



RELEASE NOTES FOR ALL PRODUCTS

ARTEMIS | EFPGASIM | RT-EVENTS | RT-LAB | RT-XSG

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ARTEMIS

Version 7.1.4

- Compatibility with RT-LAB 11.1.4
- New multi-rate stubline demo available
- Add message on how to access demos at MATLAB opening
- 3-level NPC TSB-type inverter: ground is now implicit
- IEEE 39 bus 10 machine demo is now accessible
- Improved HELP for Standard to SI conversion routine of synchronous machine
ssn_SynchronousMachine_STD2SI_conversion.m
- RT-LAB snapshot support for Artemis/SSN. Note that this does not yet include support for RT-EVENTS or the SPS S-Function called sfun_discreteVariableDelay. ARTEMiS Distributed Parameters Line is supported but not its SPS counterpart. The sfun_discreteVariableDelay S-Function is used in the following SPS library blocks, in powerlib_meascontrol/Measurements: Fundamental(PLL-Driven), Mean(Variable Frequency), Positive-Sequence(PLL-Driven), Power (PLL-Driven, Positive-Sequence) of the Measurement blocks; and also in powerlib_meascontrol/PLL blocks

Version 7.1.3

- Compatibility with RT-LAB 11.1.3

Version 7.1.2

- Compatibility with RT-LAB 11.1.2
- New method on setting initial conditions in SSN.
- SSN group tag issue corrected in SSN listing.
- IEEE 39 bus, 10 machines model available in stable version (R2015a+ only)

Version 7.1.1

- Compatibility with RT-LAB 11.1.1
- Correction to SSN solver 'art5 with backward euler nodal interface' to linearly integrate internal group sources.
- ARTEMiS on-line Help system working again.

- IEEE 39 bus, 10 machines model available (in development, R2015a+ only)

Version 7.1.0

- Compatibility with RT-LAB 11.1.0
- General upgrade of all demo models and description
- Improved switch iteration method capable of simulating 18-pulse diode rectifier demo
- New SSN option to guide in the NIB type choice
- New HVDC solid-state transformer demo.
- IEEE 34 node distribution demo improved with coupled lines.
- Bug correction: SSN machine models now display correctly.
- ARTEMiS saturation method based on flux is now optional.
- 'Known issue: a bug is preventing the ARTEMiS Help system to be accessed directly from several blocks. This help documentation can be accessed manually in the ARTEMiS installation, located here:
'~\art_help\pdf\ARTEMIS_User_Guide.pdf'.

Version 7.0.5

- Added workaround so that demo examples are now viewable in Matlab Help for R2015a Service Pack 1.

Version 7.0.4

- Compatibility with MATLAB R2015a Service Pack 1.
- Compatibility with RT-LAB 11.0.8.
- Solved an important issue related to the parallelization of SSN calculation. All RT-LAB versions between 11.0.0 and 11.0.7 experienced an increased calculation time when using the in-step parallelization feature of SSN. RT-LAB 11.0.8 and ARTEMiS 7.04 solve this issue.
- Solved issue related to re-ordering of SSN User custom groups.
- Solved .map issue that prevented compilation under RT-LAB 11.0.7.
- Upgraded SSN demo: DFIM wind-turbine snubberless induction machine and crowbar protection.
- Upgraded SSN demo: 9-level inverter with low harmonic multi-winding feeding transformer.
- Upgraded SSN demo: Train Traction Drive using 3-level NPC inverter and PMSM.
- Upgraded SSN demo: 48-pulse GTO STATCOM using SSN and high-impedance capable 3-level TSB inverters.

- New SSN distribution grid demo based on IECON-2016 paper.

Version 7.0.3

- Compatibility with MATLAB R2014b.
- Added new SSN Snubberless Synchronous Machine model with saturation. Comes with a separated routine to convert PU standard parameters to SI.
- Added new SSN Snubberless Asynchronous Machine model (Single-Fed and Doubly-Fed).
- Added new SSN Snubberless PMSM Machine model.
- Added new SSN Snubberless demo section.
- Re-organization of wideband line/cable routines. New entry script is called EMTP2SSN_WideBand.m.
- Bug correction in conversion routines for FD-line model using cables.
- Naval combat survivability testbed model upgraded using latest TSB and SSN. Model name is ssn_NavalCombatSurvivalTestbed.mdl.
- SSN OLTC correction of S-function builder command. Command now points to gcb instead of bdroot.
- Added new 3-level NPC inverter TSB model in ARTEMiS Custom Models library. This 3-level NPC model supports high-impedance modes and has no SPS switches inside like the 2-level TSB newgen.
- Alternative version of SSN OLTC made without S-function (like all snubberless SSN machine models).
- Added version compatibility table with RT-LAB.
- Added conversion file to directly read an EMTP-RV Wideband fitting file into SSN and therefore bypass the standard SSN Wideband fitter. Note that ARTEMiS still need EMTP-RV to compute the cable/line RLC matrices as a function of frequency.
- Modified SSN floating subnetwork routine to be more selective.
- Known limitation: Wideband line model does not support complex poles for the characteristic admittance. In practice, such complex poles are very rarely produced by the wideband line fitters however.
- Added warning to avoid crash in case a multi-input Simulink scope with the 'Save data to Workspace' option turned on with the 'Array' format. It is recommended that users select 'Structure with time' format to avoid this issue. The workaround is to use the Structure or Structure with time formats in Simulink Scopes.

Version 7.0.2

- Added demo of snubber-free modeling of asynchronous machine in SSN.
- Corrected demos with variable turn-ratio transformer models. The SSN S-function external code has now a version number.
- Added IEEE standard demos (IEEE 34-node, IEEE 37-bus, IEEE New England 39-bus) in SSN. Note: demo files classification is still not optimized but all required files are in the release.
- Corrected compatibility of asynchronous machine model with MATLAB R2013a.

- Added warning message for ITVC algorithm in SSN if a thyristor has a null offset voltage (ITVC requires a non-null offset voltage).
- Added details to documentation about TSBs with high-impedance capability.
- Added SSN SVC demo. This model was published in one of the papers on SSN.
- Improved treatment of isolated circuits in SSN. Warning and suggestion messages added if a SSN group does not have a ground reference.
- Generalized mutual inductance issues fixed.
- More complete SSN documentation: added fundamental SSN explanations, optimisation advices, flags, etc...
- Known limitation: ARTEMiS can cause MATLAB to crash when a multi-input Simulink scope with the 'Save data to Workspace' option turned on with the 'Array' format. It is recommended that users select 'Structure with time' format to avoid this issue. The workaround is to use the Structure or Structure with time formats in Simulink Scopes.

Version 7.0.1

- Capability to make real-time iterations on Surge Arrester (or Metal Oxide Varistor, MOV) models and Switches in SSN.
- Optimized LU factorization method in SSN using optimal ordering for non-switched nodes, switched nodes and iterative nodes. Very similar to the well-known Dommel paper of 1969 (except for iteration stuff).
- I-type NIB comes with default 1e9 Ohms resistance to avoid a common source connection error in SPS.
- POW blocks available for fault testing.
- Many new demos of Distribution Grid with very large number of equivalent EMPT node count.
- New demos for iterative MOV and switches.
- Added the AD-DRIVE-08 demo.
- Added many versions of AD-DRIVE-06 (Melco PMSM) using SSN, TSB and snubber-free TSB (using MMC method).
- Dynamic calculation of switch permutation options is now obsolete: with SSN, there is no limit on the total number of topologically connected switches so this option is useless now.
- RLC load substitution by Dynamic load option is now obsolete. Since R2011b, the SPS load flow can handle RLC load correctly.

Version 7.0.0

- Added compatibility with the RT-LAB 11.0.X product family. (TT#8494)
- Removed support for Matlab versions R2009B to R2011A. Compatible Matlab versions now range from R2011B to R2013A. (TT#8495)
- Removed support for the QNX real-time operating system. (TT#8493)

Version 6.4.5

- BERTA : Version 5.2 of Berta provides new features to the following models:

+ Berta_Site/algoberta :

- * Corrected F0 Hz wave generator
- * Gradual return from frequency ramps instead of abrupt resets
- * Configurable 50/60 Hz PLLs
- * Minimum duration of frequency resets set to 3 seconds.
- * Added power system stabilizers

+ Berta_Site/stab :

- * Added power system stabilizers

+ Algo_princ:

- * Externally provided servomotor positions
- * Parameterized minimum and maximum of the distributor.
- * Added Support for OP8620

(TT#8453)

- SSN: Fixed assignment to multiple cores that could result in watchdog events at execution. (TT#8452)

Version 6.4.4

- ePhasor : All ePhasor components have now been moved into RT-LAB 10.7.8. Starting from this version, Artemis is not required to use ePhasor. (TT#8387)

Version 6.4.3

- SSN: Fixed issues with larger SSN models that caused crashes during compilation with RTLAB, or after several consecutive offline simulations. (TT#8359, RT3#271596)

- ePhasor: Added support for multi-core parallelization. (TT#8119)

Version 6.4.2

- All related Berta blocks now support an input to parameterize more easily the fundamental signal frequency (50 Hz 60 Hz) (TT#8144)
- SSN: Fix an execution error that used to occur if a ground block was left unconnected. (TT#8126)
- SSN: Fix an error that used to occur when a current sensor was connected with one open end. (TT#8145)
- ePHASORsim: Fixed several issues with the PSS/e import functionality: out of service components and isolated busses are now skipped from being read. (TT#8117)
- ePHASORsim: Fixed an issue where the PSS/e converter cannot detect multiple loads connected to the same bus, or loads that have a zero value. (TT#8116)
- ePHASORsim demos are now available. (TT#8013)

Version 6.4.1

- Added new ePHASORsim demo to import data from pss/e (TT#8021)
- Added new ARTEMiS demo : how to code a simple inductance with user code in SSN. (TT#8016)
- Fixed some ARTEMiS demos for compatibility with 2011b and higher. (TT#8015)

Version 6.4.0

- Added support for Matlab R2012A and R2012B. (TT#7890)
- Fixed: AD_GRID_06 (wind-farm demo) divergent with recent versions of RT-LAB/ARTEMiS. (TT#7833)

Version 6.3.3

- Fixed default parameter for MMC block. (TT#7590)
- Fixed MMC CPU block and MMC CPU Controller need ARTEMiS Guide to compile with RT-LAB. (TT#7580)

Version 6.3.0

- Fixed ARTEMiS DPL which gives unbalanced voltage when the number of phases becomes 4. (TT#7326, RT3#266663)
- Fixed WideBand Line compilation in Matlab 2010a. (TT#7218, RT3#265226)
- Fixed crash during second simulation with SSN model with more than 16 SSN groups. (TT#6492)

Version 6.2.1

- Fixed SSN solver gives NaN when there are many isolated subcircuits inside the SSN model in the form of floating transformer secondaries. (TT#7025)
- Fixed deadtime was not supported for MMC-1P block. Added detection of cross firing allowing new test capability. (TT#6964)
- Added Resistance shunt with cell capacitor to allow discharge for MMC-1P block. (TT#6963)
- Modify documentation format to allow compatibility with RT-LAB documentation. (TT#6819)

Version 6.2.0

- Improve memory management in SSN solver during offline simulation. (TT#6772)
- Fixed error in mask of Asynchronous Machine pu Units with non-unity rotor turn ratio with Matlab 2010b. (TT#6763)
- Added parallel mode to SSN solver. (TT#6727)
- Added voltage measurement to the Wideband and Frequency line. (TT#6695)
- Added support of MatLab R2011a. (TT#6660)
- Added support of MatLab R2011b. (TT#6953)
- Fixed Error in Asynchronous Machine pu Units with non-unity rotor turn ratio with Matlab 2010b and newer. (TT#6800)

