



## **6SigmaDC Software Help What's New in Release 3?**

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# 1 What's New

There are numerous improvements to the software in Release 3, many of them significant. A summary of many of the changes is given below:

## Operating Systems

Release 3 now includes support for Windows Vista both 32-bit and 64-bit. This is in addition to support for Windows XP and Windows XP\_64.

## Integration

### *File/Import*

A new File/Import menu has been created with three items: Equipment Data, CAD Data and Measured Data: The Populate Cabinets functionality of Release 2 has been relocated here and renamed as Import Equipment Data; Import CAD Data has been extended and relocated here; Import Measured Data is new functionality for Release 3, enabling the import of data from 6SigmaDataq.

### AutoCAD integration

The AutoCAD integration has been significantly enhanced and now features:

- bi-directional communication of data i.e. export from 6SigmaDC to AutoCAD in addition to import. Layers exported from the 6SigmaDC suite are clearly marked with the 6Sigma prefix
- (portability between AutoCAD 2006, 2007, 2008 and 6Sigma software).
- Increased version support for AutoCAD. In addition to AutoCAD 2006 32, AutoCAD 2007 32, AutoCAD 2007 32 SP1, the following versions are now supported:
  - ACAD 2007 64 - AutoCAD 2007 itself does not support 64-bit Windows. However, it does support running on an Intel EM64T processor using Window XP. AutoCAD 2007 runs as a 32-bit application on 64-bit processor in what Intel refers to as Legacy mode. The 6SigmaDC suite does support this mode as well. The 6SigmaDC installer does not recognise this special mode, so a manual installation through a zip is needed, and an environment variable "6SIGMACADDIR" needs to be defined.
  - ACAD 2007 64 SP1 - see ACAD 2007 64.
  - ACAD 2008 32
  - ACAD 2008 64
- Increased number of supported AutoCAD symbols. In Release 2 SP1, the supported symbols were layer, block, polyline and line. The additions for Release 3 include:
  - Text
  - Mtext (multiline text)
  - Solid (2d solids, often used to represent cabinets - converted into line representation)
  - 3dsolid (converted into line representation)
  - Arc
  - Circle
- Other improvements:
  - Drag handlers makes it easier to line up the AutoCAD layers and the 6SigmaDC model
  - Selected layers are highlighted and drawn in wide line type
  - Zoom toggle

## Measured Data

6SigmaDatAq allows the user to import measured data into the Virtual Facility model and store them with the object they are associated with. For example, importing temperatures measured on an ACU. This data will be stored with the ACU in the Virtual Facility, which makes comparisons straightforward. The 6SigmaDatAq tool also provides the capability to program *ibuttons*® (*ibutton* is a registered trademark of Maxim Integrated Products / Dallas Semiconductor) to acquire data during a specified measurement period.

## Import Equipment data

Tools/ Populate Cabinets functionality for importing equipment data from a comma separated variable file (.csv) has now been renamed and moved to File /Import/ Equipment Data. The tool has also been improved to ensure it:

- Does not duplicate equipment that already exists in the 6SigmaDC model;
- Detects items that have moved;
- Detects items that have been removed.

In general this provides much improved synchronisation with external asset management tools.

## File/Export

A new File/Export menu has been created with five items: Zip, Table, View, CAD Data and Calculated Values: Export Zip and Export Table functionality of Release 2 has been relocated here; Export Image has been relocated here and renamed as Export View; Export CAD Data is new functionality for Release 3, enabling 6SigmaDC data to be imported into AutoCAD using 6SigmaCAD.arx; Export Calculated Values is new functionality for Release 3, enabling export of data from the thermal / airflow calculation to a .CSV file.

## Export Calculated Values

Export Calculated Values is an export tool that allows you to export data from the thermal / airflow calculation for selected points or planes to a comma separated variable (.csv) file.

For a list of points, the list of points where you require data is defined in a .csv file. The file format should be a heading row for the coordinate directions and units followed by rows of 3 coordinate values. The output is {sourceFileName}\_values.csv.

For a plane, the output is produced in a .csv file of user specified name.

## Setting Up The Model

### ACUs

#### ACUs connected to the False Ceiling

ACU's with a ducted connection to the false ceiling can now be connected automatically.

