What's New in PSCAD v4.6.1

(*since v4.6.0*)

Written for PSCAD^{TM} X4 version 4.6.1

September 9, 2016

Manitoba
HYDRO INTERNATIONAL
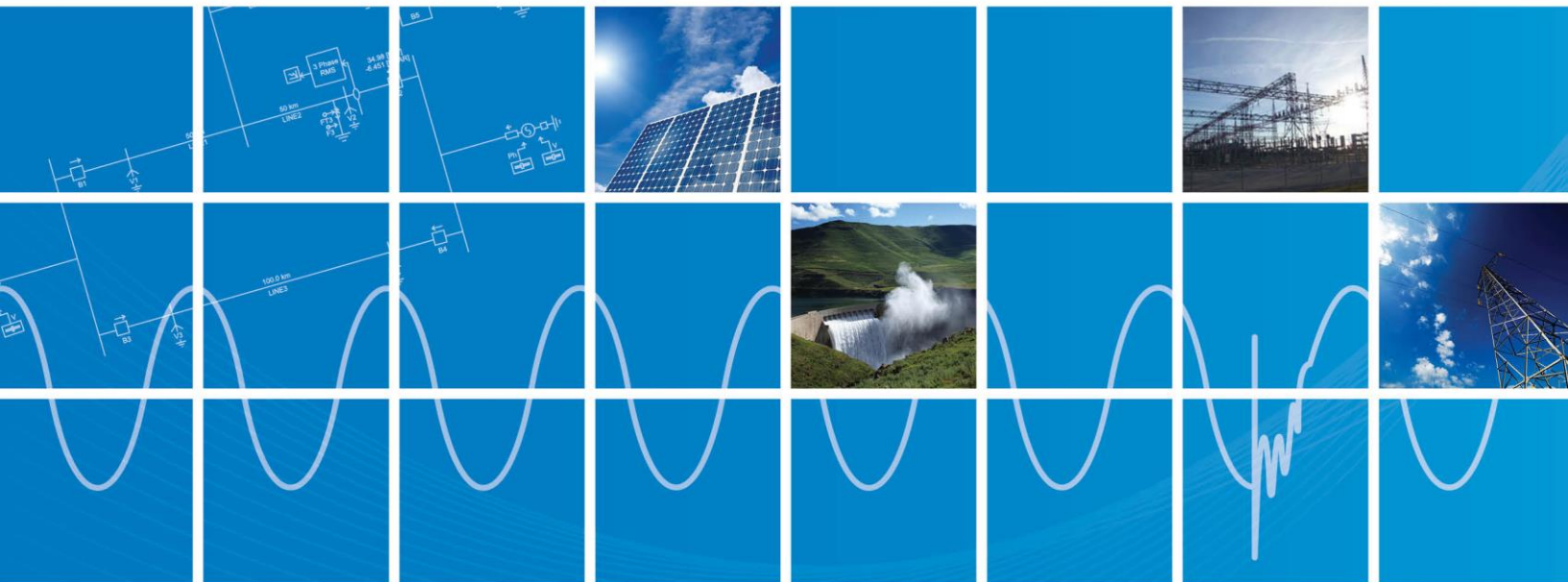
PSCAD

Deficiency Fixes:

1. **Search and Replace**: Replace functionality has been added to the *Search* pane, to allow for the replacement of <u>parameter values only</u>. Simply enter the parameter value to be replaced, along with its replacement value, and PSCAD swill scroll through all parameters values matching the search. The search and replace feature is designed to work similar to other popular software tools (#373).
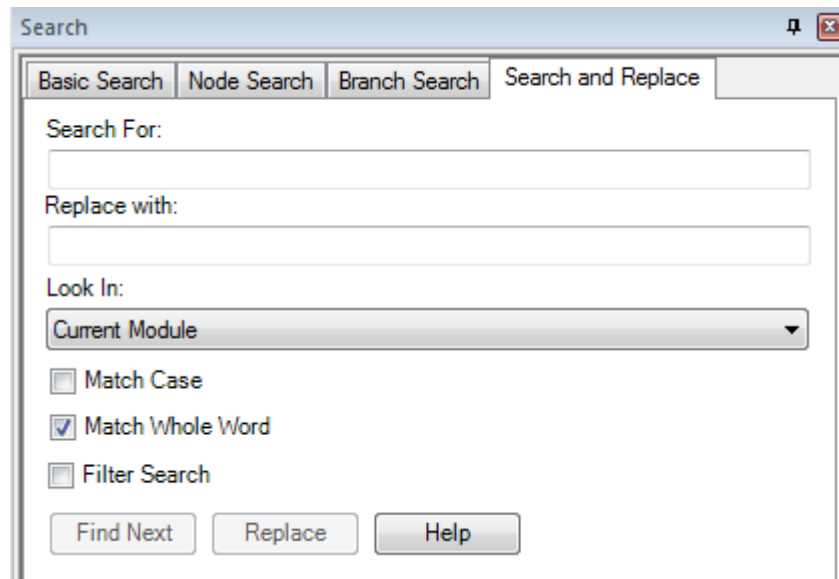

2. **Import/Export Parameter Data to/from CSV File**: Users are now able to both import parameter data from, and export parameter data to a *.csv formatted file, for storage and modification in programs such as Microsoft Excel or similar. This function may be performed either through the parameter dialog of any component, or through the *Parameter Grid* feature, which will allow for the importing or exporting of multiple component parameters to a single file. In fact, a single file containing parameter data from multiple instances of the same component may be used for importing data directly to individual components, as the feature uses component ID for identification.

| 7	[master:pgb 23638896]										
8	Name	Group	Display	Scale	Units	mrun	Pol	Min	Max	enab	UseSignalName
9	Alpha Ord	Inverter	1	57.29578		0	0	-2	2	1	0

