

# Latest Features in Embedded Coder

September 2016

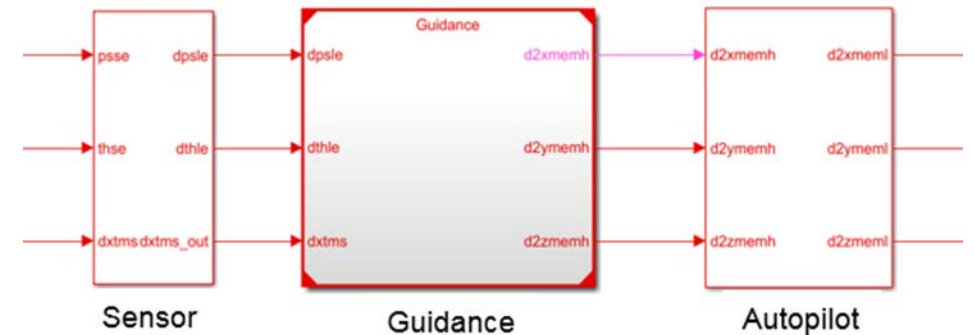
**R2016b**

# Cross-Release Code Integration

## Model code generated from earlier releases

- Model code that you generated from previous releases (R2010a and later)
- Avoid reverification cost due to the reuse of unmodified code

```
void AutonomousSystem_step(void)
{
  Sensor_SFcn( ... ) /* R2015b */
  Guidance( ... ) /* R2016b */
  Autopilot_SFcn( ... ) /* R2013a */
}
```

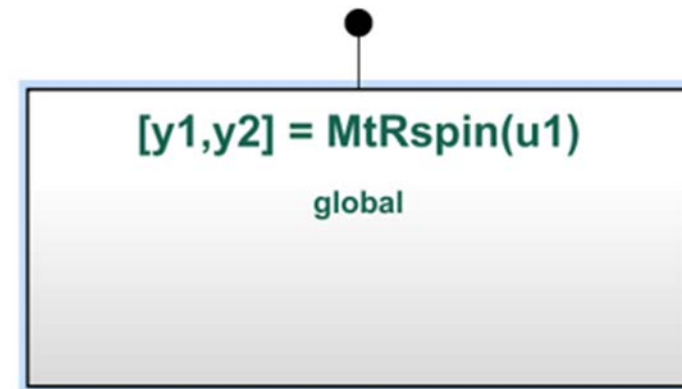


# Simulink Function Code Interface

## Configure generated C/C++ function interfaces for Simulink Function and Function Caller blocks

- Easier integration of generated code with function calls in external code and customizations for coding standards or design requirements

```
real_T MtRspin(const real_T *rtu_u1, real_T *rty_y2)
```