#### Internal ACUs Air terminals

In some facilities ACUs supply and / or return air to / from remote locations. It is now straightforward to include these as Cooling Vents / Return Vents in addition to Supplies and Returns on the ACU itself.

### Scoops

It is no longer necessary to build a custom scoop from solid obstructions where the bottom of the scoop is curved. When a scoop is used, one with a curved back / bottom is

now the default. A rectangular scoop is the alternative option. Further, a standard scoop can now be stored as part of the ACU symbol library and can be turned on and off making sensitivity studies much easier.

### *Cables: Angled Power and Data*

- Like Cooling Pipes, Power and Data cables can now be moved to run at an angle to the floor grid.
- The operation of Cables (and Pipes) has been improved so that branches don't jump (they stay relative) when parent moved.

### *Card Enclosures*

A new object, a card enclosure can be added to cabinets to represent sets of parallel electronics which have no built in airflow and rely on natural convection or forced convection from external fans. The user specifies parameters such as the geometry, number of cards, card thickness, power per card etc.

### *Fan Tray*

Fan trays can now be added freely to a cabinet and rotated.

### *Floor Grilles*

- Floor grilles no longer are limited to having active area the size of a floor tile. This means that they can be re-sized and located to represent a tile with only, for example, the central portion active.
- To allow for more complex floor grilles, Floor Grilles can have group, solid and perforated obstructions as children.
- The same is true for Ventilation Grilles in a false ceiling.

### *Power Strips*

Power strips are now available as an object in a rack / cabinet. This allows any number of power strips in a rack / cabinet and connection to multiple PDUs. Power Strips also check that there are no more items of equipment plugged in than there are sockets.

### *Rack Mounted PDU*

You can now define and use PDU's mounted in an equipment cabinet

### *Heat Exchanger*

You can now add liquid heat exchangers to cabinets and define their geometry and effectiveness for reference conditions. They can be attached to the cabinet itself or to a cabinet side. When attached to the cabinet the heat exchanger can be rotated to be at an angle to the primary cabinet geometry.

### *Mounting Rails*

For modelling simplicity, a number of different mounting rail shapes have been added. Cross sections include:

- 'L'
- 'c'
- 'g'
- box

### *Multiple Raised Floor (and / or Ceiling) grids*

To allow for buildings where the data centre has evolved with more than one raised floor grid, you can now define multiple floor grids by:

- Including Tile breaks where a part tile has been installed.
- Using Floor Cutouts (which can be at a different height to the main raised floor) with their own grid - items that can sit on the raised floor can now alternatively sit on a cutout grid.
- The same philosophy is applied to False Ceilings.
- Further, the Raised Floor Grid no longer needs to have the origin in the corner of the room. The origin for the lettering / numbering can now be anywhere on the raised floor.

### *Raised Floor Holes*

- Raised floor holes can be at any orientation - they no longer need to be aligned with the floor grid.
- A similar approach is applied to holes in the false ceiling.

### *Raised Floor Leakage*

- In addition to specified holes and cable penetrations a general leakage through the raised floor can now be easily defined over the entire raised floor by specifying a gap size that reflects how well (or badly) adjacent tiles typically adjoin each other.

### *Symbol Libraries*

- The symbol libraries have been updated, reorganised for easier searching, and a new star rating system applied. The star rating allows you to see quickly how much data was available to define the symbol library entry. The library now contains hundreds of popular items of equipment that Future Facilities and its customers have needed to include in Virtual Facility models. In fact these represent many of the most popular items.

### *Zones*

Zones can now be defined in the model to represent user defined areas of the facility that have significance to the user. Each Zone reports the total power, its area and power per area.

## **Computing Thermal / Environment Conditions**

### *Analyse Cooling Failure*

A new solution option , Analyse Cooling Failure has been included. The transient / time dependent calculation undertaken can account for thermal effects of cooling system, as well as the mass of the building.

The user can define the characteristics of the cooling system, including how long it takes for the ACUs to stop and restart, when they stop and restart, the mass of liquid in the cooling system and more. This results in a more realistic prediction of the time for the air to heat up etc.

