

MATLAB® & Simulink®
Release Notes for R2011a

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Release Notes for R2011a

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Revision History

April 2011 Online only New for Release 2011a

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Highlights of R2011a

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What’s New in Release 2011a

Release 2011a includes new features in MATLAB® and Simulink®, two new products, and updates and bug fixes to 80 other products. Subscribers to MathWorks® Software Maintenance Service can download product updates. Visit the License Center to download products, activate software, and manage your license and user information.

MATLAB Product Family Highlights

- Improved performance for many linear algebra functions in MATLAB
- Large-scale interior-point solver for quadratic programming in Optimization Toolbox™
- Object-oriented portfolio optimization solver with turnover and transaction costs in Financial Toolbox™
- Engle-Granger and Johansen cointegration tests and VEC parameter estimation in Econometrics Toolbox™
- Utilization of up to 8 local workers by MATLAB® Compiler™ generated executables and components using Parallel Computing Toolbox™

New System Toolboxes for Design in MATLAB and Simulink

- DSP System Toolbox™, a new product that combines features of Signal Processing Blockset™ and Filter Design Toolbox™
- Communications System Toolbox™, a new product that combines features of Communications Toolbox™ and Communications Blockset™
- Computer Vision System Toolbox™, a new product that incorporates the functionality of Video and Image Processing Blockset™ and adds new computer vision algorithms
- Phased Array System Toolbox™, a new product for designing, simulating, and analyzing phased array signal processing systems

New Code Generation Products

- MATLAB® Coder™, a new product for generating portable C/C++ code directly from MATLAB
- Simulink® Coder™, a new product that combines the functionality of Real-Time Workshop® and Stateflow® Coder™
- Embedded Coder™, a new product that combines the functionality of Real-Time Workshop® Embedded Coder™, Embedded IDE Link™, and Target Support Package™

Simulink Product Family Highlights

- Signal Logging Selector to compare simulation results across models and runs in Simulink
- Merge capability for Simulink models from the XML text comparison in Simulink® Report Generator™
- FPGA-in-the-Loop, customizable I/O, and board support for Xilinx® devices in Simulink® HDL Coder™, EDA Simulator Link™, and xPC Target™
- Custom component authoring using the Simscape™ language in SimDriveline™
- Automatic detection of overflow and divide-by-zero design errors using Polyspace® technology in Simulink® Design Verifier™

New Products

R2011a contains two new products.

Product Name	Description
MATLAB Coder	Generate C and C++ code from MATLAB code
Phased Array System Toolbox	Design and simulate phased array signal processing systems

For details, see “New Products” on page 1-33.

R2011a Products with License-Related Changes

Several products have license-related changes in R2011a.

For details, see “R2011a Products with License-Related Changes” on page 1-36.

System Requirements

See “System Requirements” on page 1-40 for information about System Requirements changes.

Summary of Changes to Each Product

See “Release Summary” on page 1-41 for a summary of what has changed for each product for R2011a, including whether the product has new features, bug fixes, and compatibility issues.

Summary of New Features

This section summarizes the major new features and enhancements introduced in R2011a for the following products:

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MATLAB 7.12

Development Environment

- Improvements to Mac® platform look and feel, including placement of the MATLAB menu bar at the top of the screen
- Redesigned Plot Catalog that makes it easier to browse and discover both relevant and available plots, including toolbox plots
- Submission of support requests to MathWorks Technical Support from within MATLAB
- Comparison Tool that highlights and merges differences in MAT-file variable values and excludes specified files, folders, and unchanged text

Language and Programming

- Custom creation of MATLAB classes whose objects can be combined into heterogeneous arrays
- New copyable class, providing default copy behavior for custom handle classes

Mathematics

- Performance improvements for matrix transpose, element-wise single precision functions, sparse matrix indexed assignment, and many linear algebra functions

- `rng` function for controlling random number generation
- `ichol` function for incomplete Cholesky factorization

File I/O and External Interfacing

- New functions for reading and writing NetCDF and HDF5 files

For details, see the product-specific release notes.

Simulink 7.7

Component-Based Modeling

- Modeling of interrupt-driven processes extended to Model Reference via asynchronous function-call inputs
- Latch block, enabling reusable function-call components in feedback loops
- Signal Logging Selector to centralize data logging selection across multiple models
- Model block that now displays model names of all variant choices in the Model Reference Parameter dialog box
- Creation of protected models via right-click on Model block (requires Simulink Coder)

Model Management

- Merge capability for Simulink models from the XML text comparison report (using Simulink Report Generator)
- Comparison Tool that highlights and merges differences in MAT-file variable values and excludes specified files, folders, and unchanged text

Data Management

- New signal logging format using MATLAB `timeseries` class, with simplified access to large-scale simulation data

- Data Stores that are compatible with bus signals, including access from Stateflow® and MATLAB Function blocks
- Creation and editing of Simulink.Parameter objects with bus types and MATLAB structures from the Bus Editor
- Bus output for signal groups in Signal Builder block for easy routing of test cases
- Improved data export of N-D arrays and saving of export preferences

