MATLAB® & Simulink®
Release Notes for R2007b

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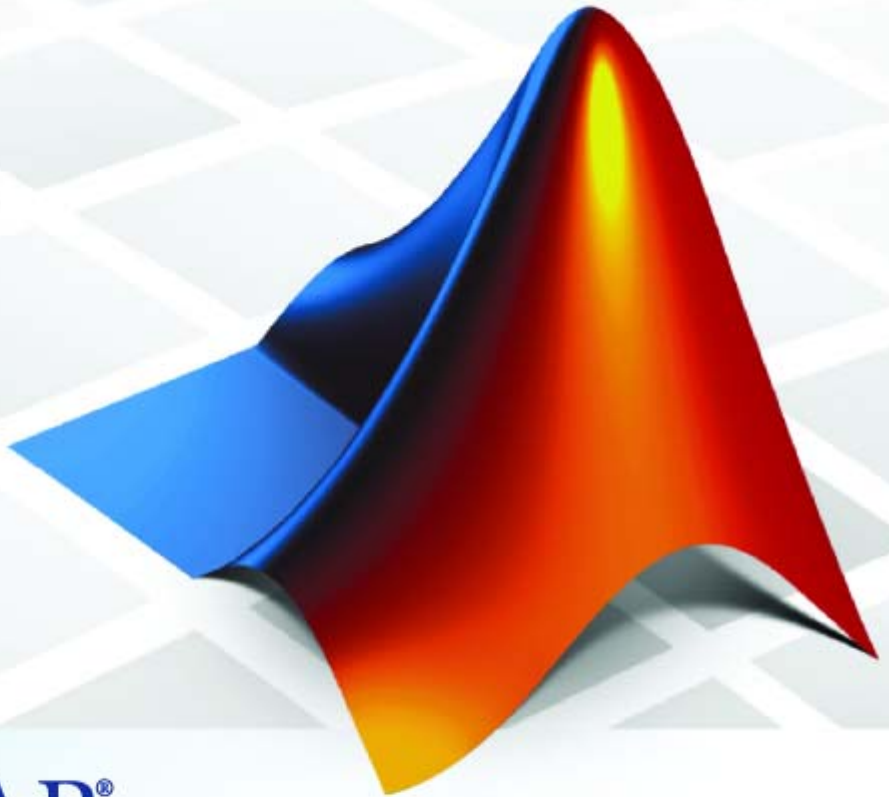
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Release Notes for R2007b

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Revision History
September 2007   First printing   New for Release 2007b

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Release Notes for R2007b

Highlights of R2007b

Release 2007b (R2007b) includes Simulink® 7.0, new features in MATLAB®, two new products released since R2007a, and updates and bug fixes to 82 other products. Subscribers to MathWorks Software Maintenance Service can download R2007b product updates.

R2007b introduces a major new feature: C code generation from Embedded MATLAB™ functions directly at the MATLAB command line, using Real-Time Workshop®. In addition, Embedded MATLAB Function blocks in Simulink support algorithms in multiple M-files.

New capabilities for the Simulink product family include:

- Simulation accelerators in Simulink provide compiled simulations and dual-core or dual-processor operation
- Normal mode model reference for component-based modeling in Simulink
- Bidirectional tracing and new target-specific code optimization architecture in Real-Time Workshop® Embedded Coder and embedded target products
- Code generation for Simscape and SimHydraulics®
- HDL code generation from Embedded MATLAB Function blocks and support for multirate designs in Simulink® HDL Coder
- Continuous time support in Stateflow®, with zero crossing detection and differential equation authoring
- Support for parallel computing in SystemTest using Distributed Computing Toolbox
- Simulink® Design Verifier, a new product for test generation and property proving

New capabilities for the MATLAB product family include:

- Support for numerical arrays greater than 2×10^9 elements on 64-bit operating systems for many MATLAB functions
- Ability to read MPEG, WMV, and other video formats on Windows® platforms in MATLAB

- Video viewer and ROI tools for polygon, ellipse, and freehand selections in Image Processing Toolbox

- Interleaving of parallel and serial code with the `parfor` function in Distributed Computing Toolbox

- Interactive graphics for the Web, using AJAX to enable rotate, zoom, and pan in MATLAB® Builder for Java™

- Support for Reuters Market Data System in Datafeed Toolbox

New Products

R2007b contains two new products.

Link for Analog Devices VisualDSP++®	Build, verify, and debug embedded code using Analog Devices VisualDSP++
Simulink® Design Verifier	Generate tests and prove model properties using formal methods

Products with License-Related Changes

The product that has a license-related changes for R2007b is:

• Simulink® Accelerator

For details, see "R2007b Product with License-Related Changes" on page 1-38.

Summary of Changes to Each Product

See "Release Summary" on page 1-50 for a summary of what has changed for each product for R2007b, including whether the product has new features, bug fixes, and compatibility issues.

Summary of New Features

> **Note** For information about potential issues for upgrading from R2007a, see "Compatibility Considerations" on page 1-39.

This section summarizes the major new features and enhancements introduced in R2007b for the following products:

"Virtual Reality Toolbox 4.6" on page 1-33	"Wavelet Toolbox 4.01" on page 1-34
"xPC Target 3.3" on page 1-34	

MATLAB® 7.5

Performance and Large Data Set Handling

- MATLAB arrays no longer limited to 2^{31} ($\sim$2 x10^9) elements, allowing many numeric and low-level file I/O functions to support real double arrays greater than 16 GB on 64-bit platforms

- New function `maxNumCompThreads` to enable you to get and set the maximum number of computational threads

- Upgraded Linear Algebra Package library (LAPACK 3.1) on all platforms, plus upgraded optimized Basic Linear Algebra Subprogram libraries (BLAS) on AMD processors (AMCL 3.6)

Development Environment

- Code folding in the Editor, allowing easier viewing and navigation of large M-files with many functions

- Ability to run functions directly from the Editor by configuring a set of arguments for an M-file

- Quick access to function help from the command line or in the Editor

Language and Programming

- New `MException` class and new try-catch syntax, allowing more robust catching and handling of errors

Mathematics

- Sparse matrix support added to the `ldl` function and backslash operator (\), allowing factorization and solving of real symmetric sparse matrices

- New `quadgk` function, allowing numerical integration using Gauss-Kronrod quadrature and supporting integration over infinite limits

- New `bvp5c` function for solving boundary value problems for ordinary differential equations, more efficient for small error tolerances

File I/O and External Interfacing

- New `mmreader` multimedia reader object on Windows platforms supporting formats such as AVI, MPEG, and WMV, and additional codecs

Graphics and GUI Building

- Toolbar editor in GUIDE to interactively design toolbars for graphical user interfaces

Embedded MATLAB™

Note Embedded MATLAB™ is a subset of the MATLAB language that can be compiled into code for embedded implementation. Generating compiled MEX-files from Embedded MATLAB™ functions requires Simulink® or Fixed-Point Toolbox. Generating C code requires Simulink and Real-Time Workshop®, and generating HDL code requires Simulink and Simulink® HDL Coder. Embedded MATLAB is also supported by Stateflow® and SimEvents®.