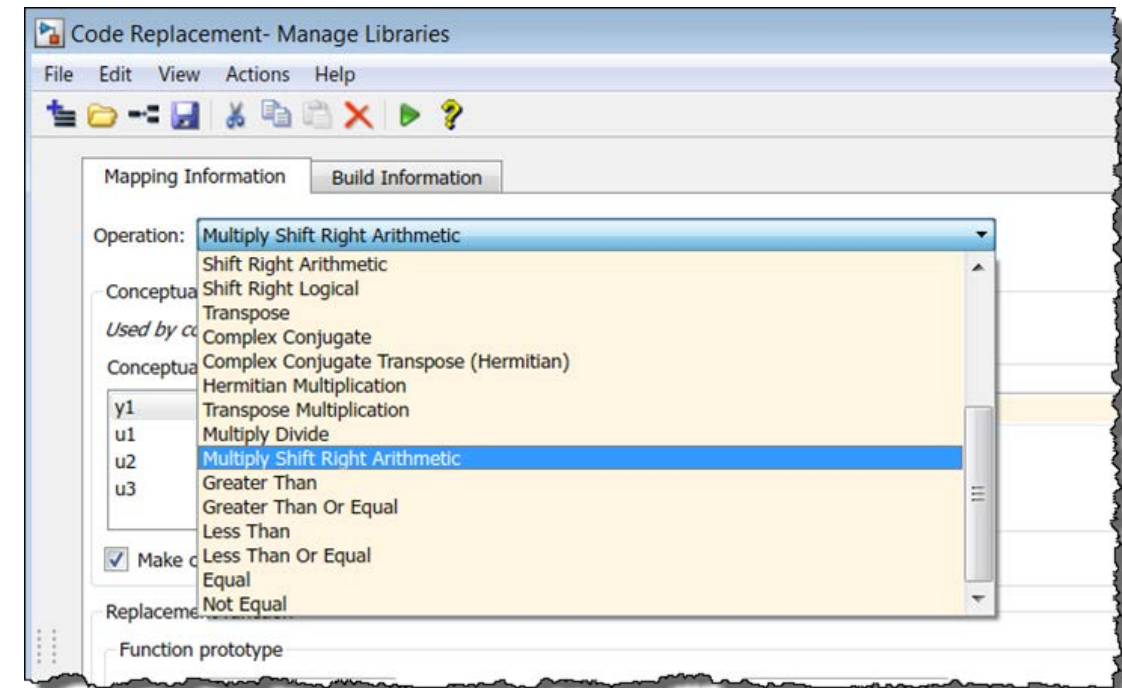


Simulink Function

# Compound Operation Code Replacement

## Replace with a single custom operation

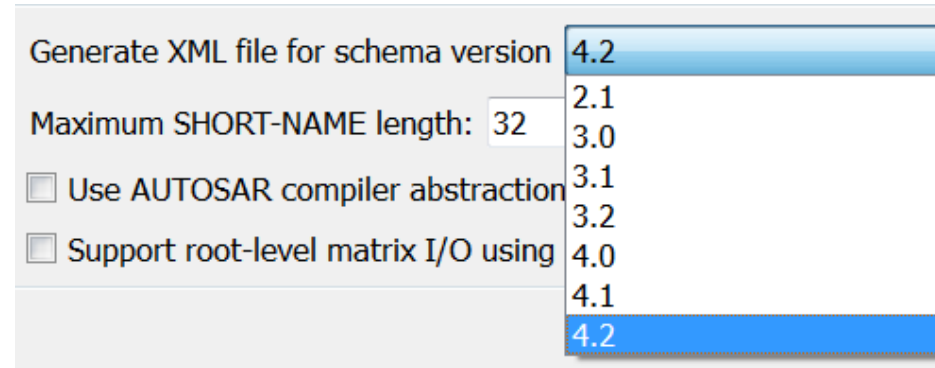
- Single operation replacement of scalar multiplication followed by
  - a shift/right arithmetic operation (RTW\_OP\_MUL\_SRA)
  - a division operation (RTW\_OP\_MULDIV)



# Support for AUTOSAR Schema Versions 3.2.2 and 4.2.2

## Seamless support for AUTOSAR releases

- Import detects AUTOSAR 2.x – 4.x release from arxml file
- User selects AUTOSAR release from configuration set options for code generation and arxml export

