MATLAB® & Simulink®
Release Notes for R2007a

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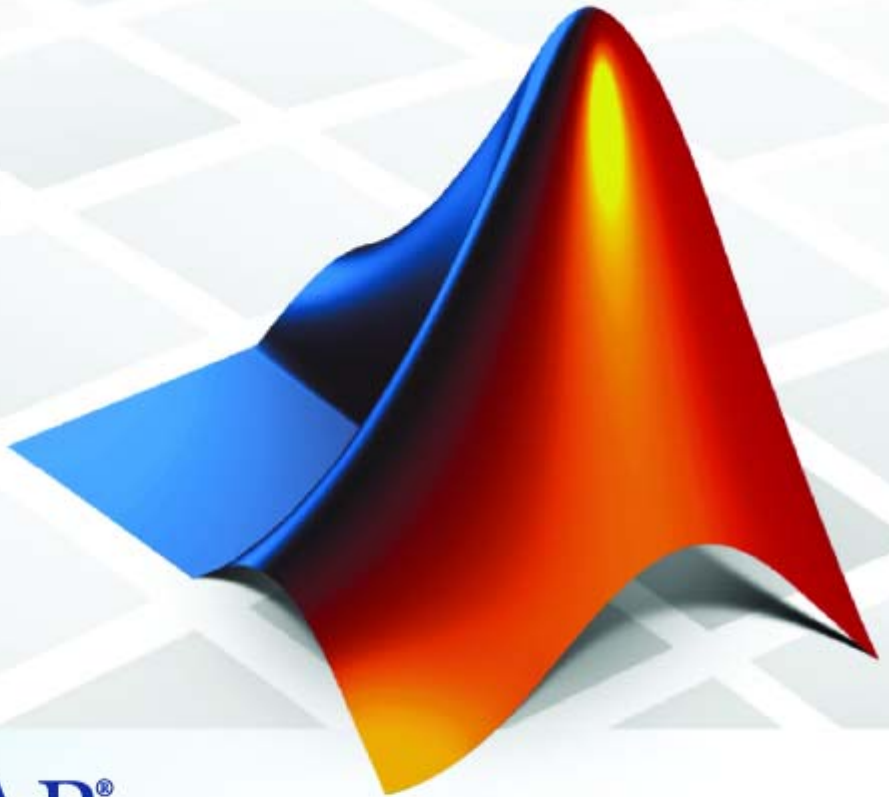
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Release Notes for R2007a

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Contents

1

Release Notes for R2007a

Highlights of R2007a

Release 2007a (R2007a) includes updates to MATLAB® and Simulink®, two new products released since R2006b, and updates and bug fixes to 82 other products. R2007a adds support for the Intel®-based Mac, Windows Vista™, and 64-bit Sun Solaris™ SPARC platforms.

New capabilities for the MATLAB product family include:

- Multithreaded computation in key MATLAB math functions for multicore and multiprocessor systems
- Ability to run parallel algorithms in four MATLAB sessions on your desktop with Distributed Computing Toolbox
- New categorical and dataset arrays in Statistics Toolbox
- Fixed-Point Toolbox acceleration at the speed of compiled C
- Exact modeling and analysis of control loops with delays in Control System Toolbox
- Generation of nonlinear models with System Identification Toolbox
- Simulated annealing in Genetic Algorithm and Direct Search Toolbox

New capabilities for the Simulink product family include:

- Multidimensional signal support Simulink, Signal Processing Blockset, Embedded MATLAB Function block, Video and Image Processing Blockset, and Real-Time Workshop®
- Improved code efficiency and MISRA C support in Real-Time Workshop® Embedded Coder
- New graphical interface for analyzing and scaling fixed-point systems in Simulink® Fixed Point
- Vector and matrix support in SimEvents™
- Simscape, a new product for multidomain physical modeling

New Products

R2007a contains two new products.

Link for Cadence® Incisive®	Cosimulate and verify Verilog and VHDL using Incisive Simulators
Simscape	Model and simulate multidomain physical systems

Products with License-Related Changes

See "R2007a Products with License-Related Changes" on page 1-32 for details about these products that have license-related changes for R2007a.

- Embedded Target for Infineon C166® Microcontrollers

- Embedded Target for Motorola® MPC555

- Embedded Target for TI C2000™

- Embedded Target for TI C6000®

- Link for Code Composer Studio™

- Link for TASKING®

- SimDriveline

- SimHydraulics™

- SimMechanics

Summary of Changes to Each Product

See "Release Summary" on page 1-45 for a summary of what has changed for each product for R2007a, including whether the product has new features, bug fixes, and compatibility issues.

Summary of New Features

> **Note** For information about potential issues involved in upgrading from R2006b, see "Compatibility Considerations" on page 1-35.

This section summarizes the major new features and enhancements introduced in R2007a for the following products:

"MATLAB® 7.4" on page 1-6	"Simulink® 6.6" on page 1-8
"Aerospace Blockset 2.3" on page 1-9	"Aerospace Toolbox 1.1" on page 1-10
"Bioinformatics Toolbox 2.5" on page 1-10	"Communications Blockset 3.5" on page 1-10
"Communications Toolbox 3.5" on page 1-11	"Control System Toolbox 8.0" on page 1-11
"Data Acquisition Toolbox 2.10" on page 1-11	"Datafeed Toolbox 2.0" on page 1-12
"Excel Link 2.5" on page 1-12	"Filter Design HDL Coder 2.0" on page 1-13
"Filter Design Toolbox 4.1" on page 1-13	"Financial Derivatives 5.0" on page 1-13
"Financial Toolbox 3.2" on page 1-14	"Fixed-Income Toolbox 1.3" on page 1-14
"Fixed-Point Toolbox 2.0" on page 1-14	"Genetic Algorithm and Direct Search Toolbox 2.1" on page 1-15
"Image Acquisition Toolbox 2.1" on page 1-15	"Image Processing Toolbox 5.4" on page 1-15
"Link for Cadence® Incisive® 2.0" on page 1-16	"Link for Code Composer Studio™ 3.0" on page 1-16
"Link for ModelSim® 2.2" on page 1-16	"Link for TASKING® 1.1" on page 1-17

MATLAB® 7.4

Development Environment

- Enhanced delimiter matching in the Editor includes language constructs such as for, if, and switch