All component parameter dialogs now possess two new buttons in the top bar, which provide the import and export functions to *.csv file respectively.
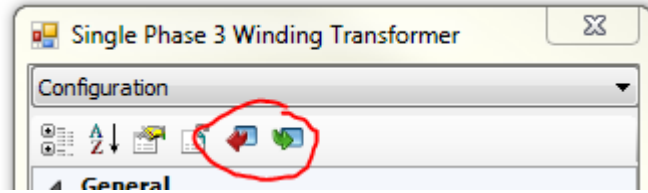
To export parameter values to a file, simply press the export button. PSCAD will create a named (default being the component definition name) *.csv file and save it to disk. A single file containing multiple component instances may also be generated via the *Parameter Grid* feature (#5650/#4435/#1217/#3788/#6057).
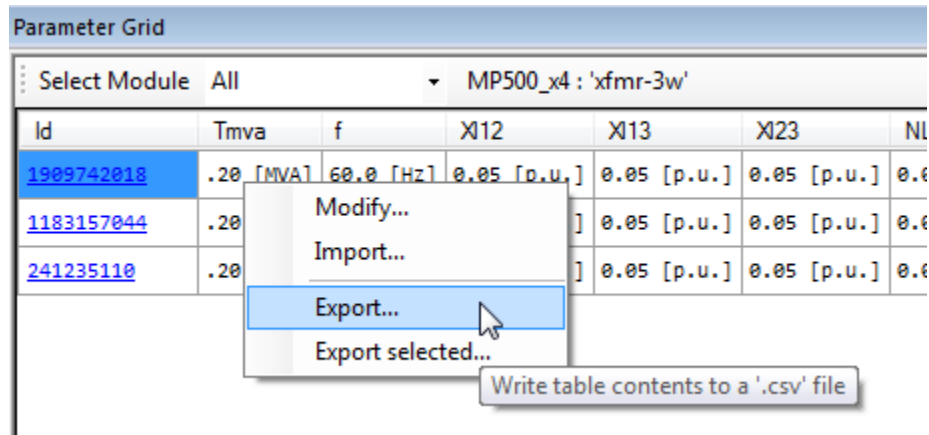

3. **Enable/Disable Output Channel Data Transfer**: It is now possible to enable/disable the transfer of plotting and meter data between EMTDC to PSCAD in individual *Output Channel* components (or many simultaneously using the *Parameter Grid* feature). Each *Output Channel* component now possesses an additional parameter called *Transfer Data?*, which can be turned on or off.
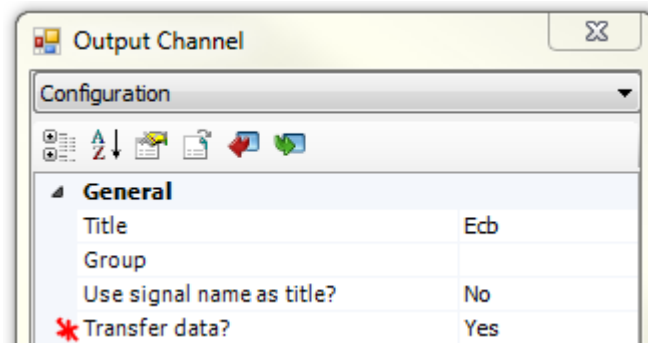

The ability to turn off data transfer will help to increase simulation speed when the curves obtained by a particular *Output Channel* are not required, without the need to delete the channel from the project.

Using the Parameter Grid, users may enable/disable data transfer on multiple *Output Channels* simultaneously (#5477).
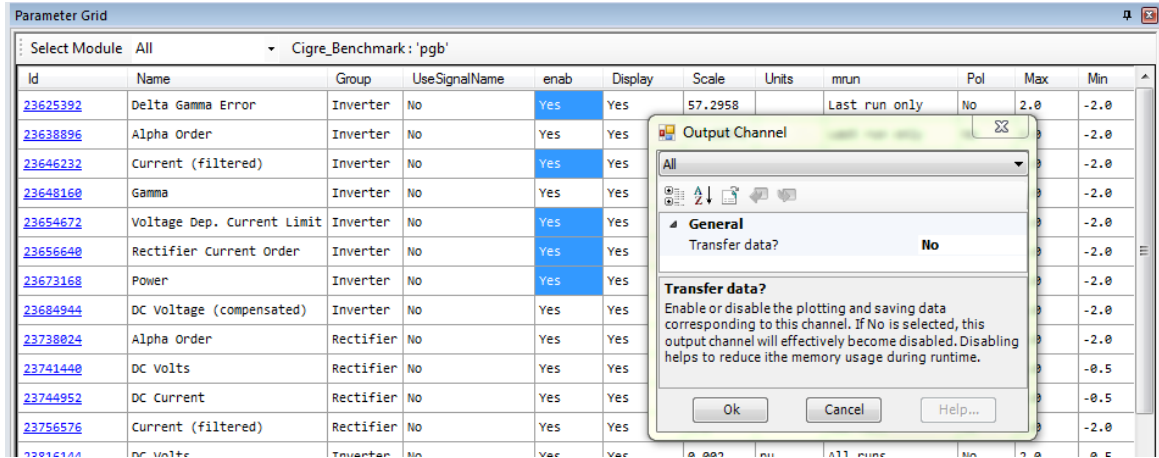
4. **Auto Recovery**: An auto-recovery function has been added, which back up both project and workspace files to a specified folder.
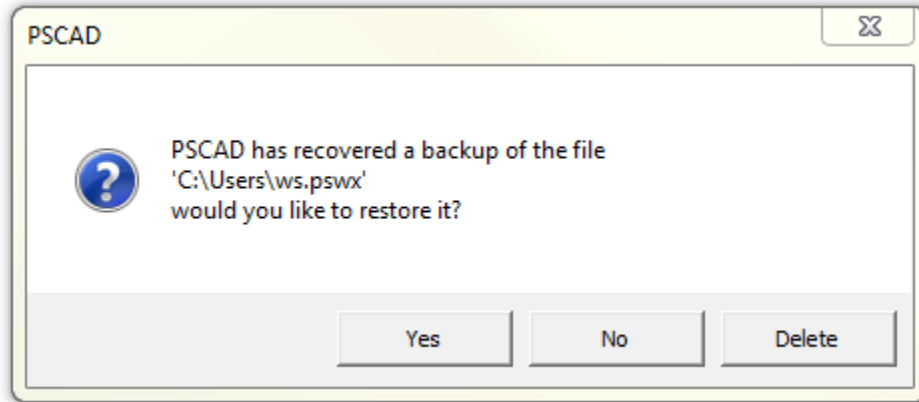
In the event of a crash, PSCAD will access the backup folder on start up, and if a backed up file is found, the user will be asked if the workspace or project should be recovered from this backup. *Yes*, *No* and *Delete* options are provided.