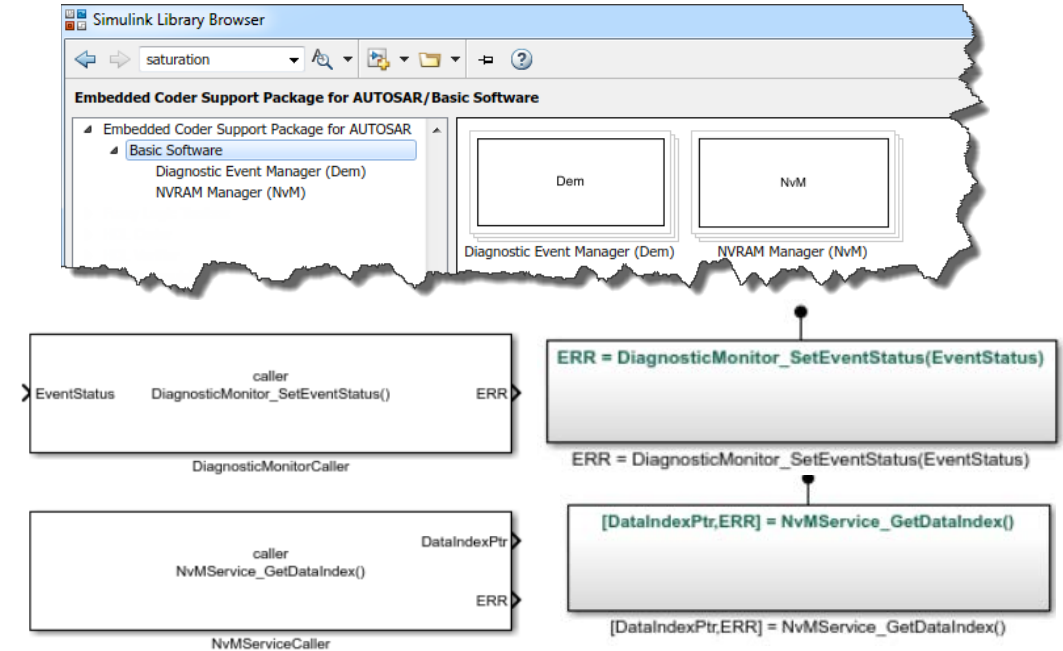


MATLAB Release	AUTOSAR Release
R2015b/R2016a/R2016b	2.1, 3.0, 3.1, <b>3.2</b> (Rev 3.2.2), 4.0, 4.1, <b>4.2</b> (Rev 4.2.1, 4.2.2)
R2014b, R2015a	2.1, 3.0, 3.1, 3.2, 4.0, <b>4.1</b> (Rev 4.1.1)
R2012a/b, R2013a/b, R2014a	2.1, 3.0, 3.1, 3.2, <b>4.0</b> (Rev 4.0.2)
R2011b	2.0, 2.1, 3.0, 3.1, 3.2
R2010a/b, R2011a	2.0, 2.1, 3.0, 3.1
R2009a/b	2.0, 2.1, 3.0
R2008a/b	2.0, 2.1

# AUTOSAR Basic Software (BSW) Block Library

## Simulate BSW including Diagnostic Event Manager (DEM) and NVRAM Manager (NvM)

- Out-of-the box solution for calls to AUTOSAR BSW services
  - Drag and drop DEM/NvM blocks for basic software simulation
  - Everything is preconfigured



