Aerospace Blockset Release Notes

Contents

Summary by Version

This table provides quick access to what's new in each version. For clarification, see "About Release Notes" on page 1.

Version (Release)	New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Latest Version V2.1 (R2006a)	Yes Details	No	Bug Reports at Web site	Printable Release Notes: PDF V2.1 product documentation
V2.0.1 (R14SP3)	No	No	Bug Reports at Web site	No
V2.0 (R14SP2+)	Yes Details	Yes Summary	Bug Reports at Web site	No
V1.6.2 (R14SP2)	No	No	Bug Reports at Web site	No
V1.6.1 (R14SP1)	No	No	No	No
V1.6 (R14)	No	No	Fixed bugs at Web site	No
V1.5.1 (R13SP2)	No	No	No	V1.5.1 product documentation
V1.5 (R13SP1)	Yes Details	Yes Summary	No	No

About Release Notes

Use release notes when upgrading to a newer version to learn about new features and changes, and the potential impact on your existing files and practices. Release notes are also beneficial if you use or support multiple versions.

If you are not upgrading from the most recent previous version, review release notes for all interim versions, not just for the version you are installing. For example, when upgrading from V1.0 to V1.2, review the New Features and Changes, Version Compatibility Considerations, and Bug Reports for V1.1 and V1.2.

New Features and Changes

These include

- New functionality
- Changes to existing functionality
- Changes to system requirements (complete system requirements for the current version are at the MathWorks Web site)
- Any version compatibility considerations associated with each new feature or change

Version Compatibility Considerations

When a new feature or change introduces a known incompatibility with the previous version, its description includes a **Compatibility Considerations** subsection that details the impact. For a list of all new features and changes that have compatibility impact, see the Compatibility Summary for Aerospace Blockset.

Compatibility issues that become known 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.

Fixed Bugs and Known Problems

MathWorks Bug Reports is a user-searchable database of known problems, workarounds, and fixes. The MathWorks updates the Bug Reports database as new problems and resolutions become known, so check it as needed for the latest information.

Access Bug Reports at the MathWorks Web site using your MathWorks Account. If you are not logged in to your MathWorks Account when you link to Bug Reports, you are prompted to log in or create an account. You then can view bug fixes and known problems for R14SP2 and more recent releases.

The Bug Reports database was introduced for R14SP2 and does not include information for prior releases. You can access a list of bug fixes made in prior versions via the links in the summary table.

Related Documentation at Web Site

Printable Release Notes (PDF). You can print release notes from the PDF version, located at the MathWorks Web site. The PDF version does not support links to other documents or to the Web site, such as to Bug Reports. Use the browser-based version of release notes for access to all information.

Product Documentation. At the MathWorks Web site, you can access complete product documentation for the current version and some previous versions, as noted in the summary table.

Version 2.1 (R2006a) Aerospace Blockset

This table summarizes what's new in V2.1 (R2006a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	No	Bug Reports at Web site	Printable Release Notes: PDF V2.1 product documentation

New features and changes introduced in this version are described here.

FlightGear Version 0.9.9 Is Supported by FlightGear Simulator Interface

FlightGear Simulator Interface now supports the standard binary distributions of FlightGear version 0.9.9 on all platforms.

The FlightGear Preconfigured 6DoF Animation block and Pack net_fdm Packet for FlightGear block have been updated accordingly.

3DoF Animation and 6DoF Animation Blocks Support Code Generation

The 3DoF Animation and 6DoF Animation blocks are now SimViewingDevices. You can view outputs with these blocks when you have connected your model to running target code using the Real-Time Workshop® external mode.

Version 2.0.1 (R14SP3) Aerospace Blockset

This table summarizes what's new in V2.0.1 (R14SP3):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Bug Reports at Web site	No

Version 2.0 (R14SP2+) Aerospace Blockset

This table summarizes what's new in V2.0 (R14SP2+):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes—Details labeled as **Compatibility Considerations**, below. See also Summary.	Bug Reports at Web site	No

New features and changes introduced in this version are described here.

Flight Simulator Interface

The Aerospace Blockset 2.0 supports an interface to the third-party FlightGear Flight Simulator, an open source flight simulator software package. You can obtain the FlightGear Flight Simulator from `http://www.flightgear.org`.

The simulator interface included with Aerospace Blockset is a unidirectional transmission from Simulink to FlightGear using FlightGear's published `net_fdm` binary data exchange specification transmitted via UDP network packets to a running instance of FlightGear.

Aerospace Blockset currently supports the standard binary distributions of FlightGear versions 0.9.3 and 0.9.8a on all platforms.

Note There is a known issue with FlightGear running on Macintosh, where Weight on Wheels (wow) is 4 bytes, as opposed to other platforms where it is 1 byte. As a result, Aerospace Blockset may experience trouble communicating with FlightGear if you are running FlightGear on Macintosh, and if you are using any of the following parameters:

- wow
- gear_pos

- gear_steer
- gear_compression
- agl
- cur_time
- warp
- visibility

For more information on the available parameters, see the reference page for the Pack net_fdm Packet for FlightGear block.

