What's New in PSCAD v4.5.1

Written for PSCAD™ X4 version 4.5.1

Manitoba
HYDRO INTERNATIONAL
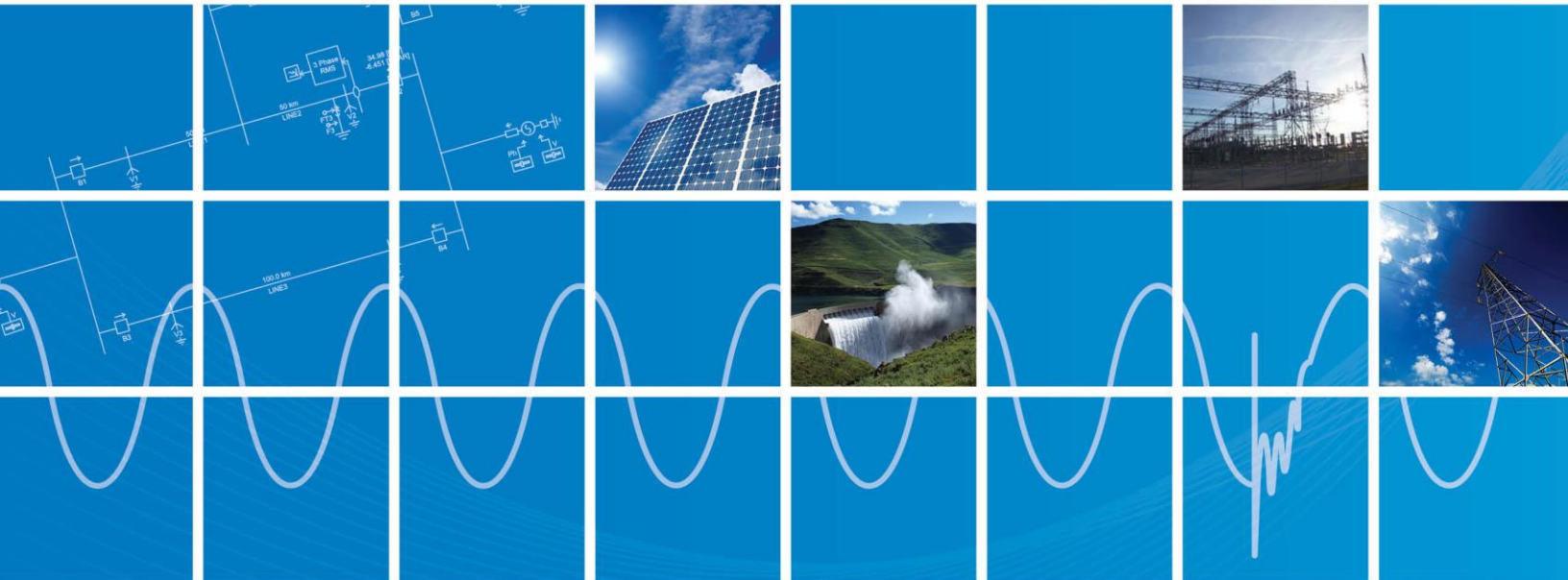
Summary

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Definition Reference Management (c/w Post-Linking)	
Enhanced Re-Map Resource Links	
64-Bit Educational Edition	Total: **106**
Automatic 'datatap2' Component Replacement	
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PSCAD

Deficiency Fixes:

1. **Definition Reference Management (c/w Post-Linking)**: When PSCAD X4 was first released in April 2010, one of the many changes to it was the ability to associate a component instance with multiple definitions, provided they possess the same name. Referred to as *Resource Linking*, this is accomplished by modifying a *Link To…* function in the component pop-up menu. For example, a user copies a master library definition called *resistor* into the local project, and then instantiates it. The *Link To…* function will display two possible definitions to link the instance to:
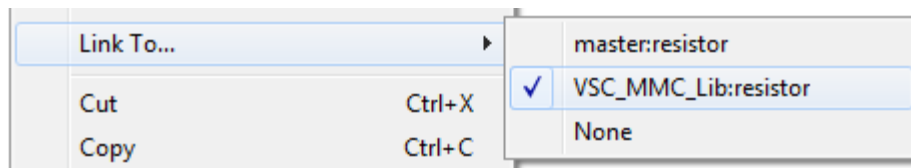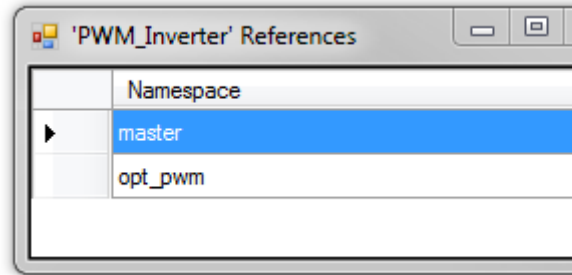

