

PSS®E 34 Release Notes



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Chapter 1

Python Compatibility

1.1. Python 2.7 End of Life

Python 2.7 reached end of life on January 1st, 2020 and is no longer being maintained.

We strongly recommend users update their Python installation and scripts used with PSS®E to be compatible with latest 32-bit Python 3 version supported with PSS®E 34. Please see newer supported Python 3 versions below that can be used with PSS®E 34.

While PSS®E 34 and PSS®E-35 will continue to provide Python 2.7 support, this may change in the future due to maintenance and/or security concerns.

PSS®E automation Python scripts will continue to work in Python 3.x without any changes. However, certain user developed Python scripts may need minor modifications during the migration process. Several common areas of attention are included below.

To assist in transitioning Python 2.7 scripts to Python 3, users can use the "2to3" utility provided with the Python 3 installation package. As an example, if "test.py" is a Python 2.x script, it can be converted to a Python 3.x script [test.py3] by running the following command at the Command Prompt:

```
C:\Python37\python.exe C:\Python37\Tools\scripts\2to3.py -n -W --add-  
suffix=3 "test.py"
```

[Here it is assumed that Python 3.7 is installed in folder C:\Python37 and this command is run from the directory where test.py is located.]

Additional information can be found on python.org at <https://docs.python.org/3/howto/pyporting.html> and <https://docs.python.org/3/whatsnew/3.0.html>.

Common areas that should be updated for compatibility include (but are not limited to):

- print has been changed to print()
- Integer division
- execfile() behavior changed to exec(open(file).read())
- raw_input() renamed to input()

1.2. Python 3.4 End of Life

Python 3.4 reached end of life on March 18, 2019 and is no longer being maintained.

Due to security vulnerabilities, the installer for Python 3.4 (and its related third-party modules for use with PSS®E) will no longer be included with the PSS®E installer starting with PSS®E 34.8.2. We strongly recom-

mend users update their Python installation and scripts used with PSS®E to be compatible with latest 32-bit Python 3 version supported with PSS®E 34.

- PSS®E Python modules compatible with Python 3.4 will continue to be installed in the PSSPY34 directory under the PSS®E-34 installation directory.

1.3. Python 3.7

Python 3.7.10 is the final downloadable binary installer and will no longer be updated after February 15, 2020.

Due to security vulnerabilities, the installer for Python 3.7 (and its related third-party modules for use with PSS®E) will no longer be included with the PSS®E installer starting with PSS®E 34.8.2. We strongly recommend users update their Python installation and scripts used with PSS®E to be compatible with latest 32-bit Python 3 version supported with PSS®E 34.

- PSS®E Python modules compatible with Python 3.7 will continue to be installed in the PSSPY37 directory under the PSS®E 34 installation directory for PSS®E 34.7.0 and newer.

1.4. Python 3.8

Support for Python 3.8 is not included with PSS®E 34 and has been skipped in favor of Python 3.9 support.

1.5. Python 3.9

Support for Python 3.9 was added with the release of PSS®E 34.8.2.

- PSS®E Python modules compatible with Python 3.9 will be installed beginning with PSS®E 34.8.2 and newer. These files will reside in the PSSPY39 directory under the PSS®E-34 installation directory.
- The default version of Python used with PSS®E 34 (i.e. the version of Python that is used by PSS®E interfaces without specifying a version with -pyver) will not change. It will continue to be Python 2.7 as it has been for PSS®E 34 earlier releases.

Note

A Python 3.9 installer is not included with the PSS®E 34 installer. To obtain an installer for Python 3.9, please visit <https://www.python.org> to download the official binary package for 32-bit Python 3.9.5 (or newer).

- The 64-bit installer of Python is not compatible with PSS®E 34 at this time. A 32-bit installation of Python 3.9 is required for proper Python 3.9 support.

Chapter 2

Compatibility Matrices

2.1. User Model DLL Compatibility

This section outlines compatibility between user model DLLs compiled with different versions of PSS®E 34. A "X" means that a model DLL compiled against specific version of PSS®E 34 (left column) can be used in a particular version of PSS®E 34 (top row).

Table 2.1.

	34.0	34.1	34.2	34.3	34.3.1	34.4	34.5	34.5.1	34.6.1	34.7	34.8	34.8.1	34.8.2
34.0 DLL	X	X	X										
34.1 DLL	X	X	X										
34.2 DLL	X	X	X										
34.3 DLL				X	X	X							
34.3.1 DLL				X	X	X							
34.4 DLL				X	X	X							
34.5 DLL							X	X	X	X	X	X	X
34.5.1 DLL							X	X	X	X	X	X	X
34.6.1 DLL							X	X	X	X	X	X	X
34.7 DLL							X	X	X	X	X	X	X
34.8 DLL							X	X	X	X	X	X	X
34.8.1 DLL							X	X	X	X	X	X	X
34.8.2 DLL							X	X	X	X	X	X	X

2.2. PSS®SINCAL Compatibility

This section outlines compatibility between PSS®SINCAL and PSS®E 34 versions.

Table 2.2.

PSS®E	BOSL in PSS®E - Using models	License needed	GMB - Editing models	License needed	Eigen-value Analysis	License needed	Harmonics	License needed
<= 34.3	14.5	No	14.5	Yes	14.5	Yes	NA	-
<= 34.3	15.0	No	15.0	Yes	15.0	Yes	NA	-
34.4	14.5	No	14.5	Yes	14.5	Yes	NA	-
34.4	15.0	No	15.0	Yes	15.0	Yes	NA	-
34.4	15.5	No	15.5	Yes	15.5	Yes	NA	-
34.4	16.0	No	16.0	Yes	16.0	Yes	NA	-
>= 34.5	15.5	No	15.5	Yes	15.5	Yes	NA	-
>= 34.5	16.0	No	16.0	Yes	16.0	Yes	NA	-

Note

PSS®SINCAL 16.5 and above are delivered as 64bit applications and thus not compatible with PSS®E 34 which is delivered as a 32bit application. PSS®E 35 is compatible with PSS®SINCAL 16.5 and above.

Chapter 3

PSS®E 34.8.2 Release Notes

May 2021

3.1. Security Enhancements

The following changes have been made to address security and/or vulnerability issues:

1. Python

- The installer for Python 3.4 (and its related third-party modules for use with PSS®E) is no longer included with PSS®E 34 beginning with PSS®E 34.8.2 due to vulnerabilities discovered for Python 3 installations that may allow remote code execution.

Support for Python 3.9 has been introduced for PSS®E 34.8.2 which includes mitigations for these vulnerabilities.

Refer to [Chapter 1, Python Compatibility](#) for more information.

- The installer for Python 3.7 (and its related third-party modules for use with PSS®E) is no longer included with PSS®E 34 beginning with PSS®E 34.8.2 due to vulnerabilities discovered for Python 3 installations that may allow remote code execution.

Support for Python 3.9 has been introduced for PSS®E 34.8.2 which includes mitigations for these vulnerabilities.

Refer to [Chapter 1, Python Compatibility](#) for more information.

3.2. Program Enhancements

The following program enhancements appear in this release:

1. Short Circuit

- When zero sequence machine impedance is zero ($R0=X0=0.0$), GUI warnings (spreadsheet cell highlighted) and progress messages are generated. These warnings and messages can be suppressed using `set_progress_verbose` API.

2. GIC

- Added RSOL and LAST as power flow solution methods to GIC analysis options.

3. PSS®E Dynamic Simulation

- Added fetch routines to get model names for the following CCT model types: Branch Other, Machine Other, Machine Protection, Switched Shunt Other, 2-Terminal DC Other, and Bus Other.
- Added logic in REGCB model to set machine output to zero if the electrical control blocks the converter.

- In the DERA model added some extra messaging and changed VAR(L+20) to contain the fraction of DER that tripped.
4. WECCLF Converter
 - Estimate and set voltages of the dummy buses of multi-section lines.
 - Save PSSE .sav file after applying these changes to converted RAW file. a) PSLF Qtable limits (PSSE GCAP), b) PSLF Generator controls, c) any PSSE automation file changes (when provided), d) disconnecting any isolated buses, and e) Estimate and set multi-section lines dummy bus voltages
 - In PSLF EPC file, the QTABLE data bus number specified is zero. In this case, ignore that record. [Bus number 0 is treated as end of gcp file by PSSE GCAP activity.]
 - In PSLF EPC file, bus type 0 is specified even when there are no generators connected. In this case, determine if this bus has any in-service branch connection, then don't isolate, instead set bus type to 1 in PSSE.
 5. WECCDS Converter
 - Modified the PSLF to PSS®E dynamics data converter (WECCDS) for converting the PSLF models esst6c and esst5c.
 6. Python
 - Added support for Python 3.9 (32-bit).

To use this feature, Python 3.9 must be installed and PSS®E must be launched with the -pyver 39 flag. This can be accomplished by:

 - Opening the PSS®E 34 Command Prompt and typing: psse -pyver 39
 - PSS®E 34 application shortcut (e.g. on the desktop): modify the shortcut target to include -pyver 39 instead of -gohome

3.3. Aha! Ideas Portal

The following items from the Aha! Ideas Portal are included in this release:

- None

3.4. Program Corrections

The following program corrections appear in this release:

1. Power Flow
 - Bug fixed in writing PSSE version 33 and earlier RAW files when transformer impedance correction table record has more than 11 points. PSSE 34 and greater can have up to 99 data points, but PSSE 33 and earlier allows only 11 data points.

Actually this bug fix was released with version 34.8.1, but was not added to its release notes.

- fixed a memory leak that happens when fetching multi-terminal DC line data with subsystem data retrieval routines, such as amultitermdcint and an error code is returned.
2. Contingency Analysis
 - Corrections made to the SWSHUNT contingencies to align with behavior of PSS®E 35.
 3. Probabilistic Reliability
 - Bug fixed in substation reliability assessment where switching operation may not be conducted correctly for normally opened switches.
 - Bug fixed in substation reliability assessment where loss of load at one of load buses is not calculated correctly in fault mode.
 4. Short Circuit
 - Bug fixed - Changing the transformer MVA did not change the sequence impedances when needed per their zero sequence impedance code. The updates done will change the sequence impedance appropriately.
 5. GIC
 - Bug fixed in GIC calculations for "efieldgrid" event. This bug was revealed when running GIC calculations over many Efield files but when Saved case and GIC data files were opened only once. Also this bug occurred only on certain network configurations.
 - Bug fixed to use power flow solution options from the saved case (instead of default solution options).
 - Corrected an issue that prevented certain GIC APIs from rendering in the Application Program Interface (API) manual.
 6. Line Properties (lineprop34.exe)
 - Corrected an issue that caused the Line Properties application to suddenly close when the calculate impedance feature was used.
 7. Node Breaker
 - Several bug fixes to the topology processor in regards to node-breaker actions affecting 3-winding transformers.
 - Bug fix made to change VSC DC line status to out-of-service when isolated through breaker actions.
 - Eliminated a potential program hang when determining intra-substation loop flows.
 - Bug fix made when rerouting FACTS device connection to new bus section or back to original bus that was potentially resulting in a crash.
 8. PSS®E Console Mode (pssecmd34.exe)
 - Fixed an issue that prevented the "-pyver" argument from being processed when launching pssecmd34.exe.

9. PSS®E Dynamic Simulation

- Increased the number of decimal places in writing out the tap and phase-shift information for OLTC1T, OLTC3T, OLPS1T and OLPS3T models.
- Fixed an issue in the DOCU check of UEL2C model – some of the CONs which were earlier marked as fatal, have now been changed to a warning.
- Fixed an issue in the DOCU check logic of the PWTBD1 model (this bug could crash PSS®E when doing DOCU check with all V-P pairs equal to zero).
- Fixed some typos in the PWTBD1 model data sheet. Also, removed the ICON table from the PWTBD1 model data sheet.
- Bug fix in the DYDA output of PWTBD1 model (the DYDA output had an extra zero in the beginning which was not required).
- In the REECA1 model, modified the CON_DSCRPT of Thld parameter (i.e., CON(J+10)) – per the earlier CON description, Thld could only be greater than or equal to zero, which was not correct.
- In the GGOV1 model, modified the DOCU check to mark Tpelec, Tb, and Tload as suspect if the corresponding data is equal to zero.
- Bug fix in the 2-terminal dc line model CHVDC2 – there was an error in setting the value of inverter dc voltage during commutation failure.
- Fixed an issue in the DOCU check of PSS3B model – CON(J+10) corresponding to data A4 which was earlier marked as fatal, has now been changed to a warning.
- Fixed an issue in the WECCDS converter – in converting PSLF model pv1g, the mcre file that was being generated by the WECCDS converter had an error as a result of which the corresponding machine was not getting designated as a renewable machine in PSS®E powerflow.
- Bug fix in the DYDA output of CHVDC2U1 model (the DYDA output was not writing out the 3 ICONS of the model).
- Updated the load shed logic when load shed relays shed loads that are modeled using the CMLDxxDGU2 model (i.e., composite load model with DER).
- Fixed an issue in the block diagram of the PSS7CU1 model (the block diagram showed a gain Ks at the output which is not present in the model and hence this has been removed).
- Fixed an issue (random crash) in outputting the Model Storage Locations for the following CCT model types: branch device, branch other, and 2-winding transformer device.

3.5. Known Issues

The following issues have been identified and known to exist in this release:

- None

Chapter 4

PSS®E 34.8.1 Release Notes

December 2020

4.1. Program Enhancements

The following program enhancements appear in this release:

1. WECCLF Converter

- Modified the PSLF to PSS®E dynamics data converter (WECCDS) for converting the following PSLF models: oel2c, uel2c, esdc4c, der_a, regc_b, reec_d.

4.2. Program Corrections

The following program corrections appear in this release:

1. Power Flow

- Fixed a potential crash in GOUT that could result from joining (JOIN) two buses in which one bus had been recently added (such as through SPLT) and at least one of the buses to be joined had a 3-winding transformer connected.
- When a power flow solution is performed with direct tap adjustment enabled, the solution may take more iterations than it should to converge. This has been fixed.

2. Dynamic Simulation

- Fixed an issue in activity DYR when reading the character ICONs of CRANIT and VFT1 models.
- Fixed an issue in the PSLF to PSS®E dynamics data converter (WECCDS) – in converting PSLF models esdc4b and esdc4c, if the derivative controller time constant (Tdr) is zero, or if the rate feedback time constant (Tf) is zero, then in converting these models to DC4B and DC4C, PSS®E will set the corresponding gains (Kdr, Kf) to zero and set Tdr and Tf to some number (say) 1.0. This is done to avoid division by zero in the PSS®E models.
- WECCDS conversion of wt2g model has been modified to use default power-slip data if PSLF wt2e model is not found in the dyd file. This is to prevent “junk” data from being written out if the PSLF wt2e model is not found by the WECCDS conversion program.
- Fixed an issue in the DC4B model related to the calculation and application of regulator (STATE(K+3)) lower limit which is the limit shown as VRMIN*VT in the DC4B model block diagram.
- In the AC7B and AC7C models, the ‘initialized out of limits’ check has been changed to not put out the message if the variable initializes exactly at the limit.

- The generator model consistency check has been updated to not put out an error if the generator model is GENTPJ1.
- Fixed an issue in CMLDxxDGU2 (DER_A+composite load model). This bug was due to wrong CON values being used to check if the Motor D terminal voltage was less than $V_{stall}(\text{Adjusted})$. Additionally, there were issues with simulating the reclose of 3-phase Motors A, B and C.
- Minor changes in output messages from CMLDxxU2 and CMLDxxDGU2 models.
- Fixed an issue in the CHVDC2U1 dyr syntax in the model documentation.
- Fixed an issue in the Dynamics 'Channel Setup wizard' GUI. This bug was precluding the machine channels from being unselected.
- Fixed an issues in the Dynamics GUI when changing the status of owner based load and load relay models.
- Fixed an issue in turbine governor models with deadband (HYGOVDU, PIDGOVDU, TGOV1DU, WPID-HYDU, GASTDU, GAST2ADU, GASTWDDU) – the input to the turbine damping factor should be speed deviation rather than the output of the speed deadband.
- Fixed an issue in the DEGOV1D model; the output has to be multiplied by speed rather than the output after deadband.
- Fixed an issue when adding a plot channel related to 3-winding transformers - if the bus associated with the 3-winding transformer is not found, or if the 3-winding transformer is not found, the API was returning an erroneous error code.
- Fixed an issue when adding a plot channel related to 3-winding transformers – in writing out the channel identifier information, PSS®E would crash because the 3-winding transformer name (which in PSS®E is 40 characters long) could not get accommodated in the buffer containing the channel identifier. To solve this issue, only 12 characters of the 3-winding transformer name are now being written out when creating the channel identifier for 3-winding transformers.
- Fixed an issue in WT12T1, WTDTA1 and WT3T1 models in accounting for the parameter DAMP at initialization. As a result of this bug, there could show initialization issues with STATE(K+2) when DAMP is greater than zero and if the initial generator speed is not 1 pu.

3. Node-breaker

- Fixed an issue in the Saved Case file (.SAV) in which VSC or multi-term DC line converters connected to a bus within a substation had the potential for the converter's node terminal connection to not be saved in the case and thus not restored when the case is read back in. This typically only affected the last VSC and/or multi-term DC line record. It had the potential however of causing a crash when the node-breaker topology processor was run. This has now been corrected but, to fully remedy the problem, bring in the case, manually reconnect the affected VSC and multi-term DC converters to a node of the bus and save the case in RAW data file format. Then read in the Raw file and save it back out as a SAV file. This will only need to be done once in 34.8.1 as the SAV file should be correct going forward. No other data within the Saved Case is affected.
- When the regulated bus within a plant is part of a substation and the regulated bus is deleted, the newly assigned regulated bus is now correctly shown.