- Ability to automatically fix a subset of M-Lint warning messages in the Editor

- Desktop tool management enhancements on Windows and Linux platforms, including the ability to maximize and hide tools

- Support for undo and redo in the Array Editor for instant correction of interactive operations

- Ability to publish M-code functions when not evaluating code

- Ability to open MATLAB files from the Windows Explorer into an already running MATLAB

- Help browser search results now include demos

Language and Programming

- New inputParser class, making it easier to parse and validate M-file function input arguments

- New assert function that throws an error if a condition is not true, enabling built-in testing of code

- New `verLessThan` function that checks the version of MATLAB, making it easier to write code that runs across multiple releases
- Numbered arguments to formatted string functions (e.g., `sprintf`), avoiding the need for parameter reordering in applications, such as translation

Mathematics

- New `bsxfun` function, enabling simpler coding and improved performance for binary operations requiring singleton expansion
- New `ilu` function for performing incomplete LU factorization to be used as a preconditioner for sparse iterative methods

File I/O and External Interfacing

- New `CollectOutput` option for the `textscan` function to automatically collect values of the same data type into a single array
- Ability to programmatically connect to an instance of a COM Automation server, to create an Automation server using a custom interface, and to take full advantage of event interfaces

Performance and Large Data Set Handling

- Multithreaded computation support for many linear algebra and element-wise numeric operations, allowing performance improvement on multicore and multiprocessor systems
- Upgraded versions of optimized Basic Linear Algebra Subprogram (BLAS) libraries on all platforms
- Improved performance of the Windows XP 64-bit platforms
- 64-bit MATLAB support for Solaris, allowing the handling of much larger data sets

For details, see the product-specific release notes

Simulink® 6.6

Multidimensional Signal Support

- Simulation and code generation support for models that create, use, and log signals having more than two dimensions

- Permute Dimensions and Squeeze blocks for manipulating multidimensional signals

- Assignment, Selector, Concatenate, and other blocks enhanced to support signals having more than two dimensions

Large-Scale Modeling

- Configuration set references for sharing configuration sets among models in model reference hierarchies

- Model referencing now supports nonzero simulation start times

- Utility functions for deleting the contents of a subsystem or model and for copying contents between a subsystem and a model

- Support for state names in state logging and model linearization commands

- Tools for identifying files required by a model and packaging them in a zip file

- New block, Model Advisor check, and utility functions for detecting buses used as vectors and automatically converting those buses to vectors

- New warning to indicate another program has changed a model file on disk while the model is loaded in Simulink

- New warning to indicate that multiple models or libraries with the same name exist on the MATLAB path

- Block callbacks for executing custom code before Simulink copies or deletes blocks

MATLAB Language Support

- Enhanced Embedded MATLAB Function block supports multidimensional signals, frame signals, function handles, and 31 additional standard library functions

- New command line functionality to check existing M-functions for compliance with the Embedded MATLAB subset, thereby facilitating their inclusion as Embedded MATLAB functions in Simulink and Stateflow

Embedded Software Design and Implementation

- Improved MISRA-C support spanning subsystems, charts, and static library files

- Enhanced Legacy Code Tool supports data-type work vectors and complex numbers

- Ability to control step function prototypes for models

- More efficient code for enabled subsystems and wide signal operations

- Support for passing alias data-type objects via mask parameters

Usability Enhancements

- Improved Model Advisor for navigating checks and displaying status

- Port name display options for displaying signal names on a subsystem block and port numbers on the corresponding port blocks

- Easier customization of object properties displayed by Model Explorer

For details, see the product-specific release notes.

Aerospace Blockset 2.3

- New MATLAB Animation block to visualize flight data

- New output coordinates and dimensions for WGS84 Gravity Model block to output the gravity vector in NED coordinates

For details, see the product-specific release notes.

Aerospace Toolbox 1.1

- New Aero class objects to visualize flight data: `Aero.Animation`, `Aero.Body`, `Aero.Geometry`, and `Aero.Camera`

- New methods for the FlightGear animation object for added flexibility in displaying animations

For details, see the product-specific release notes.

Bioinformatics Toolbox 2.5

- Support for analysis of LCMS and GCMS data

- Ability to perform GCRMA background adjustment, quantile normalization, and RMA summarization of Affymetrix microarray probe-level data

- Ability to estimate false discovery rate (FDR) of differentially expressed genes

- Ability to display and manipulate 3-D molecule structures

- Expanded support vector machine classifier function

- Enhanced control of the phylogenetic tree display

For details, see the product-specific release. notes

Communications Blockset 3.5

- New LDPC Encoder and Decoder blocks

- Fixed-point capabilities added to the Rectangular QAM Demodulator block

- Bit-wise soft-decision outputs enabled for General QAM Demodulator block

- Various blocks enhanced to accept fixed-point data types

- BCH Encoder and Decoder blocks for user specification of primitive and generator polynomials

- New default output data-type settings added to AM and PM demodulator blocks

- New default output data-type option added to Viterbi Decoder block

For details, see the product-specific release notes.

Communications Toolbox 3.5

- Support for different Doppler spectra to channel objects

- Theoretical BER results added to BERTool

- New demo showcasing MIMO capability

- New PN sequence generator object

- New `dvbs2ldpc` function that returns the parity-check matrix of an LDPC code used in the DVB-S.2 standard

- New functions for estimating delays between signals (`finddelay`) and aligning two signals (`alignsignals`)

- Enhanced speed of `rsdec` and `bchdec` functions

- Theoretical results refined for `berawgn`, `berfading`, and `BERTool`

For details, see the product-specific release notes.

Control System Toolbox 8.0

- New LTI infrastructure for efficient modeling and simulation of arbitrary linear systems with delays

- Ability to close any number of feedback loops with delays

- Exact analysis and simulation of control systems with long delays

- New `Tustin` and `Prewarp` options for `d2d` function

- New automated tuning methods in SISO Design Tool, including automated PID tuning and H-infinity loop shaping (requires Robust Control Toolbox)

For details, see the product-specific release notes.

