

**asbQuadcopter**

**Design Description**

**anton**

# **asbQuadcopter: Design Description**

by anton

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# Chapter 1. Model Version

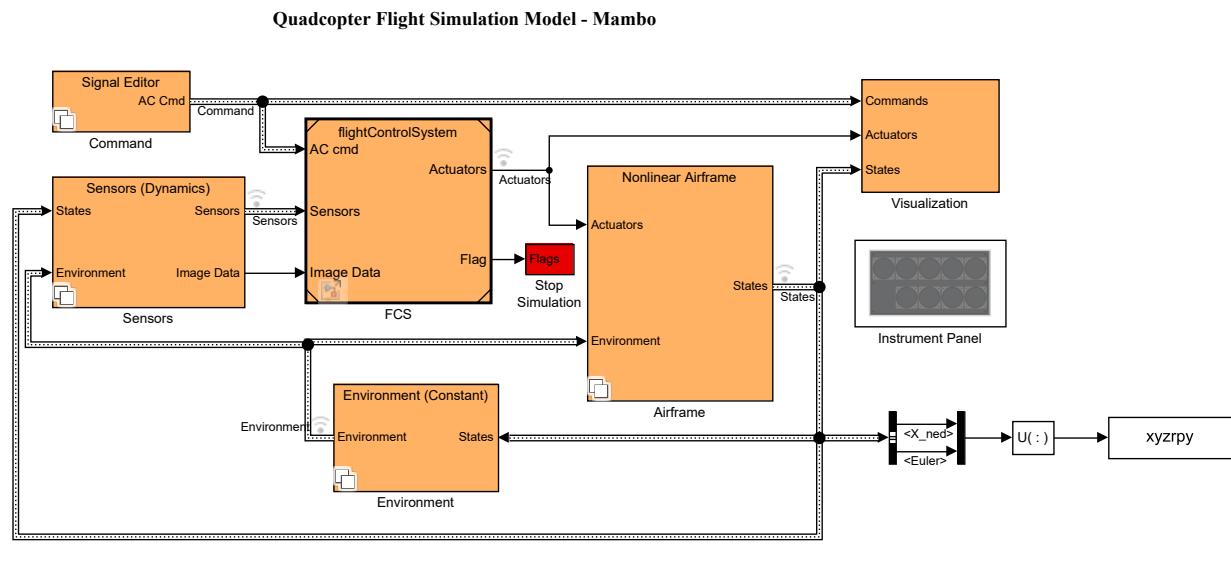
**Version:** 3.1

**Last modified:** Sat Feb 03 17:39:40 2024

**Checksum:** 3469140965 408799164 1638907925 3706276154

# Chapter 2. Root System

Figure 2.1. asbQuadcopter



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## Blocks

## Parameters

### "Bus Selector" (BusSelector)

Table 2.1. "Bus Selector" Parameters

Parameter	Value
Output signals	X_ned,Euler
Output as virtual bus	off
InputSignals	V_body Omega_body

Parameter	Value
	Euler Accel_body dOmega_body V_ned X_ned LLA DCM_be

**Output Hierarchy:**

1. *Bus Selector*
  1. <X\_ned>
  2. <Euler>

## "FCS" (ModelReference)

**Table 2.2. "FCS" Parameters**

Parameter	Value
Model name	flightControlSystem.slx
ModelFile	flightControlSystem.slx
modelName	flightControlSystem
Simulation mode	Normal
Show model initialize port	off
Show model reset ports	off
Show model terminate port	off
Schedule rates	off
Schedule rates with	Ports
AutoFillPortDiscreteRates	on
Code interface	Model reference
Variant	off

## "Mux" (Mux)

**Table 2.3. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

## "Reshape" (Reshape)

**Table 2.4. "Reshape" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

## "To Workspace" (ToWorkspace)

**Table 2.5. "To Workspace" Parameters**

Parameter	Value
Variable name	xyzrpy
Limit data points to last	inf
Decimation	1
Save format	Array
Save 2-D signals as	3-D array (concatenate along third dimension)
Log fixed-point data as a fi object	on
Sample time (-1 for inherited)	-1

## Block Execution Order

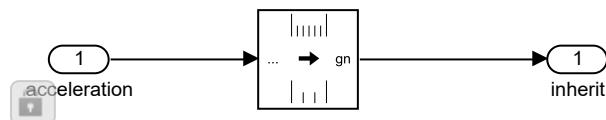
"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

---

# Chapter 3. Subsystems

## Acceleration Conversion

**Figure 3.1. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Acceleration Conversion**



## Blocks

### Parameters

"acceleration" (Inport)

**Table 3.1. "acceleration" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"inherit" (Outport)

**Table 3.2. "inherit" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]

## Chapter 3. Subsystems

---

Parameter	Value
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

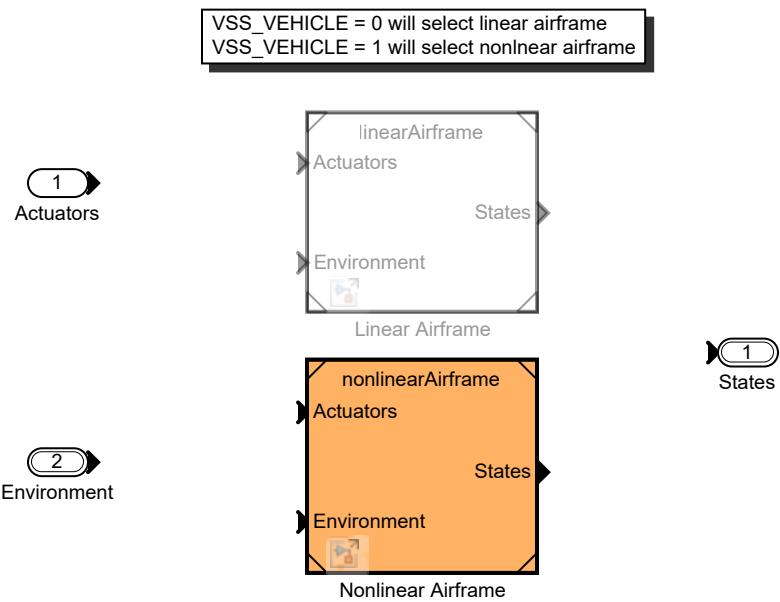
### "Unit Conversion" (UnitConversion)

**Table 3.3. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

# Airframe

**Figure 3.2. asbQuadcopter/Airframe**



## Blocks

### Parameters

"Actuators" (Inport)

**Table 3.4. "Actuators" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Environment" (Inport)

**Table 3.5. "Environment" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: EnvironmentBus

### "Nonlinear Airframe" (ModelReference)

**Table 3.6. "Nonlinear Airframe" Parameters**

Parameter	Value
Model name	nonlinearAirframe.slx
ModelFile	nonlinearAirframe.slx
modelName	nonlinearAirframe
Simulation mode	Normal
Show model initialize port	off
Show model reset ports	off
Show model terminate port	off
Schedule rates	off
Schedule rates with	Ports
AutoFillPortDiscreteRates	on
Code interface	Model reference
Variant	off
Variant control	VSS_VEHICLE_NONLINEAR

### "States" (Outport)

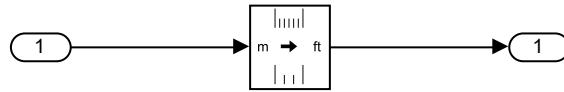
**Table 3.7. "States" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Altitude [ft]

**Figure 3.3. asbQuadcopter/Visualization/Extract Flight Instruments/Altitude [ft]**



## Blocks

## Parameters

### "Disallow CGS" (UnitConfiguration)

**Table 3.8. "Disallow CGS" Parameters**

Parameter	Value
Allowed unit systems	English SI
Allow all unit systems	off

### "In1" (Inport)

**Table 3.9. "In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Out1" (Outport)

**Table 3.10. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	ft
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

Parameter	Value
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

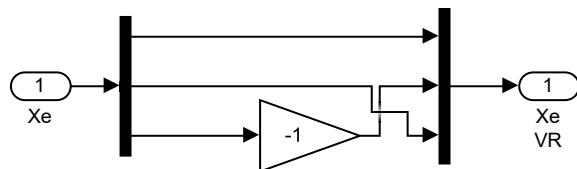
### "Unit Conversion" (UnitConversion)

**Table 3.11. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

## Axes to VR Axes

**Figure 3.4. asbQuadcopter/Visualization/Visualization/Simulink 3D/Axes to VR Axes**



## Blocks

### Parameters

#### "Demux" (Demux)

**Table 3.12. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	none

Parameter	Value
Bus selection mode	off

### "Mux" (Mux)

**Table 3.13. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "rad-->deg1" (Gain)

**Table 3.14. "rad-->deg1" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Xe" (Inport)

**Table 3.15. "Xe" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

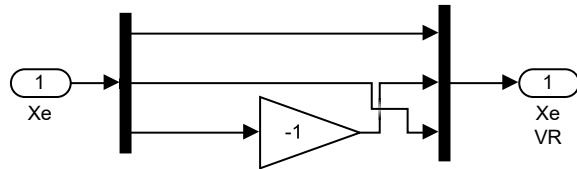
### "Xe VR" (Outport)

**Table 3.16. "Xe VR" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# Axes to VR Axes Camera Chase

**Figure 3.5. asbQuadcopter/Visualization/Visualization/Simulink 3D/Axes to VR Axes Camera Chase**



## Blocks

### Parameters

"Demux" (Demux)

**Table 3.17. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	none
Bus selection mode	off

"Mux" (Mux)

**Table 3.18. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

"rad-->deg1" (Gain)

**Table 3.19. "rad-->deg1" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]

<b>Parameter</b>	<b>Value</b>
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Xe" (Import)

**Table 3.20. "Xe" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Xe VR" (Outport)

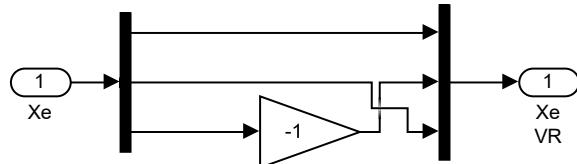
**Table 3.21. "Xe VR" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit

Parameter	Value
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Axes to VR Axes Camera Iso

**Figure 3.6. asbQuadcopter/Visualization/Visualization/Simulink 3D/Axes to VR Axes Camera Iso**



## Blocks

### Parameters

"Demux" (Demux)

**Table 3.22. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	none
Bus selection mode	off

### "Mux" (Mux)

**Table 3.23. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "rad-->deg1" (Gain)

**Table 3.24. "rad-->deg1" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Xe" (Import)

**Table 3.25. "Xe" Parameters**

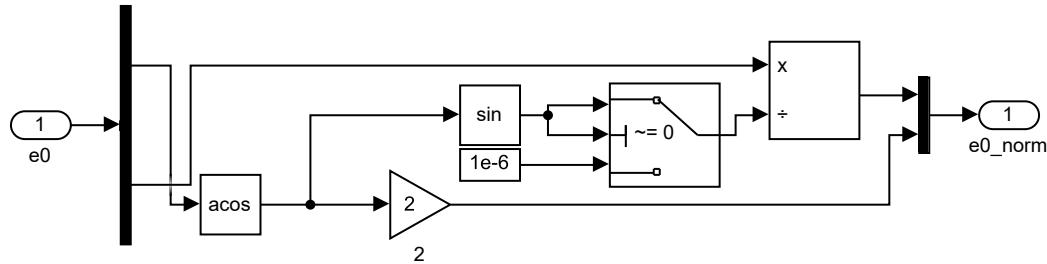
Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Xe VR" (Outport)**
**Table 3.26. "Xe VR" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# Axis Angle Vector

**Figure 3.7. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Axis Angle Vector**



## Blocks

### Parameters

"2" (Gain)

**Table 3.27. "2" Parameters**

Parameter	Value
Gain	2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Constant" (Constant)

**Table 3.28. "Constant" Parameters**

Parameter	Value
Constant value	1e-6
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Demux" (Demux)

**Table 3.29. "Demux" Parameters**

Parameter	Value
Number of outputs	[1 3 ]
Display option	none
Bus selection mode	off

### "e0" (Import)

**Table 3.30. "e0" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "e0\_norm" (Outport)

**Table 3.31. "e0\_norm" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Mux" (Mux)

**Table 3.32. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Product" (Product)

**Table 3.33. "Product" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Switch" (Switch)

**Table 3.34. "Switch" Parameters**

Parameter	Value
Criteria for passing first input	u2 ~= 0
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

### "Trigonometric Function" (Trigonometry)

**Table 3.35. "Trigonometric Function" Parameters**

Parameter	Value
Function	sin
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function2" (Trigonometry)

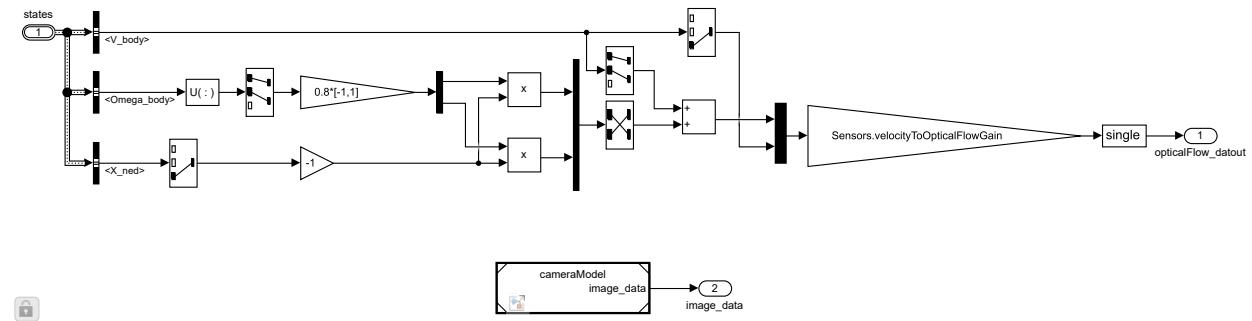
**Table 3.36. "Trigonometric Function2" Parameters**

Parameter	Value
Function	acos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

# Camera

**Figure 3.8. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/Camera**

This is a crude simulation of "optical flow" ( $vx, vy, vz$ ) as fed into the c-function `rseu_optical_flow()` on the Rolling Spider by internal, inaccessible code of Parrot's firmware.  
This is assumed to be far from what "optical flow ( $vx, vy, vz$ )" actually is!



# Blocks

## Parameters

### "Add1" (Sum)

**Table 3.37. "Add1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Bus Selector1" (BusSelector)

**Table 3.38. "Bus Selector1" Parameters**

Parameter	Value
Output signals	V_body
Output as virtual bus	off
InputSignals	V_body Omega_body Euler Accel_body dOmega_body V_ned X_ned LLA DCM_be

#### Output Hierarchy:

1. *Bus Selector1*
  1. <V\_body>

### "Bus Selector3" (BusSelector)

**Table 3.39. "Bus Selector3" Parameters**

Parameter	Value
Output signals	X_ned
Output as virtual bus	off
InputSignals	V_body Omega_body Euler Accel_body dOmega_body V_ned X_ned LLA DCM_be

#### Output Hierarchy:

1. *Bus Selector3*
  1. <X\_ned>

### "Bus Selector4" (BusSelector)

**Table 3.40. "Bus Selector4" Parameters**

Parameter	Value
Output signals	Omega_body
Output as virtual bus	off
InputSignals	V_body Omega_body Euler Accel_body dOmega_body V_ned X_ned LLA DCM_be

#### Output Hierarchy:

1. *Bus Selector4*
  1. <Omega\_body>

### "Data Type Conversion" (DataTypeConversion)

**Table 3.41. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Demux4" (Demux)

**Table 3.42. "Demux4" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

### "Gain1" (Gain)

**Table 3.43. "Gain1" Parameters**

Parameter	Value
Gain	0.8*[-1,1]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain2" (Gain)

**Table 3.44. "Gain2" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

Parameter	Value
Sample time (-1 for inherited)	-1

### "image\_data" (Outport)

**Table 3.45. "image\_data" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Model" (ModelReference)

**Table 3.46. "Model" Parameters**

Parameter	Value
Model name	cameraModel
ModelFile	cameraModel.slx
modelName	cameraModel

Parameter	Value
Simulation mode	Normal
Show model initialize port	off
Show model reset ports	off
Show model terminate port	off
Schedule rates	off
Schedule rates with	Ports
AutoFillPortDiscreteRates	on
Code interface	Model reference
Variant	off

### "Mux7" (Mux)

**Table 3.47. "Mux7" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Mux8" (Mux)

**Table 3.48. "Mux8" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "opticalFlow\_datout" (Outport)

**Table 3.49. "opticalFlow\_datout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off

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<b>Parameter</b>	<b>Value</b>
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Product" (Product)

**Table 3.50. "Product" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.51. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Reshape" (Reshape)

**Table 3.52. "Reshape" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

### "Select dx,dy" (Selector)

**Table 3.53. "Select dx,dy" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1

Parameter	Value
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

### "Select dx,dy1" (Selector)

**Table 3.54. "Select dx,dy1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

### "Select dz" (Selector)

**Table 3.55. "Select dz" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	3
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	3
Output Size	1

### "Select dz1" (Selector)

**Table 3.56. "Select dz1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	3
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	3
Output Size	1

### "states" (Inport)

**Table 3.57. "states" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus

### "SwitchPlanarOpticalFlow" (Selector)

**Table 3.58. "SwitchPlanarOpticalFlow" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2 1]
Output Size	1
Input port size	2

Parameter	Value
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[2 1]
Output Size	1

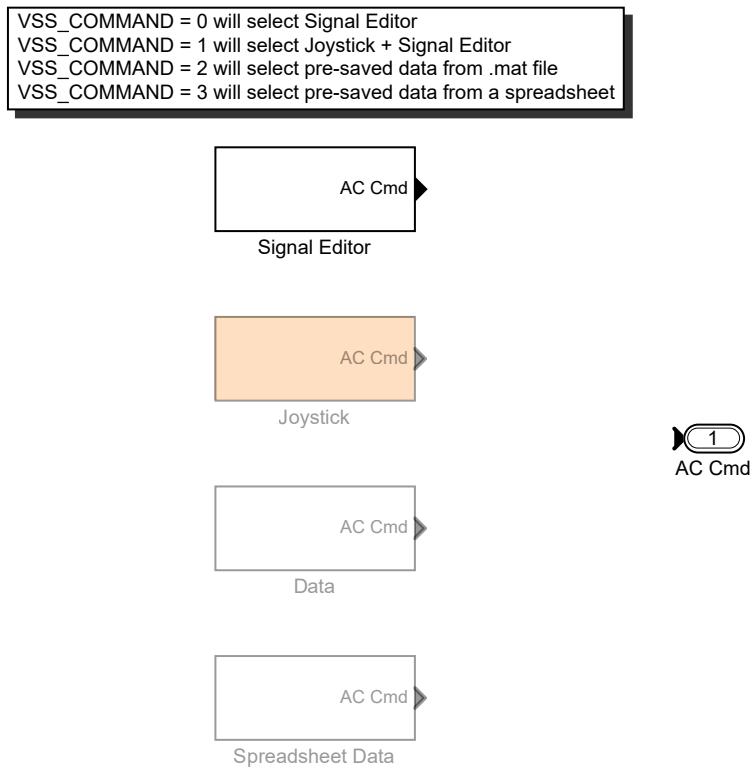
### "VelocityToOpticalFlow\_Gain" (Gain)

**Table 3.59. "VelocityToOpticalFlow\_Gain" Parameters**

Parameter	Value
Gain	Sensors.velocityToOpticalFlowGain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

# Command

**Figure 3.9. asbQuadcopter/Command**



# Blocks

## Parameters

### "AC Cmd" (Outport)

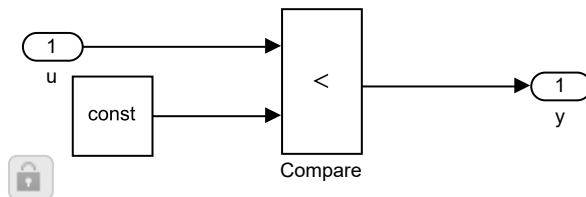
**Table 3.60. "AC Cmd" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: CommandBus

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Compare To Constant

Figure 3.10. asbQuadcopter/Command/Signal Editor/Compare To Constant



## Blocks

### Parameters

"Compare" (RelationalOperator)

Table 3.61. "Compare" Parameters

Parameter	Value
Relational operator	<

Parameter	Value
Require all inputs to have the same data type	on
Output data type	boolean
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Nearest

### "Constant" (Constant)

**Table 3.62. "Constant" Parameters**

Parameter	Value
Constant value	const
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "u" (Import)

**Table 3.63. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

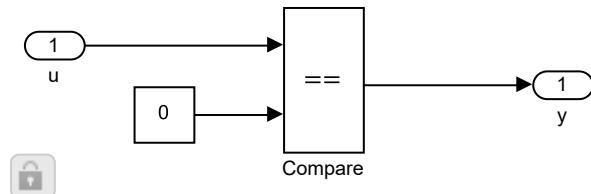
### "y" (Outport)

**Table 3.64. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## Compare To Zero

**Figure 3.11. asbQuadcopter/Command/Signal Editor/Compare To Zero**



## Blocks

### Parameters

#### "Compare" (RelationalOperator)

**Table 3.65.** "Compare" Parameters

Parameter	Value
Relational operator	==
Require all inputs to have the same data type	on
Output data type	boolean
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Nearest

#### "Constant" (Constant)

**Table 3.66.** "Constant" Parameters

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "u" (Inport)

**Table 3.67.** "u" Parameters

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

---

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

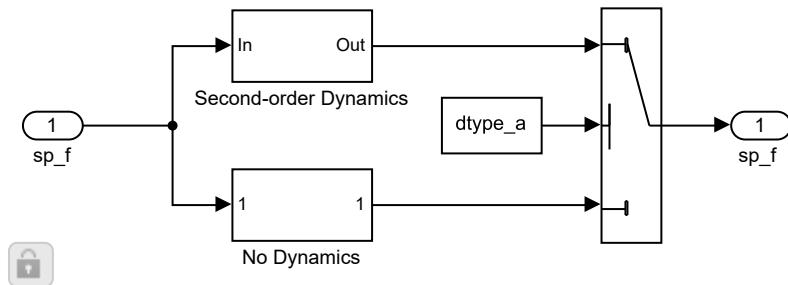
### "y" (Outport)

**Table 3.68. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

# Dynamics

**Figure 3.12. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer/Dynamics**



## Blocks

### Parameters

#### "Constant" (Constant)

**Table 3.69. "Constant" Parameters**

Parameter	Value
Constant value	dtype_a
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "Second-order Dynamics" (SubSystem)

**Table 3.70. "Second-order Dynamics" Parameters**

Parameter	Value
Natural frequency	w_a

Parameter	Value
Damping ratio	z_a
Sample time	a_Ts

### "sp\_f" (Import)

**Table 3.71.** "sp\_f" Parameters

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "sp\_f" (Outport)

**Table 3.72.** "sp\_f" Parameters

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

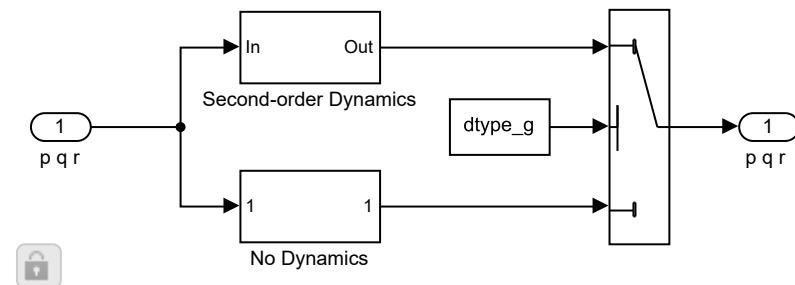
## "Switch" (Switch)

**Table 3.73. "Switch" Parameters**

Parameter	Value
Criteria for passing first input	$u2 \geq \text{Threshold}$
Threshold	0.5
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

## Dynamics

**Figure 3.13. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Gyroscope/Dynamics**



## Blocks

### Parameters

#### "Constant" (Constant)

**Table 3.74. "Constant" Parameters**

Parameter	Value
Constant value	dtype_g
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "p q r" (Inport)

**Table 3.75. "p q r" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "p q r" (Outport)

**Table 3.76. "p q r" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off

<b>Parameter</b>	<b>Value</b>
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Second-order Dynamics" (SubSystem)

**Table 3.77. "Second-order Dynamics" Parameters**

<b>Parameter</b>	<b>Value</b>
Natural frequency	w_g
Damping ratio	z_g
Sample time	g_Ts

### "Switch" (Switch)

**Table 3.78. "Switch" Parameters**

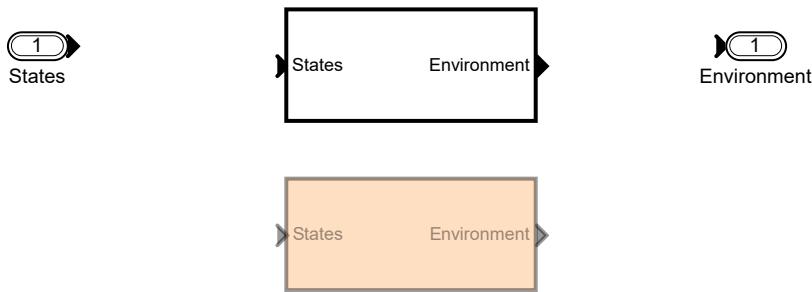
<b>Parameter</b>	<b>Value</b>
Criteria for passing first input	u2 >= Threshold
Threshold	0.5
Require all data port inputs to have the same data type	off
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

## Environment

**Figure 3.14. asbQuadcopter/Environment**

VSS\_ENVIRONMENT = 0 will select constant environment variables  
VSS\_ENVIRONMENT = 1 will select environment variables depending on position



## Blocks

### Parameters

#### "Environment" (Outport)

**Table 3.79. "Environment" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Bus: EnvironmentBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

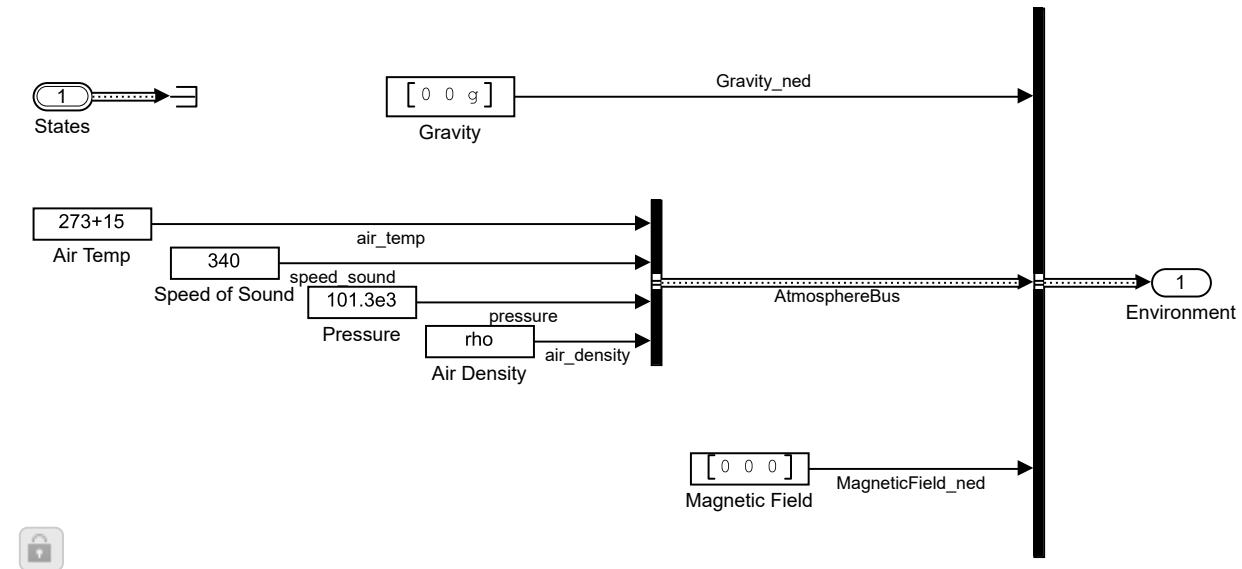
### "States" (Inport)

**Table 3.80. "States" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus

## Environment (Constant)

Checksum: 58856784 790821678 3775947740 1262843052

**Figure 3.15. asbQuadcopter/Environment/Environment (Constant)**


## Blocks

### Parameters

#### "Air Density" (Constant)

**Table 3.81. "Air Density" Parameters**

Parameter	Value
Constant value	<code>rho</code>
Interpret vector parameters as 1-D	<code>on</code>
Output minimum	<code>[]</code>
Output maximum	<code>[]</code>
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	<code>off</code>
Sample time	<code>inf</code>
Frame period	<code>inf</code>

### "Air Temp" (Constant)

**Table 3.82. "Air Temp" Parameters**

Parameter	Value
Constant value	273+15
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Bus Creator" (BusCreator)

**Table 3.83. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar
Data type	Bus: EnvironmentBus
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "Bus Creator1" (BusCreator)

**Table 3.84. "Bus Creator1" Parameters**

Parameter	Value
Number of inputs	4
Display option	bar
Data type	Bus: AtmosphereBus
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "Environment" (Outport)

**Table 3.85. "Environment" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Gravity" (Constant)

**Table 3.86. "Gravity" Parameters**

Parameter	Value
Constant value	[0 0 g]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Magnetic Field" (Constant)

**Table 3.87. "Magnetic Field" Parameters**

Parameter	Value
Constant value	[0 0 0]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Pressure" (Constant)

**Table 3.88. "Pressure" Parameters**

Parameter	Value
Constant value	101.3e3
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"Speed of Sound" (Constant)****Table 3.89. "Speed of Sound" Parameters**

Parameter	Value
Constant value	340
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"States" (Import)****Table 3.90. "States" Parameters**

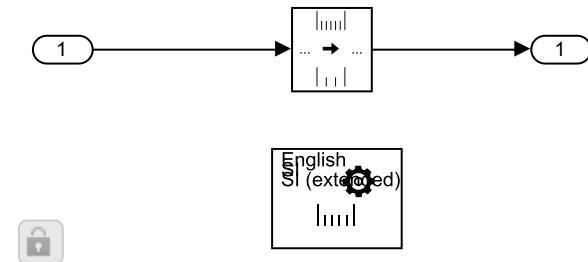
Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# Euler [deg]

**Figure 3.16. asbQuadcopter/Visualization/Extract Flight Instruments/Euler [deg]**



## Blocks

### Parameters

"Disallow CGS" (UnitConfiguration)

**Table 3.91. "Disallow CGS" Parameters**

Parameter	Value
Allowed unit systems	English SI SI (extended)
Allow all unit systems	off

"In1" (Import)

**Table 3.92. "In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Out1" (Outport)

**Table 3.93. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	deg
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

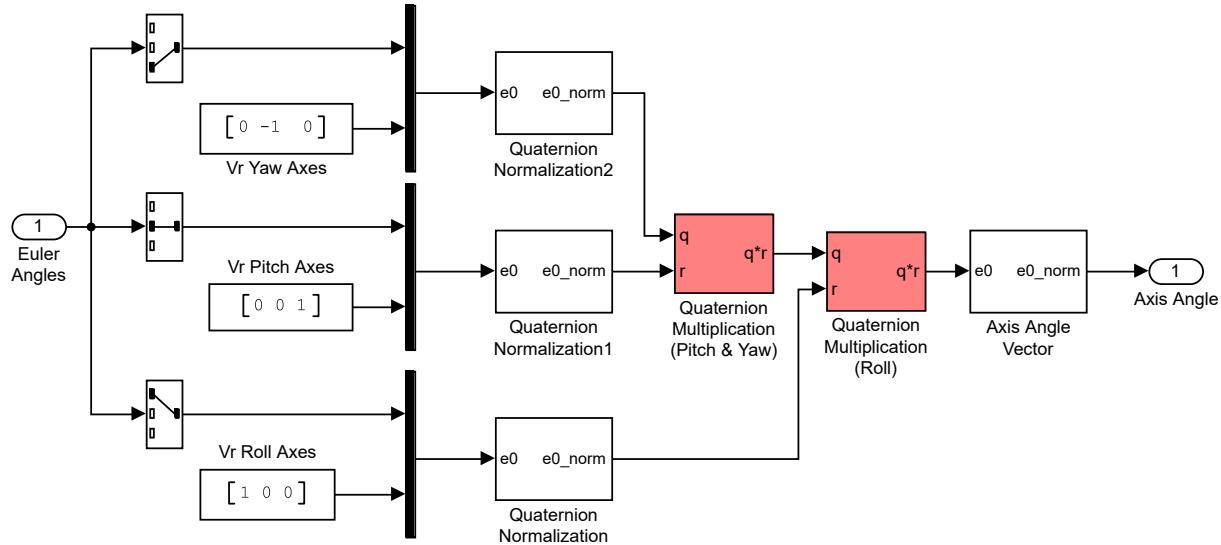
### "Unit Conversion" (UnitConversion)

**Table 3.94. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

# Euler to VR

**Figure 3.17. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR**



## Blocks

### Parameters

"Axis Angle" (Outport)

**Table 3.95. "Axis Angle" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit

Parameter	Value
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Euler Angles" (Inport)

**Table 3.96. "Euler Angles" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Mux" (Mux)

**Table 3.97. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Mux1" (Mux)

**Table 3.98. "Mux1" Parameters**

Parameter	Value
Number of inputs	2

Parameter	Value
Display option	bar

### "Mux2" (Mux)

**Table 3.99.** "Mux2" Parameters

Parameter	Value
Number of inputs	2
Display option	bar

### "Selector" (Selector)

**Table 3.100.** "Selector" Parameters

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3]
Output Size	1

### "Selector1" (Selector)

**Table 3.101.** "Selector1" Parameters

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1

Parameter	Value
Index Option	Index vector (dialog)
Index	[2]
Output Size	1

### "Selector2" (Selector)

**Table 3.102. "Selector2" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1]
Output Size	1

### "Vr Pitch Axes" (Constant)

**Table 3.103. "Vr Pitch Axes" Parameters**

Parameter	Value
Constant value	[0 0 1]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Vr Roll Axes" (Constant)

**Table 3.104. "Vr Roll Axes" Parameters**

Parameter	Value
Constant value	[1 0 0]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

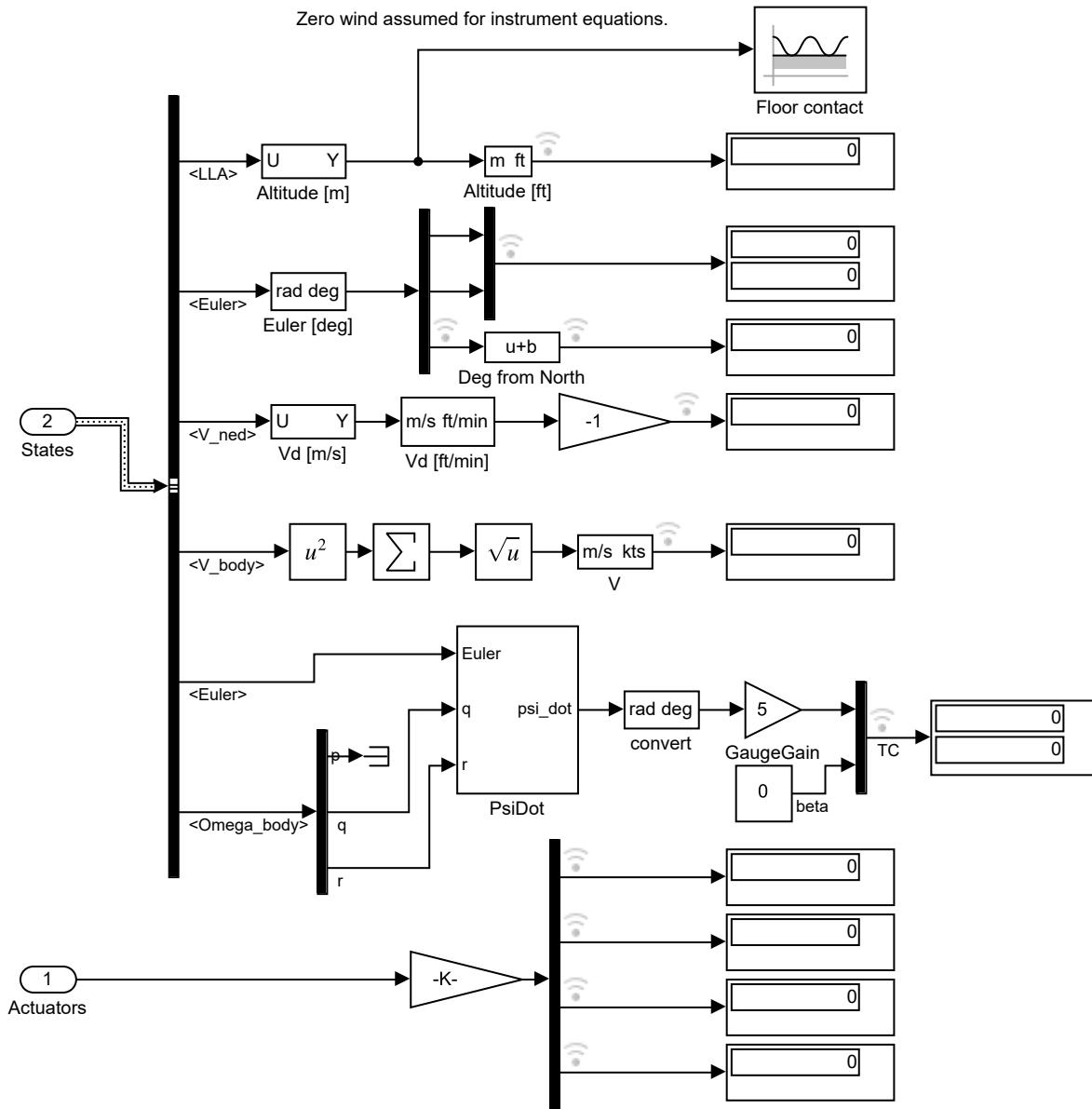
### "Vr Yaw Axes" (Constant)

**Table 3.105. "Vr Yaw Axes" Parameters**

Parameter	Value
Constant value	[0 -1 0]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

# Extract Flight Instruments

**Figure 3.18. asbQuadcopter/Visualization/Extract Flight Instruments**



## Blocks

## Parameters

### "Actuators" (Inport)

**Table 3.106. "Actuators" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Altitude [ft]" (SubSystem)

**Table 3.107. "Altitude [ft]" Parameters**

Parameter	Value
aeroblksaeroblkconversion2blockLengthConversionParamInitialunits	m
aeroblksaeroblkconversion2blockLengthConversionParamFinalunits	ft

### "Altitude [m]" (Selector)

**Table 3.108. "Altitude [m]" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3]
Output Size	1

### "Bus Selector" (BusSelector)

**Table 3.109. "Bus Selector" Parameters**

Parameter	Value
Output signals	LLA,Euler,V_ned,V_body,Euler,Omega_body
Output as virtual bus	off
InputSignals	V_body Omega_body Euler Accel_body dOmega_body V_ned X_ned LLA DCM_be

#### Output Hierarchy:

1. *Bus Selector*
  1. <LLA>
  2. <Euler>
  3. <V\_ned>
  4. <V\_body>
  5. <Euler>
  6. <Omega\_body>

### "Constant" (Constant)

**Table 3.110. "Constant" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "convert" (SubSystem)

**Table 3.111. "convert" Parameters**

Parameter	Value
aeroblk/aeroblkconversion2blockAngleConversionParamInitialunits	rad
aeroblk/aeroblkconversion2blockAngleConversionParamFinalunits	deg

### "Deg from North" (Bias)

**Table 3.112. "Deg from North" Parameters**

Parameter	Value
Bias	Vehicle.PositionOnEarth.FlatEarthToLLA.xAxis
Saturate on integer overflow	off

### "Demux" (Demux)

**Table 3.113. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.114. "Demux1" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Demux2" (Demux)

**Table 3.115. "Demux2" Parameters**

Parameter	Value
Number of outputs	3

Parameter	Value
Display option	bar
Bus selection mode	off

### "Display" (Display)

**Table 3.116. "Display" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display1" (Display)

**Table 3.117. "Display1" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display2" (Display)

**Table 3.118. "Display2" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display3" (Display)

**Table 3.119. "Display3" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display4" (Display)

**Table 3.120. "Display4" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display5" (Display)

**Table 3.121. "Display5" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display6" (Display)

**Table 3.122. "Display6" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display7" (Display)

**Table 3.123. "Display7" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display8" (Display)

**Table 3.124. "Display8" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Display9" (Display)

**Table 3.125. "Display9" Parameters**

Parameter	Value
Numeric display format	short
Decimation	1
Floating display	off

### "Euler [deg]" (SubSystem)

**Table 3.126. "Euler [deg]" Parameters**

Parameter	Value
aeroblksaeroblkconversion2blockAngleConversionParamInitialunits	rad
aeroblksaeroblkconversion2blockAngleConversionParamFinalunits	deg

### "Floor contact" (SubSystem)

**Table 3.127. "Floor contact" Parameters**

Parameter	Value
SimulinkmasksLowerBound_MP	init.posLLA(3)
SimulinkmasksInclusiveBoundary_MP	on
SimulinkmasksEnableAssertion_MP	on
SimulinkmasksStopSimulationWhenAssertionFails_MP	on
SimulinkmasksOutputAssertionSignal_MP	off
SimulinkmasksSelectIconType_MP	graphic

### "Gain" (Gain)

**Table 3.128. "Gain" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain1" (Gain)

**Table 3.129. "Gain1" Parameters**

Parameter	Value
Gain	100/Vehicle.Motor.maxLimit*[1 -1 1 -1]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "GaugeGain" (Gain)

**Table 3.130. "GaugeGain" Parameters**

Parameter	Value
Gain	5
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Math Function" (Math)

**Table 3.131. "Math Function" Parameters**

Parameter	Value
Function	square
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson

Parameter	Value
Number of iterations	3

### "Mux" (Mux)

**Table 3.132. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Mux1" (Mux)

**Table 3.133. "Mux1" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Sqrt" (Sqrt)

**Table 3.134. "Sqrt" Parameters**

Parameter	Value
Function	sqrt
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Exact
Number of iterations	3

### "States" (Inport)

**Table 3.135. "States" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum of Elements" (Sum)

**Table 3.136. "Sum of Elements" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "V" (SubSystem)

**Table 3.137. "V" Parameters**

Parameter	Value
aeroblksaeroblkconversion2blockVelocityConversionParamInitialunits	m/s
aeroblksaeroblkconversion2blockVelocityConversionParamFinalunits	kts

### "Vd [ft/min]" (SubSystem)

**Table 3.138. "Vd [ft/min]" Parameters**

Parameter	Value
aeroblk/aeroblkconversion2blockVelocityConversionParamInitialunits	m/s
aeroblk/aeroblkconversion2blockVelocityConversionParamFinalunits	ft/min

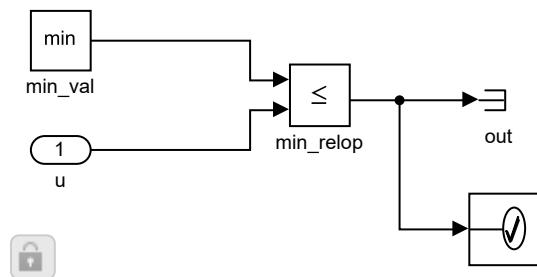
### "Vd [m/s]" (Selector)

**Table 3.139. "Vd [m/s]" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3]
Output Size	1

## Floor contact

**Figure 3.19. asbQuadcopter/Visualization/Extract Flight Instruments/Floor contact**



## Description

init.posLLA(3) <= u

## Blocks

### Parameters

#### "Assertion" (Assertion)

**Table 3.140.** "Assertion" Parameters

Parameter	Value
Enable assertion	on
Simulation callback when assertion fails	evalin('base','callback')
Stop simulation when assertion fails	on
Sample time (-1 for inherited)	-1

#### "min\_relop" (RelationalOperator)

**Table 3.141.** "min\_relop" Parameters

Parameter	Value
Relational operator	<=
Require all inputs to have the same data type	off
Output data type	Inherit: Logical (see Configuration Parameters: Optimization)
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Nearest

#### "min\_val" (Constant)

**Table 3.142.** "min\_val" Parameters

Parameter	Value
Constant value	min
Interpret vector parameters as 1-D	on
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