- New `emlc` command-line function for generating C code from Embedded MATLAB (requires Simulink and Real-Time Workshop)

- Support for algorithms that span multiple M-files, improving algorithm reuse and maintenance

- Support for calling external C functions

- Data type override, facilitating fixed-point design and enabling a single source for fixed- and floating-point code generation

- Expanded Embedded MATLAB runtime library with 13 new functions, including fixed-point bitwise operators such as `bitsliceget`, `bitconcat`, and `bitandreduce`

For details about Embedded MATLAB, see theEmbedded MATLAB feature-specific release notes .

For details about MATLAB, see the MATLAB product-specific release notes.

Simulink® 7.0

Simulation Performance

- Simulink Accelerator incorporated into Simulink, with new Rapid Accelerator mode added for faster simulation through code generation

- Simulink Profiler incorporated into Simulink for identification of simulation performance bottlenecks

- Simulink Accelerator, Rapid Accelerator, and model reference simulation targets able to specify compiler optimization level used

- Enhanced variable step discrete solver no longer takes unnecessary time steps at multiples of the maximum step size

- Simulink Accelerator, Rapid Accelerator, and model reference simulation targets able to perform mathematical operations using the same internal functions that MATLAB and Simulink use, for more consistent simulation results

Component-Based Modeling

- Model blocks have option to simulate the referenced model in normal mode, allowing for faster turnaround time, use of interactive blocks, and use of tools such as model coverage from Simulink® Verification and Validation

- New instance view option for Model Dependency viewer to display each reference to a model and indicate whether reference is simulated in accelerated or normal mode

Embedded MATLAB™ Function Block

- Support for complex and fixed-point parameters in Embedded MATLAB Function blocks

- Support in Embedded MATLAB Function blocks for calling algorithms that span multiple M-files

For additional information about the Embedded MATLAB Function block, see the "Embedded MATLAB Function Block Features and Changes" section of the Simulink release notes.

Data Management

- New standardized user interface for specifying data types associated with Simulink blocks and data objects, and Stateflow® data

- New standardized user interface enables display and editing of data types in Model Explorer spreadsheet

- New block parameters for specifying design minimum and maximum for parameters and signals

- New parameter range checking during edit time and update diagram

- New diagnostics for signal range checking during simulation and detection of continuous sample time on non-floating-point signals

- New control of output data types for Abs, Multiport Switch, Saturation, Saturation Dynamic, and Switch blocks

Configuration Management

- New Model Advisor checks, allowing search for disabled or parameterized library links in a model

- New diagnostic to warn when saving a model containing disabled or parameterized library links

- Library link status information included in Simulink window titles

- Tooltips for library link blocks include link status, as well as destination block for the link

- Model dependencies manifest tools updated with enhanced analysis to detect file dependencies from Stateflow transitions, Embedded MATLAB, and requirements documents

- Model dependencies tools now save user manifest edits for reuse the next time a manifest is generated

Embedded Software Design

- Enhanced Legacy Code Tool for supporting variables that represent memory allocated for specific instances of items such as file descriptors, device drives, and memory managed externally

Block Enhancements

- Product blocks that specify division as the first operator now automatically reorder inputs to improve efficiency of operation and precision of results
- Support for single-precision floating-point inputs, outputs, and parameter values in Discrete Filter, Discrete State-Space, and Discrete Transfer Fcn blocks

Usability Enhancements

- New block alignment and distribution commands to align blocks along edges and equalize interblock spacing
- Enhanced Model Advisor for navigating checks, displaying status, and reporting results

For details, see the product-specific release notes.

Aerospace Blockset 3.0

- New CIRA-86 Atmosphere Model block for implementing COSPAR International Reference Atmosphere (CIRA) 1986 environmental model
- New NRLMSISE-00 Atmosphere Model block for implementing 2001 United States Naval Research Laboratory Mass Spectrometer and Incoherent Scatter Radar Exosphere (NRLMSISE) environmental model
- New EGM96 Geoid block for implementing 1996 Earth Geopotential Model (EGM96)
- New Quaternions to Rotation Angles block for converting spatial representation from quaternions to any of 12 standard sequences of rotation angles

- New Rotation Angles to Quaternions block for converting spatial representation from any of 12 standard sequences of rotation angles to quaternions

- New Rotation Angles to Direction Cosine Matrix block for converting spatial representation from any of 12 standard sequences of rotation angles to a direction cosine matrix

- New Direction Cosine Matrix to Rotation Angles block for converting spatial representation from a direction cosine matrix to any of 12 standard sequences of rotation angles

For details, see the product-specific release notes.

Aerospace Toolbox 2.0

- New Aero class objects to visualize flight data using Virtual Reality Toolbox: `Aero.VirtualRealityAnimation`, `Aero.Node`, and `Aero.Viewpoint`

- New `atmoscira` function for implementing the COSPAR International Reference Atmosphere (CIRA) 1986 environmental model

- New `atmosnrlmsise00` function for implementing the 2001 United States Naval Research Laboratory Mass Spectrometer and Incoherent Scatter Radar Exosphere (NRLMSISE) environmental model

- New `geoidegm96` function for implementing the 1996 Earth Geopotential Model (EGM96)

- New `quat2angle` function for converting quaternions to any of 12 standard sequences of rotation angles

- New `angle2quat` function for converting any of 12 standard sequences of rotation angles to quaternions

For details, see the product-specific release notes.