4.3. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. All recent Intel Graphics drivers released since May 15, 2019 AND before August 12, 2020 appear to have issues which result in the incorrect display of Slider diagrams. Do not update your Intel Graphics driver to anything above 26.20.100.6709 OR below 23.20.16.7584. If you have a version that falls in this gap, please uninstall that version and install version 23.20.16.7584 or greater. Alternatively, if you have a discrete graphics card from AMD or Nvidia, make sure to configure your machine so that the discrete card is used for PSSE instead of the integrated Intel processor. If you do not wish to update your drivers, you can also choose to turn off Hardware Acceleration by going to [Edit->Preferences...], [Diagram] tab, [Advanced Global Settings] tab. This will force the diagrams to use the Microsoft provided software-only rendering, but this is much slower than using a graphics processor, and much slower in Windows 10.
2. Use of ACCC_PARALLEL, ACCC_PARALLEL_2, ACCC_WITH_TRIP_PARALLEL, N11_ACCC_PARALLEL, MACCC_PARALLEL, or MACCC_WITH_TRIP_PARALLEL is not permitted with a case containing substation data.
3. Output to the GUI has always been much slower than output to a file. This difference has become more noticeable lately, at least partially because of some reports that include more information, but perhaps also due to technology changes. There can be times, for long running reports, where the program appears to become unresponsive and the output windows are not being updated. When this occurs, the program is still running and output will appear in the window once the action is complete.

One possible technique that can help with this is to "T" the output. Currently this feature is not exposed in the GUI and is only available through the API. For example, the T_PROGRESS_OUTPUT API will allow you to write a copy of the progress output to a file at the same time as the output is written to the GUI window. Please refer to the Application Program Interface (API) manual provided with PSS®E for more details.

If needed, the maximum number of lines for output can be limited to the minimum of 1000 lines. This setting can be modified through the PSS®E application under Edit >> Preferences under the General tab

4. Importing the wx Python module, when using Python 3.4 or Python 3.7, will cause the application to become unresponsive. When using Python 3.4 or Python 3.7, Python scripts that import the wx module should be run through the "Run wxPython file..." feature under the "I/O Control" menu item. This known issue does not impact running Python from an external environment (such as IDLE or Command Prompt).
5. There is a known issue with placing knee-points on multi-section lines, either on the multi-section line itself, or on the branches that make up the multi-section line, depending on the report mode. We would advise our users to refrain from placing knee-points on multi-section lines for this release.

Chapter 5

PSS®E 34.8.0 Release Notes

August 2020

This update introduces new functionality, minor enhancements as well as program corrections.

5.1. Program Enhancements

The following program enhancements appear in this release:

1. Powerflow Module

- In the automatic phase shifter angle adjustment calculation of the Newton-Raphson power flow solutions, the adjustment of voltage phase angle during the phase shift angle adjustment calculation is suppressed if there are any in-service branches in the case with $|R/X|$ ratios greater than 10.0. The presence of such branches in the case could have resulted in failure to converge when phase shift adjustment was enabled.
- Added RXPATH API that will return the "shortest" distance between two buses, based on impedance or the number of buses.
- Added the following items to the contingency (CON) file:
 - a. SET SWSHUNT AT BUS xxx REACTIVE TO xxx MVAR
 - b. SET SWSHUNT AT BUS xxx REACTIVE TO xxx REACTIVE
 - c. SET SWSHUNT AT BUS xxx VMAX TO xxx PERUNIT
 - d. SET SWSHUNT AT BUS xxx VMIN TO xxx PERUNIT
 - e. SET SWSHUNT AT BUS xxx VSCHED TO xxx PERUNIT
 - f. CHANGE SWSHUNT AT BUS xxx REACTIVE BY xx MVAR
 - g. CHANGE SWSHUNT AT BUS xxx REACTIVE BY xx PERCENT
 - h. CHANGE SWSHUNT AT BUS xxx VMAX TO xxx PERUNIT
 - i. CHANGE SWSHUNT AT BUS xxx VMIN TO xxx PERUNIT
 - j. CHANGE SWSHUNT AT BUS xxx VSCHED TO xxx PERUNIT
 - k. ISOLATE MACHINE xxx AT BUS xxx
 - l. ISOLATE LOAD xxx AT BUS xxx
 - m. ISOLATE SHUNT xxx AT BUS xxx

- n. ISOLATE SWSHUNT AT BUS xxx
- o. ISOLATE INDUCMACHINE xxx AT BUS xxx
- p. ISOLATE TWOTERMDC xxx
- q. ISOLATE MULTITERMDC xxx
- r. ISOLATE VSCDC xxx
- s. ISOLATE FACTS xxx

2. Dynamics Module

- Added dynamic load model CMLDxxDGU2 (where xx could be BL, AR, OW, ZN or AL). This model has the DER_A added as part of the composite load model. The DER_A included in this model uses the MW and MVAR specified in the load record of PSS®E powerflow.
- Added IEEE 421.5 Overexcitation Limiter model OEL5C (called OEL5CU1 in PSS®E).
- Added NERC GP3 model (Generic synchronous generator protection model).
- Added logic in the REGCA model to take care of applying the rate limit (rrpwr) correctly when the generator power is negative (e.g., when the generator is used to model a storage device which is in charging mode of operation).
- Added GovSteamEU model (Simplified Boiler and Steam Turbine with PID governor model - CIM model based on IEC 61970-302).
- Updated the CHVDC2U1 model to add internal integration logic.
- Updated the GENTPJ1 model to allow for the modeling of subtransient saliency (i.e., allowed for CON(J+10) to be different than CON(J+11)).
- Added the WECC proposed REGC_B generator/converter model (called REGCBU1 in PSS®E).
- Added the WECC proposed REEC_D electrical control model (called REECDU1 in PSS®E).
- Added Machine reverse power relay model.
- The following new models were added for extracting phase and sequence voltages and currents:
 - a. GetBusPhsVLTU: This model can be attached to any bus and can be used to retrieve the bus phase (A, B and C phase) voltage magnitude and angle.
 - b. GetBusSeqVLTU: This model can be attached to any bus and can be used to retrieve the bus sequence (positive, negative and zero sequence) voltage magnitude and angle.
 - c. GetGenSeqCURU: This model can be attached to any generator and can be used to retrieve the machine sequence (positive, negative and zero sequence) current magnitude and angle.

- d. GetBrnSeqCURU: This model can be attached to any branch (including zero-impedance lines) and can be used to retrieve the branch sequence (positive, negative and zero sequence) current magnitude and angle. This model cannot be attached to 2-winding or 3-winding transformers.

3. GIC Module

- Added GIC_7 and GIC_8 APIs to match these APIs in PSS®E 35.
- GIC analysis api input argument that specified "GIC data file name" removed. A new api "gic_read" added to read GIC data files.
- GIC_8 api integrates GIC analysis with PSS®E Node Breaker data model. A new 2nd version of the GIC data file format is introduced to provide GIC data file without substations location data and bus-substation association data.
- Added "efieldgrid" event to use non-uniform near real-time geoelectric field data to calculate branch induced voltages due to GMD. The efield grid map data is available from USGS/SWPC web portal in JSON file format or can be provided as CSV or JSON format file.
- Added activity to download the latest or any previous time efield grid map data from USGS/SWPC web portal.
- Added activity to read .json and .csv format efield grid map data files.

4. AUX RAS Module

- Run-time performance of the AUX RAS module has been improved. The amount of improvement varies depending on the network case and AUX RAS data being used. During internal testing, an improvement of up to 300% was observed when running the contingency analysis with sample customer data which included thousands of contingencies and remedial actions.

5. GUI

- Added the ability to filter substations in the substation selector.
- GIC data is presented and edited in a spreadsheet, similar to the Network, OPF and Dynamic data spreadsheets.
- Added substation data output options to the Save RAW dialog.
- NCSFC data can be added from the Machine data record dialog.
- Pre-populate the substation selection dialog with the number of the first defined substation.
- Update results on all open diagrams after creating a new substation.
- Inform the user when attempting to open a diagram from a later version of PSS®E.
- Improved the "binding" of existing substation diagrams to network substations.

6. WECCLF Converter

- Wrong PSLE EPC data sets PSS®E RMA=0 and RMI=0. When RMA and RMI are zero, PSS®E will set WINDV1 to zero. In this situation make RMA and RMI to PSS®E default values.

- Irrespective of PSLF branch data <gi>, <tf> and <tt> values, model in-service Transformer Terminated <btyp=1> branches in PSS®E.
 - PSLF buses of <type=4> with generator and in-service branches connected, converted to PV buses.
 - PSLF buses of <type=4> with in-service branches connected, converted to PQ buses.
 - Model PSLF breaker ratings and name in PSS®E System Switching Device model.
 - Generate unique circuit Ids for parallel MSLs between two buses.
7. Automation
- Updated Python module pssarrays, arrbox, and pssexcel to process non-ascii contingency labels and non-ascii information in ACCC, PV, and QV files.
 - Added additional functions casbrn, casswd and castrn to the caspy Python module.
 - Added a SCMVA calculation to the ASCC example Python file.
8. Updated to consider "transmission line units" options to show ohms data (R0, X0 and B0) in ohms and microF when providing sequence data inputs from PSS®E GUI dialogs.
9. Added psspy.set_progress_verbose(..) to show or not show some repetitive progress messages. At this version this feature is implemented for the progress message "Zero sequence impedance is (0.0,0.0)" produced when reading sequence data file.
10. New node-breaker APIs have been introduced that return the node number to which a terminal device (load, machine, fixed bus shunt, switched shunt, induction machine, OPF adjustable bus shunt) is connected, or 0 if not connected. The corresponding new APIs are: FETCH_LOAD_TERM_NODE, FETCH_MACHINE_TERM_NODE, FETCH_SHUNT_TERM_NODE, FETCH_SWS_SHUNT_TERM_NODE, FETCH_INDMACHINE_TERM_NODE and FETCH_ADJVAR_TERM_NODE
11. New OPF APIs have been introduced that provide the ability to change the identifier (ID) of an OPF adjustable bus shunt and a branch/2-winding transformer or 3-winding transformer flow constraint. The corresponding new APIs are: OPF_CHANGE_ADJVAR_ID, OPF_CHANGE_BRN_FLOW_ID and OPF_CHANGE_3WT_FLOW_ID.

5.2. Program Corrections

The following issues have been identified and corrected in this release:

1. Powerflow Module
- In the progress output of SCAL_3, the post-scaling load total was incorrect when any of the loads being scaled had distributed generation associated with them.
 - The GetContingencySavedCase API routine was unable to pick up Incremental Saved Case Files from ZIP Archive Output Files created by PSS®E 33.
 - Fixed an issue where a SVD controlling an out of service remote bus would cause a crash.
 - Fixed an issue creating v32 and earlier Sequence data files.

- Fixed an issue with ADD LOAD/MACHINE/SHUNT contingencies.
- Fixed an issue with REMOVE INDUCTIONMACHINE contingencies.
- Fixed an issue with MOVE SWSHUNT contingencies.
- Fixed an issue with SET/CHANGE SWSHUNT contingencies.
- Fixed an issue with MONITOR 3-WINDING TRANSFORMER.
- Fixed an issue with ISOLATE FACTS contingencies.

2. OPF Module

- Added a check to ensure that OPF data has been initialized prior to OPF API commands being run.
- Cleaned up the OPF Interface Flow Report:
 - Ensuring that extraneous characters do not show up on participating branches that do not have any flow
 - Added a header and constraint information for each individual interface flow constraint
- Fixed an issue in the OPF Adjustable Load table to ensure that all impacted loads are printed out.
- The OPF Linear Constraint data now allows an external table identification number of zero (0).
- For OPF solutions involving the minimization of adjustable bus shunts, a correction has been made to the calculated objective cost value displayed at the end of the OPF solution iteration log. An incorrect value could occur when var records had a maximum var limit that was positive and a minimum limit that was negative. This only affected the "Minimum shunt var objective" value that was displayed, not the individual var values that were calculated as a result of the OPF solution and displayed in the Added Shunts (MVar) table in the OPF report.
- For OPF branch flow constraints on 3 winding transformers, the data spreadsheet now correctly displays the 3 unique buses, with the winding of interest listed first.
- The OPF Report has been cleaned up to ensure that form feed characters do not erroneously appear.
- Fixed an issue when saving an OPF Raw File in which the participating branch IDs of interface flow constraints may be incorrect.
- Various OPF report tables have been updated to accommodate larger numerical values.
- The transformer tap value printed in the OPF Linear Constraint Report for transformer variables has been corrected. This fix addresses a potential crash.

3. Node-Breaker Module

- When reading in a Powerflow Raw Data File (.raw) containing substation data, spurious warning messages are no longer output. Additionally, when data errors are encountered when reading the main substation data record, the remaining data records for that substation are skipped and the substation is not added.

- The status of terminal equipment (shunts, machines, loads) now reflects the status of the node to which it is connected. This addresses the issue where a node was taken out of service but the associated bus, or bus section, to which it belonged to was in service and hence the equipment connected to the out-of-service node also was treated as in service when it should have been out of service. In future releases the original values of the terminal connected equipment (shunts, loads, machines) will be preserved such that when their connected node is reactivated, the status of the connected equipment will return to its original status.
- The "Invalid substation number" message that popped up unnecessarily has been corrected.

4. Dynamics Module

- Fixed an issue in the DOCU check logic of WT3G2 model when the number of lumped wind turbines (specified in ICON(M)) times Prate (specified in CON(J+5)) is greater than the MVA base of the machine.
- Bug fix in writing out dyr record (activity DYDA) of SAT2T model.
- Added model documentation of CMLDBLDGU2 (DER_A+composite load model) that was added into PSS®E library at 34.7.
- Fixed issue with block diagram of AC3C model (the PID controller and the two states associated with this PID block) were missing from the block diagram.
- In the composite load model, in checking for P/Q ratio, the check was modified to be on the absolute value of P/Q.
- In the SWCAPT model, fixed an issue in writing out the Model Instance (MINS) value (this issue was observed as a crash in some simulations).
- Fixed an issue in writing out the model name in the relay characteristic ("rlc") file.
- Corrected the VAR(L) description in the pitch controller model WTPTA1.
- In the BUDCZT model documentation, interchanged CONs J+5 and J+6 to keep it consistent with the logic as coded in the model.
- In the model AC7CU1, VARs L+2 and L+3 were not being assigned a value. This change would not affect the simulation results in any way.
- Fixed an issue related to the display of generator dynamic models in the dynamics data spreadsheet view for "infeed" machines (machines marked as "infeed" type in the generator powerflow data record).
- Bug fix in the AC7B and AC7CU1 models - the limit check of the PID controller was being done after the HV and LV gates in position C. This PID controller output should be applied before the signals pass the position C HV and LV gates. This change would affect the simulation results only if the AC7B or AC7CU1 models had UEL or OEL models applied at position C.
- Bug fix in DYDA format statement of PVEU1 model. The format for writing out the first ICON of the model (which was the remote bus number) was not adequate as a result of which when attempting

to write the bus numbers that are over 3 digits long, the output (dyr file) would contain **** instead of the actual bus number.

- When performing STRT (dynamics initialization), if users select the option to gnet generators for which no dynamic models have been provided, if PSS®E finds a generator for which there is no dynamic model attached and if the machine P and Q output both are zero, PSS®E will set these machines to out-of-service.
- Fixed an issue in the ICON(M+6) description in the PLNTBU1 model documentation. The ICON(M+6) should be set such that 1 stands for "enable", 0 for "disable".
- Fixed an issue in the ICON(M+6) description in the REPCA1 and REPCTA1 model documentation. The ICON(M+6) should be set such that 1 stands for "enable", 0 for "disable".
- Bug fix in INTFLWT model (this bug would show as a crash during initialization).
- Bug fix in doing the DOCU and DYDA of "Bus Other" type model. As a result of this bug, DOCU and/or DYDA of "Bus Other" type models will output just one instance of this model type even if the case has multiple instance of the same.
- Fixed a typo in the message output of VTGDCAT and VTGTPAT models (word IGNORED was spelt as IGNOREDD).
- In the GENTPJ1 model, fixed an issue regarding the handling of implicit GSU (i.e., when RTRAN and/or XTRAN are greater than zero).
- Fixed a bug in the API CCTMIND_MSCO. As a result of this bug, the model status was not being retrieved correctly.
- Fixed a typo in the REPCA model documentation (in the model block diagram, Vt was shown as Vreg).
- Fixed a messaging issue in the CMLDxxDGU2 (xx could be BL/AR/OW/ZN/AL) model when the P/Q ratio is less than the specified PQratio threshold.
- Fixed an issue in opening the 'Bus Other' dynamics spreadsheet. This bug would show up as a crash if dynamic Bus Other model spreadsheet is opened and there is a model in that spreadsheet which is attached to a bus number which is greater than the bus sizing for which PSS®E is opened.
- Fixed an issue with the Rectifier Alpha Minimum Limiter (RAML) timer logic in the 2-terminal HVDC model CHVDC2U1.
- Added a temporary fix to prevent PSS®E from crashing in the event if the registry entry that contains the definition of channel out file type is 0 at PSS®E startup.
- Fixed an issue in using python APIs for setting the options under Dynamics>Simulation Options.
- Fixed an issue in the calculation of the output of the lag-block of HVDCAT model.
- Fixed an issue in the OEL2CU1 model data sheet - the CON description of CONs J+36 through J+39 were incorrect.
- Fixed an issue in the OEL2CU1 model data sheet - in the dyr syntax, the model name was shown as OLE2CU1 instead of OEL2CU1.