Application options have been provided under the *Environment* category in order to allow; enable/disable, backup interval and specification of backup folder (#5984).

5. **Categorize Build Messages**: Messages may now be categorized by any of the column headers existing within the *Build Message* pane. This is particularly convenient for users with larger projects, wishing to organize their messages during the debugging phase.
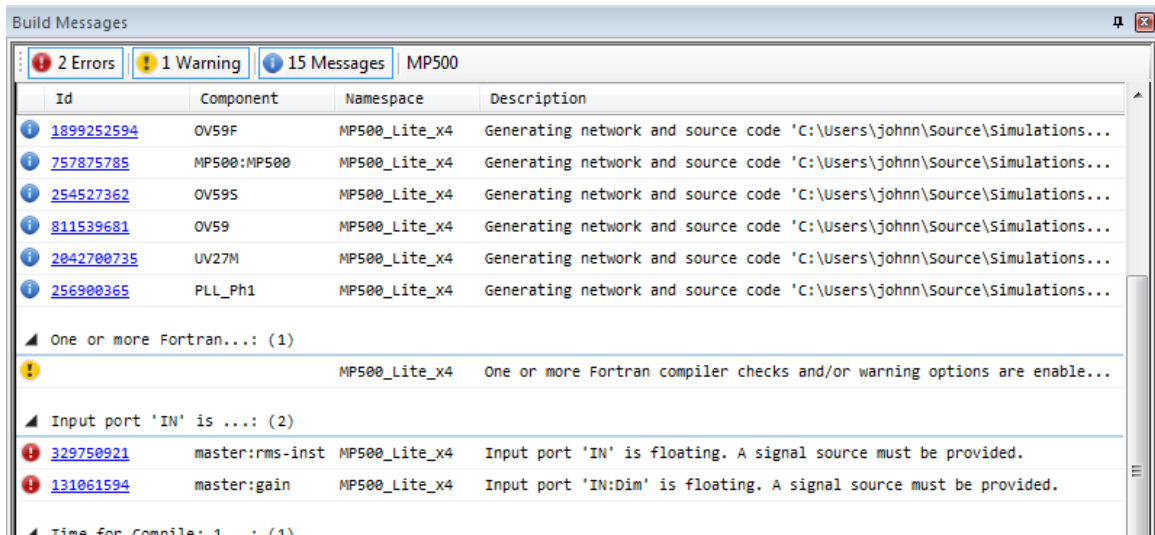

By default, simply left-click a header in the *Build Messages* pane. For example, the image above shows categorization by *Description*. Clicking the message type header at the extreme left, will sort messages by information, warning and error. The right-click context menu for this pane also provides the ability to expand and contract all groups, so you can focus only on the group you need.

This functionality may be turned off via a *Workspace Option* (#5873):
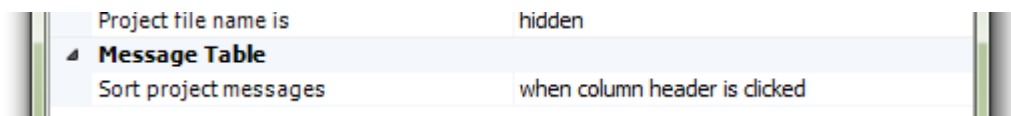
6. **Instance Path Display on Graph Title and Curves**: PSCAD now displays the full module instance path on all traces and curves, in addition to the graph title (if specified using the $(INSTANCE_PATH) macro. This display on curves