Bioinformatics Toolbox 3.0

Version 2.6 of Bioinformatics Toolbox, which was released via the Web after R2007a, includes the following new features:

- Enhanced support for reading Affymetrix files from expression, genotyping (SNP), or resequencing assays on all platforms, except Solaris

- Ability to perform background adjustment on Affymetrix microarray probe-level data using zone-based method
- New function for aligning two data sets containing sequential observations
- New demos for mass spectrometry functionality

Version 3.0, which is released as part of R2007b, includes the following new features:

- Array comparative genomic hybridization (aCGH) analysis and visualization
- RNA secondary structure prediction and visualization
- BLAST reports from local databases
- Graph clustering
- Common motifs searching

For details, see the product-specific release notes.

Communications Blockset 3.6

- Enhanced demodulators for BPSK, QPSK, and 8PSK blocks with fixed-point capabilities for hard-decision modes
- Enhanced Reed Solomon and BCH blocks with punctures and erasures
- New application-specific demos featuring WiMAX and DVB-C
- Enhanced PN Sequence Generator block with bit-packing options and smallest integer output data type mode
- Enhanced TCM Encoder block with options to terminate at the zero state

For details, see the product-specific release notes.

Communications Toolbox 4.0

- New bi-Gaussian Doppler and asymmetrical Jakes Doppler spectra objects
- Enhanced channel objects and channel visualization tool, supporting different Doppler spectra per path

- Enhanced ricianchan object, supporting different Rician parameters on all paths

- New demos modeling COST 207/GSM/EDGE and HF channels

- New eye diagram object using color to convey how often a trace traverses a point

- New PAM, OQPSK, DPSK, MSK, and General QAM modem objects

- Theoretical BERs added to BERTool for hard-decision and soft-decision decoding with AWGN

For details, see the product-specific release notes.

Curve Fitting Toolbox 1.2

- New Edit Equation option for editing custom equations

For details, see the product-specific release notes.

Data Acquistion Toolbox 2.11

- Support for 11 additional National Instruments data acquisition devices: USB-6221, USB-6229, USB-9211A, PCIe-6536, PCIe-6537, PCI-6255, PCI-6601, PCI-6602, PXI-6255 PXI-6602, and PXI-6608

- Enhanced performance of the `getsample` and `putsample` functions for acquiring and sending a single data sample when using NI- DAQmx driver software

For details, see the product-specific release notes.

Datafeed Toolbox 3.0

- Support for Reuters Market Data System

For details, see the product-specific release notes.

Distributed Computing Toolbox 3.1

- Interleaving of parallel and serial code with `parfor` in Distributed Computing Toolbox

- New graphical user interface for creating and modifying user configurations and designating the default configuration of most toolbox functions

- New parallel profiler graphical user interface for generating reports on lab computation and communication times

For details, see the product-specific release notes.

Excel® Link 3.0

- New MATLAB Function Wizard enables browsing of MATLAB directories and running of any MATLAB function from within Microsoft® Excel®

- New GUI enables viewing and changing of Excel Link preferences from within Microsoft Excel

For details, see the product-specific release notes.

Filter Design HDL Coder 2.1

- Generation of M-file that captures code generation settings from GUI, allowing easy reconstruction of the filter and test-bench code

- Processor interface to support programmable coefficients for direct form FIR filters

For details, see the product-specific release notes.

Filter Design Toolbox 4.2

- Support for complex coefficients in all FIR structures in MFILT

- New multirate Farrow filter capable of sample rate conversion

- Support for cascading of MFILTs and DFILTs with Farrow filters

- Updated documentation with new section about using integers with FIR filters

For details, see the product-specific release notes.

Financial Derivatives 5.1

- New support for pricing and sensitivity computations of swaptions

- Support for 30/360 (ISMA) basis as a variant of 30/360E with annual compounding

For details, see the product-specific release notes.

Financial Toolbox 3.3

- Support for `financialcalendar.com` trading calendars

- Support for 30/360 (ISMA) basis as a variant of 30/360E with annual compounding

- Diagonal covariance matrix support added for multivariate normal regression

For details, see the product-specific release notes.

Fixed-Income Toolbox 1.4

- Support for 30/360 (ISMA) basis as a variant of 30/360E with annual compounding

For details, see the product-specific release notes.

Fixed-Point Toolbox 2.0

- Data type override for Embedded MATLAB, facilitating fixed-point design and enabling single source for fixed- and floating-point code generation

- New bitwise operators including `bitsliceget`, `bitconcat`, and `bitandreduce`

- `abs` function support for complex-valued inputs

For details, see the product-specific release notes.

Genetic Algorithm and Direct Search Toolbox 2.2

- New multiobjective optimization using genetic algorithms to identify the Pareto-front, including optimization problems with linear and bound constraints and custom data types

- New hybrid option for combining multiobjective genetic algorithms with Optimization Toolbox functions

- Vectorized option enabled for genetic algorithms and pattern search functions with nonlinear constraints

For details, see the product-specific release notes.

Image Acquisition Toolbox 3.0

- New interactive desktop tool for key toolbox functionality, including configuring hardware, previewing an acquisition, and acquiring image or video data

- Support for many National Instruments imaging devices

For details, see the product-specific release notes.

Image Processing Toolbox 6.0

- New interactive tool (`implay`) for viewing MATLAB movies, videos, or image sequences

- New programmable GUI tools for interactive placement and manipulation of regions of interest (ROI)

- Image Tool includes interactive cropping, contrast enhancement that can modify image data, and ability to save changed images to files

- New `demosaic` function to convert Bayer pattern encoded images to truecolor RGB images

- New `impyramid` function to create a multiresolution Gaussian pyramid

- Enhanced performance for thinning and skeletonization using `bwmorph` function, and for filtering RGB images using `imfilter` function

- Enhanced ROI behavior for `imcrop`, `roipoly`, and `roifill` functions

- Expanded modular interactive GUI-building tools with two new functions (`imputfile` and `imsave`) that enable saving images

- Support for reading NITF and Radiance High Dynamic Range (HDR) images

For details, see the product-specific release notes.

Instrument Control Toolbox 2.5

- New Simulink blocks to send and receive data over TCP/IP and UDP in a Simulink model

- Additional GPIB status information provided with the `spoll` function

- Additional instrument drivers available for Agilent, LeCroy, Tabor, and Tektronix instruments; visit MATLAB Central for the latest list of instrument drivers

- Updated support for Keithley Version 8.3 GPIB drivers

For details, see the product-specific release notes.