Block Enhancements

- Expanded feature set across 1-D, 2-D, and N-D lookup tables, including option to exclude data range checking in generated code
- Shift Arithmetic block that supports shift amount as a signal
- Zero-crossing in the From File block, providing more accurate simulations by capturing discontinuities
- Complex exponential option in Trigonometric Function block with optimized run-time performance
- Sign block that supports complex floating-point input

Performance

- Single-precision computation for faster simulation on all simulation targets
- Restoration of a simulation state created in a previous release

User Interface Enhancements

- Model Explorer interface that remembers the current tab view in the property dialog pane
- Filter option in all bus-capable blocks to quickly find a member signal of the bus

- View menu items that control visibility of checks in Model Advisor
- Active signal group display on the Signal Builder block

For details, see the product-specific release notes.

Aerospace Blockset 3.7

- LLA to Flat Earth block that estimates flat Earth position from geodetic latitude, longitude, and altitude
- International Geomagnetic Reference Field 11 block that calculates the Earth's magnetic field and secular variation at a specified location and time
- Spherical Harmonic Gravity Model block with an additional Earth (EIGEN-GL04C) gravity model
- Streamlined workflow and performance improvements for code generation with environmental blocks

For details, see the product-specific release notes.

Aerospace Toolbox 2.7

- `lla2flat` function that estimates flat Earth position from geodetic latitude, longitude, and altitude
- `flat2lla` function that estimates geodetic latitude, longitude, and altitude coordinates from a flat Earth position
- `igrf11magm` function that calculates the Earth's magnetic field and secular variation at a specified location and time
- `gravitiesphericalharmonic` function with an additional Earth (EIGEN-GL04C) gravity model

For details, see the product-specific release notes.

Bioinformatics Toolbox 3.7

- High resolution (pileup) and binned coverage calculations for NGS data sets
- Efficient counting algorithms based on effective alignment for NGS data sets
- Performance improvement and less memory footprint for operations on mapped short reads
- BioMap and BioIndexedFile subsetting methods to handle NGS data sets with multiple references and to efficiently filter data sets

For details, see the product-specific release notes.

Communications System Toolbox 5.0

- LDPC encoder and decoder System objects
- GPU-based LDPC decoder System object
- RAM-based Viterbi Decoder block
- Go-back-N data link protocol and PHY layer demo
- Turbo decoder demo

For details, see the product-specific release notes.

Computer Vision System Toolbox 4.0

- `extractFeatures` function for creating an array of feature vectors (descriptors) based on interest points within an image
- `matchFeatures` function for finding the best matches between two arrays of feature vectors (descriptors)
- Visualization of epipolar geometry for stereo images using `epipolarLine`, `isEpipoleInImage`, and `lineToBorderPoints` functions
- `estimateUncalibratedRectification` function for calculating projective transformations to rectify stereo images

- Video segmentation based on Gaussian Mixture Models using `ForegroundDetector` System object
- YCbCr video format support for `ToVideoDisplay` block and `DeployableVideoPlayer` System object

For details, see the product-specific release notes.

Control System Toolbox 9.1

- Specification and management of time and frequency units in LTI models, including unit display in design and analysis plots

For details, see the product-specific release notes.

Curve Fitting Toolbox 3.1

- `fit` and `fittype` functions accept anonymous functions as custom equations

For details, see the product-specific release notes.

Data Acquisition Toolbox 2.18

- Support for counters and timers on National Instruments® CompactDAQ devices
- Direct access to IEPE accelerometer measurements using National Instruments CompactDAQ devices
- Support for National Instruments cDAQ-9188 chassis and the following C series modules: NI 9222 and NI 9223
- 64-bit support for National Instruments CompactDAQ devices

For details, see the product-specific release notes.

Database Toolbox 3.9

- `datainsert` function for improved database write performance

For details, see the product-specific release notes.

Datafeed Toolbox 4.1

- Thomson Reuters™ Tick History FTP request for multiple security and multiple date queries

For details, see the product-specific release notes.

DO Qualification Kit 1.4

- Qualification artifacts for R2011a release of supported verification products
- Traceability matrix generation providing traceability among model objects, generated code, and model requirements

For details, see the product-specific release notes.

DSP System Toolbox 8.0

- System objects `dsp.DigitalUpConverter` and `dsp.DigitalDownConverter` with algorithms for upconverting and downconverting signals
- Selected System objects that enable use of variable-size data
- MATLAB Compiler support for building standalone executables and software components from MATLAB code containing System objects
- Heterogeneous array support for System objects, enabling use of arrays of System objects
- FIR Filter Simulink block, providing implementations of digital FIR filters

- FullPrecisionOverride property for System objects, simplifying floating-point to fixed-point conversion
- High-level and low-level implementation options for blocks in Filter Designs library, enabling finer control over digital filter implementations

For details, see the product-specific release notes.