Version 6.1.0

- Optimisation of SSN memory usage in MatLab. (TT#6413)
- Added new block in ARTEMiS library: MMC 2P (TT#6406)
- Fixed "marti Line" block Help does not open properly (TT#6405)
- Added support of MatLab R2010a and R2010b. (TT#6394)

eFPGAsim

Version 1.4.3

- Fixed the issue that MMC demos are not able to run in MATLAB 2014b. (TT#8893)
- Removed the dependency to RT-XSG libraries in MMC FPGA models.(TT#8894)
- Added support for MMC models in different types of FPGA: VC707_2, MMPK7_325T and TE0741_325T.(TT#8895)
- Added standardized SFP drive in MMC model in FPGAs V7, MMPK7_325T and TE0741_325T.(TT#8896)
- Modified MMC4 black box source code to improve the accuracy inside MMC.(TT#8897)
- Set bitstream of MMC demos in the intial files automatically using 'efsSetBitstreamFile.m'.(TT#8898)
- Added masks and documentation for the RT-XSG blocks for Dual PMSM-VDQ, Induction Machine, Angle Sensors. (TT#7638)
- Fixed an issue with the eHS Gen3 solver preventing the outputs to be updated when the measurement count is equal to 1, 9, 17 or 25. (TT#8768)
- Fixed an issue with the RTXSG Scope and FPGA 64-to-64 Interconnect control panels channel selection set by the block causing the selection to reset every time the Simulink model is loaded. (TT#8772)
- Fixed an issue preventing the correct switch control mapping for FPGA-based PWM Generators (TT#8812)
- Fixed an issue in the eHS Gen3 CommBlk causing the "RTE Gates" setting to reset when the model is re-opened. (TT#8814)
- Fixed an issue with the Analog Output Mapping and Rescaling Control Panel causing the last available signal not to appear in the signal selection drop-down list for each output channel. (TT#8816)
- Fixed an issue with the eHS scenarios causing all outputs to fall to zero when using an non declared scenario. (TT#8817)
- Fixed an issue with the Dual PMSM-VDQ controller block (CPU side) causing a scaling error on the Idq axis of the Ld-Lq tables while using the Standard park transform. (TT#8868)
- Added a firmware bitstream pool directory in the Matlab path accessible by all RT-LAB models, including eFPGAsim example models. (EFS-387)
- Updated the eHS models "Two-Level Inverter" and "Three-Phase Diode Bridge" to eHSx64 Gen3 for all platforms. (EFS-395)
- Added support for SLX files for circuits designed with the SimPowerSystems and PLECS toolboxes. (EFS-402)
- Modified eHS with IOs example models to include the RT-XSG Selectable DIO blocks and . (EFS-450)
- Added support for the Loss-Compensation Algorithm for eHS for circuits designed with PLECS. (EFS-457)
- Added support for thyristors for eHS for circuits designed with PLECS. (EFS-465)
- Added support for .CCT files for circuits designed with PSIM. (EFS-488)
- Modified the eFPGAsim toolbox installer to prompt the user for administrative rights for automatic installation within the Matlab path. (EFS-511)
- The eFPGAsim JAVA packages are now installed in the Matlab ststic JAVA class path. (EFS-517)

- Added support for PLECS and PSIM circuit editors in the "Two-Level Inverter" and "Three-Phase Diode Bridge" example models. (EFS-537)
- Modified eHS with IOs example models to include a generic Analog Output solution (handling both the static analog outputs and the Analog Output Mapping and Rescaling function). (EFS-611)
- Added a security check in the eHS Gen3 solver to prevent the user to enter a custom solver step size outside the range available for the solver. (EFS-676)
- Added support for multiple 3-level bridges in a circuit simulated using the eHS solver. (EFS-737)
- Removed support for Xilinx ISE Design Suite for eHS with IOs example models for OP4500, OP4510 and OP5607. (EFS-761)
- Separate the library in 2 library in the library browser (eFPGAsim and eFPGAsim XSG). (EFS-762)
- Added an option to the eHS Gen3 CommBlk to enable an automatic communication port management that works for most firmware configurations. (EFS-763)
- Added support for three-phase measurement blocks for circuits designed with the SimPowerSystems toolbox. (EFS-764)
- Added support in eHS for circuits designed with PSIM 10.0.6. (EFS-765)

Version 1.4.2

- Support of Matlab R2015a SP1. (EFS-361)
- Removed the support of Matlab R2010b. (EFS-385)
- Support of eHSx32 Gen3 for smaller FPGA boards (OP4200 / OP5600 / OP7161). (EFS-341)
- Support of Thyristor (PSIM and SimPowerSystems circuit editors). (EFS-353)
- Support of LCA in PSIM (using the VSI block). (EFS-373)
- Support of PLECS 3.7. (TT#8732)
- Removed the support of QNX. (EFS-368)
- Fixed a bug that prevents "AinDin_AdjustmentsAcquisition" block from updating properly. (TT#8733)
- Fixed a bug that caused a JAVA error while using eHS on with regional settings of Windows 7. (TT#8745)
- Beta support of PSIM 10 (requires a PSIM patch). (EFS-354)
- Fixed a bug that caused an error during parsing the switches of a PSIM circuit for a large switch number. (TT#8747)
- Fixed a bug in PMSM-SH v2 block where machine 1 dq transforms parameters were not applied properly. (TT#8746)
- Implemented new VSC controller in MMC-HVDC CPU and MMC-HVDC FPGA demo models.
- Added over-current protection to MMC-HVDC FPGA and MMC-HVDC-DUO FPGA models.
- Added over-voltage protection reset function to MMC FPGA blocks in the library and 4 FPGA models.

Version 1.4.1

- Added support for RT-XSG v3.0+ in eFPGAsim, including porting the support for firmware generation using the Xilinx Vivado Suite and Matlab R2014b. (TT#8663)
- Fixed a bug in eHSx64 gen3 that avoided the user of using more than 55 switches. (TT#8696)
- Fixed a bug in dbl2sfp function. Extended mantissa was forced to 0 in some cases leading to wrong simulation results (system time constant was reduced). (TT#8697)
- Fixed an issue causing wires to be disconnected inside one component in MMC library of eFPGAsim version v1.4.0. (TT#8636)
- Example models "Boost and two-level bridge" and "Two-level Bridge" for eHSx64 Gen3 are provided with an OP4510 firmware, and models are configured for OP4510 by default. (TT#8656)
- Updated MMC libraries in FPGA and CPU and the files for generating bitstream for MMC4 with deadtime and overvoltage protection feature. (TT#8657)
- Added support for control of eHSx64 Gen3 inputs from another eHS core. (TT#8658)
- Corrected the eHS report log to eliminate time-step duration truncation and to fix an incorrect "Solver desired time step" value appearing the first time it is shown after the option "Provide explicit sample time for solver eHS" is unchecked. (TT#8659)
- Corrected the optimal Gs proposed by the Gs Optimization Tool is incorrect for Single-phase Three-level NPC Converter, resistive load to take into account the converter base current. (TT#8660)
- Fixed an issue causing the minimum time step to set to real time step value in circuit info of the eHSx64 Gen3 block. (TT#8634)
- Added support for control of eHSx64 Gen3 inputs from analog inputs. (TT#8661)
- Added documentation for the Switched-Reluctance Machine (SRM) block. (TT#8632)
- Added a Quickstart Guide for the eHS solver. (TT#8662)
- Added documentation for the Analog Output Mapping and Rescaling (AOMR) block. (TT#8621)
- Fixed an issue causing Simulink not being able to change Gate controls from the Gate control selection panel. (TT#8610)
- Added a patch to the RT-XSG blocks for the eHS solver and of the Analog Output Mapping and Rescaling function to avoid 'Bool type output port op gets indeterminate value' errors during offline simulation. (TT#8605)
- The eHSx64 Gen3 reset signal (coming from RT-LAB) is now resynchronized with the simulation step pulse (ModelSync). (TT#8664)
- Added 6 example model for the FPGA-based Modular Multilevel Converter (MMC) models to the eFPGAsim demo browser. (TT#8665)
- Fixed an issue with the "Multimeter" block support causing misassignments in the measurement types and names. (TT#8666)

Version 1.4.0

- Added the support of eHS Gen3 with LCA (Loss Compensation Algorithm) for 2-level and NPC converter topologies (SimPowerSystems workflow only). (TT#8594)

- Added the support of LCA in the eHS offline simulation block. (TT#8595)
- Upgraded eHS Gen2 example models to eHS Gen3 for Virtex-7 and Kintex-7 compatible chassis (NPC converter example). (TT#8596)
- Added FPGA PWMo function in the example models that can be mapped to the eHS circuit switches. (TT#7862)
- Added examples model of eHS Gen3 (3-Phase Inverter with Boost and 3-Phase inverter examples). (TT#8596)
- Added a netlist report during eHS Gen3 equation generation. (TT#8597)
- Made a tool to calculate Gs based on the topology (TT#8603)
- Fixed Unknown error a model was not including a SimPowerSystems POWERGUI or a PLECS circuit. (TT#8602)
- Fixed current measurement are wrong when the ground is present in SimPowerSystems for multi branch measurement. (TT#8504)
- Added a GUI to map the gate sources to the netlist switches (eHS Gen3 only). (TT#8601)
- Increased the maximum number of scenarios available for eHS Gen3 (up to 1023). (TT#8599)
- Added the support of Matlab R2012b R2013a R2013b R2014b R2015a (32bits and 64bits). (TT#8598)
- Added a PLL and PID functions for RCP applications. (TT#8553)
- Added a new MMC topology Clamp-Double Sub-module (CDSM). It must be applied with Artemis version v7.0.2.773 and later to realize the functionalities of CDSM in a MMC system.
- Fixed the compatibility issue between the MMC block callback and RT-LAB 11.0.3. (TT#8600)

Version 0.3.8

- Added example models of eHS with I/Os for OP4510, OP4500 and OP5607. (TT#8543)
- Added support of the PMSM Spatial Harmonic block v2 (Larger tables, embedded mechanical model). (TT#8545)
- Support of SRM block for Virtex-7 and Kintex7-based chassis. (TT#8544)
- Added the support of the "DC link filter + 2 inverters" mode in the inverter solver with boost block. (TT#8546)
- Added FPGA 64-to-64 Interconnect block to eFPGAsim CPU and FPGA libraries. (TT#8552)
- Fixed RLC and LC component support in the eHS circuit parsing function. (TT#8555)
- Fixed NI Multisim support in eHS. (TT#8306)
- Fixed an issue in the Switched-Reluctance Motor (SRM) block that was causing an initialization error during model compilation. (TT#8557).