Link for Analog Devices VisualDSP++® 1.1

Version 1.0 of Link for Analog Devices VisualDSP++® was released via the Web after R2007a. Version 1.1, released as part of R2007b, includes the new features listed below.

- Memory Copy and Memory Allocate blocks to configure and manage internal and external memory on hardware

- Target function library (TFL) replacement in code generation

For details, see the product-specific release notes.

Link for Cadence Incisive 2.1

- Solaris 32-bit mode support (on 64-bit platforms)

- Improved Cosimulation Block GUI facilitates parameter definition

- New setup script assists in installation debugging and runtime configuration

- Complete Cadence® bundled GCC library compatibility

For details, see the product-specific release notes.

Link for Code Composer Studio™ 3.1

- Support for Code Composer Studio™ V3.3
- Target function library (TFL) replacement in code generation
- Demo feature for profiling the stack
- Demo feature for creating a portable CCS project
- `ccsdsp` function now returns a `ticcs` object

For details, see the product-specific release notes.

Link for ModelSim® 2.3

- Cosimulation support for digital blocks within the ADvanceMS (ADMS) environment
- Solaris 32-bit mode support on 64-bit platforms
- Improved Cosimulation Block GUI facilitates parameter definition
- New setup script assists in installation debugging and runtime configuration
- Complete Mentor Graphics-bundled GCC library compatibility

For details, see the product-specific release notes.

Link for TASKING® 1.2

- TriCore code optimization that increases execution speed up to 18 times for saturated arithmetic operations
- Support for compact USB stick evaluation hardware, XC164CM U CAN
- New TASKING® toolset support for C166, ARM, 8051 and TriCore
- PIL can verify complex, fixed-point data

For details, see the product-specific release notes.

Mapping Toolbox 2.6

- New feature to export vector point data to KML for viewing in an Earth browser such as Google Earth

- Objects in map axes can be made transparent

- More efficient angle unit conversions

- New angle wrapping and unwrapping utilities

For details, see the product-specific release notes.

MATLAB® Builder for Java™ 2.0

- Deployable interactive graphics using AJAX to enable rotating, zooming, and panning

- Automatic generation of interface code for Java remoting (RMI), allowing components to be started in separate processes

- Single, platform-independent output file (`.jar`) for deployment

- Automatic creation of HTML documentation for class interfaces using javadoc

For details, see the product-specific release notes.

MATLAB® Compiler 4.7

- Support for Microsoft® Platform SDK compilers

- Project files use relative paths and can be shared

For details, see the product-specific release notes.

MATLAB® Distributed Computing Engine 3.2

- New graphical user interface for creating and modifying user configurations and designating the default configuration of most toolbox functions

- New parallel profiler graphical user interface for generating reports on lab computation and communication times

For details, see the product-specific release notes.

MATLAB® Report Generator 3.2.1

- New text formatting options for the Title Page, Text, and Paragraph components

For details, see the product-specific release notes.

Model-Based Calibration Toolbox 3.3

- Command-line functionality for defining inputs for test plans and models

- Expanded command-line functionality for creating, editing, and fitting local models

- Enhanced defaults and previews for space-filling designs, including design property improvements and improved handling of constrained design points

- Enhanced optimization set up and analysis, including support for boundary constraint definition in the optimization wizard, ability to rename objectives and constraints, and improved display of table gradient constraints

For details, see the product-specific release notes.

Neural Network Toolbox 5.1

- Simplified syntax for creating networks

- Automated data preprocessing and data division built into network creation

- New Simulink blocks for data preprocessing

For details, see the product-specific release notes.

OPC Toolbox 2.1

- New `trend` function for graphical display of live OPC data for OPC group object

- Support for time series object creation and access

For details, see the product-specific release notes.

Real-Time Windows Target 3.0

- Serial port (RS232) support for both binary packet and ASCII stream transfer, using new I/O blocks and driver

- User Datagram Protocol (UDP) support for both binary packet and ASCII stream transfer, using new I/O blocks and driver

- Frequency Output block to support frequency and pulse width modulation generation on several data acquisition boards

- All I/O blocks support nondouble data types to conform to Simulink

For details, see the product-specific release notes.

Real-Time Workshop® 7.0

- New `emlc` command-line function for generating C code for Embedded MATLAB algorithms, including Embedded MATLAB code that spans multiple M-files

- Support for Stateflow animation with Simulink External Mode

- Asynchronous Rate Transition blocks automatically inserted for more cases

- New parameters for configuring compiler optimization levels and settings

- Enhanced user interface with more choices for selecting target microprocessors

- Improved code integration for Stateflow local data by inheriting Simulink signal object properties, including storage class

For details about Embedded MATLAB, see theEmbedded MATLAB feature-specific release notes .

For details, see the Real-Time Workshop product-specific release notes.

Real-Time Workshop® Embedded Coder 5.0

- New Target Function Library API for mapping built-in functions and operators to target-specific code

- Bidirectional traceability now supported through automated block-to-code and code-to-block highlighting, including a comprehensive code traceability report

- More efficient code for Concat, Conjugate, Dot Product, For Iterator, Rate Transition, Transpose, and Iterator-Selector-Assignment block patterns due to improved expression folding, scalarization, and buffer reuse

- Optimized code for the model_step function prototype control feature introduced in R2007a

- Enhanced MISRA-C compliance

- User-defined data classes able to reference Custom Storage Classes from other packages, such as Simulink or mpt

- New interactive Guided Introduction demo for novices who want to generate code optimized for embedded systems

For details, see the product-specific release notes.

RF Blockset 2.1

- New library of series and shunt RLC blocks for designing lumped element cascades such as filters and matching networks

- New User-Defined Models: Nonlinear Amplifier demo

For details, see the product-specific release notes.

RF Toolbox 2.2

- New snp2smp function for converting N-port S-parameter data and termination impedances to M-port S-parameter data

- New circle method for placing circles on a Smith® Chart to depict stability regions and display constant gain, noise figure, reflection and immittance circles

- Support for plotting network parameters of devices with more than two ports on a Smith® Chart

- New `powergain` function for computing various power gains of a 2-port network

- New two-part Designing Matching Networks demo that shows how to use the new circle method (replaces two existing demos)

- Expanded Modeling a High-Speed Backplane demo that illustrates extraction of 4-port data from 16-port data

For details, see the product-specific release notes.