   There were some shortcomings with the initial design of this feature, most of which have since been rectified. For example, the addition of *the Re-Map Resource Links* function introduced v4.4 enabled users to re-link many definitions simultaneously by swapping one resource link namespace with another. However, there were still some leftover issues, pertaining to usage efficiency and link management that needed to be dealt with.

   In the latest PSCAD X4 patch release (v4.5.1), the last of these deficiencies has been resolved via a new functionality referred to as *Definition Reference Management*.

The application now maintains a list of references associated with each project: This list is comprised of all namespaces containing component definitions that have instances in said project, and is automatically updated as needed. The reference list limits the number of projects PSCAD needs to search to find where definitions are stored. In past versions, PSCAD simply searched all projects in the workspace and grabbed the first definition it found.
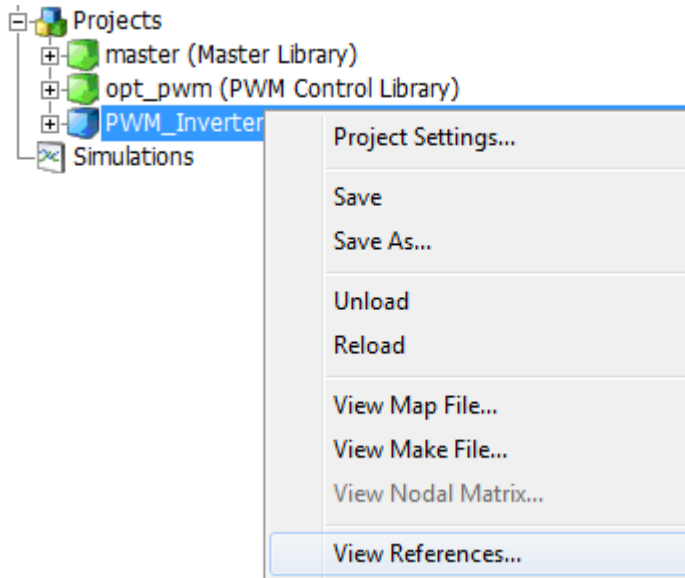

Accessing the View References Dialog   View References Dialog

As shown above, the *PWM_Inverter* case project contains instances of component definitions stored in both the master library and the *opt_pwm* library projects.

Since a unique reference list is associated with each case project, if any of the references are removed from the workspace, PSCAD can quite easily re-link the definitions if the reference is reloaded. For example, say the *opt_pwm* library project above is suddenly unloaded. The components referenced to definitions in that library will become de-linked:
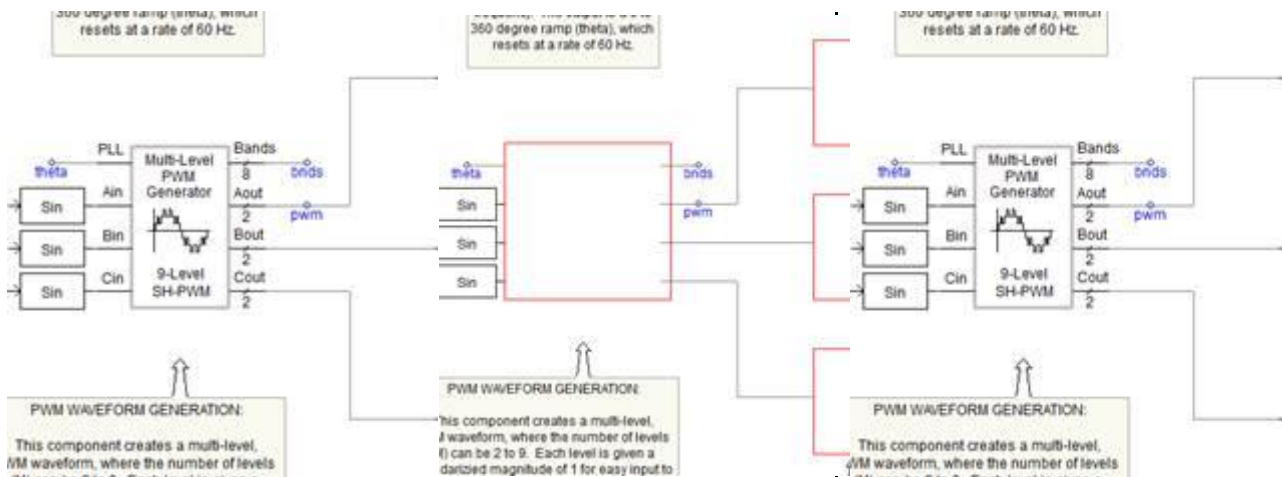
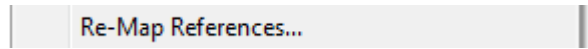| Linked | De-Linked on Unload of the *opt_pwm* Library | Re-Linked on Reload of the *opt_pwm* Library |