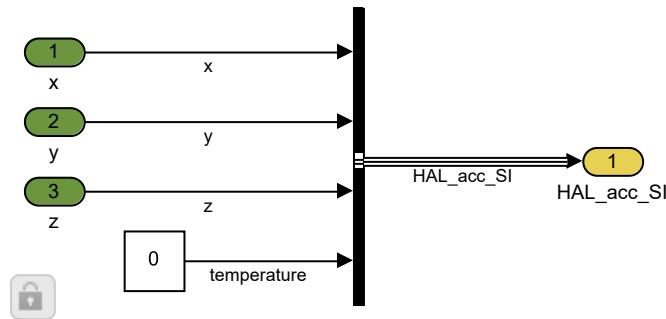
### "u" (Import)

**Table 3.143. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## HAL\_acc\_SI\_creator

**Figure 3.20. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_acc\_SI\_creator**



## Blocks

## Parameters

### "Bus Creator" (BusCreator)

**Table 3.144. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	4
Display option	bar
Data type	Bus: HAL_acc_SI_t
Output as nonvirtual bus	off
Use names from inputs instead of from bus object	on

### "HAL\_acc\_SI" (Outport)

**Table 3.145. "HAL\_acc\_SI" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "temperature" (Constant)

**Table 3.146. "temperature" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "x" (Import)

**Table 3.147. "x" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y" (Import)

**Table 3.148. "y" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

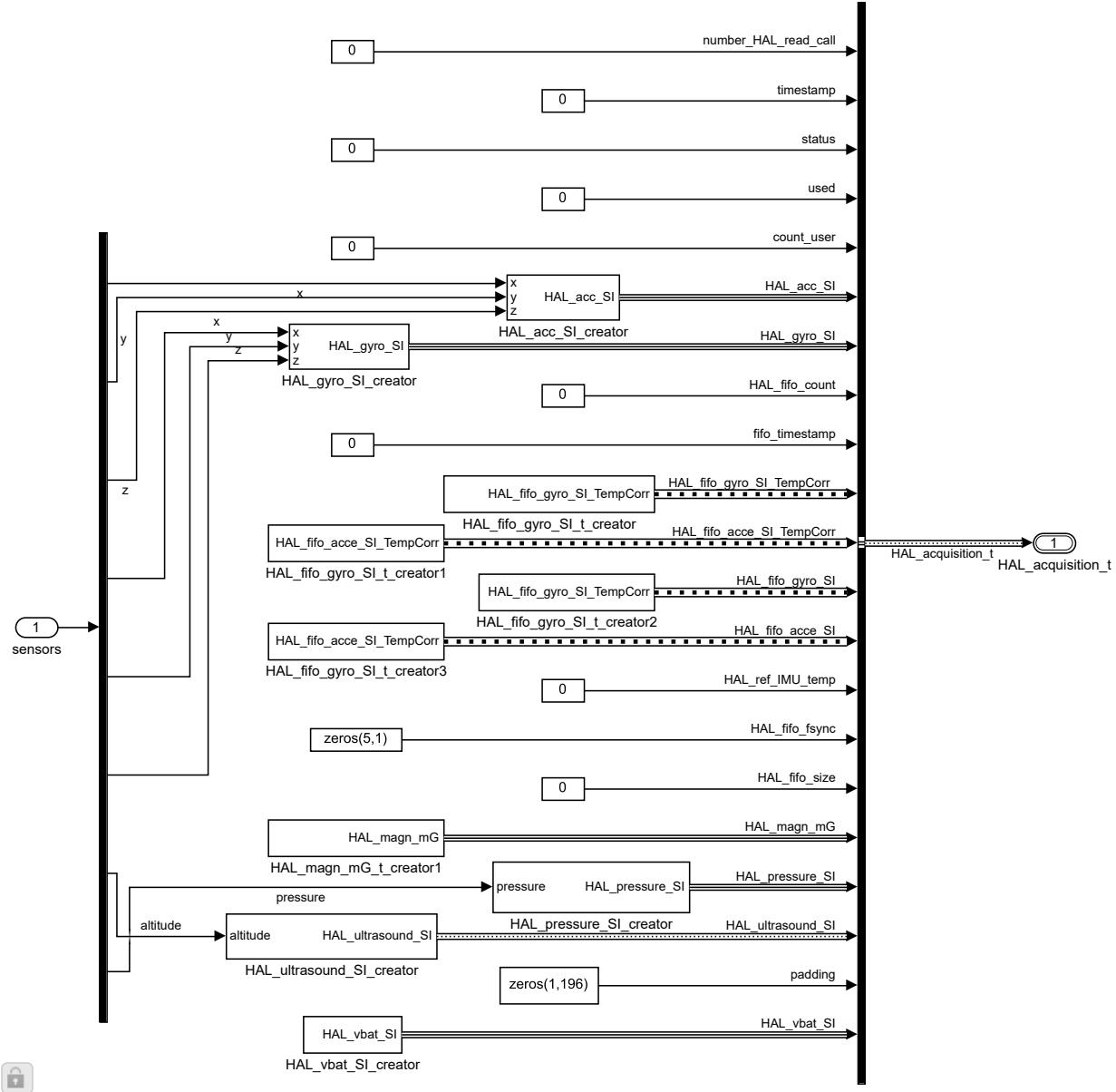
### "z" (Inport)

**Table 3.149. "z" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## HAL\_acquisition\_creator

**Figure 3.21. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator**



## Blocks

## Parameters

### "Bus Creator4" (BusCreator)

**Table 3.150. "Bus Creator4" Parameters**

Parameter	Value
Number of inputs	21
Display option	bar
Data type	Bus: HAL_acquisition_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	off

### "Demux3" (Demux)

**Table 3.151. "Demux3" Parameters**

Parameter	Value
Number of outputs	8
Display option	bar
Bus selection mode	off

### "HAL\_acquisition\_t" (Outport)

**Table 3.152. "HAL\_acquisition\_t" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: HAL_acquisition_t
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off

<b>Parameter</b>	<b>Value</b>
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### **"HAL\_fifo\_fsync" (Constant)**

**Table 3.153. "HAL\_fifo\_fsync" Parameters**

<b>Parameter</b>	<b>Value</b>
Constant value	zeros(5,1)
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### **"number\_HAL\_read\_call" (Constant)**

**Table 3.154. "number\_HAL\_read\_call" Parameters**

<b>Parameter</b>	<b>Value</b>
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"number\_HAL\_read\_call1" (Constant)**

**Table 3.155. "number\_HAL\_read\_call1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"number\_HAL\_read\_call2" (Constant)**

**Table 3.156. "number\_HAL\_read\_call2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"number\_HAL\_read\_call3" (Constant)**

**Table 3.157. "number\_HAL\_read\_call3" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

#### "number\_HAL\_read\_call4" (Constant)

**Table 3.158. "number\_HAL\_read\_call4" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "number\_HAL\_read\_call5" (Constant)

**Table 3.159. "number\_HAL\_read\_call5" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "number\_HAL\_read\_call6" (Constant)

**Table 3.160. "number\_HAL\_read\_call6" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	uint32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "number\_HAL\_read\_call7" (Constant)

**Table 3.161. "number\_HAL\_read\_call7" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "number\_HAL\_read\_call8" (Constant)

**Table 3.162. "number\_HAL\_read\_call8" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"padding" (Constant)****Table 3.163. "padding" Parameters**

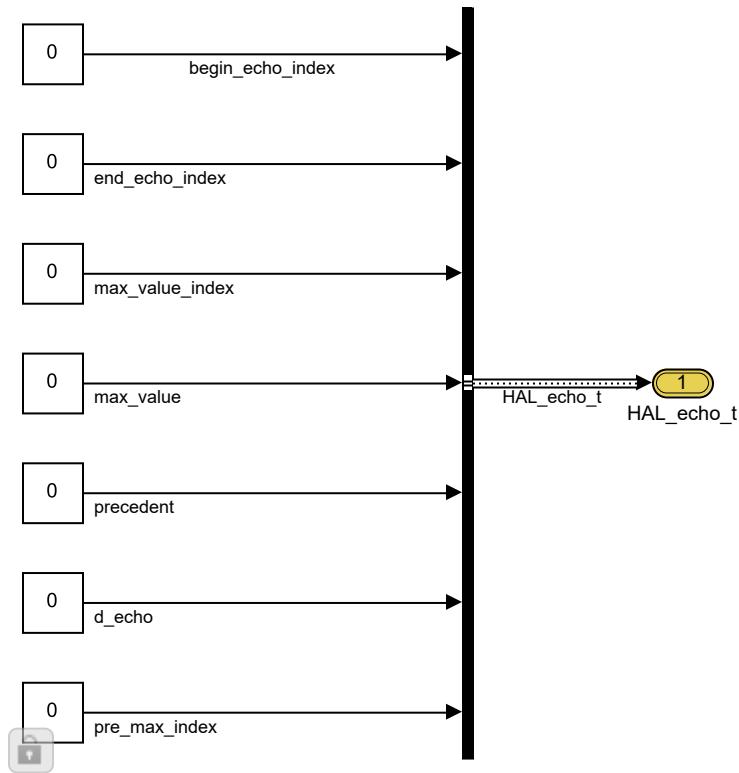
Parameter	Value
Constant value	<code>zeros(1,196)</code>
Interpret vector parameters as 1-D	<code>on</code>
Output minimum	<code>[]</code>
Output maximum	<code>[]</code>
Output data type	<code>uint8</code>
Lock output data type setting against changes by the fixed-point tools	<code>off</code>
Sample time	<code>inf</code>
Frame period	<code>inf</code>

**"sensors" (Inport)****Table 3.164. "sensors" Parameters**

Parameter	Value
Port number	<code>1</code>
Port dimensions (-1 for inherited)	<code>-1</code>
Sample time (-1 for inherited)	<code>-1</code>
Minimum	<code>[]</code>
Maximum	<code>[]</code>
Data type	Inherit: auto

## HAL\_echo\_t\_creator

**Figure 3.22. asbQuadcopter/Sensors/Sensors  
(Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/  
HAL\_ultrasound\_SI\_creator/HAL\_list\_echo\_t\_creator/HAL\_echo\_t\_creator**



## Blocks

### Parameters

"begin\_echo\_index" (Constant)

**Table 3.165. "begin\_echo\_index" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index1" (Constant)

**Table 3.166. "begin\_echo\_index1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index2" (Constant)

**Table 3.167. "begin\_echo\_index2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index3" (Constant)

**Table 3.168. "begin\_echo\_index3" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index4" (Constant)

**Table 3.169. "begin\_echo\_index4" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index5" (Constant)

**Table 3.170. "begin\_echo\_index5" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int16
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

### "begin\_echo\_index6" (Constant)

**Table 3.171. "begin\_echo\_index6" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Bus Creator6" (BusCreator)

**Table 3.172. "Bus Creator6" Parameters**

Parameter	Value
Number of inputs	7
Display option	bar
Data type	Bus: HAL_echo_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "HAL\_echo\_t" (Outport)

**Table 3.173. "HAL\_echo\_t" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

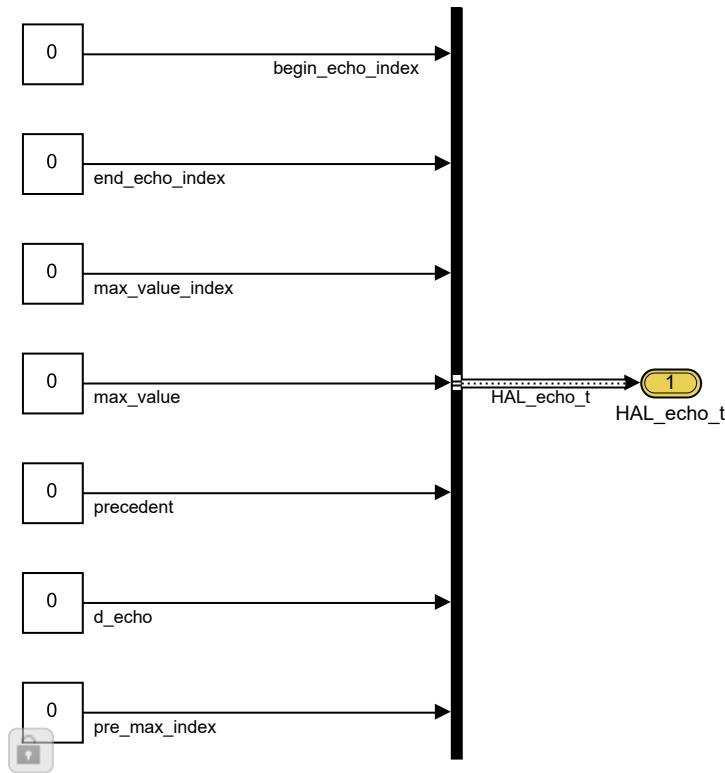
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Parameter	Value
Data type	Bus: HAL_echo_t
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## HAL\_echo\_t\_creator

**Figure 3.23. asbQuadcopter/Sensors/Sensors  
(Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/  
HAL\_ultrasound\_SI\_creator/HAL\_list\_echo\_t\_creator1/HAL\_echo\_t\_creator**



## Blocks

### Parameters

"begin\_echo\_index" (Constant)

**Table 3.174. "begin\_echo\_index" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index1" (Constant)

**Table 3.175. "begin\_echo\_index1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index2" (Constant)

**Table 3.176. "begin\_echo\_index2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index3" (Constant)

**Table 3.177. "begin\_echo\_index3" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index4" (Constant)

**Table 3.178. "begin\_echo\_index4" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "begin\_echo\_index5" (Constant)

**Table 3.179. "begin\_echo\_index5" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int16
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

### "begin\_echo\_index6" (Constant)

**Table 3.180. "begin\_echo\_index6" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Bus Creator6" (BusCreator)

**Table 3.181. "Bus Creator6" Parameters**

Parameter	Value
Number of inputs	7
Display option	bar
Data type	Bus: HAL_echo_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "HAL\_echo\_t" (Outport)

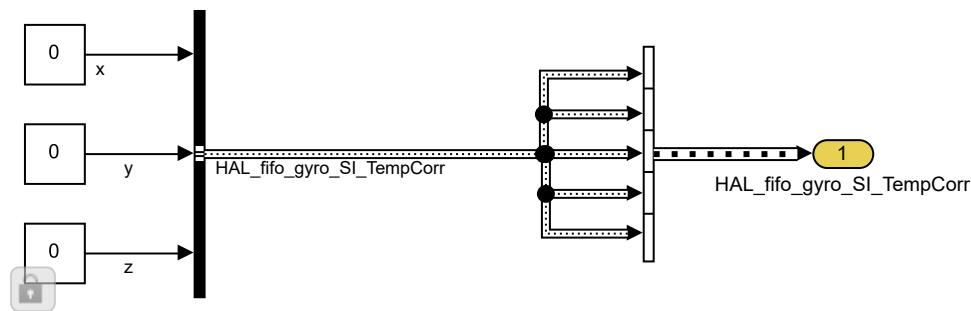
**Table 3.182. "HAL\_echo\_t" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Bus: HAL_echo_t
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## HAL\_fifo\_gyro\_SI\_t\_creator

**Figure 3.24. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_fifo\_gyro\_SI\_t\_creator**



## Blocks

## Parameters

### "Bus Creator" (BusCreator)

**Table 3.183. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar
Data type	Bus: HAL_fifo_gyro_SI_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	off

### "HAL\_fifo\_gyro\_SI\_TempCorr" (Outport)

**Table 3.184. "HAL\_fifo\_gyro\_SI\_TempCorr" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	on
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	5
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

**"Vector Concatenate" (Concatenate)****Table 3.185. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	5
Mode	Vector
Concatenate dimension	1

**"z" (Constant)****Table 3.186. "z" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"z1" (Constant)****Table 3.187. "z1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

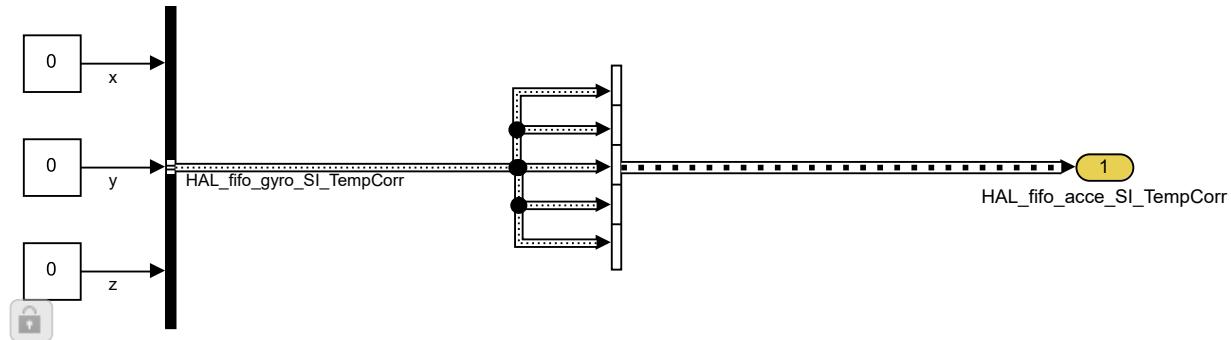
### "z2" (Constant)

**Table 3.188. "z2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

## HAL\_fifo\_gyro\_SI\_t\_creator1

**Figure 3.25. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_fifo\_gyro\_SI\_t\_creator1**



## Blocks

### Parameters

#### "Bus Creator" (BusCreator)

**Table 3.189. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	3

Parameter	Value
Display option	bar
Data type	Bus: HAL_fifo_gyro_SI_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	off

### "HAL\_fifo\_acce\_SI\_TempCorr" (Outport)

**Table 3.190. "HAL\_fifo\_acce\_SI\_TempCorr" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	on
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	5
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

**"Vector Concatenate" (Concatenate)****Table 3.191. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	5
Mode	Vector
Concatenate dimension	1

**"x" (Constant)****Table 3.192. "x" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"x1" (Constant)****Table 3.193. "x1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

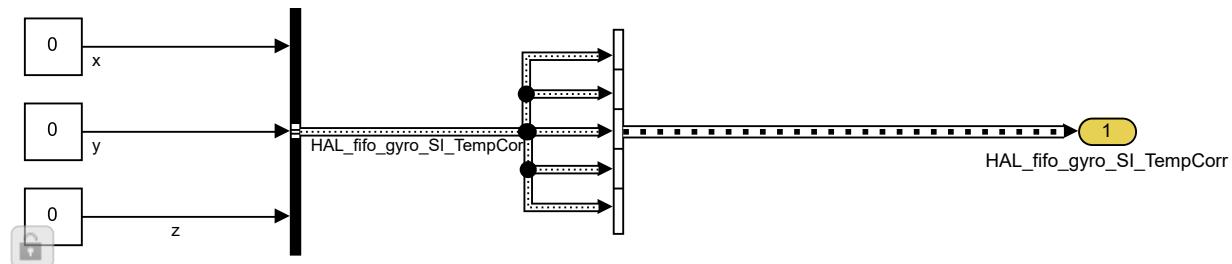
"x2" (Constant)

**Table 3.194. "x2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

## HAL\_fifo\_gyro\_SI\_t\_creator2

**Figure 3.26. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_fifo\_gyro\_SI\_t\_creator2**



## Blocks

### Parameters

"Bus Creator" (BusCreator)

**Table 3.195. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar
Data type	Bus: HAL_fifo_gyro_SI_t

Parameter	Value
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	off

### "HAL\_fifo\_gyro\_SI\_TempCorr" (Outport)

**Table 3.196. "HAL\_fifo\_gyro\_SI\_TempCorr" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	on
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	5
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Vector Concatenate" (Concatenate)

**Table 3.197. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	5
Mode	Vector

Parameter	Value
Concatenate dimension	1

### "z" (Constant)

**Table 3.198. "z" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "z1" (Constant)

**Table 3.199. "z1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "z2" (Constant)

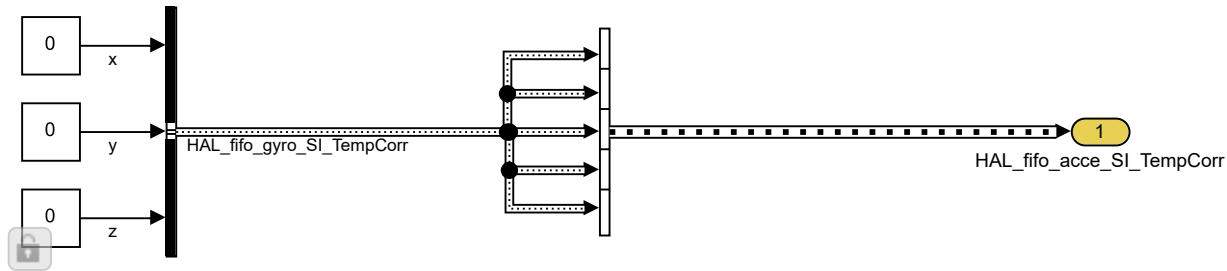
**Table 3.200. "z2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

## HAL\_fifo\_gyro\_SI\_t\_creator3

**Figure 3.27. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_fifo\_gyro\_SI\_t\_creator3**



## Blocks

### Parameters

"Bus Creator" (BusCreator)

**Table 3.201. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar
Data type	Bus: HAL_fifo_gyro_SI_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	off

### "HAL\_fifo\_acce\_SI\_TempCorr" (Outport)

**Table 3.202. "HAL\_fifo\_acce\_SI\_TempCorr" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	on
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	5
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Vector Concatenate" (Concatenate)

**Table 3.203. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	5
Mode	Vector
Concatenate dimension	1

### "z" (Constant)

**Table 3.204. "z" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "z1" (Constant)

**Table 3.205. "z1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "z2" (Constant)

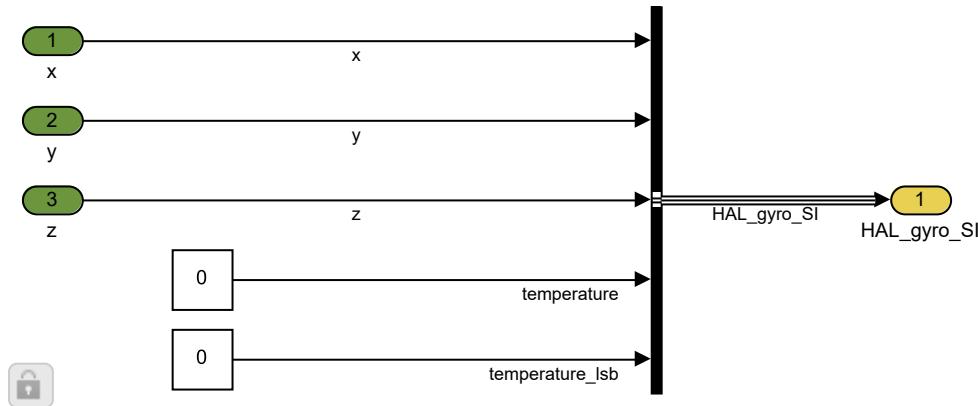
**Table 3.206. "z2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

## HAL\_gyro\_SI\_creator

**Figure 3.28. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_gyro\_SI\_creator**



## Blocks

### Parameters

"Bus Creator1" (BusCreator)

**Table 3.207. "Bus Creator1" Parameters**

Parameter	Value
Number of inputs	5
Display option	bar
Data type	Bus: HAL_gyro_SI_t
Output as nonvirtual bus	off
Use names from inputs instead of from bus object	on

### "HAL\_gyro\_SI" (Outport)

**Table 3.208. "HAL\_gyro\_SI" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "temperature" (Constant)

**Table 3.209. "temperature" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

### "temperature\_lsb" (Constant)

**Table 3.210. "temperature\_lsb" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "x" (Inport)

**Table 3.211. "x" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y" (Inport)

**Table 3.212. "y" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Inherit: auto

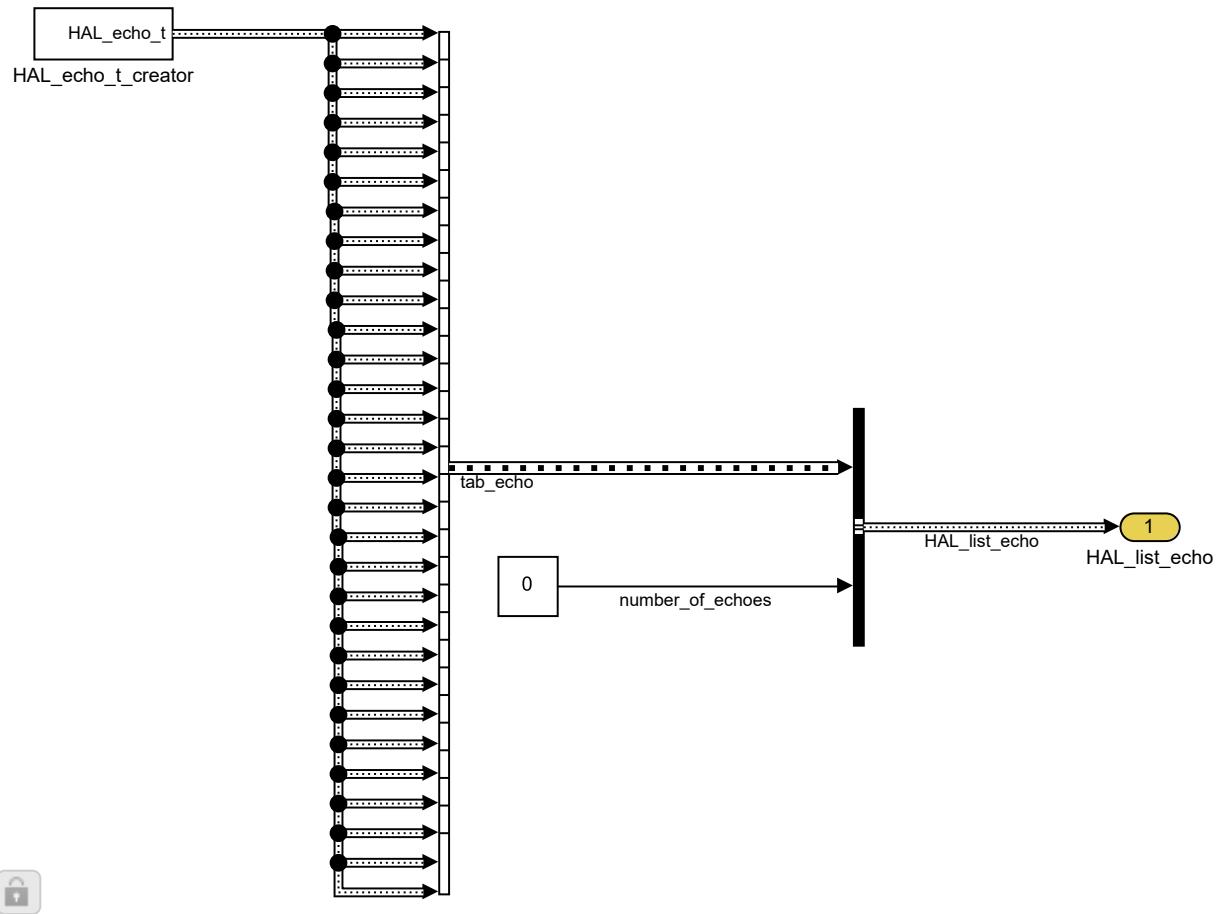
### "z" (Inport)

**Table 3.213. "z" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## HAL\_list\_echo\_t\_creator

**Figure 3.29. asbQuadcopter/Sensors/Sensors  
(Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/  
HAL\_ultrasound\_SI\_creator/HAL\_list\_echo\_t\_creator**



## Blocks

### Parameters

"Bus Creator7" (BusCreator)

**Table 3.214. "Bus Creator7" Parameters**

Parameter	Value
Number of inputs	2

Parameter	Value
Display option	bar
Data type	Bus: HAL_list_echo_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "HAL\_list\_echo" (Outport)

**Table 3.215. "HAL\_list\_echo" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "number\_of\_echoes" (Constant)

**Table 3.216. "number\_of\_echoes" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

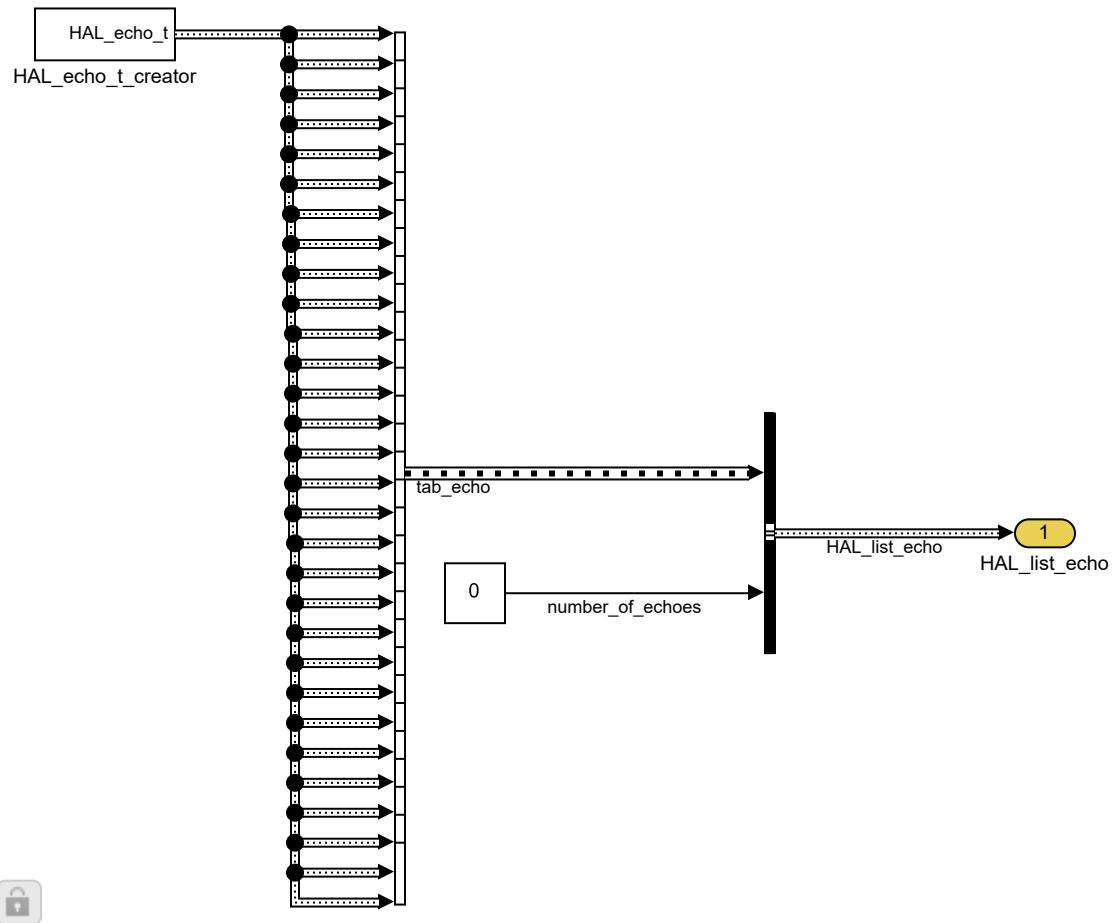
### "Vector Concatenate" (Concatenate)

**Table 3.217. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	30
Mode	Vector
Concatenate dimension	1

## HAL\_list\_echo\_t\_creator1

**Figure 3.30. asbQuadcopter/Sensors/Sensors  
(Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/  
HAL\_ultrasound\_SI\_creator/HAL\_list\_echo\_t\_creator1**



## Blocks

### Parameters

"Bus Creator7" (BusCreator)

**Table 3.218. "Bus Creator7" Parameters**

Parameter	Value
Number of inputs	2

Parameter	Value
Display option	bar
Data type	Bus: HAL_list_echo_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "HAL\_list\_echo" (Outport)

**Table 3.219. "HAL\_list\_echo" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "number\_of\_echoes" (Constant)

**Table 3.220. "number\_of\_echoes" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

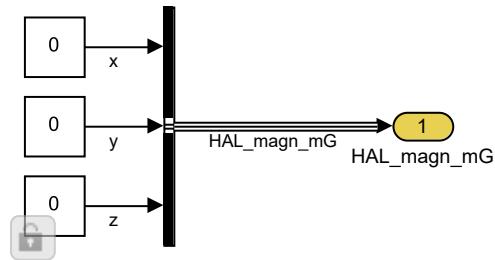
### "Vector Concatenate" (Concatenate)

**Table 3.221. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	30
Mode	Vector
Concatenate dimension	1

## HAL\_magn\_mG\_t\_creator1

**Figure 3.31. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_magn\_mG\_t\_creator1**



## Blocks

### Parameters

**"Bus Creator" (BusCreator)**
**Table 3.222. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar
Data type	Bus: HAL_magn_mG_t
Output as nonvirtual bus	off
Use names from inputs instead of from bus object	off

**"HAL\_magn\_mG" (Outport)**
**Table 3.223. "HAL\_magn\_mG" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "z" (Constant)

**Table 3.224. "z" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "z1" (Constant)

**Table 3.225. "z1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "z2" (Constant)

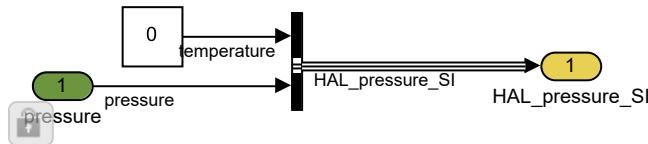
**Table 3.226. "z2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

## HAL\_pressure\_SI\_creator

Figure 3.32. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_pressure\_SI\_creator



## Blocks

### Parameters

"Bus Creator3" (BusCreator)

Table 3.227. "Bus Creator3" Parameters

Parameter	Value
Number of inputs	2
Display option	bar
Data type	Bus: HAL_pressure_SI_t
Output as nonvirtual bus	off
Use names from inputs instead of from bus object	on

"HAL\_pressure\_SI" (Outport)

Table 3.228. "HAL\_pressure\_SI" Parameters

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "pressure" (Import)

**Table 3.229. "pressure" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "temperature" (Constant)

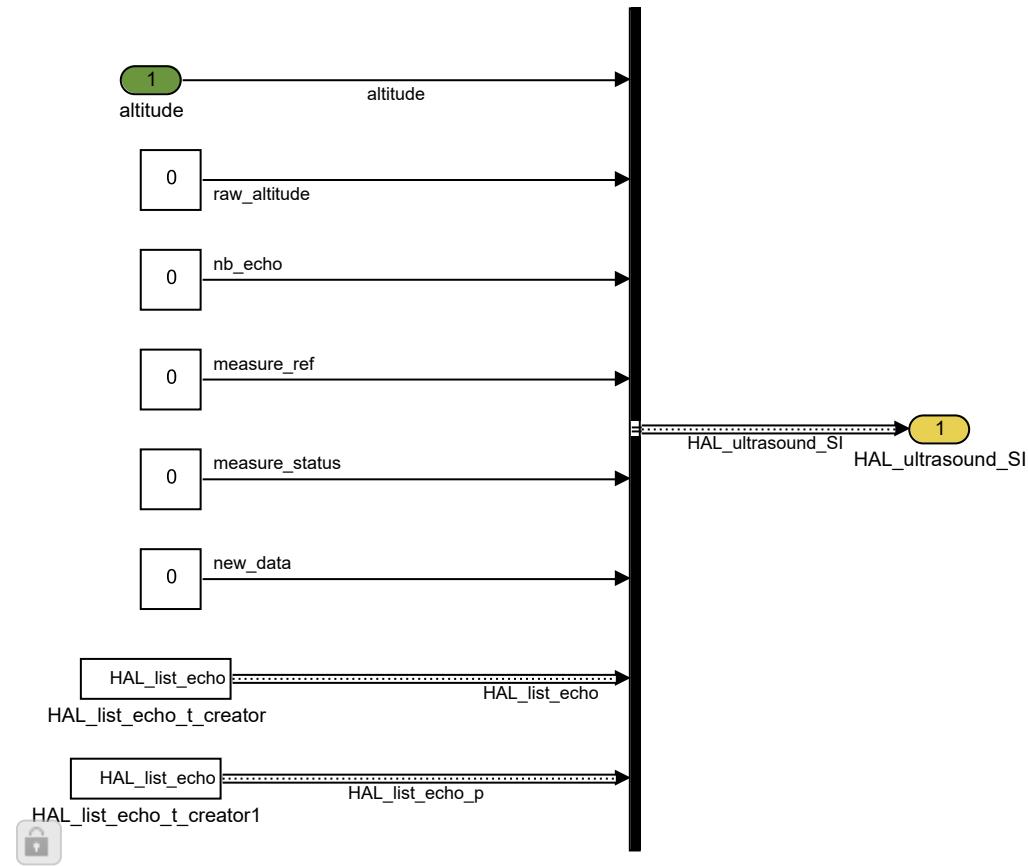
**Table 3.230. "temperature" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	double
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

## HAL\_ultrasound\_SI\_creator

**Figure 3.33. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_ultrasound\_SI\_creator**



## Blocks

## Parameters

### "altitude" (Inport)

**Table 3.231. "altitude" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Creator2" (BusCreator)

**Table 3.232. "Bus Creator2" Parameters**

Parameter	Value
Number of inputs	8
Display option	bar
Data type	Bus: HAL_ultrasound_SI_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	off

### "HAL\_ultrasound\_SI" (Outport)

**Table 3.233. "HAL\_ultrasound\_SI" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1

<b>Parameter</b>	<b>Value</b>
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "raw\_altitude" (Constant)

**Table 3.234. "raw\_altitude" Parameters**

<b>Parameter</b>	<b>Value</b>
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "raw\_altitude1" (Constant)

**Table 3.235. "raw\_altitude1" Parameters**

<b>Parameter</b>	<b>Value</b>
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf

Parameter	Value
Frame period	inf

### "raw\_altitude2" (Constant)

**Table 3.236. "raw\_altitude2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "raw\_altitude3" (Constant)

**Table 3.237. "raw\_altitude3" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	int32
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "raw\_altitude4" (Constant)

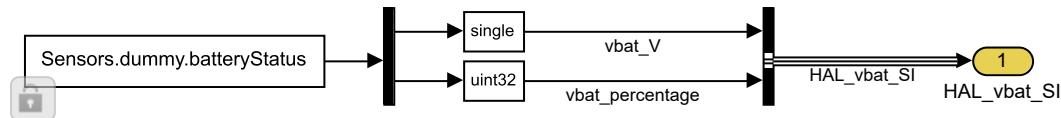
**Table 3.238. "raw\_altitude4" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

## HAL\_vbat\_SI\_creator

**Figure 3.34. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/HAL\_acquisition\_creator/HAL\_vbat\_SI\_creator**



## Blocks

### Parameters

"\_DUMMY\_batteryStatus" (Constant)

**Table 3.239. "\_DUMMY\_batteryStatus" Parameters**

Parameter	Value
Constant value	Sensors.dummy.batteryStatus
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Bus Creator5" (BusCreator)

**Table 3.240. "Bus Creator5" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar
Data type	Bus: HAL_vbat_SI_t
Output as nonvirtual bus	off
Use names from inputs instead of from bus object	on

### "convert1" (DataTypeConversion)

**Table 3.241. "convert1" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "convert2" (DataTypeConversion)

**Table 3.242. "convert2" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	uint32
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

**"Demux4" (Demux)****Table 3.243. "Demux4" Parameters**

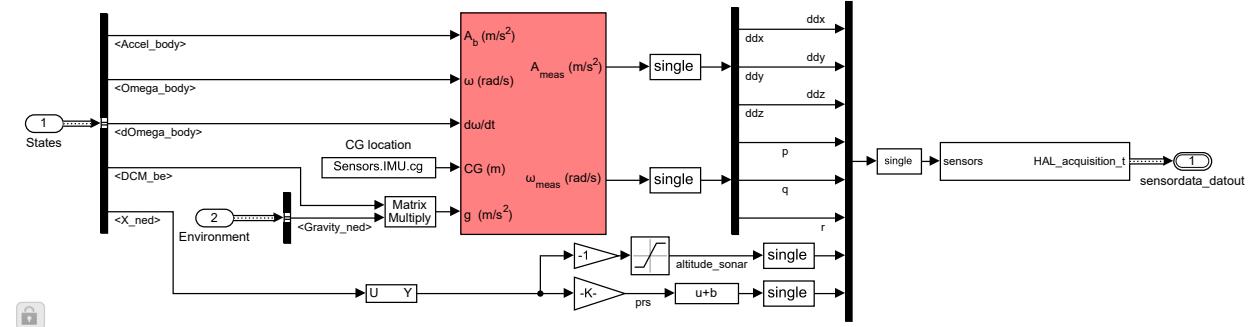
Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

**"HAL\_vbat\_SI" (Outport)****Table 3.244. "HAL\_vbat\_SI" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# IMU\_Pressure

**Figure 3.35. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure**



## Blocks

### Parameters

"altToprs\_gain" (Gain)

**Table 3.245. "altToprs\_gain" Parameters**

Parameter	Value
Gain	Sensors.altToPrsGain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "altToprs\_gain1" (Gain)

**Table 3.246. "altToprs\_gain1" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Assumes takeoff was level1" (Bias)

**Table 3.247. "Assumes takeoff was level1" Parameters**

Parameter	Value
Bias	Sensors.altToPrsBias
Saturate on integer overflow	off

### "Bus Selector" (BusSelector)

**Table 3.248. "Bus Selector" Parameters**

Parameter	Value
Output signals	Accel_body,Omega_body,dOmega_body,DCM_be,X_ned
Output as virtual bus	off
InputSignals	V_body Omega_body Euler Accel_body dOmega_body V_ned X_ned

Parameter	Value
	LLA DCM_be

**Output Hierarchy:**

1. *Bus Selector*
  1. <Accel\_body>
  2. <Omega\_body>
  3. <dOmega\_body>
  4. <DCM\_be>
  5. <X\_ned>

**"Bus Selector1" (BusSelector)**

**Table 3.249. "Bus Selector1" Parameters**

Parameter	Value
Output signals	Gravity_ned
Output as virtual bus	off
InputSignals	Gravity_ned { AtmosphereBus , air_temp speed_sound pressure air_density } MagneticField_ned

**Output Hierarchy:**

1. *Bus Selector1*
  1. <Gravity\_ned>

**"CG location" (Constant)**

**Table 3.250. "CG location" Parameters**

Parameter	Value
Constant value	Sensors.IMU.cg
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tool	off
Sample time	inf
Frame period	inf

### "Data Type Conversion" (DataTypeConversion)

**Table 3.251. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion1" (DataTypeConversion)

**Table 3.252. "Data Type Conversion1" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion2" (DataTypeConversion)

**Table 3.253. "Data Type Conversion2" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion3" (DataTypeConversion)

**Table 3.254. "Data Type Conversion3" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion4" (DataTypeConversion)

**Table 3.255. "Data Type Conversion4" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Demux" (Demux)

**Table 3.256. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar

Parameter	Value
Bus selection mode	off

### "Demux2" (Demux)

**Table 3.257. "Demux2" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Environment" (Import)

**Table 3.258. "Environment" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Mux" (Mux)

**Table 3.259. "Mux" Parameters**

Parameter	Value
Number of inputs	8
Display option	bar

### "Product" (Product)

**Table 3.260. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)

<b>Parameter</b>	<b>Value</b>
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Saturation" (Saturate)

**Table 3.261. "Saturation" Parameters**

<b>Parameter</b>	<b>Value</b>
Upper limit	inf
Lower limit	Sensors.altSensorMin
Treat as gain when linearizing	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

### "Selector2" (Selector)

**Table 3.262. "Selector2" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]

Parameter	Value
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3]
Output Size	1

### **"sensordata\_datout" (Outport)**

**Table 3.263. "sensordata\_datout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: HAL_acquisition_t
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "States" (Inport)

**Table 3.264. "States" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Three-axis Inertial Measurement Unit" (SubSystem)

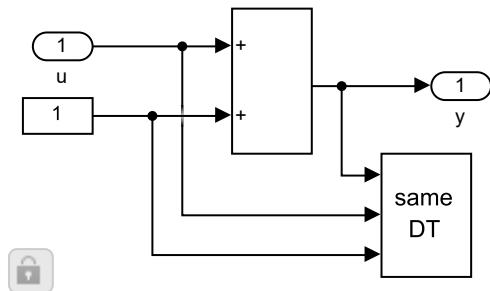
**Table 3.265. "Three-axis Inertial Measurement Unit" Parameters**