### *Predict Local Temperatures*

This is new functionality in Release 3, enabling the user to drag out a rubber-band area on the raised floor for quick recalculation. This is useful for small changes where only local conditions are likely to be affected, for example: installing new equipment into one cabinet. This local prediction assumes that the rest of the facility is unaffected by these small changes and imposes previous results as boundary conditions for the new solution

(significantly speeding up the evaluation of the proposed changes). When sufficient computing resource and time is available, the full calculation can be run to ensure that the rubber band solution for local results is representative.

### *Utilising New Processor Architectures*

A new Premium solver licensing model has been introduced that lets customers take full advantage of their new dual and quad core processors, without paying a large premium on software licenses.

### *Environment Calculation Speed*

There has been a substantial improvement in the speed of calculating the environment. Tests have shown that results are being calculated with up to 2, and sometimes more, times the speed.

## **Reporting and Model Views**

- Additional parameters are now calculated to help understand how effectively the Air Cooling Units cool the equipment. For each ACU a supply effectiveness and return effectiveness are calculated. For each item of equipment a supply effectiveness and return effectiveness are calculated. The equipment effectiveness indices are summarised at rack / cabinet level. ACU and equipment effectiveness parameters are summarised in the room summary.
- Different view of data, such as geometry views and results plots are now shown as layers. This has the advantage of being consistent with CAD and makes it easy to return to different views including arbitrary object defined rendering.
- The Schematic View has been improved providing a clear simple view for fast manipulation.
- The software now reports the number of empty U-slots available in the facility so that you can determine how much physical capacity is available.
- The automatic report has been substantially updated. It has been:
  - Re-structured with an index;
  - Each plot has separate headings and user defined plots can have user editable text above and / or below. The text can include the minimum and maximum value of the plotted variable automatically;
  - Plots can have users / clients logo included;
- The range of results in the Virtual Facility can now be displayed for any selected calculated variable. For example you can display markers to indicate the location of Minimum and Maximum temperatures.
- Results in the form of Result Planes and Particle Tracks can now be interpolated to provide a view that does not depend on the grid size.

## **6SigmaManager**

- A Room Version, can be exported from a specific facility state in 6SigmaManager so that it can be worked on in 6SigmaRoom. In this way, the designer / consultant can make structural, cooling and other one-off design changes to the facility before the room version is imported back to 6SigmaManager.
- The *Daily View* can be filtered by *Project Name* so that it is easy to see changes associated with a particular project.
- The status of the CFD solution for environmental conditions is now displayed.
- New options have been included to allow the user to easily reschedule or destroy

Alternates.

- The change history of IT equipment can be displayed by selecting *Show History* from the pop-up menu for the item.
- When a facility state is rescheduled or destroyed, there is now an option to reschedule or destroy alternates as well.
- Values can be charted in Room Summary over time using a new tool View History Trend. In addition Maximum cooling Load Available, Cooling Load Used, Total Room Load, Total Power Capacity and Current Total Power Draw can be displayed in a trend chart versus time.

### *GUI and General Operation*

- Object manipulation handles have been updated to reduce conflict between handles.
- Snap to grid has been improved making it much easier to build models.
- Overall performance of the GUI has been improved, particularly when manipulating large models.
- Cell count limit renamed to Cell Count Target to better reflect its use.
- Items in Solution Control that are not normally required have been hidden to simplify the interface.
- Warnings and errors can be suppressed where they are known and accepted. This make it easier to see important errors and warnings.
- Expand All and Collapse All in right click of any node on tree makes it easier to work with large model trees.
- You can now replace a Cabinet but keep contents. This makes it easy to compare the performance if different cabinets are chosen for an otherwise identical configuration.
- Existing objects can be added to a row without moving.
- Find has been updated so that you can now search by attributes / properties as well as object type in the tree and the symbol library.
- Menu items and Toolbar buttons have been re-ordered based on feedback to make them easier to find and use.

### *Licensing*

- A Usage log has been added to license server.
- License Server and CFDSolver services are now supported on Windows Server 2003 and Windows Vista.
- A combined 6SigmaRack and CFDSolver license is now available providing more cost effective use for customers not modelling full facilities in 6SigmaRoom or 6SigmaManager.
- See also Premium Solver described in Using New Processor Architectures Above