- Added missing unit information in the output message of generator scanning model.
- Fixed an issue with recording the DIST_3PHASE_BUS_FAULT API.
- In the turbine governor model TGOV1, the warning message regarding the mechanical power (PMECH) being initialized out of limits will be displayed only if PMECH is greater than the upper limit or less than lower limit. Earlier the message was being put out even if PMECH was initialized exactly at the upper or lower limit.

5. Short Circuit Module

- Fixed several issues with calculating the current injection for NCSFCC machines.

6. GUI

- Fixed an issue when splitting buses. The wrong branch elements were being moved.
- Fixed an issue with the dynamic bus fault disturbance dialog.
- Fixed an issue with upgrading Wind Machines in a diagram.
- Fixed an issue with removing a legend in a diagram.
- Fixed several issues with the presentation of results on three-winding transformers on diagrams.
- Fixed text justification and color issues on diagram ReportNodes.
- Updated the Custom Toolbar XML file when reading in Custom Toolbar definitions from a configuration file.
- Fixed several issues with the Machine data record dialog.
- Fixed an issue where the VAR setting would get corrupted on the Newton and Robust Solution power flow tabs.
- Fixed several issues identified with opening diagrams.
- Fixed an issue where attempting to open the dynamics bus other spreadsheet would result in a crash.
- Fixed an issue where attempting to add a new model to the dynamics bus other spreadsheet would result in a crash.
- Fixed an issue where the R/X/B field identifiers on the branch spreadsheet and data record dialog didn't respond to the OHMSIO setting.
- Fixed several issues with the MRU list.
- Fixed several issues upgrading diagrams from PSS®E-33.
- Fixed several issues with MSLs and the creation of substations and diagrams from automation files.
- Fixed an issue with column headers in the three-winding transformer results spreadsheet.

- Fixed an issue honoring the substation name when creating a new substation from the substation spreadsheet.
 - Fixed an issue with column headers in the two-winding transformer results spreadsheet.
 - Fixed an issue with the preservation of images in diagrams.
 - Fixed an issue with exporting ACCC and PC/QV results to Excel from within PSS®E.
7. WECCLF Converter
- "PSLF and PSS®E Interface Flow Comparison" report was not shown.
 - In "PSLF and PSS®E Area Interchange Comparison" report PSS®E output row was written twice.

5.3. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. Use of ACCC_PARALLEL, ACCC_PARALLEL_2, ACCC_WITH_TRIP_PARALLEL, N11_ACCC_PARALLEL, MACCC_PARALLEL, or MACCC_WITH_TRIP_PARALLEL is not permitted with a case containing substation data.
2. Output to the GUI has always been much slower than output to a file. This difference has become more noticeable lately, at least partially because of some reports that include more information, but perhaps also due to technology changes. There can be times, for long running reports, where the program appears to become unresponsive and the output windows are not being updated. When this occurs, the program is still running and output will appear in the window once the action is complete.

One possible technique that can help with this is to "T" the output. Currently this feature is not exposed in the GUI and is only available through the API. For example, the T_PROGRESS_OUTPUT API will allow you to write a copy of the progress output to a file at the same time as the output is written to the GUI window. Please refer to the Application Program Interface (API) manual provided with PSS®E for more details.

If needed, the maximum number of lines for output can be limited to the minimum of 1000 lines. This setting can be modified through the PSS®E application under Edit >> Preferences under the General tab

3. Importing the wx Python module, when using Python 3.4 or Python 3.7, will cause the application to become unresponsive. When using Python 3.4 or Python 3.7, Python scripts that import the wx module should be run through the "Run wxPython file..." feature under the "I/O Control" menu item. This known issue does not impact running Python from an external environment (such as IDLE or Command Prompt).
4. There is a known issue with placing knee-points on multi-section lines, either on the multi-section line itself, or on the branches that make up the multi-section line, depending on the report mode. We would advise our users to refrain from placing knee-points on multi-section lines for this release.

Chapter 6

PSS®E 34.7.0 Release Notes

December 2019

This update introduces new functionality, minor enhancements as well as program corrections.

6.1. Program Enhancements

The following program enhancements appear in this release:

1. PSS®E 34.7 includes the extensively improved PSS®E Model Management 3.0 add-on module. New features include interactive graphical timeline views, Slider diagram storage and visualization, individual property tooltips, in-place data submittal to PSS®MOD, basic user roles, and historical tracking of significant bulk editing operations. Other enhancements include more convenient and multi-user-aware model change recording, improved sequence and dynamics data handling, a file-based case comparison function and the ability to function as either an integrated module or a standalone application.

PSS®E Model Management 3.0 includes an updated user manual which is accessible from the "PSS®E 34" Start menu folder after installation; please refer to section 1.2 for important prerequisite and licensing information.

Local Edition is provided with the base PSS®E license; Standard Edition requires an additional purchased license.

2. WECCDS (PSLF dyd to PSS®E dyr) converter enhanced to convert the following PSLF models:
 - lhfrt
 - lhvrt
 - h6e
 - reec_c
3. Update to the WECCDS converter. In AC7B conversion, if Tdr (i.e., CON(J+4)) is zero in the "dyd" file, the conversion to "dyr" will be done by setting Kdr (i.e., CON(J+3)) to zero and Tdr to 1.0. This was done to prevent division by zero in handling of the derivative block.
4. The maximum number of substations, nodes and switching devices have been increased. The maximum number of substations is set to half the maximum number of buses and the maximum number of nodes and the maximum number of switching devices are each set to 10 times the maximum number of substations.

	1,000 Buses	4,000 Buses	12,000 Buses	50,000 Buses	200,000 Buses
Substations	500	2,000	6,000	25,000	100,000
Nodes	5,000	20,000	60,000	250,000	1,000,000
Switching devices	5,000	20,000	60,000	250,000	1,000,000

5. When saving in PSS®E Raw format, there is a new option for producing an RDCH file that excludes all substation data records.
6. When saving in PSS®E Raw format, there is a new option for producing an RDCH file that contains only substation data. The substations saved within the RDCH file can be further filtered using the bus sub-system selector.
7. Added support for Python 3.7 (32-bit). To use this feature, Python 3.7 must be installed and PSS®E must be launched with the -pyver 37 flag. This can be accomplished by:
 - Opening the PSS®E 34 Command Prompt and typing: psse -pyver 37
 - PSSE's application shortcut (e.g. on the desktop): modify the shortcut target to include -pyver 37 instead of -gohome
8. Added the ability to run wxPython files from within the PSSE application:
 - Any scripts containing wxPython code can now be run by selecting "Run wxPython file..." under the "I/O Control" menu item.
9. In applying disturbances in dynamic simulations, added the ability to designate a specific bus section when applying a three-phase fault or an unbalanced fault, and in calculating and applying an unbalanced (SCMU) fault.

6.2. Aha! Ideas Portal

The following items from the Aha! Ideas Portal are included in this release:

- 1.

6.3. Program Corrections

The following issues have been identified and corrected in this release:

1. Fixed an issue with the LineProp application where an error about a missing DLL was displayed.
2. Fixed an issue in REECB1 and REECU1 models: In imposing the lower limit on STATE(K+5) (shown as s5 in the block diagram), the correct value of the lower limit was not being picked.
3. Fixed CON(J+16) description of REPCA1 model - should have been integral gain (was shown as proportional gain).
4. Fixed Fixed a typo in the CON description of CON(J+7) of the REGCA1 model.
5. Fixed an issue in the SVSMO3T2 model dealing with the calculation of error signal (err) at initialization. Because of this bug, users would see a message (Warning: Initial error signal err 1.036 above CON(J+5)).
6. Fixed issues causing PSS®E to crash when performing interactive dynamic data checks in the Maximum Excitation Limiter model MAXEX1.
7. Fixed issues causing PSS®E to crash when performing interactive dynamic data checks in CIM5xx, CIM6xx and CIMWxx (xx could be BL, OW, ZN, AR or AL) models.
8. Fixed an issue with DYDA output of DC4B and DC4C model (model was writing out 7 instead of lines).

9. Fixed an issue with the SGT8HMU1 model. Some limits were not being calculated correctly and as a result the mechanical power output could become negative following a load shedding.
10. Fixed an issue with calculation of the current injection I_{inj} (output of the Kqv block) for the REECB and REECC (electrical control for large scale PV and battery) models.
11. Made the following modification in CMLDXXU2 (xx could be BL, OW, ZN, AR, AL) model: allowed the ability to set LTC flag (CON(J+8)) to -1 as well. With this change, the interpretation of the LTC flag specified in CON(J+8) is as follows. If this CON is any value less than or equal to 0, the LTC logic will be implemented only during initialization but not during simulation. If the LTC flag is set to 1, then the LTC logic will be implemented during initialization and also during simulation.
12. Fixed issues invoking the following dynamic simulation APIs:
 - SET_GENANG
 - SET_GENANG_2
 - SET_GENANG_3
 - SET_GENANG_SUBSYS_FLAG
 - SET_GENPWR
 - SET_GENSPDEV_SUBSYS_FLAG
 - SET_GENSPDEV
 - SET_RELANG
 - SET_RELSCN_SUBSYS_FLAG
 - SET_RELSCN
 - SET_VLTSCN_SUBSYS_FLAG
 - SET_VLTSCN
 - SET_VOLT_VIOL_SUBSYS_FLAG
 - SET_VOLTAGE_DIP_CHECK
 - SET_VOLTAGE_REC_CHECK
 - TRIG_VOLT_VIOLATION_CHECK
13. Fixed an issue in the load shed logic pertaining to frequency relay part of the load relay model UVUF-BLU1. This bug was preventing load being shed by the frequency relay. Additionally, this bug would have resulted in the model VAR location of another model getting changed.
14. Fixed an issue with AC7C model in which the OEL and UEL were not being handled correctly when these were placed at the summing junction.
15. Fixed an issue involving crash when opening model edit dialog for SVSMO2T2 model.

16. Fixed an issue involving crash when opening 'Models Tab' for viewing 'Renewable Auxiliary Control' and 'Renewable Torque Control' models.
17. When a single node within a substation becomes isolated due to the opening of a substation switching device, the potential for having the associated bus of that node erroneously taken out of service has been corrected.
18. The node-breaker isolate function has been updated to correct behavior in situations where one winding of a three-winding transformer is impacted by the isolate process and the terminal bus connections at two or all of the winding ends of the three-winding transformer reside in the same substation.
19. Fixed an issue where non-ascii characters in Python output crashed the application when using Python 3.4.
20. Fixed an issue where automation scripts containing non-ascii characters in the filename were unable to execute when using Python 3.4
21. Fixed an issue with the sliderPy Python module causing the application to become unresponsive.
22. Fixed an issue where resizing elements while grid snap was on would not work well.
23. Fixed an issue where diagram text was "blurry" due to extra transparency being added to labels.
24. Fixed an issue with printing diagrams where labels could end up grouped together in one spot.
25. Fixed an issue with several APIs, when using Python 3.7, that were incorrectly encoding a list of non-ascii strings.
26. Fixed an issue displaying non-ascii characters in a specified output device when using Python 3.7.

6.4. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. In certain cases, the PSSE installer may fail to register components relating to the Line Properties (LineProp) executable. If the LineProp application displays an error message about performing an illegal operation, run the "Register_ALineProp.ocx.bat" as administrator (right click, run as administrator). This file is provided in the "PSSE 34 Complete" by default at C:\Program Files (x86)\PTI\PSSE34 Complete.
2. Use of ACCC_PARALLEL, ACCC_PARALLEL_2, ACCC_WITH_TRIP_PARALLEL, N11_ACCC_PARALLEL, MACCC_PARALLEL, or MACCC_WITH_TRIP_PARALLEL are not permitted with a case containing substation data
3. Output to the GUI has always been much slower than output to a file. This difference has become more noticeable lately, at least partially because of some reports that include more information, but perhaps also due to technology changes. There can be times, for long running reports, where the program appears to become unresponsive and the output windows are not being updated. When this occurs the program is still running and output will appear in the window once the action is complete.

One possible technique that can help with this is to "T" the output. Currently this feature is not exposed in the GUI and is only available through the API. For example, the T_PROGRESS_OUTPUT API will allow you to write a copy of the progress output to a file at the same time as the output is written to the GUI window. Please refer to the Application Program Interface (API) manual provided with PSSE for more details.

If needed, the maximum number of lines for output can be limited to the minimum of 1000 lines. This setting can be modified through the PSSE application under Edit >> Preferences under the General tab

4. Importing the wx Python module, when using Python 3.4 or Python 3.7, will cause the application to become unresponsive. When using Python 3.4 or Python 3.7, Python scripts that import the wx module should be run through the "Run wxPython file..." feature under the "I/O Control" menu item. This known issue does not impact running Python from an external environment (such as IDLE or Command Prompt).

Chapter 7

PSS®E 34.6.1 Release Notes

July 2019

This update includes a program correction.

7.1. Program Corrections

The following issues have been identified and corrected in this release:

1. Corrected an issue where certain user model DLLs would fail to load
 - PTIUtils.dll and PTIUtils.lib have been updated to include corrections for loading user model DLLs that were compiled prior to the release of PSS®E 34.6.0. This correction does not have an effect on the engine of PSS®E since the modifications needed resided entirely within the PTIUtils DLL.

7.2. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. Use of ACCC_PARALLEL, ACCC_PARALLEL_2, ACCC_WITH_TRIP_PARALLEL, N11_ACCC_PARALLEL, MACCC_PARALLEL, or MACCC_WITH_TRIP_PARALLEL are not permitted with a case containing substation data
2. Output to the GUI has always been much slower than output to a file. This difference has become more noticeable lately, at least partially because of some reports that include more information, but perhaps also due to technology changes. There can be times, for long running reports, where the program appears to become unresponsive and the output windows are not being updated. When this occurs the program is still running and output will appear in the window once the action is complete.

One possible technique that can help with this is to "T" the output. Currently this feature is not exposed in the GUI and is only available through the API. For example, the T_PROGRESS_OUTPUT API will allow you to write a copy of the progress output to a file at the same time as the output is written to the GUI window. Please refer to the Application Program Interface (API) manual provided with PSSE for more details.

If needed, the maximum number of lines for output can be limited to the minimum of 1000 lines. This setting can be modified through the PSSE application under Edit >> Preferences under the General tab

Chapter 8

PSS®E 34.6 Release Notes

June 2019

This update introduces new functionality, minor enhancements as well as program corrections.

8.1. Program Documentation

PSS®E 34.6 ships with updated PSS®E 34.6 documentation for the following documents:

- API.pdf - Application Program Interface (API)
- DataFormat.pdf - Data Formats Reference manual
- Models.pdf - PSS®E Dynamic Standard Model Library
- PSSE_Install.pdf - PSS®E Installation manual
- POM.pdf - PSS®E Program Operation Manual (POM)
- SC.pdf - Saved Case Data Extraction Subroutines
- Vendor_Specific_Models.pdf - Vendor-Specific Model Library

For documentation items not mentioned above, the remainder of the PSS®E 34.6 documentation set ships with PSS®E 34.2 documentation plus the following additions:

- GUI_guide_Addendum.pdf - Documents additions to the user interface
- LineProp_Addendum.pdf - Documents additions/enhancements to the LineProp program

8.2. Program Enhancements

The following program enhancements appear in this release:

1. Support for the Vendor Neutral Remedial Action Scheme Format

The Vendor Neutral RAS module is created to support the new and evolving Contingency and Remedial Action Scheme standard used in the Western United States. This standard defines a way to identify contingencies, Remedial Action Schemes (RASs) and their triggering conditions in a vendor neutral manner.

This standard is being adopted by the Western Electricity Coordinating council, WECC.

2. Several improvements have been made to the Robust Solution:

- The interface has been simplified and an API is now available (RSOL)
- The algorithm has been updated to handle more difficult cases. Note that the algorithm changes required the temporary removal of the "Save best found solution steps in Python script" functionality. This option may be added in a future release.

3. Three new threshold values for use in load models:

- Load MW threshold
- Load P by Q (absolute value of P over Q) threshold
- Load bus voltage threshold

These threshold values can be used in dynamic load models to decide whether the load model should or should not be applied. The threshold values are accessible under Dynamics->Simulation Options, and can be accessed and/or set via automation scripts.

4. A new threshold value for use in frequency relay model:

- Minimum pu voltage for frequency measurement

This threshold value is accessible under Dynamics->Simulation Options, and can be accessed and/or set via automation scripts.

5. New limits for dynamic stability analysis:

- Maximum number of wind machines increased to 20,000 at 150,000 bus sizing
- Maximum number of CCT models increased to 150,000 for all bus sizing 50,000 and above
- Increased the maximum number of line relay model connections (MXRLCX) by a factor of 10. This means, at the maximum bus sizing of 200,000 buses, the value of MXRLCX, which was earlier set at 4000, has now been increased to 40,000.

6. Additional models:

- AC6CU2 - This is a revised version of AC6C to allow users to specify voltage dependency of limit on regulator output
- WT12A1U_B - This is the model referred to by NERC and WECC as the revised pitch control model wt1p_b
- OEL2C - IEEE 421.5 2016
- SGT2EU1 - Siemens SGT-2000E Gas Turbine model
- SGT8HSU1 - Siemens SGT-8000H single shaft Gas Turbine model
- SGT8HMU1 - Siemens SGT-8000H multiple shaft Gas Turbine model

7. Enhanced the verbose debugger (VERBDEB) transcript to write out the value of KPAUSE. This can be used to identify models that change KPAUSE value to 1 in the middle of an execution for KPAUSE=2.