Version 0.3.7

- Added a Neutral-Point Clamped (NPC) converter example model for eHSx16 on ML605. (TT#7612)
- Added an example model for eHSx16 with I/O interfaces for ML605. (TT#8520)

- Added a "Selectable Digital Output" block to the HIL I/O library (this block can handle static digital outputs, Event Generator signals and Pulse-Width Modulated digital outputs). Added a "Selectable Digital Input" block to the HIL I/O library (this block can handle static digital inputs, Event Detector signals and Pulse-Width Modulated digital input analysers). (TT#8521)
- Fixed help link for MMC Pulse block (MMC Gate Control Panel). (TT#8440)
- Fixed an issue with eHSx64 internal sine wave generators requiring the parameters for all 32 sine wave generators to be provided (causing malfunction of the generators if the "Use as many inputs as the current netlist requires" option was selected). (TT#8517)
- Fixed eHSx16 support for mutual inductance element that was causing matrix generation to fail with error "Reference to non-existent field 'value'.". (TT#8518)
- Fixed an issue with the MMC FPGA control block to enable custom OpCtrl or OpLnk controller name. (TT#8523)
- Fixed inconsistencies in the documentation of the Analog Output Mapping and Rescaling block and Inverter Model with Boost block. (TT#7939)

Version 0.3.6

- Added a MMC library that contains a block which has a choice of MMC half-bridge or full-bridge, MMC valve control blocks and 6 MMC demo models in typical Power System applications with related help files. (TT#8509)
- Support of the PMSM Spatial Harmonics solver and Inverter solver on Virtex-7 FPGAs. (TT#8508)
- Bugfix: "Analog Output Mapping and Rescaling block Control Panel" was not working properly when linked to the library. (TT#8507)
- Support of RL RC elements of PSIM in eHS circuit parser. (TT#8506)
- Bugfix: eHSx64 initialization port number was stuck to 1 and impossible to change. (TT#8439)
- MMC 3x512: Added the option to choose whether to have faults and gates inputs or not, fixed the behavior when the selection options are unchecked. (TT#8438)
- MMC 3x512: the decimation factor can be obtained when the FPGA is in slave mode, and the following blocks are now compatible with both OP7020 and OP7000:
 - Modular Multilevel Converter with Integrated Controller (3x512 cells)
 - Modular Multilevel Converter with Integrated Controller (3x512 cells) (Valve Current and VMMC)
 (TT#8476)
- Fixed an issue in the OP7161_2-based 3x512-cell Multilevel Modular Converters (MMC) causing wrong Vmmc values in averaged mode. (TT#8425)
- MMC: Fixed the bug of glitches on Vmmc when Vmmc_ave mode is checked when running MMC model with OP7000, obtained different decimation factors when there are more than one FPGA. (TT#8410)
- Fixed incorrect sequencing of capacitor voltages received from OP7161_2-based Multilevel Modular Converters (MMC) models using the 3x512-cell MMC library. (TT#8409)

Version 0.3.5

- Fix for the conversion function dbl2ssfp43.p that was returning wrong results for input values slightly inferior to powers of 2. (TT#8424)

Version 0.3.4

- Added support for mutual inductances and transformers with both generations of eHS for SimPowerSystems and PSIM workflows. (TT#8420)
- Added support for eHSx64, the second generation of eHS solver. It features a higher computation power (4x), more input/outputs, better accuracy and support for scenarios. (TT#8418)
- Fixed the support of int32 parameters in Ansys data (TT#8417)
- Fixed an issue with the the PMSM SH solver core. The Current results were $\sqrt{2/3}$ off the reference results when using the Ansys machine data. (TT#8416)
- Added support for induction machines in the motors library. (TT#8415)
- Bugfix: the CPU block was keeping the last solver output state when reset. When reset, the solver is outputting 0 on all outputs now. (TT#8371)
- The second core of the dual eHS was assigned the same configuration and circuit as the first core. They can now be independent. (TT#8304, RT3#276253)
- Added support for the MMC model on the OP7000 generation of simulators. Also added a three-valve, 512-cells-per-valve Modular Multilevel converter block, with new implementation of MMC which removes the parameters to adjust snubber from the previous versions. (TT#8123)

Version 0.3.3

- Added entry for DeltaT/C in the documentation of the Capacitor Differential Equation Solver block. (TT#8283)
- Support of parasitic parallel resistance in the boost inductor (dual inverter with boost block). (TT#8183)
- Add Ansys support in PMSM Solver Spatial Harmonics (TT#8182)
- Support of OP4500/VC707 for motors/converters/IOs/Sensors blocks (TT#8181)
- Fixed an issue where the Vmmc value would drop by 16 volts when switching to normal mode. (TT#8124)

Version 0.3.2

- The "2 DC source + 2 Inverters" mode of the Inverter_Solver_wboost block is not supported and returns an appropriate Matlab error the to user. (TT#8111)

- NaN were inserted in the Ld Lq and flux tables when the breakpoints were not the same for Id and Iq or the breakpoints were not defined for +/- max Iamp value (symmetric around 0). NaN are now replaced by the nearest non-NaN value. (TT#8105)
- The eHS configuration matrix location is now provided with its relative path, enabling the packaging and distribution of pre-compiled RT-LAB projects with the eHS feature. (TT#8076)
- Add support for FGPA based MMC valve and valve control. Requires RT-LAB v10.7.3 or later. (TT#7743)
- Added a 512-cell Modular Multilevel Converter (MMC) Valve and Valve Controller models. Requires RT-LAB v10.7.3 or later. (TT#7743)
- Added the RT-XSG Scope to the eFPGAsim I/O library. This scope enables the monitoring of internal FPGA signals with very fine time resolution (down to 5 ns). (TT#7482)

Version 0.3.1

- In machine models PMSM-VDQ and PMSM-SH, the Rabc force feature did not operate properly. The equation has been fixed. (TT#8055)
- Fixed an issue in the PMSM-SH machine model related to a 30-step delay between motor 1 and 2 computation not being accepted by the callback despite its being a legal setting. (TT#8054)
- Fixed an issue in the PMSM-SH machine model related to the FPGA interpolation function malfunction causing spikes on the torque. (TT#8053)
- Fixed an issue in the PMSM-VDQ machine: the block did not update properly when motor 2 is used in LdLq table mode. (TT#8052)
- Fixed an issue in the PMSM-VDQ machine model where the flux and back emf amplitude were not right when the user set the LdLq table mode. (TT#8051)
- Fixed an issue with the allocation of communication port numbers of the Dual eHS block when the linked OpCtrl block was taken from the Opal-RT I/O Common library. (TT#8005)
- Added the RT-XSG block for the "Analog Output Mapping and Rescaling" function. (TT#7882)
- Added support for initial states of Capacitor and Inductor in eHS for PLECS. (TT#7880)

Version 0.3.0

- Added support for nonzero capacitor initial voltage and inductor initial current in eHS. (TT#7880)
- Added support OP4500 Kintex7-based hardware platform for the eHS solver. (TT#7898)
- Added support for switch control polarity selection (active-high or active-low) in eHS. (TT#7881)
- Added support for AC and DC voltage and current sources in eHS, implemented as embedded source signal generators on the FPGA entity of eHS. (TT#7879)
- Added a very low leakage capacitor model block in the eFPGAsim Elements libraries. (TT#7878)

Version 0.2.4

- Added the 2-Level Inverter with Boost block. (TT#8031)
- Enhanced the eHS solver RT-XSG block packaging and documentation. (TT#7899)
- Added support for OP7020 and OP5607 Virtex7-based hardware platform for the eHS solver and Dual PMSM-VDQ motor model. (TT#7900)

Version 0.2.3

- Added a 24-phase PMSM motor function. (TT#8032)

Version 0.2.2

- Added support for OpLnk controller blocks (in addition to OpCtrl's) for the eHS solver. (TT#7815)

Version 0.2.1

- Added support for PLECS to design the circuits used by the eHS solver. (TT#7759)
- Added the "pulse selection" parameter in the eHS2 solver (a.k.a. "from Din"). (TT#7622)

Version 0.2.0

- Fixed strange behavior of PMSM torque in motor model. (TT#6749)
- Fixed problem of signal routing when compiling models with 2 motors. (TT#6725)
- Modification of PMSM example model. Links with RT-XSG are now broken. Model can run off-line without RT-XSG installed. (TT#6719)

RT-EVENTS

Version 4.1.4

- Provided compatibility with RT-LAB 11.1.4.

Version 4.1.3

- Added Matlab help landing page for RT-EVENTS
- Updated encoder and event detector demos so that they function with Matlab R2015aSP1

Version 4.0.2

- Added support for Matlab R2015a (Service Pack 1).

Version 4.0.1

- Added support for Matlab R2014b.

Version 4.0.0

- Provided compatibility with the RT-LAB 11.0 product family. (TT#8492)

Version 3.9.0

- Added support for Matlab versions R2012a, R2012b and R2013a. (TT#7891)

Version 3.8.0

- Fixed 2 level tsb high z block cannot be compiled with RT-LAB. (TT#7022)
- Modify documentation format to allow compatibility with RT-LAB documentation. (TT#6820)

Version 3.7.0

- Added support for MatLab R2011b. (TT#6952)

Version 3.6.0

- Added support for Matlab R2011a. (TT#6662)

Version 3.5.0

- Added support for Matlab R2010a and R2010b. (TT#6393)

RT-LAB

Version 11.1.4

- RT-LAB: labVIEW panel with a lot of connections close fix.
- RT-LAB: Bus object in variable table fix.
- RT-LAB: Orchestra 64 bits fix.
- RT-LAB: New ScopeView version.
- RT-LAB: ProbeControl save parameters fix.
- RT-LAB: labVIEW panel displays widget caption instead of connected datapoint.
- Drivers: New OP4200 bitstream with a fix on the latency of analog outputs.
- Drivers: Fixed minor issues in OP4200 CAN driver.
- ePHASORSim: Python API to set/get values.
- ePHASORSim: Power-flow now supports HVDC FMU.
- ePHASORSim: New demos are added for HVDC, API, and IEEE123-node test case.
- ePHASORSim: License update is required to Version 2017.4.
- ePHASORSim: Check Migration Notes in the user guide for required changes.

Version 11.1.3

- RT-LAB: Artemis compatibility fixes.
- RT-LAB: Fix issues with labVIEW API.
- RT-LAB: OP4200 better performances when no monitoring.
- RT-LAB: OP4200 Steps without overruns fix when pause model.
- Pickering: Added new low-level library to prevent possible EPROM corruption that can occurs if multiple processes are trying to use the same card.
- DNP3 master: Improved driver performances.
- OP4200: Applied minor corrections on example model.
- ePHASORSim: Updated demos to set the number of cores for real-time target (EP-827).
- ePHASORSim: Fixed bug in multiphase shunt (EP-833), connectivity check (EP-854), FMUs with unused interface pins (EP-829).
- ePHASORSim: Voltage source and current injector now can be merged to PSS/e's network (EP-630).
- ePHASORSim: New revision for Excel file (v1.5) is required with PSS/e input files, check the migration notes in the user guide.

- ePHASORSim: License update is required to Version 2017.3.