Parameter	Value
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamUnits	Metric (MKS)
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamIMUlocation	Sensors.IMU.location
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamUpdATERATE	Ts
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamSecondorderdynamicsforaccelerometer	off
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamAccelerometerNaturalFrequencyradsec	.7
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamAccelerometerDampingRatio	.2
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamAccelerometerScaleFactorAndCrosscoupling	Sensors.IMU.accelScaleCross
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamAccelerometerMeasurementBias	Sensors.IMU.accelBias
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamAccelerometerUpperAndLowerLimits	Sensors.IMU.accelLimits
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamSecondorderdynamicsforgyro	off
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamGyronaturalFrequencyradsec	.7
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamGyroDampingRatio	.2
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamGyroScaleFactorsAndCrosscoupling	Sensors.IMU.gyroScaleCross

Parameter	Value
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamGyromeasurementbias	Sensors.IMU.gyroBias
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamGsensitivebias	Sensors.IMU.gyroGBias
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamGyroupperandlowerlimits	Sensors.IMU.gyroLimits
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamNoiseon	on
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamNoiseseeds	Sensors.IMU.noiseSeeds
aeroblksaeroblknavblockThreeaxisInertialMeasurementUnitParamNoisepower	Sensors.IMU.noisePower

## Increment Real World

**Figure 3.36. asbQuadcopter/Command/Signal Editor/Live Time Ticks/ Increment Real World**



## Blocks

### Parameters

"FixPt Constant" (Constant)

**Table 3.266. "FixPt Constant" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "FixPt Data Type Duplicate" (DataTypeDuplicate)

**Table 3.267. "FixPt Data Type Duplicate" Parameters**

Parameter	Value
Number of input ports	3

### "FixPt Sum1" (Sum)

**Table 3.268. "FixPt Sum1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock data type settings against changes by the fixed-point tools	on
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"u" (Inport)**
**Table 3.269. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"y" (Outport)**
**Table 3.270. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

# Instrument Panel

**Figure 3.37. asbQuadcopter/Instrument Panel**



## Blocks

### Parameters

"Airspeed Indicator" (AirspeedIndicatorBlock)

**Table 3.271. "Airspeed Indicator" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on
Limits	[0 18 ]

**"Altimeter" (AltimeterBlock)**

**Table 3.272. "Altimeter" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on

**"Artificial Horizon" (ArtificialHorizonBlock)**

**Table 3.273. "Artificial Horizon" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on

**"Climb Rate Indicator" (ClimbIndicatorBlock)**

**Table 3.274. "Climb Rate Indicator" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on
MaximumRate	1000

**"Heading Indicator" (HeadingIndicatorBlock)**

**Table 3.275. "Heading Indicator" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on

**"Thruster 1" (RPMIndicatorBlock)**

**Table 3.276. "Thruster 1" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on

**"Thruster 2" (RPMIndicatorBlock)**

**Table 3.277. "Thruster 2" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on

**"Thruster 3" (RPMIndicatorBlock)**

**Table 3.278. "Thruster 3" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on

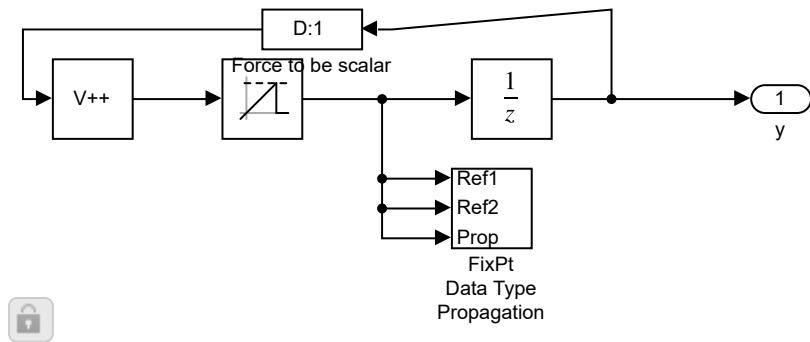
**"Thruster 4" (RPMIndicatorBlock)**

**Table 3.279. "Thruster 4" Parameters**

Parameter	Value
Label	Hide
Binding	< Simulink.HMI.SignalSpecification>
ShowInitialText	on

# Live Time Ticks

**Figure 3.38. asbQuadcopter/Command/Signal Editor/Live Time Ticks**



## Blocks

### Parameters

"FixPt Data Type Propagation" (S-Function)

**Table 3.280. "FixPt Data Type Propagation" Parameters**

Parameter	Value
Simulinkmasksx1PropagatedDataType_MP	Specify via dialog
Simulinkmasksx11PropagatedDataTypeegFixdt116Fixdtsingle_MP	uint(NumBits)
Simulinkmasksx2PropagatedScaling_MP	Specify via dialog
Simulinkmasksx21PropagatedScalingSlopeEg29OrSlopeBiasEg1253_MP	1

"Force to be scalar" (SignalSpecification)

**Table 3.281. "Force to be scalar" Parameters**

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Require nonvirtual bus	off
Unit (e.g., m, m/s^2, N*m)	inherit

Parameter	Value
Dimensions (-1 for inherited)	1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

### "Output" (UnitDelay)

**Table 3.282. "Output" Parameters**

Parameter	Value
Initial condition	0.0
Input processing	Elements as channels (sample based)
Sample time (-1 for inherited)	tsamp
State name must resolve to Simulink signal object	off

### "Wrap To Zero" (SubSystem)

**Table 3.283. "Wrap To Zero" Parameters**

Parameter	Value
SimulinkmasksThreshold_MP	(2^(NumBits))-1

### "y" (Outport)

**Table 3.284. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit

Parameter	Value
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## No Dynamics

**Figure 3.39. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer/Dynamics/No Dynamics**



## Blocks

### Parameters

"In1" (Inport)

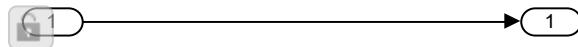
**Table 3.285. "In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Out1" (Outport)****Table 3.286. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## No Dynamics

**Figure 3.40. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Gyroscope/Dynamics/No Dynamics**

## Blocks

### Parameters

#### "In1" (Inport)

**Table 3.287. "In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "Out1" (Outport)

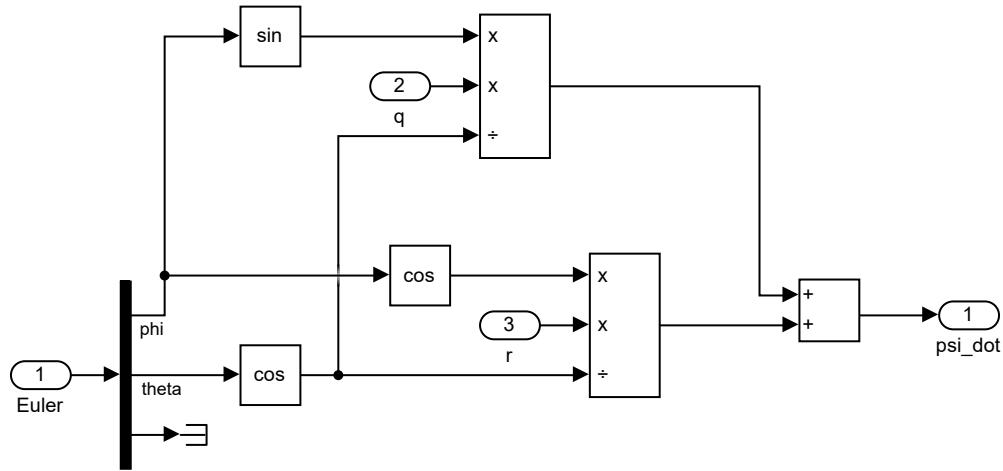
**Table 3.288. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## PsiDot

Figure 3.41. asbQuadcopter/Visualization/Extract Flight Instruments/PsiDot



## Blocks

### Parameters

#### "Add" (Sum)

Table 3.289. "Add" Parameters

Parameter	Value
Icon shape	rectangular
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Cos" (Trigonometry)

**Table 3.290. "Cos" Parameters**

Parameter	Value
Function	cos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Cos1" (Trigonometry)

**Table 3.291. "Cos1" Parameters**

Parameter	Value
Function	cos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Demux" (Demux)

**Table 3.292. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Euler" (Inport)

**Table 3.293. "Euler" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.294. "Product" Parameters**

Parameter	Value
Number of inputs	**/
Multiplication	Element-wise(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Product1" (Product)**
**Table 3.295. "Product1" Parameters**

Parameter	Value
Number of inputs	**/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"psi\_dot" (Outport)**
**Table 3.296. "psi\_dot" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off

Parameter	Value
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

### "q" (Import)

**Table 3.297. "q" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "r" (Import)

**Table 3.298. "r" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sin" (Trigonometry)

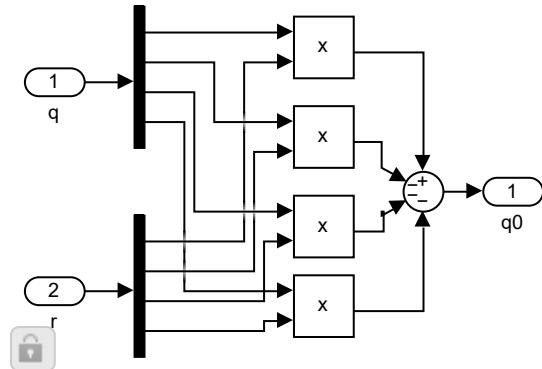
**Table 3.299. "Sin" Parameters**

Parameter	Value
Function	sin

Parameter	Value
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

## q0

**Figure 3.42. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Quaternion Multiplication (Pitch & Yaw)/q0**



## Blocks

### Parameters

"Demux" (Demux)

**Table 3.300. "Demux" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.301. "Demux1" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Product" (Product)

**Table 3.302. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.303. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product2" (Product)

**Table 3.304. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product3" (Product)

**Table 3.305. "Product3" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "q" (Inport)

**Table 3.306. "q" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "q0" (Outport)

**Table 3.307. "q0" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1

Parameter	Value
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "r" (Import)

**Table 3.308. "r" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum" (Sum)

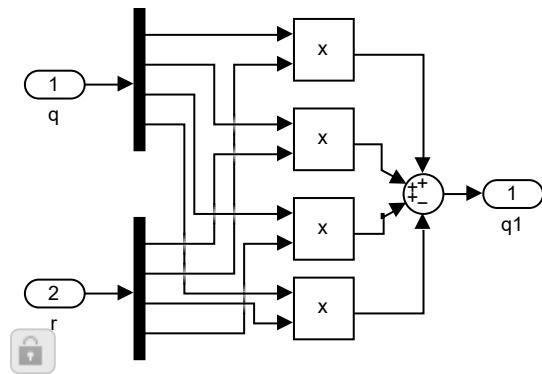
**Table 3.309. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+---
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

Parameter	Value
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**q1**

**Figure 3.43. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Quaternion Multiplication (Pitch & Yaw)/q1**



## Blocks

### Parameters

#### "Demux" (Demux)

**Table 3.310. "Demux" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.311. "Demux1" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Product" (Product)

**Table 3.312. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.313. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product2" (Product)

**Table 3.314. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product3" (Product)

**Table 3.315. "Product3" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "q" (Inport)

**Table 3.316. "q" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "q1" (Outport)

**Table 3.317. "q1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1

Parameter	Value
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "r" (Import)

**Table 3.318. "r" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum" (Sum)

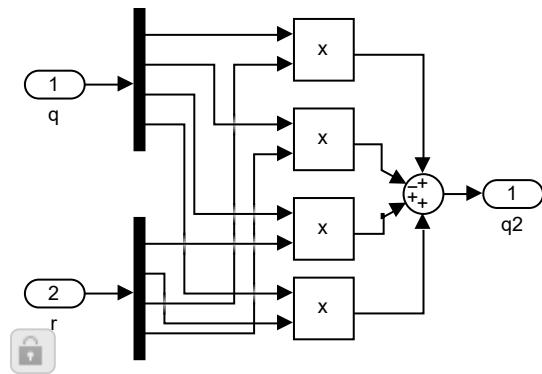
**Table 3.319. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+++-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

Parameter	Value
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

## q2

**Figure 3.44. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Quaternion Multiplication (Pitch & Yaw)/q2**



## Blocks

### Parameters

#### "Demux" (Demux)

**Table 3.320. "Demux" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.321. "Demux1" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Product" (Product)

**Table 3.322. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.323. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product2" (Product)

**Table 3.324. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product3" (Product)

**Table 3.325. "Product3" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "q" (Inport)

**Table 3.326. "q" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "q2" (Outport)

**Table 3.327. "q2" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1

Parameter	Value
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "r" (Import)

**Table 3.328. "r" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum" (Sum)

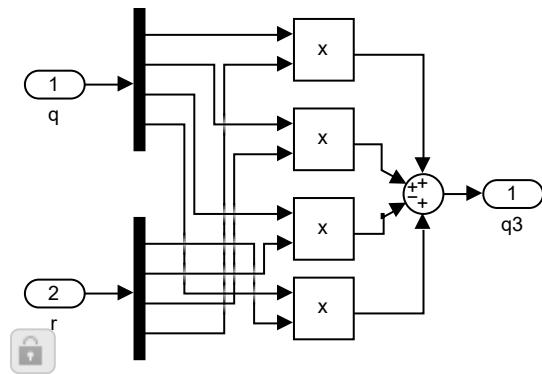
**Table 3.329. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+---
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

Parameter	Value
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

## q3

**Figure 3.45. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Quaternion Multiplication (Pitch & Yaw)/q3**



## Blocks

### Parameters

#### "Demux" (Demux)

**Table 3.330. "Demux" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.331. "Demux1" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Product" (Product)

**Table 3.332. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.333. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product2" (Product)

**Table 3.334. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product3" (Product)

**Table 3.335. "Product3" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "q" (Inport)

**Table 3.336. "q" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "q3" (Outport)

**Table 3.337. "q3" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1

Parameter	Value
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "r" (Import)

**Table 3.338. "r" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum" (Sum)

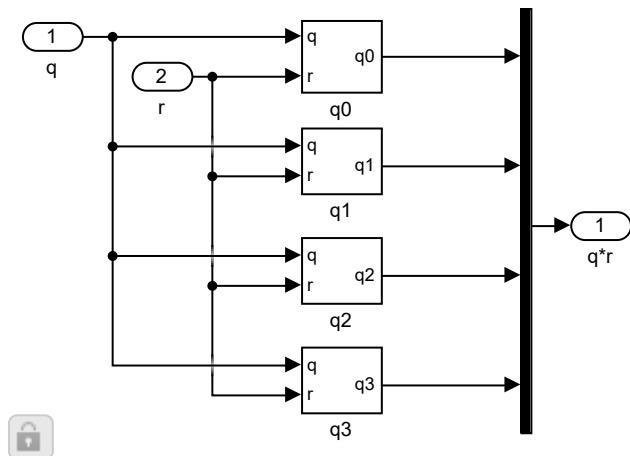
**Table 3.339. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

Parameter	Value
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

## Quaternion Multiplication (Pitch & Yaw)

**Figure 3.46. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Quaternion Multiplication (Pitch & Yaw)**



## Blocks

### Parameters

"Mux" (Mux)

**Table 3.340. "Mux" Parameters**

Parameter	Value
Number of inputs	4
Display option	bar

### "q" (Inport)

**Table 3.341. "q" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "q\*r" (Outport)

**Table 3.342. "q\*r" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	1
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

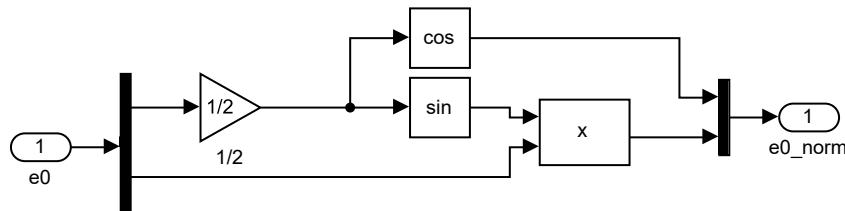
### "r" (Inport)

**Table 3.343. "r" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Quaternion Normalization

**Figure 3.47. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Quaternion Normalization**



## Blocks

### Parameters

#### "1/2" (Gain)

**Table 3.344. "1/2" Parameters**

Parameter	Value
Gain	1/2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Demux" (Demux)

**Table 3.345. "Demux" Parameters**

Parameter	Value
Number of outputs	[1 3]
Display option	none
Bus selection mode	off

### "e0" (Import)

**Table 3.346. "e0" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "e0\_norm" (Outport)

**Table 3.347. "e0\_norm" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

<b>Parameter</b>	<b>Value</b>
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Mux" (Mux)

**Table 3.348. "Mux" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Display option	bar

### "Product" (Product)

**Table 3.349. "Product" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Multiplication	Element-wise(.*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Trigonometric Function" (Trigonometry)

**Table 3.350. "Trigonometric Function" Parameters**

Parameter	Value
Function	sin
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

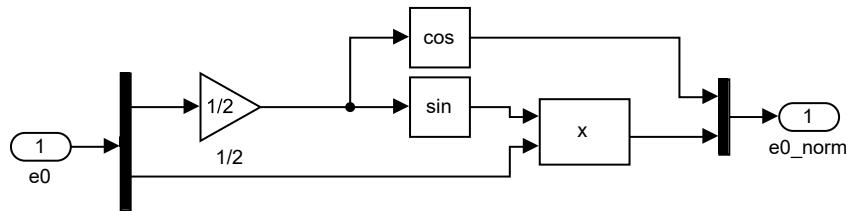
### "Trigonometric Function1" (Trigonometry)

**Table 3.351. "Trigonometric Function1" Parameters**

Parameter	Value
Function	cos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

# Quaternion Normalization1

**Figure 3.48. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Quaternion Normalization1**



## Blocks

### Parameters

"1/2" (Gain)

**Table 3.352. "1/2" Parameters**

Parameter	Value
Gain	1/2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

**"Demux" (Demux)****Table 3.353. "Demux" Parameters**

Parameter	Value
Number of outputs	[1 3]
Display option	none
Bus selection mode	off

**"e0" (Import)****Table 3.354. "e0" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"e0\_norm" (Outport)****Table 3.355. "e0\_norm" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

Parameter	Value
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Mux" (Mux)

**Table 3.356. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Product" (Product)

**Table 3.357. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Trigonometric Function" (Trigonometry)

**Table 3.358. "Trigonometric Function" Parameters**

Parameter	Value
Function	sin
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

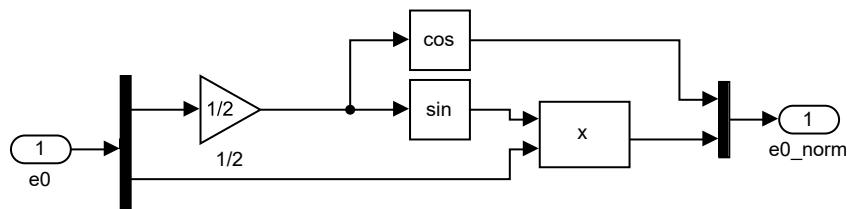
### "Trigonometric Function1" (Trigonometry)

**Table 3.359. "Trigonometric Function1" Parameters**

Parameter	Value
Function	cos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

## Quaternion Normalization2

**Figure 3.49. asbQuadcopter/Visualization/Visualization/Simulink 3D/Euler to VR/Quaternion Normalization2**



## Blocks

### Parameters

#### "1/2" (Gain)

**Table 3.360.** "1/2" Parameters

Parameter	Value
Gain	1/2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

#### "Demux" (Demux)

**Table 3.361.** "Demux" Parameters

Parameter	Value
Number of outputs	[1 3]
Display option	none
Bus selection mode	off

#### "e0" (Inport)

**Table 3.362.** "e0" Parameters

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "e0\_norm" (Outport)

**Table 3.363. "e0\_norm" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Mux" (Mux)

**Table 3.364. "Mux" Parameters**

Parameter	Value
Number of inputs	2

Parameter	Value
Display option	bar

### "Product" (Product)

**Table 3.365. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Trigonometric Function" (Trigonometry)

**Table 3.366. "Trigonometric Function" Parameters**

Parameter	Value
Function	sin
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

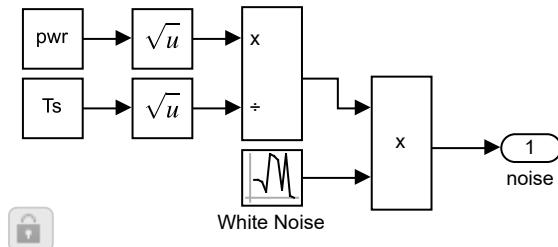
### "Trigonometric Function1" (Trigonometry)

**Table 3.367. "Trigonometric Function1" Parameters**

Parameter	Value
Function	cos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

## Random bias

**Figure 3.50. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer/Random bias**



## Blocks

### Parameters

#### "Constant" (Constant)

**Table 3.368. "Constant" Parameters**

Parameter	Value
Constant value	pwr
Interpret vector parameters as 1-D	on
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant1" (Constant)

**Table 3.369. "Constant1" Parameters**

Parameter	Value
Constant value	Ts
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Divide" (Product)

**Table 3.370. "Divide" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "noise" (Outport)

**Table 3.371. "noise" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Product" (Product)

**Table 3.372. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(*)

Parameter	Value
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sqrt" (Sqrt)

**Table 3.373. "Sqrt" Parameters**

Parameter	Value
Function	sqrt
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Exact
Number of iterations	3

### "Sqrt1" (Sqrt)

**Table 3.374. "Sqrt1" Parameters**

Parameter	Value
Function	sqrt
Sample time (-1 for inherited)	-1

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Exact
Number of iterations	3

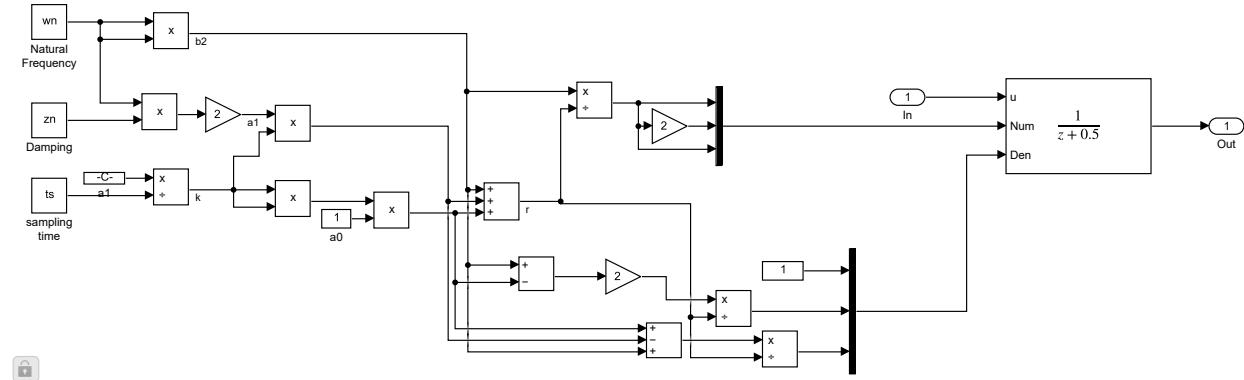
### "White Noise" (RandomNumber)

Table 3.375. "White Noise" Parameters

Parameter	Value
Mean	0
Variance	1
Seed	seed
Sample time	Ts
Interpret vector parameters as 1-D	on

## Second-order Dynamics

Figure 3.51. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer/Dynamics/Second-order Dynamics



## Blocks

### Parameters

#### "a0" (Constant)

**Table 3.376. "a0" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "a1" (Constant)

**Table 3.377. "a1" Parameters**

Parameter	Value
Constant value	2
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"a2" (Constant)**
**Table 3.378. "a2" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"Add" (Sum)**
**Table 3.379. "Add" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Add1" (Sum)

**Table 3.380. "Add1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Add2" (Sum)

**Table 3.381. "Add2" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	++-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Damping" (Constant)

**Table 3.382. "Damping" Parameters**

Parameter	Value
Constant value	zn
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Discrete Transfer Fcn" (DiscreteTransferFcn)

**Table 3.383. "Discrete Transfer Fcn" Parameters**

Parameter	Value
Numerator coefficients source	Input port
Numerator coefficients	[1]
Denominator coefficients source	Input port
Denominator coefficients	[1 0.5]
Initial states source	Dialog
Initial states	0
Input processing	Elements as channels (sample based)
External reset	None
Initial states on denominator side	0
Filter structure	Direct form II
Sample time (-1 for inherited)	ts
Optimize by skipping divide by leading denominator coefficient (a0)	on
Numerator coefficient minimum	[]
Numerator coefficient maximum	[]
Denominator coefficient minimum	[]
Denominator coefficient maximum	[]
Output minimum	[]

Parameter	Value
Output maximum	[]
State data type	Inherit: Same as input
Multiplicand data type	Inherit: Same as input
Numerator coefficient data type	Inherit: Inherit via internal rule
Denominator coefficient data type	Inherit: Inherit via internal rule
Numerator product output data type	Inherit: Inherit via internal rule
Denominator product output data type	Inherit: Inherit via internal rule
Numerator accumulator data type	Inherit: Inherit via internal rule
Denominator accumulator data type	Inherit: Inherit via internal rule
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
State name must resolve to Simulink signal object	off

### "Divide" (Product)

**Table 3.384. "Divide" Parameters**

Parameter	Value
Number of inputs	**
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

Parameter	Value
Sample time (-1 for inherited)	-1

### "Divide1" (Product)

**Table 3.385. "Divide1" Parameters**

Parameter	Value
Number of inputs	**
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide2" (Product)

**Table 3.386. "Divide2" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide3" (Product)

**Table 3.387. "Divide3" Parameters**

Parameter	Value
Number of inputs	**
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide4" (Product)

**Table 3.388. "Divide4" Parameters**

Parameter	Value
Number of inputs	**
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide5" (Product)

**Table 3.389. "Divide5" Parameters**

Parameter	Value
Number of inputs	**
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide6" (Product)

**Table 3.390. "Divide6" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide7" (Product)

**Table 3.391. "Divide7" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide8" (Product)

**Table 3.392. "Divide8" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain" (Gain)

**Table 3.393. "Gain" Parameters**

Parameter	Value
Gain	2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain1" (Gain)

**Table 3.394. "Gain1" Parameters**

Parameter	Value
Gain	2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]

Parameter	Value
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain2" (Gain)

**Table 3.395. "Gain2" Parameters**

Parameter	Value
Gain	2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "In" (Import)

**Table 3.396. "In" Parameters**

Parameter	Value
Port number	1

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Mux" (Mux)

**Table 3.397. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "Mux1" (Mux)

**Table 3.398. "Mux1" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "Natural Frequency" (Constant)

**Table 3.399. "Natural Frequency" Parameters**

Parameter	Value
Constant value	wn
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Out" (Outport)

**Table 3.400. "Out" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "sampling time" (Constant)

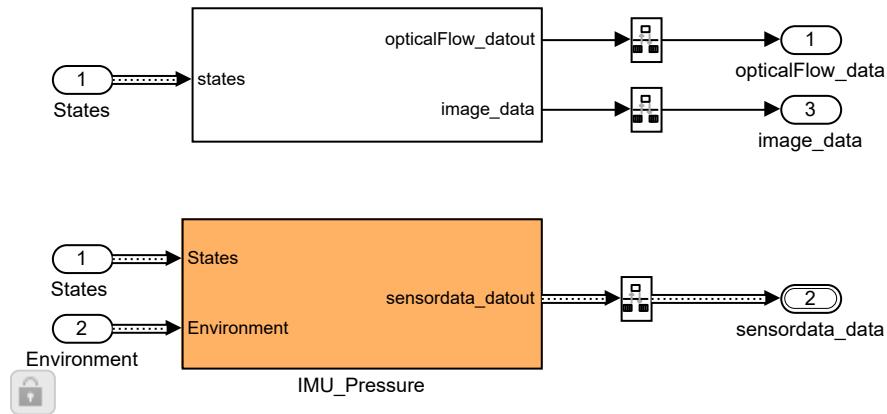
**Table 3.401. "sampling time" Parameters**

Parameter	Value
Constant value	ts
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

## Sensor System

Figure 3.52. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System



## Blocks

### Parameters

"Environment" (Import)

Table 3.402. "Environment" Parameters

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "image\_data" (Outport)

**Table 3.403. "image\_data" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "opticalFlow\_data" (Outport)

**Table 3.404. "opticalFlow\_data" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Rate Transition1" (RateTransition)

**Table 3.405. "Rate Transition1" Parameters**

<b>Parameter</b>	<b>Value</b>
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	Ts

### "Rate Transition2" (RateTransition)

**Table 3.406. "Rate Transition2" Parameters**

<b>Parameter</b>	<b>Value</b>
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify

Parameter	Value
Sample time multiple(>0)	1
Output port sample time	Ts

### "Rate Transition3" (RateTransition)

**Table 3.407. "Rate Transition3" Parameters**

Parameter	Value
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	zeros(4,9600)
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	VTs

### "sensordata\_data" (Outport)

**Table 3.408. "sensordata\_data" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: HAL_acquisition_t
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "States" (Inport)

**Table 3.409. "States" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "States" (InportShadow)

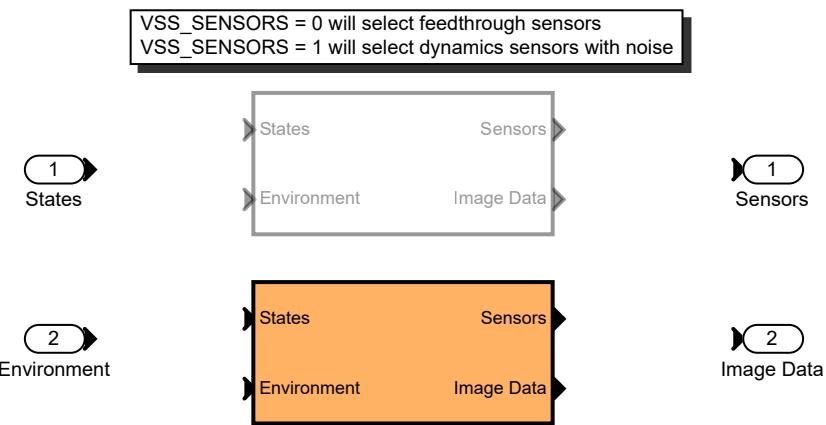
**Table 3.410. "States" Parameters**

Parameter	Value
Port number	1
Port name	States
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

Parameter	Value
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

## Sensors

**Figure 3.53. asbQuadcopter/Sensors**



## Blocks

### Parameters

#### "Environment" (Inport)

**Table 3.411. "Environment" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Image Data" (Outport)

**Table 3.412. "Image Data" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Sensors" (Outport)

**Table 3.413. "Sensors" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

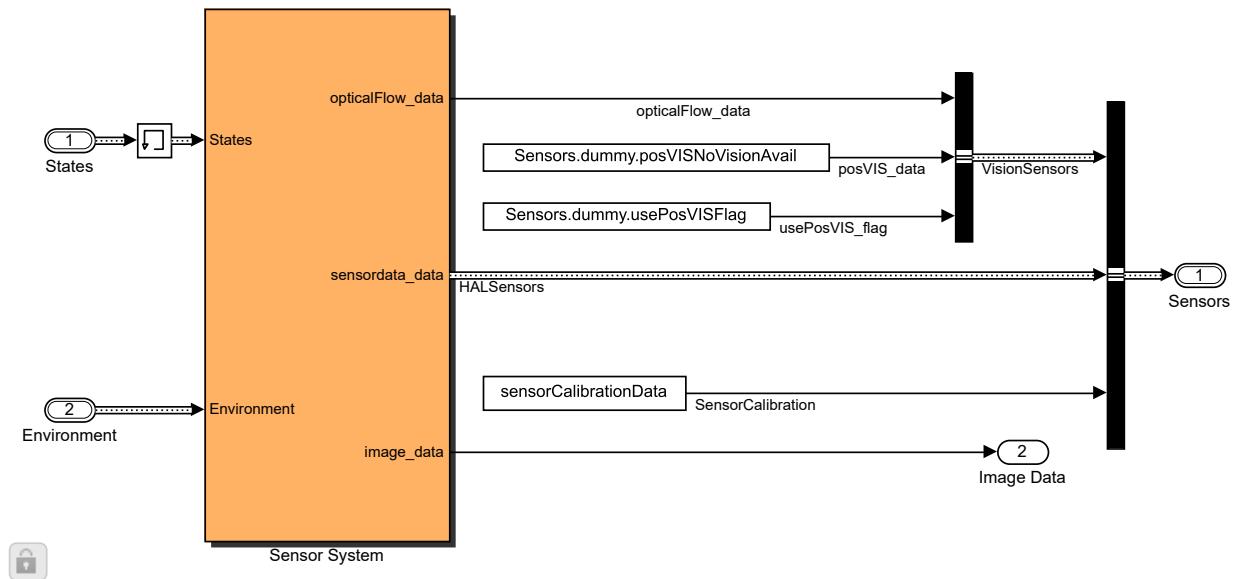
### "States" (Inport)

**Table 3.414. "States" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Sensors (Dynamics)

**Checksum:** 4128857860 3563068808 797889302 813657148

**Figure 3.54. asbQuadcopter/Sensors/Sensors (Dynamics)**


## Blocks

### Parameters

**"\_DUMMY\_FLAG\_usePosVIS" (Constant)**

**Table 3.415. "\_DUMMY\_FLAG\_usePosVIS" Parameters**

Parameter	Value
Constant value	Sensors.dummy.usePosVIS Flag
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	Ts
Frame period	inf

### "\_DUMMY\_posVIS" (Constant)

**Table 3.416. "\_DUMMY\_posVIS" Parameters**

Parameter	Value
Constant value	Sensors.dummy.posVISNoVisionAvail
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	Ts
Frame period	inf

### "Bus Creator1" (BusCreator)

**Table 3.417. "Bus Creator1" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar
Data type	Bus: SensorsBus
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "Bus Creator2" (BusCreator)

**Table 3.418. "Bus Creator2" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar
Data type	Bus: extraSensorData_t
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "Constant" (Constant)

**Table 3.419. "Constant" Parameters**

Parameter	Value
Constant value	sensorCalibrationData
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Environment" (Import)

**Table 3.420. "Environment" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: EnvironmentBus

### "Image Data" (Outport)

**Table 3.421. "Image Data" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

Parameter	Value
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	[4 9600]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Memory1" (Memory)

**Table 3.422. "Memory1" Parameters**

Parameter	Value
Initial condition	States
Inherit sample time	on
Direct feedthrough of input during linearization	off
Treat as a unit delay when linearizing with discrete sample time	off
State name must resolve to Simulink signal object	off

### "Sensors" (Outport)

**Table 3.423. "Sensors" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: SensorsBus
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "States" (Inport)

**Table 3.424. "States" Parameters**

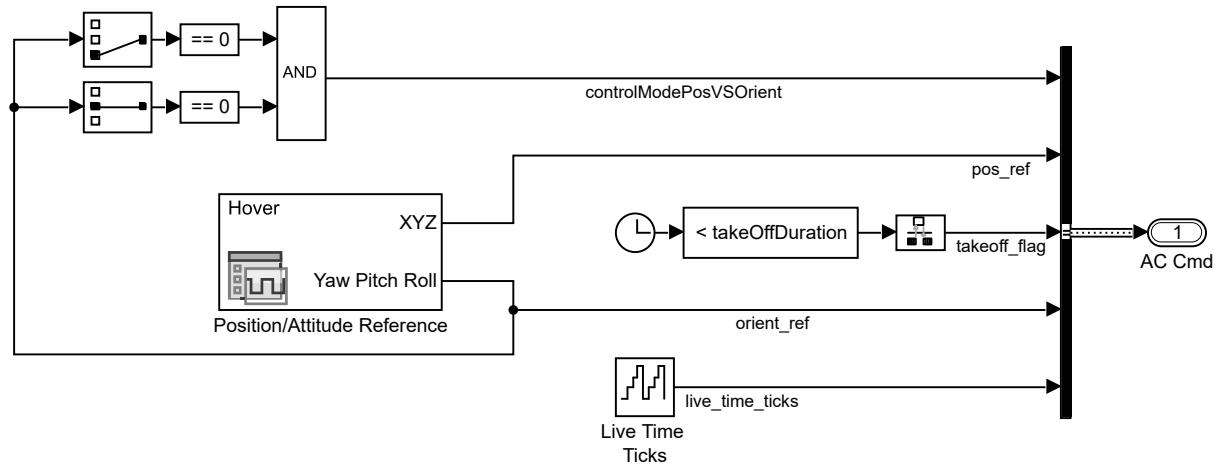
Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# Signal Editor

**Figure 3.55. asbQuadcopter/Command/Signal Editor**



## Blocks

### Parameters

"AC Cmd" (Outport)

**Table 3.425. "AC Cmd" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: CommandBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit

Parameter	Value
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Bus Creator" (BusCreator)

**Table 3.426. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	5
Display option	bar
Data type	Bus: CommandBus
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "Clock" (Clock)

**Table 3.427. "Clock" Parameters**

Parameter	Value
Display time	off
Decimation	10

### "Compare To Constant" (SubSystem)

**Table 3.428. "Compare To Constant" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<
SimulinkmasksConstantValue_MP	takeOffDuration
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Zero" (SubSystem)

**Table 3.429. "Compare To Zero" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	==
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Zero1" (SubSystem)

**Table 3.430. "Compare To Zero1" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	==
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Live Time Ticks" (SubSystem)

**Table 3.431. "Live Time Ticks" Parameters**

Parameter	Value
SimulinkmasksNumberOfBits_MP	32
SimulinkmasksSampleTime_MP	Ts

### "Logical Operator" (Logic)

**Table 3.432. "Logical Operator" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Position/Attitude Reference" (SubSystem)

**Table 3.433. "Position/Attitude Reference" Parameters**

Parameter	Value
FileName	positionAttitudeRef.mat
Active Scenario	Hover
Signal	XYZ
Out a bus	off
Select bus object	Bus: BusObject
Sample Time	Ts
Interpolate data	on
Enable zero-crossing detection	off
Form output after final data value by	Holding final value
Unit	inherit

### "Rate Transition3" (RateTransition)

**Table 3.434. "Rate Transition3" Parameters**

Parameter	Value
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	Ts

### "Selector" (Selector)

**Table 3.435. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	2
Output Size	1
Input port size	3

<b>Parameter</b>	<b>Value</b>
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	2
Output Size	1

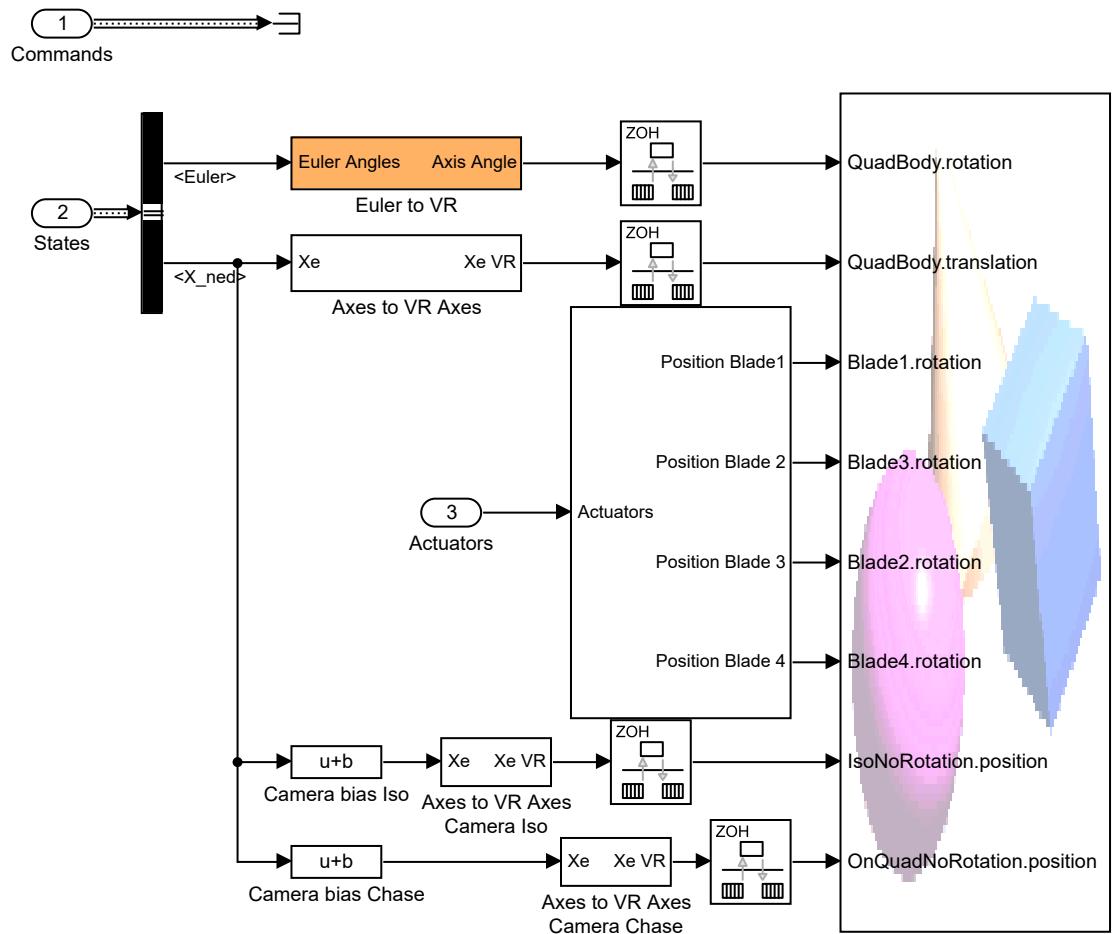
### "Selector1" (Selector)

**Table 3.436. "Selector1" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	3
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	3
Output Size	1

# Simulink 3D

**Figure 3.56. asbQuadcopter/Visualization/Visualization/Simulink 3D**



## Blocks

### Parameters

"Actuators" (Inport)

**Table 3.437. "Actuators" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Selector" (BusSelector)

**Table 3.438. "Bus Selector" Parameters**

Parameter	Value
Output signals	Euler,X_ned
Output as virtual bus	off
InputSignals	V_body Omega_body Euler Accel_body dOmega_body V_ned X_ned LLA DCM_be

#### Output Hierarchy:

1. *Bus Selector*
  1. <Euler>
  2. <X\_ned>

### "Camera bias Chase" (Bias)

**Table 3.439. "Camera bias Chase" Parameters**

Parameter	Value
Bias	[-4 0 -.9558]'
Saturate on integer overflow	off

### "Camera bias Iso" (Bias)

**Table 3.440. "Camera bias Iso" Parameters**

Parameter	Value
Bias	[0.9009 .99 -.6247]'
Saturate on integer overflow	off

### "Commands" (Import)

**Table 3.441. "Commands" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Rate Transition" (RateTransition)

**Table 3.442. "Rate Transition" Parameters**

Parameter	Value
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	-1

### "Rate Transition1" (RateTransition)

**Table 3.443. "Rate Transition1" Parameters**

Parameter	Value
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	-1

### "Rate Transition2" (RateTransition)

**Table 3.444. "Rate Transition2" Parameters**

Parameter	Value
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	-1

### "Rate Transition3" (RateTransition)

**Table 3.445. "Rate Transition3" Parameters**

Parameter	Value
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	-1

### "States" (Inport)

**Table 3.446. "States" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

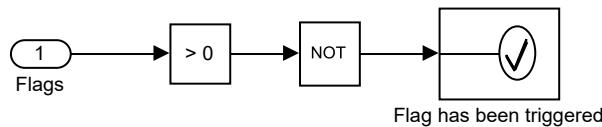
### "VR Sink" (S-Function)

**Table 3.447. "VR Sink" Parameters**

Parameter	Value
Sample Time	12*Ts
View	on
Remote View	off
Fields Written	QuadBody.rotation.4.1.1.double#QuadBody.translation.3.1.1.double#Blade1.rotation.4.1.1.double#Blade3.rotation.4.1.1.double#Blade2.rotation.4.1.1.double#Blade4.rotation.4.1.1.double#IsoNoRotation.position.3.1.1.double#OnQuadNoRotation.position.3.1.1.double
World File Name	asbQuadcopterWorld.wrl
AutoView	on
Video Dimensions	[]
Allow Variable Size	off

## Stop Simulation

**Figure 3.57. asbQuadcopter/Stop Simulation**



## Blocks

### Parameters

#### "Compare To Zero" (SubSystem)

**Table 3.448. "Compare To Zero" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Flag has been triggered" (Assertion)