8. Added support for the import of PSLF version 19 EPC files

9. Improved the rendering of text on diagrams

10. Redirected some intrusive Alert messages to Progress during equivalencing operations

11. Refresh the dynamic load spreadsheets if load status changes

12. Updated the GIC module to implement TPL-007 Supplemental Event Calculations with Moving boxes. Added new version of GIC calculation api GIC_6. It supports the following new features:

- Different Ways to specify Moving Box
 - Any generic subsystem definition (areas, owners, zones, kV levels)
 - Rank substations with maximum GIC flows as center of the moving box
 - Rank transformers with maximum GIC flows as center of the moving box
 - Any substation number as center of the moving box
 - Any location as center of the moving box
- Option to calculate induced voltages on branch segments inside and outside of the moving box can be specified
 - apply Supplemental event Efield to line segment inside the box and Benchmark (or uniform) event Efield to line segments outside the box
 - apply Supplemental event Efield to entire branch
- Length and Width (North-South and East-West dimension) of the moving box can be specified.
- Options for treatment of study subsystem boundary transformers.
 - include buses of boundary transformers in study subsystem considering subsystem definition voltage
 - include buses of boundary transformers in study subsystem ignoring subsystem definition voltage
- GIC Results Text Report can be generated for specified report subsystem
- Maximum VAR worst case can be defined considering transformers either in study subsystem or report subsystem
- arrbox module updated to export supplemental event calculations output
- GICMAPS module updated to plot supplemental event results
- GIC GUI dialog updated to support GIC_6 api
- If a substation number is not provided for any bus in the study subsystem, attempt is made to derive the associated substation based on the transformer and zero impedance line connections. This is useful when using "subsystem boundary transformers" option.

13. Update AcccBrowseGrid to display monitoring of SWD flows and 12 ratings

14. Added the ability to identify intra-substation loop flows in substation diagrams

15. Update substation flow report, SPOUT, to identify intra-substation loop flows

16. Added the ability to identify bus sections in OPF linear equations for bus voltage angle and magnitude

17. Added the ability to extract monitored SWD flows and Node voltages from ACC files
18. Added string 'XFRMAG' to fetch routines ARDAT, ZNDAT, OWDAT and SYSTOT to return magnetizing admittance
19. Added string 'XFRMAG' to subsystem fetch routines for Areas, Owners and Zones to return magnetizing admittance
20. Added the ability to monitor flows on substation swds by subsystem
21. Added support for GOUT and Network Data record operations from result spreadsheets that contained a bus as a primary key
22. Increased the precision in the Lat/Lon fields on the Node Breaker substation spreadsheet
23. Added support for updating both substation node and node bar annotation to ALL elements in the substation
24. Enhanced auto substation diagram layouts, specifically the route branches take around buses (groups of nodes)
25. Alert messages during node-breaker related contingencies are redirected to the Progress output
26. Enforce the bus section number to be updated to the smallest node number in the section. Under certain substation topology changes this was not being done
27. General improvements in the topology processor
28. In contingency analysis reports, the contingency labels generated for automatic single and double contingencies have been made more descriptive and unique:

SINGLE/DOUBLE	OPN	LIN	#	(Open line)
SINGLE/DOUBLE	OPN	TIE	#	(Open tie line)
SINGLE/DOUBLE	OPN	SBK	#	(Open system breaker)
SINGLE/DOUBLE	ISO	LIN	#	(Isolate line)
SINGLE/DOUBLE	STK	BRK	#	(Stuck/inoperable breaker)
SINGLE/DOUBLE	OPN	TRM	#	(Open terminal)
SINGLE/DOUBLE	OPN	SWD	#	(Open switching device)
SINGLE/DOUBLE	OPN	BRK	#	(Open breaker)
SINGLE/DOUBLE	OPN	SWT	#	(Open switch)
SINGLE/DOUBLE	CLS	TRM	#	(Close terminal)
SINGLE/DOUBLE	CLS	SWD	#	(Close switching device)
SINGLE/DOUBLE	CLS	BRK	#	(Close breaker)
SINGLE/DOUBLE	CLS	SWT	#	(Close switch)
SINGLE/DOUBLE	ISO	SWD	#	(Isolate switching device)
SINGLE/DOUBLE	ISO	BRK	#	(Isolate breaker)
SINGLE/DOUBLE	ISO	SWT	#	(Isolate switch)

Each label is appended with a numeric identifier (#) that is unique for each type of automatic contingency.

8.3. Aha! Ideas Portal

The following items from the Aha! Ideas Portal are included in this release:

1. PSSE-I-867: In TPCH, when printing tap step in the tap step and voltage band checks, print both the t1 step and t-effective step
2. PSSE-I-868: Bus "status" is now reflected on dynamic spreadsheets where applicable
3. PSSE-I-869: GOUT from dynamic spreadsheets is now supported where applicable
4. PSSE-I-870: Improvements have been made to the Copy/Paste operations in the dynamic spreadsheets

8.4. Program Corrections

The following issues have been identified and corrected in this release:

1. Corrected an issue where the ACCC_PARALLEL and ACCC_PARALLEL_2 APIs would crash the program
2. Corrected issues in several models:
 - AC7CU1 - Fixed an issue accounting for OEL and UEL when these are applied for position C in the model block diagram
 - CCOMP4U1 - Fixed an issue in the calculation of reactive current
 - DERAU1

All CON references in DOCU,Check (MODE 7) were off by 1

Added messaging when the multiplier (corresponding to vl0, vh0, fl and fh) becomes zero and also when these timers expire

Modified the logic for calculating the current injections (ISORCE) and the angle that is used for projecting the id and iq onto the network reference frame

 - AC7B - Fixed an issue in in handling OEL and UEL models
 - PSS3B - Changed DOCU, Check for CON(J+14) to 'Warning' instead of 'Fatal Error'
 - SVSMO2T2 - Fixed an issue where the model SVSMO1T2 was being called even when the model attached was SVSMO2T2
 - VIEPCU2 - Fixed an issue in DYDA/DOCU with ICON(M+5)
 - REGCA1 - Fixed an issue with the initialization of ANGLE (ANGLE has to be calculated in radians and not degrees)
3. Corrected an issue where machine output quantities (P and Q) were not being reset to zero if the machine was set to "out of service"
4. Corrected an issue where the dynamic simulation option Out-of-step Scan(OSSCAN) API would not allow changing the options when playing in the corresponding idv script
5. Corrected several issues with user style elements changes not being preserved/presented correctly
6. Corrected an issue where moving a connection point in a diagram to the top/bottom of a busbar could cause the program to hang

7. Corrected several issues when relinking elements in a diagram
8. Corrected an issue dealing with corrupt kneepoints on diagrams
9. Corrected an issue where floating elements in diagrams were drawn beneath/behind symbols
10. Corrected an issue rendering arrows on diagrams
11. Corrected an issue with filled busbars on diagrams
12. Corrected an issue with the ANSI API that could cause a program crash
13. Corrected an issue with the LTAP API that could cause a program crash
14. Corrected an issue with the length of path/filenames in PSSPLT
15. Corrected several issues with the PSSACCSS module in terms of backward compatibility and documentation
16. Corrected several issues in ACCC reports
17. Corrected an issue with the display of VAR values for FACTS devices in diagrams
18. Corrected an issue with the suppression of bus names/numbers in diagrams
19. Corrected an issue with the initialization of rating selections in several dialogs
20. Corrected an issue with the automatic name generation for FACTS devices and DC elements
21. Corrected an issue with adding a new induction machine through the spreadsheet
22. Corrected an issue with specifying a Python file to record changes in the Robust Solver
23. Corrected an issue with adding a new machine on a split substation
24. Corrected several issues where wind machines were not identified correctly
25. Corrected several issues with Copy/Paste operations in diagrams
26. GIC Module Corrections:
 - Auto-transformers common winding DC network resistance calculation was wrong when it was calculated from power flow data and transformer vector group was defined in power flow data.
 - Three winding transformers winding DC network resistance calculated from power flow data could be assigned to wrong winding number when the winding bus base voltages are same.
 - Transformer GIC(t) calculation and report option value was limited to 1
 - GIC dialog GUI not accepting negative values for tielevels option
27. Corrected several issues in the AcccBrowseGrid that would cause it to crash when navigating certain tabs
28. Corrected several issues with column titles when reporting apparent impedances in short circuit analysis

29. Corrected an issue where FACTS and MTDC terminals in a substation were not being included in the RAW file
30. Corrected an issue when calculating substation flows
31. Corrected an issue reading zero-impedance lines with out-of-service switching devices
32. Corrected an issue with default options for Newton and Gauss solution APIs
33. Corrected an issue with multi-section lines have a zero total impedance
34. Corrected several issues in contingency analysis when determining if items were already included in contingency lists
35. Corrected several issues in retrieving results from DCC files
36. Corrected an issue monitored flow labels in ACC files
37. Corrected an issue in the ACCC multiple file report
38. Corrected an issue where certain networks with multiple three-winding transformers could crash the Bus Subsystem selector
39. Corrected several column labeling issues in result spreadsheets
40. Corrected an issue where information in the diagram annotation dialogs was not being preserved between uses
41. Corrected an issue where a regulated bus number of 0 in the switched shunt spreadsheet could crash the program
42. Corrected an issue in the dynamic load model area, owner and zone spreadsheets affecting Add/Replace model functionality
43. Corrected an issue when checking the maximum number of levels that can be isolated in isolate operations
44. Corrected an issue doing a drag/drop of channels from COMTRADE files
45. Corrected an issue with opening FACTS device result spreadsheets from the Tree View
46. Corrected several issues with tool tips and sectionalized buses
47. Corrected several issues with the Undo buffer in diagrams
48. Corrected an issue with three-winding transformers in GOUT
49. Corrected several issues in upgrading diagrams automatically from previous versions
50. Corrected an issue with duplicate bus numbers appearing in substation diagram legends
51. Corrected an issue where out-of-service substation switching devices were incorrectly being removed when converting a bus section to a full network bus
52. Corrected a potential crash when converting a bus section to a full network bus and the section was connected to more than one bus within the substation

53. Corrected an issue where plant and machine data was incorrectly being removed from parent bus when bus section merged back in
54. Corrected an issue where incorrect Bus Section identifiers would be displayed if Bus Numbers were sorted in descending order
55. The node-breaker topology processor was erroneously being activated during certain actions such as equivalencing and when converting a bus section to a network bus. This has now been corrected.

Terminal devices connected to nodes that become disabled are no longer explicitly taken out-of-service. They now key off of the status of their associated bus, consistent with the behavior during other powerflow network outage actions.

8.5. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. Use of ACCC_PARALLEL, ACCC_PARALLEL_2, ACCC_WITH_TRIP_PARALLEL, N11_ACCC_PARALLEL, MACCC_PARALLEL, or MACCC_WITH_TRIP_PARALLEL are not permitted with a case containing substation data
2. Output to the GUI has always been much slower than output to a file. This difference has become more noticeable lately, at least partially because of some reports that include more information, but perhaps also due to technology changes. There can be times, for long running reports, where the program appears to become unresponsive and the output windows are not being updated. When this occurs the program is still running and output will appear in the window once the action is complete.

One possible technique that can help with this is to "T" the output. Currently this feature is not exposed in the GUI and is only available through the API. For example, the T_PROGRESS_OUTPUT API will allow you to write a copy of the progress output to a file at the same time as the output is written to the GUI window. Please refer to the Application Program Interface (API) manual provided with PSSE for more details.

If needed, the maximum number of lines for output can be limited to the minimum of 1000 lines. This setting can be modified through the PSSE application under Edit >> Preferences under the General tab

Chapter 9

PSS®E 34.5 Release Notes

October 2018

This update introduces new functionality, minor enhancements as well as program corrections.

9.1. Program Notes

1. DFAX files will need to be regenerated for use in 34.5

9.2. Program Documentation

PSS®E 34.5 ships with updated PSS®E 34.5 documentation for the following documents:

- Models.pdf - PSS®E Dynamic Standard Model Library
- Vendor_Specific_Models.pdf - Vendor-Specific Model Library
- SC.pdf - Saved Case Data Extraction Subroutines
- API.pdf - Application Program Interface (API)
- DataFormat.pdf - Data Formats Reference Manual

PSS®E 34.5 ships with the PSS®E 34.2 documentation set with the following additions:

- GUI_guide_Addendum.pdf - Documents additions to the user interface
- LineProp_Addendum.pdf - Documents additions/enhancements to the LineProp program
- POM_Addendum.pdf - Documents additions/enhancements to the Node-Breaker and GIC engines
- POM_GIC_Addendum.pdf - Comprehensive update of GIC documentation from Program Operation Manual (POM)

9.3. Program Beta Tests

Harmonics Beta

A PSS®E harmonics module will be beta tested with the initial release of 34.5. If you are interested in participating in a beta test of this functionality please contact support at pti.support.energy@siemens.com making sure to put "Harmonics Beta Test" in the subject line.

The PSS®E Harmonics module contains:

- Integrated spreadsheets for entering and maintaining harmonics data for PSS®E networks
- Integrated harmonics solution engine
- Display of harmonics results in:

- Results spreadsheets
- Diagrams
- Plots

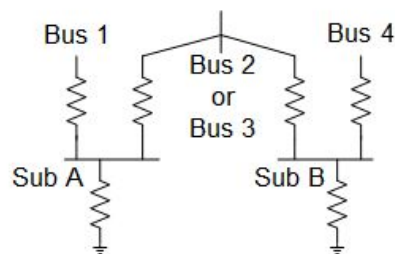
9.4. Program Enhancements

The following program enhancements appear in this release:

1. Starting with PSS®E 34.5.0, a local CodeMeter license will be used before a CodeMeter Network license
2. Dynamic model debug option. When toggled ON, the name of every model called at every time step with identifying information will be directed to a report window. This, like any other PSS®E report output, can be redirected to a file. If crashes occur during dynamic initialization and runs, this can be used to determine which model is causing the problem. This option can be toggled ON/OFF at any point during the simulation. It can be found under Dynamics > Simulation options... labeled "Model debug output". This option can be recorded in an idv or python script.
3. Updated PSLF to PSS®E RAW conversion to address issues with DC elements in v19 EPC files
4. Updated PSLF to PSS®E WECCDS conversion to convert PSLF hyg3 model to PSS®E HYG3 model
5. Improvements to Scenario Manager file tracking
6. The maximum number of Islands allowed during contingency processing has been increased to 20
7. For non-transformer branches, add data checking warning if a branch connects buses with different base voltages
8. Updated the GIC module to include:
 - Comprehensive update of GIC chapter in Program Operation Manual (POM), see POM_GIC_Addendum.pdf
 - Apply subsystem voltage filter on neighbor network buses added when tie levels > 0
 - When an auto-transformer is also specified as T-model in GIC data, model it as T-model, not as an auto-transformer
 - Treatment of Zero Impedance Line buses assigned to different substations



AC Network Connections



GIC DC Network Connections

- New API, GIC_5 supports the following new features:
 - Specify the degree scan step size
 - Specify the magnitude scan step size and maximum storm strength
 - Ability to run a power flow solution for each degree scan calculation
 - Specify scaled addition of GIC Mvar losses to the base case during power flow solution
 - Note - It is not available fom GUI in this release, access it from automation scripts.
 - New API, GIC_PF_OPTIONS:
 - Run this API before run of activity GIC
 - Use this activity to specify power flow solution method and options that will be used to solve power flow on GIC Mvar loss added working case
 - Note - It is not available fom GUI in this release, access it from automation scripts.
 - New API, GIC_PF:
 - Use this activity to apply previously calculated GIC Mvar losses from RDCH file to the working case and run power flow
 - The losses will be added in scaled manner to arrive at the converged power flow solution
 - Note - It is not available fom GUI in this release, access it from automation scripts.
 - Updated progress messages including:
 - Zero Impedance Line buses assigned to different substations
 - The transformer in study subsystem has NO vector group specified
 - Branches that are treated as Zero length branches
 - Same geographical location is used by many substations
 - New section to report:
 - For Benchmark and Supplemental Events report section titled "Storm Strength on a Branch considering alpha and beta factors" added
 - This gives alpha factor, beta factor and equivalent geoelectric field strength applicable to each branch in GIC study network
9. New limits for the number of CONs, ICONs, STATEs and VARs at 150,000 bus sizing:
- CONs - 2226300
 - ICONs - 1499900

- STATES - 1499900
 - VARs - 2276300
10. IEEE 421.5 dynamic models additions:
- AC11CU1
 - ST10CU1
 - PSS6CU1
 - UEL2CU1
11. WECC approved dynamic models additions:
- HYG3U1 - GP Governor, G2 Governor plus Turbine model
 - H6EU1 - Hydro Turbine with American Governor Company Controller
12. Additional vendor models:
- FCVWTU1 - Vestas full converter wind turbine model
 - VIEPCU1 - Vestas IEC 61400-27 power plant controller (PPC)
 - VIEPCU2 - Vestas IEC 61400-27 power plant controller (PPC)
 - CDVAR7U1 - AMSC D-VAR Model
13. Additional models:
- SITGTU1 - Siemens SGT-A65 Gas Turbine Model
14. Model Enhancements:
- DERAU1 - Per REMTF discussions:
 - Replaced feedback of Pgen to Pord
 - Added negative rate limit check for charging mode
15. Numerous improvements to the Node-Breaker topology processor and substation diagram layouts based on testing as part of the NERC-SAMS Node-Breaker modeling task force. They include :
- Increased the precision of substation flows
 - Substation switching devices cannot be placed between nodes belonging to two unique buses within the same substation. In this situation, use regular branch/transformer connections.
 - In contingency analysis, when an unbalance between power demand and generation has been detected, a message will be printed about the imbalance and the program will continue on
 - Automatic "Isolate Line" contingencies will no longer generate records that include zero impedance lines