Version 11.1.2

- RT-LAB: Many quality fixes.
- RT-LAB: Pickering problem - Connections.opal.
- RT-LAB: RT-LAB datasources are visible in ScopeView.
- RT-LAB: Uninstall RT-LAB on targets repaired.
- RT-LAB: RTLAB_INTEL_COMPILER environment variable disabled for OP4200.
- RT-LAB: Intel licence check added.
- RT-LAB: Visual studio redistribuable problem corrected in installer.
- RT-LAB: LabVIEW runtime are installed with MegaInstaller.
- RT-LAB: Clean up RT-LAB processes when starting added.
- RT-LAB: RT-LAB report improvements.
- RT-LAB: Excel files are now open outside of RT-LAB.
- RT-LAB: Matlab non virtual bus object are usable with restrictions.
- ePHASORSim: Updated PHASOR09 demo to include multiphase components with CYME input file(EP-797).
- ePHASORSim: Fixed bugs for connectivity check in presence of three-phase voltage source (EP-816).
- ePHASORSim: Machine's initial status are taken into account for both power flow and dynamic simulation for PSS/e input files using the built-in library (EP-761).
- ePHASORSim: Automatic set up for MEX in case of requirement (EP-815).
- ePHASORSim: Fixed bus for 2-port FMUs (EP-820)
- ePHASORSim: License update is required to Version 2017.2.
- Synchronization: Fixed intermittent timing issue during initialization sequence of the Oregano syn1588 PCIe card.
- IEC61850: Added support of non-light edition (IEC61869-9).
- C37.118 slave: Fixed binding to specific network interface (TT8972).
- DNP3 master: Fixed binding to specific network interface (TT8965).
- OP4200: Fixed bitstream IDs displayed by the flash utility (TT8970).

Version 11.1.1

- RT-LAB: Fixed libOpalMMC build in RT-LAB (IVV-173).
- RT-LAB: Several Quality fixes.

- RT-LAB: Support of Console 64bits.
- RT-LAB: Fixed embedded mode with IO.
- RT-LAB: Add sfun_DBL2SFP and sfun_SFP2DBL for OP4200 (RTBETA-86).
- RT-LAB: Support of OP4200 connections management.
- RT-LAB: Fix issue in some TestSR which failed because API version doesn't match MetaController version.
- ePHASORSim: Support of multiphase line, load, shunt and fault for distribution systems (number of phases can be 1, 2, or 3).
- ePHASORSim: Power flow now supports voltage source, switch and constant current load.
- ePHASORSim: Connectivity check is done during initialization time for power flow and dynamic simulations and reports the existing islands.
- ePHASORSim: New version of Excel template (V1.4).
- ePHASORSim: User guide and examples are updated.
- ePHASORSim: License update is required to Version 2017.1.
- C37.118: Added new slave interface driver with enhanced performance and features.
- IEC61850: Added new Sampled Values and GOOSE interface driver with enhanced performance and features.
- IEC61850: Added example model for error injection feature.
- IEC61850: Fixed load issue with Simulink block implementation.
- DNP3: Added support of master interface to perform data exchange with external slave devices.
- EtherCAT: Added support of master interface to perform data exchange with external slave devices.
- Ethernet: Added new example model to perform easy TCP and UDP communication over Ethernet.
- OP4200: First release of OP4200 I/O configuration interface.
- SENT: Added support of Single Edge Nibble Transmission protocol and example model for Timestamped Digital Outputs (TSDO).

Version 11.1.0

- RT-LAB: Changed real-time target platform name to "OPAL-RT Linux (x86-based)" (RTLAB-1516)
- RT-LAB: Upgraded to Eclipse RCP 4.6, PyDev 5.1, and Java 8. WARNING: Workspaces opened with RT-LAB 11.1 are not compatible with previous versions of RT-LAB (RTLAB-1133)
- RT-LAB: Upgraded default Python interpreter to Python 2.7.12 with NumPy and SciPy modules (RTLAB-1422)
- RT-LAB: Added the Configuration editor in the Project Explorer in order to view and edit connections between project components (RTLAB-1381)
- RT-LAB: Added support for LabVIEW 2015 and 2016 in RT-LAB's API (RTLAB-1569)
- RT-LAB: Added diagnostic tool accessible through Windows Start Menu (RTLAB-1434)
- RT-LAB: Updated "Flash bitstream" window with latest OPAL-RT simulators (RTLAB-285)

- RT-LAB: Fixed compilation issue with 2-D Lookup Table (RTLAB-1473)
- RT-LAB: Fixed Variable Table issue when Simulink model contains mask parameters with MATLAB R2014b and MATLAB R2015aSP1 (RTLAB-1607)
- Pickering: Added an option to run the driver on a dedicated core when better performances are required.
- Pickering: Fix default values and data exchange for FIUs.
- Kvaser CAN: Added new driver and example models for PCIEcan 4xHS card.
- Softing CAN: Fixed manual reset when more than one card is used in the same system.
- Synchronization: Added support of a new synchronization card supporting IEEE-1588, IRIG-B and 1PPS.
- NI-PCDIO96: Fixed example models compilation (TT# 8941).
- OP4510 v2: Added example model with selectable digital I/Os functionality.
- VC707: Added support for board indexes higher than 31.
- OP5142: Fixed load issue with resolver in block.
- MIL-1553: Activate redundancy/retry of BC on alternate bus for GE implementation.

Version 11.0.8

- OP5363: Fixed issue with MATLAB callback of configurable voltage threshold block.
- ARINC 429: Fixed issue with multiple channels usage.
- Pickering: Fixed issue with FIU 40-195-001 card.
- Pickering: Added support and example model for the 40-297-020 resistive card.
- Softing CAN: Fixed issue when model is operating in XHP mode for a long period of time.
- Flash update: Increased maximum path length value from 256 characters to 1024 characters.
- RT-LAB: Added support for LabVIEW 2014 in RT-LAB's API (RTLAB-654)
- RT-LAB: Improved bug reporting for RT-LAB launch problems and model compilation/execution problems (RTLAB-1409)
- RT-LAB: Fixed an issue with SSN parallel feature (RTLAB-1379)
- RT-LAB: Fixed an issue with "pseudo workspace variables" for MATLAB R2015aSP1 (RTLAB-1377)
- ePHASORSim: Power flow and dynamic simulation (FMU only) for shunt FACTS devices.
- ePHASORSim: Read and import the FACTS device data from PSS/e RAW file for FMU only.

Version 11.0.7

- RT-LAB: Pre-release of integrated LabVIEW panels are accessible in a special capability (RTLAB-1136)

- RT-LAB: Fixed useless appearance of set_matlab_version_32 for MATLAB R2015aSP1 (RTLAB-1349)
- RT-LAB: Fixed rtlab and rtio libraries that do not appear in Simulink library browser for MATLAB R2014b and MATLAB R2015aSP1 (RTLAB-1359)
- RT-LAB: Fixed partial compilation functionality for models with SSN blocks (RTLAB-1283)
- RT-LAB: Updated Python API example models
- ePHASORSim: Power flow feature with embedded positive sequence components (except the constant current load).
- ePHASORSim: Power flow feature with generator-type FMUs in positive sequence components.
- ePHASORSim: New Excel template file (V1.3) with new components for machine, exciter, PSS, turbine-governor, and three-winding transformer.
- ePHASORSim: New mask design.
- ePHASORSim: New feature to find the proper number of parallel threads to optimize the run time performance on Windows.
- ePHASORSim: Improved the data validation and logging messages to inform user.
- ePHASORSim: Improvements in parallel solver feature to assign the CPU cores.
- ePHASORSim: New example demo for CYME input file.
- ePHASORSim: Revisions for user guide.
- ePHASORSim: Licence update is required with Version 2016.2 for power flow, parallel processing, PSS/e and CYME input file features.
- ePHASORSim: Compatibility note: FMU's generated by FMUcreator in older versions must be recreated by this version.
- OpNICan: Fixed block CAN receive and transmit bloc generatation from database file. (TT# 8763)
- OpCommon library: Added multirange fonctionnality for VC707, ML605 and OP5142.
- Pickering: Added support of 40-190B-001 1 fault bus FIU card.
- Pickering: Added support of 40-295-121 programmable resistive card with 16-bit resolution.
- OP5142 analog outputs: Fixed load issue when using block from OpCommon library (TT# 8751).
- OP5142 analog outputs: Fixed voltage multirange when using block from OP5142 library (TT# 8308).
- OP4510 analog outputs: Fixed voltage precision (TT# 8737).
- OpCtrl and OpLnk blocks of Opcommon library can now support bitstream located in the Matlab path (TT# 8749).
- OP5363: Added support for digital input card with configurable voltage threshold.
- OP5332: Added mezannine identifier of new analog card with 2 MSPS pair-isolated outputs.
- Added support of selectable digital I/OS fonctionnality to OpCommon library blocks.

Version 11.0.6

- RT-LAB: Added partial support for MATLAB R2015aSP1 *Note that Artemis and RT-Events are supported from MATLAB R2011B to 2013A and with R2014b (RTLAB-1016)
- RT-LAB: Fixed network interface detection problem with IP addresses 169.254.XXX.XXX (RTLAB-1025)
- RT-LAB: Fixed problem with display log (RTLAB-1174)
- RT-LAB: Fixed issues with variable table concerning bus signals and labeled signals (RTLAB-1196)
- RT-LAB: Added support for Fortran S-Function example with RedHat targets (RTLAB-1217)
- ePHASORSim: New licence required based on number of nodes and Version 2016.1.
- ePHASORSim: New examples are added: IEEE 4 and 13node cases as distribution systems, and IEEE 118bus for positive sequence networks.
- ePHASORSim: PSS/e import function reads the switched shunt from the *.raw file.
- ePHASORSim: Revisions for user guide.
- ePHASORSim: Improved the speed of data loading for large-scale systems.
- ePHASORSim: Improved handling error and warning messages when there is singular matrices, missing models, FMUs, or wrong directory.
- ePHASORSim: Improved the speed of unzipping process for FMUs.
- ePHASORSim: Bug fixed for current measurement in PI-line.
- XPlane: Corrected example model connection file.
- ML605/OP5142: Fixed display of hardware mismatch messages.
- MMPK7/TE0741: Improved fallback procedure.

Version 11.0.5

- ePHASORSim: Bug fixed in parallel feature of solver for Linux OS.

Version 11.0.4

- RT-LAB: Added support for MATLAB R2014b (RTLAB-508)
- RT-LAB: Added eFPAGAsim example models in the "New RT-LAB Project" wizard (RTLAB-852)
- RT-LAB: Fixed the selection of the vector range in the project explorer (RTLAB-837)
- ePHASORSim: Added a new feature to import network data from CYME for distribution systems.
- ePHASORSim: PSS/e import function reads the 3-winding transformer from the *.raw file for its default values of CM, CZ, and CW.
- ePHASORSim: PSS/e import function reads phase shift, magnetization impedance, and tap ration for 2-winding transformer from the *.raw file for its default values of CM, CZ, and CW.

- ePHASORsim: PSS/e import function reads GENCLS, TGOV1, EXST1 from the *.dyr file. For GENROU it reads the saturation factors as well.
- ePHASORsim: Initialization process is improved to load the files faster and reduce the memory usage.
- ePHASORsim: Improvements in run-time performance up to 10-15%.
- ePHASORsim: PHASOR03 demo has modified to show the latest component added to PSS/e import feature.
- ePHASORsim: Added mechanism to detect and report unsupported components and stop the simulation.
- ePHASORsim: Modified constant current load.
- ePHASORsim: Bug fixed for symmetric matrix factorization routine.
- Pickering: Added an option to the battery simulator module to operate asynchronously.
- Pickering: Kernel module is not loaded automatically when running the simulation.
- EthetCAT slave: Fixed boolean data alignment on more than one block of 8 bits.
- Orchestra: Increased the maximum number of signals that can be mapped by the framework.