Data Acquisition Toolbox 2.10

- Support for acquiring time-domain data directly into a time series variable for analysis and visualization within Time Series Tools

- Support for 10 additional National Instruments (NI) data acquisition devices: USB-6210, USB-6211, USB-6215, USB-6218, PCI-6230, PCI-6232, PCI-6233, PXI-6230, PXI-6232, and PXI-6233

- Support for 17 additional Measurement Computing Corporation (MCC) data acquisition devices, including the PCI-2511, PCI-2513, PCI-2515, PCI-2517, and various USB devices

For details, see the product-specific release notes.

Datafeed Toolbox 2.0

- New vendor support for Kx Systems kdb+ database and Haver Analytics financial data

For details, see the product-specific release notes.

Distributed Computing Toolbox 3.1

- Ability to automatically run four workers on the client machine licensed by Distributed Computing Toolbox

- New interface for pmode that provides a Parallel Command Window separate from the MATLAB client Command Window

- Vectorized creation of multiple tasks for a job with one command

- Expanded MATLAB functions that work on distributed arrays: `find`, `cat`, `horzcat`, `vertcat`, and `subsindex`

- Enhanced object display format

- Additional interface scripts for third-party schedulers that do not require a shared file system between client and scheduler

For details, see the product-specific release notes.

Excel Link 2.5

- `MLMIssingDataAsNaN` sets empty cells to `NaN` or zero

- `MLUseCellArray` toggles `MLPutMatrix` to always use cell arrays in MATLAB

For details, see the product-specific release notes.

Filter Design HDL Coder 2.0

- HDL code generation support for Farrow filters and polyphase sample rate converters

- Enhanced speed and area trade-off options

- Enhanced GUI that supports the EDA Scripts dialog box and access to HDL code generation from the `filterbuilder` tool in Filter Design Toolbox

For details, see the product-specific release notes.

Filter Design Toolbox 4.1

- Fdesign support for octave band and fractional octave band filters

- Fdesign support for parametric equalizer filters

- Arbitrary magnitude and phase added to multirate filters

- Fdesign support for notch and peak filters

- Support for fixed-point inputs and tunable parameters in Filter Design Toolbox blocks

For details, see the product-specific release notes.

Financial Derivatives 5.0

- Support for pricing and sensitivity computations using trinomial and implied trinomial trees

- Support for financial derivatives computations using International Securities Market Association (ISMA) basis

For details, see the product-specific release notes.

Financial Toolbox 3.2

- Support for fixed-income computations using International Securities Market Association (ISMA) basis

- Support for basis computations that use the International Securities Market Association (ISMA) convention, allowing fixed income and derivatives pricing using ISMA basis in all toolboxes

For details, see the product-specific release notes.

Fixed-Income Toolbox 1.3

- Support for fixed-income computations using the International Securities Market Association (ISMA) basis

For details, see the product-specific release notes.

Fixed-Point Toolbox 2.0

- Fixed-point algorithms that use the Embedded MATLAB subset for executing at compiled C code speeds

- New `fi` syntax support for using the `fimath` object as an argument

- Dot notation support for `fimath` in Embedded MATLAB

- `get` function support for `fi`, `fimath`, and `numerictype` in Embedded MATLAB

- Fixed-point support for Embedded MATLAB functions `diag`, `permute`, `tril`, and `triu`

- Embedded MATLAB enhanced to support multidimensional arrays and function handles

For details, see the product-specific release notes.

Genetic Algorithm and Direct Search Toolbox 2.1

- New optimization functionality for performing simulated annealing and threshold acceptance for unconstrained and bound-constrained problems

- Enhanced genetic algorithm function syntax to be consistent with other optimization solvers

For details, see the product-specific release notes.

Image Acquisition Toolbox 2.1

- New Simulink block (From Video Device) to bring image and video data streams into Simulink from any image acquisition devices supported in MATLAB

- Support for additional QImaging devices: Retiga 2000RV, Retiga 4000RV, and Rolera MGi

- Support for additional Matrox devices: Helios XA and Solios XA

- Improved DCAM adaptor, which uses Version 6.4.2 of the CMU DCAM driver, supports 1394B firewire and DCAM 1.3.1, and supports higher frame rates

For details, see the product-specific release notes.

Image Processing Toolbox 5.4

- `imresize` function that runs faster, uses less memory, supports new interpolation methods, and supports new options for specifying output size

- `applycform` function that uses tetrahedral interpolation for profiles containing multidimensional lookup tables, with more accurate results

- The Control Point Selection Tool enhanced visual appearance, improved usability, and support for use in scripts

- `impoint`, `imline`, and `imrect` functions to support interactive placement, and now `imrect` also supports interactive resizing

- New `montage` parameters that control the arrangement and appearance of the images displayed

For details, see the product-specific release notes.

Link for Cadence® Incisive® 2.0

Version 1.0 of Link for Cadence® Incisive® was released via the Web after R2006b. Version 2.0, released as part of R2007a, includes the new features listed below.

- Native VHDL support

- Option to deactivate HDL cosimulation block for faster Simulink model debugging

- Mixed-language (VHDL and Verilog) cosimulation support in Simulink models

For details, see the product-specific release notes.

Link for Code Composer Studio™ 3.0

- Project Generator capability enables project generation for C2000, C5000, and C6000 processors from Simulink models

- Support for processor-in-the-loop (PIL) cosimulation with C2000, C5000, and C6000 processors

- Library of Simulink blocks for interrupt handling and accessing the memory in the projects generated with Project Generator

- Real-time execution profiler for profiling projects generated with Project Generator and running on a target processor

- Demos of how to use PIL cosimulation and real-time execution profiling

For details, see the product-specific release notes.

Link for ModelSim® 2.2

- Option to deactivate HDL cosimulation block for faster Simulink model debugging

- Mixed-language (VHDL and Verilog) cosimulation in Simulink models

For details, see the product-specific release notes.

Link for TASKING® 1.1

- Verification demo on using software-in-the-loop (SIL) and processor-in-the-loop (PIL) for testing generated and hand-written code

- New verification function (`target_block_verify`) that automates comparison of simulation and SIL/PIL results

- New functions (`readMemoryUnits` and `writeMemoryUnits`) that simplify reading from and writing to target memory

- Maximum stack usage reported automatically after PIL test (command-line functions also available for non-PIL use)

- Bidirectional traceability between generated code in TASKING and Simulink blocks

- Support for model reference

- Support for Real-Time Workshop GRT target for building and downloading (Real-Time Workshop Embedded Coder ERT target is still required for PIL)

- Support for PIL with the DSP563xx Toolset

- New TASKING Toolset support for TriCore v2.4r1 patch 1 and C166/ST10 v8.6 r2

For details, see the product-specific release notes.