Signal Processing Blockset 6.6

- New To Audio Device and From Audio Device blocks to support more than two audio channels, plus Windows, Macintosh, and Linux platforms

- New Array-Vector blocks for performing arithmetic operations along a specified dimension of an N-D array

- `Ceiling` and `Zero` rounding modes added to all fixed-point-capable blocks

- N-D support added to several blocks, including DSP Constant, Minimum, Maximum, and Difference

- New CIC Filter Design block in the Filter Design Toolbox block library

For details, see the product-specific release notes.

Signal Processing Toolbox 6.8

- New spectrum option for confidence interval estimation

- New method to measure spurious-free dynamic range (SFDR)

- New function to find local maxima (peaks)

For details, see the product-specific release notes.

SimDriveline 1.4

- New Rotational Coupling Simscape interface element
- Run-time parameters enabled for two more blocks

For details, see the product-specific release notes.

SimEvents® 2.1

- Attribute Function block for manipulating attributes using Embedded MATLAB
- New demos for shared-resource applications and advanced techniques
- Enhanced visibility and logging of events

For details, see the product-specific release notes.

SimHydraulics® 1.2.1

- Code generation supported through Real-Time Workshop

For details, see the product-specific release notes.

SimMechanics 2.7

- New Simscape interface elements: Prismatic-Translational Interface and Revolute-Rotational Interface
- SimMechanics state names available to Simulink and Real-Time Workshop
- Redundant constraint analysis control with new tolerance setting

For details, see the product-specific release notes.

SimPowerSystems 4.5

- Five new blocks: Battery, Stepper Motor, Grounding Transformer, Three-Phase Transformer Inductance Matrix Type (Two Windings), and Three-Phase Transformer Inductance Matrix Type (Three Windings)

- New measurement option in the PI Section Line block for measuring voltages and currents at the start and end of each pi-section

For details, see the product-specific release notes.

Simscape 2.0

- Code generation supported through Real-Time Workshop

- New Thermal block libraries to simulate basic thermal effects

- Expanded Physical Signal block libraries with five new blocks

- Improved simulation performance

For details, see the product-specific release notes.

Simulink® Control Design 2.2

- Full support for linearization and compensator design of Simulink models containing model reference blocks

- New option to compute exact linear time-invariant representation of Simulink models with time delays

- Ability to linearize periodic function-call subsystems

For details, see the product-specific release notes.

Simulink® Design Verifier 1.1

Version 1.0 of Simulink® Design Verifier was released via the Web after R2007a. Version 1.1, released as part of R2007b, includes the new feature listed below.

- New support for fixed-point data types

For details, see the product-specific release notes.

Simulink® Fixed Point 5.5

- New Fixed-Point Tool options that provide batch control of signal logging for models and subsystems

- New standardized user interface for specifying fixed-point data types associated with Simulink blocks and data objects, as well as Stateflow data

- Additions and subtractions use an accumulator data type for improved precision and accuracy of results and reduced saturation code generated by Real-Time Workshop

- Product blocks that specify division as the first operator automatically reorder inputs to improve efficiency of operation and precision of results

- Data type conversions involving nonzero bias use an accumulator data type to reduce intermediate saturations and improve accuracy of results

For details, see the product-specific release notes.

Simulink® HDL Coder 1.2

- HDL code generation support for models with multiple sample rates, including use of Rate Transition, Upsample, and Downsample blocks

- Additional blocks supported for HDL code generation: Dual Port RAM, Unit Delay Enabled, and Math Function Square Root

- HDL code generation support for new Embedded MATLAB fixed-point bitwise operators

- Parameter passing feature for block implementations to support pipelined implementations for most blocks and customizable port generation for black-box implementations

For details, see the product-specific release notes.

Simulink® Verification and Validation 2.2

- New model coverage support for referenced models under normal mode
- Updated MathWorks Automotive Advisory Board (MAAB) checks in Model Advisor
- New DO-178B checks in Model Advisor
- New API to facilitate customizing Model Advisor HTML reports

For details, see the product-specific release notes.

Stateflow® 7.0

- Enhanced continuous-time support with zero-crossing detection for modeling dynamic systems with modal behavior
- New super-step feature for modeling asynchronous semantics by performing multiple state transitions within one execution step
- Support for Stateflow chart outputs and local data to inherit properties from Simulink signal objects
- Common dialog for specifying data types of Stateflow objects across Simulink and Stateflow
- Support for fixed-point parameters in Truth Table blocks
- • Support in Embedded MATLAB™ functions for calling algorithms that span multiple M-files

For details, see the product-specific release notes.

Stateflow® Coder 7.0

- Support for animating Stateflow charts when running a Simulink model in external mode

- Support for controlling storage class of Stateflow local data in generated code by inheriting it from Simulink signal objects

- Support for the Target Function Library published by Real-Time Workshop Embedded Coder to map built-in math functions to target-specific implementations

For details, see the product-specific release notes.

Statistics Toolbox 6.1

- Gaussian mixture distribution fitting and random number generation

- Copula parameter estimation from data

- Diagonal covariance matrix support for multivariate normal regression

- Enhanced `boxplot` style suitable for displaying a large number of groups

- Conversion from covariance matrix to correlation matrix

For details, see the product-specific release notes.

System Identification Toolbox 7.1

- Ability to estimate static nonlinearities for Hammerstein-Wiener models using a one-variable polynomial

For details, see the product-specific release notes.

SystemTest 2.0

- Integration with Distributed Computing Toolbox and MATLAB Distributed Computing Engine, enabling distributed testing on multiple computers

- New ability to generate test vector values using probability distribution for randomizing test parameters (useful for performing Monte Carlo analyses)

- Grouped test vectors can be used in plots in the Test Results Viewer for exploring the relationship between other grouped vectors

- Ability to run tests set up in SystemTest from the MATLAB command line, (useful for running multiple TEST files as a batch or calling a TEST file as part of an M-file)

For details, see the product-specific release notes.

Target for Freescale™ MPC5xx 2.2

- Support for CodeWarrior™ Development Tools

For details, see the product-specific release notes.