and traces greatly enhances the user's ability to discover the source of a particular trace, especially when sourced from within a multiple instance module. The full instance path is displayed in a flyby on both the curve call list and on graph itself (#4214/#5713).
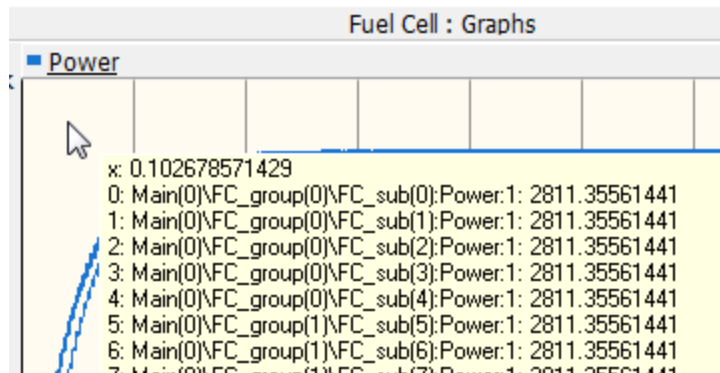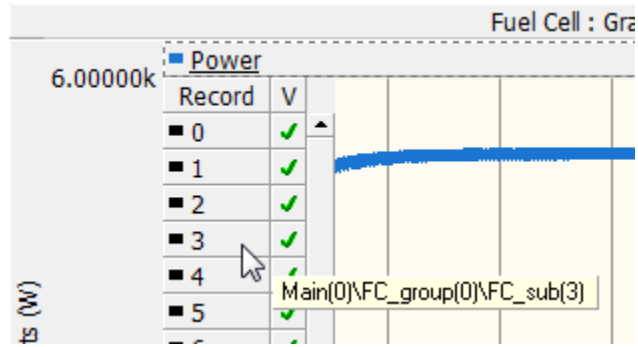
Full path display on graph panels provides a visual reference, which is especially convenient when adding graphs to reports and such.
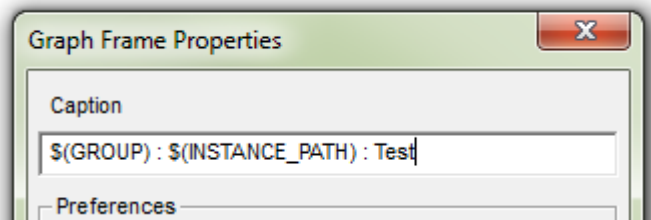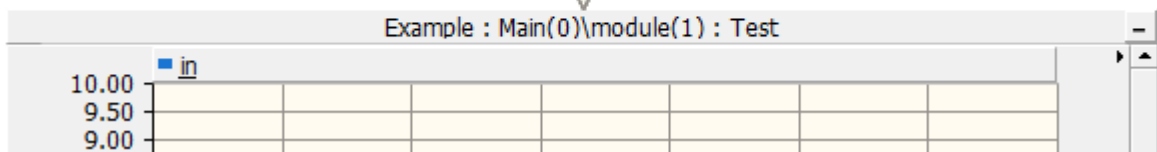
7. **Change Text Label Colour**: It is now possible to change the colour of text labels within the *Graphics* section of the *Definition Editor*. Simply bring up the *Text Label* properties dialog to modify the colour (#5610).
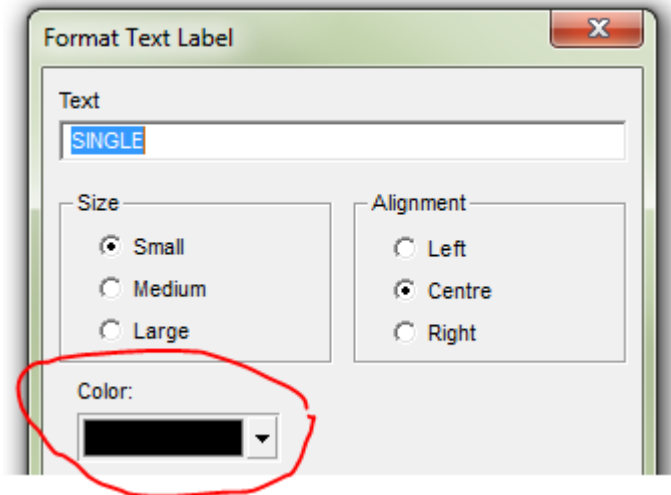
8. **Multi-Extension Project File Names**: PSCAD now supports multi-extension files. For example, the following folder contains multiple case project files, possessing the same namespace.
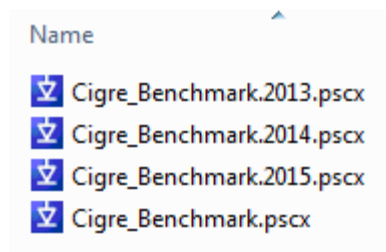
Users can utilize this functionality as an additional degree of freedom for organizing and/or to provide a revision history mechanism for case files.