Mapping Toolbox 2.5

- Improved performance for the `los2` and `viewshed` functions

- New functions for degrees-minutes-seconds conversions

- Utility functions for computing distance and position along meridians

For details, see the product-specific release notes.

MATLAB® Builder for .NET 2.2

- Support for Windows 64-bit operating system

- New utility for converting older projects to the new Deployment Tool format

For details, see the product-specific release notes.

MATLAB® Builder for Excel 1.2.8

- Support for Windows 64-bit operating system
- Qualified for Excel 2007 Beta
- New utility for converting older projects to the new Deployment Tool format

For details, see the product-specific release notes.

MATLAB® Builder for Java 1.1

- Support for Windows 64-bit, Mac, Intel Mac, and Solaris 64-bit operating systems
- Ability to pass Java objects directly to compiled M-functions, with objects accessible by the MATLAB Java Builder interface
- Conversion methods for transforming MATLAB numeric array data into Java primitive numeric types
- Ability to convert RGB image data to Java AWT image object format
- Ability to access Sun Javadoc using the Search field in the MATLAB Help browser

For details, see the product-specific release notes.

MATLAB® Compiler 4.6

- Support for Intel Mac and Solaris 64-bit operating systems
- Readme file now generated to guide users through application deployment
- MCR Installers available for all supported platforms
- Access to Deployment Tool project files available from the command line for automated build execution

For details, see the product-specific release notes .

MATLAB® Distributed Computing Engine 3.1

- Ability to automatically run four workers on the client machine licensed by Distributed Computing Toolbox

- New interface for `pmode` that provides a parallel Command Window separate from the MATLAB client Command Window

- Vectorized creation of multiple tasks for a job with one command

- Expanded MATLAB functions that work on distributed arrays: `find`, `cat`, `horzcat`, `vertcat`, and `subsindex`

- Enhanced object display format

- Interface scripts for third-party schedulers that do not require a shared file system between the client and scheduler

For details, see the product-specific release notes.

Model-Based Calibration Toolbox 3.2

- Ability to create, edit, and fit models interactively either by using new command-line functionality or by building scripts to automate the process

- New tools for assessing and using optimization results to generate optimal look-up tables

- Ability to use distributed computing to speed up multiple-run optimization problems (requires Distributed Computing Toolbox)

- Ability to find globally optimal solutions using genetic algorithms and pattern search methods (requires Genetic Algorithm and Direct Search Toolbox)

For details, see the product-specific release notes.

Real-Time Workshop® 6.6

- Static file dependencies reduced for improved integration and builds

- Enhanced code efficiency, including Merge and Concatenate block optimizations

- Enhanced checking and reporting for identifier conflicts

- Support for multidimensional signals

- Support for indexed tunable parameters used in tunable expressions

- Support for Simulink Legacy Code Tool enhancements

- New TLC tutorial

For details, see the product-specific release notes.

Real-Time Workshop® Embedded Coder 4.6

- Ability to control step function prototypes for models

- New ERT target for generating host-based shared libraries (`.dll` and `.so`)

- Enhanced software-in-the-loop (SIL) testing with new portable word sizes option

- New code style options for controlling expression optimizations in generated code

- Enhanced MISRA-C compliance

For details, see the product-specific release notes.

RF Blockset 2.0

- Support for Agilent P2D and S2D system-level verification models

- Enhanced dialog boxes for physical blocks

- Enhanced interface for importing data from a file

- New noise and nonlinearity specification options for physical amplifier and mixer blocks

- Support for using a logarithmic scale for one or more plot axes and plotting on both the left and right Y-axes
- New Connection Port block for adding an RF Blockset physical modeling connector port to a subsystem
- Two new demos: "Power in Simulink Sources and Signals" and "An Executable Specification for System Design"

For details, see the product-specific release notes.

RF Toolbox 2.1

- Support for Agilent P2D and S2D system-level verification models
- Mixer spur analysis from imported intermodulation tables
- `timeresp` method for computing the time response of an `rfmodel` object to a specified input signal
- New methods for plotting `rfckt` objects using a logarithmic scale for one or more axes
- `gamma2z` function for computing input impedance from a reflection coefficient
- Data tips for viewing numerical information on plots
- New "Visualizing Mixer Spurs" demo and upgraded existing demos to reflect newest features

For details, see the product-specific release notes.

Robust Control Toolbox 3.2

- New Simulink blocks for importing uncertain models into Simulink and performing Monte Carlo analysis of uncertainty effects
- `dcgainmr` function to reduce model order based on modal decomposition
- `ltiarray2uss` function to construct an uncertain model that captures a range of linear behaviors
- Enhanced algorithm for computing the structured singular value

For details, see the product-specific release notes.

Signal Processing Blockset 6.5

- New Kalman Adaptive Filter block

- Unsigned fixed-point and integer support added to Cumulative Product, Cumulative Sum, Difference, FIR Decimation, FIR Interpolation, and FIR Rate Conversion blocks

- n-D support added to Check Signal Attributes, dB Conversion, dB Gain, Frame Conversion, Normalization, and Pad blocks

- X-axis control added to Vector Scope and Spectrum Scope blocks

- New Filter Design Toolbox blocks: Arbitrary Magnitude Filter, Octave Filter, Parametric Estimation, and Peak-Notch Filter

For details, see the product-specific release notes.

Signal Processing Toolbox 6.7

- New circular convolution function

- Support for partial frequency-range input for spectrum objects

- `realizemdl` method available for `dfilt.statespace` objects

- Support for `lsf2poly` and `latcfilt` multichannel input

For details, see the product-specific release notes.

SimBiology 2.1.1

Version 2.1 of SimBiology, which was released via the Web after R2006b, includes the following new features. No additional new features were added in Version 2.1.1, which is released as part of R2007a.

- Ability to export graphical pathways to SVG, JPEG, or PDF formats

- Ability to create graphical pathway printouts that include headers and footers

- Ability to select and edit globally on graphical components

- Ability to mouse over a block to see details in the Block Overview window

For details, see the Version 2.0 section of the product-specific release notes.