Target for Infineon C166® 1.5

- C-CAN device driver blocks for ST10 C-CAN module

- Support for compact USB stick evaluation hardware, XC164CM U CAN

- Support for TASKING toolset

For details, see the product-specific release notes.

Target for TI C2000™ 2.3

- Support for CCP and ASAP2 protocols
- New external mode capability using newly added support for CCP and ASAP2 protocols
- New high-resolution PWM on c280x Targets
- Interrupt handling for 280x eQEP
- New workflow demo showcasing all major features of Target for TI C2000

For details, see the product-specific release notes.

Target for TI C6000™ 3.3

- Support for DM643x platform
- DM642EVM Video Capture Display blocks to support S-video
- Support for Code Composer Studio 3.3 and BIOS 5.2+ combination
- New workflow demo showing examples of legacy code integration
- New TCP/IP host block from Instrument Control Toolbox added to the Video Surveillance demo
- Enhanced usability of TCP/IP blocks, without restrictions on the size of data sent or received

For details, see the product-specific release notes.

Video and Image Processing Blockset 2.4

- New Corner Detection block with three available algorithms

- New Lucas-Kanade, Derivative of Gaussian method added to the Optical Flow block

- New fixed-point support for the Lucas-Kanade, Difference filter method of the Optical Flow block

- Enhanced performance of all blocks in the Morphological Operations library

- UNIX support added to Multimedia File block

- New demo for video mosaicking

For details, see the product-specific release notes.

Virtual Reality Toolbox 4.6

- New VR To Video block, allowing RGB video stream output for further 2-D video processing

- Joystick and Magellan Space Mouse® input functionality added to MATLAB interface

- Joystick and Magellan Space Mouse input support added for 32-bit and 64-bit Linux operating systems

- Axes transformation and math functions added to MATLAB toolbox interface

For details, see the product-specific release notes.

Wavelet Toolbox 4.01

- Enhanced ability to import and export data between the workspace and all GUIs

- Ability to generate scalograms of wavelet coefficients in continuous wavelet analysis

- Constructing clusters from hierarchical cluster trees in multisignal analysis via the command line

- New demo on multisignal analysis and clustering

For details, see the product-specific release notes.

xPC Target 3.3

- New I/O boards interface support, including General Standards PMC–24DSI12 and PMC66-16AO1 for audio applications

- Support for real-time CAN protocol SAE J1939 standard

- Support for the monitoring and logging of signals from referenced models

- Enhanced support for shared interrupts, allowing multiple boards to have the same interrupt numbers

For details, see the product-specific release notes.

New Products

R2007b contains two new products.

Link for Analog Devices VisualDSP++®	Build, verify, and debug embedded code using Analog Devices VisualDSP++
Simulink® Design Verifier	Generate tests and prove model properties using formal methods

Link for Analog Devices VisualDSP++®

Note Link for Analog Devices VisualDSP++® was released via the Web after R2007a but before R2007b.

Link for Analog Devices VisualDSP++ connects MATLAB and Simulink with the VisualDSP++® integrated development and debugging environment (IDDE) from Analog Devices. Link for Analog Devices VisualDSP++ lets you debug and verify embedded code running on Analog Devices processors using MATLAB scripts and Simulink models. You can create test benches in MATLAB and Simulink to verify handwritten or automatically generated embedded code.

Link for Analog Devices VisualDSP++ can be used with Real-Time Workshop and Real-Time Workshop Embedded Coder to generate complete VisualDSP++ projects that include application C or assembler code and linker description files from Simulink models. You can rapidly prototype your designs and perform processor-in-the-loop (PIL) simulations

Key Features

- Automates verification and debugging of embedded software for Analog Devices Blackfin, SHARC, and TigerSHARC processors using MATLAB, Simulink, and VisualDSP++

- Generates complete VisualDSP++ projects for Analog Devices processors from Simulink models

- Supports PIL simulation with Analog Devices processors using the same Simulink model for system design, system simulation, code generation, and embedded code verification

- Provides synchronous and asynchronous schedulers in multitasking mode in the code generated from Simulink models

- Supports custom cache configuration and memory mapping on Analog Devices processors from within Simulink models

- Provides a real-time execution profiler that profiles embedded code executing on Analog Devices processors and helps identify bottlenecks in code performance

For details, see the product-specific release notes.

Simulink® Design Verifier

Note Simulink® Design Verifier was released via the Web after R2007a, but before R2007b.

Simulink Design Verifier generates tests for your Simulink and Stateflow models that satisfy model coverage and user-defined objectives. It also proves model properties and generates examples of violations.

Simulink Design Verifier supports the following model coverage objectives: decision, condition, and modified condition/decision coverage (MC/DC). You can define custom test objectives directly in your Simulink or Stateflow models by using design verification blocks. With property proving, you can explore your design for flaws, missed requirements, and unwanted states, issues that are difficult to uncover by simulation alone.

Key Features

- Generates tests for Simulink and Stateflow models

- Detects unreachable design elements in models

- Proves model properties and generates examples of violations

- Includes blocks for defining properties

- Produces test-generation and property-proving analysis reports
For details, see the product-specific release notes.

R2007b Product with License-Related Changes

Product	R2007b Changes
Simulink® Accelerator	As of R2007b, Simulink Accelerator functionality has been merged into Simulink.

Compatibility Considerations

These topics summarize potential compatibility considerations when upgrading from R2007a to R2007b:

In this section...
"R2007b Compatibility" on page 1-39
"Compatibility for Each Product" on page 1-43
"Compatibility Considerations for New Functions and Models" on page 1-43

R2007b Compatibility

This table highlights some important potential compatibility issues when upgrading from R2007a to R2007b. Refer to product-specific release notes for details on these and other product-specific compatibility considerations.

