Release Notes for Aerospace Toolbox

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R2012b

Version: 2.10
New Features: Yes
Bug Fixes: Yes

FlightGear animation object support for FlightGear versions 2.4 and 2.6

The Aerospace Toolbox product now supports FlightGear Versions 2.6 and 2.4.

For more information on working with FlightGear, see "Aero.FlightGearAnimation Objects".

R2012a

Version: 2.9
New Features: Yes
Bug Fixes: No

Support 2011 Version of DATCOM

The `datcomimport` function has been enhanced to support the 2011 version of DATCOM files.

Using FlightGear Version 2.4.0 with Aerospace Toolbox

Aerospace Toolbox Version 2.9 does not support FlightGear Version 2.4.0. Use this procedure as a workaround.

1. In the MATLAB® Command Window, create a FlightGear animation object.

   ```
   h = Aero.FlightGearAnimation;
   ```

2. Set the FlightGear animation object property `FlightGearVersion` to 2.0.

   ```
   h.FlightGearVersion = '2.0';
   ```

3. Set the FlightGear animation object property `FlightGearBaseDirectory` to the location of FlightGear Version 2.4.0.

   ```
   h.FlightGearBaseDirectory = 'C:\Program Files\FlightGear240'
   ```

4. Generate the run script.

   ```
   GenerateRunScript(h)
   ```

5. Save and close this file.

For more information, see Aero.FlightGearAnimation Objects in the Aerospace Toolbox User's Guide.

R2011b

Version: 2.8
New Features: Yes
Bug Fixes: No

Conversion of Error and Warning Message Identifiers

Compatibility Considerations: Yes

For R2011b, error and warning message identifiers have changed in Aerospace Toolbox.

Compatibility Considerations

If you have scripts or functions that use message identifiers that changed, you must update the code to use the new identifiers. Typically, message identifiers are used to turn off specific warning messages.

For example, the `Aero:FlightGearAnimation:NeedTimeData` identifier has changed to `aero:FlightGearAnimation:NeedTimeData`. If your code checks for `Aero:FlightGearAnimation:NeedTimeData`, you must update it to check for `aero:FlightGearAnimation:NeedTimeData` instead.

To determine the identifier for a warning, run the following command just after you see the warning:

```
[MSG,MSGID] = lastwarn;
```

This command saves the message identifier to the variable *MSGID*.

Note Warning messages indicate a potential issue with your code. While you can turn off a warning, a suggested alternative is to change your code so it runs warning-free.

Demos

The following demos are new:

- Visualizing World Magnetic Model Contours for 2010 Epoch — Visualize contour plots of the calculated values for the Earth's magnetic field using World Magnetic Model 2010 (WMM-2010) overlaid on maps of the Earth.
- Visualizing Geoid Height for Earth Geopotential Model 1996 — Calculate the Earth's Geoid height using the EGM96 Geopotential Model.

Function and Function Element Being Removed

Compatibility Considerations: Yes

The following table lists the function and function element name being removed for R2011b.

Function or Function Element Name	What Happens When You Use the Function or Element?	Use These Functions or Function Elements Instead	Compatibility Considerations
`wrldmagm` `'2000'` or `'2005'` epoch year	Warns	For model years between 2000 and the start of 2010, use `igrf11magm`. For model years between 2010 and the start of 2015, use `wrldmagm`.	For model years between 2000 and the start of 2010, use `igrf11magm`. For model years between 2010 and the start of 2015, use `wrldmagm`.

R2011a

Version: 2.7
New Features: Yes
Bug Fixes: No

New LLA to Flat Earth Function

The `lla2flat` function estimates a flat Earth position from geodetic latitude, longitude, and altitude coordinates.

New Flat Earth to LLA Function

The `flat2lla` function estimates geodetic latitude, longitude, and altitude coordinates from a flat Earth position.

New International Geomagnetic Reference Field 11 Function

The `igrf11magm` function calculates the Earth's magnetic field using the 11th generation of the International Geomagnetic Reference Field.

The gravityspericalharmonic Function Supports New Planet Model

The `gravityspericalharmonic` function now supports the EIGEN-GL04C gravity field model.

R2010b

Version: 2.6
New Features: Yes
Bug Fixes: No

New Geoid Height Function

The `geoidheight` function calculates the height of geoid undulations/height using one of three geopotential models.

Support to Read File Types 6, 21, and 42 for 2008 Version of DATCOM

The `datcomimport` function has been enhanced to read file types 6, 21, and 42 for 2008 DATCOM files. In previous releases, the Aerospace Toolbox read only file type 6 and 21.