**Table 3.449. "Flag has been triggered" Parameters**

Parameter	Value
Enable assertion	on
Stop simulation when assertion fails	on
Sample time (-1 for inherited)	-1

### "Flags" (Import)

**Table 3.450. "Flags" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	uint8

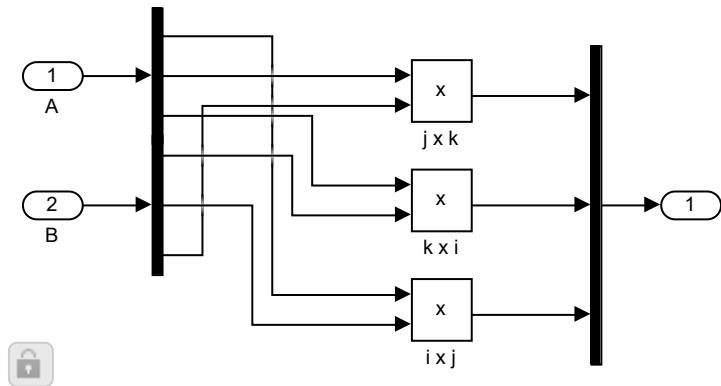
### "Logical Operator" (Logic)

**Table 3.451. "Logical Operator" Parameters**

Parameter	Value
Operator	NOT
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

# Subsystem

**Figure 3.58. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer/w x (w x d)/w x (w x d)/Subsystem**



## Blocks

### Parameters

#### "A" (Inport)

**Table 3.452. "A" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "B" (Inport)

**Table 3.453. "B" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Demux" (Demux)

**Table 3.454. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.455. "Demux1" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "i x j" (Product)

**Table 3.456. "i x j" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "j x k" (Product)

**Table 3.457. "j x k" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "k x i" (Product)

**Table 3.458. "k x i" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on

Parameter	Value
Sample time (-1 for inherited)	-1

### "Mux" (Mux)

**Table 3.459. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

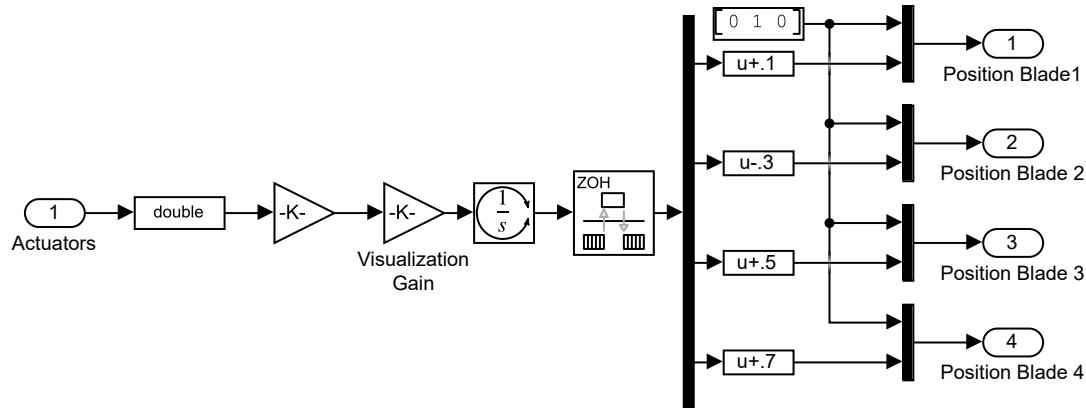
### "Out1" (Outport)

**Table 3.460. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# Subsystem

**Figure 3.59. asbQuadcopter/Visualization/Visualization/Simulink 3D/ Subsystem**



## Blocks

### Parameters

"Actuators" (Input)

**Table 3.461. "Actuators" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"Bias" (Bias)

**Table 3.462. "Bias" Parameters**

Parameter	Value
Bias	.1
Saturate on integer overflow	off

**"Bias1" (Bias)****Table 3.463. "Bias1" Parameters**

Parameter	Value
Bias	-.3
Saturate on integer overflow	off

**"Bias2" (Bias)****Table 3.464. "Bias2" Parameters**

Parameter	Value
Bias	.5
Saturate on integer overflow	off

**"Bias3" (Bias)****Table 3.465. "Bias3" Parameters**

Parameter	Value
Bias	.7
Saturate on integer overflow	off

**"Constant" (Constant)****Table 3.466. "Constant" Parameters**

Parameter	Value
Constant value	[0 1 0]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Data Type Conversion" (DataTypeConversion)

**Table 3.467. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	double
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Demux" (Demux)

**Table 3.468. "Demux" Parameters**

Parameter	Value
Number of outputs	4
Display option	bar
Bus selection mode	off

### "Gain" (Gain)

**Table 3.469. "Gain" Parameters**

Parameter	Value
Gain	-Vehicle.Motor.commandToW2Gain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Integrator" (Integrator)

**Table 3.470. "Integrator" Parameters**

Parameter	Value
External reset	none
Initial condition source	internal
Initial condition	[.1 .2 -.3 -.4]
Limit output	off
Upper saturation limit	inf
Lower saturation limit	-inf
Wrap state	on
Wrapped state upper value	2*pi
Wrapped state lower value	-2*pi
Show saturation port	off
Show state port	off
Ignore limit and reset when linearizing	off
Enable zero-crossing detection	on
State Name (e.g., 'position')	"

### "Mux" (Mux)

**Table 3.471. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Mux1" (Mux)

**Table 3.472. "Mux1" Parameters**

Parameter	Value
Number of inputs	2

Parameter	Value
Display option	bar

### "Mux2" (Mux)

**Table 3.473. "Mux2" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Mux3" (Mux)

**Table 3.474. "Mux3" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Position Blade 2" (Outport)

**Table 3.475. "Position Blade 2" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog

Parameter	Value
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Position Blade 3" (Outport)

**Table 3.476. "Position Blade 3" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Position Blade 4" (Outport)

**Table 3.477. "Position Blade 4" Parameters**

Parameter	Value
Port number	4
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Position Blade1" (Outport)

**Table 3.478. "Position Blade1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### **"Rate Transition2" (RateTransition)**

**Table 3.479. "Rate Transition2" Parameters**

<b>Parameter</b>	<b>Value</b>
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	-1

### **"Visualization Gain" (Gain)**

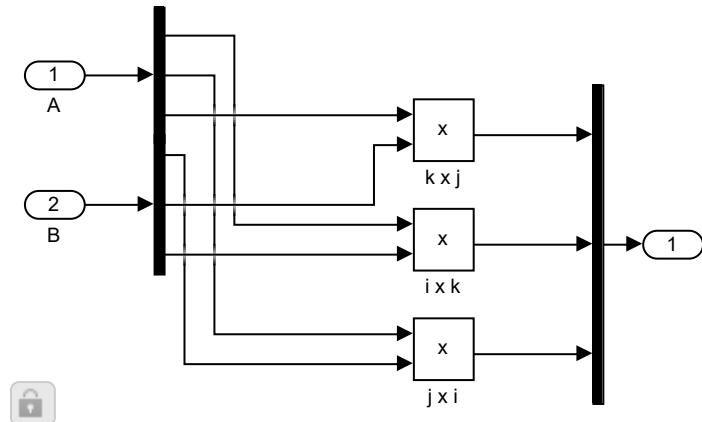
**Table 3.480. "Visualization Gain" Parameters**

<b>Parameter</b>	<b>Value</b>
Gain	.0001
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]

Parameter	Value
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

## Subsystem1

**Figure 3.60. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer/w x (w x d)/w x (w x d)/Subsystem1**



## Blocks

### Parameters

### "A" (Import)

**Table 3.481. "A" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "B" (Import)

**Table 3.482. "B" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Demux" (Demux)

**Table 3.483. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.484. "Demux1" Parameters**

Parameter	Value
Number of outputs	3

Parameter	Value
Display option	bar
Bus selection mode	off

### "i x k" (Product)

**Table 3.485. "i x k" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "j x i" (Product)

**Table 3.486. "j x i" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on

Parameter	Value
Sample time (-1 for inherited)	-1

### "k x j" (Product)

**Table 3.487. "k x j" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Mux" (Mux)

**Table 3.488. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "Out1" (Outport)

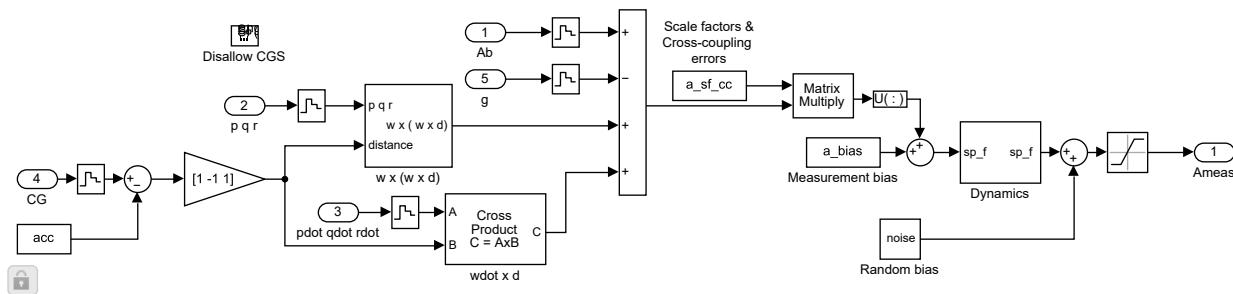
**Table 3.489. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# Three-axis Accelerometer

**Figure 3.61. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer**



## Blocks

## Parameters

### "Ab" (Import)

**Table 3.490. "Ab" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Ameas" (Outport)

**Table 3.491. "Ameas" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	m/s^2
Port dimensions (-1 for inherited)	3
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

**"CG" (Inport)****Table 3.492. "CG" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Disallow CGS" (UnitConfiguration)****Table 3.493. "Disallow CGS" Parameters**

Parameter	Value
Allowed unit systems	English SI SI (extended)
Allow all unit systems	off

**"g" (Inport)****Table 3.494. "g" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Gain" (Gain)****Table 3.495. "Gain" Parameters**

Parameter	Value
Gain	[1 -1 1]

Parameter	Value
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Measurement bias" (Constant)

**Table 3.496. "Measurement bias" Parameters**

Parameter	Value
Constant value	a_bias
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "p q r" (Import)

**Table 3.497. "p q r" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

### "pdot qdot rdot" (Import)

**Table 3.498. "pdot qdot rdot" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.499. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Random bias" (SubSystem)

**Table 3.500. "Random bias" Parameters**

Parameter	Value
Noise power	a_pow

Parameter	Value
Sample Time	a_Ts
Seeds	a_seeds

### "Reshape1" (Reshape)

**Table 3.501.** "Reshape1" Parameters

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

### "Saturation" (Saturate)

**Table 3.502.** "Saturation" Parameters

Parameter	Value
Upper limit	a_sath
Lower limit	a_satl
Treat as gain when linearizing	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

### "Scale factors & Cross-coupling errors" (Constant)

**Table 3.503.** "Scale factors & Cross-coupling errors" Parameters

Parameter	Value
Constant value	a_sf_cc
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Sum" (Sum)

**Table 3.504. "Sum" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+---
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum1" (Sum)

**Table 3.505. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

<b>Parameter</b>	<b>Value</b>
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum4" (Sum)

**Table 3.506. "Sum4" Parameters**

<b>Parameter</b>	<b>Value</b>
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum7" (Sum)

**Table 3.507. "Sum7" Parameters**

<b>Parameter</b>	<b>Value</b>
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "wl\_ins" (Constant)

**Table 3.508. "wl\_ins" Parameters**

Parameter	Value
Constant value	acc
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Zero-Order Hold" (ZeroOrderHold)

**Table 3.509. "Zero-Order Hold" Parameters**

Parameter	Value
Sample time (-1 for inherited)	a_Ts

### "Zero-Order Hold1" (ZeroOrderHold)

**Table 3.510. "Zero-Order Hold1" Parameters**

Parameter	Value
Sample time (-1 for inherited)	a_Ts

### "Zero-Order Hold2" (ZeroOrderHold)

**Table 3.511. "Zero-Order Hold2" Parameters**

Parameter	Value
Sample time (-1 for inherited)	a_Ts

### "Zero-Order Hold3" (ZeroOrderHold)

**Table 3.512. "Zero-Order Hold3" Parameters**

Parameter	Value
Sample time (-1 for inherited)	a_Ts

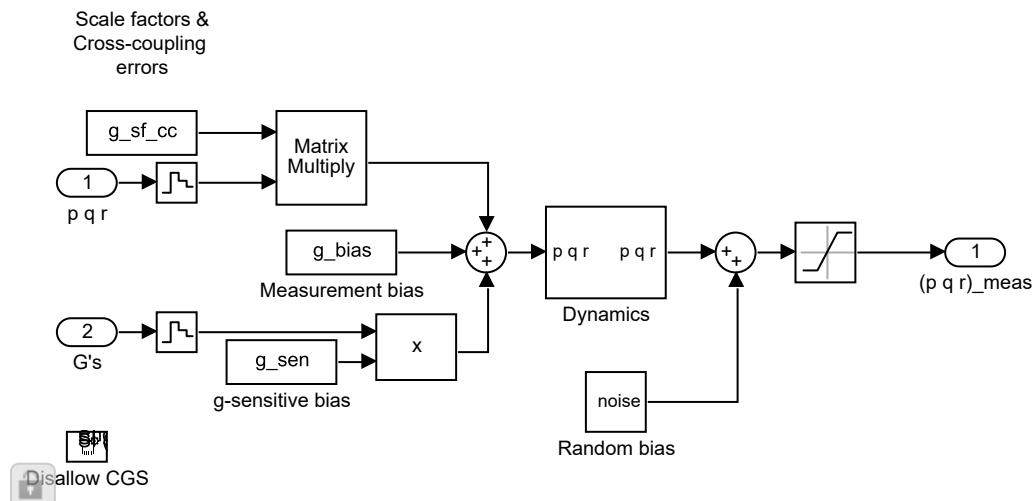
### "Zero-Order Hold4" (ZeroOrderHold)

**Table 3.513. "Zero-Order Hold4" Parameters**

Parameter	Value
Sample time (-1 for inherited)	a_Ts

## Three-axis Gyroscope

**Figure 3.62. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Gyroscope**



## Blocks

### Parameters

#### "(p q r)\_meas" (Outport)

**Table 3.514.** "(p q r)\_meas" Parameters

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	rad/s
Port dimensions (-1 for inherited)	3
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

#### "Disallow CGS" (UnitConfiguration)

**Table 3.515.** "Disallow CGS" Parameters

Parameter	Value
Allowed unit systems	English SI SI (extended)

Parameter	Value
Allow all unit systems	off

### "G's" (Import)

**Table 3.516. "G's" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "g-sensitive bias" (Constant)

**Table 3.517. "g-sensitive bias" Parameters**

Parameter	Value
Constant value	g_sen
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Measurement bias" (Constant)

**Table 3.518. "Measurement bias" Parameters**

Parameter	Value
Constant value	g_bias
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "p q r" (Import)

**Table 3.519. "p q r" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.520. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.521. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Random bias" (SubSystem)

**Table 3.522. "Random bias" Parameters**

Parameter	Value
Noise power	g_pow
Sample Time	g_Ts
Seeds	g_seeds

### "Saturation" (Saturate)

**Table 3.523. "Saturation" Parameters**

Parameter	Value
Upper limit	g_sath
Lower limit	g_satl
Treat as gain when linearizing	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

### "Scale factors & Cross-coupling errors" (Constant)

**Table 3.524. "Scale factors & Cross-coupling errors" Parameters**

Parameter	Value
Constant value	g_sf_cc
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Sum1" (Sum)

**Table 3.525. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum4" (Sum)

**Table 3.526. "Sum4" Parameters**

Parameter	Value
Icon shape	round
List of signs	+++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Zero-Order Hold" (ZeroOrderHold)

**Table 3.527. "Zero-Order Hold" Parameters**

Parameter	Value
Sample time (-1 for inherited)	g_Ts

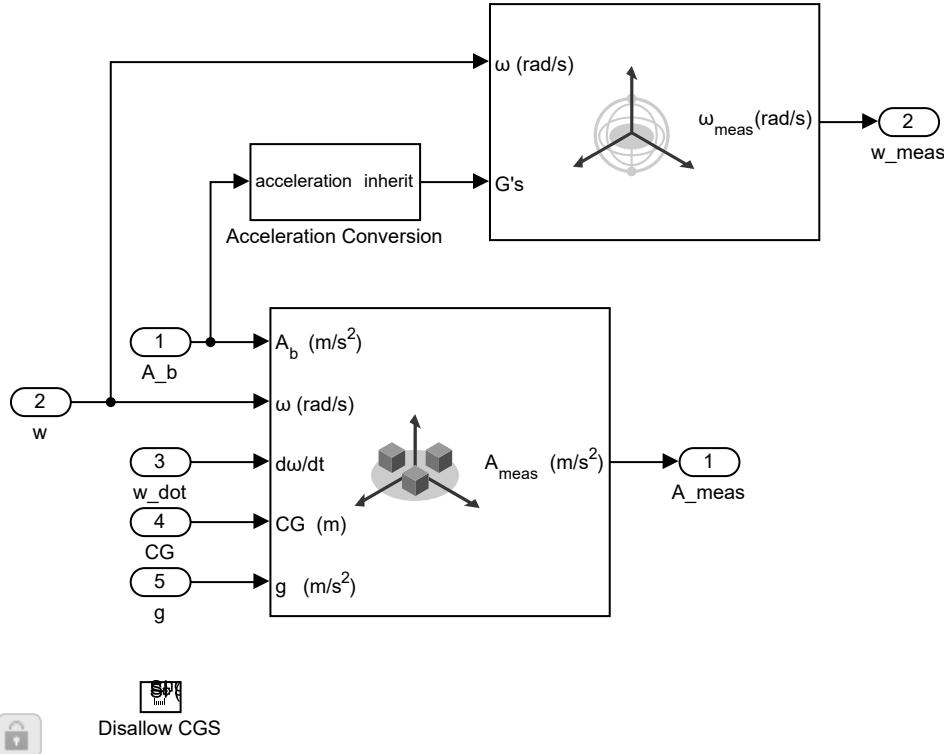
### "Zero-Order Hold1" (ZeroOrderHold)

**Table 3.528. "Zero-Order Hold1" Parameters**

Parameter	Value
Sample time (-1 for inherited)	g_Ts

# Three-axis Inertial Measurement Unit

**Figure 3.63. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit**



## Blocks

### Parameters

"A\_b" (Import)

**Table 3.529. "A\_b" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

### "A\_meas" (Outport)

**Table 3.530. "A\_meas" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	m/s <sup>2</sup>
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "CG" (Inport)

**Table 3.531. "CG" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Disallow CGS" (UnitConfiguration)

**Table 3.532. "Disallow CGS" Parameters**

Parameter	Value
Allowed unit systems	English SI SI (extended)
Allow all unit systems	off

### "g" (Inport)

**Table 3.533. "g" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Three-axis Accelerometer" (SubSystem)

**Table 3.534. "Three-axis Accelerometer" Parameters**

Parameter	Value
aeroblksaeroblknavblockThreeaxisAccelerometerParamUnits	Metric (M KS)
aeroblksaeroblknavblockThreeaxisAccelerometerParamAccelerometerlocation	imu
aeroblksaeroblknavblockThreeaxisAccelerometerParamSubtractgravity	on
aeroblksaeroblknavblockThreeaxisAccelerometerParamSecondorderdynamics	off
aeroblksaeroblknavblockThreeaxisAccelerometerParamNaturalfrequencyradsec	w_a
aeroblksaeroblknavblockThreeaxisAccelerometerParamDampingratio	z_a

<b>Parameter</b>	<b>Value</b>
aeroblksaeroblknavblockThreeaxisAccelerometerParamScalefactorsandcrosscoupling	a_sf_cc
aeroblksaeroblknavblockThreeaxisAccelerometerParamMeasurementbias	a_bias
aeroblksaeroblknavblockThreeaxisAccelerometerParamUpdatatesec	i_Ts
aeroblksaeroblknavblockThreeaxisAccelerometerParamNoiseon	on
aeroblksaeroblknavblockThreeaxisAccelerometerParamNoiseseeds	i_seeds(1:3)
aeroblksaeroblknavblockThreeaxisAccelerometerParamNoisepower	i_pow(1:3)
aeroblksaeroblknavblockThreeaxisAccelerometerParamLowerandupperoutputlimits	a_sat

#### **"Three-axis Gyroscope" (SubSystem)**

**Table 3.535. "Three-axis Gyroscope" Parameters**

<b>Parameter</b>	<b>Value</b>
aeroblksaeroblknavblockThreeaxisGyroscopeParamSecondorderdynamics	off
aeroblksaeroblknavblockThreeaxisGyroscopeParamNaturalfrequencyradsec	w_g
aeroblksaeroblknavblockThreeaxisGyroscopeParamDampingratio	z_g
aeroblksaeroblknavblockThreeaxisGyroscopeParamScalefactorsandcrosscoupling	g_sf_cc
aeroblksaeroblknavblockThreeaxisGyroscopeParamMeasurementbias	g_bias
aeroblksaeroblknavblockThreeaxisGyroscopeParamGsensitivebias	g_sens
aeroblksaeroblknavblockThreeaxisGyroscopeParamUpdatatesec	i_Ts
aeroblksaeroblknavblockThreeaxisGyroscopeParamNoiseon	on
aeroblksaeroblknavblockThreeaxisGyroscopeParamNoiseseeds	i_seeds(4:6)
aeroblksaeroblknavblockThreeaxisGyroscopeParamNoisepower	i_pow(4:6)
aeroblksaeroblknavblockThreeaxisGyroscopeParamLowerandupperoutputlimits	g_sat

#### **"w" (Import)**

**Table 3.536. "w" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

### "w\_dot" (Import)

**Table 3.537. "w\_dot" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "w\_meas" (Outport)

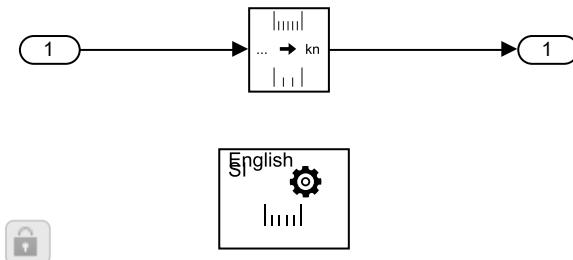
**Table 3.538. "w\_meas" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	rad/s
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off

Parameter	Value
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## V

**Figure 3.64. asbQuadcopter/Visualization/Extract Flight Instruments/V**



## Blocks

### Parameters

"Disallow CGS" (UnitConfiguration)

**Table 3.539. "Disallow CGS" Parameters**

Parameter	Value
Allowed unit systems	English SI
Allow all unit systems	off

"In1" (Input)

**Table 3.540. "In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Inherit: auto

### "Out1" (Outport)

**Table 3.541. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	knot
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

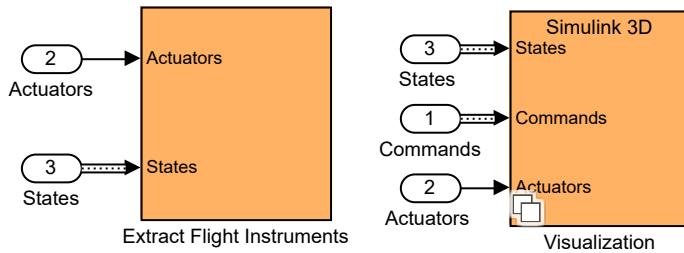
### "Unit Conversion" (UnitConversion)

**Table 3.542. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

# Visualization

**Figure 3.65. asbQuadcopter/Visualization**



## Blocks

### Parameters

"Actuators" (Input)

**Table 3.543. "Actuators" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"Actuators " (InputShadow)

**Table 3.544. "Actuators " Parameters**

Parameter	Value
Port number	2
Port name	Actuators
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]

<b>Parameter</b>	<b>Value</b>
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Commands" (Import)

**Table 3.545. "Commands" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "States" (Import)

**Table 3.546. "States" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "States " (InportShadow)

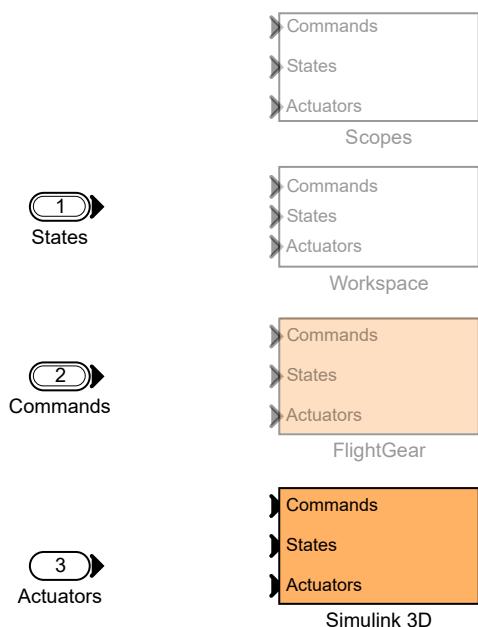
**Table 3.547. "States " Parameters**

Parameter	Value
Port number	3
Port name	States
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

# Visualization

**Figure 3.66. asbQuadcopter/Visualization/Visualization**

VSS\_VISUALIZATION = 0 will select scopes as means to visualize variables/states  
VSS\_VISUALIZATION = 1 will send select states in a variable to the workspace  
VSS\_VISUALIZATION = 2 will use FlightGear as visualization  
VSS\_VISUALIZATION = 3 will use a Simulink 3D interface



# Blocks

## Parameters

### "Actuators" (Input)

**Table 3.548. "Actuators" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

### "Commands" (Import)

**Table 3.549. "Commands" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: CommandBus

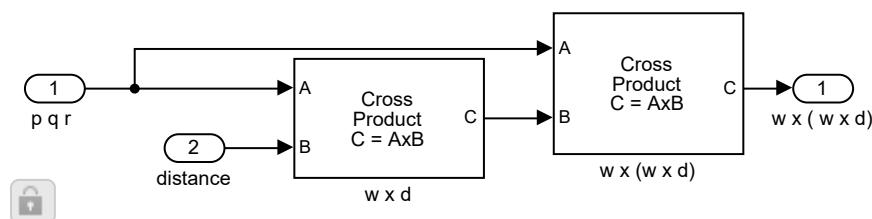
### "States" (Import)

**Table 3.550. "States" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus

## w x (w x d)

**Figure 3.67. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer/w x (w x d)**



## Blocks

### Parameters

"distance" (Import)

**Table 3.551.** "distance" Parameters

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"p q r" (Import)

**Table 3.552.** "p q r" Parameters

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"w x ( w x d)" (Outport)

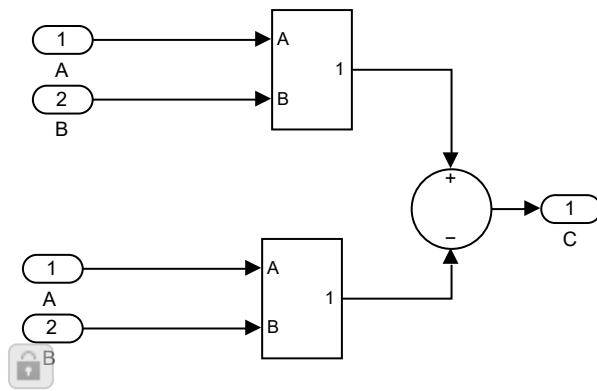
**Table 3.553.** "w x ( w x d)" Parameters

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## w x (w x d)

**Figure 3.68. asbQuadcopter/Sensors/Sensors (Dynamics)/Sensor System/IMU\_Pressure/Three-axis Inertial Measurement Unit/Three-axis Accelerometer/w x (w x d)/w x (w x d)**



## Blocks

## Parameters

### "A" (Import)

**Table 3.554. "A" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "A" (ImportShadow)

**Table 3.555. "A" Parameters**

Parameter	Value
Port number	1
Port name	A
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "B" (Import)

**Table 3.556. "B" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "B" (ImportShadow)

**Table 3.557. "B" Parameters**

Parameter	Value
Port number	2
Port name	B
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "C" (Outport)

**Table 3.558. "C" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Sum" (Sum)

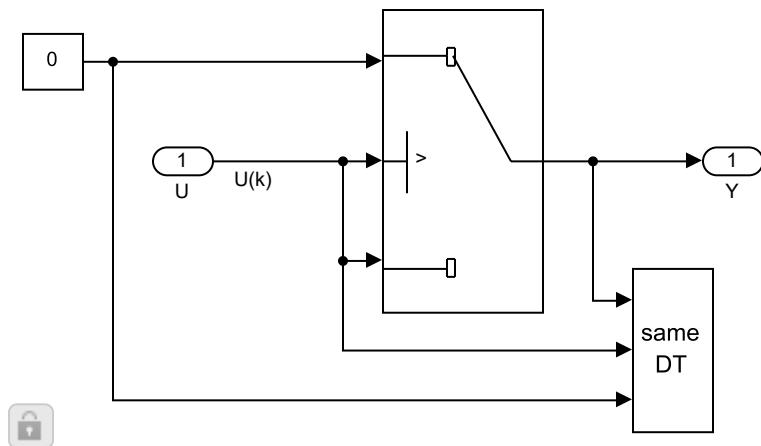
**Table 3.559. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+   -
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Accumulator data type	Inherit: Inherit via internal rule

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

## Wrap To Zero

Figure 3.69. asbQuadcopter/Command/Signal Editor/Live Time Ticks/Wrap To Zero



## Blocks

### Parameters

#### "Constant" (Constant)

Table 3.560. "Constant" Parameters

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "FixPt Data Type Duplicate1" (DataTypeDuplicate)

**Table 3.561. "FixPt Data Type Duplicate1" Parameters**

Parameter	Value
Number of input ports	3

### "FixPt Switch" (Switch)

**Table 3.562. "FixPt Switch" Parameters**

Parameter	Value
Criteria for passing first input	$u2 > \text{Threshold}$
Threshold	Threshold
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	off
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

**"U" (Import)**
**Table 3.563. "U" Parameters**

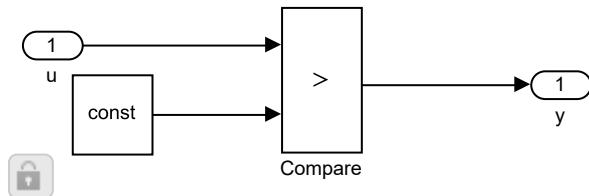
Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Y" (Outport)**
**Table 3.564. "Y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	0
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## Compare To Constant

## Figure 3.70. flightControlSystem/Flight Control System/Crash Predictor Flags/Compare To Constant



## Blocks

## Parameters

## "Compare" (RelationalOperator)

**Table 3.565. "Compare" Parameters**

Parameter	Value
Relational operator	>
Require all inputs to have the same data type	on
Output data type	boolean
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Nearest

## "Constant" (Constant)

**Table 3.566. "Constant" Parameters**

Parameter	Value
Constant value	const
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

### "u" (Inport)

**Table 3.567. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y" (Outport)

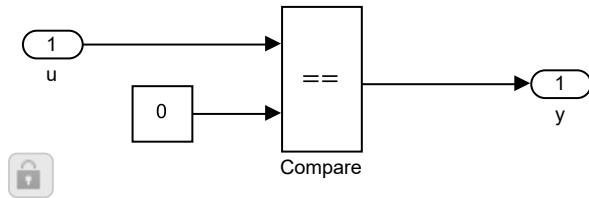
**Table 3.568. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## Compare To Zero

**Figure 3.71. flightControlSystem/Flight Control System/landing logic/ Compare To Zero**



## Blocks

### Parameters

"Compare" (RelationalOperator)

**Table 3.569. "Compare" Parameters**

Parameter	Value
Relational operator	$==$
Require all inputs to have the same data type	on
Output data type	boolean
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Nearest

### "Constant" (Constant)

**Table 3.570. "Constant" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "u" (Inport)

**Table 3.571. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y" (Outport)

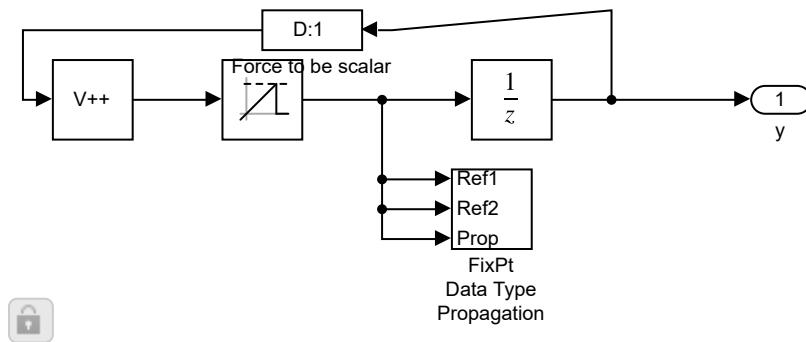
**Table 3.572. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## Counter Free-Running

**Figure 3.72. flightControlSystem/Flight Control System/landing logic/Counter Free-Running**



## Blocks

## Parameters

### "FixPt Data Type Propagation" (S-Function)

**Table 3.573. "FixPt Data Type Propagation" Parameters**

Parameter	Value
Simulinkmasksx1PropagatedDataType_MP	Specify via dialog
Simulinkmasksx11PropagatedDataTypeegFixdt116Fixdtsingle_MP	uint(NumBits)
Simulinkmasksx2PropagatedScaling_MP	Specify via dialog
Simulinkmasksx21PropagatedScalingSlopeEg29OrSlopeBiasEg1253_MP	1

### "Force to be scalar" (SignalSpecification)

**Table 3.574. "Force to be scalar" Parameters**

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Require nonvirtual bus	off
Unit (e.g., m, m/s^2, N*m)	inherit
Dimensions (-1 for inherited)	1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

### "Output" (UnitDelay)

**Table 3.575. "Output" Parameters**

Parameter	Value
Initial condition	0.0
Input processing	Elements as channels (sample based)
Sample time (-1 for inherited)	tsamp
State name must resolve to Simulink signal object	off

### "Wrap To Zero" (SubSystem)

**Table 3.576. "Wrap To Zero" Parameters**

Parameter	Value
SimulinkmasksThreshold_MP	(2^(NumBits))-1

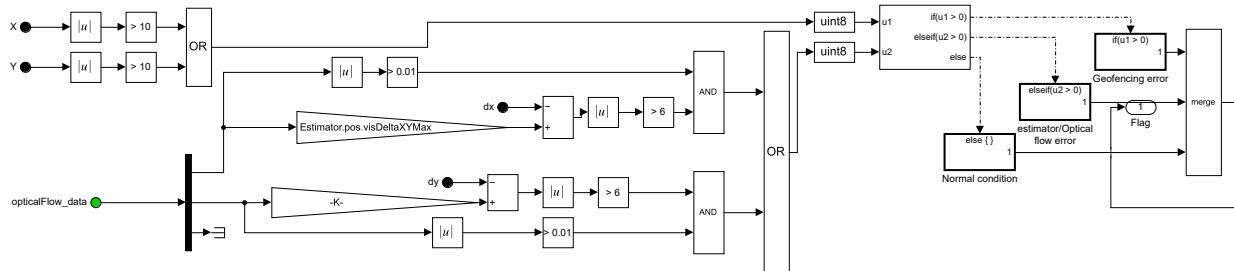
### "y" (Outport)

**Table 3.577. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

# Crash Predictor Flags

**Figure 3.73. flightControlSystem/Flight Control System/Crash Predictor Flags**



## Blocks

### Parameters

#### "Abs" (Abs)

**Table 3.578. "Abs" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

#### "Abs1" (Abs)

**Table 3.579. "Abs1" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs2" (Abs)

**Table 3.580. "Abs2" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs3" (Abs)

**Table 3.581. "Abs3" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs4" (Abs)

**Table 3.582. "Abs4" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs5" (Abs)

**Table 3.583. "Abs5" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Bus Element In" (Inport)

**Table 3.584. "Bus Element In" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In1" (Import)****Table 3.585. "Bus Element In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In2" (Import)****Table 3.586. "Bus Element In2" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In3" (Import)****Table 3.587. "Bus Element In3" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In4" (Import)

**Table 3.588. "Bus Element In4" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Compare To Constant" (SubSystem)

**Table 3.589. "Compare To Constant" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	10.0
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Constant1" (SubSystem)

**Table 3.590. "Compare To Constant1" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	10.0
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Constant2" (SubSystem)

**Table 3.591. "Compare To Constant2" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	6.0

Parameter	Value
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Constant3" (SubSystem)

**Table 3.592. "Compare To Constant3" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	6.0
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Constant4" (SubSystem)

**Table 3.593. "Compare To Constant4" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	0.01
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Constant5" (SubSystem)

**Table 3.594. "Compare To Constant5" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	0.01
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Data Type Conversion" (DataTypeConversion)

**Table 3.595. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Nearest
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion1" (DataTypeConversion)

**Table 3.596. "Data Type Conversion1" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Nearest
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Demux" (Demux)

**Table 3.597. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Flag" (Outport)

**Table 3.598. "Flag" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Gain" (Gain)

**Table 3.599. "Gain" Parameters**

Parameter	Value
Gain	Estimator.pos.visDeltaXYMax
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain1" (Gain)

**Table 3.600. "Gain1" Parameters**

Parameter	Value
Gain	Estimator.pos.visDeltaXYMax
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "If" (If)

**Table 3.601. "If" Parameters**

Parameter	Value
Number of inputs	2
If expression (e.g. u1 ~= 0)	u1 > 0
Elseif expressions (comma-separated list, e.g. u2 ~= 0, u3(2) < u2)	u2 > 0
Show else condition	on
Enable zero-crossing detection	on

Parameter	Value
Sample time (-1 for inherited)	-1

### "Logical Operator" (Logic)

**Table 3.602. "Logical Operator" Parameters**

Parameter	Value
Operator	OR
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	Inherit: Logical (see Configuration Parameters: Optimization)
Sample time (-1 for inherited)	-1

### "Logical Operator1" (Logic)

**Table 3.603. "Logical Operator1" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Logical Operator2" (Logic)

**Table 3.604. "Logical Operator2" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Logical Operator3" (Logic)

**Table 3.605. "Logical Operator3" Parameters**

Parameter	Value
Operator	OR
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	Inherit: Logical (see Configuration Parameters: Optimization)
Sample time (-1 for inherited)	-1

### "Merge" (Merge)

**Table 3.606. "Merge" Parameters**

Parameter	Value
Number of inputs	3
Initial output	0
Allow unequal port widths	off
Input port offsets	[]

### "Subtract" (Sum)

**Table 3.607. "Subtract" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Subtract1" (Sum)

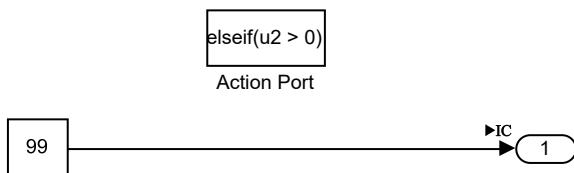
**Table 3.608. "Subtract1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

## estimator/Optical flow error

Checksum: 1189581423 2077896839 1796701699 1437658620

**Figure 3.74. flightControlSystem/Flight Control System/Crash Predictor Flags/estimator//Optical flow error**



## Interface

### Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.609.**

Description:

Data Type: uint8

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Blocks

### Parameters

#### "Action Port" (ActionPort)

**Table 3.610. "Action Port" Parameters**

Parameter	Value
States when execution is resumed	held
Propagate sizes of variable-size signals	Only when execution is resumed

#### "Constant" (Constant)

**Table 3.611. "Constant" Parameters**

Parameter	Value
Constant value	99
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf

Parameter	Value
Frame period	inf

### "Out1" (Outport)

**Table 3.612. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

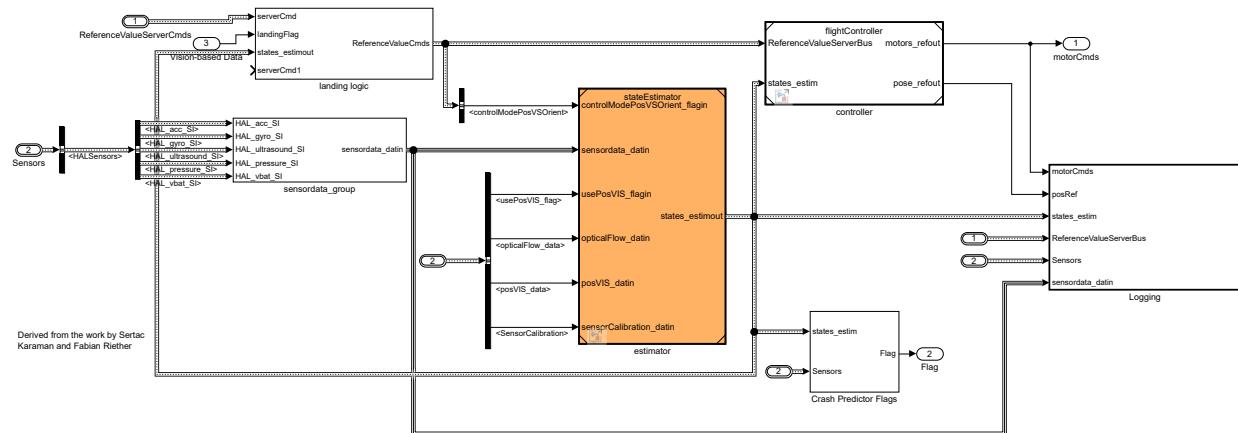
## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## Flight Control System

**Checksum:** 2661642920 473385755 2758537112 3990655483

**Figure 3.75. flightControlSystem/Flight Control System**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.613.**

Description:

Data Type: CommandBus

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.614.**

Description:

Data Type: SensorsBus

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.615.**

Description:

Data Type: double

Signal Type: real

Width: 1

Dimensions: [2 1 1 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.616.**

Description:

Data Type: uint8

Signal Type: real

Width: 1

Dimensions: [1 1 ]

**Table 3.617.**

Description:

Data Type: single

Signal Type: real

Width: 4

Dimensions: [1 4 ]

## Blocks

### Parameters

#### "Bus Selector" (BusSelector)

**Table 3.618. "Bus Selector" Parameters**

Parameter	Value
Output signals	VisionSensors.usePosVIS_flag,VisionSensors.opticalFlow_data,VisionSensors.posVIS_data,SensorCalibration
Output as virtual bus	off

Parameter	Value
Input Signals	{ VisionSensors , opticalFlow_data posVIS_data usePosVIS_flag } { HALSensors , { number_HAL_read_call ; timestamp ; status ; used ; count_user ; { HAL_acc_SI , x y z temperature } ; { HAL_gyro_SI , x y z temperature temperature_lsb } ; HAL_fifo_count ; fifo_timestamp ; { HAL_fifo_gyro_SI_TempCorr , x y z } ; { HAL_fifo_acce_SI_TempCorr , x y z } ; { HAL_fifo_gyro_SI , x y z } ; { HAL_fifo_acce_SI , x y z } ; HAL_ref_IMU_temp ; HAL_fifo_fsync ; HAL_fifo_size ; { HAL_magn_mG , x y z } ; { HAL_pressure_SI , temperature pressure } ; { HAL_ultrasound_SI , { altitude ; raw_altitude ; nb_echo ; measure_ref ; measure_status ; new_data ; { HAL_list_echo , { { tab_echo , begin_echo_index end_echo_index max_value_index max_value precedent_d_echo pre_max_index } ; number_of_echoes } } ; { HAL_list_echo_p , { { tab_echo , begin_echo_index end_echo_index max_value_index max_value precedent_d_echo pre_max_index } ; number_of_echoes } } } } ; padding ; { HAL_vbat_SI , vbat_V vbat_percentage } } } SensorCalibration

**Output Hierarchy:**

1. *Bus Selector*
  1. <usePosVIS\_flag>
  2. <opticalFlow\_data>
  3. <posVIS\_data>
  4. <SensorCalibration>

**"Bus Selector1" (BusSelector)**

**Table 3.619. "Bus Selector1" Parameters**

Parameter	Value
Output signals	controlModePosVSOrrient
Output as virtual bus	off
InputSignals	controlModePosVSOrrient pos_ref takeoff_flag orient_ref live_time_ticks

**Output Hierarchy:**

1. *Bus Selector1*
  1. <controlModePosVSOrrient>

**"Bus Selector2" (BusSelector)**

**Table 3.620. "Bus Selector2" Parameters**

Parameter	Value
Output signals	HAL_acc_SI,HAL_gyro_SI,HAL_ultrasound_SI,HAL_pressure_SI,HAL_vbat_SI