Version 11.0.3

- RT-LAB: Added partial support for MATLAB R2013b *Note that Artemis and RT-Events are supported from MATLAB R2011B to 2013A (RTLAB-782)
- RT-LAB: Added Python 2.5, 2.6 and 2.7 libraries for RedHat host
- RT-LAB: Modified the installer in order to fix the progress bar and required disk space (RTLAB-672)
- RT-LAB: Fixed a character mix problem in display log (RTLAB-662)
- RT-LAB: Fixed asynchronous processes built with GCC compiler
- RT-LAB: Fixed a load error if incremental build is skipped (RTLAB-688)
- RT-LAB: Fixed a network configuration detection problem (RTLAB-807)
- ePHASORsim: Fixed shunt devices are now supported when importing PSS/e network data
- ePHASORsim: Updated user guide and example phasor02
- ePHASORsim: Windows and linux FMUs may now be independent of one-another, as in example phasor05
- Modbus slave: Added IP aliasing feature for TCP communication
- Modbus slave: Added support of RTU communication (serial)
- C37.118 master: Fixed issue with reception of packets on limit cases
- C37.118 master: Fixed issue with alignment of data with fraction of seconds
- C37.118 master: Fixed missed packets when two packets are received at the same time (invalid frame size error)
- C37.118 master: Added PMU watchdog to allow connection of the slave after model execution
- C37.118 master: Fixed acquisition automatic start in UDP mode
- C37.118 master: Fixed TCP+UDP mode

- OPC UA: Added the possibility to use strings to define node IDs
- IEC61850: Added support of fixed-length GOOSE float encoding/decoding
- Triphase: Replaced kernel module to be compatible with the high-performance PCIe optical link
- Pickering: Fixed FIU example models configuration files
- Pickering: Fixed connection directions with programmable resistive cards driver
- TE0741: Added multirange support to analog outputs
- ML605-Rev2: Added multirange support to analog outputs

Version 11.0.2

- Applicom: Added support of Siemens S7 communication protocol through the APP-ETH-PCIE Network Interface Card.
- OPC UA: Added the possibility to timestamp data points using an external time source (i.e Spectracom TSync-PCIE).
- OPC UA: Added the possibility to control the quality of the data points from the model.
- EtherCAT: Added support for EtherCAT Slave using the Hilscher CIFX 50E-RE card.
- IEC61850: Fixed GOOSE detection when data change occurs faster than retransmission.
- ePHASORSim: The ePHASORSim solver is now a part of RT-LAB 11.
- ePHASORSim: The simulation speed is improved.
- ePHASORSim: Fixed bugs to resolve the chattering issues with FMUs.
- ePHASORSim: "Bus Trip" command is added.
- ePHASORSim: Fault impedance is now editable by user.
- ePHASORSim: OPAL-RT's OpenModelica RPM for Linux target is added to RT-LAB.
- ePHASORSim: Added ePHASORSim examples to RT-LAB Project wizard.
- ePHASORSim: Added error message report for exiting NaN values in opal file.
- ePHASORSim: Revised user guide.

Version 11.0.1

- Repaired the embedded simulation mode (RTLAB-494)
- Added support for Python 2.7 (RTLAB-645)
- Solved issues with certain network configurations (RTLAB-625)
- Deactivated system recovery for OpalNode as it became useless (RTLAB-623)
- Added error message and blocked opening of RT-LAB if OpalNode is not correctly initialized (RTLAB-611)

- Changed installer to use .zip files (RTLAB-584)
- Fixed an issue with the Variables Table, for which the information was no longer valid after recompilation (RTLAB-450)
- Maintained address information in .param files (RTLAB-649)
- OPC UA: Added OPC UA server driver with example model.
- OP4510: Renamed LEDs signals in example models to match with the LEDs names on front of the chassis.
- OP4510: Modified analog output range in example models from -10V/10V to -16V/16V.
- IEC61850: Added support of dot-separated structures in FCDA data attributes. (TT#7155)
- Spectracom TSync: added option to initialize the board with the system time.
- Triphase: Added support for Triphase power amplifier driver with example model.
- Fixed initialization of drivers running under services (Modbus Slave, IEC-104, HEI, Pickering BattSim, RFM).
- Increased the maximum path length of a bitstream on the host computer workspace.

Version 11.0.0

- RT-LAB: Removed support for Windows XP (TT#8484)
- RT-LAB: Removed support for Matlab versions R2009B to R2011A. Compatible Matlab versions now range from R2011B to R2013A. (TT#8482)
- RT-LAB: Fixed printing of messages from asynchronous process to RT-LAB display. (TT#8474)
- RT-LAB: Improved the use of asynchronous process and s-functions. (TT#8473)
- RT-LAB: Removed QNX support. (TT#8472)
- RT-LAB: Fixed conflicts of MetaController versions when rebooting machine. (TT#8471)
- RT-LAB: Removed Matlab 64-bits options from regular user GUI (it is enabled for advanced users). (TT#8470)
- RT-LAB: Removed need of administrator rights to use RT-LAB. (TT#8469)
- RT-LAB: Added debugging tools to debug models and libraries on target. (TT#8468)
- RT-LAB: Improved the RT-LAB installer. The firewall is now automatically configured. (TT#8467)
- RT-LAB: Fixed parallel simulation of ARTEMIS-SSN models in RT-LAB. (TT#8466)
- RT-LAB: Improved stability of the Controller. (TT#8465)
- RT-LAB: Fixed the refresh of related products documentation (ARTEMIS, RT-EVENTS, for example). (TT#8464)
- RT-LAB: Fixed the management of network adapters, enabling the use of RT-LAB even if several network adapters are configured. (TT#8463)
- RT-LAB: Fixed controller crash caused by corruption of LLM files. (TT#8462)
- RT-LAB: Fixed the management of perspectives, when switching between different RT-lab versions. (TT#8461)
- RT-LAB: Fixed compilation log that crashed when large amounts of traces were logged. (TT#8460)

- RT-LAB: Added API support to Linux host. (TT#8459)
- RT-LAB: Improved Controller log system. (TT#8458)
- RT-LAB: Added logs to diagnose Matlab related issues. (TT#8457)
- RT-LAB: Fixed progress bar that was not accurate during incremental build of models. (TT#8456)
- RT-LAB: Fixed license management (runtime and development versions). (TT#8455)
- Fixed size error validation for TE0741-7K410T module (TT#8431)

Version 10.7.10

- Hilscher CFX 50E-DP Profibus : Added support for Profibus DPV1 (acyclic communication interface). (TT#8513)
- C37.118: Increased the maximum number of slaves that can send simultaneous PMU data streams from a single model. (TT#8514)
- VC707: Fixed an intermittent issue when attempting to flash a bitstream that is already programmed in the FPGA. (TT#8515)
- ePHASORsim: New sections have been added to ePHASORsim's user guide.
- ePHASORsim: Synchronous machines made by FMUs can now be tripped during a simulation by defining an input signal with the keyname "TRIP".
- ePHASORsim: Added example "phasor05_PSSE_FMU" to Matlab demonstrating the use of PSS/e input for FMU simulation.
- ePHASORsim: The FMU logger output strings now contain variable names instead of reference numbers.
- ePHASORsim: Fixed the release of memory at the end of simulation.
- ePHASORsim: Installing OpenModelica on Redhat via FMUCreator now behaves correctly when different versions of Fortran already exist.
- ePHASORsim: Multiple models can be selected for compilation at the same time in FMUCreator.

Version 10.7.9

- Orchestra: Fixed the compilation of the external component in the Orchestra example model for Windows targets. (TT#8451)
- ePHASORsim: Import from PSS/e files has been extended to the Modelica based library. (TT#8447)
- ePHASORsim: Users can export the admittance matrix into a CSV file. This feature is available only for Simulink offline simulation. (TT#8446)
- ePHASORsim: Developed a Modelica based library that includes models for machines and controllers. This library is not included in the RT-LAB package and must be requested separately. (TT#8445)
- ePHASORsim: Added a tool that allows to install OpenModelica on Linux RedHat targets and compile FMUs from OpenModelica models. (TT#8444)

- ePHASORsim: Both Excel formats, XLS and XLSX can now be used as input files. XLSX is more adapted for larger systems. (TT#8443)
- ePHASORsim: Added interface to import FMUs built with OpenModelica. (TT#8442)
- ePHASORsim: Phasors are now independent from the ARTEMiS block set. For ePHASORsim to function properly, the user should make sure that no ARTEMiS version older than 6.4.5 are used. (TT#8441)
- SBS ARINC429: Fixed SSN field encoding when using BCD or discrete types. (TT#8450)
- Bluestorm Serial: Fixed the asynchronous process for higher baud rates transmission with the BlueStorm card. (TT#8449)
- TCP Communication: Added a TCP communication interface to communicate with CANoe software (Vector). (TT#8448)
- C37.118: Fixed master data interpretation in polar representation (TT#8426)
- ORION Protocol: Added flash update support for the ORION protocol through the OP7161 (using remote flashing via optical fiber) (TT#8398)
- OP4500: Added RCP blocks support. (TT#8404, RT3#278102)
- QPCX-1553: implemented RT-Enable for the GE QPCX-1553 card. (TT#8384, RT3#278033)
- OP5142: Fixed compatibility with the OpCtrl library block. (TT#8345)

Version 10.7.8

- ePhasor : All ePhasor components have now been moved into RT-LAB 10.7.8. Starting from this version, Artemis is not required to use ePhasor. (TT#8388)
- Hilscher CIFS 50E-DP Profibus : Added support for the Profibus protocol for master and slave mode. Master mode requires an onboard master license provided by Hilscher. (TT#8386)

Version 10.7.7

- CAN DB: Fixed an issue with the generation of blocks for the National Instruments controller. (TT#8376)
- DNP3: Fixed an issue with the slave when trying to use the IP address of the simulator to bind the communication interface. (TT#8375)
- EtherCAT: Added support for EtherCAT Slave using the Hilscher CIFS 50E-RE card. (TT#8291)
- Encoder In (Common I/O library): Fixed block output labels and reviewed the documentation. (TT#8277)
- OP5110: Operability has been restored on QNX 6.5. (TT#8273, RT3#275705)
- Fixed an issue with targets using an OP5110 and running on QNX 6.5 that was blocking the load step of RT-LAB while it was reading the calibration information on the analog cards. (TT#8273, RT3#275705)

Version 10.7.6

- RFM: Fixed and issue present from RT-LAB 10.7.0 to 10.7.5 where models using the RFM driver were crashing after executing several seconds. (TT#8346)
- Pickering: Added support for 40-295-121-10/12 and 40-295-121-6/24. (TT#8331)
- Pickering: Fixed overruns that occurred in XHP mode when the model was running at a 1 ms step size. (TT#8328)
- Pickering: Reviewed the documentation and updated information for the support of the PXI 40-199 FIU board. (TT#8319)
- Pickering: Added an example model for new card PXI 40-199. (TT#8318)
- Pickering: Integrated new Pickering FIU card 40-199-002. (TT#8317)
- Fixed the Automatic Start Of Frame feature of the CreateArinc.m script file used for the generation of the arinc.config and connections.opal file. Those two files are required by the Arinc 429 driver. (TT#8316)
- Pickering: Fixed an issue that required the module to be loaded and unloaded manually between model executions. (TT#8147)