SimDriveline 1.3

- Ability to model multidomain physical systems using Simscape (now required)
- Ability to share models using Simscape editing modes

For details, see the product-specific release notes.

SimEvents™ 2.0

- Vector and matrix support for modeling dense payloads via attributes
- Entity combining feature for bundling entities and attributes
- Time-out feature for modeling point-to-point timing constraints
- New application demos in communications, video processing, and architecture modeling

For details, see the product-specific release notes.

SimHydraulics™ 1.2

- Ability to model multidomain physical systems using Simscape (now required)
- Ability to share models using Simscape editing modes
- Eight new blocks
- Initial conditions added for certain blocks
- Foundation and Utilities block libraries moved from SimHydraulics to Simscape

For details, see the product-specific release notes.

SimMechanics 6.0

- Ability to model multidomain physical systems using Simscape (now required)
- Ability to share models using Simscape editing modes
- Two blocks now with tunable parameters

For details, see the product-specific release notes.

SimPowerSystems 4.4

- New Brushless DC Motor Drive block

For details, see the product-specific release notes.

Simulink® Accelerator 6.6

- Nonverbose output is now the default when generating code

For details, see the product-specific release notes.

Simulink™ Control Design 2.1

- Ability to linearize using an operating point specified directly in a Simulink model
- Ability to linearize at simulation snapshots using the GUI
- Ability to perform control design at simulation snapshots using the GUI

For details, see the product-specific release notes.

Simulink® Fixed Point 5.4

- Enhanced Fixed-Point Tool provides a new interactive graphical environment for analyzing and scaling fixed-point systems

For details, see the product-specific release notes.

Simulink HDL Coder 1.1

- HDL Code Generation from the Embedded MATLAB Function block

- Enhanced GUI supports generation of EDA Tool Scripts

- HDL code generation for the Link for Cadence Incisive HDL Cosimulation block

For details, see the product-specific release notes.

Simulink® Report Generator 3.2

- Support for hierarchical Web-view navigation

- Support for Scalable Vector Graphics format in System Snapshot and Stateflow Snapshot components for HTML reports

For details, see the product-specific release notes.

Stateflow® 6.6

- New operators for detecting changes in Stateflow data values: hasChanged, hasChangedFrom, and hasChangedTo

- Enhanced MISRA-C code generation support, including elimination of `goto` statements

For details, see the product-specific release notes.

Stateflow® Coder 6.6

- Elimination of `goto` statements from Stateflow generated code

For details, see the product-specific release notes.

Statistics Toolbox 6.0

- New dataset arrays that enable convenient organization and analysis of heterogeneous data and metadata

- New categorical arrays for organizing and processing categorical data

- New distribution fitting functionality for modeling outlier-prone data using empirical and Pareto models

- `scatterhist` function produces scatter plots of 2-D data with marginal distributions along the axes

- `linhyptest` function for linear hypothesis testing of regression coefficients

- Classification and regression trees now produce objects for analyzing model results

- Enhanced `classify` function for computing coefficients of discriminant functions defining boundaries between classification regions

For details, see the product-specific release notes.

Symbolic Math Toolbox 3.2

- Extended support for Intel processors on 64-bit Linux and Intel Mac platforms

- New Maple™ 10 kernel access

For details, see the product-specific release notes.

System Identification Toolbox 7.0

- Ability to estimate nonlinear black-box models, including nonlinear ARX and Hammerstein-Wiener models

- Ability to estimate nonlinear grey-box models based on arbitrary ordinary differential equations specified in an M-file or MEX-file

- New getting started guide

For details, see the product-specific release notes.

SystemTest 1.1

- Enhanced limit and tolerance checking, providing more options for defining the pass/fail criteria for a test

- Support for `undo` and `redo` now available in the SystemTest desktop

- New Test Execution mode using grouped Test Vectors to increase control over the flow of tests, also useful for Monte Carlo or Design of Experiments (DOE)

- Reports generated for test execution enhanced to contain more information, including plots

- Enhanced `save` and `load` capabilities in the Test Results Viewer

For details, see the product-specific release notes.

Target for Freescale™ MPC5xx 2.1

- Support for Simulink external mode via CAN.

- Support for Real-Time Workshop GRT target for build and download (Real-Time Workshop Embedded Coder ERT target required for PIL, Algorithm Export, and other features)

For details, see the product-specific release notes.

Target for Infineon C166® 1.4

- Support for Simulink external mode via CAN.

- Support for Real-Time Workshop GRT target for build and download (Real-Time Workshop Embedded Coder ERT target required for PIL, bit-addressable memory, and other features)

- Support for Model Reference

For details, see the product-specific release notes.

Target for TI C2000™ 2.2

- General-purpose I/O (GPIO) blocks added to configure GPIO registers for C280x targets

- Software Interrupt block for interrupt-driven scheduling in models

- C280x CAP blocks for all C280x processor targets

For details, see the product-specific release notes.

Target for TI C6000™ 3.2

- External mode for C6416DSK, C6711DSK, C6713DSK, DM642EVM, and C6455/TCI6482 DSK/EVM hardware for modifying block parameters in real time and logging block output (PADK6727 does not support external mode)

- Block Processing subsystem block for processing incremental portions of images using DMA transfers to improve throughput

- Transmit, Receive, and Configure blocks to implement Serial RapidIO (SRIO) communications for C6455 targets

- Enhanced DM642 EVM video block to support PAL format input and output

- EDMA block for configuring DMA transfers

For details, see the product-specific release notes.

Video and Image Processing Blockset 2.3

- Support for color data added to 11 blocks

- Simplified color data management from 3-D array representation

- Insert Text block now supports placing multiple strings of text on images

- New demo for stereo vision computes the disparity map between two images

- New Kalman Filter block from Signal Processing Blockset added to "People Tracking" and "Lane Departure Warning System" demos

For details, see the product-specific release notes.

Virtual Reality Toolbox 4.5

- Full-screen mode in Virtual Reality Toolbox viewer and Orbisnap standalone viewer

For details, see the product-specific release notes.