Parameter	Value
Output as virtual bus	off
InputSignals	<pre> number_HAL_read_call timestamp status used count_user { HAL_acc_SI , x y z temperature } { HAL_gyro_SI , x y z temperature temperature_lsb } HAL_fifo_count fifo_timestamp { HAL_fifo_gyro_SI_TempCorr , x y z } { HAL_fifo_acce_SI_TempCorr , x y z } { HAL_fifo_gyro_SI , x y z } { HAL_fifo_acce_SI , x y z } HAL_ref_IMU_temp HAL_fifo_fsync HAL_fifo_size { HAL_magn_mG , x y z } { HAL_pressure_SI , temperature pressure } { HAL_ultrasound_SI , { altitude ; raw_altitude ; nb_echo ; measure_ref ; measure_status ; new_data ; { HAL_list_echo , { { tab_echo , begin_echo_index end_echo_index max_value_index max_value precedent d_echo pre_max_index } ; number_of_echoes } } ; { HAL_list_echo_p , { { tab_echo , begin_echo_index end_echo_index max_value_index max_value precedent d_echo pre_max_index } ; number_of_echoes } } } } padding { HAL_vbat_SI , vbat_V vbat_percentage }</pre>

**Output Hierarchy:**

1. *Bus Selector2*
  1. <HAL\_acc\_SI>
  2. <HAL\_gyro\_SI>
  3. <HAL\_ultrasound\_SI>
  4. <HAL\_pressure\_SI>
  5. <HAL\_vbat\_SI>

**"Bus Selector3" (BusSelector)**

**Table 3.621. "Bus Selector3" Parameters**

Parameter	Value
Output signals	HALSensors
Output as vi	off

Parameter	Value
rtual bus	
Input Signals	{ VisionSensors , opticalFlow_data posVIS_data usePosVIS_flag } { HALSensors , { number_HAL_read_call ; timestamp ; status ; used ; count_user ; { HAL_acc_SI , x y z temperature } ; { HAL_gyro_SI , x y z temperature temperature_lsb } ; HAL_fifo_count ; fifo_timestamp ; { HAL_fifo_gyro_SI_TempCorr , x y z } ; { HAL_fifo_acce_SI_TempCorr , x y z } ; { HAL_fifo_gyro_SI , x y z } ; { HAL_fifo_acce_SI , x y z } ; HAL_ref_IM_U_temp ; HAL_fifo_fsync ; HAL_fifo_size ; { HAL_magn_mG , x y z } ; { HAL_pressure_SI , temperature pressure } ; { HAL_ultrasound_SI , { altitude ; raw_altitude ; nb_echo ; measure_ref ; measure_status ; new_data ; { HAL_list_echo , { { tab_echo , begin_echo_index end_echo_index max_value_index max_value precedent_d_echo pre_max_index } ; number_of_echoes } } ; { HAL_list_echo_p , { { tab_echo , begin_echo_index end_echo_index max_value_index max_value precedent_d_echo pre_max_index } ; number_of_echoes } } } ; padding ; { HAL_vbat_SI , vbat_V vbat_percentage } } } SensorCalibration

**Output Hierarchy:**

1. *Bus Selector3*
  1. <HALSensors>
    1. *Bus Selector2*
      1. <HAL\_acc\_SI>
      2. <HAL\_gyro\_SI>
      3. <HAL\_ultrasound\_SI>
      4. <HAL\_pressure\_SI>
      5. <HAL\_vbat\_SI>

**"controller" (ModelReference)**
**Table 3.622. "controller" Parameters**

Parameter	Value
Model name	flightController.slx
ModelFile	flightController.slx
modelName	flightController
Simulation mode	Normal
Show model initialize port	off
Show model reset ports	off
Show model terminate port	off
Schedule rates	off
Schedule rates with	Ports
AutoFillPortDiscreteRates	on
Code interface	Model reference
Variant	off

### "estimator" (ModelReference)

**Table 3.623. "estimator" Parameters**

Parameter	Value
Model name	stateEstimator.slx
ModelFile	stateEstimator.slx
modelName	stateEstimator
Simulation mode	Normal
Show model initialize port	off
Show model reset ports	off
Show model terminate port	off
Schedule rates	off
Schedule rates with	Ports
AutoFillPortDiscreteRates	on
Code interface	Model reference
Variant	off

### "Flag" (Outport)

**Table 3.624. "Flag" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog

<b>Parameter</b>	<b>Value</b>
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "motorCmds" (Outport)

**Table 3.625. "motorCmds" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "ReferenceValueServerCmds" (Inport)

**Table 3.626. "ReferenceValueServerCmds" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: CommandBus

### "ReferenceValueServerCmds1" (InportShadow)

**Table 3.627. "ReferenceValueServerCmds1" Parameters**

Parameter	Value
Port number	1
Port name	ReferenceValueServerCmds
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: CommandBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Sensors" (Import)

**Table 3.628. "Sensors" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: SensorsBus

### "Sensors1" (ImportShadow)

**Table 3.629. "Sensors1" Parameters**

Parameter	Value
Port number	2
Port name	Sensors
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: SensorsBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	on
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Sensors2" (ImportShadow)

**Table 3.630. "Sensors2" Parameters**

Parameter	Value
Port number	2
Port name	Sensors
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: SensorsBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	on
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Sensors3" (ImportShadow)

**Table 3.631. "Sensors3" Parameters**

Parameter	Value
Port number	2
Port name	Sensors
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: SensorsBus
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Output as nonvirtual bus	on
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Vision-based Data" (Import)

**Table 3.632. "Vision-based Data" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

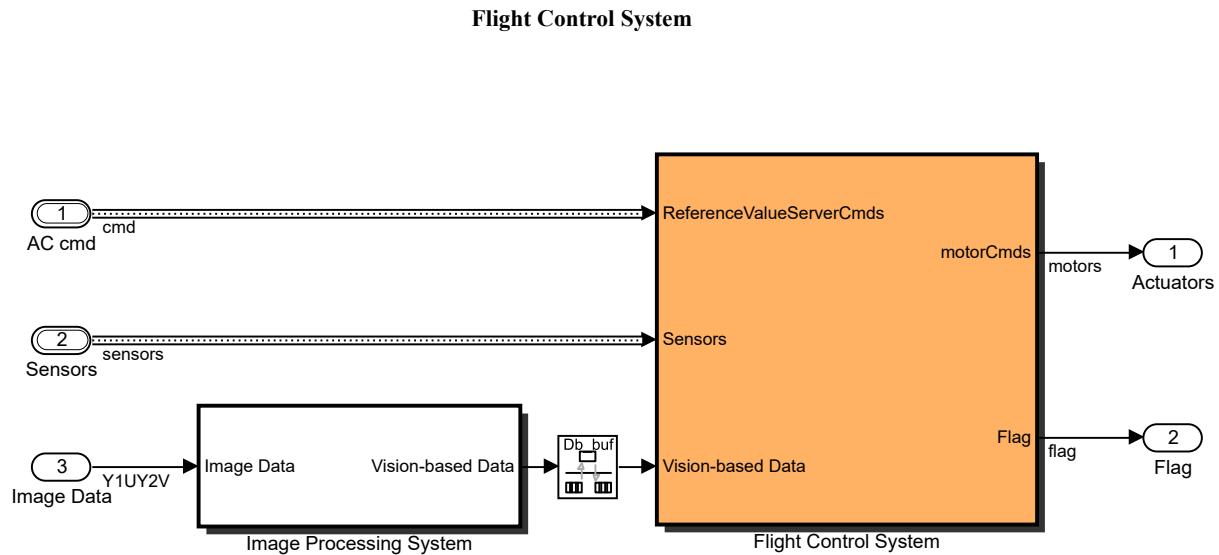
## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## flightControlSystem

Checksum: 2728336813 954154440 3924427001 2730387811

**Figure 3.76. flightControlSystem**



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## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.633. cmd**

Description:

Data Type: CommandBus

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.634. sensors**

Description:

Data Type: SensorsBus  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.635. Y1UY2V**

Description:  
Data Type: uint8  
Signal Type: real  
Width: 38400  
Dimensions: [2 4 9600 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.636. flag**

Description:  
Data Type: uint8  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.637. motors**

Description:  
Data Type: single  
Signal Type: real  
Width: 4  
Dimensions: [1 4 ]

## Blocks

## Parameters

**"AC cmd" (Inport)**
**Table 3.638. "AC cmd" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: CommandBus

**"Actuators" (Outport)**
**Table 3.639. "Actuators" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	single
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	4
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Flag" (Outport)

**Table 3.640. "Flag" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Image Data" (Inport)

**Table 3.641. "Image Data" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	[4 9600]
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	uint8

### "Rate Transition" (RateTransition)

**Table 3.642. "Rate Transition" Parameters**

Parameter	Value
Ensure data integrity during data transfer	on
Ensure deterministic data transfer (maximum delay)	off
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	-1

### "Sensors" (Inport)

**Table 3.643. "Sensors" Parameters**

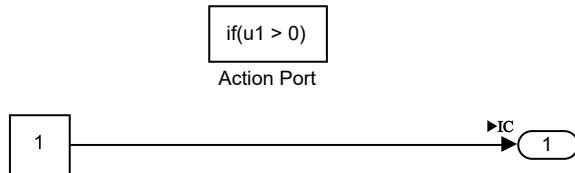
Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: SensorsBus

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## Geofencing error

**Checksum:** 1189581423 2077896839 1796701699 1437658620

**Figure 3.77. flightControlSystem/Flight Control System/Crash Predictor Flags/Geofencing error**

## Interface

### Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.644.**

Description:

Data Type: uint8

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Blocks

### Parameters

"Action Port" (ActionPort)

**Table 3.645. "Action Port" Parameters**

Parameter	Value
States when execution is resumed	held
Propagate sizes of variable-size signals	Only when execution is resumed

### "Constant" (Constant)

**Table 3.646. "Constant" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Out1" (Outport)

**Table 3.647. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	off

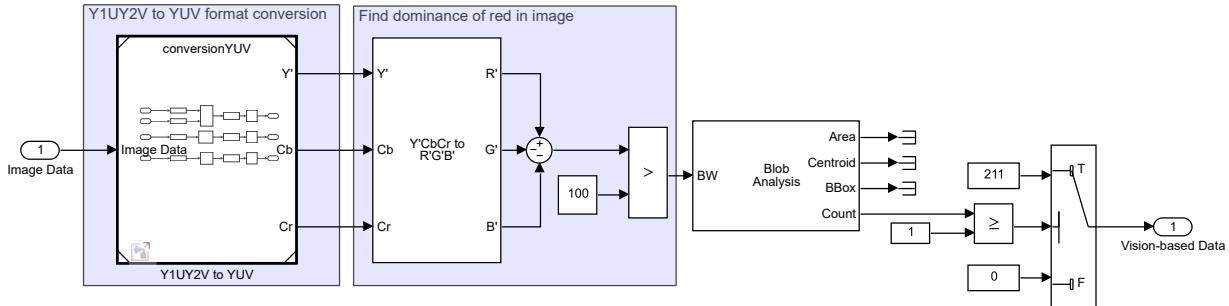
## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# Image Processing System

Checksum: 1949950957 1048030153 3595038198 4105119106

**Figure 3.78. flightControlSystem/Image Processing System**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.648.**

Description:

Data Type: uint8

Signal Type: real

Width: 38400

Dimensions: [2 4 9600 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.649.**

Description:

Data Type: double

Signal Type: real

Width: 1

Dimensions: [2 1 1 ]

## Blocks

### Parameters

#### "Blob Analysis" (S-Function)

**Table 3.650. "Blob Analysis" Parameters**

Parameter	Value
visionmasksArea	on
visionmasksCentroid	on
visionmasksBoundingBox	on
visionmasksMajorAxisLength	off
visionmasksMinorAxisLength	off
visionmasksOrientation	off
visionmasksEccentricity	off
visionmasksEquivalentDiameterSquared	off
visionmasksExtent	off
visionmasksPerimeter	off
visionmasksStatisticsOutputDataType	single
visionmasksConnectivity	8
visionmasksOutputLabelMatrix	off
visionmasksMaximumNumberOfBlobs	50
visionmasksWarnIfMaximumNumberOfBlobs	on
visionmasksOutputActualNumberOfBlobs	on
visionmasksSpecifyMinimumBlobAreaInPixels1	off

Parameter	Value
visionmasksSpecifyMaximumBlobAreaInPixels1	off
visionmasksExcludeBlobsTouchingImageBorder	off
visionmasksOutputBlobStatisticsAsAVariable	off
visionmasksFillEmptySpacesInOutput	on
visionmasksFillValues	-1
visionmasksRoundIntegerCalculationsTowards	Floor
visionmasksSaturateOnIntegerOverflow	off
accumMode	Binary point scaling
accumWordLength	32
accumFracLength	0
outputMode	Binary point scaling
outputWordLength	32
outputFracLength	16
SimulinkmasksLockDataTypeAgainstFxpTools_MP	off

### "Color Space Conversion" (S-Function)

**Table 3.651. "Color Space Conversion" Parameters**

Parameter	Value
visionmasksConversion	Y'CbCr to R'G'B'
visionmasksUseConversionSpecifiedBy	Rec. 601 (SDTV)
visionmasksImageSignal	Separate color signals

### "Constant" (Constant)

**Table 3.652. "Constant" Parameters**

Parameter	Value
Constant value	100
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Image Data" (Import)

**Table 3.653. "Image Data" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "One" (Constant)

**Table 3.654. "One" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "One1" (Constant)

**Table 3.655. "One1" Parameters**

Parameter	Value
Constant value	211
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

### "One2" (Constant)

**Table 3.656. "One2" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Relational Operator" (RelationalOperator)

**Table 3.657. "Relational Operator" Parameters**

Parameter	Value
Relational operator	>=
Require all inputs to have the same data type	off
Output data type	boolean
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Simplest

### "Relational Operator1" (RelationalOperator)

**Table 3.658. "Relational Operator1" Parameters**

Parameter	Value
Relational operator	>
Require all inputs to have the same data type	off
Output data type	boolean

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Simplest

### "Sum" (Sum)

**Table 3.659. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+--
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Switch" (Switch)

**Table 3.660. "Switch" Parameters**

Parameter	Value
Criteria for passing first input	$u2 > \text{Threshold}$
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

### "Vision-based Data" (Outport)

**Table 3.661. "Vision-based Data" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Y1UY2V to YUV" (ModelReference)

**Table 3.662. "Y1UY2V to YUV" Parameters**

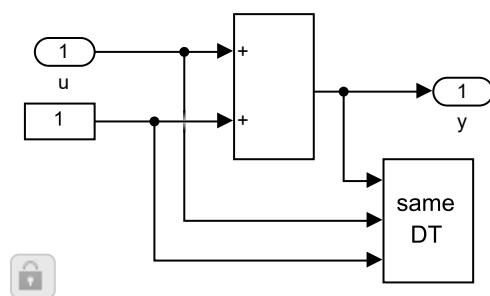
Parameter	Value
Model name	conversionYUV.slx
ModelFile	conversionYUV.slx
modelName	conversionYUV
Simulation mode	Normal
Show model initialize port	off
Show model reset ports	off
Show model terminate port	off
Schedule rates	off
Schedule rates with	Ports
AutoFillPortDiscreteRates	on
Code interface	Model reference
Variant	off

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## Increment Real World

**Figure 3.79. flightControlSystem/Flight Control System/landing logic/Counter Free-Running/Increment Real World**



## Blocks

## Parameters

### "FixPt Constant" (Constant)

**Table 3.663. "FixPt Constant" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "FixPt Data Type Duplicate" (DataTypeDuplicate)

**Table 3.664. "FixPt Data Type Duplicate" Parameters**

Parameter	Value
Number of input ports	3

### "FixPt Sum1" (Sum)

**Table 3.665. "FixPt Sum1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock data type settings against changes by the fixed-point tools	on
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "u" (Import)

**Table 3.666. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y" (Outport)

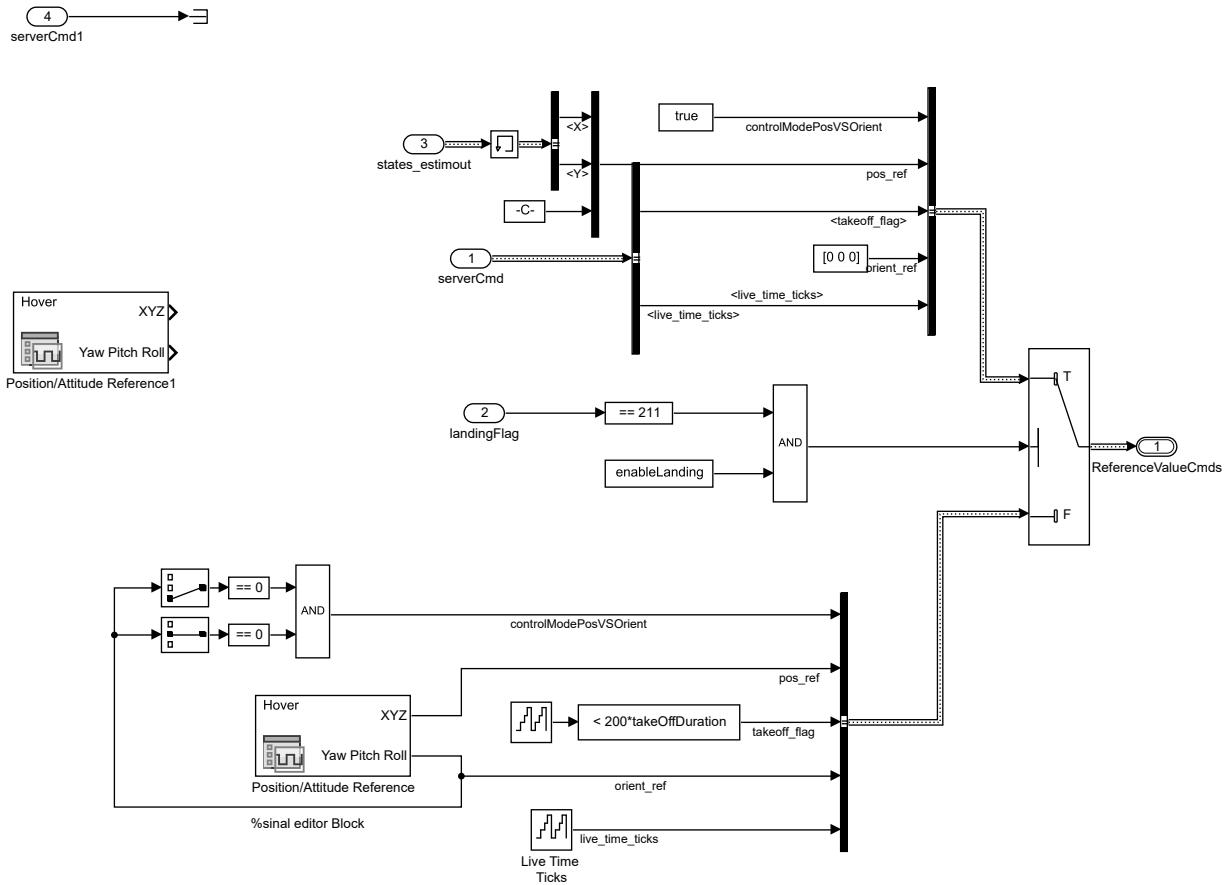
**Table 3.667. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## landing logic

Figure 3.80. flightControlSystem/Flight Control System/landing logic



## Blocks

## Parameters

### "Bus Creator" (BusCreator)

**Table 3.668. "Bus Creator" Parameters**

Parameter	Value
Number of inputs	5
Display option	bar
Data type	Bus: CommandBus
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "Bus Creator1" (BusCreator)

**Table 3.669. "Bus Creator1" Parameters**

Parameter	Value
Number of inputs	5
Display option	bar
Data type	Bus: CommandBus
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "Bus Selector" (BusSelector)

**Table 3.670. "Bus Selector" Parameters**

Parameter	Value
Output signals	X,Y
Output as virtual bus	off
InputSignals	X Y Z yaw pitch roll dx dy dz p q r

#### Output Hierarchy:

1. Bus Selector

1. <X>
2. <Y>

### "Bus Selector1" (BusSelector)

**Table 3.671. "Bus Selector1" Parameters**

Parameter	Value
Output signals	takeoff_flag, live_time_ticks
Output as virtual bus	off
Input Signals	controlModePosVSOrt pos_ref takeoff_flag orient_ref live_time_ticks

#### Output Hierarchy:

1. *Bus Selector1*
  1. <takeoff\_flag>
  2. <live\_time\_ticks>

### "Compare To Constant" (SubSystem)

**Table 3.672. "Compare To Constant" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	==
SimulinkmasksConstantValue_MP	211
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Constant1" (SubSystem)

**Table 3.673. "Compare To Constant1" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<
SimulinkmasksConstantValue_MP	200*takeOffDuration
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Zero" (SubSystem)

**Table 3.674. "Compare To Zero" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	==
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Zero1" (SubSystem)

**Table 3.675. "Compare To Zero1" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	==
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Constant" (Constant)

**Table 3.676. "Constant" Parameters**

Parameter	Value
Constant value	enableLanding
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant1" (Constant)

**Table 3.677. "Constant1" Parameters**

Parameter	Value
Constant value	true
Interpret vector parameters as 1-D	on

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant2" (Constant)

**Table 3.678. "Constant2" Parameters**

Parameter	Value
Constant value	landingAltitude
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant3" (Constant)

**Table 3.679. "Constant3" Parameters**

Parameter	Value
Constant value	[0 0 0]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Counter Free-Running" (SubSystem)

**Table 3.680. "Counter Free-Running" Parameters**

Parameter	Value
SimulinkmasksNumberOfBits_MP	32
SimulinkmasksSampleTime_MP	-1

### "landingFlag" (Inport)

**Table 3.681. "landingFlag" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Live Time Ticks" (SubSystem)

**Table 3.682. "Live Time Ticks" Parameters**

Parameter	Value
SimulinkmasksNumberOfBits_MP	32
SimulinkmasksSampleTime_MP	Ts

### "Logical Operator" (Logic)

**Table 3.683. "Logical Operator" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Logical Operator1" (Logic)

**Table 3.684. "Logical Operator1" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Memory" (Memory)

**Table 3.685. "Memory" Parameters**

Parameter	Value
Initial condition	0
Inherit sample time	on
Direct feedthrough of input during linearization	off
Treat as a unit delay when linearizing with discrete sample time	off
State name must resolve to Simulink signal object	off

### "Mux" (Mux)

**Table 3.686. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "Position/Attitude Reference" (SubSystem)

**Table 3.687. "Position/Attitude Reference" Parameters**

Parameter	Value
FileName	positionAttitudeRef.mat
Active Scenario	Hover
Signal	Yaw Pitch Roll

Parameter	Value
Out a bus	off
Select bus object	Bus: BusObject
Sample Time	Ts
Interpolate data	off
Enable zero-crossing detection	off
Form output after final data value by	Setting to zero
Unit	inherit

### "Position/Attitude Reference1" (SubSystem)

**Table 3.688. "Position/Attitude Reference1" Parameters**

Parameter	Value
FileName	positionAttitudeRef.mat
Active Scenario	Hover
Signal	Yaw Pitch Roll
Out a bus	off
Select bus object	Bus: BusObject
Sample Time	Ts
Interpolate data	off
Enable zero-crossing detection	off
Form output after final data value by	Setting to zero
Unit	inherit

### "ReferenceValueCmds" (Outport)

**Table 3.689. "ReferenceValueCmds" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: CommandBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

<b>Parameter</b>	<b>Value</b>
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Selector" (Selector)

**Table 3.690. "Selector" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	2
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	2
Output Size	1

### "Selector1" (Selector)

**Table 3.691. "Selector1" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based

Parameter	Value
Index Option	Index vector (dialog)
Index	3
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	3
Output Size	1

### "serverCmd" (Import)

**Table 3.692. "serverCmd" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "serverCmd1" (Import)

**Table 3.693. "serverCmd1" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "states\_estimout" (Import)

**Table 3.694. "states\_estimout" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Switch" (Switch)

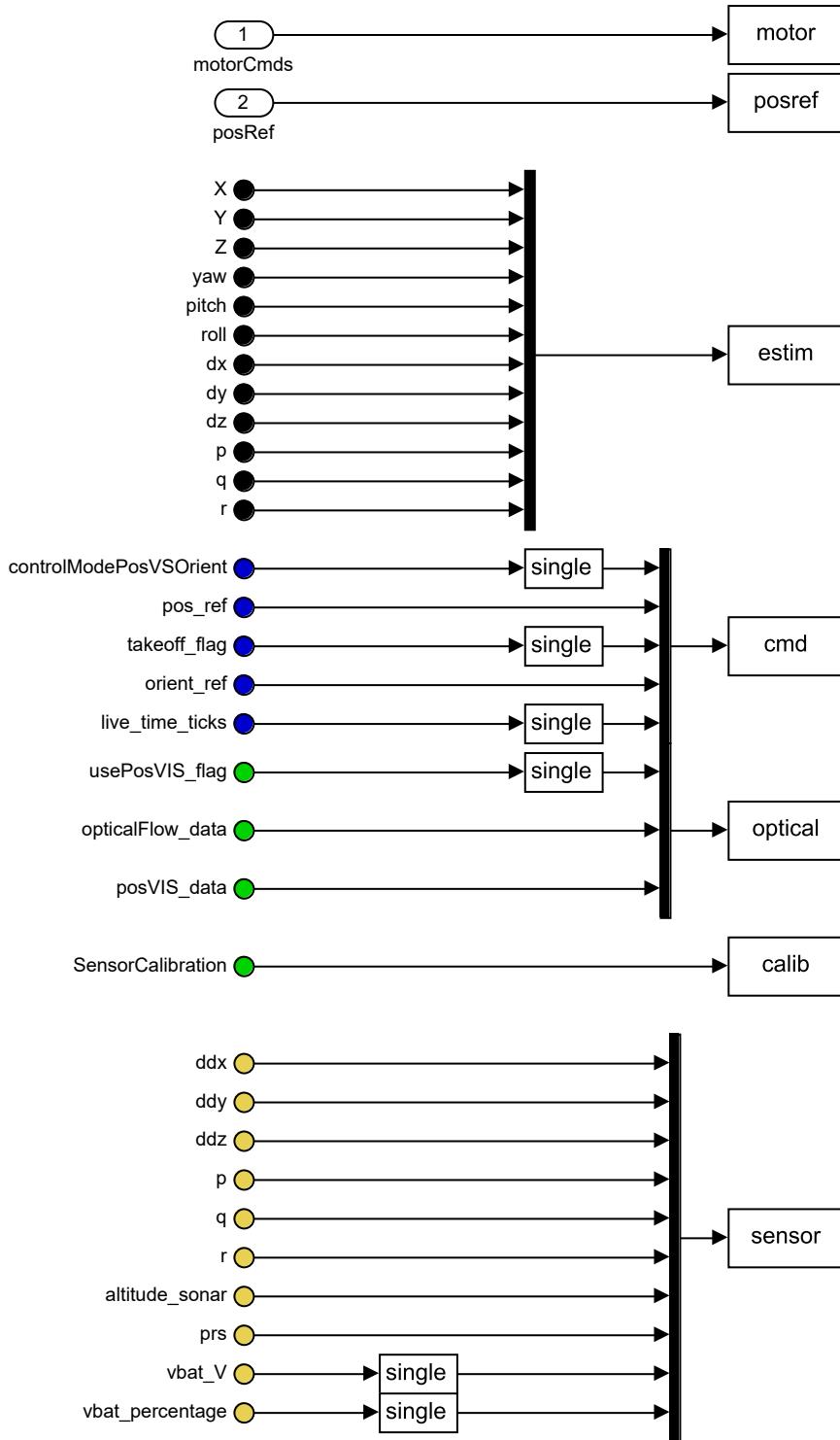
**Table 3.695. "Switch" Parameters**

Parameter	Value
Criteria for passing first input	u2 > Threshold
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

## Logging

Checksum: 3544776220 1226151248 240846544 2769640776

**Figure 3.81. flightControlSystem/Flight Control System/Logging**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.696.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1]

**Table 3.697.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1]

**Table 3.698.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1]

**Table 3.699.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1]

**Table 3.700.**

Description:

Data Type: boolean

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.701.**

Description:

Data Type: single

Signal Type: real

Width: 3

Dimensions: [1 3 ]

### **Table 3.702.**

Description:

Data Type: boolean

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.703.**

Description:

Data Type: single

Signal Type: real

Width: 3

Dimensions: [1 3 ]

### **Table 3.704.**

Description:

Data Type: uint32

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.705.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.706.**

Description:

Data Type: single

Signal Type: real

Width: 3

Dimensions: [1 3]

**Table 3.707.**

Description:

Data Type: single

Signal Type: real

Width: 4

Dimensions: [1 4]

**Table 3.708.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.709.**

Description:

Data Type: single

Signal Type: real

Width: 8

Dimensions: [1 8]

**Table 3.710.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.711.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.712.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.713.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.714.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.715.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.716.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.717.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.718.**

Description:

Data Type: uint32

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.719.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.720.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.721.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.722.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.723.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.724.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.725.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.726.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1]

**Table 3.727.**

Description:  
Data Type: single  
Signal Type: real  
Width: 4  
Dimensions: [1 4 ]

**Table 3.728.**

Description:  
Data Type: single  
Signal Type: real  
Width: 8  
Dimensions: [1 8 ]

## Blocks

### Parameters

#### "Bus Element In" (Inport)

**Table 3.729. "Bus Element In" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "Bus Element In1" (Inport)

**Table 3.730. "Bus Element In1" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In10" (Import)

**Table 3.731. "Bus Element In10" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In11" (Import)

**Table 3.732. "Bus Element In11" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In12" (Import)

**Table 3.733. "Bus Element In12" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

### "Bus Element In13" (Import)

**Table 3.734. "Bus Element In13" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In14" (Import)

**Table 3.735. "Bus Element In14" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In15" (Import)

**Table 3.736. "Bus Element In15" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In16" (Import)****Table 3.737. "Bus Element In16" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In17" (Import)****Table 3.738. "Bus Element In17" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In18" (Import)****Table 3.739. "Bus Element In18" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In19" (Import)****Table 3.740. "Bus Element In19" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In2" (Import)****Table 3.741. "Bus Element In2" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In20" (Import)****Table 3.742. "Bus Element In20" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In21" (Import)

**Table 3.743. "Bus Element In21" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In22" (Import)

**Table 3.744. "Bus Element In22" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In23" (Import)

**Table 3.745. "Bus Element In23" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In24" (Import)

**Table 3.746. "Bus Element In24" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In25" (Import)

**Table 3.747. "Bus Element In25" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In26" (Import)

**Table 3.748. "Bus Element In26" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In27" (Import)****Table 3.749. "Bus Element In27" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In28" (Import)****Table 3.750. "Bus Element In28" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In29" (Import)****Table 3.751. "Bus Element In29" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In3" (Import)****Table 3.752. "Bus Element In3" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In30" (Import)****Table 3.753. "Bus Element In30" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In4" (Import)****Table 3.754. "Bus Element In4" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In5" (Import)

**Table 3.755. "Bus Element In5" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In6" (Import)

**Table 3.756. "Bus Element In6" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Element In7" (Import)

**Table 3.757. "Bus Element In7" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In8" (Import)****Table 3.758. "Bus Element In8" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Bus Element In9" (Import)****Table 3.759. "Bus Element In9" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Data Type Conversion1" (DataTypeConversion)****Table 3.760. "Data Type Conversion1" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion11" (DataTypeConversion)

**Table 3.761. "Data Type Conversion11" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion2" (DataTypeConversion)

**Table 3.762. "Data Type Conversion2" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion3" (DataTypeConversion)

**Table 3.763. "Data Type Conversion3" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion7" (DataTypeConversion)

**Table 3.764. "Data Type Conversion7" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion9" (DataTypeConversion)

**Table 3.765. "Data Type Conversion9" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "motorCmds" (Inport)

**Table 3.766. "motorCmds" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Mux" (Mux)

**Table 3.767. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "Mux1" (Mux)

**Table 3.768. "Mux1" Parameters**

Parameter	Value
Number of inputs	5
Display option	bar

### "Mux2" (Mux)

**Table 3.769. "Mux2" Parameters**

Parameter	Value
Number of inputs	12
Display option	bar

### "Mux3" (Mux)

**Table 3.770. "Mux3" Parameters**

Parameter	Value
Number of inputs	10
Display option	bar

### "posRef" (Import)

**Table 3.771. "posRef" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "To Workspace" (ToWorkspace)

**Table 3.772. "To Workspace" Parameters**

Parameter	Value
Variable name	motor
Limit data points to last	inf
Decimation	1
Save format	Structure With Time
Save 2-D signals as	3-D array (concatenate along third dimension)
Log fixed-point data as a fi object	on
Sample time (-1 for inherited)	-1

### "To Workspace1" (ToWorkspace)

**Table 3.773. "To Workspace1" Parameters**

Parameter	Value
Variable name	posref
Limit data points to last	inf
Decimation	1
Save format	Structure With Time
Save 2-D signals as	3-D array (concatenate along third dimension)
Log fixed-point data as a fi object	on
Sample time (-1 for inherited)	-1

### "To Workspace2" (ToWorkspace)

**Table 3.774. "To Workspace2" Parameters**

Parameter	Value
Variable name	estim
Limit data points to last	inf
Decimation	1
Save format	Structure With Time
Save 2-D signals as	3-D array (concatenate along third dimension)
Log fixed-point data as a fi object	on
Sample time (-1 for inherited)	-1

### "To Workspace3" (ToWorkspace)

**Table 3.775. "To Workspace3" Parameters**

Parameter	Value
Variable name	cmd
Limit data points to last	inf
Decimation	1
Save format	Structure With Time
Save 2-D signals as	3-D array (concatenate along third dimension)
Log fixed-point data as a fi object	on
Sample time (-1 for inherited)	-1

### "To Workspace4" (ToWorkspace)

**Table 3.776. "To Workspace4" Parameters**

Parameter	Value
Variable name	optical
Limit data points to last	inf
Decimation	1
Save format	Structure With Time
Save 2-D signals as	3-D array (concatenate along third dimension)
Log fixed-point data as a fi object	on
Sample time (-1 for inherited)	-1

### "To Workspace5" (ToWorkspace)

**Table 3.777. "To Workspace5" Parameters**

Parameter	Value
Variable name	calib
Limit data points to last	inf
Decimation	100
Save format	Structure With Time
Save 2-D signals as	3-D array (concatenate along third dimension)
Log fixed-point data as a fi object	on
Sample time (-1 for inherited)	-1

### "To Workspace6" (ToWorkspace)

**Table 3.778. "To Workspace6" Parameters**

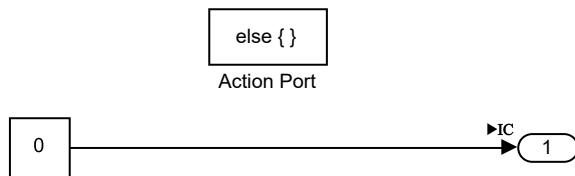
Parameter	Value
Variable name	sensor
Limit data points to last	inf
Decimation	1
Save format	Structure With Time
Save 2-D signals as	3-D array (concatenate along third dimension)
Log fixed-point data as a fi object	on
Sample time (-1 for inherited)	-1

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## Normal condition

**Checksum:** 1189581423 2077896839 1796701699 1437658620

**Figure 3.82. flightControlSystem/Flight Control System/Crash Predictor Flags/Normal condition**

## Interface

### Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.779.**

Description:

Data Type: uint8

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Blocks

### Parameters

#### "Action Port" (ActionPort)

**Table 3.780. "Action Port" Parameters**

Parameter	Value
States when execution is resumed	held
Propagate sizes of variable-size signals	Only when execution is resumed

### "Constant" (Constant)

**Table 3.781. "Constant" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Out1" (Outport)

**Table 3.782. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off

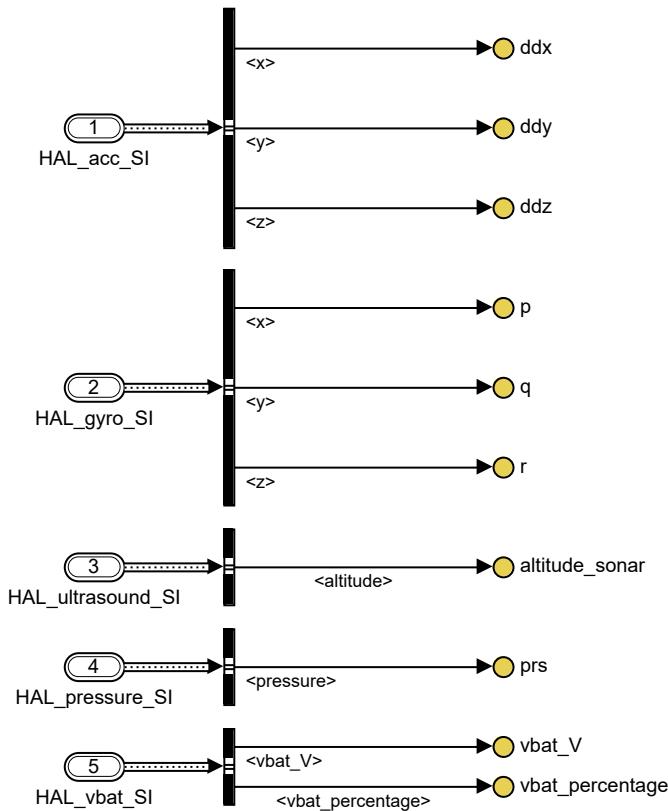
Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	off

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## sensordata\_group

Figure 3.83. flightControlSystem/Flight Control System/sensordata\_group



## Blocks

## Parameters

### "Bus Selector1" (BusSelector)

**Table 3.783. "Bus Selector1" Parameters**

Parameter	Value
Output signals	vbat_V,vbat_percentage
Output as virtual bus	off
InputSignals	vbat_V vbat_percentage

**Output Hierarchy:**

1. *Bus Selector1*
  1. <vbat\_V>
  2. <vbat\_percentage>

### "Bus Selector3" (BusSelector)

**Table 3.784. "Bus Selector3" Parameters**

Parameter	Value
Output signals	x,y,z
Output as virtual bus	off
InputSignals	x y z temperature

**Output Hierarchy:**

1. *Bus Selector3*
  1. <x>
  2. <y>
  3. <z>

### "Bus Selector4" (BusSelector)

**Table 3.785. "Bus Selector4" Parameters**

Parameter	Value
Output signals	x,y,z
Output as virtual bus	off
InputSignals	x y z temperature temperature_lsb

**Output Hierarchy:**

1. *Bus Selector4*
  1. <x>
  2. <y>
  3. <z>

**"Bus Selector5" (BusSelector)**

**Table 3.786. "Bus Selector5" Parameters**

Parameter	Value
Output signals	altitude
Output as virtual bus	off
InputSignals	altitude raw_altitude nb_echo measure_ref measure_status new_data { HAL_list_echo , { { tab_echo , begin_echo_index end_echo_index max_value_index max_value precedent d_echo pre_max_index } ; number_of_echoes } } { HAL_list_echo_p , { { tab_echo , begin_echo_index end_echo_index max_value_index max_value precedent d_echo pre_max_index } ; number_of_echoes } }

**Output Hierarchy:**

1. *Bus Selector5*
  1. <altitude>

**"Bus Selector6" (BusSelector)**

**Table 3.787. "Bus Selector6" Parameters**

Parameter	Value
Output signals	pressure
Output as virtual bus	off
InputSignals	temperature pressure

**Output Hierarchy:**

1. *Bus Selector6*
  1. <pressure>

### "HAL\_acc\_SI" (Import)

**Table 3.788. "HAL\_acc\_SI" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: HAL_acc_SI_t

### "HAL\_gyro\_SI" (Import)

**Table 3.789. "HAL\_gyro\_SI" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: HAL_gyro_SI_t

### "HAL\_pressure\_SI" (Import)

**Table 3.790. "HAL\_pressure\_SI" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: HAL_pressure_SI_t

### "HAL\_ultrasound\_SI" (Import)

**Table 3.791. "HAL\_ultrasound\_SI" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: HAL_ultrasound_SI_t

### "HAL\_vbat\_SI" (Import)

**Table 3.792. "HAL\_vbat\_SI" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: HAL_vbat_SI_t

### "Out Bus Element" (Outport)

**Table 3.793. "Out Bus Element" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	ddx
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element1" (Outport)

**Table 3.794. "Out Bus Element1" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	ddy
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

Parameter	Value
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element2" (Outport)

**Table 3.795. "Out Bus Element2" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	ddz
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element3" (Outport)

**Table 3.796. "Out Bus Element3" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	p
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element4" (Outport)

**Table 3.797. "Out Bus Element4" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	q
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element5" (Outport)

**Table 3.798. "Out Bus Element5" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	r

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Parameter	Value
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element6" (Outport)

**Table 3.799. "Out Bus Element6" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	altitude_sonar
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element7" (Outport)

**Table 3.800. "Out Bus Element7" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port name	sensordata_datin
Element	prs
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit

Parameter	Value
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element8" (Outport)

**Table 3.801. "Out Bus Element8" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	vbat_V
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off

Parameter	Value
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

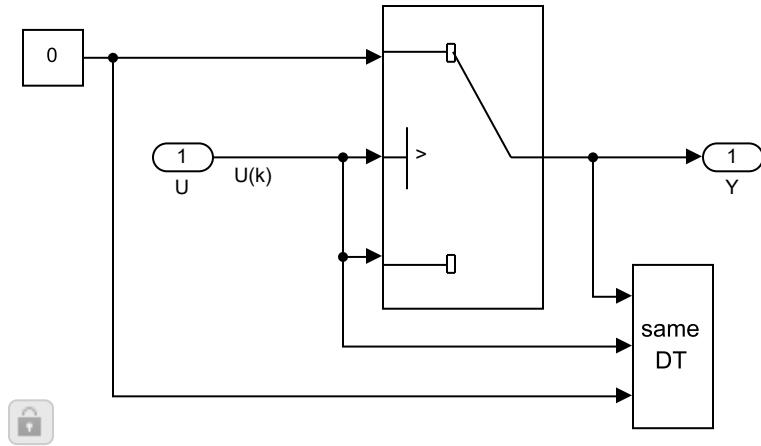
### "Out Bus Element9" (Outport)

**Table 3.802. "Out Bus Element9" Parameters**

Parameter	Value
Port number	1
Port name	sensordata_datin
Element	vbat_percentage
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Wrap To Zero

**Figure 3.84. flightControlSystem/Flight Control System/landing logic/Counter Free-Running/Wrap To Zero**



## Blocks

### Parameters

#### "Constant" (Constant)

**Table 3.803. "Constant" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "FixPt Data Type Duplicate1" (DataTypeDuplicate)

**Table 3.804. "FixPt Data Type Duplicate1" Parameters**

Parameter	Value
Number of input ports	3

### "FixPt Switch" (Switch)

**Table 3.805. "FixPt Switch" Parameters**

Parameter	Value
Criteria for passing first input	u2 > Threshold
Threshold	Threshold
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	off
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