Version 10.7.5

- The OpalApi is now compatible with Python 2.7. However, support is limited to the API itself and the main RT-LAB user interface is still limited to Python 2.6. In order to use Python 2.7 with RT-LAB, a compatible interpreter must be launched externally. (TT#8177, RT3#274379)
- Max Technologies Arinc429: Fixed an issue that would cause a load failure if only input labels were defined in the Excel data file. (TT#8280)
- Max Technologies Arinc429: The send signal can now be used to interrupt the transmission of messages. (TT#8279)
- XSG Scope: Improved the example models and reworked the documentation. (TT#8275)
- Max Technologies Arinc429: Fixed an issue that caused all transmissions to abort on a given channel if at least one start of frame was not an integer multiple of the minor frame. (TT#8270)
- TestDrive Pulsed Output module: Added new block to support the SENT protocol. (TT#8254)
- Fixed an issue with the detection and flashing of primary and secondary OP7161 modules in multi-FPGA applications. Previously, it could result in load failures with respect to the secondary OP7161. (TT#8153)
- Max Technologies Arinc429: Fixed an issue where a BNR encoded data was not properly decoded. (TT#8157)
- Max Technologies Arinc429: Fixed an issue that prevented BCD encoding and decoding from function properly. (TT#8156)
- Max Technologies Arinc429: Fixed a crash when resetting a model that uses the Arinc 429 driver. (TT#8097)
- Max Technologies Arinc429: Improved the CreateArinc.m script file so it distinguishes between input words and output words. (TT#8095)
- Max Technologies Arinc429: Fixed an issue about the generation of the connections.opal file from the CreateArinc.m Matlab script. (TT#8071)

Version 10.7.4

- OpFromFile and OpWriteFile now allow a CSV file containing the list of files to be either read or written in dynamic mode as the file parameter. Also, the OpWriteFile mask has been modified to enable explicit specification of Real Time and Non Real Time file paths. Use these parameters to set the location of the file to be written when running on the host machine (Non Real Time), or a target (Real Time). The default values reference the directory in which the model is running. (TT#8120)
- Pickering FIU: Correct card indexes are printed for propertyTree test (TT#8140)
- Pickering license name in driver is updated to "PICKERINGFIU". (TT#8127)
- Add support for the new interface card 126-0506 with the OP5600 variant of the ML605. The software remains compatible with older bitstreams and hardware, while the new firmwares are compatible with all hardware generations. (TT#8091)

Version 10.7.3

- Max Technologies Arinc429: The "CreateArinc" m-script now generates connections.opal file from excel configuration file. (TT#8071)
- Max Technologies Arinc429: Fixed an issue where labels higher than 255 in octal format were not displayed in the console subsystem. (TT#8104)
- Add support for FGPA based MMC valve and valve control. Requires eFPGAsim v0.3.2 or later. (TT#8103)
- C37.118: Update of the controller block documentation. (TT#8099)
- C37.118: Update of the example model. (TT#8098)
- RT-LAB now supports the Xilinx Kintex7-410T FPGA with the OP4500 simulator. (TT#8094)
- Max Technologies Arinc429: Added manual configuration of the minor and major frames within the new driver architecture, allowing the user to configure the scheduling of the messages. (TT#8093)
- Flash_update tool: Added support of Xilinx Kintex7-410T FPGA with the OP4500 simulator. (TT#8063)

Version 10.7.2

- C37.118: Fixed a fault that occurred when attempting to connect to a non-existing PMU. (TT#8061)
- ARINC429 DIL: Added an Excel sheet and a Matlab script file as a temporary interface for the for the generation of the ".opal" files. (TT#8047)
- DNP3: Fixed the list of files to transfer before loading the model. (TT#8046)
- Ethercat: added support of the Elmo Gold Solo Whistle Motor drive. (TT#8045)
- Ethercat: Added Qnx (version 6.5) support. (TT#8044)

- FPGA reconfiguration: Fixed crash of the flash_update application when the path to the bitstream file is too long. (TT#8027)
- Serial protocol: Added support of baud rates up to 1.8432 Mbps with the Connect Tech Bluestorm board (Linux and Qnx). (TT#7854, RT3#271782)

Version 10.7.1

- X-Plane: The new driver and plugin is compatible with Redhat and QNX, with X-Plane version 8, 9, and 10. It also requires a license. (TT#8020)
- Improved management of file transfers to and from the target PC for the AsyncSerial process. (TT#4863)
- OP4500: Fixed wrong identification of the OP4500 FPGA by the FPGA reconfiguration tool. (TT#8022)
- Fixed an issue with OpCtrl block when used for the OP7000 multi-FPGA simulator where the secondary bitstream files would be found invalid. (TT#7959)
- Spectracom TSync: Fixed Simulink block mask issue while checking and unchecking "Generate timestamp" option. (TT#7930)
- Added support of OP5607 (Virtex 7) in the flash_update utility. (TT#7917)
- DNP3: Repaired binary output initialization. (TT#7893)
- Improved feedback of the flash_update tool on RT-LAB display window when it is flashing a bitstream so the user knows which FPGA is getting flashed. (TT#7749)

Version 10.7.0

- Fixed "Enable extended timeout" option causes the automatic files retrieval to fail. (TT#7885)
- Added support of Dolphin Reflective memory communication type in RT-LAB Orchestra. (TT#7872)
- Added support of Ethernet communication type in RT-LAB Orchestra. (TT#7871)
- Added support for Matlab R2013A. (TT#7870)
- Fixed model link when copying a project. (TT#7861)
- Fixed Orchestra callback with more than 600 output. (TT#7832)
- Fixed empty license fields displayed after installing a license file. (TT#7823)
- Added File/Exit menu in RT-LAB. (TT#7831)
- Added support for Matlab R2012B. (TT#7428)
- Added support for Matlab R2012A. (TT#7427)
- OpJoystick: Added support of the Extreme 3D Pro Logitech joystick (RedHat operating system). (TT#7907)
- C37.118 Master: Added support of the master:

Communication: TCP, UDP, TCP+UDP

Configuration 1 and 2

Phasors data: nominal frequency, frequency deviation, polar notation, rectangular notation, integer-floating point encoding

Analog and digital data

Timestamping

(TT#7838)

- C37.118 Slave: Fixed issue while using analog values (wrong type). (TT#7819)
- Flash_update tool: Added protection to prevent the user from using the flash_update tool while model is running. (TT#7787)
- OP7000 - OP7020: Fixed problem while interfacing several OP7020 boards within the same Simulink sub-system. (TT#7742)
- OP7000: Reinforce Simulink model verification. Added check for duplicated controller names. (TT#7736)
- OP7000: Fixed issue while flashing bitstream of secondary FPGA (flashing procedures called several times). (TT#7686)
- OP7610: Fixed validation issue with the OP7000 secondary FPGA bitstream names. (TT#7664)
- OP7020: Added support of the OP7020 chassis. (TT#7627)
- IEC 61850: Added support of GPS timestamping for Goose messages. (TT#7339)
- Fixed communication between Orchestra and VMIC5565 PCIe card on Redhat target. (TT#7321)
- OP5142: Fixed compilation error while using Resolver In and Resolver Out into the same model. (TT#7288)
- Fixed synchronisation between projet explorer parameter and Variable Viewer. (TT#7824)
- Remove parenthesis after 'RT-LAB' in the Install menu. (TT#7858)
- Added OP7161 filter in Flash bitstream tool in RT-LAB. (TT#7776)

Version 10.6.5

- LIN-LDF: Modifications to LDF parser whas done to improve/correct all issues related to file format. (TT#7954)
- Foundation Fieldbus H1: Code instrumentation for on-site investigation while adding new sensors. And it is now possible to enable/disable the increment of ST_REV value.

Environmental variables to do so:

- 1.- TEMP = 99 to activate print logs
- 2.- ST_REV_INC = ON (TT#7953)

- Malibu Tech FIU: Added missing asynchronous process source code (.c .h and .rpm file). (TT#7937)
- Malibu Tech FIU: Faults are disabled after reset of the simulation model. (TT#7936)
- Spectracom-TSync: Fixed hard reset crash when Spectracom Tsync is used in conjunction with IEC61850 GOOSE Subscriber block. (TT#7931)
- RCP Analog IN: Fixed several synchronization problems with PWM period. (TT#7868, RT3#271437)

- LIN-LDF: Fixed model generation issue while using LIN Scheduler with just 1 schedule table. (TT#6502)
- CAN: Now the controller block has the option to specify the value of CAN ID Offset, then spread it throughout the generated model where this value is needed. (TT#6024)

Version 10.6.4

- OpJoystick: Added support of the Extreme 3D Pro Logitech joystick (RedHat operating system). (TT#7907)
- OP5142: Fixed compilation error while using Resolver In and Resolver Out into the same model. (TT#7288)

Version 10.6.3

- OP4500: Added support of OP4500 (Xilinx Kintex 7). DI/DO AI/AO, PWM, Encoder, Resolver, Timestamped DI/DO are now available with the new FPGA Kintex 7 and the new chassis OP4500. (TT#7848)
- IEC 60870-5-104: Added support of IEC 104 slave mode. (TT#7837)
- OP5142: Fixed bad FPGA initialization when number of resolvers = 2 in the resolver in block. (TT#7259, RT3#265814)

Version 10.6.2

- Serial protocol: Fixed issue while resetting RT-LAB models with several serial interfaces. The reset procedure of a serial interface (RS232, RS485 ...) is now faster and prevents the controller from aborting the reset procedure. (TT#7740)
- UDP-IP RT communication: Fixed problem while using UDP-IP communication link for multi-target system. (TT#7724, RT3#270659)
- Modbus TCP: added support of Modbus TCP slave emulation in RT-LAB.

The following functions are supported:

read/write coils

read/write registers

read input coils

read input registers (TT#7726)

- CanOpen: Fixed a memory leak problem in the driver that forced the user to reboot the whole system every 4-5 model executions. (TT#7605)
- IEC61850: Fixed issue while using IEC 61850 protocol in several Matlab/Simulink subsystems. (TT#7251)
- Malibu FIU: support of RedHat operating system. (TT#7098)

Version 10.6.0

- Fixed .reg an .prm fail to transfer all the time. (TT#7653, RT3#270092)
- Fixed switching workspace also switches Python interpreter, even if this one no longer exists. (TT#7533)
- Fixed RTLAB skipping 'Model separation /code generation' causes compile error. (TT#7342)
- Added new incremental build of a model. (TT#7237)
- Fixed OPAL-RT Toolbox installation in Matlab. (TT#6698)
- C37.118: Fixed wrong encoding of floating point values. (TT#7687)
- IEC61850: Added procedure to configure the NETGEAR switch to work with IEC61850 protocol VLAN feature. (TT#7671)
- SBS Arinc429: fixed issue while muting channels configured in scheduled mode. (TT#7618, RT3#269581)
- MaxTechnologies Arinc 429: Enable muting of specific labels rather than channels (labels to mute can be specified dynamically in run time using a dedicated inport of the Simulink block). (TT#7610)
- Improved reset of models using the Ixxat CanOpen board. (TT#7496)
- Added support for 4 devices on each Ixxat CanOpen board. (TT#7494)
- ML605: Fixed crash in Matlab (MEXW32 of the "ML605EX1 DigitalOut" block) if the number of channels is undefined. (TT#7493)
- OP7161: Modification of FPGA flashing force option to prevent reflashing all secondary FPGAs in OP7000 chassis (use FPGA_BITSTREAM_FORCE_SLOT instead). (TT#7455)
- Modbus TCP: Added support of Modbus Slave communication protocol. (TT#7691)
- Added detection of an unlicensed ScopeView before opening it. (TT#7692)
- Added a list of standard environment variables for a model. (TT#7401)
- Fixed adding new folders in the Python libraries are not taken into account by RT-LAB. (TT#7214)
- Fixed CPU Assignment; list should provide the same number of CPUs as the target. (TT#5804)

Version 10.5.11

- Added support of 64 subsystems in RT-LAB (TT#7874)