Econometrics Toolbox 2.0

- Engle-Granger and Johansen cointegration tests
- Parameter estimation and constraint tests for cointegrated models
- VEC\VAR model conversion utilities
- Historical data sets for cointegration analysis

For details, see the product-specific release notes.

EDA Simulator Link 3.3

- FPGA-in-the-loop simulation using Xilinx Spartan-6, Virtex-6, Virtex-5, and Virtex-4 devices on a variety of development boards, including SP605, SP601, ML605, ML401/2/3, ML506/7, XUP Atlys, and XUPV5

For details, see the product-specific release notes.

Embedded Coder 6.0

- Multicore deployment on Windows[®], Linux[®], and VxWorks[®]RTOS for multirate models
- Memory section pragmas for declarations and definitions of data and functions, including shared utilities and referenced models

- SIL and PIL verification that supports code execution profiling, tunable parameters, and simplified model initialization
- AUTOSAR target with multiple runnables from virtual subsystems, code descriptor elements, import of record types, and calibration parameter improvements
- MISRA-C:2004 objective in Code Generation Advisor
- Target function libraries that enable replacement of generated code for reciprocal square root, sine, and cosine functions based on their computational method
- Improved consistency and placement of generated code comments

For details, see the product-specific release notes.

Filter Design HDL Coder 2.8

- HDL code generation for partly serial architectures for IIR DF1-SOS and for FIR interpolators
- HDL code generation for distributed arithmetic and serial architectures for cascade filters

For details, see the product-specific release notes.

Financial Derivatives Toolbox 5.7

- Interest-rate tree model in option adjusted spreads (OAS) for callable and puttable bonds
- Generalized Hull-White algorithm for interest-rate tree models

For details, see the product-specific release notes.

Financial Toolbox 4.0

- Object-oriented portfolio optimization solver
- Methods for portfolio optimization with transaction costs and turnover constraints
- Tools for troubleshooting portfolio optimization problem definition and solutions

For details, see the product-specific release notes.

Fixed-Income Toolbox 2.1

- Convertible bond pricing updated to include put features, variable-rate coupons, continuous dividend yields, and no exercise periods
- Single-name credit default swap (CDS) options

For details, see the product-specific release notes.

Fixed-Point Toolbox 3.3

- `cordicrotate`, `cordicpol2cart` functions enabling efficient CORDIC-based simulation and code generation for complex rotation and Polar to Cartesian conversion
- Unsigned data types for existing `cordiccxp`, `cordicsincos`, `cordicsin`, and `cordiccos` functions

For details, see the product-specific release notes.

IEC Certification Kit 1.4

- IEC 61508 tool certification by TÜV SÜD of R2011a versions of Embedded Coder, Simulink® PLC Coder™, and Polyspace products

- ISO 26262 tool qualification by TÜV SÜD of R2011a versions of Embedded Coder and Polyspace products
- Enhanced dialog for exporting traceability matrices

For details, see the product-specific release notes.

Image Acquisition Toolbox 4.1

- Access to vendor-specific properties in GigE Vision cameras
- Data logging with more video codecs on Windows, Mac, and Linux
- 64-bit Windows support for DALSA® and Matrox® frame grabbers
- Support for additional DALSA and Matrox frame grabbers

For details, see the product-specific release notes.

Image Processing Toolbox 7.2

- `bwconvhull` function for creating convex hull images
- `dicomwrite` function for writing multiple frames in one DICOM file
- `nitfread` function for reading NITF files that contain JPEG images
- Reduced memory use in `watershed` and `std2` functions

For details, see the product-specific release notes.

Instrument Control Toolbox 2.12

- Digitizer, upconverter, and downconverter IIVI instrument classes
- TCP/IP server sockets for establishing a single remote connection
- 64-bit IIVI-C drivers

For details, see the product-specific release notes.

Mapping Toolbox 3.3

- `geotiffwrite` function that exports georeferenced images or data to GeoTIFF format
- Spatial referencing objects for relating georeferenced images or data to geographic or planar coordinates

For details, see the product-specific release notes.

MATLAB Builder EX 2.0 (for Microsoft Excel)

- Utilization of up to 8 workers on local computers for applications and components developed using Parallel Computing Toolbox capabilities
- Control of empty cell values in a spreadsheet
- Automatic XLA add-in generation
- Function Wizard for one-click macro creation
- Prototyping and source code debugging of MATLAB functions with MATLAB® Builder™ EX Function Wizard
- Administrative rights no longer needed to deploy MATLAB Builder EX add-ins

For details, see the product-specific release notes.

MATLAB Builder JA 2.2.1 (for JAVA language)

- Utilization of up to 8 workers on local computers for applications and components developed using Parallel Computing Toolbox capabilities

For details, see the product-specific release notes.

MATLAB Builder NE 4.0 (for Microsoft .NET Framework)

- Utilization of up to 8 workers on local computers for applications and components developed using Parallel Computing Toolbox capabilities
- Type-safe automatic conversion to and from native .NET, COM and MATLAB data types
- Windows Communication Foundation (WCF) with Web or enterprise service-oriented architecture (SOA)
- Direct passing of .NET objects to and from a compiled MATLAB function
- Administrative rights no longer needed to deploy COM components

For details, see the product-specific release notes.