### "U" (Import)

**Table 3.806. "U" Parameters**

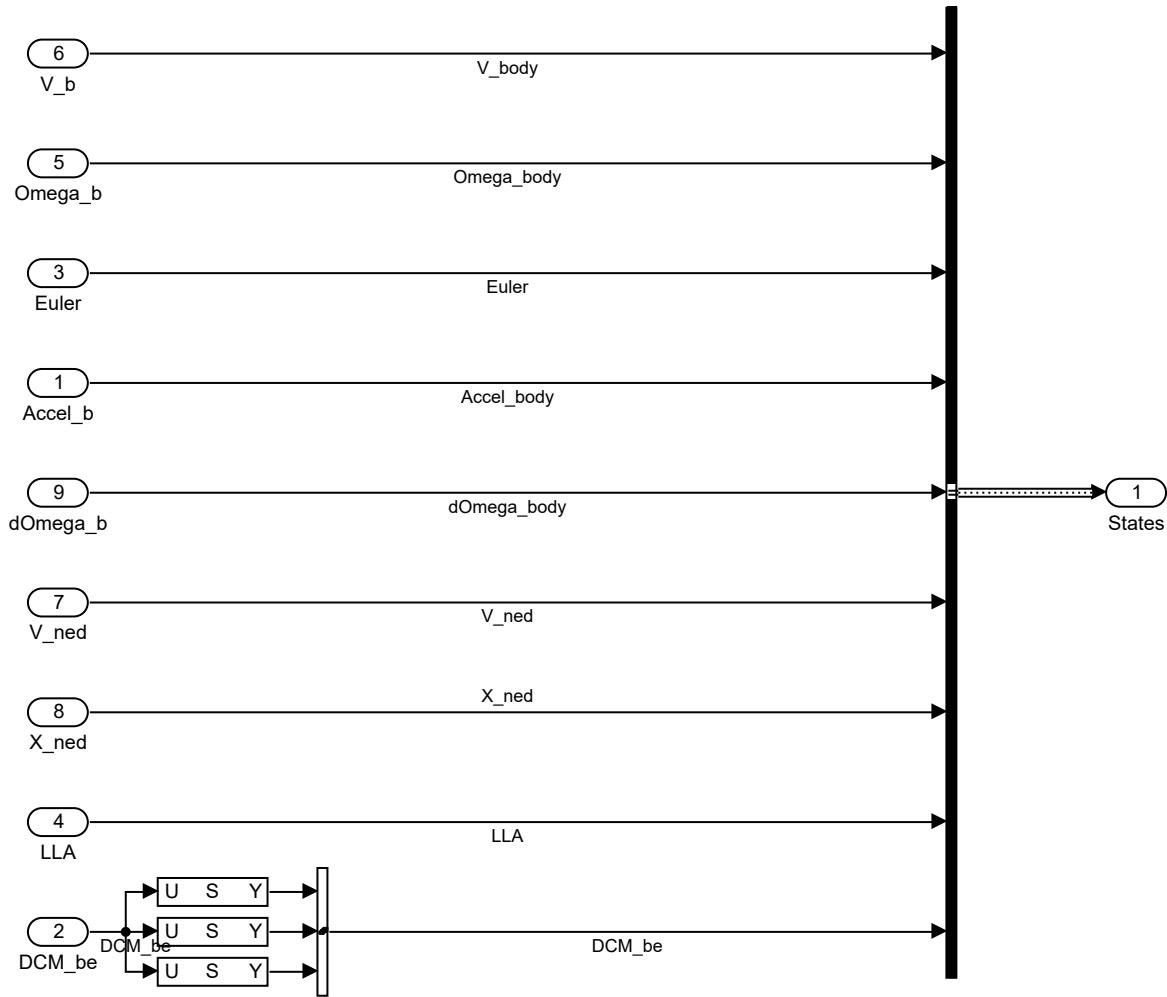
Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Y" (Outport)****Table 3.807. "Y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	0
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## Bus setup

**Figure 3.85. linearAirframe/Linear/Bus setup**



## Blocks

### Parameters

"`Accel_b`" (Inport)

**Table 3.808. "Accel\_b" Parameters**

Parameter	Value
Port number	1

Parameter	Value
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Bus Creator5" (BusCreator)

**Table 3.809. "Bus Creator5" Parameters**

Parameter	Value
Number of inputs	9
Display option	bar
Data type	Bus: StatesBus
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

### "DCM\_be" (Inport)

**Table 3.810. "DCM\_be" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	9
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "dOmega\_b" (Inport)

**Table 3.811. "dOmega\_b" Parameters**

Parameter	Value
Port number	9
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Inherit: auto

### "Euler" (Import)

**Table 3.812. "Euler" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "LLA" (Import)

**Table 3.813. "LLA" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Omega\_b" (Import)

**Table 3.814. "Omega\_b" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Selector" (Selector)

**Table 3.815. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2 3]
Output Size	1
Input port size	9
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2 3]
Output Size	1

### "Selector1" (Selector)

**Table 3.816. "Selector1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[4 5 6]
Output Size	1
Input port size	9
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[4 5 6]
Output Size	1

### "Selector2" (Selector)

**Table 3.817. "Selector2" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based

<b>Parameter</b>	<b>Value</b>
Index Option	Index vector (dialog)
Index	[7 8 9]
Output Size	1
Input port size	9
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[7 8 9]
Output Size	1

### "States" (Outport)

**Table 3.818. "States" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "V\_b" (Import)

**Table 3.819. "V\_b" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "V\_ned" (Import)

**Table 3.820. "V\_ned" Parameters**

Parameter	Value
Port number	7
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Vector Concatenate" (Concatenate)

**Table 3.821. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	3
Mode	Multidimensional array
Concatenate dimension	2

### "X\_ned" (Import)

**Table 3.822. "X\_ned" Parameters**

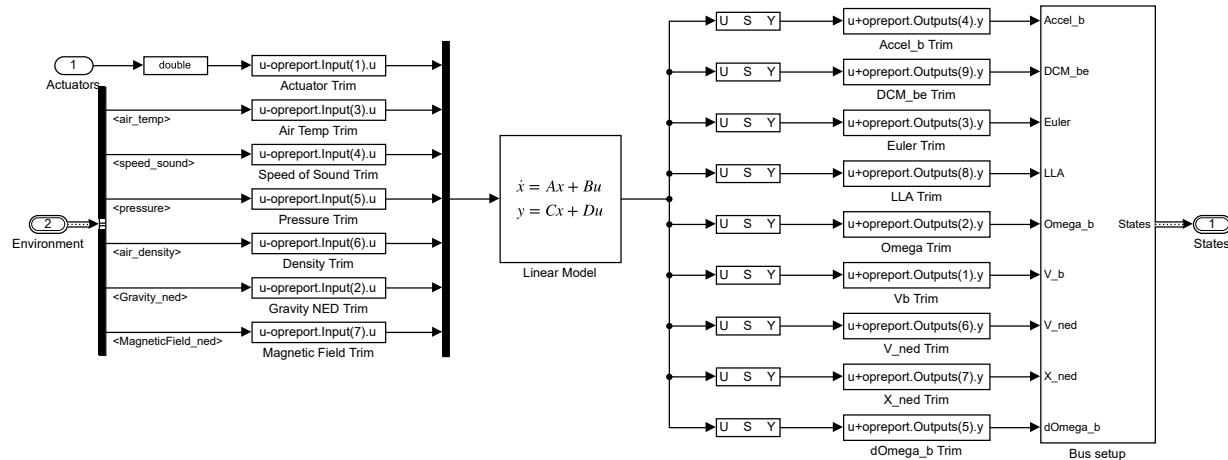
Parameter	Value
Port number	8

Parameter	Value
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Linear

Checksum: 3066777912 2754721269 1238436804 2321928412

**Figure 3.86. linearAirframe/Linear**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.823.**

Description:

Data Type: single

Signal Type: real

Width: 4

Dimensions: [1 4 ]

**Table 3.824.**

Description:

Data Type: EnvironmentBus

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.825.**

Description:

Data Type: StatesBus

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Blocks

### Parameters

#### "Accel\_b Trim" (Bias)

**Table 3.826. "Accel\_b Trim" Parameters**

Parameter	Value
Bias	opreport.Outputs(4).y
Saturate on integer overflow	off

#### "Actuator Trim" (Bias)

**Table 3.827. "Actuator Trim" Parameters**

Parameter	Value
Bias	-opreport.Input(1).u

Parameter	Value
Saturate on integer overflow	off

### "Actuators" (Input)

**Table 3.828. "Actuators" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Air Temp Trim" (Bias)

**Table 3.829. "Air Temp Trim" Parameters**

Parameter	Value
Bias	-opreport.Input(3).u
Saturate on integer overflow	off

### "Bus Selector" (BusSelector)

**Table 3.830. "Bus Selector" Parameters**

Parameter	Value
Output signals	AtmosphereBus.air_temp,AtmosphereBus.speed_sound,AtmosphereBus.pressure,AtmosphereBus.air_density,Gravity_ned,MagneticField_ned
Output as virtual bus	off
InputSignals	Gravity_ned { AtmosphereBus , air_temp speed_sound pressure air_density } MagneticField_ned

#### Output Hierarchy:

1. *Bus Selector*
  1. <air\_temp>
  2. <speed\_sound>
  3. <pressure>
  4. <air\_density>

5. <Gravity\_ned>
6. <MagneticField\_ned>

### "Data Type Conversion" (DataTypeConversion)

**Table 3.831. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	double
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "DCM\_be Trim" (Bias)

**Table 3.832. "DCM\_be Trim" Parameters**

Parameter	Value
Bias	opreport.Outputs(9).y
Saturate on integer overflow	off

### "Density Trim" (Bias)

**Table 3.833. "Density Trim" Parameters**

Parameter	Value
Bias	-opreport.Input(6).u
Saturate on integer overflow	off

### "dOmega\_b Trim" (Bias)

**Table 3.834. "dOmega\_b Trim" Parameters**

Parameter	Value
Bias	opreport.Outputs(5).y
Saturate on integer overflow	off

### "Environment" (Import)

**Table 3.835. "Environment" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: EnvironmentBus

### "Euler Trim" (Bias)

**Table 3.836. "Euler Trim" Parameters**

Parameter	Value
Bias	opreport.Outputs(3).y
Saturate on integer overflow	off

### "Gravity NED Trim" (Bias)

**Table 3.837. "Gravity NED Trim" Parameters**

Parameter	Value
Bias	-opreport.Input(2).u
Saturate on integer overflow	off

### "Linear Model" (StateSpace)

**Table 3.838. "Linear Model" Parameters**

Parameter	Value
A	linsys.a
B	linsys.b
C	linsys.c
D	linsys.d
Initial conditions	zeros(length(linsys.a),1)
Allow non-zero values for D matrix initially specified as zero	off

Parameter	Value
State Name (e.g., 'position')	"

### "LLA Trim" (Bias)

**Table 3.839.** "LLA Trim" Parameters

Parameter	Value
Bias	opreport.Outputs(8).y
Saturate on integer overflow	off

### "Magnetic Field Trim" (Bias)

**Table 3.840.** "Magnetic Field Trim" Parameters

Parameter	Value
Bias	-opreport.Input(7).u
Saturate on integer overflow	off

### "Mux" (Mux)

**Table 3.841.** "Mux" Parameters

Parameter	Value
Number of inputs	7
Display option	bar

### "Omega Trim" (Bias)

**Table 3.842.** "Omega Trim" Parameters

Parameter	Value
Bias	opreport.Outputs(2).y
Saturate on integer overflow	off

### "Pressure Trim" (Bias)

**Table 3.843. "Pressure Trim" Parameters**

Parameter	Value
Bias	-opreport.Input(5).u
Saturate on integer overflow	off

### "Selector" (Selector)

**Table 3.844. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[22 23 24]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[22 23 24]
Output Size	1

### "Selector1" (Selector)

**Table 3.845. "Selector1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[19 20 21]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[19 20 21]
Output Size	1

### "Selector2" (Selector)

**Table 3.846. "Selector2" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[13 14 15]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[13 14 15]
Output Size	1

### "Selector3" (Selector)

**Table 3.847. "Selector3" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2 3]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2 3]
Output Size	1

### "Selector4" (Selector)

**Table 3.848. "Selector4" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based

Parameter	Value
Index Option	Index vector (dialog)
Index	[31 32 33]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[31 32 33]
Output Size	1

### "Selector5" (Selector)

**Table 3.849. "Selector5" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[25 26 27]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[25 26 27]
Output Size	1

### "Selector6" (Selector)

**Table 3.850. "Selector6" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[28 29 30]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1

Parameter	Value
Index Option	Index vector (dialog)
Index	[28 29 30]
Output Size	1

### "Selector7" (Selector)

**Table 3.851. "Selector7" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[16 17 18]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[16 17 18]
Output Size	1

### "Selector8" (Selector)

**Table 3.852. "Selector8" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[4 5 6 7 8 9 10 11 12]
Output Size	1
Input port size	33
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[4 5 6 7 8 9 10 11 12]
Output Size	1

**"Speed of Sound Trim" (Bias)****Table 3.853. "Speed of Sound Trim" Parameters**

Parameter	Value
Bias	-opreport.Input(4).u
Saturate on integer overflow	off

**"States" (Outport)****Table 3.854. "States" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

**"V\_ned Trim" (Bias)****Table 3.855. "V\_ned Trim" Parameters**

Parameter	Value
Bias	opreport.Outputs(6).y
Saturate on integer overflow	off

**"Vb Trim" (Bias)****Table 3.856. "Vb Trim" Parameters**

Parameter	Value
Bias	opreport.Outputs(1).y
Saturate on integer overflow	off

**"X\_ned Trim" (Bias)****Table 3.857. "X\_ned Trim" Parameters**

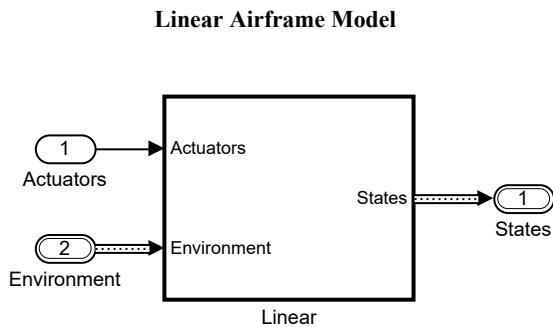
Parameter	Value
Bias	opreport.Outputs(7).y
Saturate on integer overflow	off

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## linearAirframe

**Checksum:** 2366768239 3548539101 2828865999 3745699506

**Figure 3.87. linearAirframe**

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## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.858.**

Description:  
Data Type: single  
Signal Type: real  
Width: 4  
Dimensions: [1 4 ]

**Table 3.859.**

Description:  
Data Type: EnvironmentBus  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

### Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.860.**

Description:  
Data Type: StatesBus  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

## Blocks

### Parameters

#### "Actuators" (Import)

**Table 3.861. "Actuators" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	4
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	single

#### "Environment" (Import)

**Table 3.862. "Environment" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: EnvironmentBus

### "States" (Outport)

**Table 3.863. "States" Parameters**

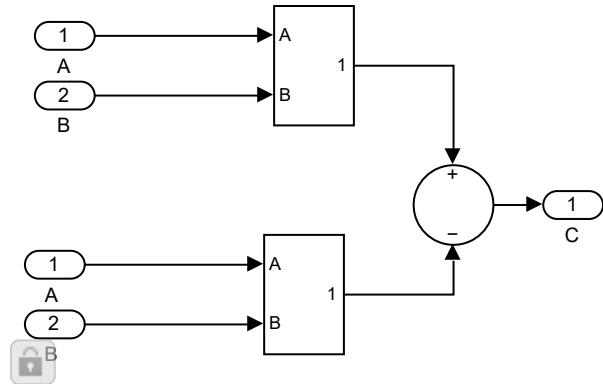
Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	on
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## 3x3 Cross Product

**Figure 3.88. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate omega\_dot/3x3 Cross Product**



## Blocks

### Parameters

"A" (Inport)

**Table 3.864. "A" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"A " (InportShadow)

**Table 3.865. "A " Parameters**

Parameter	Value
Port number	1
Port name	A

<b>Parameter</b>	<b>Value</b>
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "B" (Import)

**Table 3.866. "B" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "B" (ImportShadow)

**Table 3.867. "B" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Port name	B
Is a bus element port block	off

<b>Parameter</b>	<b>Value</b>
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "C" (Outport)

**Table 3.868. "C" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog

<b>Parameter</b>	<b>Value</b>
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

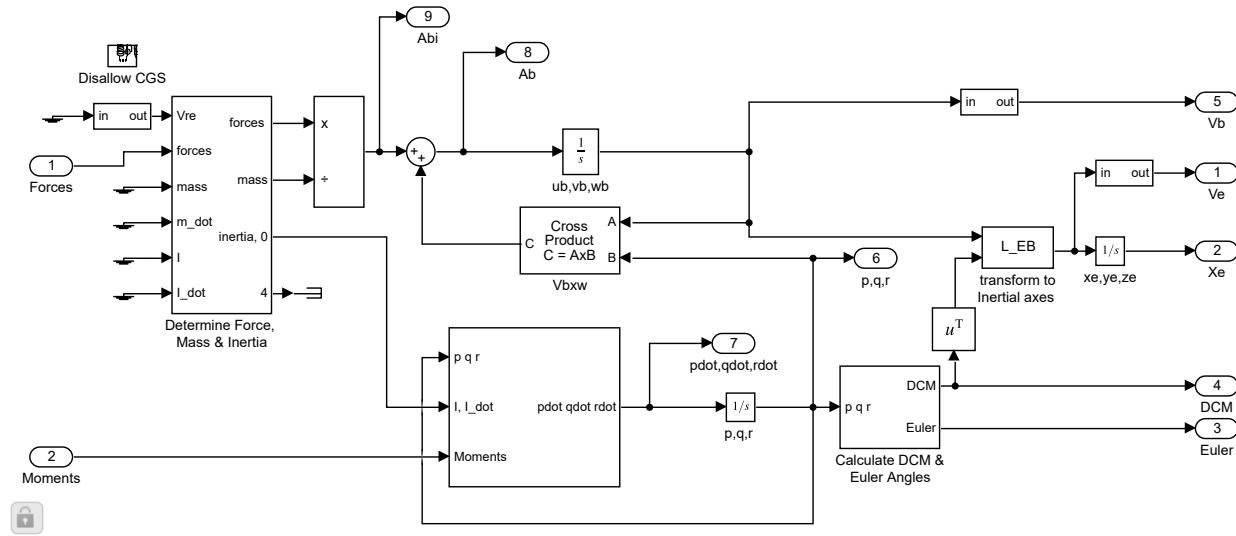
### "Sum" (Sum)

**Table 3.869. "Sum" Parameters**

<b>Parameter</b>	<b>Value</b>
Icon shape	round
List of signs	+   -
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

# 6DOF (Quaternion)

**Figure 3.89. nonlinearAirframe/Nonlinear/6DOF (Quaternion)**



## Blocks

### Parameters

#### "Ab" (Outport)

**Table 3.870. "Ab" Parameters**

Parameter	Value
Port number	8
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	m/s <sup>2</sup>
Port dimensions (-1 for inherited)	-1

Parameter	Value
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Abi" (Outport)

**Table 3.871. "Abi" Parameters**

Parameter	Value
Port number	9
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	m/s^2
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0

Parameter	Value
Interpret vector parameters as 1-D	on

### "DCM" (Outport)

**Table 3.872. "DCM" Parameters**

Parameter	Value
Port number	4
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	1
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Disallow CGS" (UnitConfiguration)

**Table 3.873. "Disallow CGS" Parameters**

Parameter	Value
Allowed unit systems	English SI SI (extended)

Parameter	Value
Allow all unit systems	off

### "Euler" (Outport)

**Table 3.874. "Euler" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	rad
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Forces" (Inport)

**Table 3.875. "Forces" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Moments" (Import)

**Table 3.876. "Moments" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "p,q,r" (Outport)

**Table 3.877. "p,q,r" Parameters**

Parameter	Value
Port number	6
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	rad/s
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held

Parameter	Value
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "p,q,r" (Integrator)

**Table 3.878. "p,q,r" Parameters**

Parameter	Value
External reset	none
Initial condition source	internal
Initial condition	pm_0
Limit output	off
Upper saturation limit	inf
Lower saturation limit	-inf
Wrap state	off
Wrapped state upper value	pi
Wrapped state lower value	-pi
Show saturation port	off
Show state port	off
Ignore limit and reset when linearizing	off
Enable zero-crossing detection	on
State Name (e.g., 'position')	pm_statename

### "pdot,qdot,rdot" (Outport)

**Table 3.879. "pdot,qdot,rdot" Parameters**

Parameter	Value
Port number	7
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	rad/s <sup>2</sup>
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Product" (Product)

**Table 3.880. "Product" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum" (Sum)

**Table 3.881. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Transpose" (Math)

**Table 3.882. "Transpose" Parameters**

Parameter	Value
Function	transpose
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tool s	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "ub,vb,wb" (Integrator)

**Table 3.883. "ub,vb,wb" Parameters**

Parameter	Value
External reset	none
Initial condition source	internal
Initial condition	Vm_0
Limit output	off
Upper saturation limit	inf
Lower saturation limit	-inf
Wrap state	off
Wrapped state upper value	pi
Wrapped state lower value	-pi
Show saturation port	off
Show state port	off
Ignore limit and reset when linearizing	off
Enable zero-crossing detection	on
State Name (e.g., 'position')	Vm_statename

### "Vb" (Outport)

**Table 3.884. "Vb" Parameters**

Parameter	Value
Port number	5
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	m/s
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

<b>Parameter</b>	<b>Value</b>
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Ve" (Outport)

**Table 3.885. "Ve" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	m/s
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Xe" (Outport)

**Table 3.886. "Xe" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	m
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "xe,ye,ze" (Integrator)

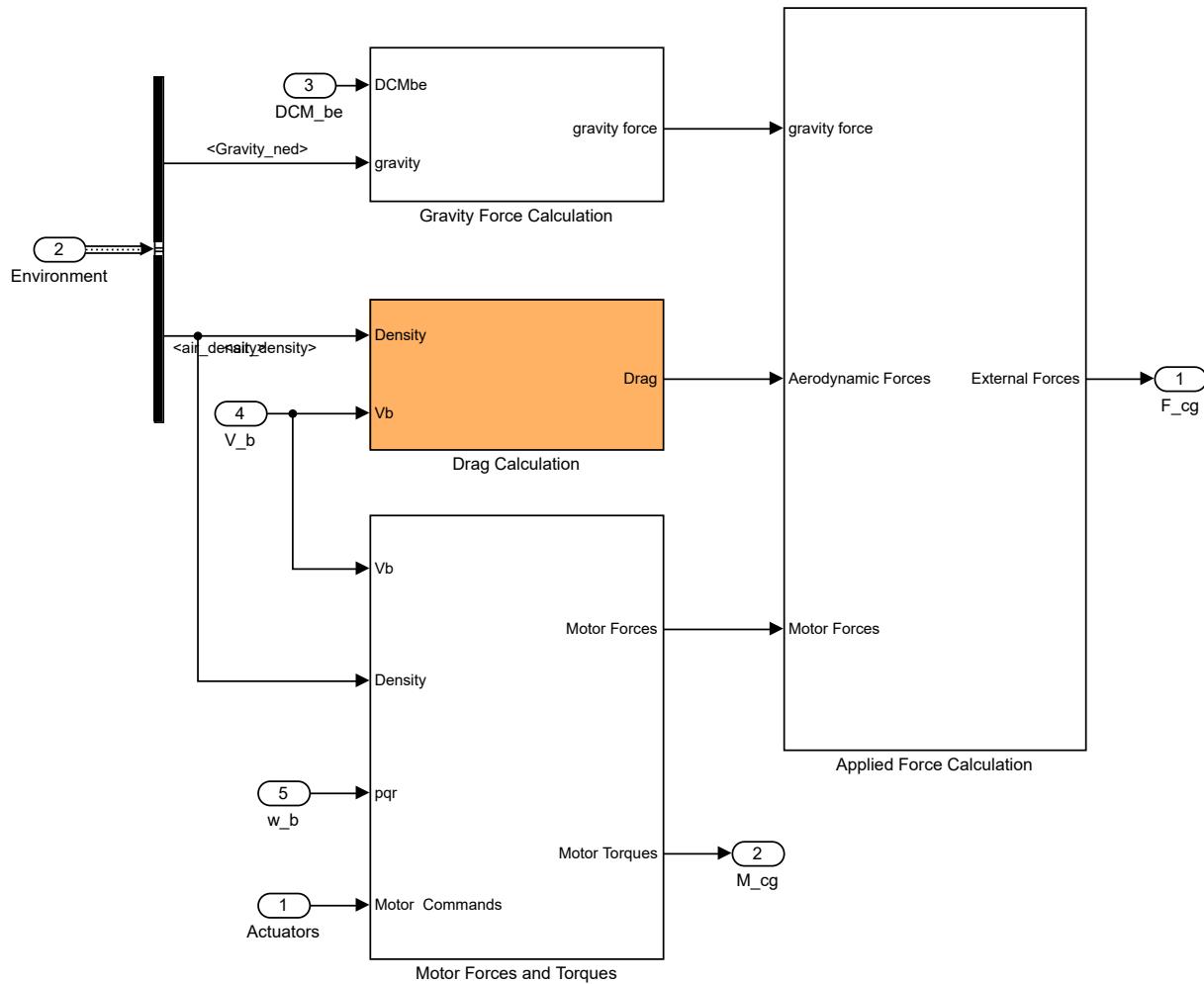
**Table 3.887. "xe,ye,ze" Parameters**

Parameter	Value
External reset	none
Initial condition source	internal
Initial condition	xme_0
Limit output	off
Upper saturation limit	inf
Lower saturation limit	-inf

Parameter	Value
Wrap state	off
Wrapped state upper value	pi
Wrapped state lower value	-pi
Show saturation port	off
Show state port	off
Ignore limit and reset when linearizing	off
Enable zero-crossing detection	on
State Name (e.g., 'position')	xme_statename

## AC model

Figure 3.90. nonlinearAirframe/Nonlinear/AC model



## Blocks

### Parameters

#### "Actuators" (Inport)

**Table 3.888. "Actuators" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "Bus Selector" (BusSelector)

**Table 3.889. "Bus Selector" Parameters**

Parameter	Value
Output signals	Gravity_ned,AtmosphereBus.air_density
Output as virtual bus	off
InputSignals	Gravity_ned { AtmosphereBus , air_temp speed_sound pressure air_density } MagneticField_ned

#### Output Hierarchy:

1. *Bus Selector*
  1. <Gravity\_ned>
  2. <air\_density>

#### "DCM\_be" (Inport)

**Table 3.890. "DCM\_be" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Inherit: auto

### "Environment" (Import)

**Table 3.891. "Environment" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "F\_cg" (Outport)

**Table 3.892. "F\_cg" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	N
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

<b>Parameter</b>	<b>Value</b>
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "M\_cg" (Outport)

**Table 3.893. "M\_cg" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	N*m
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "V\_b" (Import)

**Table 3.894. "V\_b" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

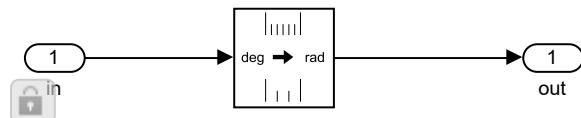
### "w\_b" (Import)

**Table 3.895. "w\_b" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Angle Conversion2

**Figure 3.91. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LongLat\_offset/Find Radian//Distance/Angle Conversion2**



## Blocks

## Parameters

**"in" (Import)**
**Table 3.896. "in" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"out" (Outport)**
**Table 3.897. "out" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	rad
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

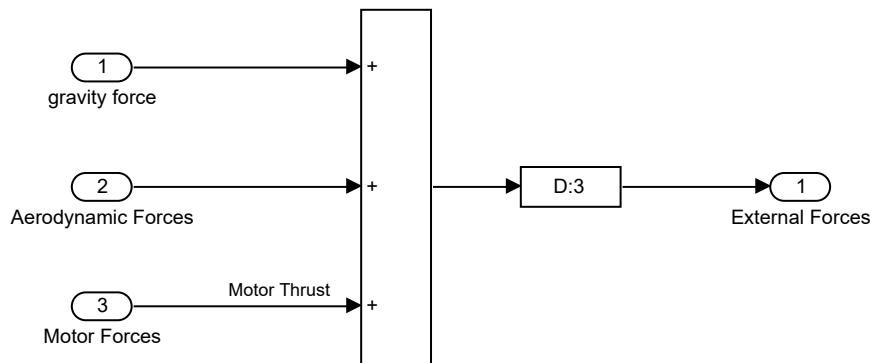
### "Unit Conversion" (UnitConversion)

**Table 3.898. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

## Applied Force Calculation

**Figure 3.92. nonlinearAirframe/Nonlinear/AC model/Applied Force Calculation**



## Blocks

### Parameters

#### "Add1" (Sum)

**Table 3.899. "Add1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Aerodynamic Forces" (Import)

**Table 3.900. "Aerodynamic Forces" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "External Forces" (Outport)

**Table 3.901. "External Forces" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	N
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off

Parameter	Value
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "gravity force" (Import)

**Table 3.902. "gravity force" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Motor Forces" (Import)

**Table 3.903. "Motor Forces" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Signal Specification" (SignalSpecification)

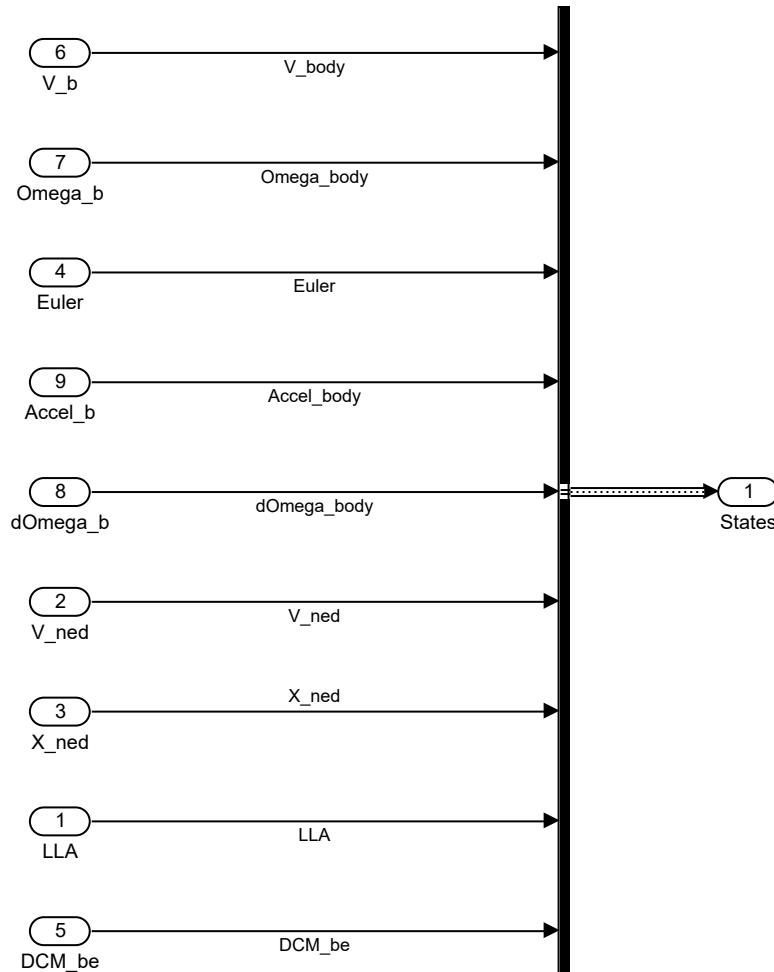
**Table 3.904. "Signal Specification" Parameters**

Parameter	Value
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Require nonvirtual bus	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Dimensions (-1 for inherited)	3
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

## Bus setup

Figure 3.93. nonlinearAirframe/Nonlinear/Bus setup



## Blocks

### Parameters

#### "Accel\_b" (Inport)

**Table 3.905. "Accel\_b" Parameters**

Parameter	Value
Port number	9
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "Bus Creator5" (BusCreator)

**Table 3.906. "Bus Creator5" Parameters**

Parameter	Value
Number of inputs	9
Display option	bar
Data type	Bus: StatesBus
Output as nonvirtual bus	on
Use names from inputs instead of from bus object	on

#### "DCM\_be" (Inport)

**Table 3.907. "DCM\_be" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	[3 3]
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "dOmega\_b" (Import)

**Table 3.908. "dOmega\_b" Parameters**

Parameter	Value
Port number	8
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Euler" (Import)

**Table 3.909. "Euler" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "LLA" (Import)

**Table 3.910. "LLA" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Omega\_b" (Import)

**Table 3.911. "Omega\_b" Parameters**

Parameter	Value
Port number	7
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "States" (Outport)

**Table 3.912. "States" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "V\_b" (Import)

**Table 3.913. "V\_b" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "V\_ned" (Import)

**Table 3.914. "V\_ned" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

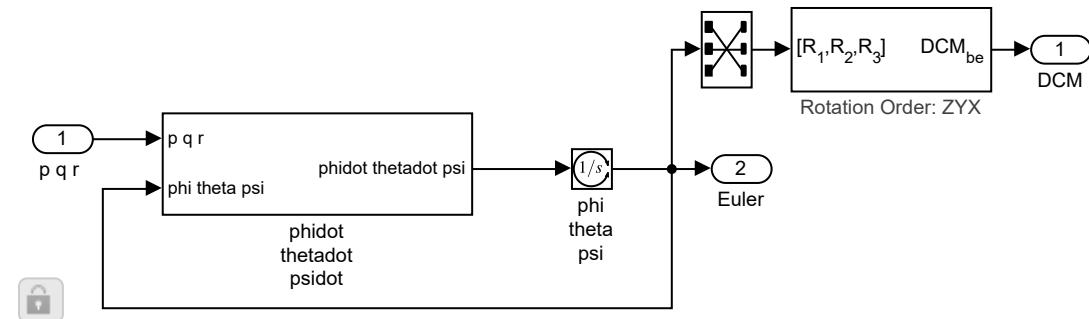
### "X\_ned" (Import)

**Table 3.915. "X\_ned" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# Calculate DCM & Euler Angles

**Figure 3.94. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate DCM & Euler Angles**



## Blocks

### Parameters

"DCM" (Outport)

**Table 3.916. "DCM" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog

<b>Parameter</b>	<b>Value</b>
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Euler" (Outport)

**Table 3.917. "Euler" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "p q r" (Import)

**Table 3.918. "p q r" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "phi theta psi" (Integrator)

**Table 3.919. "phi theta psi" Parameters**

Parameter	Value
External reset	none
Initial condition source	internal
Initial condition	eul_0
Limit output	off
Upper saturation limit	inf
Lower saturation limit	-inf
Wrap state	on
Wrapped state upper value	pi
Wrapped state lower value	-pi
Show saturation port	off
Show state port	off
Ignore limit and reset when linearizing	off
Enable zero-crossing detection	on
State Name (e.g., 'position')	eul_statename

### "Rotation Angles to Direction Cosine Matrix" (SubSystem)

**Table 3.920. "Rotation Angles to Direction Cosine Matrix" Parameters**

Parameter	Value
shared_aeroblkssharedaeroblktransformblockAng2DCMPParamRotationOrder	ZYX

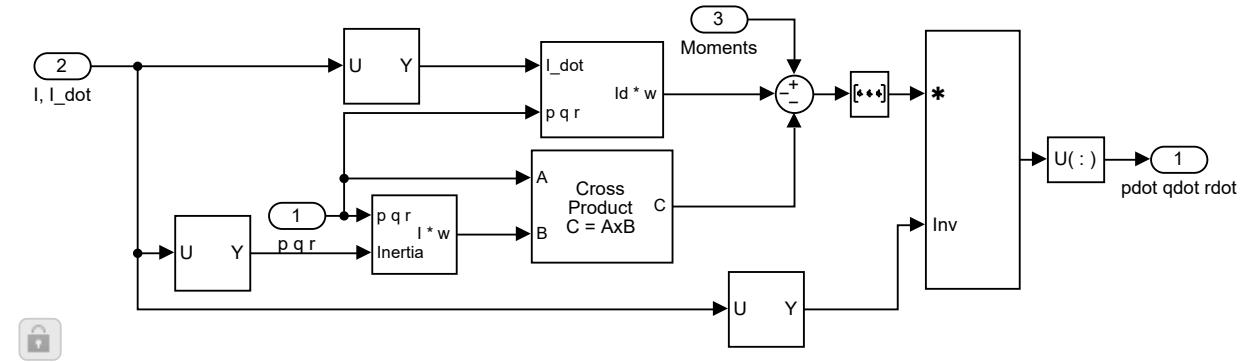
### "Selector" (Selector)

**Table 3.921. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3 2 1]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3 2 1]
Output Size	1

## Calculate omega\_dot

**Figure 3.95. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate omega\_dot**



## Blocks

## Parameters

### "I, I\_dot" (Import)

**Table 3.922. "I, I\_dot" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Moments" (Import)

**Table 3.923. "Moments" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "p q r" (Import)

**Table 3.924. "p q r" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "pdot qdot rdot" (Outport)

**Table 3.925. "pdot qdot rdot" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Product2" (Product)

**Table 3.926. "Product2" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Reshape" (Reshape)

**Table 3.927. "Reshape" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

### "Reshape1" (Reshape)

**Table 3.928. "Reshape1" Parameters**

Parameter	Value
Output dimensionality	Row vector (2-D)
Output dimensions	[1,1]

### "Selector" (Selector)

**Table 3.929. "Selector" Parameters**

Parameter	Value
Number of input dimensions	2
Index mode	One-based
Index Option	Index vector (dialog) Select all
Index	1:3 -1
Output Size	1
Input port size	2
Sample time (-1 for inherited)	-1

Parameter	Value
Index Option	Index vector (dialog),Select all
Index	1:3,-1
Output Size	1

### "Selector1" (Selector)

**Table 3.930. "Selector1" Parameters**

Parameter	Value
Number of input dimensions	2
Index mode	One-based
Index Option	Index vector (dialog) Select all
Index	4:6 -1
Output Size	1
Input port size	2
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog),Select all
Index	4:6,-1
Output Size	1

### "Selector2" (Selector)

**Table 3.931. "Selector2" Parameters**

Parameter	Value
Number of input dimensions	2
Index mode	One-based
Index Option	Index vector (dialog) Select all
Index	1:3 -1
Output Size	1
Input port size	2
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog),Select all

Parameter	Value
Index	1:3,-1
Output Size	1

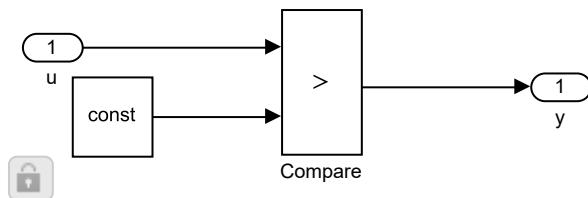
### "Sum2" (Sum)

**Table 3.932. "Sum2" Parameters**

Parameter	Value
Icon shape	round
List of signs	+--
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

## Compare To Constant

**Figure 3.96. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LatLong wrap/Latitude Wrap 90/Compare To Constant**



## Blocks

### Parameters

### "Compare" (RelationalOperator)

**Table 3.933. "Compare" Parameters**

Parameter	Value
Relational operator	>
Require all inputs to have the same data type	on
Output data type	boolean
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Nearest

### "Constant" (Constant)

**Table 3.934. "Constant" Parameters**

Parameter	Value
Constant value	const
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "u" (Import)

**Table 3.935. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

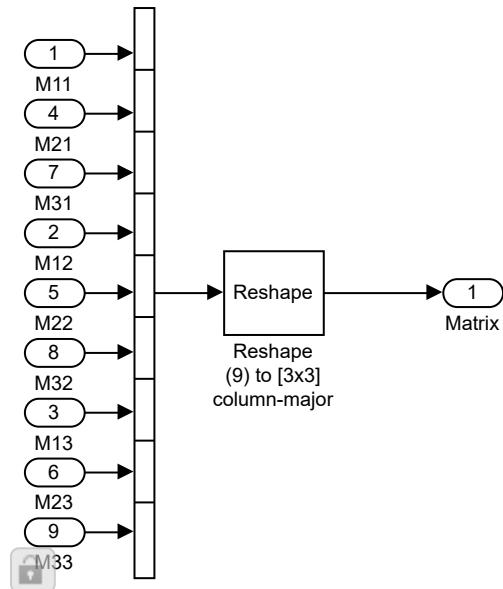
### "y" (Outport)

**Table 3.936. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## Create 3x3 Matrix

**Figure 3.97. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate DCM & Euler Angles/Rotation Angles to Direction Cosine Matrix/Create 3x3 Matrix**



## Blocks

### Parameters

"M11" (Inport)

**Table 3.937. "M11" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M12" (Import)

**Table 3.938. "M12" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M13" (Import)

**Table 3.939. "M13" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M21" (Import)

**Table 3.940. "M21" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M22" (Import)

**Table 3.941. "M22" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M23" (Import)

**Table 3.942. "M23" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M31" (Import)

**Table 3.943. "M31" Parameters**

Parameter	Value
Port number	7
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M32" (Import)

**Table 3.944. "M32" Parameters**

Parameter	Value
Port number	8
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M33" (Import)

**Table 3.945. "M33" Parameters**

Parameter	Value
Port number	9
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Matrix" (Outport)

**Table 3.946. "Matrix" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit

Parameter	Value
Port dimensions (-1 for inherited)	[3 3]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Reshape (9) to [3x3] column-major" (Reshape)

**Table 3.947. "Reshape (9) to [3x3] column-major" Parameters**

Parameter	Value
Output dimensionality	Customize
Output dimensions	[3,3]

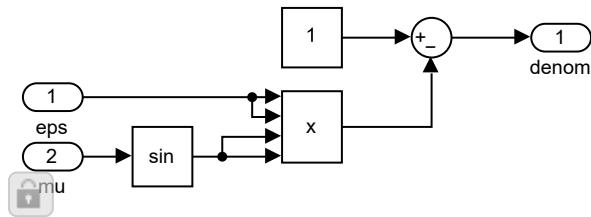
### "Vector Concatenate" (Concatenate)

**Table 3.948. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	9
Mode	Vector
Concatenate dimension	1

# denom

**Figure 3.98. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LongLat\_offset/Find Radian//Distance/denom**



## Blocks

### Parameters

#### "Constant" (Constant)

**Table 3.949. "Constant" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "denom" (Outport)

**Table 3.950. "denom" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off

<b>Parameter</b>	<b>Value</b>
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "eps" (Import)

**Table 3.951. "eps" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "mu" (Import)

**Table 3.952. "mu" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product1" (Product)

**Table 3.953. "Product1" Parameters**

Parameter	Value
Number of inputs	4
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum1" (Sum)

**Table 3.954. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

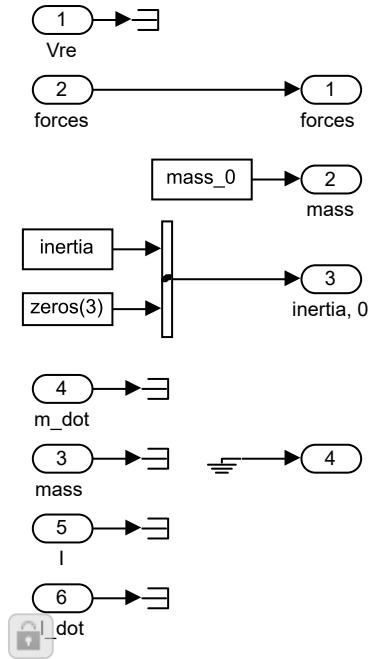
### "Trigonometric Function1" (Trigonometry)

**Table 3.955. "Trigonometric Function1" Parameters**

Parameter	Value
Function	sin
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

# Determine Force, Mass & Inertia

**Figure 3.99. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Determine Force, Mass & Inertia**



## Blocks

### Parameters

#### "Constant" (Constant)

**Table 3.956. "Constant" Parameters**

Parameter	Value
Constant value	mass_0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf

Parameter	Value
Frame period	inf

### "Constant1" (Constant)

**Table 3.957. "Constant1" Parameters**

Parameter	Value
Constant value	inertia
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant2" (Constant)

**Table 3.958. "Constant2" Parameters**

Parameter	Value
Constant value	zeros(3)
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "forces" (Inport)

**Table 3.959. "forces" Parameters**

Parameter	Value
Port number	2

<b>Parameter</b>	<b>Value</b>
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "forces" (Outport)

**Table 3.960. "forces" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "I" (Import)

**Table 3.961. "I" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	double

### "I\_dot" (Import)

**Table 3.962. "I\_dot" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	double

### "inertia, 0" (Outport)

**Table 3.963. "inertia, 0" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit

Parameter	Value
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "m\_dot" (Import)

**Table 3.964. "m\_dot" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	double

### "mass" (Outport)

**Table 3.965. "mass" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

Parameter	Value
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "mass" (Inport)

**Table 3.966. "mass" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Out9" (Outport)

**Table 3.967. "Out9" Parameters**

Parameter	Value
Port number	4
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### **"Vector Concatenate" (Concatenate)**

**Table 3.968. "Vector Concatenate" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Mode	Multidimensional array
Concatenate dimension	1

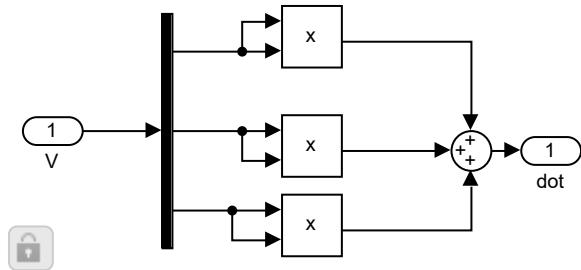
### **"Vre" (Inport)**

**Table 3.969. "Vre" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# dot

**Figure 3.100. nonlinearAirframe/Nonlinear/AC model/Drag Calculation/Drag Calc/Dynamic Pressure/dot**



## Blocks

### Parameters

"Demux1" (Demux)