Version 10.5.9

- Modbus TCP: Added support of Modbus Slave protocol. (TT#7691)

Version 10.5.8

- SBS Arinc429: fixed issue while muting channels configured in scheduled mode. (TT#7618, RT3#269581)

Version 10.5.7

- IEC61850: Bug fixed: wrong construction of the Goose data set name ('\$GO\$' replaced by '\$'). (TT#7569)
- Asynchronous Process (DNP3): Fixed problem of timing while resetting model with many asynchronous processes (more than 20). (TT#7487)
- IEC61850: bug fix: sometimes an empty goose message was published at the beginning of the simulation. (TT#7247)

Version 10.5.6

- Fixed empty real-time subsystem folders were created directly under C:\ or C:\Users\username\ when retrieving files from a target. (TT#7469, RT3#264962)
- Orchestra: added support for the reflective memory board VMIC 5565 (128M) under the RedHat operating system. (TT#7321)
- Improved reset of models using the Ixxat CanOpen card. (TT#7496)
- Added support for 4 devices on each Ixxat CanOpen card. (TT#7494)
- I2C/SPI: added the support of the USB module from Keterex KX910H. SPI master/slave and I2C master/slave interface are now available in RT-LAB. Based on asynchronous process, the user has the ability to format the messages at will. (TT#7504)
- C37.118: Added verification of IP address availability, avoiding duplication of IP address on the network. (TT#7489)
- DNP3: Fixed timing issue while resetting models with many DNP3 IEDs. (TT#7488)
- Added support of the TSync board from Spectracom. This board offers precise timing and synchronisation signals to any FPGA board from OPAL-RT Technologies (OP5142, OP7161, ML605). Using this board, the customer can synchronize their RT-LAB model to any external clock source (IRIG-B, 1PPS). (TT#7463)
- IEC61850: implementation of the timestamping (UTC time) of the published Goose messages. (TT#7064, RT3#263907)
- IEC61850: Added Sampled Value (IEC61850 - 9.2 LE) subscriber functionality. (TT#6707)

Version 10.5.5

- Added the support of the DNP3 Slave protocol under the RedHat operating system.

This allows the user to emulate any kind of DNP3 slave device in RT-LAB. Please refer to the example model and to the Matlab/Simulink block help for further information. (TT#7462)

- Added support for the C37.118 communication protocol under the RedHat operating system.

In power electronics, the C37.118 communication protocol is often used by the Phasor Measurement Units to publish their data. Built over Ethernet, this protocol is now supported on RedHat, it uses the asynchronous process architecture to handle communication on the Ethernet network. Please refer to the example model and to the Matlab/Simulink help for further information. (TT#7458)

Version 10.5.4

- Fixed Incremental Build for selected subsystem. (TT#7347, RT3#267183)
- Improved incremental build step. (TT#7344)
- Added a license check after installation. An error message is displayed if the license is invalid, and the previous one is restored. (TT#7278)
- Improved License user interface. (TT#7277)
- Fixed Select/Deselect probes in Monitoring View that was not working. (TT#7350)
- Fixed Re-import a model after having deleted it from a project. (TT#7349)

Version 10.5.3

- Fixed Orchestra to support framework in XHP mode and external in non-XHP mode. (TT#7329)
- Can/Provtech: fixed compilation issue under Linux. (TT#7313)
- OP5142/ML605: fixed synchronisation issue with FPGA boards distributed on a cluster. (TT#7305, RT3#266945)
- ML605/OP761x: fixed compilation error while using Analog In functionalities on both ML605 and OP761x boards in the same model. (TT#7324)
- Fault Injection Unit: added multirate model support (Malibu FIU or ETAS ES4440). (TT#7315)
- CanDB: added support of DLC greater than 8 in dbc file. It is physically possible for a value between 9-15 to be transmitted in the 4-bit DLC, although the data is still limited to eight bytes. Certain controllers allow the transmission and/or reception of a DLC greater than eight, but the actual data length is always limited to eight bytes. (TT#7314)
- Pickering 50-295: added multirate model support. (TT#7310)
- SBS Arinc429: fixed crash of the target while resetting Arinc429 simulation model. This may happen when the SBS Arinc429 board shares the interrupt line. (TT#7298, RT3#266802)
- OP7000: fixed issue when flashing more than one OP7000 board. (TT#7264)
- Malibu Tech Fault Injection Unit: fixed problem of FIU freezing after receiving several commands. (TT#7132, RT3#264806)
- CanOpen: added simulation model of a Digital Valve Positionner from Woodward. (TT#7102)

- Added example model for the Base Module. (TT#4613)
- Added example model for DM6210 digital I/O. (TT#3421)
- Added example model for DM6210 analog in. (TT#3420)

Version 10.5.2

- Malibu Tech FIU: fixed problem with FIU freezing after sending several commands. (TT#7300)
- FIU: added support of ETAS ES4440 module (QNX Operating system). (TT#7099)

Version 10.5.1

- Documentation: updated the list of supported Xilinx ISE tool suite versions. (TT#7244)
- RCP: added a new Matlab/Simulink library for Rapid Control Prototyping application. This library allows users to synchronize any simulation model on a PWM signal, along with its analog input acquisitions. (TT#7297)
- RFM: fixed crash at model reset when RFM and OP5142 boards are used in the same sub-system. (TT#7291)
- Fixed compilation error when OpNI-670x Analog Out and OpNI67x Digital In Simulink blocks are used in the same sub-system. (TT#7260, RT3#266242)
- ML605: updated the help file of the Controller Simulink block. (TT#7266)
- IEC61850: added explanation in error message when initialization fails. (TT#7250)
- IEC61850: added source MAC address in published Goose messages. (TT#7063, RT3#263907)
- OP5142: update the example model encoder. (TT#6059)

Version 10.5.0

- Added new parameter in Dynamic acquisition to set the file size limit during writing of a MAT-File. (TT#7257)
- Added incremental build in RT-LAB. (TT#7256)
- Fixed compiling models in debug mode that was not functional. (TT#7192)
- Fixed some Simscape examples that failed to compile on WIN32 target. (TT#7160)
- Fixed RT-LAB InstallShield sometimes freezes at the end of the installation. (TT#7075)
- Fixed InstallShield Wizard stay open in windows bar after installation of RT-LAB. (TT#6969)
- Added support for MATLAB 64 bit (R2010a, R2010b, R2011a, R2011b) (TT#3604)
- Added support for Model Reference. (TT#2343)
- Added advanced functionalities (Encoder, PWM, TSD, TSB) for the new OP7160 board. (TT#6843)

- Fixed problem of board detection when using both SBS ABI-PCI-2 card and SBS Arinc PCI-8 board in the same model in the same target. (TT#6768)
- Fixed flash_update problem with ML605 and OP7000 on RedHat OS. (TT#6979)
- Added more visibility for error during file transfer (Compilation step). (TT#6836)
- Added automatic installation of OPAL-RT product documentation in RT-LAB. (TT#6817)
- Added "Save As" button to target consoles (TT#6805)

RT-XSG

Version 3.1.3

- Vivado: Added support of Vivado 2015.4 by taking into account the Xilinx Compilation type "Synthesized_Checkpoint".
- OP4200: Added support of User LEDs.
- Vivado: Added support of 2016.3 (added synth_stub option in Tcl script for generating the user model stub) with IP Cache option available for better Synthesis time achievement.
- OP4510: Fixed issue with Expansion slot IO Block configuration (ExpansionSignal type). (TT#8969)
- VC707: Updated the Gray Zone by adding dont_touch attribute on configuration clock for generating a bitstream.
- OP4200 and Vivado 2016.3: Changed a constraint for allowing the generation of a bitstream (SPIx1).
- Updated the Selectable DIO block (specific to the TSDIO functionality) by adding a delay before the Model Synchronization pulse. (TT#8978)
- Mezzanine OP5342: Added support of the new Analog IN at 2 MSPS for OP4510 and OP5607 with Signal Integrity control (IO's drive strength specific modifications; additional timing constraints).
- Added new report as hardware configuration file (Product, FPGA, mezzanine names) in the project folder (hw_config.txt).
- Mezzanine OP5342: Bring correction on safe frequency support of the I2C communication bus under the user clock following (100 or 200 MHz).
- Selectable DIO: added synchronization on ModelSync for Selectable DO (rtxsg_application_lib.slx).

Version 3.1.2

- Fixed One step delay in Generic Aurora transmission when one word is transmitted per time step. (TT#8839)
- Add an option to enable or disable the CRC in the Generic Aurora. (TT#8951)
- Added support for new IO carrier names of the OP4200 system. (TT#)
- Added feature to generate the update request internally for OP4500. (TT8937#)
- Fixed fatal exception again Matlab 2015aSP1. (TT8888#)
- Modify design to prevent flipping board index problem on OP4510 system. (TT8938#)

Version 3.1.0

- Added a "Selectable DIO" fonctionnality in RT-XSG. (TT#8791)

- Added support for Matlab 2015aSP1. (TT#8607)
- Added support for OP4200 (Zynq 7030) (alpha release). (TT#8741)
- Added support for OP5363 mezzanine (32 DI High Impedance) for Virtex-7 (OP5700, OP5607), and Kintex-7 (OP4510,OP4520). (TT#8369)
- Fixed SineCosine block obsolescence in Common/op_cosin block with interpolated-LUT-based sine wave generator. (TT#4472)
- Fixed Park/Inversed Park transform blocks with updated Common/op_cosin block. (TT#8576, RT3#284360)
- Fixed an issue preventing the support of space characters in the model path. (TT#8622)
- Added a mechanism to detect a model crash in Hypersim, so that a protection logic can be implemented for the outputs of the simulator. (TT#8739)
- Added a protection to prevent endless error reporting when performing an update diagram (Ctrl-D) on a model when the Version block name is not exactly 'Version'. (TT#8757)
- Replaced the feature "open timing analyzer" by a timing text-file report. (TT#8623)
- Fixed an issue causing timing violation errors when generating bitstreams for OP4500. (TT#8783)
- Fixed an issue with chassis ID value changing from 0 to 31 after bitstream is programmed on systems with Virtex7 FPGA. (TT#8793)

Version 3.0.0

- Fixed filtering of input signals for TSDI and PWMI operating at 200MHz. (TT#8573)
- Added an option in the Version block to force the maximum fanout value for the ModelSync and nRst signals. (TT#8556)
- Fixed Generic Aurora Communication block to prevent Matlab crash at model opening. (TT#8505)
- Improved PCIe timing management for Kintex7 FPGA (MMPK7 and TE0741) by relaxing maxskew parameter. (TT#8503)

Version 2.3.4

- Added a mechanism to detect a model crash in Hypersim, so that a protection logic can be implemented for the outputs of the simulator. (TT#)
- Added support for OP5332 mezzanine (16 analog Outputs, 2MS/s, pair isolated) on OP5600 (OP5142 and ML605). (TT#8740)
- Added a "Selectable DIO" functionality in RT-XSG. (TT#8791)
- Added support for OP5363 mezzanine (32DI High Impedance) for OP5600 (Spartan3 and Virtex6). (TT#8792)
- Fixed an issue with chassis ID value changing from 0 to 31 after bitstream is programmed on systems with Virtex7 FPGA. (TT#8793)
- Fixed SineCosine block error in example model Sinusoidal_AnalogIO_rtxsg.mdl for OP5142. (TT#8797)

