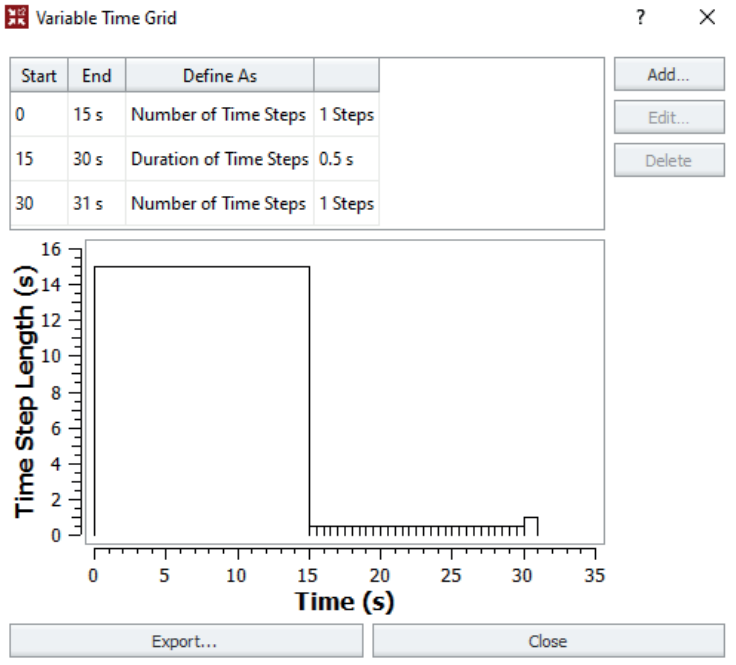
You can now change the units used for power and size when importing a power map onto a component or heat source.

## Rename Tool Improvements

We've made improvements to the Rename tool, allowing you to rename multiple objects more easily in large models. You can now reset the incremental numbering or lettering of selected objects for each new parent object, and skip numbers or letters in the sequence.

### Time Distribution Graph Displayed in Variable Time Grid Window

When setting up a transient simulation with a variable time grid, you can now see the time distribution graph in the Variable Time Grid window. This enables you to quickly view how the time distribution graph changes as you add or remove time step ranges.




The Variable Time Grid Window (shown left) combines the time distribution graph and variable time grid.

### Controller Network View Improvements

We've added the ability to show Controller Network views for individual objects, and improved the readability of the Controller Network View in very large models.

## Import & Export

Future Facilities continues to make 6SigmaET more inter-operable by adding the following new integrations.

### Export STEP Files from 6SigmaET

You can now export a model, or selected objects in the model, in STEP format.

### Export to OBJ

You can now export your model in the OBJ geometry definition file format.

### Import New Objects via CSV

You can now import new objects into the software using a CSV that contains the correct property information. Each row in the CSV file refers to a unique object in the model. Each column provides a property value for that object. Once the new objects data has been imported, the properties of the individual objects in the model will match those defined in the CSV file.

### Find Using CSV File

We've added the option to import CSV files into the Find window, allowing you to quickly populate the Find window with the criteria you want to use for the search.

## New or Updated Model Objects

In response to customer feedback, we've added some new objects and updated some existing ones.

### New Sensor Array Object

We've added a new Sensor Array object to 6SigmaET. This is a logical object which allows you to group multiple sensors measuring the same variable. It can be set to read the maximum, minimum or weighted average of the attached sensors' measurements. A sensor array (or multiple sensor arrays) can then be attached to a controller, rather than having to attach large numbers of sensors to a controller individually.

### Specify Heat Transfer Coefficients on Faces and Solid Obstructions

You can now specify fluid and solid heat transfer coefficients on faces and solid obstructions.

### Specify Heat Exchanger Flow Resistance in 3 Axes

You now have the option to specify the air flow resistance for heat exchangers in all 3 axes.

### Specify Fan Housing Thickness

You can now specify the total thickness of a fan, including its housing, allowing you to model fans more accurately.

## Learn More

Please visit the 6SigmaET website to start your free trial or download the new release. Our software development is driven by customer input and industry trends. As always, please do not hesitate to reach out if you have any thoughts on how our software can better serve you and your business' needs.

# More Information and Registration for a free Software Trial

www.alpha-numerics.de
and switch to english version

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