Wavelet Toolbox 4.0

- Nine new wavelet 1–D multisignal functions for wavelet analysis, compression and compression scores, denoising, thresholding, decomposition and reconstruction, changing decomposition coefficients, and decomposition energy repartitions

- New wavelet 1–D multisignal GUI for all new functions, plus clustering

For details, see the product-specific release notes.

xPC Target 3.2

- Support for interfacing with target PC parallel ports

- Support for interfacing with new I/O boards, including Commtech Fastcom 422/2-PCI-335, Measurement Computing PCI-DAS1002 and PCI-DAC6703, Quanser Q4, and National Instruments PCI-6528

- Expanded xPC Target Explorer, C API, and COM API to select signals using signal names instead of block paths

- Support for encoding and decoding messages specified via a CANdb file

- DDK for writing device drivers for xPC Target

For details, see the product-specific release notes.

New Products

R2007a contains two new products.

Link for Cadence® Incisive®	Cosimulate and verify Verilog and VHDL using Incisive Simulators
Simscape	Model and simulate multidomain physical systems

Link for Cadence Incisive

Note Link for Cadence® Incisive® was released via the Web after R2006b, but before R2007a. The Web-release version of the product was named Link for Incisive; for R2007a the product name has been changed to Link for Cadence® Incisive® .

Link for Cadence Incisive is a cosimulation interface that integrates MATLAB and Simulink into the hardware design flow for application-specific integrated circuit (ASIC) and field programmable gate array (FPGA) development. It provides a bidirectional link between MATLAB and Simulink and Incisive platform simulators from Cadence Design Systems. Link for Cadence Incisive enables you to verify your HDL design from within MATLAB and Simulink. It provides native cosimulation support for Verilog and support for VHDL and mixed-language simulations via Verilog modules.

Key Features

- Native Verilog support

- Connection of a Simulink model to one or more Incisive simulators

- MATLAB test bench capability, enabling the use of MATLAB code to simulate and check HDL code

- MATLAB component capability, enabling simulation of MATLAB code in place of entities not yet coded in HDL

- User-selectable communication modes between MATLAB and Simulink and Incisive, providing shared memory (for faster performance) and TCP/IP sockets (for versatility)

- Interactive or batch mode cosimulation, debugging, testing, and verification of HDL code from MATLAB

For details, see the product-specific release notes.

Simscape

Simscape extends Simulink with tools for modeling and simulating multidomain physical systems. Simscape lets you model systems that span mechanical, electrical, hydraulic, and other physical domains. Simscape can be used to model and simulate a variety of physical systems for aerospace, defense, automotive, and industrial applications. Add-on physical modeling products extend Simscape to model more detailed aspects of hydraulic, 3-D mechanical, and 1-D mechanical systems.

Key Features

- Single environment for modeling and simulating mechanical, electrical, and hydraulic systems

- Library of physical modeling building blocks and fundamental mathematical elements

- Connection blocks to bridge modeling domains

- Ability to tune and simulate models built with SimMechanics, SimDriveline, or SimHydraulics

For details, see the product-specific release notes.

R2007a Products with License-Related Changes

Product	R2007a Changes
Embedded Target for Infineon C166® Microcontrollers	As of R2007a, Embedded Target for Infineon C166® Microcontrollers has been renamed Target for Infineon C166®. In addition, the product no longer requires Real-Time Workshop Embedded Coder.
Embedded Target for Motorola® MPC555	As of R2007a, Embedded Target for Motorola® MPC555 has been renamed Target for Freescale™ MPC5xx. In addition, the product no longer requires Real-Time Workshop Embedded Coder.
Embedded Target for TI C2000™ DSP	As of R2007a, Embedded Target for TI C2000™ DSP has been renamed Target for TI C2000™.
Embedded Target for TI C6000™ DSP	As of R2007a, Embedded Target for TI C6000™ DSP has been renamed Target for TI C6000™.
Link for Code Composer Studio™	As of R2007a, Link for Code Composer Studio™ no longer requires Signal Processing Toolbox.
Link for Incisive	Link for Incisive was released via the Web after R2006b, but before R2007a. The Web-release version of the product was named Link for Incisive; for R2007a the product has been renamed Link for Cadence® Incisive®.
Link for TASKING®	As of R2007a, Link for TASKING® no longer requires Real-Time Workshop Embedded Coder.

Product	R2007a Changes
SimDriveline	As of R2007a, SimDriveline requires Simscape, a new product in this release.
SimHydraulics	As of R2007a, SimHydraulics requires Simscape, a new product in this release.
SimMechanics	As of R2007a, SimMechanics requires Simscape, a new product in this release.

Discontinued Products

The following products have been discontinued and are not included in R2007a:

- Embedded Target for Motorola® HC12
- xPC TargetBox®

Embedded Target for Motorola HC12

As of R2007a, Embedded Target for Motorola HC12 is no longer available for purchase and no new feature development or further bug fixes will occur. Technical support will be offered on a limited basis, as available. Contact your sales representative with additional questions.

xPC TargetBox

As of R2007a, xPC TargetBox® hardware is no longer available for purchase from The MathWorks. The MathWorks has partnered with Speedgoat GmbH, a Switzerland-based real-time simulation hardware vendor, to support existing xPC TargetBox users. Contact your sales representative with additional questions.

Compatibility Considerations

These topics summarize the potential compatibility considerations when upgrading from R2006b to R2007a:

- "R2007a Compatibility Assessment" on page 1-35
- "Compatibility for Each Product" on page 1-39
- "Compatibility Considerations for New Functions and Models" on page 1-40