The *Definition Reference Management* feature comes complete with *post-linking* ability. When the *opt_pwm* library project is reloaded, PSCAD will relink all delinked components in the *PWM_Inverter* case automatically. Note that in past versions, all delinked components would need at this point to be manually relinked (even if there were hundreds!).

There are also minor changes made to the menu items and terminology associated with references: The older term for a *Resource* is now simply referred to as a *Reference*. This affects some of the menu items as follows:

| Edit Reference... | L |
| Switch Reference | ▶ |

Re-Map References...
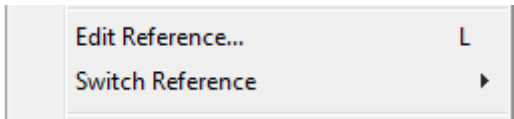
*Edit Resource* and *Link To…* Have Changed   Re-Map Resource Links has Changed

Important Note

Although it is still possible to link component instances to definitions <u>stored in other case projects</u>, this practice is not supported by the *Definition Reference Manager*. It is important to remember to store component definitions in library projects only, as this is what they are specifically designed for. This practise will also ensure that your definition storage methods will conform to future developments in PSCAD.

Reference List Rules:

- Library projects cannot possess a reference list. This simply means that the *Definition Reference Manager* does not support libraries linked to other libraries.
- Case project reference lists will only contain library projects. The *Definition Reference Manager* does not support listing definitions stored in other case projects.

2. **Enhanced Re-Map Resource Links**: The *Re-Map Resource Links* function has been renamed to *Re-Map References* in order to conform to the new *Definition Reference Management* feature. More importantly, a new field has been added to allow users to specify by definition name, in addition to namespace. This enhancement will increase the power and flexibility of this function.
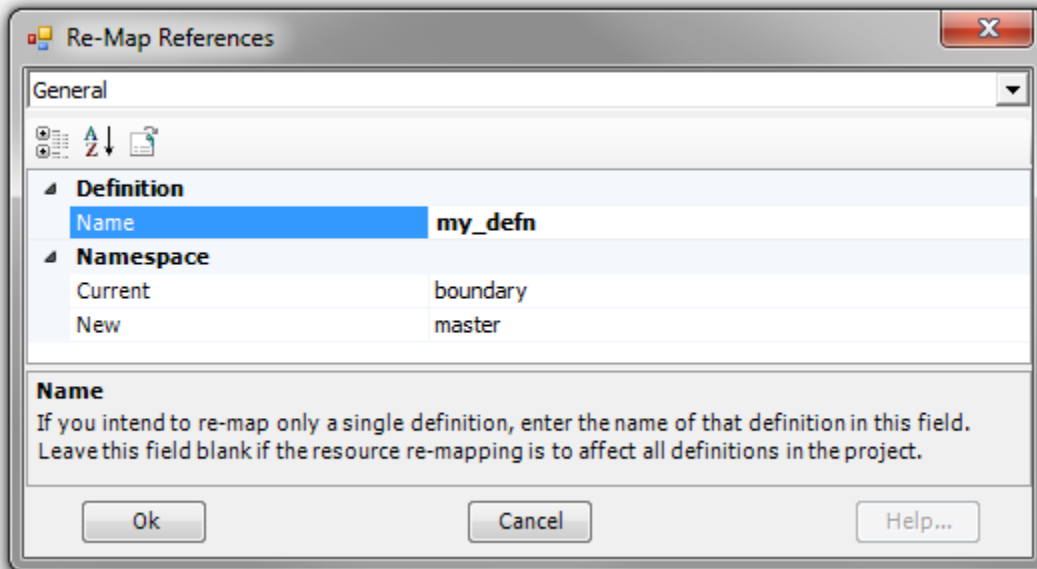
3. **64-Bit Educational Edition**: The 64-bit PSCAD product is now available for Educational Edition licences.