Note that each of these files possesses the same namespace, in that PSCAD will ignore everything after the first period (i.e. '.2025.pscx') when it synchronizes namespace to filename. This also means only one of these files may be loaded at a time (#6047).

9. **Reorder Projects**: Case and library projects may now be reordered within the workspace (#5860).
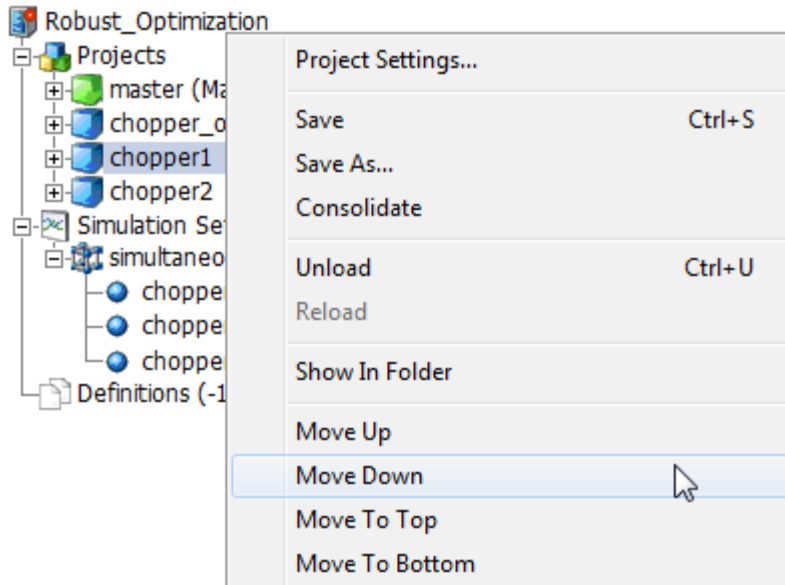
10. **Multiple Select/Copy/Delete in Definitions Branch**: It is now possible to select multiple definitions in the *Workspace* pane definitions branch, and then perform a delete or copy action (#4224/#5874).
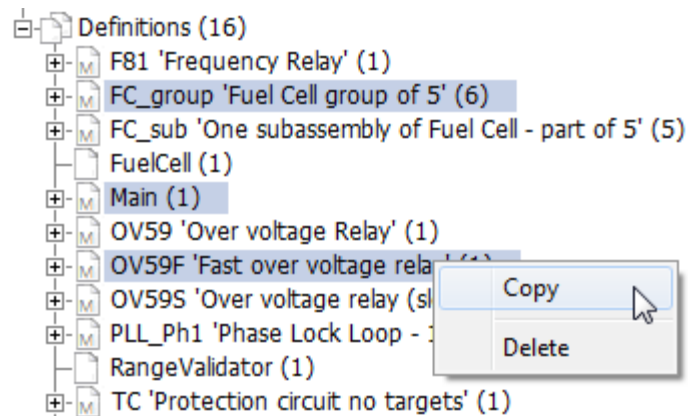
11. **Clone Simulation Sets**: This option will create a copy of the set selected and append it to the end of the simulation set list, complete with all options (#5718).
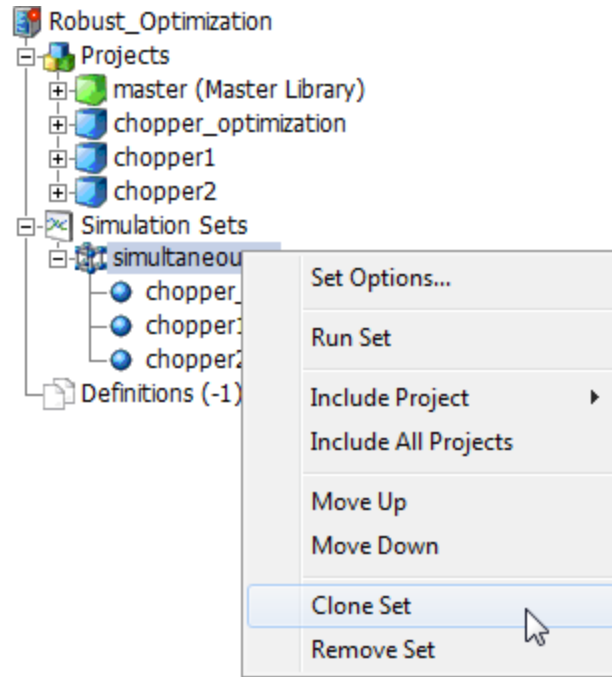
12. **Simulation Set Force Rebuild**: The ability to change a global substitution value between *Simulation Set* runs is an important function. However, if a global substitution is used in say a *Transmission Line* or a literal parameter, the corresponding definition may need to be recompiled. In the absence of an elegant way to determine which definition requires a recompile, a new option has been provided in the *Simulation Options* dialog to force a temporary folder clean between *Simulation Set* runs, thereby forcing each task to rebuild before launch (#5714).
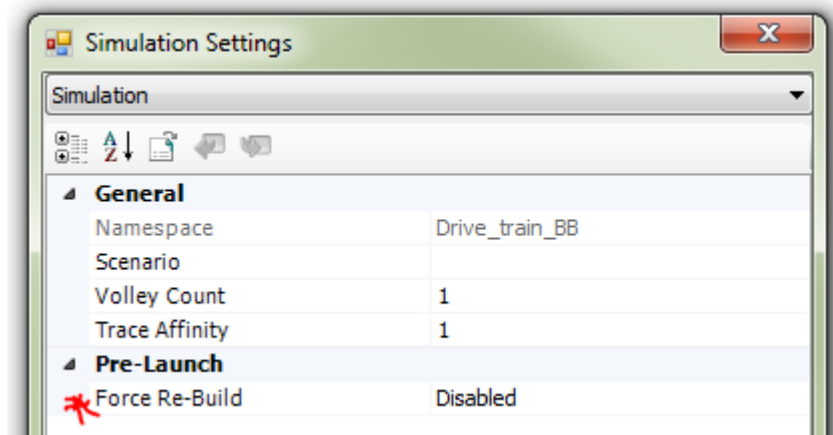
13. **Layer Colour**: Users now have control over *Layer* colour, via a *Layer Properties* dialog (#5832).
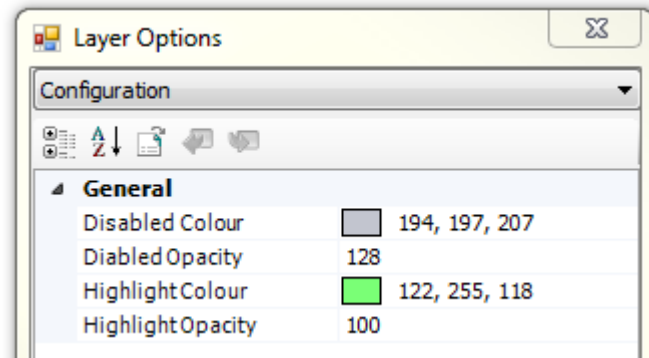
14. **Construction of a Transmission Segment Definition from a CSV File**: It is now possible to construct a transmission line definition within *.csv file format and import it as a definition file. The file must of course conform to a standard format in order to be imported properly.

15. **Graphical Indication of Build/Runtime Failure**:   PSCAD now graphically indicates in the workspace tree that a simulation task has failed. This simulation task icon turns red upon a failure (#6014).
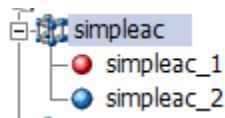
16. **Parent Module Display on Component Graphics**: Additional substitution keys were added to PSCAD for use in *Text Labels* in the *Graphics* section of the *Definition Editor* (#6100).
    - $(Parent:Inst_Name) will display the instance name of the parent module, on which the component resides.
    - $(Parent:Defn_Name) will display the definition name of the parent module, on which the component resides.
    - $(Parent:Inst_Num) will display the instance number of the parent module, on which the component resides.
    - $(Parent:Path) will display the full path of the parent module, on which the component resides.

17. **New Search Option:** It is now possible to exclude the master library when searching the entire workspace (#6138).