**Table 3.970. "Demux1" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

"dot" (Outport)

**Table 3.971. "dot" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

<b>Parameter</b>	<b>Value</b>
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Product" (Product)

**Table 3.972. "Product" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Product1" (Product)**
**Table 3.973. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Product2" (Product)**
**Table 3.974. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum" (Sum)

**Table 3.975. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

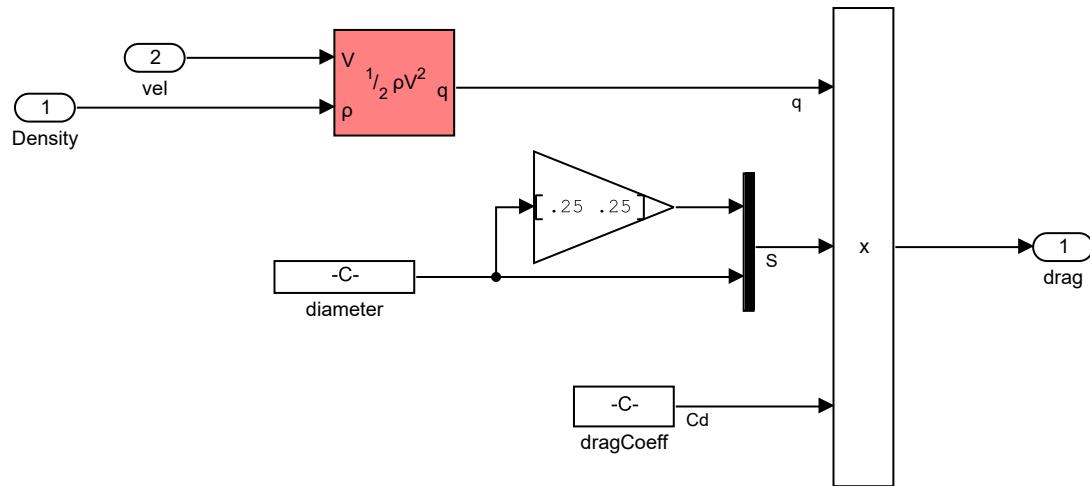
### "V" (Import)

**Table 3.976. "V" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# Drag Calc

**Figure 3.101. nonlinearAirframe/Nonlinear/AC model/Drag Calculation/Drag Calc**



## Blocks

### Parameters

"Density" (Inport)

**Table 3.977. "Density" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"diameter" (Constant)**
**Table 3.978. "diameter" Parameters**

Parameter	Value
Constant value	Vehicle.Airframe.diameter
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	0
Frame period	inf

**"drag" (Outport)**
**Table 3.979. "drag" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	N
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off

Parameter	Value
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "dragCoeff" (Constant)

**Table 3.980. "dragCoeff" Parameters**

Parameter	Value
Constant value	Vehicle.Airframe.Cdx
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	0
Frame period	inf

### "Gain" (Gain)

**Table 3.981. "Gain" Parameters**

Parameter	Value
Gain	[.25 .25]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Mux1" (Mux)

**Table 3.982. "Mux1" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Product" (Product)

**Table 3.983. "Product" Parameters**

Parameter	Value
Number of inputs	3
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "vel" (Import)

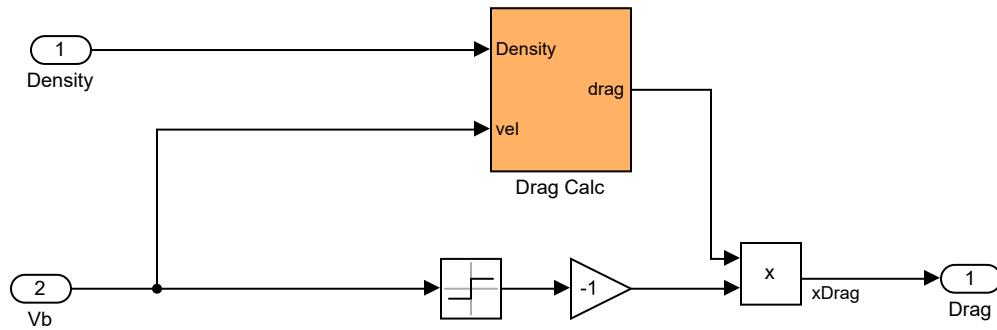
**Table 3.984. "vel" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Drag Calculation

Figure 3.102. nonlinearAirframe/Nonlinear/AC model/Drag Calculation



## Blocks

### Parameters

"Density" (Import)

Table 3.985. "Density" Parameters

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Drag" (Outport)

**Table 3.986. "Drag" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	N
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Gain3" (Gain)

**Table 3.987. "Gain3" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product" (Product)

**Table 3.988. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.*.)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sign" (Signum)

**Table 3.989. "Sign" Parameters**

Parameter	Value
Enable zero-crossing detection	off
Sample time (-1 for inherited)	-1

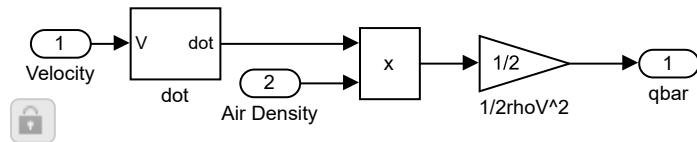
"Vb" (Inport)

**Table 3.990. "Vb" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Dynamic Pressure

**Figure 3.103. nonlinearAirframe/Nonlinear/AC model/Drag Calculation/Drag Calc/Dynamic Pressure**



## Blocks

### Parameters

"1/2rhoV^2" (Gain)

**Table 3.991. "1/2rhoV^2" Parameters**

Parameter	Value
Gain	1/2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Same as input
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Air Density" (Import)

**Table 3.992. "Air Density" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product2" (Product)

**Table 3.993. "Product2" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Multiplication	Element-wise(.*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "qbar" (Outport)

**Table 3.994. "qbar" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	0
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

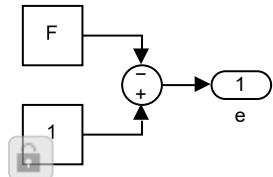
### "Velocity" (Inport)

**Table 3.995. "Velocity" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

e

**Figure 3.104. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LongLat\_offset/Find Radian//Distance/e**



## Blocks

### Parameters

#### "Constant" (Constant)

**Table 3.996. "Constant" Parameters**

Parameter	Value
Constant value	F
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "e" (Outport)

**Table 3.997. "e" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]

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<b>Parameter</b>	<b>Value</b>
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "f" (Constant)

**Table 3.998. "f" Parameters**

<b>Parameter</b>	<b>Value</b>
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

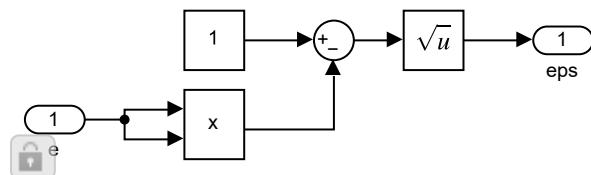
### "Sum" (Sum)

**Table 3.999. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**e^4**

**Figure 3.105. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LongLat\_offset/Find Radian//Distance/e^4**



## Blocks

### Parameters

### "Constant" (Constant)

**Table 3.1000. "Constant" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "e" (Inport)

**Table 3.1001. "e" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "eps" (Outport)

**Table 3.1002. "eps" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off

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<b>Parameter</b>	<b>Value</b>
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Product1" (Product)

**Table 3.1003. "Product1" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "sqrt" (Sqrt)

**Table 3.1004. "sqrt" Parameters**

Parameter	Value
Function	sqrt
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

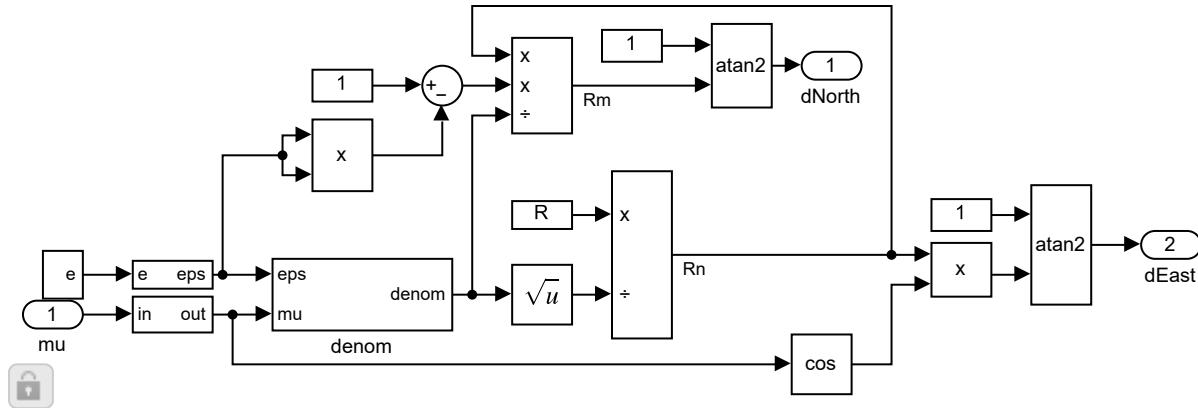
### "Sum1" (Sum)

**Table 3.1005. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

# Find Radian/Distance

**Figure 3.106. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LongLat\_offset/Find Radian//Distance**



## Blocks

### Parameters

#### "Constant" (Constant)

**Table 3.1006. "Constant" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant1" (Constant)

**Table 3.1007. "Constant1" Parameters**

Parameter	Value
Constant value	R
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant2" (Constant)

**Table 3.1008. "Constant2" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant3" (Constant)

**Table 3.1009. "Constant3" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]

<b>Parameter</b>	<b>Value</b>
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "dEast" (Outport)

**Table 3.1010. "dEast" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "dNorth" (Outport)

**Table 3.1011. "dNorth" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "mu" (Inport)

**Table 3.1012. "mu" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product1" (Product)

**Table 3.1013. "Product1" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product2" (Product)

**Table 3.1014. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product3" (Product)

**Table 3.1015. "Product3" Parameters**

Parameter	Value
Number of inputs	**/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product4" (Product)

**Table 3.1016. "Product4" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "sqrt" (Sqrt)

**Table 3.1017. "sqrt" Parameters**

Parameter	Value
Function	sqrt
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Sum1" (Sum)

**Table 3.1018. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function" (Trigonometry)

**Table 3.1019. "Trigonometric Function" Parameters**

Parameter	Value
Function	cos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function1" (Trigonometry)

**Table 3.1020. "Trigonometric Function1" Parameters**

Parameter	Value
Function	atan2
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

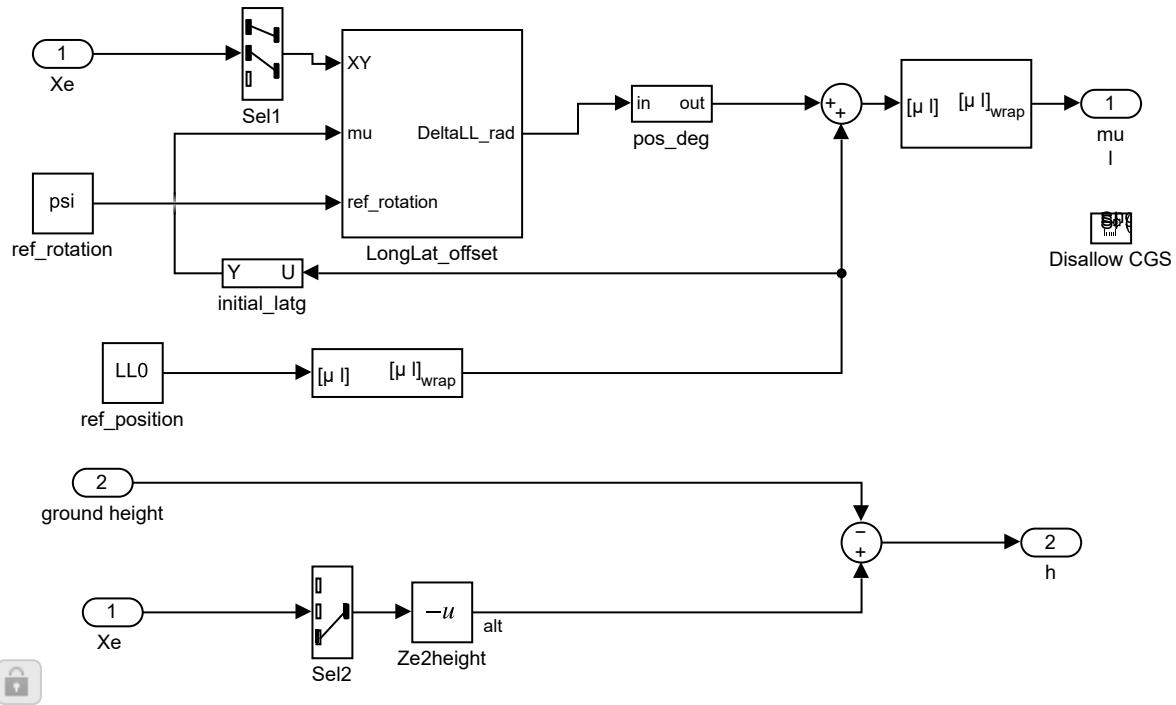
### "Trigonometric Function2" (Trigonometry)

**Table 3.1021. "Trigonometric Function2" Parameters**

Parameter	Value
Function	atan2
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

# Flat Earth to LLA

**Figure 3.107. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA**



## Blocks

### Parameters

"Disallow CGS" (UnitConfiguration)

**Table 3.1022. "Disallow CGS" Parameters**

Parameter	Value
Allowed unit systems	English SI SI (extended)
Allow all unit systems	off

### "ground height" (Inport)

**Table 3.1023. "ground height" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "h" (Outport)

**Table 3.1024. "h" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	m
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "initial\_latg" (Selector)

**Table 3.1025. "initial\_latg" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1]
Output Size	1
Input port size	2
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1]
Output Size	1

### "mu I" (Outport)

**Table 3.1026. "mu I" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	deg
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "ref\_position" (Constant)

**Table 3.1027. "ref\_position" Parameters**

Parameter	Value
Constant value	LL0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "ref\_rotation" (Constant)

**Table 3.1028. "ref\_rotation" Parameters**

Parameter	Value
Constant value	psi
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Sel1" (Selector)

**Table 3.1029. "Sel1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1,2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1,2]
Output Size	1

### "Sel2" (Selector)

**Table 3.1030. "Sel2" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	3
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	3
Output Size	1

### "Sum" (Sum)

**Table 3.1031. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	++

Parameter	Value
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum1" (Sum)

**Table 3.1032. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Xe" (Import)

**Table 3.1033. "Xe" Parameters**

Parameter	Value
Port number	1

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Xe" (ImportShadow)

**Table 3.1034. "Xe" Parameters**

Parameter	Value
Port number	1
Port name	Xe
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	m
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Ze2height" (UnaryMinus)

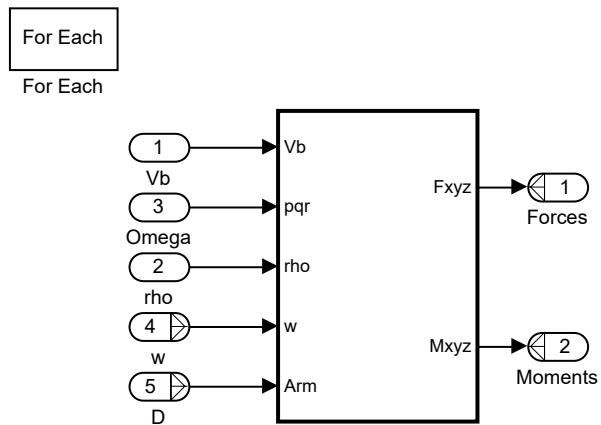
**Table 3.1035. "Ze2height" Parameters**

Parameter	Value
Sample time (-1 for inherited)	-1
Saturate on integer overflow	off

## For Each Subsystem

Checksum: 1631904142 184459401 4192760397 3581132362

**Figure 3.108. nonlinearAirframe/Nonlinear/AC model/Motor Forces and Torques/For Each Subsystem**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1036.**

Description:  
Data Type: double  
Signal Type: real  
Width: 3  
Dimensions: [2 3 1 ]

**Table 3.1037.**

Description:  
Data Type: double  
Signal Type: real  
Width: 3

Dimensions: [1 3 ]

**Table 3.1038.**

Description:

Data Type: double

Signal Type: real

Width: 3

Dimensions: [1 3 ]

**Table 3.1039.**

Description:

Data Type: double

Signal Type: real

Width: 1

Dimensions: [1 1 ]

**Table 3.1040.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [2 1 1 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1041.**

Description:

Data Type: double

Signal Type: real

Width: 3

Dimensions: [2 3 1 ]

**Table 3.1042.**

Description:

Data Type: double

Signal Type: real

Width: 3

Dimensions: [2 3 1 ]

## Blocks

### Parameters

#### "D" (Import)

**Table 3.1043. "D" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "For Each" (ForEach)

**Table 3.1044. "For Each" Parameters**

Parameter	Value
Partition index output data type	int32
Show partition index output port (zero-based indexing)	off
Partition	off off off on on
Partition Dimension	1 1 1 2 2
Partition Width	1 1 1

Parameter	Value
	1 1
Partition Offset	0 0 0 0 0
Concatenation Dimension	2 2
Number of iterations (-1 for auto-computed)	-1

### "Forces" (Outport)

**Table 3.1045. "Forces" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Moments" (Outport)

**Table 3.1046. "Moments" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Omega" (Inport)

**Table 3.1047. "Omega" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "rho" (Import)

**Table 3.1048. "rho" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Vb" (Import)

**Table 3.1049. "Vb" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "w" (Import)

**Table 3.1050. "w" Parameters**

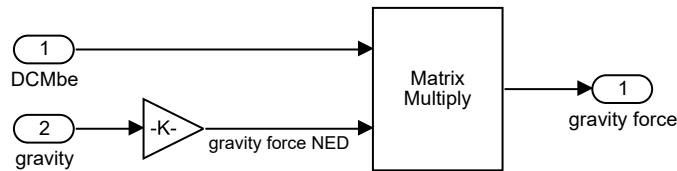
Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# Gravity Force Calculation

**Figure 3.109. nonlinearAirframe/Nonlinear/AC model/Gravity Force Calculation**



## Blocks

### Parameters

"DCMbe" (Input)

**Table 3.1051. "DCMbe" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"Gain1" (Gain)

**Table 3.1052. "Gain1" Parameters**

Parameter	Value
Gain	Vehicle.Airframe.mass
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "gravity" (Import)

**Table 3.1053. "gravity" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "gravity force" (Outport)

**Table 3.1054. "gravity force" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	N
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

<b>Parameter</b>	<b>Value</b>
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

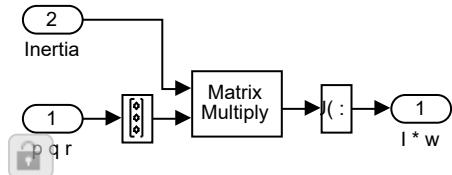
### "Product" (Product)

**Table 3.1055. "Product" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

# I X W

**Figure 3.110. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate omega\_dot/I x w**



## Blocks

### Parameters

"I \* w" (Outport)

**Table 3.1056. "I \* w" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off

Parameter	Value
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Inertia" (Import)

**Table 3.1057. "Inertia" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "p q r" (Import)

**Table 3.1058. "p q r" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.1059. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Reshape1" (Reshape)

**Table 3.1060. "Reshape1" Parameters**

Parameter	Value
Output dimensionality	Column vector (2-D)
Output dimensions	[1,1]

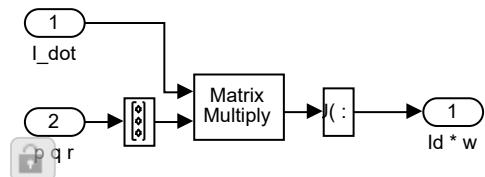
### "Reshape2" (Reshape)

**Table 3.1061. "Reshape2" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

## I x w1

**Figure 3.111. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate omega\_dot/I x w1**



## Blocks

### Parameters

**"I\_dot" (Import)**
**Table 3.1062. "I\_dot" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Id \* w" (Outport)**
**Table 3.1063. "Id \* w" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "p q r" (Import)

**Table 3.1064. "p q r" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.1065. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Reshape1" (Reshape)

**Table 3.1066. "Reshape1" Parameters**

Parameter	Value
Output dimensionality	Column vector (2-D)
Output dimensions	[1,1]

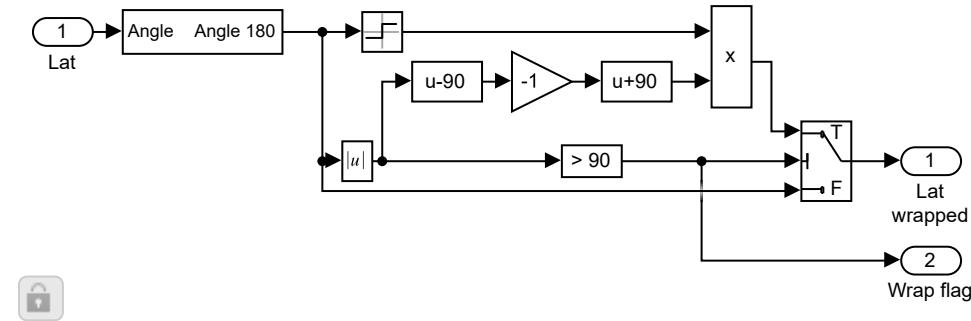
### "Reshape2" (Reshape)

**Table 3.1067. "Reshape2" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

## Latitude Wrap 90

**Figure 3.112. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LatLong wrap/Latitude Wrap 90**



## Blocks

### Parameters

#### "Abs1" (Abs)

**Table 3.1068. "Abs1" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Bias" (Bias)

**Table 3.1069. "Bias" Parameters**

Parameter	Value
Bias	-90
Saturate on integer overflow	off

### "Bias1" (Bias)

**Table 3.1070. "Bias1" Parameters**

Parameter	Value
Bias	+90
Saturate on integer overflow	off

### "Compare To Constant" (SubSystem)

**Table 3.1071. "Compare To Constant" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	90
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Divide1" (Product)

**Table 3.1072. "Divide1" Parameters**

Parameter	Value
Number of inputs	**
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain" (Gain)

**Table 3.1073. "Gain" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Lat" (Import)

**Table 3.1074. "Lat" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Lat wrapped" (Outport)

**Table 3.1075. "Lat wrapped" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Sign1" (Signum)

**Table 3.1076. "Sign1" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1

**"Switch" (Switch)****Table 3.1077. "Switch" Parameters**

Parameter	Value
Criteria for passing first input	u2 ~= 0
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

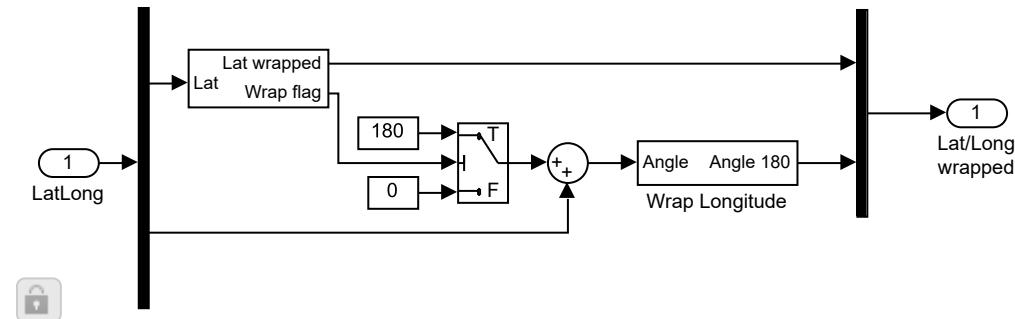
**"Wrap flag" (Outport)****Table 3.1078. "Wrap flag" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off

Parameter	Value
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## LatLong wrap

Figure 3.113. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LatLong wrap



## Blocks

### Parameters

#### "Constant" (Constant)

Table 3.1079. "Constant" Parameters

Parameter	Value
Constant value	180
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant1" (Constant)

**Table 3.1080. "Constant1" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Demux" (Demux)

**Table 3.1081. "Demux" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

### "Lat/Long wrapped" (Outport)

**Table 3.1082. "Lat/Long wrapped" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "LatLong" (Inport)

**Table 3.1083. "LatLong" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Mux" (Mux)

**Table 3.1084. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Sum" (Sum)

**Table 3.1085. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

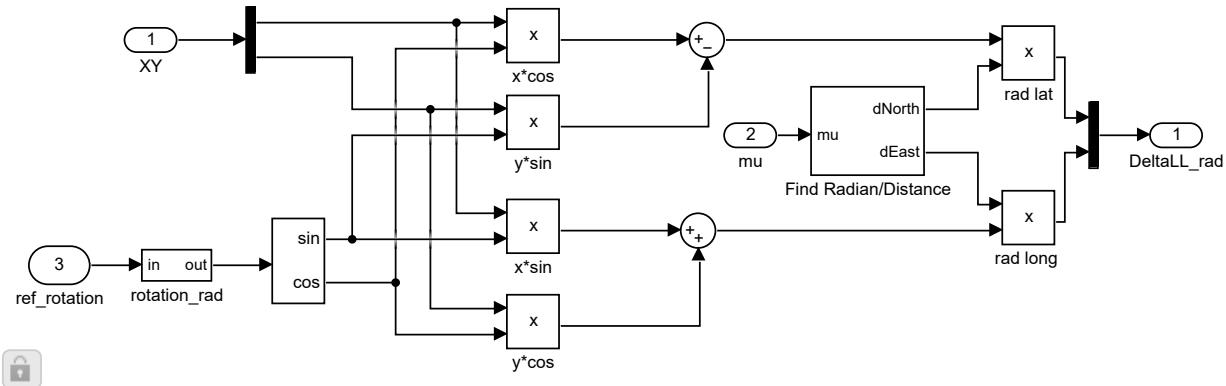
### "Switch1" (Switch)

**Table 3.1086. "Switch1" Parameters**

Parameter	Value
Criteria for passing first input	u2 ~= 0
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

# LongLat\_offset

**Figure 3.114. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LongLat\_offset**



## Blocks

### Parameters

"DeltaLL\_rad" (Outport)

**Table 3.1087. "DeltaLL\_rad" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off

Parameter	Value
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Demux" (Demux)

**Table 3.1088. "Demux" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

### "mu" (Import)

**Table 3.1089. "mu" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Mux" (Mux)

**Table 3.1090. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "rad lat" (Product)

**Table 3.1091. "rad lat" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "rad long " (Product)

**Table 3.1092. "rad long " Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "ref\_rotation" (Import)

**Table 3.1093. "ref\_rotation" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "SinCos" (Trigonometry)

**Table 3.1094. "SinCos" Parameters**

Parameter	Value
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Sum" (Sum)

**Table 3.1095. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

Parameter	Value
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum1" (Sum)

**Table 3.1096. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "x\*cos" (Product)

**Table 3.1097. "x\*cos" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "x\*sin" (Product)

**Table 3.1098. "x\*sin" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "XY" (Import)

**Table 3.1099. "XY" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y\*cos" (Product)

**Table 3.1100. "y\*cos" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

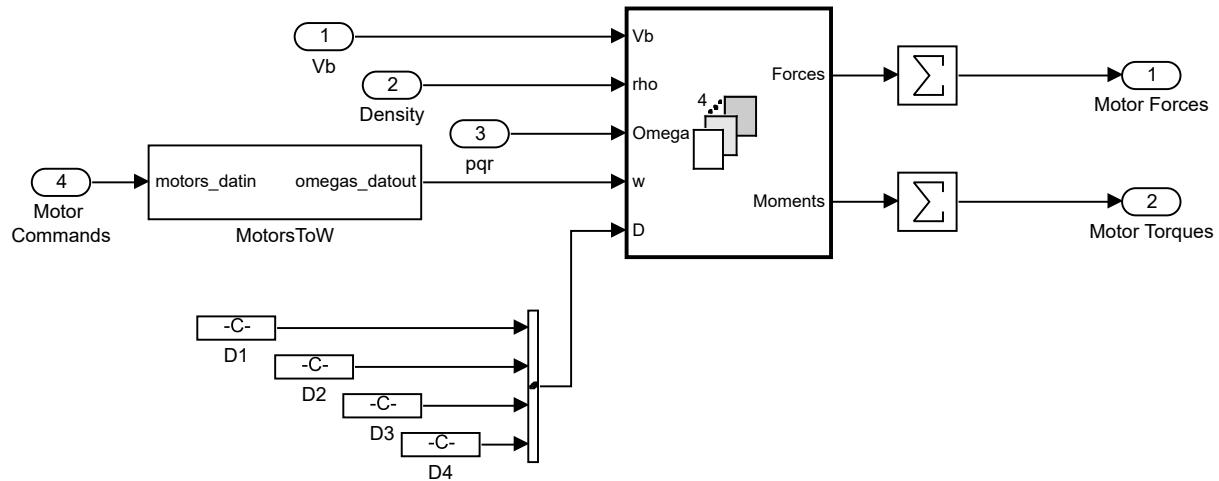
### "y\*sin" (Product)

**Table 3.1101. "y\*sin" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

# Motor Forces and Torques

**Figure 3.115. nonlinearAirframe/Nonlinear/AC model/Motor Forces and Torques**



## Blocks

### Parameters

"D1" (Constant)

**Table 3.1102. "D1" Parameters**

Parameter	Value
Constant value	[Vehicle.Airframe.xy -Vehicle.Airframe.xy Vehicle.Airframe.h]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "D2" (Constant)

**Table 3.1103. "D2" Parameters**

Parameter	Value
Constant value	[Vehicle.Airframe.xy Vehicle.Airframe.xy Vehicle.Airframe.h]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "D3" (Constant)

**Table 3.1104. "D3" Parameters**

Parameter	Value
Constant value	[-Vehicle.Airframe.xy Vehicle.Airframe.xy Vehicle.Airframe.h]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "D4" (Constant)

**Table 3.1105. "D4" Parameters**

Parameter	Value
Constant value	[-Vehicle.Airframe.xy -Vehicle.Airframe.xy Vehicle.Airframe.h]
Interpret vector parameters as 1-D	on

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Density" (Inport)

**Table 3.1106. "Density" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Motor Commands" (Inport)

**Table 3.1107. "Motor Commands" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Motor Forces" (Outport)

**Table 3.1108. "Motor Forces" Parameters**

Parameter	Value
Port number	1

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<b>Parameter</b>	<b>Value</b>
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	N
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Motor Torques" (Outport)

**Table 3.1109. "Motor Torques" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	N*m

<b>Parameter</b>	<b>Value</b>
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "pqr" (Inport)

**Table 3.1110. "pqr" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum of Elements" (Sum)

**Table 3.1111. "Sum of Elements" Parameters**

<b>Parameter</b>	<b>Value</b>
Icon shape	rectangular
List of signs	+
Sum over	Specified dimension
Dimension	2
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum of Elements1" (Sum)

**Table 3.1112. "Sum of Elements1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+
Sum over	Specified dimension
Dimension	2
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Vb" (Import)

**Table 3.1113. "Vb" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

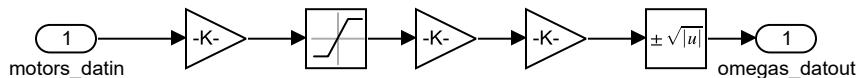
### "Vector Concatenate" (Concatenate)

**Table 3.1114. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	4
Mode	Multidimensional array
Concatenate dimension	2

## MotorsToW

**Figure 3.116. nonlinearAirframe/Nonlinear/AC model/Motor Forces and Torques/MotorsToW**



## Blocks

### Parameters

#### "Motordirections" (Gain)

**Table 3.1115. "Motordirections" Parameters**

Parameter	Value
Gain	[1 -1 1 -1]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on

Parameter	Value
Sample time (-1 for inherited)	-1

### "Motordirections1" (Gain)

**Table 3.1116. "Motordirections1" Parameters**

Parameter	Value
Gain	[1 -1 1 -1]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "motors\_datin" (Import)

**Table 3.1117. "motors\_datin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"motorsToW2\_Gain" (Gain)**
**Table 3.1118. "motorsToW2\_Gain" Parameters**

Parameter	Value
Gain	Vehicle.Motor.commandToW2 Gain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

**"omegas\_datout" (Outport)**
**Table 3.1119. "omegas\_datout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

<b>Parameter</b>	<b>Value</b>
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Saturation5" (Saturate)

**Table 3.1120. "Saturation5" Parameters**

<b>Parameter</b>	<b>Value</b>
Upper limit	Vehicle.Motor.maxLimit
Lower limit	Vehicle.Motor.minLimit
Treat as gain when linearizing	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

### "Signed Sqrt" (Sqrt)

**Table 3.1121. "Signed Sqrt" Parameters**

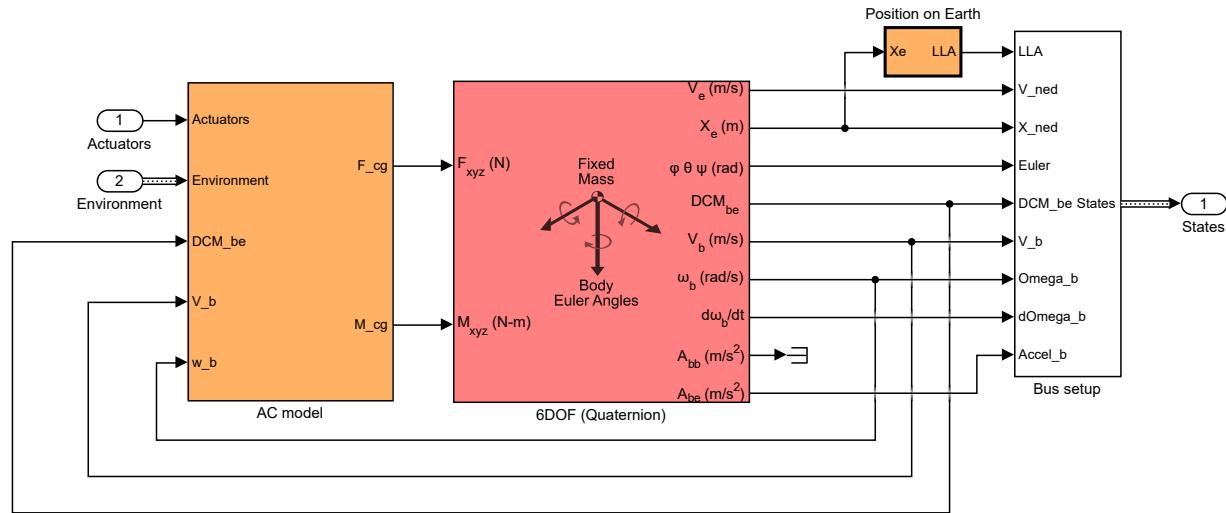
<b>Parameter</b>	<b>Value</b>
Function	signedSqrt
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Exact
Number of iterations	3

## Nonlinear

Checksum: 1905934492 3551346852 3381672838 633650839

**Figure 3.117. nonlinearAirframe/Nonlinear**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1122.**

Description:  
Data Type: single  
Signal Type: real  
Width: 4  
Dimensions: [2 1 4 ]

**Table 3.1123.**

Description:  
Data Type: EnvironmentBus  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1124.**

Description:  
Data Type: StatesBus  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

## Blocks

### Parameters

#### "6DOF (Quaternion)" (SubSystem)

**Table 3.1125. "6DOF (Quaternion)" Parameters**

Parameter	Value
shared_aeroblksharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamUnits	Metric (MK S)
shared_aeroblksharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamMasstype	Fixed

<b>Parameter</b>	<b>Value</b>
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamRepresentation	Euler Angles
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamInitialpositioninertialaxesXeYeZe	init.posNED
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamInitialvelocityinbodyaxesUvw	init.vb
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamInitialEulerorientationrollpitchyaw	init.euler
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamInitialbodyrotationratespqr	init.angRates
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamInitialmass	Vehicle.Airframe.mass
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMBodyAxisParamInertia	Vehicle.Airframe.inertia
shared_aeroblkssharedaeroblk6dofbodyinertialAccelFlag	on
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMStateNamePosition	"
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMStateNameVelocity	"
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMStateNameEulerAngles	"
shared_aeroblkssharedaeroblk6dofbodyblock6DOFEoMStateNameRotationRates	"

### "Actuators" (Import)

**Table 3.1126. "Actuators" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Environment" (Import)

**Table 3.1127. "Environment" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "States" (Outport)

**Table 3.1128. "States" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

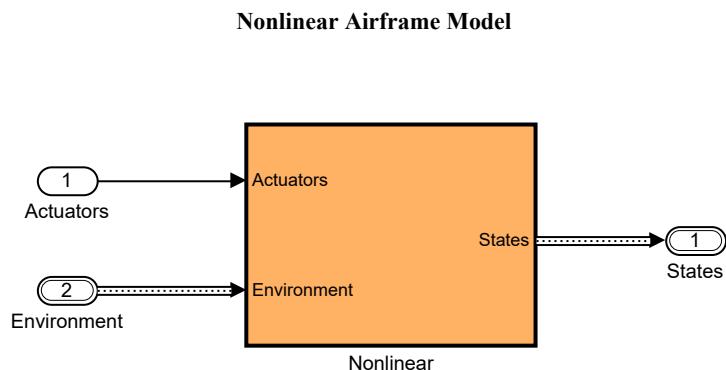
## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# nonlinearAirframe

Checksum: 3918741883 1515522514 159627213 4072635812

**Figure 3.118. nonlinearAirframe**



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## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1129.**

Description:  
Data Type: single  
Signal Type: real  
Width: 4  
Dimensions: [2 1 4 ]

**Table 3.1130.**

Description:  
Data Type: EnvironmentBus  
Signal Type: real  
Width: 1

Dimensions: [1 1]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1131.**

Description:

Data Type: StatesBus

Signal Type: real

Width: 1

Dimensions: [1 1]

## Blocks

### Parameters

#### "Actuators" (Import)

**Table 3.1132. "Actuators" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	[1 4]
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	single

#### "Environment" (Import)

**Table 3.1133. "Environment" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Bus: EnvironmentBus

### "States" (Outport)

**Table 3.1134. "States" Parameters**

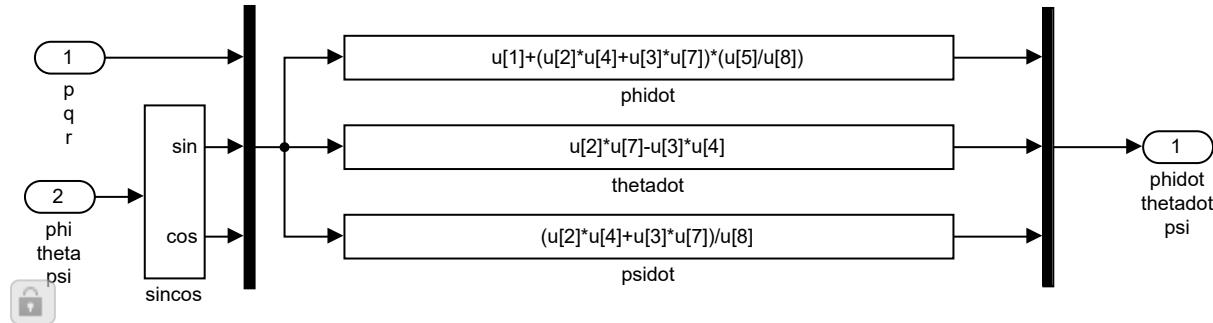
Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Bus: StatesBus
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	on
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# phidot thetadot psidot

**Figure 3.119. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate DCM & Euler Angles/phidot thetadot psidot**



## Blocks

### Parameters

"Mux1" (Mux)

**Table 3.1135. "Mux1" Parameters**

Parameter	Value
Number of inputs	[3 3 3]
Display option	bar

"Mux2" (Mux)

**Table 3.1136. "Mux2" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "p q r" (Import)

**Table 3.1137. "p q r" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "phi theta psi" (Import)

**Table 3.1138. "phi theta psi" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "phidot" (Fcn)

**Table 3.1139. "phidot" Parameters**

Parameter	Value
Expression	$u[1]+(u[2]*u[4]+u[3]*u[7])*(u[5]/u[8])$
Sample time (-1 for inherited)	-1

### "phidot thetadot psi" (Outport)

**Table 3.1140. "phidot thetadot psi" Parameters**

Parameter	Value
Port number	1
Icon display	Port number

<b>Parameter</b>	<b>Value</b>
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	0
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "psidot" (Fcn)

**Table 3.1141. "psidot" Parameters**

<b>Parameter</b>	<b>Value</b>
Expression	$(u[2]*u[4]+u[3]*u[7])/u[8]$
Sample time (-1 for inherited)	-1

### "sincos" (Trigonometry)

**Table 3.1142. "sincos" Parameters**

<b>Parameter</b>	<b>Value</b>
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian

Parameter	Value
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

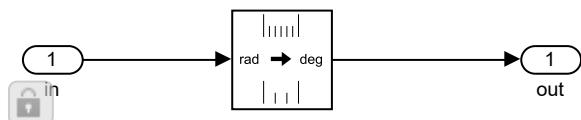
### "thetadot" (Fcn)

**Table 3.1143. "thetadot" Parameters**

Parameter	Value
Expression	$u[2]*u[7]-u[3]*u[4]$
Sample time (-1 for inherited)	-1

## pos\_deg

**Figure 3.120. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/pos\_deg**



## Blocks

### Parameters

#### "in" (Inport)

**Table 3.1144. "in" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "out" (Outport)

**Table 3.1145. "out" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	deg
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

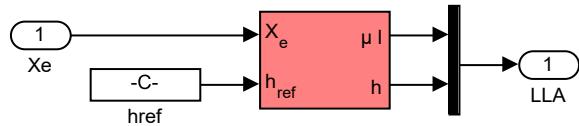
### "Unit Conversion" (UnitConversion)

**Table 3.1146. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

## Position on Earth

Checksum: 2488600386 1733903447 1114691593 2743263834

**Figure 3.121. nonlinearAirframe/Nonlinear/Position on Earth**


## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1147.**

Description:  
Data Type: double  
Signal Type: real  
Width: 3  
Dimensions: [1 3 ]

### Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1148.**

Description:  
Data Type: double  
Signal Type: real  
Width: 3  
Dimensions: [1 3 ]

## Blocks

### Parameters

### "Flat Earth to LLA" (SubSystem)

**Table 3.1149. "Flat Earth to LLA" Parameters**

Parameter	Value
aeroblksaeroblktransformblockFlatEarthtoLLAParamUnits	Metric (MKS)
aeroblksaeroblktransformblockFlatEarthtoLLAParamPlanetmodel	Earth (WGS84)
aeroblksaeroblktransformblockFlatEarthtoLLAParamInputReferencePosition	off
aeroblksaeroblktransformblockFlatEarthtoLLAParamInitialgeodeticlatitude andlongitudedeg	init.posLLA(1:2)
aeroblksaeroblktransformblockFlatEarthtoLLAParamDirectionofflatEarthx axisdegreesclockwisefromnorth	Vehicle.PositionOnEarth.FlatEarthToLLA.xAxis

### "href" (Constant)

**Table 3.1150. "href" Parameters**

Parameter	Value
Constant value	Vehicle.PositionOnEarth.href
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "LLA" (Outport)

**Table 3.1151. "LLA" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

<b>Parameter</b>	<b>Value</b>
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Mux" (Mux)