- In contingency analysis, added the ability to monitor flows through a substation switching device
 - Corrected an issue when adding more than one substation switching device between two nodes
 - Corrected an issue during contingency analysis in which buses set to out of service due to actions of the node-breaker topology processor were not being reinstated to their original status
 - Corrected an issue in which incorrect substation flows were being calculated within a substation that contained multiple buses
 - Corrected an issue with substation records not being written to the RAW file
 - Corrected an issue when joining two buses connected to unique bus sections within a substation. Also corrected an issue where the From and To ends of the branch connected to the substation could end up being reversed during the bus merge.
 - Corrected several issues with the STUCK BREAKER contingency command, either automatically generated or specified in a contingency description file. Please note that in multi event contingencies the STUCK BREAKER command(s) must be defined before other contingency actions.
 - Corrected several program crashes during contingency analysis
16. GNEs are now supported in One-line, GOUT and Substation diagrams
 17. N-term DC lines are supported in One-line, GOUT and Substation diagrams
 18. Option to use software based rendering for diagrams where hardware based rendering is not available. This can be found at Edit > Preferences > Diagrams.
 19. Branch symbols now take up no space on One-line diagrams, allowing easier manipulation
 20. Bus sections are now resizable on One-line diagrams
 21. Option to set the minimum and maximum arrow sizes on diagrams
 22. The branch ID is now closer to the branch symbol on the diagram
 23. OPF and Short Circuit results updated to support bus sections
 24. The display of bus sections in one-line diagrams is now a configurable setting
 25. Relinking items on a diagram is now faster
 26. The Plotting package handles multiple files with the same name
 27. Charts display coordinate labels on mouseover
 28. Annotations can be added by clicking on a chart location
 29. Harmonics Results can be visualized within the integrated plotting package

9.5. Aha! Ideas Portal

The following items from the Aha! Ideas Portal are included in this release:

1. PSS®E-I-546: Ability to delete a selection of elements from Slider all at once
2. PSS®E-I-548: Automatic Bus Type Management when adding generators to non-generating buses
3. PSS®E-I-591: Dynamic Model Debugger
4. PSS®E-I-828: Warning message for different kV buses tied together by non-transformer branch
5. PSS®E-I-840: Non-modal dialogs for SCMU/SCOP

9.6. Program Corrections

The following issues have been identified and corrected in this release:

1. Corrected an issue with the Silent Installer
2. Corrected an issue with diagram titles if loaded via automation
3. Corrected an issue with odd join behavior when joining two buses that are connected to a bus that has been sectionalized
4. Corrected an issue in contingency analysis in which a six digit bus number was not being recognized in a Subsystem (.SUB) file
5. Corrected an issue with the calculation of substation switching device flows
6. Corrected an issue where splitting a bus from a diagram creates a new bus on the diagram way out of bounds
7. Corrected an issue where PSS®E crashed when multiple diagrams are opened
8. Corrected an issue where PSS®E crashed when copying a symbol with a border to another diagram
9. Corrected an issue where custom font sizes were lost when upgrading diagram
10. Corrected several issues with the creation and manipulation of kneepoints in diagrams
11. Corrected several issues with grid snapping in diagrams
12. Corrected an issue in TMLC when opening the conductor file
13. Corrected an issue in Short Circuit calculating MOV currents when connected to a zero impedance line
14. Corrected several formatting issues when large numbers were written to a RAW file
15. Corrected issue where substation terminal records were not written to the RAW file
16. Corrected several issues with GNEs
17. Corrected an issue in GENDSP
18. Corrected an issue selecting/list substations containing many buses
19. Corrected an issue with several diagram settings "fighting" for control of Circuit Id display

20. Corrected an issue with deleting more than one substation at a time from the Substation spreadsheet
21. Corrected an issue where the following buses field was automatically cleared
22. Corrected an issue where the Flat dialog was automatically restore values to defaults
23. Corrected an issue displaying FACTS devices on the dynamic model spreadsheet
24. Corrected an issue editing Load models from the dynamic spreadsheets
25. Corrected several issues with grid snapping on diagrams
26. Cleaned up several issues dealing with duplicate contingency messages
27. Model Corrections:
 - GEWTGCU1 - Corrected an issue with internal wind model structures
 - OLTC1T, OLTC3T, OLPS1T, OLPS3T - Corrected an issue with imposing tap/phase shift
28. Corrected precision issues with X-Axis scaling
29. Corrected an issue with scaling when the time ranges for channels differ
30. Corrected issues with visible grid and associated Y-Axis when a series is deleted
31. Corrected the following issues with the Dyntools Python module:
 - Corrected an issue where "Insufficient access rights" would be displayed as an error when attempting to use an existing out/outx file multiple times
 - Corrected an issue where objects created from the Dyntools Python module could not be deleted

9.7. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. Use of ACCC_PARALLEL and ACCC_PARALLEL_2 will cause a program crash

Chapter 10

PSS®E 34.4 Release Notes

April 2018

This update introduces new functionality, minor enhancements as well as program corrections.

10.1. Program Documentation

PSS®E 34.4 ships with updated PSS®E 34.4 documentation for the following documents :

- Models.pdf - PSS®E Dynamic Standard Model Library
- SC.pdf - Saved Case Data Extraction Subroutines
- API.pdf - Application Program Interface (API)
- DataFormat.pdf - Data Formats Reference Manual

PSS®E 34.4 ships with the PSS®E 34.2 documentation set with the following additions :

- GUI_guide_Addendum.pdf - Documents additions to the user interface
- LineProp_Addendum.pdf - Documents additions/enhancements to the LineProp program
- POM_Addendum.pdf - Documents additions/enhancements to the Node-Breaker and GIC engines

10.2. Program Beta Tests

A PSS®E harmonics module will be beta tested with the initial release of 34.4. If you are interested in participating in a beta test of this functionality please contact support at pti.support.energy@siemens.com making sure to put "Harmonics Beta Test" in the subject line.

The PSS®E Harmonics module contains :

- Integrated spreadsheets for entering and maintaining harmonics data for PSS®E networks
- A harmonics solution engine
- Display of harmonics results in :
 - Results spreadsheets
 - Slider diagrams
 - Plots

A Voltage Violation Check has been added to the DVRM and will be beta tested with the initial release of 34.4. If you are interested in participating in a beta test of this functionality please contact support at pti.support.energy@siemens.com making sure to put "DVRM Beta Test" in the subject line.

The DVRM Voltage Violation Check can be used to analyze the voltage violation for the buses that are contained in the channel output file. Users will be able to input the voltage recovery criteria (voltage recovery threshold and the recovery time) for each bus and perform the voltage violation check. There will be a visual indication of all the buses that have failed the voltage violation check.

10.3. Installation Notes

PSS®E Xpress shortcuts will no longer say "PSS®E Xpress 34" and "PSS®Express GUI Guide". PSS®E Xpress users will only see a "PSS®E 34" shortcut.

The document "Express_GUI_guide.pdf" is always installed in the DOCS folder.

10.4. Program Enhancements

The following program enhancements appear in this release:

1. GIC additions:
 - GIC Module updated to NERC TPL-007-2 standard alpha and beta factors, GIC(t) profile of Benchmark Event and Supplemental Events
 - Added functions to 'gicdata' Python module to facilitate build and use of one GIC data file for a number of grid operation scenarios
 - Automatic GMD storm orientation and strength scan including power flow solution
 - Updated GIC calculation Text/Excel Reports to include Switched Shunts, DC System Shunts and Load Shunts GICs
 - PSSARRAYS exports Switched Shunts, DC System Shunts and Load Shunts GICs
2. IEEE 421.5 dynamic models additions:
 - ST4C
 - ST8C
 - AC9C
 - ST9C
 - AC8C
 - PSS2C
 - PSS7C
3. WECC approved dynamic models additions:
 - Distributed Energy Resources Model DER_A
 - Generic 2-Terminal HVDC Model CHVDC2
4. Numerous improvements to the Node-Breaker topology processor and substation diagram layouts based on testing as part of the NERC-SAMS Node-Breaker modeling task force. They include :

- Remote bus regulation of buses is now supported on Nodes contained within a substation that has been sectioned due to switching operations
 - Node-breaker topology processor messages no longer printed during READ operations
 - Reading in substation data from a RAW file is significantly faster
 - Better handling of isolated branches and buses due to substation topology changes
 - Maximum number of substations and nodes is increased
 - Existing branches can now be converted into system switching devices however use of the Node-Breaker substation model with substation switching devices is strongly encouraged in lieu of the system switching devices
 - Substation switching devices (i.e. breakers, switches within the substation) can now be placed between nodes belonging to different buses within a substation
 - The parent bus section will now always have the lowest bus section number of the bus
 - Substation and Substation Node numbers may be changed from the data sheet dialogs
 - Two new auto-build substation configurations have been added: the "breaker-and-a-half with odd/even nodes in columns" and the "double-bus-single-breaker with odd/even nodes in columns" will create a substation layout that places all odd numbered nodes in a column on the side of main node 1 and all even numbered nodes in a column on the side of main node 2.
5. Dyntools supports outx-type files in processing
 6. Added support for extracting voltage limits from ACC files
 7. Made the three-winding transformer symbol on diagrams smaller for better placement
 8. Slider performance when reading in and panning diagrams has been improved
 9. Slider improvements when cascading updates through related diagram symbols
 10. Added associated bus angle and voltage on Substation Node results spreadsheet
 11. Users can associate a different channel file with each function variable, edit the function from the Plot-Tree after adding and create new functions by multi-selecting channels from several files in the PlotTree
 12. When building a substation, the substation number is automatically defaulted to the first bus added to the station
 13. The Robust Solver can record a script of all operations taken to achieve a solution
 14. Changed the program default on the dynamic "Preclude Run" option from TRUE to FALSE
 15. Undocked windows are now visible upon program startup
 16. GOUT and Station draw functions immediately create diagrams if chosen from the context menu
 17. Added ability to close all open diagrams at once

18. The maximum of allowed islands during contingency operations has been raised from 10 to 20
19. Added API to retrieve INTEGER values for Switched Shunts
20. Added Subsystem API to retrieve REAL values for Substation Nodes
21. Added voltage limit functionality to ACCC_FILE_GET_SUMMARY

10.5. Program Corrections

The following issues have been identified and corrected in this release:

1. There is an issue in PSS®E 34.3 when loading user-written model libraries (i.e. a dll) built in PSS®E 34.0 through PSS®E 34.2. PSS®E 34.3 will also not be able to load such user-written model libraries built in PSS®E 34.4. PSS®E 34.4 can load user-written model libraries built in any earlier release of PSS®E 34. Releases of PSS®E prior to 34.3 will be able to load user-written model libraries built in PSS®E 34.4.

This issue was related directly to the loading of model DLLs and not related to the models themselves, nor to the object files of those models. Additionally, this only affects models that call other PSS®E standard models.

2. Corrected an issue where entire plant could be deleted if one of the machines on a substation bus section was moved to another bus
3. Corrected an issue in which identical switched shunts could end up on two sections of the same bus within a substation
4. Corrected issues with branch and transformer connections between two buses within the same substation
5. Improved the automatic position of radial symbols on diagrams
6. Corrected several issues with animated flows on diagrams
7. Corrected an issue updating VSC DC line results on diagrams
8. Corrected an issue with the dynamic Fact model spreadsheet when the terminal bus = 0
9. Corrected an issue with sorting contingencies on the Incremental Save Case Restore dialog
10. Corrected an issue with filenames in custom toolbar items
11. Corrected issues with styling (color, width etc) on items in diagrams
12. Corrected an issue with creating previous version RAW files where the Nominal and Emergency Min values were reversed
13. Corrected an issue with ADD/REMOVE MACHINE contingencies not updating plant QGEN when changing the status of a fixed Q machine
14. Corrected an issue in the sensitivity analysis reporting
15. Corrected an issue in contingency analysis with tripping a GEN, LOAD or SHUNT

16. Corrected an issue in contingency analysis with removing generators and branches in a single contingency
17. Corrected an issue in the "B" matrix to account for load and shunt changes
18. Corrected an issue where voltage ratings were incorrectly cut off for OTDF reports
19. Corrected an issue in WTTQA1 with the conversion of WPCMND to Turbine base
20. Corrected an issue in DC4B with data checking. Under some circumstances this could cause a crash.
21. Corrected an issue in GEWTGDU1 with JCODE which impacted the correct execution of this model
22. Corrected an issue with AC7CU1 DYDA record
23. Corrected an issue in finding the suspect state number and reporting it for CCT type models
24. Converted some Error messages in ST6B to Warning messages
25. Corrected an issue in the governor droop dispatch model in ACCC

In the ACCC governor droop dispatch model, the generators with the smaller droop make a bigger contribution in the dispatch. PMAX and PMIN are also considered in the ACCC governor droop dispatch.

10.6. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. Approximately only 6 Slider diagrams can be opened at once. This is due to the resource requirements of the improved diagram rendering engine. This constraint is based on screen resolution, so computers with lower resolution displays will be able to open more diagrams at once. This will be corrected in the future by making more internal resources sharable amongst diagrams instead of each diagram requiring its own resources.
2. wxPython programs won't run in the GUI when using Python 3.4
3. Multi-Terminal DC lines will not draw in substation Diagrams
4. It is not possible to use non-ASCII strings with Python 3.4 in PSS®E 34.3.0

Chapter 11

PSS®E 34.3.1 Release Notes

October 2017

This update introduces program corrections.

11.1. Program Corrections

The following issues have been identified and corrected in this release:

1. Corrected an issue causing a slowdown when running automation files
2. Added a file used to compile models that was missing from the installer
3. Corrected an issue restoring an incremental saved case from a filtered list
4. Corrected an issue with using Bus Location files
5. Corrected several issues in recording the exporting of channel data to Excel files
6. Added missing Module chapters to the API manual (PSSPLOT, PSSRDB, PSSARRAYS, PSS®EXCEL, EXCELPY, GICDATA, PSSPIHIST, PSSACCSS)

11.2. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. wxPython programs won't run in the GUI when using Python 3.4
2. Multi-Terminal DC lines will not draw in substation diagrams
3. It is not possible to use non-ASCII strings with Python 3.4 in PSS®E 34.3.0

Chapter 12

PSS®E 34.3 Release Notes

September 2017

This update introduces new functionality, minor enhancements as well as program corrections.

12.1. Program Documentation

PSS®E 34.3 ships with the PSS®E 34.2 documentation set with the following additions :

- DataFormats_Addendum.pdf - Documents additions/changes to the RAW file format
- GUI_guide_Addendum.pdf - Documents additions to the user interface
- LineProp_Addendum.pdf - Documents additions/enhancements to the LineProp program
- POM_Addendum.pdf - Documents additions/enhancements to the Node-Breaker and GIC engines

12.2. Program Enhancements

The following program enhancements appear in this release:

1. Ability to access the LineProp functionality directly from the PSS®E GUI to update line properties within the spreadsheet view
2. Help solve difficult cases using the new “Robust Solution” option added to Loadflow Solutions
3. Node-Breaker modeling introduces support for:
 - Switched shunts
 - Induction machines
 - FACTS devices
 - Two-terminal DC lines
 - Two-terminal VSC DC lines
 - Multi-terminal DC lines
4. Added support for Python 3.x throughout the product. As released PSS®E will work with Python 2.7.13 and Python 3.4.x.
5. GIC additions:
 - Added branch induced voltage type to report
 - Added line shunt GIC flows to report

- Diagrams updated to display GIC flows at additional elements
6. Updated activity IECs to IEC 60909-0, 2016-01 Edition 2.0 standard requirements including:
 - Fault current contributions from Wind Power station units with asynchronous generator, and Power station units with full size converter
 - Wind Power station units with double fed asynchronous generator
 - Power station units with full size converter
 7. IEEE 421.5 dynamic models additions:
 - AC7C
 - DC4C
 - ST6C
 8. Uniform messaging has been applied to all remaining standard PSS®E dynamic models. Messages may be retrieved using APIs or sent directly to Excel for post-processing
 9. Export plots directly to Excel from the PSS®E GUI. This functionality can also be scripted.
 10. Create X-Y Plots directly from the Plotting package
 11. Added Wibu CodeMeter support for hourly licensing schemes
 12. Dynamic models and GIC engine now delivered as separate DLLs for ease in rolling out updates
 13. Environment manager updated to work with Visual Studio version 2017
 14. Improved DYRE messaging for certain models, removed superfluous compile messages
 15. Improved algorithm for calculating differences in floating point numbers for determining whether to record changes
 16. OUT or OUTX file selection/determination is controlled only through selection on the Dynamic Network Options dialog. This should avoid confusion in the type of Channel file actually being created.
 17. In DYRE, if typing in a filename, automatically select file output rather than Report window
 18. When filtering strings on spreadsheets, the use of wildcards, "*", is now supported
 19. Added ability to recover bus locations when reading in a diagram file
 20. Node-breaker topology processor messages no longer printed during contingency analysis

12.3. Program Corrections

The following issues have been identified and corrected in this release:

1. Corrected an issue with LINOUT/LINEND faults

2. Updated headers in several short circuit reports
3. Updated header in PSCOPF report
4. Corrected an issue with post fault voltages for ASCC and IECS
5. Corrected several memory leaks in the LineProp engine
6. Corrected an issue with SBSBSRCL and SBSBSMEM dealing with the length of passed file names
7. Corrected an issue in OLTC1T when writing out data in DYDA
8. Corrected an issue in the DOCU of Miscellaneous Other models
9. Corrected a potential issue when processing substations that have three-winding transformer connections
10. Corrected an issue when calculating Shunt element GICs
11. Corrected an issue creating duplicate branches in the GIC dc network under certain Zero Impedance Line configurations
12. Corrected several issues with the substation reliability assessment dialog
13. Corrected several issues with the DragDropPlotData API
14. Corrected an issue where reading a previous version RAW file directly would generate an error message
15. Corrected an issue where a FACTS device could not be drawn from the network tree view
16. Corrected several issues with filenames not having the correct suffix when saved
17. Corrected several issues with diagram defaults not being preserved
18. Corrected an issue where the default diagram properties dialog would crash without a network or diagram open
19. Corrected an issue where a FACTS device tooltip could cause a crash
20. Corrected a potential crash within the Node-Breaker topology processor when processing substations with three-winding transformer terminal connections
21. Corrected branch and three-winding transformer OPEN TERMINAL contingencies
22. Corrected an issue in which a three-winding transformer would not be included when monitoring by subsystem if at least one of the buses of the transformer was out-of-service.