MATLAB Compiler 4.15

- Utilization of up to 8 workers on local computers for applications and components developed using Parallel Computing Toolbox capabilities
- Error reporting for graphical applications

For details, see the product-specific release notes.

MATLAB Distributed Computing Server 5.1

- GPU array indexing, `ndgrid`, `conv`, and `filter` functions, and enhancements to `arrayfun` function
- Distributed arrays with `arrayfun` and `reshape` functions and 2-D block-cyclic distribution in matrix multiplication and concatenation

- Utilization of up to 8 workers on local computers for MATLAB Compiler generated applications and components
- Visual indicator on MATLAB desktop to indicate status of interactive MATLAB pool sessions
- Admin Center feature that remotely starts and stops system services associated with MathWorks job manager on all computers in a cluster

For details, see the product-specific release notes.

MATLAB Report Generator 3.10

- Reports in PDF format that produce section titles on the same page as the section text
- Reports in PDF format that produce captions on the same page as the associated image

For details, see the product-specific release notes.

Model-Based Calibration Toolbox 4.2

- Multistart algorithm for finding local optima and creating smoother tables
- Smart tradeoff zooming on local model ranges
- Option to use multiple objectives to analyze modal optimization results
- Option to delay dependent fit updates when leaving local node
- Parallel model building simplified by reducing the number of setup steps

For details, see the product-specific release notes.

Model Predictive Control Toolbox 3.3

- Constraints on linear combinations of MPC controller inputs and outputs
- Terminal constraints and weights on MPC controller inputs and outputs for achieving closed-loop stability
- Optimal cost and optimal control trajectory access for both MPC controller object and block

For details, see the product-specific release notes.

OPC Toolbox 3.0

- Direct access to OPC data stored in historians
- Support for OPC HDA (Historical Data Access) version 1.2
- Discovery of OPC HDA servers
- Reading of raw and processed OPC historical data using synchronous operations

For details, see the product-specific release notes

Optimization Toolbox 6.0

- Large-scale interior-point quadratic programming solver
- Demo of a portfolio optimization problem solved using quadprog function
- Robustness improvements: nonlinear solvers tolerant of objective and constraint function failures

For details, see the product-specific release notes.

Parallel Computing Toolbox 5.1

- GPU array indexing, `ndgrid`, `conv`, and `filter` functions, and enhancements to `arrayfun` function
- Distributed arrays with `arrayfun` and `reshape` functions and 2-D block-cyclic distribution in matrix multiplication and concatenation
- Utilization of up to 8 workers on local computers for MATLAB Compiler generated applications and components
- Visual indicator on MATLAB desktop to indicate status of interactive MATLAB pool sessions
- Admin Center feature that remotely starts and stops system services associated with MathWorks job manager on all computers in a cluster

For details, see the product-specific release notes.

Polyspace Client for Ada 6.1

- Support for Rational® and Aonix compilers
- Code verification time reduction on multicore computers
- Viewer that displays results with ToolTips containing the values of variables

For details, see the product-specific release notes.

Polyspace Server for Ada 6.1

- Code verification time reduction on multicore computers

For details, see the product-specific release notes.

Polyspace Client for C/C++ 8.1

- Code metrics for C++
- Distinction of structure field in the data dictionary
- Customization of computation through overflow
- Wizard to ease project configuration
- Precision enhancements on arrays and functions

For details, see the product-specific release notes.

Polyspace Server for C/C++ 8.1

- Code metrics for C++

For details, see the product-specific release notes.

Polyspace Model Link SL 5.7

- Customization of computation through overflow
- Main generator that considers the scope of the step, initialization functions, and calibrations
- Precision enhancements on arrays and functions
- Ability to comment a check directly in the Simulink model

For details, see the product-specific release notes.

Real-Time Windows Target 3.7

- Packet Input and Packet Output blocks that support big-endian byte order
- Compiler upgrade to Open Watcom 1.9

For details, see the product-specific release notes.

Robust Control Toolbox 3.6

- `genss` and `genfrd` classes for modeling linear control systems with tunable components
- `realp` and `genmat` classes for creating custom tunable components, such as a low-pass or notch filter
- Tuning of `genss` models of control systems with `hinfstruct` command

For details, see the product-specific release notes.

Signal Processing Toolbox 6.15

- Performance improvements to `filtfilt` function, taking advantage of multithreaded computations
- `filtfilt` function, now accepting IIR filters in second-order section form

For details, see the product-specific release notes.

SimBiology 3.4

- Redesigned desktop, supporting streamlined model-building workflow, iterative workflows, and comparison of analysis results
- Arbitrary time units for simulation time
- Parameter estimation of initial conditions for species and compartments
- Robust parameter estimation
- Calculation of weighted residuals for population-fitting tasks

For details, see the product-specific release notes.