4. **Automatic 'datatap2' Component Replacement**: When the application option is selected, PSCAD will replace any existing obsolete 'datatap2' components with their modern equivalent.
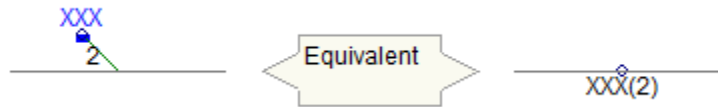
PSCAD will issue a navigable message so that you can manually check each replacement in the project.

This is an important step, as the actual coordinate of the 'datatap2' signal will be shifted by one grid point (down and to the left) on the Schematic canvas, so as to accommodate the 'datatap' component. This may lead to signal source contention errors that should, for the most part, be detected by the compiler when you build the case.

5. **Support Request Dialog Enhancements**: The *Support Request* feature has been enhanced to include both a field to define the summary of the request, as well as the ability to attach the following files, in addition to the original licencing and support files:

   - Current project (*.pscx) file.
   - Workspace (*.pswx) file.
   - Build Message Table messages.

6. **Educational Edition Module Instance Limit Removed**: The scoping limitation on page module instances has been removed from the educational edition product. Educational edition projects are now limited to 64 unique module definitions (#4135).

7. **Fortran Preprocessor Enable/Disable Control**: A new project setting (under the Fortran tab) has been added in order to provide the ability to enable/disable the Fortran preprocessor. Disabled by default, this option is support for both the Intel and GFortran compilers. An additional text field is also provided to allow the user to define a comma-separated list of preprocessor identifiers (#4185).
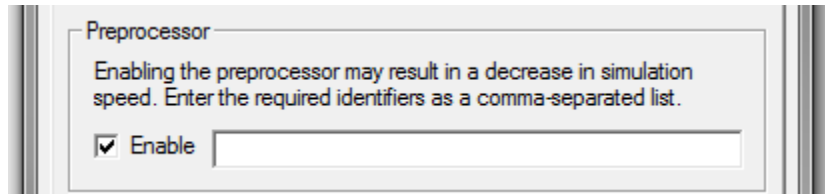
8. **Open Mechanism Refactored**: With the introduction of PSCAD X4, the load mechanism was split into two separate filters: Load and Import. This design was inefficient, as it forced the user to choose to either import (*.psc/*.psl) or load (*.pscx/*.pslx) before navigating to the file. Sometimes, an improper choice was made, requiring a cancel of the mechanism and restart from the beginning. Now when the Open button is pressed, the default filter is the entire spectrum of files (*.pscx, *.pslx, *.pswx, etc.) (#4202).
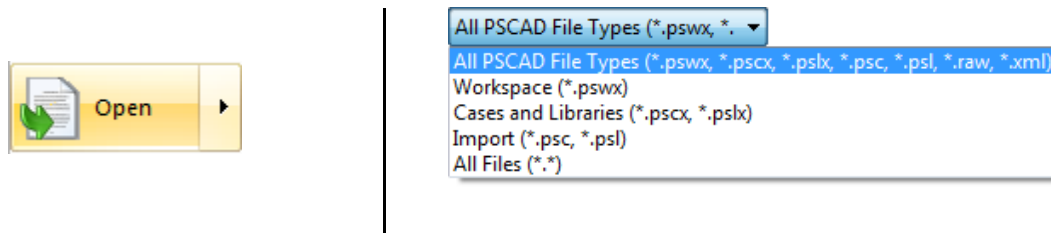
Bug Fixes:

1. Inter-project copy/paste of transmission lines and cables is now supported. This means that the line/cable definition and associated instances may reside in separate projects (#4030).
2. Radio link receivers now work properly in PSCAD when they are used within multiple-instance modules (#4016).
3. PSCAD no longer crashes if viewing a signal flyby while in the process of building a project (#4107).
4. Parameter dialog no longer pops up on the wrong screen when utilizing multiple monitors (#4116).
5. Appending external source files with extension other than *.f is now supported. PSCAD now supports source files of type *.f, *.f90, *.for, *.c, and *.cpp (#3618).
6. Transmission line models are now properly relinked to their definitions change of project namespace (#4013).
7. Module parameters with output intent no longer accept literal data, as this caused a Fortran language violation (#3523).

8. Module output parameters defined as constant now create a signal labelled as a constant (#3523).

9. A change to an existing simulation set name is now reflected in the run button drop menu (#4052).

10. The schematic canvas location no longer gets reset when you run a simulation following a component deletion (#4036).

11. The schematic canvas zoom level no longer gets reset when you run a simulation following a graphing tool edit (#3992).

12. Map file, Make file and Log file docking panes have been separated into three dock-able windows, instead of a single, tabbed window (#3984).

13. Transmission lines/cables that require a ground component no longer solve if the ground component is missing (#3325).

14. The Support Request form now updates automatically when the selected compiler is changed (#4018).

15. Multiple v4.1 or v4.2 cases may now be imported simultaneously, via multi-select in the import dialog (#3954).

16. Opening and closing the simulation set dialog without modifying, no longer leads to an invalid 'A simulation already has that name' error message (#4083)

17. The ability to add a simulation task now functions properly if there are more than 32 projects loaded in the workspace (#4084).

18. A single or set of components that have somehow shifted the drawing grid will now snap to the grid when moved or copied (#4122).

19. PSCAD now ensures that the trial license request file has the '.txt' file extension (#3996).

20. The Project settings Fortran tab has been rearranged slightly to be more intuitive (#4124).

21. The 'move concealed objects onto canvas' feature will now move multiple objects onto the canvas simultaneously (#4014).

22. PSCAD now limits the number of recently used projects listed in the workspace file to 10. Previously there was no imposed limit (#3255).

23. PSCAD now creates a new document when a new workspace is created. Previously, remnants of the old workspace were re-used in the new one (#4136).

24. Creating a new, loading or saving a workspace or project file is no longer allowed, while in the process of loading a workspace (#4108).

25. Component is no longer deleted when undoing a link to action (#3969).

26. PSCAD no longer crashes when project resource links are re-mapped and then the workspace re-opened (#4150).

27. Map, make and log file viewing panes now update when the corresponding file is modified, even if modified by an external process. Previously, these panes updated only when selecting the project in the workspace (#4144).

28. The ctrl + s hotkey will now save the workspace when it is selected in the workspace window (#3982).

29. Global substitutions will now function properly when used within module instances, whose definition is stored in another project. Any global substitution that is used within an externally defined module must be defined in the case where the module is instantiated (#4060).
30. Double-clicking a simulation set task will now bring the corresponding project to focus (#3878).
31. Scenario deletions are now properly handled by undo/redo (#3960).
32. A message will now be sent to the message table when the compile/make process is aborted manually by the user, indicating as such (#349).
33. The '()' characters are no longer supported in namespace names. If a case project filename contains these characters, they will be replaced with '_' when synched with the namespace (#4138).
34. PSCAD no longer runs forever if project run configuration is set to 'slave' without a defined 'master' project (#3997).
35. Graph markers can now be moved properly with hotkeys or dialog/menu options (#4015).
36. Curves and controls whose name is linked to a global substitution will now update properly when global substitution value is modified (#3916).
37. Some PSCAD v4.5 simulations were running half the speed of v4.4 and v4.2. This issue was related to inefficient posting in the message table, and has been fixed (#4027).
38. All simulation runs that do not use the Xoreax Grid Engine (XGE) now use the 'localhost' loopback. This resolved crashing issues when using Virtual Private Network (VPN) (#4147).
39. The efficiency of the message table has been vastly improved, resulting in huge speed increases when intense messaging occurs (ex. loading a large case without a referenced library project) (#4148).
40. It is no longer possible to 'Re-open' a workspace that has not yet been saved (#4161).
41. PSCAD now warns the user if Fortran compiler related checks and warnings are enabled, as these options can effect compile/simulation speed (#3943).
42. Sequence of actions involving the scenario manager is no longer undone/re-done in the wrong order (#4009).
43. Quick access bar does not list reserved PSCAD application shortcuts (#4155).
44. The project last modified timestamp is no longer changed if the project is saved without being modified (#4094).
45. Changing the name of an individual project following its inclusion in a simulation set no longer results in a crash on running the simulation set (#4194).
46. Saving a new workspace (i.e. 'Untitled') will now properly invoke the 'Save Workspace' dialog (#4190).
47. Build messages are now displayed when compiling an individual module instance (#3971).
48. The user is now informed when attempting to navigate into a module whose reference to it definition is not properly set (#4066).
49. Map/make/log file panes will now update on project context switch when schematic tabs are clicked (#4170).
50. Transmission line manual solve ended message is no longer posted as an error (#4230).
51. If the last loaded workspace was new (or 'Untitled') when the application was closed, it will now be remembered and reloaded at start up (#4146).