Support for FlightGear 2.0

Aerospace Toolbox now supports FlightGear Version 2.0.

For more information on working with FlightGear, see Aero.FlightGearAnimation Objects in the Aerospace Toolbox User's Guide.

Functions and Function Elements Being Removed

Compatibility Considerations: Yes

Function or Function Element Name	What Happens When You use the Function or Element?	Use This Instead	Compatibility Considerations
`geoidegm96`	Warns	`geoidheight`	Replace all existing instances of `geoidegm96` with `geoidheight`.

R2010a

Version: 2.5
New Features: Yes
Bug Fixes: No

New Gravity Centrifugal Effect Function

The `gravitycentrifugal` function implements the centrifugal effect for eight planets and the Moon, plus the capability to customize this effect.

New Spherical Harmonic Gravity Model Function

The `gravityspericalharmonic` function implements the spherical harmonic gravity models for Earth (EGM2008, EGM96), Moon (LP100K, LP165P), and Mars (GMM2B), plus the capability to customize these models.

New Gas Dynamics Functions

New gas dynamics functions, including isentropic flow (`flowisentropic`), normal shock (`flownormalshock`), Rayleigh flow (`flowrayleigh`), Fanno flow (`flowfanno`), and Prandtl-Meyer flow (`flowprandtlmeyer`).

Updated World Magnetic Function

Updated `wrldmagm` function to include world magnetic model for years 2010-2015 (WMM-2010).

Demos

The Comparing Zonal Harmonic Gravity Model to Other Gravity Models demo has been updated to include comparison of other gravity models.

R2009b

Version: 2.4
New Features: Yes
Bug Fixes: No

New Zonal Harmonic Gravity Model Function

The `gravityzonal` function implements the zonal harmonic gravity model.

Support for FlightGear 1.9.1

Aerospace Toolbox Version 3.4 now supports FlightGear Version 1.9.1.

For more information on working with FlightGear, see Aero.FlightGearAnimation Objects in the Aerospace Toolbox User's Guide.

R2009a

Version: 2.3
New Features: Yes
Bug Fixes: No

Support to Read File Type 21 for 2007 Version of DATCOM

The `datcomimport` function has been enhanced to read file type 21 for 2007 DATCOM files. In previous releases, the Aerospace Toolbox read only file type 6.

Using FlightGear Version 1.9.0 with Aerospace Toolbox

Aerospace Toolbox Version 2.3 does not support FlightGear Version 1.9.0. You can use this procedure.

1. In the MATLAB Command Window, create a FlightGear animation object.

   ```
   h = Aero.FlightGearAnimation;
   ```

2. Set the FlightGear animation object property `FlightGearVersion` to 1.0.

   ```
   h.FlightGearVersion = '1.0';
   ```

3. Set the FlightGear animation object property `FlightGearBaseDirectory` to the location of FlightGear Version 1.9.0.

   ```
   h.FlightGearBaseDirectory = 'C:\Program Files\FlightGear190'
   ```

4. Generate the run script.

   ```
   GenerateRunScript(h)
   ```

5. Open the custom FlightGear run script with a text editor and change the input parameter `'--airport-id='` to `'--airport='`.

6. Save and close this file.

For more information on working with FlightGear, see Aero.FlightGearAnimation Objects in the Aerospace Toolbox User's Guide.

R2008b

Version: 2.2
New Features: Yes
Bug Fixes: No

Support for 2007 Version of DATCOM File

The `datcomimport` function has been enhanced to support the 2007 DATCOM file in addition to the 1976 and 1999 DATCOM files.

FlightGear Version 1.0 with Aerospace Toolbox

Aerospace Toolbox Version 2.2 now supports FlightGear Version 1.0. To access this version of FlightGear, you can use this procedure.

1. In the MATLAB Command Window, create a FlightGear animation object.

   ```
   h = Aero.FlightGearAnimation;
   ```

2. Set the FlightGear animation object property `FlightGearVersion` to 1.0.

   ```
   h.FlightGearVersion = '1.0';
   ```

3. Set the FlightGear animation object property `FlightGearBaseDirectory` to the location of FlightGear Version 1.0.

   ```
   h.FlightGearBaseDirectory = 'C:\Program Files\FlightGear10'
   ```

For more information on working with FlightGear, see Aero.FlightGearAnimation Objects in the Aerospace Toolbox User's Guide.

FlightGear Animation Object play Method Now Supports Custom Timers

The FlightGear animation object `play` method now supports custom timers.

In previous releases, you needed to create your own `play` method if your FlightGear animation object was used with custom timers. This is no longer necessary.