SimDriveline 2.0

- Component library fully integrated with Simscape simulation technology, supporting physical signals, data logging, local solver, and other Simscape features

- Component models combining rotational and translational mechanical domains, including lead screw and worm gear
- Gear loss models for all gear components
- Translator to convert existing SimDriveline models and user-defined libraries to the new component library
- Algorithms for simulating systems with redundant dynamic constraints

For details, see the product-specific release notes.

SimElectronics 1.6

- Semiconductor device models now include temperature dependence

For details, see the product-specific release notes.

SimHydraulics 1.9

- Blocks for modeling axial-piston machines

For details, see the product-specific release notes.

SimPowerSystems 5.4

- Permanent Magnet Synchronous Machine block enhanced to model 5-phase synchronous machines
- Interactive interface and MATLAB function to compute parameters of a double-cage Asynchronous Machine block based on standard manufacturer data
- Interactive interface and faster algorithm for performing load flow calculations, with support for additional components
- SimState support, enabling the saving and restoring of a model's simulation state

For details, see the product-specific release notes.

Simscape 3.5

- Hydraulic source blocks for modeling constant flow rate and constant pressure
- Simulation diagnostics improvements that aid debugging by indicating specific equations in Simscape language file
- Scalability improvements, accelerating simulations of larger systems
- Algorithm improvements for algebraic loop detection and zero-crossing robustness

For details, see the product-specific release notes.

Simulink 3D Animation 5.3

- VRML graphic primitives and backgrounds in the 3D World Editor Object library
- 3D World Editor shortcut on the MATLAB Desktop Start menu
- 3D World Editor option for hiding default VRML values
- Interactive setting in 3D World Editor for importing viewpoint values from currently navigated camera position in the viewer
- Preference option for startup window position of the 3D World Editor

For details, see the product-specific release notes.

Simulink Coder 8.0

- Data copy reductions for data store blocks, target function libraries, and matrix parameters
- Code optimizations for Discrete State Space and Product blocks
- User-defined types shared across models
- C-API access to root-level inputs and outputs

- ASAP2 files with Standard Axis lookup table format and custom computation method names
- Option to remove code protection for out-of-range inputs in Lookup and Prelookup table blocks
- Stateflow state functions code without unnecessary code perturbations from other state functions

For details, see the product-specific release notes.

Simulink Control Design 3.3

- Selection of individual bus elements as input and output linearization points
- Optional output argument of `linlft` command for returning linearization of excluded blocks
- Access to current linearization of a Simulink block for specifying custom linearization

For details, see the product-specific release notes.

Simulink Design Verifier 2.0

- Automatic detection of overflow and divide-by-zero design errors, including proof and counterexample generation
- Test-generation engine for improved performance and handling of nonlinear arithmetic and unsupported model objects
- Display of analysis information on the model using coloring and a context-sensitive information window
- Display of model analysis results in Model Explorer
- Updated block library that includes temporal operators

For details, see the product-specific release notes.

Simulink Fixed Point 6.5

- View manager that automatically optimizes columns displayed by the Fixed-Point Tool
- CORDIC Approximation for Magnitude-Angle to Complex block
- CORDIC Approximation of Complex Exponential for Trigonometric Function block
- Target function library replacement control for fixed-point abs, min, max, and sign functions
- Enhanced design minimum and maximum range checking

For details, see the product-specific release notes.

Simulink HDL Coder 2.1

- Device support for 9 Xilinx FPGA development boards
- Enhanced area and speed optimizations, including resource sharing within feedback loops, retiming across subsystem hierarchies, path delay balancing, and resource estimation reports
- Additional clocking options that include generation of multiple clocks
- Code generation for From and Goto blocks connected across subsystem boundaries
- RAM-based implementations for Viterbi Decoder and Integer Delay blocks
- Save and restore feature in HDL Workflow Advisor
- BlackBox implementations for subsystems that enable specification of generic parameters as strings of parameter-value pairs

For details, see the product-specific release notes.

Simulink PLC Coder 1.2

- Code generation support for Phoenix Contact® PC WORX IDE
- Lookup Table blocks
- Fixed-point data types

For details, see the product-specific release notes.

Simulink Report Generator 3.10

- Merge capability for Simulink models from the XML text comparison report
- Reports in PDF format with better quality snapshots for Simulink models and Stateflow charts
- System Design Description report demos

For details, see the product-specific release notes.

Simulink Verification and Validation 3.1

- Filtering capability in model coverage to allow exclusion of specific objects from model coverage collection
- Requirements for reusable components, including libraries and model reference blocks
- Component test function, `slvnmmergedata`, for merging of several different test data files into a single file for easier management of test data
- ISO® 26262 Modeling Standards Checks

For details, see the product-specific release notes.