52. The full path of the loaded workspace (and each loaded project) can now be viewed via a popup window (#4191).
53. The popup menu functions in the scenario viewer now function properly (#4216).
54. The workspace auto-save option is now set to `Never` by default when a new workspace is created (#4199).
55. The act of exporting a component definition to a file no longer breaks undo/redo (#3990).
56. The build and runtime messages window are now cleared prior to project build, blackbox, module compile, and/or static library generation (#4265).
57. Connection port names may now contain up to 31 characters (#4163).
58. The ctrl + c hotkey to copy now functions in the Component Properties Viewer, as well as other viewers (#3956).
59. Projects last saved in PSCAD v4.3 format now load with local component instances properly linked to their associated definitions (#4271).
60. Left mouse click no longer fails to select the proper parameter field, when selecting near the bottom of a long parameter category page (i.e. one that needs to be vertically scrolled) (#3170).
61. The application no longer crashes when attempting to blackbox a module whose definition is stored in an external project (#4266).
62. Component popup flybys once again display the definition source namespace (#4268).
63. Workspace option default to limit radio links has been increased from 64 to 256 (#4281).
64. Modifications to a module definition stored in an external library, is now properly detected by the incremental builder (#4208).
65. Changes to a module instance (ex. a new module is added within an existing module), which is referenced to a definition stored in an external library, are now reflected properly in the project module hierarchy where the module instance resides (#4234).
66. Output parameter signals no longer generate a signal creation warning on build (#4282).
67. Changes to control interfaces once again trigger a warning message with the option to save changes to the current scenario (#4280).
68. Changes made directly within slider interface input fields now trigger a warning message with the option to save changes to the current scenario (#3986).
69. A copy/cut/paste action from the right-click popup menu now copies the correct component, even when another is selected (#4275).
70. Projects containing transmission lines are no longer flagged as modified when run (#3849).
71. Pasting a graph frame multiple times no longer requires a schematic canvas left-click between paste operations (#3961).
72. Curve glyphs will always display following a run, without the curves needing to be refreshed (#3497).
73. The master library is no longer loaded twice in certain situations (#4173).
74. The support page default header information is now updated when the system settings dialog is closed with a press of the OK button (#4319).
75. The workspace is now flagged as modified when a case or library project namespace is modified (i.e. save as… for case projects) (#4309).