R2007a Compatibility Assessment

Upgrading from R2006b to R2007a is not expected to cause any significant compatibility problems for most users. The compatibility considerations likely to be noticed by the broadest cross-section of users are summarized in the following table. Refer to product-specific release notes for details on these and other product-specific compatibility considerations.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB	Default MATLAB startup folder on Windows systems has changed. Instead of using the \Work folder in your MATLAB installation folder, MATLAB now creates a \MATLAB folder in your My Documents folder (Documents on Vista systems).	See "New Default MATLAB Startup Folder" on page 1-42.	None required.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB – Desktop Tools and Development Environment	Double-clicking a file associated with MATLAB in Windows (e.g., MAT-file) opens in existing MATLAB, instead of opening a new MATLAB session. M-files open in MATLAB Editor/Debugger instead of stand-alone Editor.	For M-files, if MATLAB is not running, and a license is not available, MATLAB will not start and file will not open.	To open an M-file in stand-alone Editor, run `meditor.exe` and open file from there. To start stand-alone Editor or another editor when double-clicking M-files in Windows, change Windows file association.
MATLAB - Mathematics	Mersenne Twister algorithm used as new default for random number generator (`rand` function).	`rand` will produce different values than in previous releases. Code that uses the `'state'` or `'seed'` keyword to initialize `rand` will change the generator algorithm from the new default. Code that uses the `'state'` or `'seed'` keyword to save or restore the initial state of `rand` without first explicitly selecting the corresponding algorithm may not work as intended.	If your code requires the generator algorithm used by `rand` in previous releases, you will need to reinitialize `rand` using the command `rand('state',0)`.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB - Mathematics	Divide-by-zero and log-of-zero warnings turned off by default.	Warning status is still updated and only the screen output turned off. Numerical results could be corrupted without you realizing it.	If you want these warnings to display, type `warning on MATLAB:divideByZero warning on MATLAB:logOfZero` to turn them on.
MATLAB - Programming	Files in directory which is one or more levels below a MATLAB class directory (`@dir`) are no longer callable.	Code that has these calls will error.	Move the files you want to call to a directory other than a class directory.
MATLAB – Graphics and 3-D Visualization	Movies no longer play during loading.	The number of times a movie plays will be reduced by one because the preview no longer displays during loading.	For code that calls a movie in a loop a certain number of times and you want that number to remain the same, add one extra iteration to the loop.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB – External Interfaces/API	MEX-files created in or prior to R11 no longer supported.	Programs that rely on R11 or prior MEX-files will produce an `Invalid MEX-file` error.	Recompile MEX-files with MATLAB R12 or later.
Simulink	In the Configuration Parameters dialog, **Diagnostics Data Validity** pane, the default setting for **Signal resolution** is now Explicit only. Previously, the default was Explicit and Warn Implicit.	Models built in R2007a will default to Explicit only. Models created in previous versions will retain the Signal resolution value with which they were saved, and will run as they did before. Therefore, new models may behave differently from existing models.	To specify the previous behavior in a new model, change Signal resolution to Explicit and Warn Implicit, or use the API to change `SignalResolutionControl` to `TryResolveAllWithWarnings`.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
Simulink	Evaluating port parameters will start from system above the block that owns the port.	Incorrect results may occur because port parameters will no longer be able to resolve against variables that exist in the mask workspace of the block that owns the port.	Change the subsystem's port parameters so they do not rely on variables in the subsystem's mask workspace.
Signal Processing Blockset	R11.1 blocks, deprecated since R14SP2, have been removed.	Models containing removed blocks will fail to run.	Run helper script before upgrading to remove old R11.1 DSP Blockset blocks and replace them with current Signal Processing Blockset blocks. Refer to the MATLAB Central submission titled "Tool for Removing R11 DSP Blockset Blocks from Models" on the Web to download the script and its associated documentation.

Compatibility for Each Product

To see if any known compatibility considerations exist for your product, see "Release Summary" on page 1-45. If the table shows that there are compatibility considerations for any of your products, follow the link to the product's release notes and refer to the summary table of compatibility considerations. From this table you can link to details. If you are upgrading from a release before R2006b, also see the entries in the table for earlier versions.

Compatibility Considerations for New Functions and Models

The introduction of new functions and models could cause a conflict with any of your own M-files, models, and variables having the same names.

Example

If you created a function named assert in a previous release, it might conflict with the new MATLAB assert function (introduced in R2007a). Another conflict that might arise is when you load a MAT-file that contains a variable named assert.

To identify and address name conflicts, see these topics in the MATLAB Programming documentation:

- Don't Use Function Names for Variables
- Naming a Function Uniquely

System Requirements

New Platform Support

R2007a adds support for these platforms:

- Intel®-based Macintosh
- Microsoft® Windows Vista™
- 64-bit Sun Solaris™ SPARC

For information on system requirements, visit http://www.mathworks.com/support/sysreq/r2007a/.

Installation Notes for Windows

- "New Default MATLAB Startup Folder" on page 1-42
- "Running MATLAB on Vista" on page 1-42
- "User Account Control Dialog Box and setup.exe" on page 1-43
- "Running a Vista System as a License Server" on page 1-44

New Default MATLAB Startup Folder

The default MATLAB startup folder (or startup directory) has changed on Windows systems. In previous releases, the default startup folder was the `Work` folder in the MATLAB installation folder. For example, in R2006b, if you installed MATLAB in `C:\Program Files`, the default startup folder would be:

```
C:\Program Files\MATLAB\R2006b\Work
```

In R2007a, MATLAB creates a folder named `MATLAB` in your `My Documents` folder (`Documents` folder on Vista systems) and uses this folder as the default startup folder. This change was made to complement the new Vista security policy, or User Account Control (UAC). Creating files in the `C:\Program Files` folder requires administrator privileges.

Note the following:

- Each user now has their own startup folder.
- Default MATLAB startup folder is no longer release-specific.
- Default MATLAB startup folder is now part of each user's roaming profile.

For more information about this change, and about how to specify the MATLAB startup folder, see "Startup and Shutdown".

Running MATLAB on Vista

A fundamental change in Windows Vista™, the User Account Control (UAC) feature, can impact the ability of MATLAB and supporting products to appropriately update system and global settings as necessary.

Two examples of system or global settings being updated by MATLAB or supporting products include, but are not limited to, installing ActiveX controls and registering DLLs.

Examples of some MathWorks products that install ActiveX controls or register DLLs include:

- Data Acquisition Toolbox

- Gauges Blockset

- MATLAB Builder for .NET

- MATLAB Builder for Excel

- MATLAB Builder for Java

- MATLAB Compiler

- Model-Based Calibration Toolbox

- Requirements Management Interface

- Simulink Verification and Validation

- xPC Target

If you work with a product that does these operations, you need to run MATLAB as an administrator. With UAC, users with standard user privileges and users with administrator privileges are both treated as standard users. The recommended approach to run MATLAB as an administrator is to right-click on the MATLAB shortcut icon and select `Run as administrator`.

User Account Control Dialog Box and setup.exe

When you start the MathWorks Installer on a Windows Vista™ system, Windows displays a **User Account Control** dialog box stating that an unidentified program (`setup.exe`) wants access to your computer. The `setup.exe` program is the MathWorks Installer. Click **Allow** to continue with the installation.