New Aerospace Blocks

The new Simulink blocks introduced in Aerospace Blockset 2.0 are listed below:

3DoF (Wind Axes)

6 DoF ECEF (Quaternion)

6DoF Wind (Quaternion)

6DoF Wind (Wind Angles)

Simple Variable Mass 3DoF (Wind Axes)

Simple Variable Mass 6 DoF ECEF (Quaternion)

Simple Variable Mass 6DoF Wind (Quaternion)

Simple Variable Mass 6DoF Wind (Wind Angles)

Custom Variable Mass 3DoF (Wind Axes)

Custom Variable Mass 6 DoF ECEF (Quaternion)

Custom Variable Mass 6DoF Wind (Quaternion)

Custom Variable Mass 6DoF Wind (Wind Angles)

4th Order Point Mass (Longitudinal)

4th Order Point Mass Forces (Longitudinal)

6th Order Point Mass (Coordinated Flight)

6th Order Point Mass Forces (Coordinated Flight)

Quaternion Modulus

Quaternion Multiplication

Quaternion Norm

Quaternion Normalize

Quaternion Rotation

Wind Angular Rates

World Magnetic Model 2005

Mach Number and Dynamic Pressure Blocks Input

Previously the Mach Number and Dynamic Pressure blocks worked with airspeed as an input. This was not how the blocks were intended to work. Starting with this release, these blocks only accept velocity vectors as input.

Compatibility Considerations

The Mach Number and Dynamic Pressure blocks no longer accept airspeed as an input. Use velocity vectors as input for these blocks.

Version 1.6.2 (R14SP2) Aerospace Blockset

This table summarizes what's new in V1.6.2 (R14SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Bug Reports at Web site	No

Version 1.6.1 (R14SP1) Aerospace Blockset

This table summarizes what's new in V1.6.1 (R14SP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	No	No

Version 1.6 (R14) Aerospace Blockset

This table summarizes what's new in V1.6 (R14):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	Fixed bugs at Web site	No

Version 1.5.1 (R13SP2) Aerospace Blockset

This table summarizes what's new in V1.5.1 (R13SP2):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
No	No	No	V1.5.1 product documentation

Version 1.5 (R13SP1) Aerospace Blockset

This table summarizes what's new in V1.5 (R13SP1):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems	Related Documentation at Web Site
Yes Details below	Yes—Details labeled as **Compatibility Considerations**, below. See also Summary.	No	No

New features and changes introduced in this version are described here.

New Aerospace Blocks

The new Simulink blocks introduced in Aerospace Blockset 1.5 are listed below:

Simple Variable Mass 3DoF (Body Axes)

Custom Variable Mass 3DoF (Body Axes)

Simple Variable Mass 6DoF (Euler Angles)

Simple Variable Mass 6DoF (Quaternion)

Custom Variable Mass 6DoF (Euler Angles)

Calculate Range

World Magnetic Model 2000

Dryden Wind Turbulence Model (Continuous (+q -r))

Dryden Wind Turbulence Model (Continuous (+q +r))

Dryden Wind Turbulence Model (Continuous (-q +r))

Von Kármán Wind Turbulence Model (Continuous (+q -r))

Von Kármán Wind Turbulence Model (Continuous (+q +r))

Von Kármán Wind Turbulence Model (Continuous (-q +r))

Dryden Wind Turbulence Model (Discrete (+q -r))

Dryden Wind Turbulence Model (Discrete (+q +r))

Dryden Wind Turbulence Model (Discrete (-q +r))

Horizontal Wind Model

Aerodynamic Forces and Moments

Moments about CG due to Forces

Symmetric Inertia Tensor

Estimate Center of Gravity

Estimate Inertia Tensor

Dynamic Pressure

Mach

Create 3x3 Matrix

Invert 3x3 Matrix

Adjoint of 3x3 Matrix

Determinant of 3x3 Matrix

SinCos

Relative Ratio

Pressure Altitude

Ideal Airspeed Correction

Incidence, Sideslip, & Airspeed

Lapse Rate Model

Non-Standard Day 310

Non-Standard Day 210C

Block Implementation Improvements

The following list contains improvements to the Aerospace Blockset since the previous release:

- 6DoF blocks now output translational accelerations.
- Out of Range actions (None, Warning, Error) are now available for WGS84 Gravity Model block and the COESA Atmosphere Model block.
- Where applicable, you can now select to output velocity for blocks in knots.

Compatibility Considerations

As a result of conversion from the previous version, the output and behavior of some of the blocks have changed. These differences are listed below.

Dryden Wind Turbulence Block. If DCM equals eye(3) (identity matrix) and wind direction equals 0° (from North), the output of the Dryden Wind Turbulence Model (Continuous +q -r) block yields the same results as past versions of the Dryden Wind Turbulence Model (Aerospace Blockset 1.0 and 1.0.1) with approximately 10e-7 error.

Also, for the Dryden Wind Turbulence Model (Continuous) block, the military specifications result in the same transfer function after evaluating the turbulence scale lengths, and the turbulence transfer functions balance each other out.

Wind Shear Block. When using metric units, values will differ from the previous version of the Aerospace Blockset at the second decimal place (0.0x) due to corrections in the metric altitude to measure wind speed. It has been changed from six meters to ~6.096 meters. The specification calls for 20 feet and the new metric altitude is the exact conversion.

COESA Atmosphere Block. When using English units, density units have changed from lbm/ft^3 to slugs/ft^3. Blocks will be forwarded, with automatic conversion, to continue to output density in lbm/ft^3. Users may wish to investigate updating their models to use slugs/ft^3.

Turbofan Engine System Block. Users might experience minor changes in output values due to unit conversion correction for relative ratios.

Compatibility Summary for Aerospace Blockset

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided with the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
Latest Version V2.1 (R2006a)	None
V2.0.1 (R14SP3)	None
V2.0 (R14SP2+)	See the **Compatibility Considerations** subheading for this new feature or change: "Mach Number and Dynamic Pressure Blocks Input" on page 9
V1.6.2 (R14SP2)	None
V1.6.1 (R14SP1)	None
V1.6 (R14)	None
V1.5 (R13SP1)	See the **Compatibility Considerations** subheading for this new feature or change: "Block Implementation Improvements" on page 16