Version 2.3.3

- Fixed SineCosine block obsolescence in Common/op_cosin block with interpolated-LUT-based sine wave generator. (TT#4472)
- Fixed Park/Inversed Park transform blocks with updated Common/op_cosin block. (TT#8576, RT3#284360)

Version 2.3.2

- Fixed filtering of input signals for TSDI and PWMI operating at 200MHz. (TT#8573)
- Added an option in the Version block to force the maximum fanout value for the ModelSync and nRst signals. (TT#8556)
- Fixed Generic Aurora Communication block to prevent Matlab crash at model opening. (TT#8505)
- Improved PCIe timing management for Kintex7 FPGA (MMPK7 and TE0741) by relaxing maxskew parameter. (TT#8503)
- Added support for the OP5963 optical-fiber synchronization card. It is compatible with OP5142 and ML605_2. (TT#8572)

Version 2.3.1

- Added support for SPI communication on OP5600/ML605 systems. (TT#8516)
- Fixed an issue with the Pulse-Width Modulated Input (PWMI) block introduced in RT-XSG v2.3.0, causing the measured frequency and duty ratio to remain fixed at their minimum value. (TT#8510)

Version 2.3.0

- Improved Generic Aurora protocol for high speed optical fiber communication to prevent erroneous behaviour at start of simulation on Hypersim. (TT#8491)
- Added high-speed mode for OP5330 Analog Output interface. This enable sampling period down to 440 ns by using 8 of the 16 channels of the interface. (TT#8488)
- Added support for Trenz Kintex7 FPGA (160T, 325T and 410T) for use in O4510 chassis. Support includes all features needed in RT-LAB simulation like PCIe communication, flash programming, control of the 4 I/O mezzanine modules, expansion I/O module (RS422 or optical fiber) and User LEDs, support of the SFP ports. (TT#8437)
- Updated Orion communication protocol to add support for variable number of words in messages, and a command header word. (TT#8403)

- Improved Orion protocol stability for communication between OP7000 and OP4510. (TT#8400)
- Fixed Orion protocol to support 100MHz clock frequency on OP7000 systems. (TT#8399)
- The PWMO block is now synchronized with the model, preventing drifting between identically configured pulse-width modulated signals generated simultaneously on different chassis. (TT#8326, RT3#276464)
- Fixed an issue with PWMI function where the outputs would keep their values until the input signal switches. When the PWM is static (duty = 100% / 0%), the period is now forced to the maximum value, and the time on to the maximum or minimum value depending if the state of the DIN is High or Low. (TT#7849)

Version 2.2.6

- Added support for the 32DIn high impedance mezzanine (126-0515) on the OP5600/OP5142 platform. (TT#8320)
- Limit options for the OP4500 hardware configuration in the opxsgHardConfigGUI dialog. The OP4500 has two permanently integrated digital IO cards on the Slot#1 Section A (digital IN) and B (digital OUT). (TT#8276)

Version 2.2.5

- Added 2 Gpbs data rate capability to the Inter-FPGA communication block. (TT#8245)

Version 2.2.4

- Correction within the DAC controller to eliminate the risk that the reset signal could cause a hold time violation. (TT#8141)
- Add support for the new interface card 126-0506 with the OP5600 variant of the ML605. The software remains compatible with older bitstreams and hardware, while the new firmwares are compatible with all hardware generations. (TT#7965)

Version 2.2.3

- Added support for the new level-shifter board for ML605 (126-0506). (TT#7965)
- Added support for Analog In 8 Channel (126-0513 OP5340-2) (TT#8110)
- Fixed an issue with the DataIN protection logic circuit when transitioning from execute to pause and back to execute state. (TT#8109)
- Updated documentation for the InterFPGA SFP comm block in order to reflect recent changes and the correct block usage. (TT#8108)
- Added support for fallback for VC707 and MMPK7. (TT#8107)

- QEO and Resolver Unpacking blocks now support the StartOfFrame signal to be aligned with the data. (TT#8106)
- Enhanced OP5340 (Analog input card) interface to facilitate timing requirement closure during bitstream generation. (TT#8096, RT3#274455)
- Added support for ORION protocol. (TT#8072)
- Added support for Kintex7 card MMPK7-410T. (TT#8062)
- Removed the opUpdateDiagram function from the product (the file name conflicted with the RT-LAB toolbox). (TT#8024)

Version 2.2.2

- Added support for InterFPGA communication on VC707 OP7020/OP5607 Systems (Inter-FPGA et MMC communication Block have been reworked for V6, V7, K7). (TT#8036)
- Added support for 16-bit bitstream_minorid (was 5-bit). (TT#8035)
- Dropped support for OP5130 (Virtex2P), ML505, ML506 (XSG and standalone), ML507, and Xilinx/Digilent XUPV5-1x110T FPGA cards (obsolete). (TT#8034)
- TSDI block: Enabled the edge type selection parameter detected to be selected from an input port (TT#8033)
- Fixed an issue related to OP7000 inter-FPGA communication blocks causing Matlab to crash during bitstream generation or offline simulation of the RT-XSG model. (TT#7958)
- Fixed an issue with DataIn unpacking blocks related to signals dropping to zero when simulation overruns occur. (TT#7933)
- Added Differential I/O block (a.k.a Encoder) for OP4500 system. (TT#7844)
- Added the Resolver In/Out Examples for OP7161/ML605/OP4500. (TT#7369)

Version 2.2.1

- Added support for Opal-RT OP5360-1 Digital Mezzanine Push-Pull FET 5 to 15V, 50ns - 32 Dout. (TT#8037)
- Fixed various issues related to the copy of report files: Matlab diary is created in RT-XSG directory, fpga_model_sysgen_error.log is transferred, the CDC file is transferred, the MRP file is transferred if a MAP error is detected. (TT#7967)
- Added support for OP4500 Kintex7-based hardware platform (alpha). (TT#7844)
- Fixed an issue with ML605 firmwares that resulted in the RT-LAB model execution giving a "Timeout waiting for valid bit" error during model execution. (TT#7813, RT3#271671)
- Fixed an issue with the TSDO block in which the events might be delayed by one simulation step. (TT#7790)
- Added support for use of Din in the back of the OP7162 secondary FPGA. (TT#7786)
- Fixed a crash that was happening when generating a bitstream with more than 4 SFP on the OP7020. (TT#7746)
- Added analog and digital I/O support for VC707-based hardware platforms (OP5607 chassis). (TT#7741)

- Added support for OP7824 - 16 Channels DOUT Fiber Optic card. (TT#7727)
- Updated the XSG Aurora block to output statistics on the data traffic going through the block (TX error, RX error, overflows, etc.). (TT#7714)
- Updated Resolver In Packing block. Updated the OP5142 Resolver In/Out example model. (TT#7369)

Version 2.2.0

- Added support for the 35mA Analog Out mezzanine in OP5600 target. (TT#7165)

Version 2.1.6a

- OP7000: fixed synchronization issue between OP7000 chassis (sporadic overruns). (TT#7325)
- Added 200MHz support for OP5341 (Fast AIN 2MS). (TT#7129)
- Fixed issues with the resolver out block. Amplitude for sinus and cosinus are selected independently from carrier amplitude. (TT#7111, RT3#264678)
- Resolver Out: Added amplitudes for SinResolver and CosResolver independent from carrier amplitude. (TT#7111, RT3#264678)

Version 2.1.7

- Fix crash of MatLab when installing RT-XSG on Windows XP. (TT#7370)

Version 2.1.5

- Fixed issue while using A/D channels at 200 MHz. (TT#7268, RT3#266105)

Version 2.1.3

- Fixed problem of OP5330 Load_DAC command duplication for one buffer. (TT#6962, RT3#262970)
- Fixed problem of contention, overheat on mezzanine and FPGA when DIN/AIN mezzanine is physically present when loading a bitstream where this I/O slot/group is unused. (TT#6755, RT3#263151)

Version 2.1.2

- Fixed issue with PWM Out block. Duty of the signal suddenly dropped to 0.
(TT#6889, RT3#262656)
- Clarified the specifications of the TSDout RT-XSG block. The minimal delay between two pulses is 40 ns. The documentation is up-to-date. (TT#6799, RT3#260778)

Version 2.1.1

- Fixed calibration model for Analog In block. (TT#6848)
- Fixed problem when generating events shortly before the end of the model time step (40 ns) using TSDO. (TT#6812)
- Added a new XSG Scope. This scope can monitor up to 32 channels with:
 - Up to 250 samples per CPU model time step
 - User-friendly graphical interface
 - Data resolution selection (16 bits or free)

This RT-XSG block is associated to an RT-LAB block. (TT#6785)

- Fixed problem with Resolver Out when using external carrier (wrong amplitude). (TT#6747, RT3#261629)
- Fixed crash at compilation under Windows 7 (64 bits). (TT#6680)

Version 2.1.0

- Modification of Resolver In block output order:

pin1 CarrierOut
pin2 Theta
pin3 RotorfreqBase
pin4 Error

Modification of ResolverIn packing input order:

pin1 Sync
pin2 Theta1
pin3 RotorFreqBase1
pin4 Theta2

pin5 RotorFreqBase2 (TT#6656)

- Update of the Resolver In block documentation. (TT#6654)
- Fixed FPGA drive output to fix problem with Analog In board. (TT#6579, RT3#260422)
- Fixed bug when selecting OP5236-1 board in Hardware Config block. (TT#6651)
- Update of the Hardware Config XSG block documentation. (TT#6636)
- Fixed problem with OP5142 XSG bitbasher block (wrong endianness). (TT#6551, RT3#258775)
- Added new SPI block. (TT#6272, RT3#223779)
- Added support for PCIe Xilinx patch. THIS PATCH IS REQUIRED in order to be able to generate bitstream with RT-XSG. (TT#6574)
- Fixed DDR3 issues with ML605. (TT#6571)
- Fixed PWMO unpacking block. (TT#6562)
- Fixed support for new DIN Mezzanine. Added a new ID board. (TT#6558)
- Fixed incorrect number for digital I/O board. (TT#6553)
- Added support for ML605 I/O. (TT#6355)
- Increased the Maximum Frequency of the PWM output block to 200Mhz. (TT#6511)
- Added support for I/O on BP1 connector. (TT#6507)
- Fixed Analog Out block that was keeping the last value after reset. (TT#6487, RT3#258403)
- Added new ResolverIn and ResolverOut block. (TT#6474)
- Added support for DDR3 memory controller. (TT#6340)
- Added support for ML605. (TT#6295)
- Added support for differential mode, resolution and direction in Quad encoder block. (TT#5251)
- Added support for OP5237-3 Isolated High Voltage 16-Pull-16-Push Hybrid 32out/30in Digital Interface (TT#6415)
- Added support for multiple ranges for the calibration. (TT#6398)
- Added support to execute XSG at 200Mhz on ML605. (TT#6338)
- Added support for MATLAB R2010a and R2010b. (TT#6262)
- Fixed TSDIn block to send an initial state when no event has been detected. (TT#6327)
- Fixed "-k" option that is not supported with xilinx 12.1. (TT#6107)
- Fixed TSBIIn block to remove an additional delay. (TT#6091)
- Added the Floating-Point FPGA State-Space solver. (TT#5897)
- Added 4 example models for the ML605:
 - 1- Simple Multiply and Add
 - 2- PWM and Digital I/O
 - 3- Analog In/Out
 - 4- DIO, TSDIO, QEIO, AIO (TT#6635, RT3#260904)

- Added a new configuration parameter of Encoder In: resolution. (TT#6539, RT3#258775)