Running a Vista System as a License Server

Because Macrovision license daemons do not run on Vista systems as a service, you cannot configure the license manager as a service on Vista.

You must run the license manager as an application, or use a different platform as your license server. When running the MathWorks Installer, accept the default on the **License Manager Configuration** dialog box, which is `Do Not configure service...`.

To start the license manager after the installation is complete, follow this procedure:

1 Open a DOS command prompt window. To open a DOS command prompt window, select **Run** on the Windows **Start** menu. In the **Run** dialog box, enter cmd and click **OK**.

2 Navigate to the *matlabroot*/flexlm folder (where matlabroot is your MATLAB installation folder). For example, if you installed in `C:\Program Files\MATLAB\R2007a`, enter C: and press **Return**, to move to your C: drive, and then enter the following command:

`cd C:\Program Files\MATLAB\R2007a\flexlm`

3 Execute the following command to start the license manager daemon (lmgrd.exe):

`lmgrd.exe -c license_file -l log_file`

In this command, license_file specifies the full path of your License File and log_file specifies the full path of the license manager log file.

Do not configure the license manager as a service using LMTOOLS.

Release Summary

> **Note** An asterisk (*) after a product name indicates the product has had a Web release since R2006b.

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
MATLAB®	Yes	Yes	Yes
Simulink®	Yes	Yes	Yes
Aerospace Blockset	Yes	Yes	Yes
Aerospace Toolbox	Yes	Yes	No
Bioinformatics Toolbox	Yes	Yes	Yes
Communications Blockset	Yes	Yes	Yes
Communications Toolbox	Yes	Yes	Yes
Control System Toolbox	Yes	Yes	No
Curve Fitting Toolbox	No	Yes	No
Data Acquisition Toolbox	Yes	Yes	Yes
Database Toolbox	No	Yes	No
Datafeed Toolbox	Yes	Yes	No
Distributed Computing Toolbox	Yes	No	Yes
Embedded Target for Infineon C166®Microcontrollers – name changed to Target for Infineon C166®	N/A	N/A	N/A

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Embedded Target for Motorola® HC12 (see "Discontinued Products" on page 1-34)	N/A	N/A	N/A
Embedded Target for Motorola® MPC555 – name changed toTarget for Freescale™ MPC5xx	N/A	N/A	N/A
Embedded Target for TIC2000™ DSP – see Target for TI C2000™ MPC5xx	N/A	N/A	N/A
Embedded Target for TIC6000™ DSP – see Target for TI C6000™ MPC5xx	N/A	N/A	N/A
Excel Link	Yes	No	No
Extended Symbolic Math Toolbox	Yes	Yes	No
Filter Design HDL Coder	Yes	No	No
Filter Design Toolbox	Yes	Yes	No
Financial Derivatives Toolbox	Yes	No	No
Financial Toolbox	Yes	Yes	No
Fixed-Income Toolbox	Yes	No	No
Fixed-Point Toolbox	Yes	Yes	Yes
Fuzzy Logic Toolbox (no release notes)	No	Yes	No
GARCH Toolbox	No	No	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Gauges Blockset	No	No	No
Genetic Algorithm and Direct Search Toolbox	Yes	Yes	Yes
Image Acquisition Toolbox	Yes	Yes	Yes
Image Processing Toolbox	Yes	Yes	Yes
Instrument Control Toolbox	No	Yes	Yes
Link for Cadence® Incisive®* (see "New Products" on page 1-30)	Yes	Yes	No
Link for Code Composer Studio Development Tools	Yes	Yes	No
Link for ModelSim®	Yes	Yes	No
Link for TASKING®	Yes	No	Yes
Mapping Toolbox	Yes	Yes	Yes
MATLAB® Builder for Excel	Yes	Yes	No
MATLAB® Builder for Java	Yes	Yes	No
MATLAB® Builder for .NET	Yes	Yes	No
MATLAB® Compiler	Yes	Yes	No
MATLAB® Distributed Computing Engine	Yes	No	Yes
MATLAB® Report Generator	No	Yes	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Model-Based Calibration Toolbox	Yes	Yes	No
Model Predictive Control Toolbox	No	Yes	No
Neural Network Toolbox	No	No	No
OPC Toolbox	No	Yes	No
Optimization Toolbox	No	Yes	No
Partial Differential Equation Toolbox (no release notes)	No	No	No
Real-Time Windows Target	No	Yes	No
Real-Time Workshop®	Yes	Yes	No
Real-Time Workshop® Embedded Coder	Yes	Yes	No
RF Blockset	Yes	No	No
RF Toolbox	Yes	Yes	No
Robust Control Toolbox	Yes	Yes	No
Signal Processing Blockset	Yes	Yes	Yes
Signal Processing Toolbox	Yes	Yes	No
SimBiology*	Yes	No	No
SimDriveline	Yes	Yes	Yes
SimEvents	Yes	Yes	Yes
SimHydraulics	Yes	Yes	Yes
SimMechanics	Yes	Yes	Yes
SimPowerSystems	Yes	Yes	Yes

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Simscape (see "New Products" on page 1-30)	No	No	Yes
Simulink® Accelerator	Yes	Yes	No
Simulink® Control Design	Yes	Yes	No
Simulink® Fixed Point	Yes	Yes	No
Simulink® HDL Coder	Yes	Yes	No
Simulink® Parameter Estimation	No	Yes	No
Simulink® Report Generator	Yes	Yes	No
Simulink® Response Optimization	No	Yes	No
Simulink® Verification and Validation	No	No	No
Spline Toolbox	No	No	No
Stateflow® and Stateflow® Coder	Yes	Yes	No
Statistics Toolbox	Yes	Yes	Yes
Symbolic Math Toolbox	Yes	Yes	No
System Identification Toolbox	Yes	Yes	No
SystemTest	Yes	No	Yes
Target for Freescale™ MPC5xx	Yes	Yes	Yes
Target for Infineon® C166	Yes	Yes	Yes
Target for TI C2000™	Yes	Yes	Yes
Target for TI C6000™	Yes	Yes	Yes

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Video and Image Processing Blockset	Yes	Yes	Yes
Virtual Reality Toolbox	Yes	No	No
Wavelet Toolbox	Yes	Yes	No
xPC Target	Yes	Yes	Yes
xPC TargetBox® (see "Discontinued Products" on page 1-34)	N/A	N/A	N/A