» `rtwdemo_autosar_nvm_emulation`

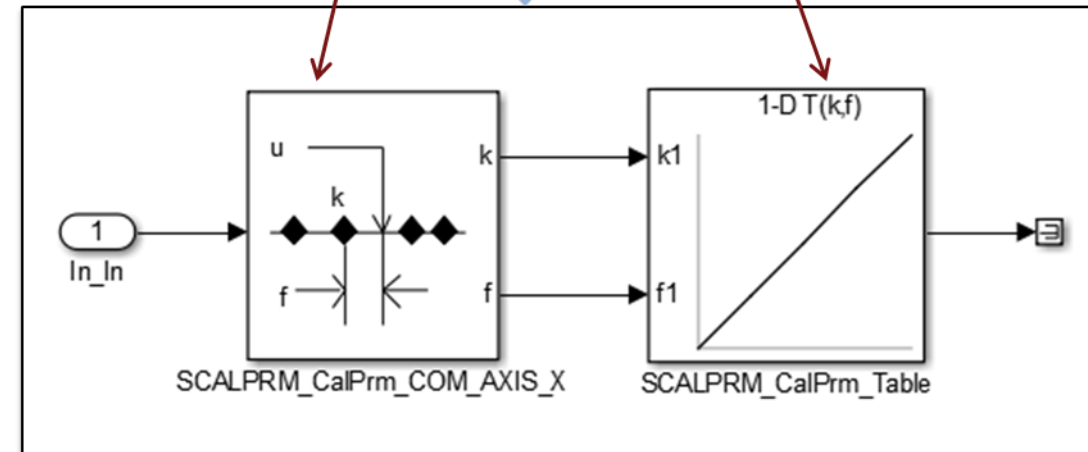
# Lookup Table Import Enhancements

## Support round-trip workflows by importing lookup tables

- Importer configures Lookup Table blocks with new classes
  - Simulink.LookupTable
  - Simulink.Breakpoint
- Supports integrated (STD\_AXIS) and distributed (COM\_AXIS) lookups

```

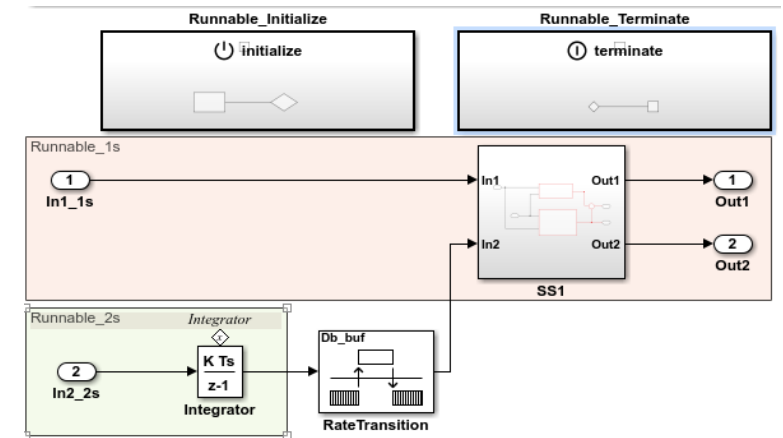
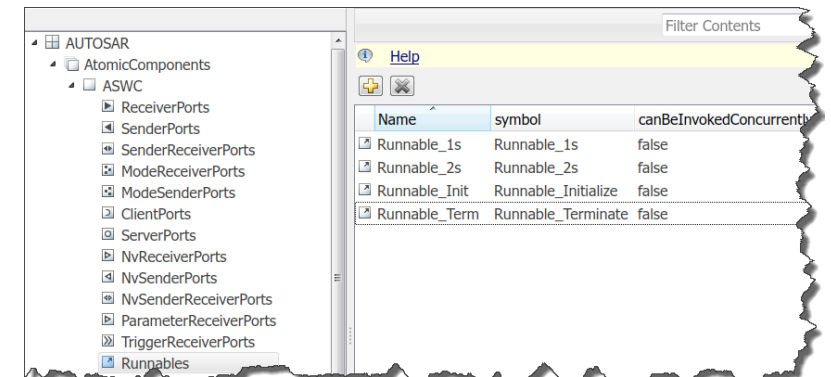
<SHARED-PARAMETERS>
  <PARAMETER-DATA-PROTOTYPE>
    <SHORT-NAME>CalPrm_COM_AXIS_X</SHORT-NAME>
    <CATEGORY>COM_AXIS</CATEGORY>
    ...
  </PARAMETER-DATA-PROTOTYPE>
  <PARAMETER-DATA-PROTOTYPE>
    <SHORT-NAME>CalPrm_Table</SHORT-NAME>
    <CATEGORY>CURVE</CATEGORY>
    ...
  </PARAMETER-DATA-PROTOTYPE>
</SHARED-PARAMETERS>
    
```



# AUTOSAR Startup, Reset, and Shutdown Modeling

## New Simulink blocks for Initialize and Terminate function

- You can map each Simulink initialize, reset, or terminate entry-point function to an AUTOSAR runnable
- All modeling styles are supported

Name	symbol	canBeInvokedConcurrentl
Runnable_1s	Runnable_1s	false
Runnable_2s	Runnable_2s	false
Runnable_Init	Runnable_Initialize	false
Runnable_Term	Runnable_Terminate	false



# Embedded Coder Support for STM32F746G Discovery Board

## Generate optimized code for STM32F746G discovery board

- Provides blocks for audio I/O, analog input, PWM output, SPI master transfer, SPI read/write, digital read/write, PWM output, I2C master read/write