76. PSCAD now checks for excessive plotted channels before launching EMTDC (maximum 1024) (#4302).
77. Incremental build in one project is no longer triggered by changes to other loaded projects (#4323).
78. Case and library projects sharing the same namespace can no longer be loaded in the same workspace (#4327).
79. Component properties viewer now possesses consistent popup menus in all tabs. Also, MS WordPad is no longer launched automatically when saving data to a file (#4350).
80. PgUp and PgDn hotkeys now function to vertically scroll the schematic canvas (#4343).
81. Workspaces (i.e.*.pswx files) are now included in the recent projects list in the ribbon PSCAD tab (#4048).
82. Terminology used in the workspace (i.e. menus and titles) has been cleaned up for consistency (#4358).
83. Switching projects with a minimized workspace tree no longer causes a crash (#4362).
84. Global substitutions properties dialog reset to default button as been added back in (#4366).
85. The current canvas scroll and zoom position is now saved for library projects (#4372).
86. Functionality to disable slider control when using the mouse wheel has been extended to include graph panel scroll (#3813).
87. The 'Add as control' option is now disabled when adding an output channel as a graph or meter (#4373).
88. All master library project context menu items have been disabled, except for project settings (#4383).
89. PSCAD no longer crashes when the output file name contains invalid characters (#4400).
90. Changing licensed edition now reset the incremental build flags (#4097).
91. Invalid characters in simulation set names are now dealt with properly (#4427).
92. Simulation sets can no longer be deleted while one or more tasks are running (#4428).
93. Removed redundant 'Cancel' button in the re-open workspace dialog (#4434).
94. Schematic canvases position no longer 'jumps' on project build or undo/redo (#4448/#4447).
95. PSCAD no longer crashes if the two more definitions of the same name and located in different projects, and are referenced from a single project (#4433).
96. PSCAD no longer truncates very large Branch script segments when writing the data file (#4458).
97. PSCAD now functions properly when using an integrated debugger (#4010).
98. Fixed total output channel check to include trace dimension. This resolves a signal mapping problem that occurred in cases with greater than 1,024 output channels (#4463).
99. Graphic canvas no longer acts flaky when editing inter-project module definitions (#4449).
100. Snapshot files now work properly in projects that contain radiolink components (#4465).
101. Curve legends are now reverted properly after undoing an output channel deletion (#3979).
102. PSCAD no longer crashes in certain circumstances when unloading a built project with solved transmission lines (#3928).
103. Cable configuration component help button no longer points to wrong help topic (#4481).
104. Redundant workspace branch collapse removed (#4386).
105. Bus component parameters dialog now has correct title (#4381).

Master Library

Bug Fixes:

1. An unrealistic warning message for L0 must be less than L+ was removed from the PI3_SECTION_CFG routine, as this is a valid situation for cables (#3929).
2. The transformer models now include copper losses properly when saturation is selected (#3264).
3. A missing STORF storage allocation in 'src_ccin_1' component script has been fixed (#4087).
4. The 230 kV default value of the parameter 'Rated Load Voltage (rms L-G)' in the Fixed Load component has been adjusted to $230/\sqrt{3}$. This had been a source of user confusion (#3753).
5. The permanent magnet machine is now configured to accept either speed or mechanical torque input, similar to what is done in the synchronous and induction machines (#3625).
6. The radio link transmitter no longer allows invalid characters to be used in composing its signal name parameter (#3505).
7. Pruned unused t-line definitions from the master library definitions list (#4187).
8. The integration of copper losses into the transformer models was found to lead to un-damped oscillations in some circumstances. A solution has been derived that distributes the saturation current through all the windings, alleviating this problem (#3264).

EMTDC

Bug Fixes:

1. EMTDC no longer complains that the snapshot file has been modified and aborts the simulation if the assigned storage for RTCx or STFXRx arrays is more than the actual amount used (#4105).
2. INTEGER and LOGICAL storage arrays are now specified with a format when written to the snapshot file. Previously, the lack of format specification caused issues when the snapshot was generated by the GFortran compiler (#3749).
3. A project set as root control master simulation will now function properly if it contains an optimum run component (#4012).

Licensing/Utilities

Bug Fixes:

1. The license update tools no longer display serial/parallel lock warnings, as support for these devices was discontinued years ago (#3995).
2. The 64-bit PSCAD product can now get a license from a standalone License Manager the on localhost machine (#4000).
3. Licensing TCP timeouts are now functioning properly (#4156).

4. PSCAD licensing now functions properly when running on machines within an OpenVPN tunnel (#4151).

5. PSCAD no longer crashes on start-up if the license host name exceeds 15 characters (#3277).

6. The FortranMedic will no longer report that the PSCAD 64-bit product is installed on 32-bit Windows (#4046).

7. PSCAD no longer changes licenses log file target during operation (#4192).

8. The installation folder location can now be reselected if install originally failed (#4334).

9. MyUpdater now displays the correct product titles (#4379).

10. Trial licenses may now be installed if the computer has no C-drive (#4331).

11. Installer will now detect and warn if Internet Explorer 9 is not installed. (#4351).

12. Installer will now point file extension to correct PSCAD version (#4259).