12.4. Known Issues

The following known issues have been identified and will be corrected in a future release:

1. wxPython programs won't run in the GUI when using Python 3.4
2. Multi-Terminal DC lines will not draw in substation Diagrams

3. It is not possible to use non-ASCII strings with Python 3.4 in PSS®E 34.3.0

Chapter 13

PSS®E 34.2 Release Notes

April 2017

This update introduces several new modules as well as other minor enhancements and program corrections.

13.1. New Modules

PSS®E Parallel Dynamics Module

Automate and speed your dynamics simulations up to 24x.

Small Signal Stability Analysis Module

New small signal stability analysis module replaces NEVA. Faster and able to analyze larger networks.

13.2. Program Enhancements

The following program enhancements appear in this release:

1. Automatic importing of background images from mapping service providers
2. Node-breaker modeling supported in Short Circuit and OPF analysis
3. APIs to convert a bus section to a full network bus and to remove a bus from an existing substation
4. GIC:
 - Thermal impacts are now calculated and can be output
 - DC resistance conversion factors are now taken into account for Branches and Transformers
 - GIC data file additions:
 - Branch Line shunts
 - Switched Shunt
 - Two/Multi Terminal DC
 - VSC DC
 - FACTS Device
 - Load
5. Plotting:
 - Export directly to Excel from a Chart

- Better placement of multiple Y Axes
 - Easier to delete a series from a Chart
 - Axis scaling in X and Y is same as PSSPLT
6. Better initialization for dynamic simulations:
 - Automatic ZSORCE correction with Network Simulation Option
 - Automatic GNET option on STRT to GNET machines which are missing Generator models
 7. Improved characterization of dynamics error messages and new APIs for automatically extracting messages for post-processing and analysis.
 8. Revised composite load model – CMLDxxU2 (xx – BL, AR, OW, ZN, AL)
 9. New governor models offer support for specification of asymmetrical dead-band in speed signal:
 - GGOV1DU
 - IEEEG1DU
 - IEESGODU
 - WESGOVDU
 - WPIDHYDU
 - GASTWDDU
 - GAST2ADU
 - GASTDU
 - HYGOVDU
 - TGOV1DU
 - IEEEG3DU
 - DEGOV1DU
 - PIDGOVDU
 - TGOV3DU
 - HYGOV2DU
 10. The following GE Vendor specific wind models are now supplied as part of the standard PSS®E installation:
 - GEWT2MU1
 - GEWTARU1

- GEWTECU1
 - GEWTGCU1
 - GEWTGDU1
 - GEWTPTU1
11. New APIs to check for duplicate contingency names in DFAX and CON files and during execution of Contingency APIs. Useful when duplicate contingency names can cause confusion in post-processing of results:
 - CHKCNTDUPLICON
 - CHKCNTDUPLIDFX
 - DUPLICATE_CNTLABEL_CHECK
 12. Open/Save dialog initial directory now bases on active document location.
 13. Run automation file dialog uses updated dialog format. "Arguments" button has been relocated.
 14. Animated flow arrows can be scaled.
 15. Transformer connection symbols can toggled on/off.
 16. Diagrams can be "floated" in other monitors with reduced functionality.

13.3. Program Corrections

The following issues have been identified and corrected in this release:

1. Corrected issues with ID errors in commands with DISPATCH, or Bus ID errors on dispatched buses, that could cause the CON file to be out of synch and produce erroneous errors.
2. Corrected an issue with LINOUT/LINEND faults in SEQD.
3. Corrected an issue in setting classical fault conditions related to distributed generation.
4. Corrected an issue in outputting the bus name in Relay data file.
5. Corrected several issues where the DVRM import process would create blank datasets.
6. Corrected an issue in the KIA initialization block in ST7B.
7. Corrected an issue in EXST3.
8. Corrected several issues in REGCA1.
9. Corrected an issue when tapping a line connected to a substation.
10. Corrected an issue when reading in a v33 SAV file.
11. Corrected an issue with PSAS with long filenames.

- 12. Corrected an issue with CLOSE BRANCH contingency cases.
- 13. Corrected an issue in ACCC_FILE_GET_SUMMARY() that could lead to a crash.
- 14. Corrected an issue in the N-1-1 APIs.
- 15. Corrected an issue with overflowing results for Fixed Shunts on diagrams.
- 16. Corrected an issue with display results for N-Term DC elements on diagrams.
- 17. Corrected an issue with creating FACTS Devices on diagrams.
- 18. Corrected several issues with processing PVI/QV result files.
- 19. Updated error returns from ACCC_FILE_XXXX APIs for further clarity.

Chapter 14

PSS®E 34.1.1 Release Notes

November 2016

This update corrects many issues involving program operation as well as introducing several new features and functionalities.

14.1. Program Enhancements

The following program enhancements appear in this release:

1. Improved the Isolate By Breaker operation. Items isolated no longer have their status changed. Only the items used to perform the isolation have their status changed.
2. SAVDSP and SNPDSP now return the full path of the files opened.
3. Improved discovery of equipment and lines on bus-sections in split substations.
4. BRNINT now supports a 'TYPE' string for system switching devices. Will return system switching device type or 0 if not a system switching device.
5. Added automatic contingencies for SINGLE ISOLATE substation switching devices.
6. Added option to control inclusion of transformers in automatic OPEN TERMINAL contingencies.
7. In the DVRM, improved messaging when duplicate contingencies are encountered in ACC results.
8. In the DVRM, improved performance by removing duplicate and non-accessible values from the OUTX and ACC databases.
9. In the DVRM, added time values for max and min frequency tooltips to the OUTX workbooks.
10. Added the ability to select a Node by selecting any column in the Substation Node selector.
11. Added the ability to select a Switching Device by selecting any column in the Substation Switching Device selector.
12. Improved messaging when a non-existent substation node is selected in a Substation Node field.
13. Animated flow arrows now extend along the entire length of "branch-type" elements in diagrams.
14. KML output from diagrams has been re-introduced.
15. Substation Node and Switching Device selectors have been added to the Isolate By Breaker dialog.
16. Added support for Branch-Other type models in the dynamics GUI.
17. Added support for CCT-Other type models in the dynamics GUI.

18. Improved the Custom Toolbar dialog to allow a double-click on an item to automatically move it to the other list.
19. Default grid on a diagram is always shown as dotted lines.
20. Improved the implementation of the default text color.
21. Layers can now be manipulated in the layer manager in any order of operation.
22. Improved the handling of contours and their options.
23. Improved the handling of X axis scaling on plots.
24. Improved processing of the command line.
25. Increased the number of buses and Zero Impedance Lines (ZILS) that can be connected together in a single group from 50 to 200.
26. Toolbars can now be locked and unlocked from the toolbar context menu.

14.2. Program Corrections

The following program errors have been detected and corrected in this release:

1. Corrected several issues in the contingency analysis engine dealing with correctly identifying network elements in substations containing one or more bus-sections.
2. Corrected an issue when Isolating By Breaker in which nodes within a substation were not properly identified for isolation operations.
3. Corrected an issue that could result in Multi-Section Lines contained in a RAW file not being added to the network.
4. Corrected a reporting issue when more than 7 type 3 buses exist in the network.
5. Corrected several issues in the pssaccss Python APIs used to retrieve results from ACC files.
6. Corrected several issues in the RAS API documentation referring to APIs used to retrieve results from ACC files.
7. Corrected an issue in the N-1-1 parallel API resulting from an uninitialized monitored node value.
8. Corrected an issue in the MONITOR NODE VOLTAGE IN SUBSYSTEM definition.
9. Corrected an issue in the Substation Reliability Assessment API that could result in a program crash.
10. Corrected an issue with tripping multi-section lines in the MACCC API.
11. Corrected an issue when monitoring out-of-service branches with the automatic syntax.
12. Corrected an issue in ACC results reporting where the voltage max and min values were reversed.
13. Corrected an issue creating GIC plots.
14. Corrected an issue in LDS3BL in the call to DELAY when checking for breaker time out (the CON index argument should have been JJ+2 instead of J+9)breaker time out.

15. Corrected an issue in SYNAXBU1, input from PLNTBU1 model need not be multiplied by SBASE/MBASE because the signal coming into the SYNAXBU1 model is a voltage signal.
16. Corrected an issue in PVGU1 in checking the CURHVRCR limit.
17. Corrected an issue in Short Circuit where distributed load values were not initialized while setting classical fault conditions.
18. Corrected an issue in the DVRM where some ACC files could not be read during database creation.
19. Corrected an issue where a bad Id string in the Branch, Load, Fixed Shunt, Machine, Induction Machine or Three Winding selector could cause a program crash.
20. Corrected an issue where the unit type, %S or %I, was reported incorrectly for non-transformer branches.
21. Corrected an issue where diagrams were not being updated correctly after an Isolate By Breaker operation.
22. Corrected an issue where branches selected on diagrams were not recognized in the diagram Summation dialog.
23. Corrected an issue in the data record dialogs where an infinite loop of error messages could occur if there was an error in an input field value. Now only output incorrect data message when the Ok button is selected..
24. Corrected an issue with displaying Line shunt symbols on diagrams.
25. Corrected an issue where full file paths were not being retrieved from Zip files.
26. Corrected an issue where read-only temp files were not being cleaned up properly.
27. Corrected an issue where G-Out would sometimes crash on cases that had automatically re-sized memory.
28. Corrected an issue updating SLD files from v33 where kneepoints were reversed causing "twisted" lines.
29. Corrected several issues with licensing LineProp and auxilliary programs.

14.3. Known Issues

The following program issues are known to exist in this release:

1. All parallel contingency APIs are precluded from running if there are substations in the case. The ability for these APIs to successfully operate when bus sections are introduced as the result of Node-Breaker contingencies being executed is still under development.
2. OPF and SC APIs are precluded from running if there are any bus sections in the case. Further development to fully accommodate this situation is currently in progress.

Chapter 15

PSS®E 34.1 Release Notes

June 2016

15.1. Introduction

This release introduces several new modules, licensed separately, enhancements to the contingency engine to recognize new Node-Breaker specific contingencies and well as other minor enhancements and program corrections.

New Modules

This section describes the new modules that are available with PSS®E 34.1.

Data Visualization and Reporting Module

This module, licensed separately, provides users with a powerful data visualizer, capable of revealing trends and problem areas in a network with a series of visual, interactive dashboards that allow the user to “drill” down to the problems in their network.

PSS®E-PSCAD Network Data Conversion Module

This module, licensed separately, directly translates PSS®E network models into high-fidelity PSCAD electromagnetic transients models. Detailed (electromagnetic transients type) machine and HVDC models can then be integrated into this network model for sophisticated analysis.

PSS®E-PSCAD Co-Simulation Module

This module, licensed separately, provides a hybrid simulation interface between PSCAD EMT and PSS®E transient stability applications. Allows complex PSCAD models to communicate with a PSS®E transient stability time-domain simulation. The PSCAD side system equivalent gets updates from PSS®, and the PSS®E side gets updates from the in PSCAD models at each time step. This hybrid simulation allows dynamic system equivalents in PSCAD, more accurate model behavior in PSS®E, and different versions of PSS®E running simultaneously.

Advanced Contingency Analysis and RAS Tools

This module, licensed separately, provides extended tools allowing PSS®E users to perform powerful power flow and contingency analysis customizations, including the ability to model Remedial Action Schemes (RAS) and Special Protection Systems (SPS). Includes fast PSS®E contingency analysis results APIs, contingency results to database APIs, power flow and contingency analysis Python extension framework and functions for complex, user-defined RAS and SPS schemes.

Measurement Interface Module

This module, licensed separately, provides an interface for importing real-time and historic telemetry data from measurement data sources (e.g. PI Historian) into PSS®E. Example use cases are to calculate and set

ambient-adjusted and dynamic ratings in PSS®E for off-line analysis, and to obtain more accurate generation and load profiles.

15.2. Program Enhancements

The following program enhancements appear in this release:

1. Numerous Node-Breaker enhancements including:
 - A. Ability to isolate network elements by breaker. This action systematically travels outward from the item to be isolated until sufficient system or substation breakers are opened to complete the isolation.
 - B. Ability to define the number of levels searched outward into the network when attempting to isolate network elements by system or substation breakers.
 - C. Ability to Restore the network after an Isolate by Breaker action. This operation restores the working network to the state it was in prior to the first Isolate operation, or to the state prior to the first Isolate operation after the previous Restore operation.
 - D. For any bus that is sectionalized, the bus number shown in spreadsheets is always formatted with the bus number and section number. Substation switching devices may now be connected between nodes attached to different buses within the same substation.
 - E. Added the following items to CON file:
 - a. OPEN BREAKER
 - b. OPEN SWITCH
 - c. OPEN TERMINAL
 - d. ISOLATE BREAKER
 - e. ISOLATE SWITCH
 - f. ISOLATE LINE (extended to handle MSL and 3WT)
 - g. ISOLATE BUS
 - h. ISOLATE NODE
 - i. CLOSE BREAKER
 - j. CLOSE SWITCH
 - k. CLOSE TERMINAL
 - l. STUCK BREAKER
 - m. SINGLE/DOUBLE OPEN/ISOLATE TERMINAL FROM BUS
 - n. SINGLE/DOUBLE ISOLATE LINE FROM BUS

- o. SINGLE/DOUBLE/BUSDOUBLE/PARALLEL ISOLATE LINE IN a SUBSYSTEM
 - p. SINGLE/DOUBLE OPEN/ISOLATE TERMINAL IN a SUBSYSTEM
 - q. SINGLE OPEN/CLOSE SWD/BREAKER/SWITCH IN a SUBSYSTEM
 - r. SINGLE STUCK BREAKER IN a SUBSYSTEM
- F. Added the following items to the MON file:
- a. MONITOR VOLTAGE RANGE ALL NODES
 - b. MONITOR VOLTAGE RANGE for a NODE in a SUBSTATION
 - c. MONITOR VOLTAGE RANGE NODES IN a SUBSYSTEM
 - d. MONITOR VOLTAGE RANGE NODES IN a SUBSTATION
 - e. MONITOR VOLTAGE RANGE NODES IN a BUS
 - f. MONITOR VOLTAGE RANGE NODES IN an AREA
 - g. MONITOR VOLTAGE RANGE NODES IN an ZONE
 - h. MONITOR VOLTAGE RANGE NODES IN an KV level
 - i. MONITOR VOLTAGE RANGE NODES IN an OWNER
 - j. MONITOR VOLTAGE DEVIATION ... (same as for RANGE)
 - k. MONITOR VOLTAGE LIMIT ... (same as for RANGE)
2. A new extended form of the Channel file has been created. This extended Channel file contains additional information used for post-processing the Channel files in the Data Visualization and Reporting Module (DVRM). In version 34.X, the dynamic simulation will, by default, generate the standard Channel file, which by default, has an extension .OUT. Users can instruct PSS®E to generate an extended Channel file (.OUTX) file by going to Dynamics> Simulation Options and checking the box "Extended file (.outx)" under 'Channel Output file type. This operation can be recorded in an automation script.
- At version 35, the default file Channel file type will be the extended Channel file, the .OUTX.
- It should be noted that it is not possible to convert a .OUT file to a .OUTX. The .OUTX file contains additional data that is only captured during the simulation, so consideration must be given to the post processing requirements for the Channel file when creating it.
3. Added support for Dynamic Line and Switched Shunt "Other" type models.
4. Added dynamic model REECCU1, electrical control for battery model.
5. Multi-unit plant controller model (PLNTBU1) along with the following associated auxiliary models:
- A. SYNAXBU1 - for interface between PLNTBU1 and synchronous condensers.
 - B. REAX3BU1 - for interface between PLNTBU1 and Type 3 renewable machines.

- C. REAX4BU1 - for interface between PLNTBU1 and Type 4 renewable machines.
 - D. FCTAXBUI – for interface between PLNTBU1 and FACTS devices (STATCON type devices, i.e., devices modeled as FACTS devices in PSS®E power flow).
 - E. SWSAXBUI – for interface between PLNTBU1 and SVC (devices modeled as switched shunt in PSS®E power flow).
6. Playback model (PLBVFU1). This model can be used to play-in known voltage and/or frequency signals for dynamic model validation.
 7. Add monitored substation node information to the ACC file and updated ACC associated Python functions to operate on this information.
 8. Added support in the plotting module for PSSPLT SUBT, TINT and LFTI commands.
 9. GIC leff formulas now use the series winding current direction from Series to Common.
 10. Add Node-Breaker quantities to individual fetch routines.
 11. Created new Node-Breaker subsystem based fetch routines and added routines to iterate through Node-Breaker elements.
 12. Ability to “lock” and “unlock” docked toolbars from the Window menu.
 13. Ability to “exclude” radial and branch elements from “Grow” operations.
 14. Added ability to shift + double click to extend GOUT diagrams.
 15. Added “Fetch” routines to retrieve model data for CCT models. Fetch routines are also supported in Python and IPLAN.
 16. Load, Fixed Shunt and Machine selectors now use a single field for selection, rather than a separate field for the bus and Ids.
 17. Added Results spreadsheets for VSC DC lines, Substations, Substation Nodes, Substation SWDs, N and 2-Term DC lines, Induction Machines, FACTS Devices and 3 Winding Transformers.
 18. The ability to filter spreadsheets has been restored. Spreadsheets are now filtered in place.
 19. Added support for Data Record dialogs from the subtabs of 3 Winding, DC and VSC DC line spreadsheets.
 20. Added ability to draw GIC results on a network map from PSS®E GUI.
 21. Added Efield scanning to the GIC calculation.
 22. Added an option to the Dynamic network options to select DVRM compatible OUTX file creation when creating and writing channels to a channel output file.
 23. Move diagram defaults to a separate dialog to avoid confusion.
 24. Added support for Home directories and Macro support in directory definitions.
 25. Enhancements to Data Record dialogs when changing I/O codes.