Stateflow 7.7

- Right-click option for setting local breakpoints
- Use of MATLAB expressions to specify data size
- Options to debug a specific chart in a model and to change data values while debugging
- Atomic subcharts that support input events and enable control of generated function names
- Arrays of buses passed as chart inputs and outputs
- Option to maintain highlighting of active states after simulation
- New signal logging format using MATLAB `timeseries` class, with simplified access to states and local data

For details, see the product-specific release notes.

Statistics Toolbox 7.5

- Boosted decision trees for classification and regression
- Memory and performance improvements in hierarchical clustering
- Tie detection in kth nearest neighbor searching (`knnsearch` function)
- Weighted residuals in `nlmefit` function

For details, see the product-specific release notes.

Symbolic Math Toolbox 5.6

- Expression wrapping of math output in the MuPAD® notebook interface
- Performance improvements in `dsolve` and `ode::solve` functions, used for solving ordinary differential equations
- `solve` function that handles more equation types, such as systems of trigonometric equations
- `inverf` and `inverfc` functions for computing inverse and inverse-complementary error functions
- Performance improvements in polynomial operations, such as greatest common divisor, partial fraction decomposition, and resultant

For details, see the product-specific release notes.

Vehicle Network Toolbox 1.4

- New code generation capabilities for the following Simulink blocks: CAN Configuration, CAN Receive and CAN Transmit
- Support for National Instruments CAN interface hardware, including PCI, PXI, PCMCIA, and USB devices
- CAN message filtering capability in CAN Tool

For details, see the product-specific release notes.

Wavelet Toolbox 4.7

- FFT-based inverse continuous wavelet transform
- FFT-based continuous wavelet transform
- New demo on using pattern adapted wavelets for signal detection

For details, see the product-specific release notes.

xPC Target 5.0

- Programming of FPGA boards with Simulink models to run within xPC Target Turnkey systems (requires Simulink HDL Coder)
- Task-level profiling of execution times to help with load balancing
- Support for cameras based on the Camera Link[®] interface standard
- Image acquisition from USB Webcams
- Sending and receiving of UDP packets in real time
- Windows 64-bit support from MATLAB command line

For details, see the product-specific release notes.

New Products

In this section...
“MATLAB® Coder 2.0” on page 1-33
“Phased Array System Toolbox 1.0” on page 1-34

R2011a contains two new products.

Product Name	Description
MATLAB Coder	Generate C and C++ code from MATLAB code
Phased Array System Toolbox	Design and simulate phased array signal processing systems

MATLAB Coder 2.0

MATLAB Coder generates standalone C and C++ code from MATLAB code. The generated source code is portable and readable. MATLAB Coder supports a subset of core MATLAB language features, including program control constructs, functions, and matrix operations. It can generate MEX functions that let you accelerate computationally intensive portions of MATLAB code and verify the behavior of the generated code.

Key Features

- Incorporation of the Embedded MATLAB feature of Real-Time Workshop for generating C code from MATLAB
- Automatic generation of MEX functions from supported MATLAB code for acceleration in MATLAB
- Graphical tool for managing MATLAB Coder projects that allows specification of entry points, input data properties, and compiler options for code generation configuration options
- Dynamic memory allocation for variable-size data in the generated C code

- Run-time library expanded to include many new functions in MATLAB and toolboxes including System objects from the DSP System Toolbox, Communications System Toolbox, and Computer Vision System Toolbox
- Common MATLAB language features supported for code generation, including matrix operations, subscripting, program control statements, and structures

For details, see the product-specific release notes.

Phased Array System Toolbox 1.0

Phased Array System Toolbox provides algorithms and tools for the design, simulation, and analysis of phased array signal processing systems. These capabilities are provided as MATLAB functions and MATLAB System objects. The system toolbox includes algorithms for waveform generation, beamforming, direction of arrival estimation, target detection, and Space-Time Adaptive Processing.

The system toolbox lets you build monostatic, bistatic, and multistatic architectures for a variety of array geometries. You can model these architectures on stationary or moving platforms. Array analysis and visualization tools help you evaluate spatial, spectral, and temporal performance. The system toolbox lets you model an end-to-end phased array system or use individual algorithms to process acquired data.

Key Features

- Algorithms available as MATLAB functions and MATLAB System objects
- Monostatic, bistatic, and multistatic phased array system modeling
- Array analysis and 3-D visualization; physical array modeling for uniform linear arrays, uniform rectangular arrays, and arbitrary conformal arrays on platforms with motion
- Broadband and narrowband digital beam-forming functions, including MVDR/Capon, LCMV, time delay, Frost, time delay LCMV, and sub-band phase shift
- Space-time adaptive processing algorithms, including Displaced Phase Center Array (DPCA), Adaptive DPCA, Sample Matrix Inversion (SMI), and Angle-Doppler response visualization

- Direction of arrival algorithms, including MVDR, ESPRITE, Beam Scan, Root Music, and Monopulse
- Waveform synthesis functions for pulsed CW, linear FM, stepped FM, and staggered PRF signals, and waveform visualization tools for ambiguity function and matched filter response
- Algorithms for TVG, pulse compression, coherent and noncoherent integration, CFAR processing, plotting ROC curves, and estimating range and Doppler

For details, see the product-specific release notes.