18. **Radiolink Name Display**: A new parameter called 'Caption' has been added to the radiolink component in the master library to help with determining the source of its associated curve. When the radiolink transmits from a slave case to its master, the rank number is now displayed, along with its name for easy identification (#6165).
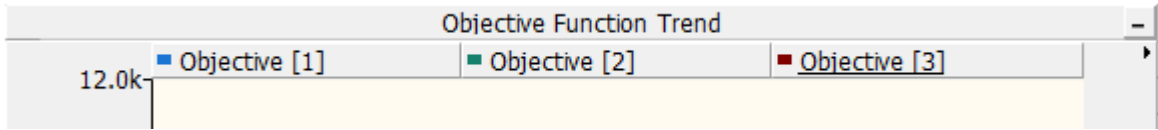
19. **Parameter Grid Drag and Drop**: It is now possible to instantiate a copy of an component instance directly from the parameter grid table. Also, if the components listed in the parameter grid pane are output channels, you can either instantiate new output channels onto the canvas, or create curves in graphs directly via drag and drop. Simply hold down the Ctrl key, click the desired instance Id cell, then drag the instance over the schematic canvas to create   (#5046).
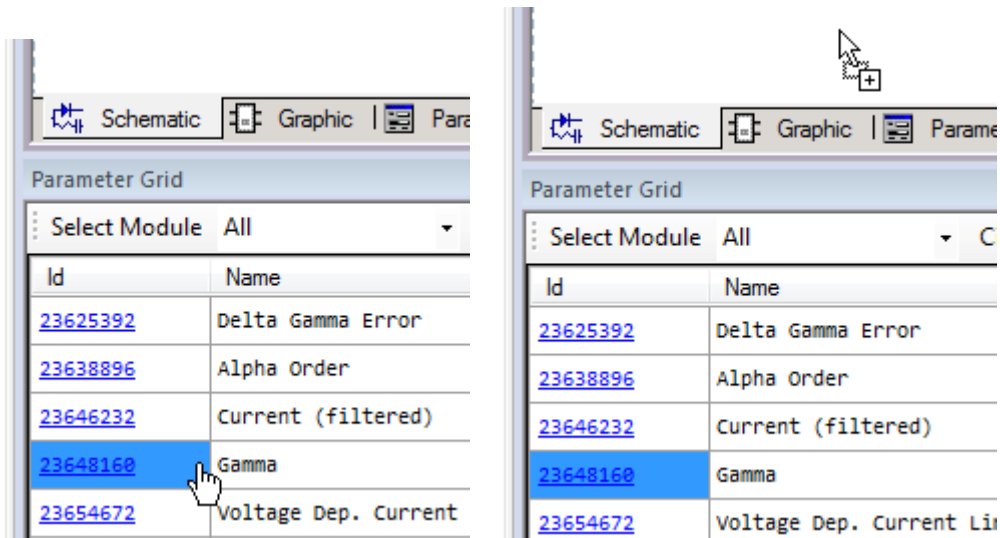
20. **Parameter Dialog Last Sized Memory**:   Component parameter dialog pane size is now maintained in memory; this new functionality is by default enabled, but it may be turned off via an application option. Simply open any parameter dialog on any component, resize it and press the OK button. The next time the parameter dialog is opened, it will size itself according to its last known size (#4927).

21. **PolyWire Adjustment Now Snaps to Grid:** A new application option has been added to enable a snap to grid functionality when adjusting polywire vertices and endpoints. This is also affects transmission line wires and buses (#1092).

Bug Fixes:

1. Minor bug invloving the specification of volley launch limit has been fixed (#5877).
2. Input parameter dimension is now set to the entered dimension value if the parameter is an array. Previously, the signal created by said parameter was set to 1 (scalar) (#5902).
3. **An object file is now properly created when blackboxing using the GFortran compiler (#5770).**
4. **PSCAD no longer crashes when changing a connection port to electrical type, from the corresponding ribbon tab (#5887).**
5. Removed duel, vertical scroll bar that would appear in the build message window when shrunk vertically (#5812).
6. Curves no longer get added to the wrong graph when using Ctrl + left mouse drag and drop, and the scrollable graph pane contains multiple graphs (#3678).
7. **Combining disabled and enabled modules using layers no longer confuses instance-based argument values. An overhaul of the project call stack has rectified this issue: The compiler would become confused if a multipley instanced module existed where some instances were enabled and some were not (#5857).**
8. Small toolbar arrow on graphs now functions properly (#5954).
9. **PSCAD now properly creates a Global Substitutions category for the main page module when a new case is created (#5896).**
10. **Ctrl + drag drop is now functioning properly when copying runtime objects from the definition tree (#5897).**
11. **Deleting a definition from the workspace tree now properly removes all instances for their respective canvases (#5937).**
12. **The Electric Network Interface (ENI) is now functioning properly when utilizing cables possessing a sheath (#5940).**
13. The workspace consolidator no longer deletes the contents of the destination folder permently. Instead the entire folder is moved to the recycle bin for recovery if needed (#5973).
14. A warning message to indicate that signals of dimension higher than 32 may affect plotting performance has been adjusted to only be output if an output channel is connected to the signal (#5972).
15. Arrows are no longer added to output ports in the initial graphic created by the component wizard (#5957).
16. The new divider component property dialog now draws the proper, user selected colour (#5919).
17. A failsafe mechanism has been added ensure ensure that component id numbers are always unique. Unique ids is a fundamental requirement for PSCAD to function properly. Non-unique ids are detected and fixed on project load or import (#4773/#5982).
18. Components no longer disappear following a box select, ctrl + left mouse drag and then repeat operation (#4500).
19. PSCAD now ensures that all enabled ports on a component, possessing the same name, also possess the same conditions (#5991).

20. The PSCAD compiler now properly checks data tap components and issues an understandable error message if there is a problem (#5997).

21. **When a project is compiled from inside of a module, a call to that module is now properly created (#5939/#5876).**

22. The 'allow empty string' text parameter attribute is now considered when data entry is performed within the parameter grid (#6043).

23. **Plot panel x-axis limit setting is now linked with project run duration on creation of new plots (#4647).**

24. Individual trace settings, such as bold and digital/analog, are now saved separately in the plot. Previously, changes to any trace would be forced on the entire curve (#5777).

25. PSCAD now checks what version was last used to modify a project and warns the user on load, if the present PSCAD is a lesser version (#6015).

26. Copy with dependents and copy transfer features have been optimized for speed. There is now a substantial difference in speed when using these features to copy very large module hierarchies (#5885).

27. **Mutual coupling now functions properly when using the newer simple coax cable component (*Cable_CoaxSimpl*) (#6045).**

28. PSCAD now ensures that a signal that is being passed from within a module, out through an output parameter that is marked constant, is indeed constant (#5987).

29. A signal name contention warning no longer appears in situations where an unnamed bus is connected to a node label or xnode (#5516).

30. Parameter dialogs are now positioned at screen center when opened. This avoids part of the dialog appearing off screen when invoked near the screen edge (#6038).

31. Table parameter data entry has been adjusted to accept floating point or scientific notation using a decimal point only. European comma format is no longer accepted (#6052).

32. Pasting a component, after having been copped from the master library canvas, on to another canvas will now work properly if only the canvas navigation tab was pressed (#6065).

33. Online controls (such as sliders and dials) now maintain their respective connections to their current values when copy transferred (#6075).