- 26. Updated geophysical positioning on diagrams.
- 27. Added the ability to generate substation diagrams from the Tree View and locate substations in planning diagrams.
- 28. The documentation “Launch” page can now be accessed from the Help menu.
- 29. Diagram panning with the arrows on the diagram can be accelerated using the <Shift> and <Ctrl> keys.
- 30. Diagrams pan/“fly” to new views when the view is changed automatically or programmatically.

15.3. Program Corrections

The following program errors have been detected and corrected in this release:

- 1. Corrected an issue causing a program crash when version 32 and previous version Sequence files were written.
- 2. Corrected an issue that could cause a program crash during IECS calculations.
- 3. Updated dynamic model REECA1 to not use the remote bus ICON in order to remain consistent with WECC specs.
- 4. Updated dynamic model SVSMO1T2 and SVSMO2T2 to allow inputting auxiliary signals.
- 5. Updated dynamic model WTPTA1 to regard VAR(L) as input from the plant controller.
- 6. Updated dynamic model TSTGOV1 to fix error in writing DYDA record.
- 7. Corrected several issues in the subsystem engine that could results in invalid subsystem selections and program crashes.
- 8. Corrected an issue with very large MBASE values in RAWD.
- 9. Corrected an issue scaling in GIC maps when the lat and long delta was below a threshold.
- 10. Corrected an issue in psspy.treedat() that could sometimes cause a program crash.
- 11. Corrected an issue in caspy.psslod and caspy.pssbrn with setting arguments that could cause a program crash.
- 12. Corrected an issue in the GIC calculation with find the bus substation of a ZIL buses that were not in the study subsystem.
- 13. Corrected an issue where induction machine contributions were not included in the net bus equipment injection.
- 14. Corrected an issue in sensitivity analysis where sensitivity factors less than the cutoff were not presented.
- 15. Corrected several issues reading previous version PV, QV and ACC files.
- 16. Corrected an issue in identifying wind auxiliary and torque control models during an edit operation.
- 17. Corrected the calculation of substation flows.

18. Corrected the flow direction arrows within substation diagrams.
19. Substation nodes are now correctly placed out of service if they become isolated due the opening of a connected line. They will also be placed back in service if it is no longer isolated.
20. Corrected an issue with selecting Areas, Owners and Zones in Load models.
21. Corrected an issue with adding Branch Other type models.
22. Corrected an issue with displaying ratings on Legends, Branch and 2 and 3 Winding Transformers on diagrams.
23. Corrected an issue with displaying FACTS Device results on diagrams.
24. Corrected an issue ordering items on the Zone spreadsheet if a bus subsystem was applied.
25. Corrected an issue with displaying ratings and updating the reactance on substation SWDs.
26. Corrected an issue with Topology bus numbers appearing in dynamic spreadsheets.
27. Corrected an issue with the DYDA and DOCU dialogs where the wrong model type would get processed.
28. Corrected an issue when saving dynamics data and a "Bus must exist" message appears without being required.
29. Corrected an issue with displaying results on Substations in substation diagrams.
30. Corrected an issue with setting loading percentages on diagrams. MVA and Current as %MVA controls were not correct.
31. Corrected an issue with preserving OPF annotation settings.
32. Corrected an issue with missing Distributed Generation controls on the Load Data Record dialog.
33. Corrected an issue with preserving the Out of Service setting on a diagram.
34. Corrected several issues with printing diagrams.
35. Corrected an issue with double clicking in Output bar windows.
36. Corrected an issue with opening files in a zipped archive.
37. Corrected an automation issue with SETDIAGRESPFLOWOPTIONS_2.

15.4. Known Issues

The following program issues are known to exist in this release:

1. All parallel contingency APIs are precluded from running if there are substations in the case. The ability for these APIs to successfully operate when bus sections are introduced as the result of Node-Breaker contingencies being executed is still under development.
2. There may be issues in N-1-1, MACCC and PSCOPF APIs when executing Node-Breaker Isolate or Open Breaker contingency operations that result in the introduction of bus sections. Further development to fully accommodate this situation is currently in progress.

3. OPF and SC APIs are precluded from running if there are any bus sections in the case. Further development to fully accommodate this situation is currently in progress.
4. The DVRM dialog will generate an error when operations are "chained" i.e. creating a database and then a workbook. The workbook is still created. This message can be ignored for the time being.
5. The LineProp utility does not function correctly. Further development to remedy this situation is currently in progress.
6. Node-Breaker contingencies paired with other contingencies in a contingency block can generate errors. For example a Node-Breaker contingency that resulted in the creation of a bus section followed by a contingency that opened a line could result in an error. Further development to remedy this situation is currently in progress.

Chapter 16

PSS®E 34.0.2 Release Notes

February 2016

16.1. Introduction

This update fixes several issues involving data structures used to operate on substations. If your network .sav files contains substation data, we recommend that you RAWD the case out to a .raw file and then READ the .raw file back in, saving it as a .sav file if necessary. This will update the internal data structures contained in the original .sav file.

Special Installation Note regarding wxPython

Certain functions in the PSS®E user interface and the PSS®E Python™ API rely on the open source wxPython package. At this time, wxPython is not able to be installed along with the PSS®E installer. In order to install wxPython, please use this link:

<http://www.wxpython.org>

Without wxPython installed, the following functions will not work, or will have limited functionality:

- Environment Manager – Used to build user libraries and manage search paths.
- excelexport – Used to export ACC and PV/QV results to Microsoft® Excel from PSS®E.
- plot2word – Used to export plots to Microsoft® Word. wxPython is only for certain plotting capability.
- dyntools – Used for dynamics simulation plot analysis. wxPython is only for certain plotting capability.
- pssarrays – Used for post-analysis of ACC and GIC results files. wxPython is only needed for certain GIC-related functionality.

For further information regarding finding and installing Python™ modules used by PSS®E, please see the Updating Python and its modules: Installation Guidelines page available via the following link:

ReadMePYinstall.pdf

16.2. Program Enhancements

Engine Updates

- PSS®E Environment Manager has been updated to 7.0.1 to address all known issues.
- Updated progress output messages from the topology processor.
- Network elements connected to Bus Sections are now reported in their correct order throughout all PSS®E reports.

- Improvements in Python Dyntools module to aid in inserting plot files into Word documents.
- XFRINT now supported SIDCOD to return the controlled bus side code.
- Subsystem fetch routine, GET_VSC_DC_CONV_TYPES and related routines modified to recognize Bus Sections.
- Subsystem fetch routine, GET_TWO_TERM_DC_CONV_TYPES and related routines modified to recognize Bus Sections.
- Subsystem fetch routine, GET_MULTI_TERM_DC_CONV_TYPES and related routines modified to recognize Bus Sections.
- Subsystem fetch routines for induction machines modified to recognize Bus Sections.
- Subsystem fetch routines for returning flows modified to recognize Bus Sections.
- Subsystem fetch routine, GET_GET_FACTS_BUS_TYPES and related routines modified to recognize Bus Sections.
- Updated all example Python files to fix issues and allow improved un-attended operation.

GUI Updates

- Preselect the station number in substation selector so that hands don't have to move from keyboard to select for edit.
- Added support for the machine selector from the Id cells in the OPF Generator Reactance and Reserve spreadsheets.
- Added support for the machine selector from the Bus and Id cells in the NCSFCC spreadsheet.
- Delayed import of several Python modules until actually required. This should eliminate startup errors for Python modules that are not required for the basic operation of PSS®E.
- Improved layouts for automatically generated substation diagrams.
- Improved import of v33 diagrams. Branch symbols are now correctly added and layer assignments preserved.
- Improved creation of PSS®E34.grd file to prevent conflicts with future updates.
- Improved the range checking on decimal fields in dialogs.

16.3. Program Corrections

Engine Updates

- In WECCDS, fixed an issue when converting WTDTA1 when Kshaft is zero.
- Fixed an issue when the zero-sequence factored matrix was bigger than the positive sequence matrix.
- Fixed an issue with incorrectly referenced substation nodes. This would occur when a great number of substations are present in the case with isolated elements.

- Fixed several issues with three-winding transformers in a substation when topology changes are introduced through switching actions.
- Fixed a sorting issue with branches when the bus output option was set to Names.
- Fixed an issue reporting a bus number that was JOINed.
- Fixed an issue that prevented identifying wind auxiliary and wind torque control models during model edits.
- Fixed an issue with changing the Model Status for CCT models.
- In OLTC3T, OLPS1T, OLPS3T, OLTC1T, fixed an issue that was causing problems when doing DYDA or DOCU using a .snp file which was paused during a simulation run.
- Fixed issues with Python pssaccss module when reading .acc, .pv and .qv files.
- Fixed an issue with flow direction in the calculation of effective GIC of auto transformers.
- Fixed several issues with DISPATCH commands in contingency analysis.
- Fixed several issues recognizing Bus Sections in two and three-winding transformer fetch routines.

GUI Updates

- Fixed selection issues with Load, Fixed Shunt and Machine selectors. Selectors could crash if a bus sequence number of zero was passed to them.
- Branch selector was not handling MSL selection properly.
- The configuration file builder was not writing out real number with a "." decimal point as recognized by the contingency engine.
- Fixed issues displaying terminal connections on switched shunt spreadsheet.
- End location for tapping a line were reversed when the additional bus was added.
- Fixed several issues dealing with transformer data in the GIC transformer data spreadsheet.
- Model boxes used to identify the presence of associated dynamic models were not displayed in GOUT diagrams.

16.4. Bug Fixes

Engine Updates

- Resolved an issue in AccBrwsGrid.exe when reading a v33.6 and 32.2.4 .acc file.
- Resolved a problem with OPF Bus Shunts when changing data through the API and utilizing default values.
- Resolved an issue where very large sensitivities were showing up on Slider diagrams displaying OPF results.
- In PSS4B, use VAR(L+4) instead of VAR(L+3).
- In WTTQA1, WNDSP4 was not being converted to the proper base (Torque controller base) before being used in MODE 2 and 3.

- Fixed several issues discovered when deleting substations.
- RDCH had issues when reading in data changes to equipment associated with a Bbus S-section.
- RAWD and LIST incorrectly exhibited star point buses for cases with 3-winding transformers and substation Bus Sections.
- PURGSHUNT() and PURGLOAD() could crash or enter an infinite loop.
- Tapping a line that is connected to nodes at one or both ends could result in an error.
- Validation of a fault in the substation reliability API was using the wrong connection index.
- System mismatch, SYSSM and related routines, calculated mismatch incorrectly at buses that contained Bbus Ssections.
- Several utilities could not read .acc files created in v33.6 and v32.2.4.

GUI Updates

- Changes to RateC from the Node-Breaker Switching Device spreadsheet were not getting saved.
- Results for VSC and Two-Term DC lines were not displayed correctly on diagrams.
- Wrong bus voltage was displayed on substations in substation diagrams.
- Wrong bus voltage was displayed on substation nodes in substation diagrams.
- Results for FACTS devices could be displayed on diagrams wrong depending on whether they were series or radial devices.
- The wrong converter numbers were displayed when bringing up the dialog to change annotation for VSC and Two-Term DC lines.
- Check diagram could fail if Bus Sections were present in the network.
- Selecting model from the Model Box on a diagram could select the wrong model for edit.

Chapter 17

PSS®E 34.0.1 Release Notes

September 2015

17.1. Introduction

This release of PSS®E includes major modeling enhancements, usability enhancements, and program corrections, particularly for the new Node-Breaker functionality.

17.2. Special Installation Note regarding wxPython

Certain functions in the PSS®E user interface and the PSS®E Python™ API rely on the open source wxPython package. At this time, wxPython is not able to be installed along with the PSS®E installer. In order to install wxPython, please use this link:

<http://sourceforge.net/projects/wxpython/files/wxPython/2.8.12.1/wxPython2.8-win32-unicode-2.8.12.1-py27.exe/download>.

Without wxPython installed, the following functions will not work, or will have limited functionality:

- Environment Manager – Used to build user libraries and manage search paths.
- excelexport – Used to export ACC and PV/QV results to Microsoft® Excel from PSS®E.
- startin – Used to set the working directory for PSS®E.
- plot2word – Used to export plots to Microsoft® Word. wxPython is only for certain plotting capability.
- dyntools – Used for dynamics simulation plot analysis. wxPython is only for certain plotting capability.
- pssarrays – Used for post-analysis of ACC and GIC results files. wxPython is only needed for certain GIC-related functionality.

For further information regarding finding and installing Python™ modules used by PSS®E, please see the **Python Modules used by PSS®E Python Utilities** page available via the following link:

<http://w3.usa.siemens.com/smartgrid/us/en/transmission-grid/products/grid-analysis-tools/transmission-system-planning/Pages/PythonModules.aspx>

17.3. Program Enhancements

- Added information message if model could not be added due to conflict between machine type and model type (for example, Wind or Non-Wind machine).
- Default names for substation and substation nodes are enforced.
- Dynamics data files can now be opened directly, just as other network files are.

- Improvements to substation layout algorithms for cleaner automatic layouts.
- For substation terminal records in the RAW file, the TYP field can be either '2' or 'B' for non-transformer branches and two-winding transformers (for readability).
- On RAW file generator records, when <4 owners are specified in the case and has Wind machine data specified, the string ",0,1.0" is written as default owner number and owner fraction values rather than ",, ".
- Separate UNDO buffers are maintained for each active diagram for better UNDO behavior.
- Substation numbers can now be up to 6 digits to align with bus number length.
- Now able to specify no ShortCircuit output file by entering the SCFILE filename as "nooutput"
 1. When an actual SCFILE is specified:
 - a. Create contributions reports to TEMP files as calculation progress.
 - b. Create total fault current reports using SCFILE so that all fault types are reported together for each bus when cases have MOVs. This is the way the program has always operated .
 2. When the SCFILE is "nooutput":
 - a. Create all reports without needing SC results file - create report as calculation progress. Added in PSS®E 33.6 and later to allow not writing SC results file.
 - b. Case without MOV - report output will look exactly as in (1) as they always did. 3PH, LG, LLG, LL total fault currents reported together.
 - c. Case with MOV - report output will look different 3PH, LG, LLG, LL total fault currents reported separately, because that's how calculations are done. For example, PH3 bus fault, PH3 LINOUT and PH3 LINEND faults applied and their reports created.

17.4. Program Corrections

- 3 winding transformer connections in GOUT and substation diagrams have been improved.
- Added initialization of dynamics models WNDSP4 in WTTQAU1.
- An increased number of diagrams that contain large embedded images can now be opened at once. The number available to open depends on system resources and image size.
- Added better error handling and reporting when importing PSS®E Python modules.
- Added better search performance for Study files.
- Bus data values changed on any substation bus section are now reflected on all the bus sections associated with that bus.
- Bus sections created through switching operations on substations are now reported in correct ascending numerical or alphabetical order.
- Busbars that are aligned vertically or horizontally now display link connections between them in a more consistent manner.

- Diagram grid style is now accurately displayed on the diagram.
- Fixed an issue with the length of the name displayed in the spreadsheet for the DC, VSC and FACTS devices.
- Fixed formatting on numerous reports to support by Node-Breaker bus section reporting.
- Improved the GENTPJU1 model output formatting.
- Addressed the situation when a diagram was opened before the associated save case and results on the diagram would not appear.
- Improved the process of unzipping and locating files contained in a Study zip file.
- Improvements have been made to editing arguments in the Study editor dialog.
- Improvements in searching for files contained in a Study.
- Improvements made to the process of unzipping a Study file.
- Improvements made to search functions for loading existing substation diagrams associated with a case.
- Issues with the Study Files Tree View have been fixed.
- Line mode help is now directed to the Progress window rather than a report.
- Multi-section line toggling now performs as expected.
- Plant data on a bus section can now be properly changed.
- Data changes on a bus in a substation are now propagated to all bus sections associated with that bus.
- The PSS®E34 EXAMPLE folder path can now be accessed by Python through the variable EXAM_PATH.
- The REGCAU1 model DOCU format has been improved.
- Station bus symbols in substation diagrams now accurately reflect the correct voltage limit coloring and line style.
- Substation Node numbers can now be changed.
- The substation spreadsheet can now display all buses associated with the substation.
- Substations can now be deleted.
- Substations numbers can now be changed.
- Fixed an issue in the SVSMO3U1 model with deadband checking.
- Fixed the SVSMO3U2 description for ICON(M+2), and fixed an issue with deadband checking.
- The dialog to open an Incremental Save Case did not always work correctly. This has been fixed.
- Issues with handling the full pathname for loaded model libraries is now fixed.
- The Multi-Section line reporting toolbar button has returned.