R2011a Products with License-Related Changes

The following products have license-related changes in R2011a. To use the latest version of each product, you must have a subscription to MathWorks Software Maintenance Service (SMS) as of R2011a.

- Communications Blockset
- Communications Toolbox
- Embedded IDE Link™
- Filter Design Toolbox
- Real-Time Workshop
- Real-Time Workshop Embedded Coder
- Signal Processing Blockset
- Stateflow Coder
- Target Support Package
- Video and Image Processing Blockset

Communications Blockset and Communications Toolbox

As of R2011a, Communications Blockset and Communications Toolbox are merged and renamed Communications System Toolbox. Both Communications Blockset and Communications Toolbox are no longer available for purchase individually. Communications System Toolbox requires DSP System Toolbox.

If you are:	
Subscribed to SMS as of R2011a for either Communications Blockset or Communications Toolbox, or both	Your license will be updated to include Communications System Toolbox 5.0 at no initial cost; it will appear on future SMS renewal invoices.
Not subscribed to SMS as of R2011a for either Communications Blockset or Communications Toolbox, or both	Your license will be updated to include Communications System Toolbox 5.0 at no initial cost. You will need to renew your SMS subscription to access the updated product.

Filter Design Toolbox and Signal Processing Blockset

As of R2011a, Filter Design Toolbox and Signal Processing Blockset are merged and renamed DSP System Toolbox. Both Filter Design Toolbox and Signal Processing Blockset are no longer available for purchase individually.

If you are:	
Subscribed to SMS as of R2011a for either Filter Design Toolbox or Signal Processing Blockset, or both	Your license will be updated to include DSP System Toolbox 8.0 at no initial cost; it will appear on future SMS renewal invoices.
Not subscribed to SMS as of R2011a for either Filter Design Toolbox or Signal Processing Blockset, or both	Your license will be updated to include DSP System Toolbox 8.0 at no initial cost. You will need to renew your SMS subscription to access the updated product.

Real-Time Workshop and Stateflow Coder

As of R2011a, Stateflow Coder and Real-Time Workshop are merged and renamed Simulink Coder. Both Real-Time Workshop and Stateflow Coder are no longer available for purchase individually. Simulink Coder requires MATLAB Coder.

If you are:	
Subscribed to SMS as of R2011a for either Stateflow Coder or Real-Time Workshop, or both	Your license will be updated to include Simulink Coder 8.0 and MATLAB Coder 2.0 at no initial cost; they will appear on future SMS renewal invoices.
Not subscribed to SMS as of R2011a for either Stateflow Coder or Real-Time Workshop, or both	Your license will be updated to include Simulink Coder 8.0 and MATLAB Coder 2.0 at no initial cost. You will need to renew your SMS subscription to access the updated products.

Real-Time Workshop Embedded Coder, Target Support Package, and Embedded IDE Link

As of R2011a, Real-Time Workshop Embedded Coder, Target Support Package, and Embedded IDE Link are merged and renamed Embedded Coder. Real-Time Workshop Embedded Coder, Target Support Package, and Embedded IDE Link are no longer available for purchase individually. Embedded Coder requires MATLAB Coder and does not require Simulink.

If you are:	
Subscribed to SMS as of R2011a for any of the following products: Real-Time Workshop Embedded Coder Target Support Package Embedded IDE Link	Your license will be updated to include Embedded Coder 6.0 and MATLAB Coder 2.0 at no initial cost; they will appear on future SMS renewal invoices.
Not subscribed to SMS as of R2011a for any of the following products: Real-Time Workshop Embedded Coder Target Support Package Embedded IDE Link	Your license will be updated to include Embedded Coder 6.0 and MATLAB Coder 2.0 at no initial cost. You will need to renew your SMS subscription to access the updated products.

Video and Image Processing Blockset

As of R2011a, Video and Image Processing Blockset is renamed Computer Vision System Toolbox.

System Requirements

The major system requirements changes for R2011a follow.

For more information on system requirements, visit [Platforms & Requirements](#).

In this section...
“Platforms No Longer Available for New Releases” on page 1-40
“Future Data Execution Prevention (DEP) Compatibility” on page 1-40

Platforms No Longer Available for New Releases

As of R2011a, new releases from MathWorks will no longer be available for the Apple Mac OS® X Version 10.5.x (Leopard) operating system. MathWorks continues to provide 64-bit releases of MATLAB products for the Mac OS Version 10.6.x (Snow Leopard) operating system.

Future Data Execution Prevention (DEP) Compatibility

In the future, new releases from MathWorks will be compatible with the Microsoft® Data Execution Prevention (DEP) security feature. At that time, DEP-incompatible components, such as ATL 7.1, that you use with MathWorks products might cause a failure. For information on upgrading your components, see the Microsoft support article [Applications Using Older ATL Components May Experience Conflicts With DEP](#).