Compatibility issues that are reported after the product has been released are added to Bug Reports at the MathWorks Web site. Because bug fixes can sometimes result in incompatibilities, also review fixed bugs in Bug Reports for any compatibility impact.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
All products (See "Changes to the MATLAB Locale Setting" on page 1-46)	On Macintosh OS X, MATLAB now reads the native OS X locale and UI Language settings and sets the default coded character set for each locale.	This affects users not in the United States or who do not speak English (i.e., locale setting is not USA or language setting is not English.) Incorrect or garbled characters or unexpected behavior may occur.	Use the **International System Preference** pane to set locale and UI language.
MATLAB	Files provided with MATLAB and other products no longer include carriage returns and line feeds.	Viewing files provided with MATLAB in Windows Notepad and possibly other editors will not show line endings and may be less readable.	Open files provided with MATLAB in the MATLAB Editor or another text editor, such as Microsoft WordPad. If you have file associations that use Notepad, change them to WordPad or another editor.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB – Desktop	Changed error messages and M-file line numbers displayed for errors in anonymous functions (within script files or at the command line).	Programs using line numbers returned in response to errors in anonymous functions may not work as expected.	Remove dependencies on the returned error messages and line numbers, or update your program code to use the new returned strings and values.
MATLAB – Desktop and All Link and	Links and Targets product category added to the	Link and Target products are not in the same	To find any Link or Target product, look under the Links and Targets heading.
MATLAB – Programming	New internal format for P-code files.	P-code files built with current MATLAB 7.5 will not work on Version 7.4 or earlier. P-code files built using MATLAB 7.4 or earlier will work on Version 7.5, but support for these earlier file versions may be discontinued in a future release.	Use an earlier version of MATLAB to create P-code files that will be used on earlier MATLAB versions. Using MATLAB 7.5, rebuild any previously created P-code files that you expect to need in the future.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
MATLAB – Programming	Codec that MATLAB uses for reading and writing AVI files is not provided in Windows Vista.	Using `aviread` on Windows Vista to read an AVI file generates an error. Creating an AVI file on Vista with `avifile` or `movie2avi` generates a warning and creates an uncompressed AVI file.	Download and install a compatible codec, such as the Indeo5 codec, from Ligos Corporation.
MATLAB – External Interfaces/API	MEX-files created prior to R14 are no longer supported.	Programs that rely on MEX-files created prior to R14 will produce an "Invalid MEX-file" error.	Recompile MEX-files with MATLAB R14 or later.

Product and Area	Compatibility Consideration	Potential Impact	Recommended Actions
Simulink and Real-Time Workshop	New model configuration parameter, **Compiler optimization level** defaults to `Optimizations off (faster builds)`.	Models built and run using the default **Compiler optimization level** setting may have shorter build times, but longer execution times.	If you prefer not to use the new default, set the **Compiler optimization level** in the **Optimization** pane (Simulink users) or the **Real-Time Workshop** pane (Real-Time Workshop users) of the Configuration Parameters dialog.
MATLAB Compiler and All Builder products	`buildmcr` is no longer supported.	Attempting to run `buildmcr` produces an error message.	Run `MCRInstaller.exe` (Windows), `MCRInstaller.bin` (UNIX), or `MATLAB_Component_Runtime.dmg` (Mac) to generate an MCR with MATLAB installer technology.

Compatibility for Each Product

To see if any reported compatibility considerations exist for your product, see "Release Summary" on page 1-50. If the table shows that there are reported 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 R2007a, 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 `validatestring` in a previous release, it might conflict with the new MATLAB `validatestring` function (introduced in R2007b).

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

Support for Solaris and Macintosh

As of R2007b, new releases from the MathWorks will no longer be available on

- Solaris 8 and Solaris 9

- Macintosh operating systems prior to 10.4.7

Also, The MathWorks will only support FLEXnet license manager Version 11.4 and above.

For information on system requirements, visit Platforms & Requirements.

Changes to the MATLAB Locale Setting

In this section...
"Validating the Locale Setting" on page 1-46
"Standardizing Locale Across Platforms" on page 1-46
"Calculating Dates in Programs" on page 1-48
"Numeric Format Uses C Locale" on page 1-49

Validating the Locale Setting

MATLAB Version 7.5 (R2007b) contains a database of supported locales. MATLAB looks for the database and checks that the user-specified locale setting is supported. If it is not, MATLAB uses the default locale setting en_US.US-ASCII.

Standardizing Locale Across Platforms

Retrieving and using the proper locale setting is a mandatory operation in creating and using applications for international audiences. In R2007b, MATLAB Version 7.5 standardizes the way it initializes the locale setting across platforms.

Users who do not speak English or do not live in the United States should be aware of the changes described below.

Windows Platform Changes

Changes to Locale Settings. In previous versions, MATLAB used the system locale to handle character code conversion. Now MATLAB uses the user locale.

User locale and system locale must be the same value. If these values are not the same, users may see garbled text or incorrect characters.

Additional information may be found in the "Windows Platform Changes" section of Technical Support solution 1-4HCH1H at:

```
http://www.mathworks.com/support/solutions/data/
1-4HCH1H.html?solution=1-4HCH1H
```

How to Set Locale Values. Technical Support solution 1-4HCH1H explains how to view and set the following values on Windows:

- User locale

- System locale

Changes to the Date Format. Users may see changes in the date formats, depending on the locale. For example, using the Japanese locale, the format of the date field in the `dir` M-function in MATLAB Version 7.4 might be displayed as:

```
3-Feb-2007
```

while in MATLAB Version 7.5, the same value might be displayed as:

```
03-2-2007
```

Macintosh OS X Platform Changes

Changes to Locale Settings. In previous versions, MATLAB used environment variables to set locale. Now MATLAB reads the native OS X locale and UI language settings.

MATLAB sets the default coded character set (codeset) for each locale. Users may see different characters than expected.

Some MATLAB functionality is handled by the Java Virtual Machine (JVM). In previous versions, the JVM determined its own default file encoding, e.g. the OS X-specific encoding, MacRoman. Now MATLAB initializes the JVM with the MATLAB locale setting. MacRoman is not supported by MATLAB.

Users may see garbled text or incorrect characters. Each codeset assigns a unique character code to each character. Sometimes the character code for a particular character is different in different codesets. For example, if you use a character code to display a degree symbol, loading a different codeset might result in displaying a different character.

MATLAB checks if the user UI language setting is the same as the user locale. If not, MATLAB displays a warning.

Users are no longer required to set locale-specific environment variables.

Additional information may be found in the "Macintosh Platform Changes" section of Technical Support solution 1-4HCH1H at:

```
http://www.mathworks.com/support/solutions/data/
1-4HCH1H.html?solution=1-4HCH1H
```

How to Set Locale Values. Technical Support solution 1-4HCH1H explains how to view and set the following values on Macintosh platforms.