34. PSCAD no longer continues on to solve project transmission segments if a build or link error occurs beforehand (# 5780).

35. Solution time step and other related project settings, no longer accept non-literal values (#6061).

36. **Solving transmission lines with mutually coupled, manually entered data causes PSCAD to crash when more than two mutually coupled lines are included (#6076).**

37. Load speed optimized. Extremely large cases will now load even faster (#5644).

38. Undo/redo now functions properly within a page module whose definition is linked to a library project (i.e. inter-namespace module) (#5981).

39. The compiler now detects non-module components residing within a manually sequenced module, with a sequence order number of '0' and stops the build. All components, including output channels, must be given a sequence order number to avoid numerous issues, including curve mapping (#6090).

40. PSCAD now allows projects containing a period (.) in the filename to be saved. This is related to the recently added support for multipart extensions (#6047).

41. The 'Socket buffer was unable the send data...' message has been changed to a more understandable message, complete with suggested causes/solutions (#6063).

42. **PSCAD now properly detects duplicate named transmission or cable segments when the exist in separate, unique page modules (#6098).**

43. The incremental builder will now properly mark projects modified if page module parameters are added, deleted or modified, as well as when project layers are added, deleted or modified (#5841).

44. Copy transfer now transfers the proper instance links, when both user-defined, and master library components, share the same definition name (#6102).

45. Both the application option and the schematic canvas context menu options to reveal off-canvas objects are now working properly (#6099).

46. PSCAD now maintains a list of past folders accessed within the new project dialog, path field drop list (#4641).

47. Copy transfer now properly maintains the segment name of transmission lines and cables upon paste transfer (#6106).

48. **The search results pane will no longer provide a navigable link to the station canvas (on which the top-level module, usually 'Main', resides). This prevents users from inadvertently deleting the top-level module and causing serious problems in their projects (#6104).**

49. Data modification through the parameter grid now works properly for all data types. Previously the regex checking performed was not in synch with that of the parameter dialogs (#6112).

50. **The PSCAD compiler now issues an error for situations where a single phase circuit is connect to a 3-phase circuit through a bus component. Previously, the single-phase would get connected to phase A of the 3-phase circuit without any warning (#6060).**

51. **Modifying layer contents now properly flags the incremental builder to rebuild affected module definitions (#6120).**

52. **It is no longer possible to delete the definition of the Main (or top-level) module in a project. PSCAD would crash if the main page definition was deleted while viewing another page (#6126).**

53. It is no longer possible to load two projects possessing the same namespace, by saving a single project as the same name multiple times (#6124).

54. Copy transfer now snaps the component to the schematic grid on paste transfer (#6123).

55. PSCAD will now issue a source contention if two or more unique component output ports are shorted to the same source signal (#6129).

56. Schematic canvas re-paint efficiency has been improved at zoom levels other than 150% (#4667).

57. **Blackbox now tallies total component storage array usage properly, and includes all as part of the #STORAGE directive statement (#6048).**

58. Subsystems are now marked as grounded whenever one of the signals mapped to an xnode is grounded. Previously these grounding points were not identified, leading to ungrounded subsystem warnings (#6143).

59. Newly created plot panels now default their x-axis maximum to correspond to the project simulation time. This issue was especially problematic when simulating fast transient cases with a simulation run duration in the milli to micro second range (#4647).

60. A non-existent, 32-bit MATLAB installation is no longer detected if only the 64-bit version is actually installed (#6181).

61. Unsaved new projects can no longer be unloaded without the user being asked to save first (#6159).

62. Control panel interfaces no longer disappear when dragged mistakenly to the control panel header (#6163).

63. **Component graphics no longer get randomly duplicated when editing component definitions (#6172).**

64. Schematic canvas tabs now update properly while viewing multiple text files sourced from multiple projects (#6178).

65. Sticky note arrows are no longer redrawn improperly when rotated (#6185).

66. The search function no longer includes component ID, unless the user so specifies in the search pane (#6147).

67. **PSCAD no longer crashes on project compile if an XNode is included in a disabled or invisible layer (#6196).**

68. **Blackbox now supports components that utilize the Model-Data script segment (#6193)**.

69. **A critical bug was discovered and fixed that caused PSCAD to enter a bad state, and then crash at a later time. This issue was only encountered when utilizing inter-namespace module instances (#6208).**

70. Trailing mouse clicks when changing view context (i.e. navigating into or out of page modules) no longer cause spurious, unintended operations, such as component deletion, etc. (#6211).

71. Control frames may now be added to layers (#5924).

72. It is now possible to delete component instances from the canvas that lack an ID number (#6187).

73. The definition and instance count indicators in the workspace tree are now accurate and consistent (#6203).

74. Component wizard port option now displays correctly when large text size option is selected in the Windows OS options (#6219).

75. **Control interface values are no longer reset erroneously during unrelated user actions. This bug appeared to be seemingly random in occurrence, but was found to be related to using copy transfer of a module containing control interfaces (#6224).**

76. Case projects containing runtime controls that were saved as part of a disabled layer, will no longer show a present value of NaN in the corresponding interface, when the case is loaded again (#6236).

77. **The electric network interface now functions properly when using pipe-type cables to split networks (#6199).**

78. **Radiolink components no longer cause a runtime error when they are disabled as part of a layer (#6231).**

79. Duplicate runtime messages now properly discarded (if set to do so) when the messages are coming back from EMTDC without an associated component ID (#6234).

80. **Transmission line definitions are now handled properly when part of a module that has been copy transferred (#6240).**

81. The workspace primary window tree will now properly reflect the current project context that is being viewed on the screen (#6243).

82. **PSCAD no longer crashes in the specific situation when starting multiple simulation sets from a snapshot. Periodically a wrong index was being used, causing the crash (#6246).**

83. **The Xoreax Grid Engine is now functioning properly (#6242).**

84. **PSCAD no longer crashes when a control interface is cut from a control panel using ctrl+x (#6252).**

85. Individual curves and control interfaces may now be deleted directly using the 'Delete' key (#6256).

86. New layers may now be created directly from the component context menu (#6130).

87. Macro functionality support has been added to File Reference component. Users may now include keys, such as '$(Compiler)' in file paths (#6154).