Currently with 32-bit R2011a MATLAB (and prior releases), if your computer system-wide configuration of DEP is set to AlwaysOn (via the command line `bcdedit /set nx AlwaysOn`), you will see a failure when trying to use certain MATLAB functionality, such as Help. For more information, see the Microsoft support article [A detailed description of the Data Execution Prevention \(DEP\) feature in Windows XP Service Pack 2, Windows XP Tablet PC Edition 2005, and Windows Server 2003](#).

Release Summary

An asterisk (*) after a product name indicates the product has had a Web release since R2010b.

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	No	No
Bioinformatics Toolbox™	Yes	Yes	Yes
Communications System Toolbox	Yes	Yes	Yes
Computer Vision System Toolbox	Yes	Yes	Yes
Control System Toolbox™	Yes	Yes	No
Curve Fitting Toolbox™	Yes	Yes	No
Data Acquisition Toolbox™	Yes	Yes	No
Database Toolbox™	Yes	Yes	No
Datafeed Toolbox™	Yes	Yes	No
DO Qualification Kit	Yes	Yes	No
DSP System Toolbox	Yes	Yes	Yes
Econometrics Toolbox	Yes	No	No
EDA Simulator Link	Yes	Yes	Yes
Embedded Coder	Yes	Yes	Yes
Filter Design HDL Coder™	Yes	No	Yes
Financial Derivatives Toolbox™	Yes	No	No
Financial Toolbox	Yes	Yes	No
Fixed-Income Toolbox™	Yes	No	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Fixed-Point Toolbox™	Yes	No	Yes
Fuzzy Logic Toolbox™	No	Yes	No
Gauges Blockset™	No	Yes	No
Global Optimization Toolbox	No	Yes	No
IEC Certification Kit	Yes	No	No
Image Acquisition Toolbox™	Yes	Yes	Yes
Image Processing Toolbox™	Yes	Yes	Yes
Instrument Control Toolbox™	Yes	Yes	No
Mapping Toolbox™	Yes	Yes	Yes
MATLAB Builder EX	Yes	Yes	No
MATLAB Builder JA	Yes	Yes	No
MATLAB Builder NE	Yes	No	No
MATLAB Coder	Yes	Yes	Yes
MATLAB Compiler	Yes	Yes	Yes
MATLAB® Distributed Computing Server™	Yes	Yes	Yes
MATLAB® Report Generator™	Yes	Yes	No
Model-Based Calibration Toolbox™	Yes	No	No
Model Predictive Control Toolbox™	Yes	Yes	No
Neural Network Toolbox™	No	Yes	No
OPC Toolbox™	Yes	No	No
Optimization Toolbox	Yes	Yes	Yes
Parallel Computing Toolbox	Yes	Yes	Yes
Partial Differential Equation Toolbox™ (no release notes)	No	Yes	No
Phased Array System Toolbox	Yes	No	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Polyspace® Client™ for C/C++	Yes	Yes	Yes
Polyspace® Server™ for C/C++	Yes	Yes	Yes
Polyspace Client for Ada	Yes	Yes	Yes
Polyspace Server for Ada	Yes	Yes	Yes
Polyspace Model Link™ SL	Yes	Yes	Yes
Polyspace Model Link TL	Yes	Yes	Yes
Polyspace UML Link™ RH	No	No	No
Real-Time Windows Target™	Yes	Yes	Yes
RF Toolbox™	No	No	No
Robust Control Toolbox™	Yes	No	Yes
Signal Processing Toolbox™	Yes	Yes	Yes
SimBiology®	Yes	Yes	Yes
SimDriveline *	Yes	Yes	Yes
SimElectronics®	Yes	No	Yes
SimEvents®	Yes	No	No
SimHydraulics®	Yes	Yes	No
SimMechanics™	No	Yes	No
SimPowerSystems™	Yes	Yes	No
SimRF™	No	Yes	No
Simscape	Yes	Yes	Yes
Simulink® 3D Animation™	Yes	Yes	No
Simulink Coder	Yes	Yes	Yes
Simulink® Control Design™	Yes	Yes	No
Simulink® Design Optimization™	No	No	No
Simulink Design Verifier	Yes	Yes	No

Product (Links to Release Notes)	New Features	Bug Fixes	Compatibility Considerations
Simulink® Fixed Point™	Yes	Yes	Yes
Simulink HDL Coder	Yes	Yes	No
Simulink PLC Coder	Yes	Yes	No
Simulink Report Generator	Yes	Yes	No
Simulink® Verification and Validation™	Yes	Yes	No
Spreadsheet Link™ EX	No	Yes	No
Stateflow	Yes	Yes	Yes
Statistics Toolbox™	Yes	Yes	Yes
Symbolic Math Toolbox™	Yes	Yes	Yes
System Identification Toolbox™	No	Yes	No
SystemTest™	No	Yes	Yes
Vehicle Network Toolbox™	Yes	No	No
Wavelet Toolbox™	Yes	Yes	No
xPC Target	Yes	Yes	Yes