- User locale
- User UI language setting

Linux Platform Changes

JVM File Encoding. MATLAB now initializes the JVM file encoding with the MATLAB locale setting.

Calculating Dates in Programs

In previous versions of MATLAB, programmers used the `datenum` function with the `dir` function `date` field to calculate numeric date values. Such practice can produce incorrect results.

If you programmatically use date values, avoid converting a formatted date string into a numeric value. MATLAB Version 7.4 (R2007a) introduced a `datenum` field to use in date calculations. For information, see "The dir Function Returns Additional datenum Field".

Compatibility Considerations

To ensure the correct calculation of functions using date values, replace `datenum` function calls with the use of the `dir` function `datenum` field.

For example, look at the modification date of your MATLAB `license.txt` file:

```
cd(matlabroot)
f=dir('license.txt')
```

MATLAB displays information similar to:

```
f =
        name: 'license.txt'
        date: '10-May-2007 17:48:22'
       bytes: 5124
       isdir: O
     datenum: 7.3317e+005
```

If your code uses a command similar to:

```
n=datenum(f.date);
```

you must replace it with:

```
n=f.datenum;
```

Numeric Format Uses C Locale

MATLAB reads the user locale for all categories except for the LC_NUMERIC category. This category controls numeric data formatting and parsing. MATLAB always sets LC_NUMERIC to the C locale.

For example, some users expect a comma in a number while other users expect a decimal. The value of pi can be displayed as 3.1415 or 3,1415, depending on the format used by a locale. MATLAB always uses 3.1415, regardless of the format specified by the user locale.

Release Summary

Note An asterisk (*) after a product name indicates the product has had a Web release since R2007a.

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
MATLAB®	Yes	Yes	Yes
Simulink®*	Yes	Yes	Yes
Aerospace Blockset	Yes	No	Yes
Aerospace Toolbox	Yes	No	Yes
Bioinformatics Toolbox*	Yes	Yes	Yes
Communications Blockset	Yes	Yes	No
Communications Toolbox	Yes	Yes	No
Control System Toolbox	No	Yes	No
Curve Fitting Toolbox	Yes	No	No
Data Acquisition Toolbox	Yes	Yes	Yes
Database Toolbox	No	Yes	No
Datafeed Toolbox	Yes	Yes	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Distributed Computing Toolbox	Yes	No	Yes
Excel® Link	Yes	No	No
Extended Symbolic Math Toolbox	No	No	No
Filter Design HDL Coder	Yes	Yes	Yes
Filter Design Toolbox	Yes	Yes	Yes
Financial Derivatives Toolbox	Yes	Yes	No
Financial Toolbox	Yes	Yes	No
Fixed-Income Toolbox	Yes	No	No
Fixed-Point Toolbox	Yes	Yes	Yes
FuzzyLogic Toolbox	No	Yes	No
GARCH Toolbox	No	No	No
Gauges Blockset	No	No	No
Genetic Algorithm and Direct Search Toolbox	Yes	No	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Image Acquisition Toolbox	Yes	Yes	Yes
Image Processing Toolbox	Yes	Yes	Yes
Instrument Control Toolbox	Yes	Yes	Yes
Link for Analog Devices VisualDSP++®* (see "New Products" on page 1-35)	Yes	No	Yes
Link for Cadence® Incisive®*	Yes	Yes	Yes
Link for Code Composer Studio	Yes	Yes	Yes
Link for ModelSim®	Yes	Yes	Yes
Link for TASKING®	Yes	No	Yes
Mapping Toolbox	Yes	Yes	Yes
MATLAB® Builder for Excel	No	No	Yes
MATLAB® Builder for Java	Yes	Yes	No
MATLAB® Builder for .NET	No	Yes	Yes

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
MATLAB® Compiler	Yes	Yes	Yes
MATLAB® Distributed Computing Engine	Yes	Yes	Yes
MATLAB® Report Generator	Yes	No	No
Model-Based Calibration Toolbox	Yes	Yes	No
Model Predictive Control Toolbox	No	No	No
Neural Network Toolbox	Yes	Yes	Yes
OPC Toolbox	Yes	Yes	No
Optimization Toolbox	No	Yes	No
Partial Differential Equation Toolbox (no release notes)	No	No	No
Real-Time Windows Target	Yes	Yes	No
Real-Time Workshop®*	Yes	Yes	Yes
Real-Time Workshop® Embedded Coder*	Yes	Yes	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
RF Blockset	Yes	Yes	No
RF Toolbox	Yes	No	No
Robust Control Toolbox	No	No	No
Signal Processing Blockset	Yes	Yes	Yes
Signal Processing Toolbox	Yes	Yes	No
SimBiology®*	Yes	Yes	No
SimDriveline	Yes	Yes	No
SimEvents®	Yes	Yes	Yes
SimHydraulics®	Yes	No	No
SimMechanics	Yes	Yes	No
SimPowerSystems	Yes	Yes	Yes
Simscape	Yes	Yes	No
Simulink® Accelerator (see "R2007b Product with License-Related Changes" on page 1-38)	N/A	N/A	N/A
Simulink® Control Design	Yes	Yes	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Simulink® Design Verifier* (see "New Products" on page 1-35)	Yes	No	No
Simulink® Fixed Point*	Yes	No	Yes
Simulink® HDL Coder	Yes	Yes	Yes
Simulink® Parameter Estimation	No	No	No
Simulink® Report Generator	No	Yes	No
Simulink® Response Optimization	No	No	No
Simulink® Verification and Validation*	Yes	Yes	No
Spline Toolbox	No	No	No
Stateflow® and Stateflow® Coder*	Yes	Yes	Yes
Statistics Toolbox	Yes	Yes	Yes
Symbolic Math Toolbox	No	Yes	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
System Identification Toolbox	Yes	Yes	No
SystemTest	Yes	Yes	No
Target for Freescale™ MPC5xx	Yes	Yes	Yes
Target for Infineon® C166	Yes	No	Yes
Target for TI C2000™	Yes	Yes	Yes
Target for TI C6000™	Yes	Yes	Yes
Video and Image Processing Blockset	Yes	Yes	Yes
Virtual Reality Toolbox	Yes	No	No
Wavelet Toolbox	Yes	No	No
xPC Target	Yes	Yes	Yes