88. File reference component messages are now sent to the message table on compile (#6177).

89. Canvas resizing bounds are once again functioning properly (#6230).

90. **Plot step is once again modifiable during a simulation run (#6258).**

91. PSCAD no longer issues several message dialog boxes when a volley launch is terminated (#6275).

92. **Custom component help links now function properly again. The dependent html browser application option has been added back (#6266).**

93. Copy/paste of combination graphics, that include a connection port, no longer result in a paste off-canvas (#6286).

94. **Transmission line conductor bundling information is now handled correctly when importing a v4.2.1 case into v4.6 (#6218).**

95. Global substitutions may once again be used within data and node labels to substitute signal name (#6241).

96. All source files are now appended in the additional source files project setting (if configured as such) when a module hierarchy is blackboxed (#6312).

97. **The off-canvas object detection feature no longer incorrectly identifies components outside the A-sized canvas range as off-canvas (#6303).**

98. PSCAD now detects and reports if the WebRoot anti-virus program is installed. WebRoot can interfere with several PSCAD operations, including compilation, and communication (#6292).

99. PSCAD warns if the CommonDocuments environment is not properly configured. A missing CommonDocuments folder can lead to unexpected behaviour in the MyUpdater (#4949).

100. When viewing the legacy licensing mode tab, the user can now also view the log file (#6271).

101. **Output channels, which exist within a page module stored in a library project, are now disabled from plotting if that module is instantiated in multiple projects that are run within a simulation set. This situation was found to cause thrashing between cached output channel values, leading to strange and inaccurate plots (#6322).**

102. **Simulation set root control volley launch will no longer hang if a user manual stop invoked before completion of all tasks (#6323).**
103. Definition context menu in the definition tree, now enables/disables menu functions properly, based on definition type (#6262).
104. **PSCAD now checks to ensure that the project plot step is an integer multiple of the time step. EMTDC will not launch until this condition is corrected (#5366).**
105. **PSCAD no longer crashes when attempting to navigate to an unresolved definition from the message table (#6330).**
106. Canvas resize detection is now functioning properly. If a canvas resize to a smaller page is attempted, and there are components outside the resulting bounds, the canvas will not be resized (#6334/#6335).

EMTDC

Deficiency Fixes:

1. The animated graphics algorithm has been adjusted to function on a real timer, with a constant refresh interval. Previously, the total simulation run was divided into a set number of intervals, which would make the refresh appear sluggish for cases with long simulation times (#2730).
2. EMTDC now adds the last branch number processed to the error message when ideal loops are detected in a project (#6056).
3. EMTDC no longer abnormally terminates while reading a lookup table file with white space after the EndFile directive (#6035).
4. The internal LASTSTEP flag in EMTDC is now enabled for the last time step when either the Stop or Skip buttons are pressed. Previously, LASTSTEP was enabled only on the final times step at the end of the simulation (#5947).

Bug Fixes:

1. An EMTDC runtime error no longer occurs when the multiple run component is used in conjunction with the COMTRADE recorder component (#5929).
2. **EMTDC will now issue a message if the amount of memory required for the simulation exceeds that that is available (#5913).**

Master Library

Bug Fixes:

1. Fixed a regex check problem in the *xy_table* component. Previously it would not allow a change in table file name (#5901).
2. A trivial error in the flyby script for the 3-Phase, 4-Winding Transformer (xfmr-3p4w2) component has been fixed (#5866).
3. **The Manual Entry of Y,Z component has been modified to provide a warning (as opposed to an error, when the component is used to represent a cable, and the zero-sequence RXB data is less than the positive sequence (#5851).**
4. **An error in defining variables for XY coordinates in transmission line tower asymmetrical bundling has been fixed (#5960).**
5. The nominal pi-section component no longer outputs a 'Suspicious floating terminal at node' warning (#5689).
6. Several master library components have had their respective parameters cleaned so as to not include a unit in the default value field. This was causing a duplicate unit specifier issue when resetting component parameter values to default (#6004).
7. An initial output value issue has been resolved in the interpolated firing pulse generator when set to GTO mode (#6044).
8. The frequency scanner no longer sees double the resistance value of any *Source Model 1* instances in the case. The correct value of resistance is now considered (#6005).
9. The surge generator peak current amplitude is now defined as a variable (formerly a constant) (#6072).
10. **Variable impedance branch now works with the GFortran compiler when partial combination of RLC is selected (#6092).**
11. The length of the filename in the xy transfer function is now checked to see whether it satisfies the requirements (#6080).
12. The 'surge1' component no longer generates INF when very large values are assigned as the peak magnitude (#6116).
13. **The final EFD calculation in the EXST3A exciter component is now calculated properly (#6150).**
14. When the thermal governor model 3 is released from initialized conditions it will now properly maintain the steady state (#6173).
15. The RTP/COMTRADE recorder no longer limits the record step to 50 ⯑s when in COMTRADE mode (minimum record step is now 1 ⯑s). The 50 us limit still applies to RTP mode however (#6155).
16. **The 'high reject' functionality in the 2nd Order Transfer Functions component has been corrected and is now accurate (#6160).**
17. **The modulo component now correctly calls the MODULO Fortran function (#6284).**

LCP

Bug Fixes:

1. Z and Y matrix solutions are now correct for all ideally cross-bonded cables (#5983).

Licensing and Utilities

Deficiency Fixes:

1. The License Manager, along with a new setup tool, now supports new policy-based licensing modes.
2. The License Manager now provides more service-related logging, so as to determine if service has unexpectedly stopped.

Bug Fixes:

1. The LicenseUpdate utility now works properly on machines, where PSCAD has never been installed (#5733).
2. The updated Sentinel USB driver v7.5.9 supports the Windows 10 operating system (#6036).
3. MyCentre e-mail is no longer case sensitive when acquiring a license (#6310).
4. PSCAD does not auto-renew a license certificate on start-up if configured to return a certificate on exit (#6263).
5. Display of certificate details now provides more information (#5575).