- The per-unit voltage of the parent bus displayed at a Substation Node is now directly related to the Bus Section base voltage.
- The VPERHZU1 model is now categorized as Machine Protection rather than Machine Other.
- When a diagram is open, the diagram now automatically zooms to the extents (fits the full diagram in the viewing area).

17.5. Bug Fixes

- Fixed an issue where adding a DC or VSC DC line interactively in a diagram would result in a crash.
- Fixed an issue where annotation labels could not be added to a diagram when Bind Mode is off.
- Fixed an issue where automated printing of more than one PV curve at a time did not work.
- Fixed an issue where bringing up the OPF interface flow dialog would sometimes crash the program.
- Fixed an issue where clicking on a 3-winding transformer on a diagram would not always yield the correct spreadsheet/data record entry.
- Fixed an issue where the contour flag was always set to true even if the user canceled out of the dialog.
- Fixed an issue where creating a diagram for a substation that contained two buses, each attached to a leg of a common 3-winding transformer, would result in a crash.
- Fixed an issue where creating a new Summation on a diagram did not work.
- Fixed an issue where default Short Circuit data on the Load data record dialog was not getting set correctly.
- Fixed an issue where the Drag and Drop operation from the Study Tree would not always work correctly.
- Fixed an issue with models with a negative NUMTRM value.
- Fixed an issue where an automatically built ring bus of only 2 nodes required 2 switching device links between them.
- Fixed an issue with INTFLW model MODE 1 and 6 operation.
- Fixed an issue in the ADD_CCTBRNOMOD_MODEL() API.
- Fixed an issue where the length of the argument strings passed when opening files was calculated incorrectly.
- Fixed an issue where the links were not always attached correctly when copying and pasting items on a diagram.
- The machine contributions are now properly included in the substation flow calculation. Previously was using whatever flow was calculated from another load, shunt device or branch element connected to the same bus within the substation.
- Fixed an issue where moving items with IDs did not honor the ID entered in the dialog.
- Fixed an issue where opening a new Plotbook without any other windows open caused a crash.

- Fixed an issue where the Out-of-Service option is not read correctly from the .pssxml file.
- Fixed a problem in RMAX and RMIN handling in the GET_TWO_WINDING_DATA_5 and TWO_WINDING_CHNG_5 APIs.
- Fixed an issue where renamed Studies did not stay in the same location in the Study Tree View after being renamed.
- Fixed an issue where, in the REPCAU1 model, Pbrnch was not getting set correctly, as well as an error in MODE 4. Also fixed description for ICON(M+6) and remote bus checking.
- ThevZ is now reported for each fault type separately for cases with MOVs.
- Fixed an issue where results coloring on diagrams would not always accurately reflect the state of the network.
- Fixed an issue where rotation of items on diagrams sometimes did not work as expected.
- Fixed an issue where splitting a bus that has bus sections and attached machines results in a crash.
- Fixed an issue where the SVSMO1U1, SVSMO1U2 and SVSMO2U2 models POD signal added incorrectly and the MVAR in VAR(L+28) was calculated incorrectly.
- Fixed an issue where tab names on some spreadsheets was being displayed as "Network Data".
- Fixed an issue where the Print Preview presentation did not always accurately reflect what was being printed.
- Fixed several issues reading PV/QV results files.
- Fixed an issue reading SVSMO3T2 model DYRE data.
- Fixed issues where Unicode characters in filenames caused issues in Python files.
- When converting from a V34 file to a previous RAW version, bad data could result if not all values on 3-winding transformer records: 3, 4 and 5 were entered.
- Fixed an issue where, when multiple machines at a bus are moved to bus sections, associated plant data was not always updated correctly.

17.6. Compiler Information

General Information

PSS®E 34 is built using the Intel® Parallel Studio XE 2015 Composer Edition (Intel® Visual Fortran, or IVF, 15.0) compiler and the Microsoft® Visual Studio 2013 (Microsoft® Visual C/C++ 12.0) compiler. This is the recommended platform to use for building user-written extensions to PSS®E 34, such as CONEC, CONET, and user-written dynamics models. Fortran code must be compiled with IVF 10.1 or later. Intel® Parallel Studio comes with a Visual Studio Shell, which will work with PSS®E 34 as well. When using a version of IVF other than 15.0, please be aware that the later run-time libraries must be used. The PSS®E Environment Manager, which is delivered with PSS®E 34, or can be downloaded from our website, can be used to build extension libraries for PSS®E or assist with maintaining environment variables associated with controlling the compiler versions in use.

17.7. Additional Notes

A compiler is not required to run PSS®E because the Fortran and C run-time libraries are included with PSS®E. A compiler is required only if you are compiling CONEC and/or CONET, user-written dynamics models, or programs that call USRCAS.

Intel® has offered a special discounted upgrade fee to Siemens PTI customers. To purchase either the upgrade or a new license of IVF compiler under this offer, you must contact Frankie Terlecki at frank.terlecki@intel.com. Please be sure **Siemens PTI customer** is included in the subject line.

17.8. User-Written Model Notes

Since PSS®E 31, DC line and FACTS devices are identified by 12 character device names instead of numbers. To retain backward compatibility of old Saved Case files, device names are now set to the old device number left-justified, for example, 1 becomes "1 ". However, User-Written models of these devices that are called in CONEC and/or CONET will have to be modified to map the old device number to its corresponding new internal device index. If you have any questions, please contact PSS®E support at <https://siemens-energy.secure.force.com/pti>.

17.9. Program Documentation

Documentation can be found in the DOCS folder in the PSS®E 34 installation directory.

17.10. Important Compatibility Notes

The following items address issues with backwards compatibility:

- PSS®E 34 SAV files are not compatible with previous versions of PSS®E.
- PSS®E 34 SNP files are not compatible with previous versions of PSS®E.
- PSS®E 34 SLD files are not compatible with previous versions of PSS®E.

Chapter 18

PSS®E 34.0 Release Notes

April 2015

18.1. Introduction

This release of PSS®E includes major modeling enhancements, usability enhancements, and program corrections. In particular, the introduction of integrated Node-Breaker modeling, combined with your existing Bus-Branch models, will give you a new level of analysis capabilities.

18.2. Special Installation Note regarding wxPython

Certain functions in the PSS®E user interface and the PSS®E Python™ API rely on the open source wxPython package. At this time, wxPython is not able to be installed along with the PSS®E installer. In order to install wxPython, please use this link:

<http://sourceforge.net/projects/wxpython/files/wxPython/2.8.12.1/wxPython2.8-win32-unicode-2.8.12.1-py27.exe/download>.

Without wxPython installed, the following functions will not work, or will have limited functionality:

- Environment Manager – Used to build user libraries and manage search paths.
- excelexport – Used to export ACC and PV/QV results to Microsoft® Excel from PSS®E.
- startin – Used to set the working directory for PSS®E.
- plot2word – Used to export plots to Microsoft® Word. wxPython is only for certain plotting capability.
- dyntools – Used for dynamics simulation plot analysis. wxPython is only for certain plotting capability.
- pssarrays – Used for post-analysis of ACC and GIC results files. wxPython is only needed for certain GIC-related functionality.

For further information regarding finding and installing Python™ modules used by PSS®E, please see the **Python Modules used by PSS®E Python Utilities** page available via the following link:

<http://w3.usa.siemens.com/smartgrid/us/en/transmission-grid/products/grid-analysis-tools/transmission-system-planning/Pages/PythonModules.aspx>

18.3. Program Enhancements

Node-Breaker Modeling

Version 34 introduces fully-integrated Node-Breaker modeling into the power flow and contingency analysis engines. Creation and manipulation of detailed substation Node-Breaker data is fully incorporated into

the PSS®E engine, network data spreadsheets, and single-line diagrams. During switching studies and contingency analysis, the creation and management of topology buses, presented as bus sections, is fully automated and controlled by the engine.

New Network Size Level

The maximum number of buses in a network has been increased from 150,000 to 200,000 buses. Other element size levels have been increased as well. For details, please refer to Table 3.1 in The Program Operation Manual.

Updated Study File Management System

The integrated Study File Management System (formally known as Scenarios) has been revamped to make file management much easier. You can create a study file collection (called a Study) and manage these files in the Study Explorer located in the tree view.

Character ICON Size Increased to 12 Characters

The maximum length of a character ICON has been increased from 2 characters to 12. This will allow the names of devices, such as DC lines and FACTS, to be passed to models directly without need for manipulation.

Accessing Phase Voltages for Wind Machine controls

Provision has been made in the PSS®E engine to access phase voltages which can potentially be used in wind model control logic.

In-feed Modeling Machines

A new machine type **In-feed** has been added. An In-feed type machine is one for which the machine P and Q are fixed. These can be used for modeling fixed injection from an external system.

Updated Transformer Impedance Correction Tables

Transformer impedance tables have been updated to now allow 99 defined points, as well as real and imaginary pairs for transformers that require them.

Ability to Merge Multiple Contingency Results Files

A new API has been created to allow the merging of separate *.acc results files into a single file for reporting and processing. This API is also available interactively.

New Contingency Types to Support Node-Breaker Modeling

Several new contingency definitions have been added to the CON file specification to leverage Node-Breaker substation models. Breakers can be opened, closed and isolated. Node voltages and breaker flows can also be reported using new MON file additions.

No Separate Executable Needed for Parallel Contingency Analysis

PSS®E Parallel Contingency Analysis allows the simultaneous use of up to 24 cores to improve the performance of contingency analysis. Version 33 required a separate executable in order to use parallel processing for contingency analysis. This separate executable is no longer needed in version 34.

Increased Customizable Ratings Sets

The number of ratings available has increased. There are now twelve customizable ratings sets that can be given custom names and descriptions.

Branch Names

All ac lines, two-winding transformers, and three-winding transformers can have names up to 40 characters long. Names can be blank, however all non-blank names must be unique within the case for future name-based identification.

Modeling Distributed Generation on Load Feeders

Distributed generation (for example, rooftop PV) can be modeled as part of the load data. For details please refer to Power Flow Load data record in the **Data Formats Reference Manual**.

Solution Parameters in SAV and RAW Files

Solution parameters are now saved in the SAV and RAW files, along with the last known solution method, so that the power flow solution embedded in a SAV or RAW file can be recreated exactly when reloaded or shared.

Solution Parameters in SEQ File

Short circuit solution parameters are now saved in the SEQ file, so that the short circuit solution can be recreated exactly when reloaded or shared.

Updated RAW, SAV, and SEQ File Converters

All file type converters have updated to handle conversions between version 33 formats and version 34 formats for full backwards compatibility with many previous versions.

Sequence File Additions

The following additions have been made to the SEQ file:

- Generator phase angles
- Non-conventional source fault contributions (NCSFC)

ASCC Analysis Additions

The ASCC function now supports non-conventional source fault contributions (NCSFC).

Geomagnetic Induced Currents (GIC) Module Additions

The GIC module engine now supports:

- Field scaling
- Non-uniform field calculation

WECC Model Support

PSS®E 34.0 supports the current WECC PSLF power flow, as well as dynamic data conversion up to version 19.

Plotting Function Additions

PSS®E PlotPackage now supports the following PSSPLT functions:

- RANG (range calculation)
- SLCT (channel selection function)
- FUNC (custom function definitions)

Results Spreadsheets

PSS®E now provides spreadsheets for displaying subsystem-based results for several major data categories. Results may be exported directly to a CSV file or to Microsoft® Excel. The data categories that are currently supported include Buses, Plants, Machines, Loads, Fixed Shunts, Switched Shunt, AC Lines, Areas, Owners, and Zones. Areas, Owners, and Zones include aggregate information, such as total load and generation.

New Dynamics Models

The following models have been added to the PSS®E simulation model library:

New IEEE 421.5 Models available in V34	Governor Models for V34 (Pratt and Whitney Turboden turbine-governor)	Machine Protection Models for V34 (V/Hz Generator Relay Model)
ST1C ST5C ST7C AC1C AC2C AC3C AC4C AC5C AC6C DC1C DC2C AC6A	PWTBD1	VPERHZU1

All the models can be used in the standard state-space simulations only.

Additional Dynamics Changes

The dynamic simulation options (Dynamics>Dynamic Simulation Options) functionality has been enhanced to allow for the following:

- Ability to select some of the options on a subsystem basis.
- Ability to monitor and trip if the condition is violated.

- Scan generators exceeding speed deviation threshold.

Additional GUI Changes

The main network spreadsheet has been reorganized to group common spreadsheets into tabs, allowing for quick selection between spreadsheets.

Diagrams have been optimized for performance. Line elements, such as branches and DC lines, now include a **branch** symbol along their length.

Diagram properties and annotation dialogs have been reorganized, providing consistent presentation.

Global Settings and Preferences

Additional changes have been made to allow single-line diagram defaults and settings to be imported and exported to external XML configuration files. This allows a user to take many of their program settings to another computer and configure PSS®E to operate in the manner in which they are accustomed.

Silent Install for Automated Installations

PSS®E can now be installed silently using a script, thereby allowing administrators to push the installation of PSS®E to network machines. If you are interested in setting up a silent install for PSS®E 34 on your network, please contact PSS®E support.

Updated Environment Manager

The PSS®E Environment Manager can now be used for:

- Compiling and linking user models to create User Model DLLs (*.dll).
- Compiling and linking user models to create User Model static libraries (*.lib).
- Setting the Windows Environment to enable compiling and linking of user models.

Running PSS®E Outside of the GUI with Python™

When running PSS®E from an external Python™ interpreter, it is no longer necessary to add the PSSBIN path to sys.path or to os.environ['PATH']. Simply include the following import statement to your Python script file:

```
import PSS®E34
```

After this import statement, psspy, pssarrays, dyntools, excelpy and other PSS®E modules can safely be imported and used.

A Note on the New Licensing System (WIBU CodeMeter)

Despite information published in previous months, the new licensing system (WIBU CodeMeter) will not be mandatory for running PSS®E 34.0. The current SafeNet Sentinel dongles will continue to work for V34.0 and previous versions.

18.4. Known Issues

Due to the complexity of moving to a Node-Breaker model within PSS®E, there are still a few known issues with program operation when Node-Breaker data is present. These issues will be resolved in future releases.

- When a node becomes de-energized through switching operations, all connected radial equipment (loads, machines, shunts, etc.) will be taken out-of-service and the original state of the equipment is lost. When the node is reenergized, all of these radial devices will be switched to in-service, regardless of their original in-service state. In a future release, the original state of the equipment will be restored when nodes become de-energized and reenergized.
- Not all bus-branch contingencies can be automatically converted into equivalent Node-Breaker contingencies in contingency analysis at this time.
- The OpenByBreaker APIs are temporarily disabled due to unresolved issues. .
- Although node voltage monitor definitions can be added to the MON file, the node voltage results are not yet added to the ACC output file. The node voltage contingency results are included in the text reports however.
- There is an issue that may cause a crash while using the graphical difference display (GDIF) when bus sections are present because of Node-Breaker switching.
- Spreadsheet column filtering is temporarily disabled due to an unresolved issue. The spreadsheets can still be filtered when defining bus subsystems.
- Some temporary files may show up in the Discover Files list in the Study Explorer.
- You may see a Runtime Library Error message when starting PSS®E. This does not indicate an actual problem and can be ignored.
- The OPF and Short Circuit engines do not currently recognize Node-Breaker data.
- Running a tie line comparison, API DFTI API, will result in a program crash.
- Exporting PV/QV results using pssarrays can result in a crash.
- Due to changes in the Slider rendering engine, imported images will not appear in 34.0.0 diagrams.

18.5. Compiler Information

General Information

PSS®E 34 is built using the Intel® Parallel Studio XE 2015 Composer Edition (Intel® Visual Fortran, or IVF, 15.0) compiler and the Microsoft® Visual Studio 2013 (Microsoft® Visual C/C++ 12.0) compiler. This is the recommended platform to use for building user-written extensions to PSS®E 34, such as CONEC, CONET, and user-written dynamics models. Fortran code must be compiled with IVF 10.1 or later. Intel® Parallel Studio comes with a Visual Studio Shell, which will work with PSS®E 34 as well. When using a version of IVF other than 15.0, please be aware that the later run-time libraries must be used. The PSS®E Environment Manager, which is delivered with PSS®E 34, or can be downloaded from our website, can be used to build extension libraries for PSS®E or assist with maintaining environment variables associated with controlling the compiler versions in use.

Additional Notes

A compiler is not required to run PSS®E because the Fortran and C run-time libraries are included with PSS®E. A compiler is required only if you are compiling CONEC and/or CONET, user-written dynamics models, or programs that call USRCAS.

Intel® has offered a special discounted upgrade fee to Siemens PTI customers. To purchase either the upgrade or a new license of IVF compiler under this offer, you must contact Frankie Terlecki at frank.terlecki@intel.com. Please be sure **Siemens PTI customer** is included in the subject line.

User-Written Model Notes

Since PSS®E 31, DC line and FACTS devices are identified by 12 character device names instead of numbers. To retain backward compatibility of old Saved Case files, device names are now set to the old device number left-justified, for example, 1 becomes "1 ". However, User-Written models of these devices that are called in CONEC and/or CONET will have to be modified to map the old device number to its corresponding new internal device index. If you have any questions, please contact PSS®E support at <https://siemens-energy.secure.force.com/pti>.

18.6. Program Documentation

Documentation can be found in the DOCS folder in the PSS®E 34 installation directory.

18.7. Important Compatibility Notes

The following items address issues with backwards compatibility:

- PSS®E 34 SAV files are not compatible with previous versions of PSS®E.
- PSS®E 34 SNP files are not compatible with previous versions of PSS®E.
- PSS®E 34 SLD files are not compatible with previous versions of PSS®E.