R2008a

Version: 2.1
New Features: Yes
Bug Fixes: No

Support for 1999 Version of DATCOM File

The `datcomimport` function has been enhanced to support the 1999 DATCOM file in addition to the 1976 DATCOM file.

Using FlightGear Version 1.0 with Aerospace Toolbox

Aerospace Toolbox Version 2.1 does not support FlightGear Version 1.0. You can use this procedure.

1. In the MATLAB Command Window, create a FlightGear animation object.

   ```
   h = Aero.FlightGearAnimation;
   ```

2. Set the FlightGear animation object property `FlightGearVersion` to 0.9.10.

   ```
   h.FlightGearVersion = '0.9.10';
   ```

3. Set the FlightGear animation object property `FlightGearBaseDirectory` to the location of FlightGear Version 1.0.

   ```
   h.FlightGearBaseDirectory = 'C:\Program Files\FlightGear10'
   ```

For more information on working with FlightGear, see Aero.FlightGearAnimation Objects in the Aerospace Toolbox User's Guide.

R2007b

Version: 2.0
New Features: Yes
Bug Fixes: No

Virtual Reality Toolbox Animation Object

This release introduces the following new objects and their associated methods to visualize flight data using the Virtual Reality Toolbox™ product:

- `Aero.VirtualRealityAnimation`
- `Aero.Node`
- `Aero.Viewpoint`

Support for the COSPAR International Reference Atmosphere 1986 Model

The `atmoscira` function implements the COSPAR International Reference Atmosphere (CIRA) 1986 environmental model.

Support for 2001 United States Naval Research Laboratory Mass Spectrometer and Incoherent Scatter Radar Exosphere

The `atmosnrlmsise00` function implements the 2001 United States Naval Research Laboratory Mass Spectrometer and Incoherent Scatter Radar Exosphere (NRLMSISE) environmental model.

Support for the EGM96 Geopotential Model

The `geoidegm96` function implements the 1996 Earth Geopotential Model (EGM96).

quat2angle Function Replaces quat2euler

Compatibility Considerations: Yes

The `quat2angle` function converts spatial representation from any of 12 standard sequences of rotation angles to quaternions.

Compatibility Considerations

The `quat2euler` function is deprecated. Applications that contain this function continue to be supported, but an error message will be displayed. Use the `quat2angle` function instead.

angle2quat Function Replaces euler2quat

Compatibility Considerations: Yes

The `angle2quat` function converts spatial representation from quaternions to any of 12 standard sequences of rotation angles.

Compatibility Considerations

The `euler2quat` function is deprecated. Applications that contain this function continue to be supported, but an error message will be displayed. Use the `angle2quat` function instead.

R2007a

Version: 1.1
New Features: Yes
Bug Fixes: No

New Aerospace Toolbox Objects

This release introduces the following new objects and their associated methods to create a six–degrees–of–freedom animation of multiple bodies that have custom geometries:

- `Aero.Animation`
- `Aero.Body`
- `Aero.Camera`
- `Aero.Geometry`

New Aerospace Toolbox Demo

The Aerospace Toolbox product has a new demo, Overlaying Simulated and Actual Flight Data, which illustrates the use of the Aero objects.

R2006b

Version: 1.0
New Features: Yes
Bug Fixes: No

Introduction of Aerospace Toolbox Product

This product extends the MATLAB technical computing environment by providing reference standards, environment models, and aerodynamic coefficient importing for performing advanced aerospace analysis to develop and evaluate your designs. An interface to the FlightGear flight simulator enables you to visualize flight data in a three-dimensional environment and reconstruct behavioral anomalies in flight-test results. To ensure design consistency, the Aerospace Toolbox software provides utilities for unit conversions, coordinate transformations, and quaternion math, as well as standards-based environmental models for the atmosphere, gravity, and magnetic fields. You can import aerodynamic coefficients directly from the U.S. Air Force Digital Data Compendium (DATCOM) to carry out preliminary control design and vehicle performance analysis.

The toolbox provides you with the following main features:

- Provides standards-based environmental models for atmosphere, gravity, and magnetic fields.
- Converts units and transforms coordinate systems and spatial representations.
- Implements predefined utilities for aerospace parameter calculations, time calculations, and quaternion math.
- Imports aerodynamic coefficients directly from the U.S. Air Force Digital Data Compendium (DATCOM).
- Interfaces to the FlightGear flight simulator, enabling visualization of vehicle dynamics in a three-dimensional environment.

The Aerospace Toolbox software has the following limitation:

- The FlightGear animation object can not be compiled with the MATLAB Compiler™ software to create a standalone application.