**Table 3.1152. "Mux" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of inputs	2
Display option	bar

### "Xe" (Import)

**Table 3.1153. "Xe" Parameters**

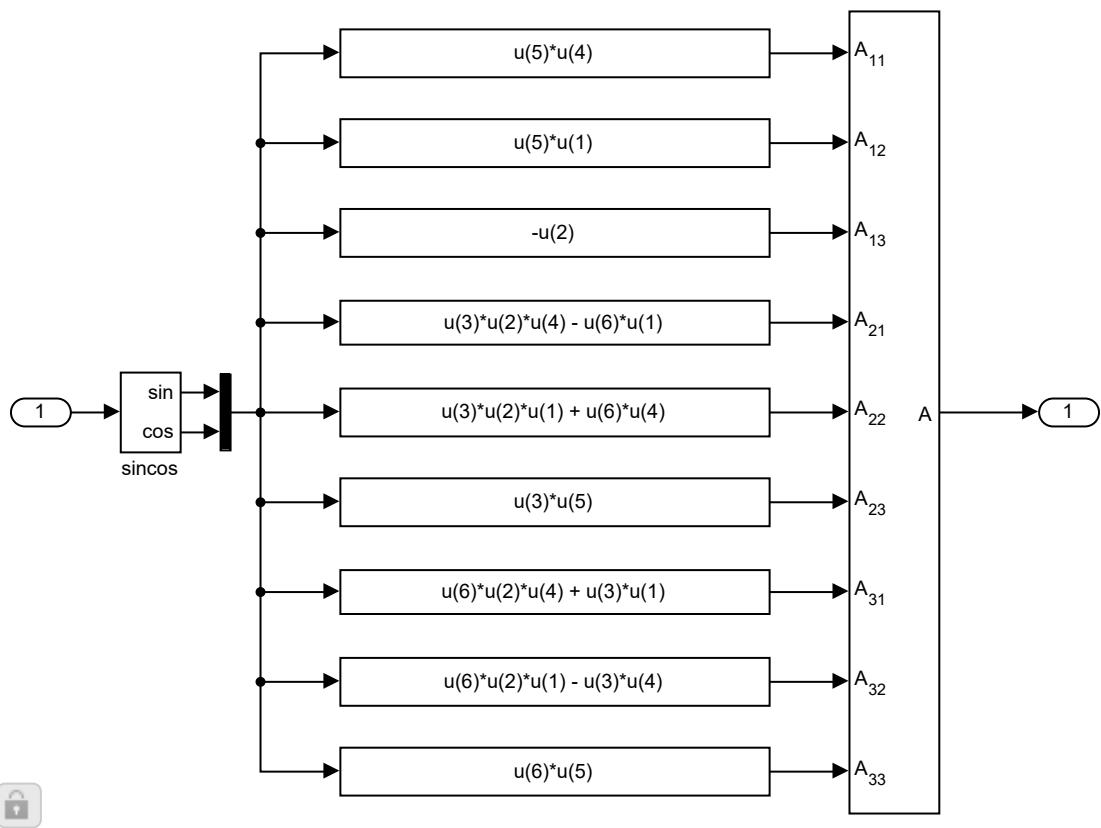
<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## Rotation Angles to Direction Cosine Matrix

**Figure 3.122. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate DCM & Euler Angles/Rotation Angles to Direction Cosine Matrix**



## Blocks

## Parameters

### "Fcn11" (Fcn)

**Table 3.1154. "Fcn11" Parameters**

Parameter	Value
Expression	$u(5)*u(4)$
Sample time (-1 for inherited)	-1

### "Fcn12" (Fcn)

**Table 3.1155. "Fcn12" Parameters**

Parameter	Value
Expression	$u(5)*u(1)$
Sample time (-1 for inherited)	-1

### "Fcn13" (Fcn)

**Table 3.1156. "Fcn13" Parameters**

Parameter	Value
Expression	$-u(2)$
Sample time (-1 for inherited)	-1

### "Fcn21" (Fcn)

**Table 3.1157. "Fcn21" Parameters**

Parameter	Value
Expression	$u(3)*u(2)*u(4) - u(6)*u(1)$
Sample time (-1 for inherited)	-1

### "Fcn22" (Fcn)

**Table 3.1158. "Fcn22" Parameters**

Parameter	Value
Expression	$u(3)*u(2)*u(1) + u(6)*u(4)$
Sample time (-1 for inherited)	-1

### "Fcn23" (Fcn)

**Table 3.1159. "Fcn23" Parameters**

Parameter	Value
Expression	$u(3)*u(5)$
Sample time (-1 for inherited)	-1

### "Fcn31" (Fcn)

**Table 3.1160. "Fcn31" Parameters**

Parameter	Value
Expression	$u(6)*u(2)*u(4) + u(3)*u(1)$
Sample time (-1 for inherited)	-1

### "Fcn32" (Fcn)

**Table 3.1161. "Fcn32" Parameters**

Parameter	Value
Expression	$u(6)*u(2)*u(1) - u(3)*u(4)$
Sample time (-1 for inherited)	-1

### "Fcn33" (Fcn)

**Table 3.1162. "Fcn33" Parameters**

Parameter	Value
Expression	$u(6)*u(5)$
Sample time (-1 for inherited)	-1

### "In1" (Import)

**Table 3.1163. "In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Mux" (Mux)

**Table 3.1164. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Out1" (Outport)

**Table 3.1165. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	1
Port dimensions (-1 for inherited)	[3,3]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0

Parameter	Value
Interpret vector parameters as 1-D	off

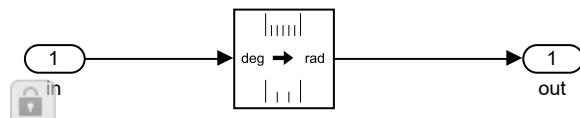
### "sincos" (Trigonometry)

**Table 3.1166. "sincos" Parameters**

Parameter	Value
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

## rotation\_rad

**Figure 3.123. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LongLat\_offset/rotation\_rad**



## Blocks

### Parameters

#### "in" (Inport)

**Table 3.1167. "in" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Inherit: auto

### "out" (Outport)

**Table 3.1168. "out" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	rad
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Unit Conversion" (UnitConversion)

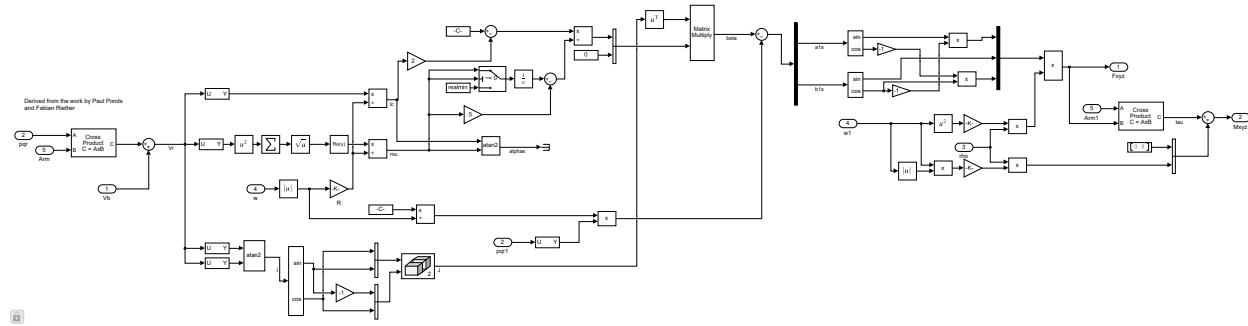
**Table 3.1169. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

# Rotor Dynamics

Checksum: 3419625829 2884726080 1592735309 220572275

**Figure 3.124. nonlinearAirframe/Nonlinear/AC model/Motor Forces and Torques/For Each Subsystem/Rotor Dynamics**



## Blocks

### Parameters

#### "Abs" (Abs)

**Table 3.1170. "Abs" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

#### "Abs1" (Abs)

**Table 3.1171. "Abs1" Parameters**

Parameter	Value
Enable zero-crossing detection	on

Parameter	Value
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Arm" (Import)

**Table 3.1172. "Arm" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	[3 1]
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Arm1" (InportShadow)

**Table 3.1173. "Arm1" Parameters**

Parameter	Value
Port number	5
Port name	Arm
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit

Parameter	Value
Port dimensions (-1 for inherited)	[3 1]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Complex to Real-Imag" (ComplexToRealImag)

**Table 3.1174. "Complex to Real-Imag" Parameters**

Parameter	Value
Output	Real
Sample time (-1 for inherited)	-1

### "Constant" (Constant)

**Table 3.1175. "Constant" Parameters**

Parameter	Value
Constant value	$8/3 * \text{Vehicle.Rotor.theta0} + 2 * \text{Vehicle.Rotor.theta1}$
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant1" (Constant)

**Table 3.1176. "Constant1" Parameters**

Parameter	Value
Constant value	0

Parameter	Value
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant2" (Constant)

**Table 3.1177. "Constant2" Parameters**

Parameter	Value
Constant value	16/Vehicle.Rotor.lock
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant3" (Constant)

**Table 3.1178. "Constant3" Parameters**

Parameter	Value
Constant value	[0 0]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf

Parameter	Value
Frame period	inf

### "Constant4" (Constant)

**Table 3.1179. "Constant4" Parameters**

Parameter	Value
Constant value	realmin
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Demux" (Demux)

**Table 3.1180. "Demux" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

### "Divide" (Product)

**Table 3.1181. "Divide" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide1" (Product)

**Table 3.1182. "Divide1" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide2" (Product)

**Table 3.1183. "Divide2" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Divide3" (Product)

**Table 3.1184. "Divide3" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Fxyz" (Outport)

**Table 3.1185. "Fxyz" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	[3 1]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Gain" (Gain)

**Table 3.1186. "Gain" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain1" (Gain)

**Table 3.1187. "Gain1" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain2" (Gain)

**Table 3.1188. "Gain2" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

Parameter	Value
Sample time (-1 for inherited)	-1

### "Math Function" (Math)

**Table 3.1189. "Math Function" Parameters**

Parameter	Value
Function	square
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Math Function1" (Math)

**Table 3.1190. "Math Function1" Parameters**

Parameter	Value
Function	reciprocal
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Math Function2" (Math)

**Table 3.1191. "Math Function2" Parameters**

Parameter	Value
Function	transpose
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Math Function3" (Math)

**Table 3.1192. "Math Function3" Parameters**

Parameter	Value
Function	square
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Matrix Concatenate" (Concatenate)

**Table 3.1193. "Matrix Concatenate" Parameters**

Parameter	Value
Number of inputs	2
Mode	Multidimensional array
Concatenate dimension	2

### "Mux" (Mux)

**Table 3.1194. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "Mxyz" (Outport)

**Table 3.1195. "Mxyz" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	[3 1]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "pqr" (Inport)

**Table 3.1196. "pqr" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "pqr1" (InportShadow)

**Table 3.1197. "pqr1" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Port name	pqr
Is a bus element port block	off
Icon display	Port number

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Parameter	Value
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	3
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Product" (Product)

**Table 3.1198. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.1199. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product2" (Product)

**Table 3.1200. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product3" (Product)

**Table 3.1201. "Product3" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product4" (Product)

**Table 3.1202. "Product4" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product5" (Product)

**Table 3.1203. "Product5" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product6" (Product)

**Table 3.1204. "Product6" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Product7" (Product)**
**Table 3.1205. "Product7" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.*.)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"R" (Gain)**
**Table 3.1206. "R" Parameters**

Parameter	Value
Gain	Vehicle.Rotor.radius
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "R1" (Gain)

**Table 3.1207. "R1" Parameters**

Parameter	Value
Gain	2
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "R2" (Gain)

**Table 3.1208. "R2" Parameters**

Parameter	Value
Gain	.5
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

Parameter	Value
Sample time (-1 for inherited)	-1

### "R3" (Gain)

**Table 3.1209. "R3" Parameters**

Parameter	Value
Gain	Vehicle.Rotor.Ct*Vehicle.Rotor.radius^2*Vehicle.Rotor.area
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "R4" (Gain)

**Table 3.1210. "R4" Parameters**

Parameter	Value
Gain	-Vehicle.Rotor.Cq*Vehicle.Rotor.radius^3*Vehicle.Rotor.area
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "rho" (Inport)

**Table 3.1211. "rho" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Selector" (Selector)

**Table 3.1212. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

### "Selector1" (Selector)

**Table 3.1213. "Selector1" Parameters**

Parameter	Value
Number of input dimensions	1

<b>Parameter</b>	<b>Value</b>
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3]
Output Size	1

### "Selector2" (Selector)

**Table 3.1214. "Selector2" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[2]
Output Size	1

### "Selector3" (Selector)

**Table 3.1215. "Selector3" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1]
Output Size	1
Input port size	3

Parameter	Value
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1]
Output Size	1

### "Selector4" (Selector)

**Table 3.1216. "Selector4" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2 1]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[2 1]
Output Size	1

### "Sqrt" (Sqrt)

**Table 3.1217. "Sqrt" Parameters**

Parameter	Value
Function	sqrt
Output signal type	complex
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule

Parameter	Value
Method	Exact
Number of iterations	3

### "Sum" (Sum)

**Table 3.1218. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum of Elements" (Sum)

**Table 3.1219. "Sum of Elements" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum1" (Sum)

**Table 3.1220. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum2" (Sum)

**Table 3.1221. "Sum2" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

<b>Parameter</b>	<b>Value</b>
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum3" (Sum)

**Table 3.1222. "Sum3" Parameters**

<b>Parameter</b>	<b>Value</b>
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum4" (Sum)

**Table 3.1223. "Sum4" Parameters**

<b>Parameter</b>	<b>Value</b>
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Switch" (Switch)

**Table 3.1224. "Switch" Parameters**

Parameter	Value
Criteria for passing first input	$u2 \approx 0$
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

### "Trigonometric Function" (Trigonometry)

**Table 3.1225. "Trigonometric Function" Parameters**

Parameter	Value
Function	atan2
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function1" (Trigonometry)

**Table 3.1226. "Trigonometric Function1" Parameters**

Parameter	Value
Function	atan2
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function2" (Trigonometry)

**Table 3.1227. "Trigonometric Function2" Parameters**

Parameter	Value
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function3" (Trigonometry)

**Table 3.1228. "Trigonometric Function3" Parameters**

Parameter	Value
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function4" (Trigonometry)

**Table 3.1229. "Trigonometric Function4" Parameters**

Parameter	Value
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Vb" (Import)

**Table 3.1230. "Vb" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Vector Concatenate" (Concatenate)

**Table 3.1231. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	2
Mode	Vector
Concatenate dimension	1

### "Vector Concatenate1" (Concatenate)

**Table 3.1232. "Vector Concatenate1" Parameters**

Parameter	Value
Number of inputs	2
Mode	Vector
Concatenate dimension	1

### "Vector Concatenate2" (Concatenate)

**Table 3.1233. "Vector Concatenate2" Parameters**

Parameter	Value
Number of inputs	2
Mode	Vector
Concatenate dimension	1

### "Vector Concatenate3" (Concatenate)

**Table 3.1234. "Vector Concatenate3" Parameters**

Parameter	Value
Number of inputs	2
Mode	Vector
Concatenate dimension	1

### "w" (Inport)

**Table 3.1235. "w" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	[1 1]
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"w1" (ImportShadow)****Table 3.1236. "w1" Parameters**

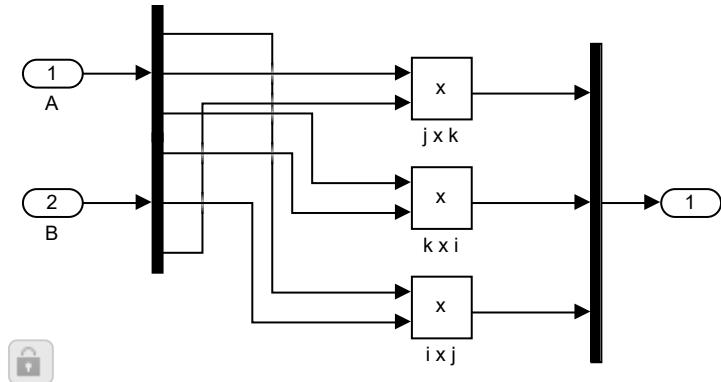
Parameter	Value
Port number	4
Port name	w
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	[1 1]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# Subsystem

**Figure 3.125. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate omega\_dot/3x3 Cross Product/Subsystem**



## Blocks

### Parameters

#### "A" (Inport)

**Table 3.1237. "A" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "B" (Inport)

**Table 3.1238. "B" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Demux" (Demux)

**Table 3.1239. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.1240. "Demux1" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "i x j" (Product)

**Table 3.1241. "i x j" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "j x k" (Product)

**Table 3.1242. "j x k" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "k x i" (Product)

**Table 3.1243. "k x i" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on

Parameter	Value
Sample time (-1 for inherited)	-1

### "Mux" (Mux)

**Table 3.1244. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

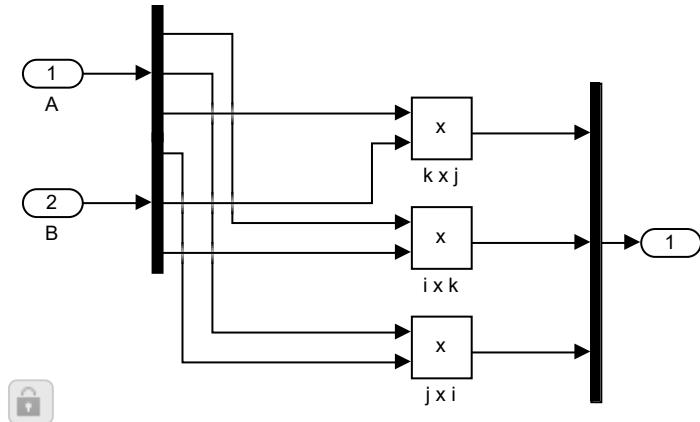
### "Out1" (Outport)

**Table 3.1245. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# Subsystem1

**Figure 3.126. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Calculate omega\_dot/3x3 Cross Product/Subsystem1**



## Blocks

### Parameters

"A" (Inport)

**Table 3.1246. "A" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"B" (Inport)

**Table 3.1247. "B" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Demux" (Demux)

**Table 3.1248. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.1249. "Demux1" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "i x k" (Product)

**Table 3.1250. "i x k" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "j x i" (Product)

**Table 3.1251. "j x i" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "k x j" (Product)

**Table 3.1252. "k x j" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on

Parameter	Value
Sample time (-1 for inherited)	-1

### "Mux" (Mux)

**Table 3.1253. "Mux" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

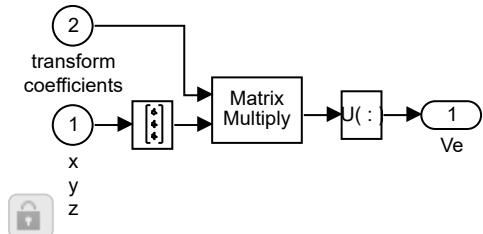
### "Out1" (Outport)

**Table 3.1254. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# transform to Inertial axes

**Figure 3.127. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/transform to Inertial axes**



## Blocks

### Parameters

"Product" (Product)

**Table 3.1255. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

**"Reshape1" (Reshape)****Table 3.1256. "Reshape1" Parameters**

Parameter	Value
Output dimensionality	Column vector (2-D)
Output dimensions	[1,1]

**"Reshape2" (Reshape)****Table 3.1257. "Reshape2" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

**"transform coefficients" (Inport)****Table 3.1258. "transform coefficients" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Ve" (Outport)****Table 3.1259. "Ve" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

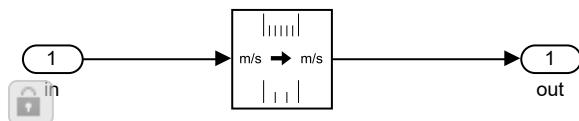
### "x y z" (Import)

**Table 3.1260. "x y z" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Velocity Conversion

**Figure 3.128. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Velocity Conversion**



## Blocks

### Parameters

#### "in" (Import)

**Table 3.1261. "in" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "out" (Outport)

**Table 3.1262. "out" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

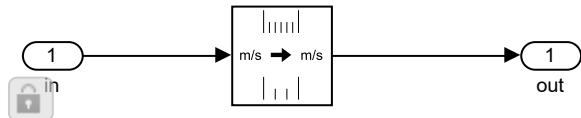
### "Unit Conversion" (UnitConversion)

**Table 3.1263. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

## Velocity Conversion1

**Figure 3.129. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Velocity Conversion1**



## Blocks

### Parameters

#### "in" (Inport)

**Table 3.1264. "in" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "out" (Outport)

**Table 3.1265. "out" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

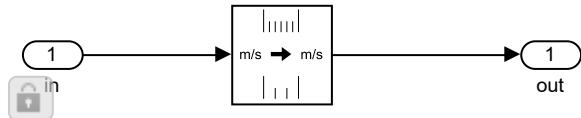
### "Unit Conversion" (UnitConversion)

**Table 3.1266. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit: Inherit via internal rule

# Velocity Conversion2

**Figure 3.130. nonlinearAirframe/Nonlinear/6DOF (Quaternion)/Velocity Conversion2**



## Blocks

### Parameters

#### "in" (Inport)

**Table 3.1267. "in" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "out" (Outport)

**Table 3.1268. "out" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

Parameter	Value
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	m/s
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

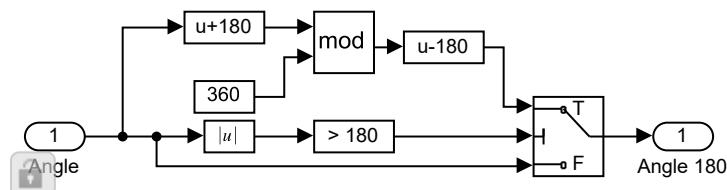
### "Unit Conversion" (UnitConversion)

**Table 3.1269. "Unit Conversion" Parameters**

Parameter	Value
Output data type	Inherit; Inherit via internal rule

## Wrap Angle 180

**Figure 3.131. nonlinearAirframe/Nonlinear/Position on Earth/Flat Earth to LLA/LatLong wrap/Latitude Wrap 90/Wrap Angle 180**



## Blocks

## Parameters

### "Abs" (Abs)

**Table 3.1270. "Abs" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Angle" (Import)

**Table 3.1271. "Angle" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Angle 180" (Outport)

**Table 3.1272. "Angle 180" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

Parameter	Value
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Bias" (Bias)

**Table 3.1273. "Bias" Parameters**

Parameter	Value
Bias	180
Saturate on integer overflow	off

### "Bias1" (Bias)

**Table 3.1274. "Bias1" Parameters**

Parameter	Value
Bias	-180
Saturate on integer overflow	off

### "Compare To Constant" (SubSystem)

**Table 3.1275. "Compare To Constant" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	180
SimulinkmasksOutputDataType_MP	boolean

Parameter	Value
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Constant2" (Constant)

**Table 3.1276. "Constant2" Parameters**

Parameter	Value
Constant value	360
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Math Function1" (Math)

**Table 3.1277. "Math Function1" Parameters**

Parameter	Value
Function	mod
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

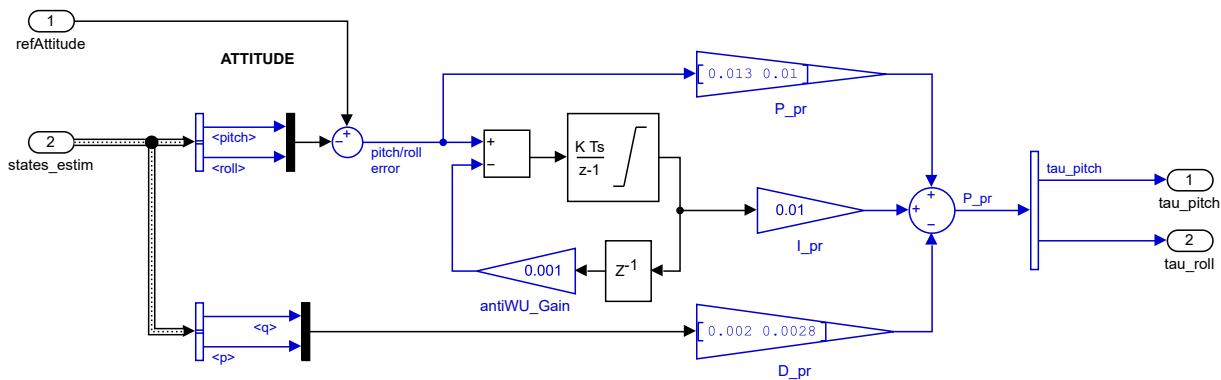
## "Switch" (Switch)

**Table 3.1278. "Switch" Parameters**

Parameter	Value
Criteria for passing first input	$u2 \approx 0$
Threshold	180
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

## Attitude

**Figure 3.132. flightController/Flight Controller/Attitude**



## Blocks

## Parameters

### "Add" (Sum)

**Table 3.1279. "Add" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "antiWU\_Gain" (Gain)

**Table 3.1280. "antiWU\_Gain" Parameters**

Parameter	Value
Gain	0.001
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Bus Selector3" (BusSelector)

**Table 3.1281. "Bus Selector3" Parameters**

Parameter	Value
Output signals	pitch,roll
Output as virtual bus	off
InputSignals	X Y Z yaw pitch roll dx dy dz p q r

#### Output Hierarchy:

1. Bus Selector3
  1. <pitch>
  2. <roll>

### "Bus Selector4" (BusSelector)

**Table 3.1282. "Bus Selector4" Parameters**

Parameter	Value
Output signals	q,p
Output as virtual bus	off
InputSignals	X Y Z yaw pitch roll dx dy dz p q r

#### Output Hierarchy:

1. Bus Selector4
  1. <q>
  2. <p>

### "D\_pr" (Gain)

**Table 3.1283. "D\_pr" Parameters**

Parameter	Value
Gain	[0.002;0.0028]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Delay" (Delay)

**Table 3.1284. "Delay" Parameters**

Parameter	Value
Delay length source	Dialog
Delay length	1
Delay upper limit	100
Initial condition source	Dialog
Initial condition	0
External reset	None
Show enable port	off
Prevent direct feedthrough	off
Diagnostic for delay length	None
Remove delay length check in generated code	off
Input processing	Elements as channels (sample based)
Use circular buffer for state	off
Sample time (-1 for inherited)	-1

Parameter	Value
State name must resolve to Simulink signal object	off

### "Demux" (Demux)

**Table 3.1285. "Demux" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

### "Discrete-Time Integrator" (DiscreteIntegrator)

**Table 3.1286. "Discrete-Time Integrator" Parameters**

Parameter	Value
Integrator method	Integration: Forward Euler
Gain value	1.0
External reset	none
Initial condition source	internal
Initial condition	0
Sample time (-1 for inherited)	Ts
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Limit output	on
Upper saturation limit	2
Lower saturation limit	-2
Show saturation port	off
Show state port	off
Ignore limit and reset when linearizing	off
State name must resolve to Simulink signal object	off

### "I\_pr" (Gain)

**Table 3.1287. "I\_pr" Parameters**

Parameter	Value
Gain	0.01
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Mux" (Mux)

**Table 3.1288. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Mux1" (Mux)

**Table 3.1289. "Mux1" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "P\_pr" (Gain)

**Table 3.1290. "P\_pr" Parameters**

Parameter	Value
Gain	[0.013;0.01]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "refAttitude" (Import)

**Table 3.1291. "refAttitude" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "states\_estim" (Import)

**Table 3.1292. "states\_estim" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum16" (Sum)

**Table 3.1293. "Sum16" Parameters**

Parameter	Value
Icon shape	round
List of signs	++-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum19" (Sum)

**Table 3.1294. "Sum19" Parameters**

Parameter	Value
Icon shape	round
List of signs	+ -
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]

<b>Parameter</b>	<b>Value</b>
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "tau\_pitch" (Outport)

**Table 3.1295. "tau\_pitch" Parameters**

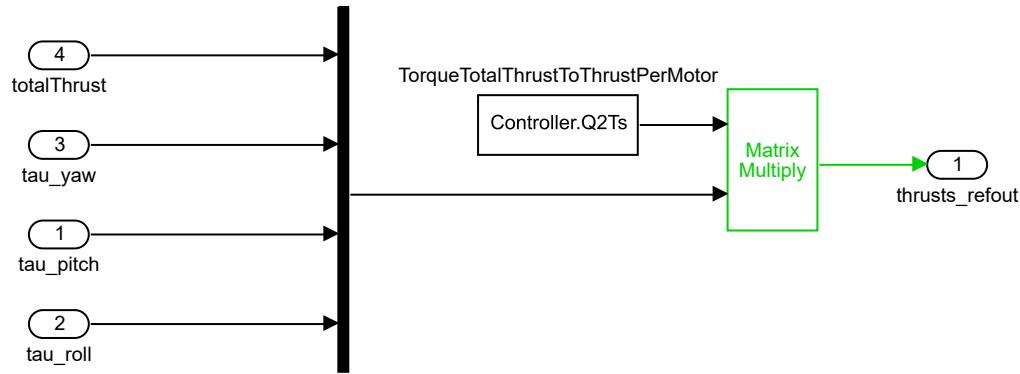
<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

**"tau\_roll" (Outport)****Table 3.1296. "tau\_roll" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# ControlMixer

**Figure 3.133. flightController/Flight Controller/ControlMixer**



## Blocks

### Parameters

"Mux2" (Mux)

**Table 3.1297. "Mux2" Parameters**

Parameter	Value
Number of inputs	4
Display option	bar

"Product" (Product)

**Table 3.1298. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "tau\_pitch" (Import)

**Table 3.1299. "tau\_pitch" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "tau\_roll" (Import)

**Table 3.1300. "tau\_roll" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "tau\_yaw" (Import)

**Table 3.1301. "tau\_yaw" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "thrusts\_refout" (Outport)

**Table 3.1302. "thrusts\_refout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

**"TorqueTotalThrustToThrustPerMotor" (Constant)**

**Table 3.1303. "TorqueTotalThrustToThrustPerMotor" Parameters**

Parameter	Value
Constant value	Controller.Q2Ts
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

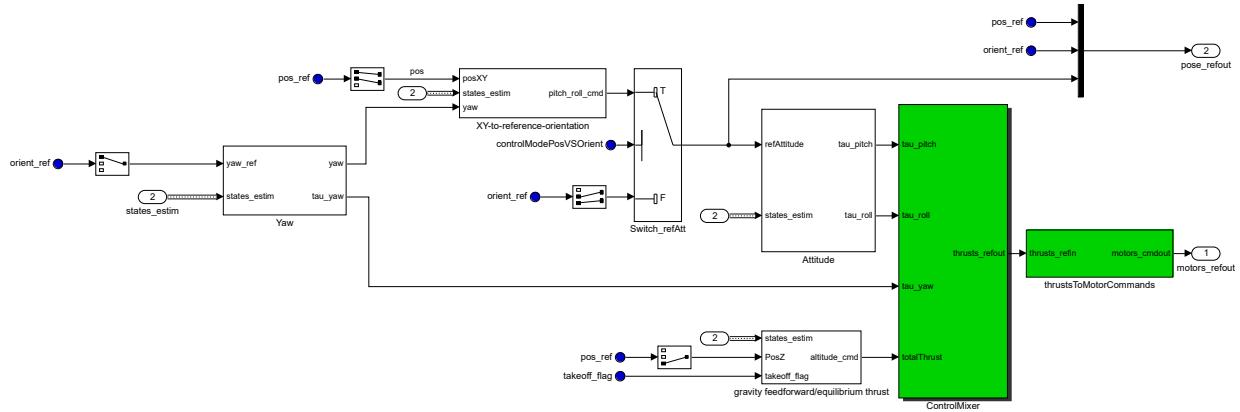
**"totalThrust" (Inport)**

**Table 3.1304. "totalThrust" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# Flight Controller

**Figure 3.134. flightController/Flight Controller**



## Blocks

### Parameters

#### "In Bus Element" (Inport)

**Table 3.1305. "In Bus Element" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "In Bus Element1" (Inport)

**Table 3.1306. "In Bus Element1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "In Bus Element2" (Import)

**Table 3.1307. "In Bus Element2" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "In Bus Element3" (Import)

**Table 3.1308. "In Bus Element3" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "In Bus Element4" (Import)

**Table 3.1309. "In Bus Element4" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

### "In Bus Element5" (Import)

**Table 3.1310. "In Bus Element5" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "In Bus Element6" (Import)

**Table 3.1311. "In Bus Element6" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "In Bus Element7" (Import)

**Table 3.1312. "In Bus Element7" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "motors\_refout" (Outport)

**Table 3.1313. "motors\_refout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Mux2" (Mux)

**Table 3.1314. "Mux2" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "pose\_refout" (Outport)

**Table 3.1315. "pose\_refout" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Selector" (Selector)

**Table 3.1316. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	3
Output Size	1
Input port size	3

Parameter	Value
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	3
Output Size	1

### "Selector1" (Selector)

**Table 3.1317. "Selector1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

### "Selector2" (Selector)

**Table 3.1318. "Selector2" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2 3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[2 3]
Output Size	1

### "Selector3" (Selector)

**Table 3.1319. "Selector3" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	1
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	1
Output Size	1

### "states\_estim" (Inport)

**Table 3.1320. "states\_estim" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "states\_estim1" (InportShadow)

**Table 3.1321. "states\_estim1" Parameters**

Parameter	Value
Port number	2
Port name	states_estim
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]

<b>Parameter</b>	<b>Value</b>
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "states\_estim2" (InportShadow)

**Table 3.1322. "states\_estim2" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Port name	states_estim
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "states\_estim3" (InportShadow)

**Table 3.1323. "states\_estim3" Parameters**

Parameter	Value
Port number	2
Port name	states_estim
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Switch\_refAtt" (Switch)

**Table 3.1324. "Switch\_refAtt" Parameters**

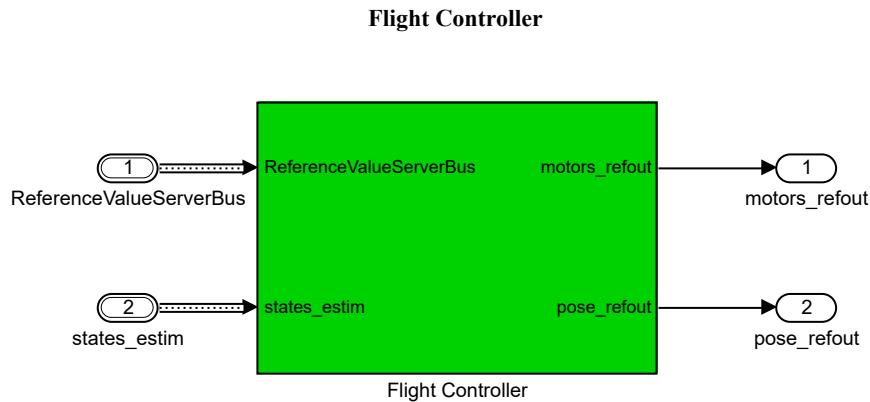
Parameter	Value
Criteria for passing first input	u2 > Threshold
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

## flightController

**Checksum:** 706200838 3384048798 3204572622 1769317802

**Figure 3.135. flightController**



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## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1325.**

Description:

Data Type: CommandBus

Signal Type: real

Width: 1

Dimensions: [1 1 ]

### **Table 3.1326.**

Description:

Data Type: statesEstim\_t

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## **Output Signals**

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

### **Table 3.1327.**

Description:

Data Type: single

Signal Type: real

Width: 4

Dimensions: [1 4 ]

### **Table 3.1328.**

Description:

Data Type: single

Signal Type: real

Width: 8

Dimensions: [1 8 ]

## **Blocks**

## **Parameters**

### "motors\_refout" (Outport)

**Table 3.1329. "motors\_refout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "pose\_refout" (Outport)

**Table 3.1330. "pose\_refout" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "ReferenceValueServerBus" (Inport)

**Table 3.1331. "ReferenceValueServerBus" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Bus: CommandBus

### "states\_estim" (Inport)

**Table 3.1332. "states\_estim" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]

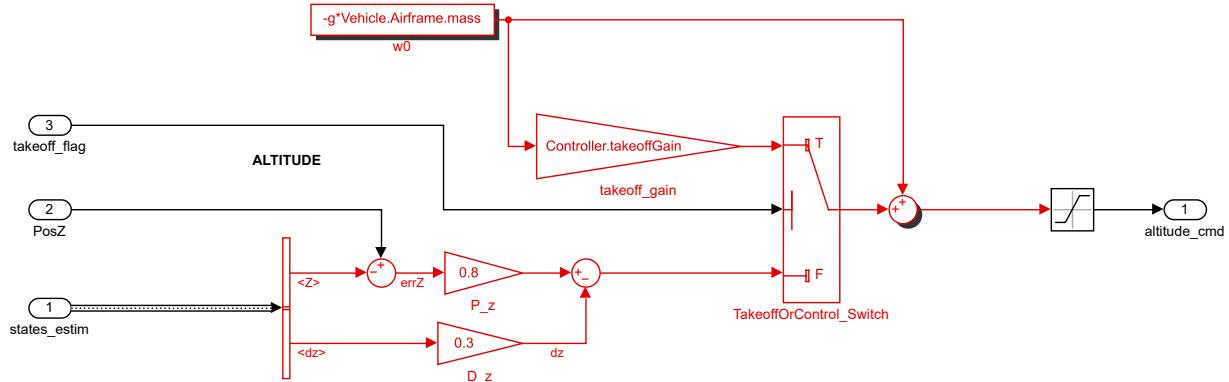
Parameter	Value
Maximum	[]
Data type	Bus: statesEstim_t

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# gravity feedforward/equilibrium thrust

**Figure 3.136. flightController/Flight Controller/gravity feedforward// equilibrium thrust**



## Blocks

### Parameters

"altitude\_cmd" (Outport)

**Table 3.1333. "altitude\_cmd" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Bus Selector6" (BusSelector)

**Table 3.1334. "Bus Selector6" Parameters**

<b>Parameter</b>	<b>Value</b>
Output signals	Z,dz
Output as virtual bus	off
InputSignals	X Y Z yaw pitch roll dx dy dz p q r

#### **Output Hierarchy:**

1. *Bus Selector6*
  1. <Z>
  2. <dz>

### "D\_z" (Gain)

**Table 3.1335. "D\_z" Parameters**

Parameter	Value
Gain	0.3
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "P\_z" (Gain)

**Table 3.1336. "P\_z" Parameters**

Parameter	Value
Gain	0.8
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "PosZ" (Import)

**Table 3.1337. "PosZ" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "SaturationThrust" (Saturate)

**Table 3.1338. "SaturationThrust" Parameters**

Parameter	Value
Upper limit	$4 * \text{Controller.totalThrustMaxRelative} * \text{Controller.motorsThrustPerMotorMax}$
Lower limit	$-4 * \text{Controller.totalThrustMaxRelative} * \text{Controller.motorsThrustPerMotorMax}$
Treat as gain when linearizing	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

### "states\_estim" (Import)

**Table 3.1339. "states\_estim" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Inherit: auto

### "Sum15" (Sum)

**Table 3.1340. "Sum15" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum3" (Sum)

**Table 3.1341. "Sum3" Parameters**

Parameter	Value
Icon shape	round
List of signs	+ -
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock data type settings against changes by the fixed-point tools	off

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum4" (Sum)

**Table 3.1342. "Sum4" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "takeoff\_flag" (Import)

**Table 3.1343. "takeoff\_flag" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "takeoff\_gain" (Gain)

**Table 3.1344. "takeoff\_gain" Parameters**

Parameter	Value
Gain	Controller.takeoffGain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "TakeoffOrControl\_Switch" (Switch)

**Table 3.1345. "TakeoffOrControl\_Switch" Parameters**

Parameter	Value
Criteria for passing first input	u2 > Threshold
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

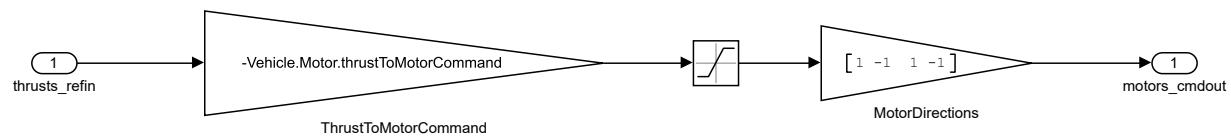
### "w0" (Constant)

**Table 3.1346. "w0" Parameters**

Parameter	Value
Constant value	-g*Vehicle.Airframe.mass
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	Ts
Frame period	inf

## thrustsToMotorCommands

**Figure 3.137. flightController/Flight Controller/thrustsToMotorCommands**



## Blocks

### Parameters

#### "MotorDirections" (Gain)

**Table 3.1347. "MotorDirections" Parameters**

Parameter	Value
Gain	[1 -1 1 -1]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "motors\_cmdout" (Outport)

**Table 3.1348. "motors\_cmdout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Saturation5" (Saturate)

**Table 3.1349. "Saturation5" Parameters**

Parameter	Value
Upper limit	Vehicle.Motor.maxLimit
Lower limit	Vehicle.Motor.minLimit
Treat as gain when linearizing	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

### "thrusts\_refin" (Inport)

**Table 3.1350. "thrusts\_refin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "ThrustToMotorCommand" (Gain)

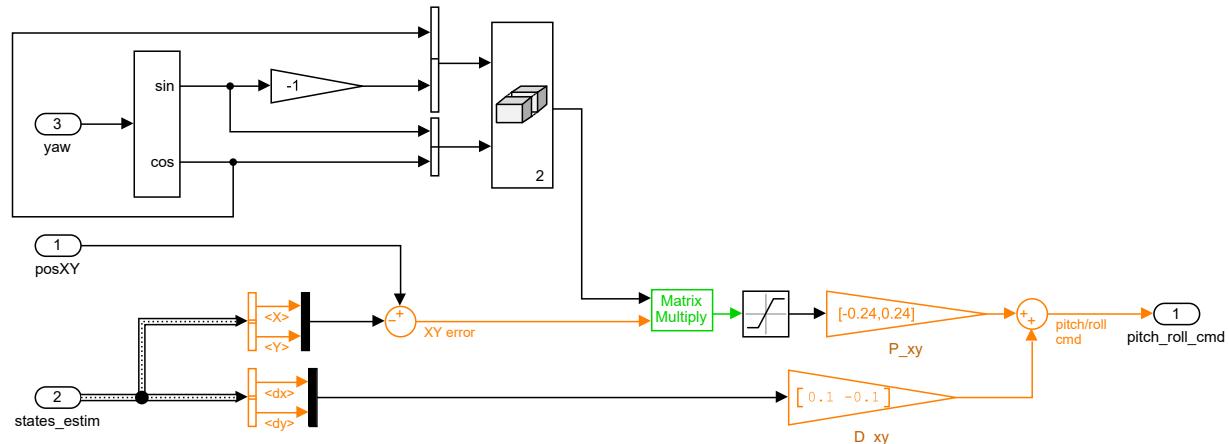
**Table 3.1351. "ThrustToMotorCommand" Parameters**

Parameter	Value
Gain	-Vehicle.Motor.thrustToMotorCommand
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

## XY-to-reference-orientation

Figure 3.138. flightController/Flight Controller/XY-to-reference-orientation



## Blocks

### Parameters

"Bus Selector1" (BusSelector)

Table 3.1352. "Bus Selector1" Parameters

Parameter	Value
Output signals	X,Y
Output as virtual bus	off
InputSignals	X Y

Parameter	Value
	Z
	yaw
	pitch
	roll
	dx
	dy
	dz
	p
	q
	r

**Output Hierarchy:**

1. *Bus Selector1*
  1. <X>
  2. <Y>

**"Bus Selector2" (BusSelector)**

**Table 3.1353. "Bus Selector2" Parameters**

Parameter	Value
Output signals	dx,dy
Output as virtual bus	off
Input Signals	X Y Z yaw pitch roll dx dy dz p q r

**Output Hierarchy:**

1. *Bus Selector2*
  1. <dx>
  2. <dy>

**"D\_xy" (Gain)**

**Table 3.1354. "D\_xy" Parameters**

Parameter	Value
Gain	[0.1, -0.1]

<b>Parameter</b>	<b>Value</b>
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Gain" (Gain)

**Table 3.1355. "Gain" Parameters**

<b>Parameter</b>	<b>Value</b>
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Matrix Concatenate" (Concatenate)****Table 3.1356. "Matrix Concatenate" Parameters**

Parameter	Value
Number of inputs	2
Mode	Multidimensional array
Concatenate dimension	2

**"Mux" (Mux)****Table 3.1357. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

**"Mux1" (Mux)****Table 3.1358. "Mux1" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

**"P\_xy" (Gain)****Table 3.1359. "P\_xy" Parameters**

Parameter	Value
Gain	[-0.24,0.24]
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "pitch\_roll\_cmd" (Outport)

**Table 3.1360. "pitch\_roll\_cmd" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "posXY" (Inport)

**Table 3.1361. "posXY" Parameters**

Parameter	Value
Port number	1

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.1362. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Saturation" (Saturate)

**Table 3.1363. "Saturation" Parameters**

Parameter	Value
Upper limit	3
Lower limit	-3
Treat as gain when linearizing	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	single

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

### "states\_estim" (Inport)

**Table 3.1364. "states\_estim" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum17" (Sum)

**Table 3.1365. "Sum17" Parameters**

Parameter	Value
Icon shape	round
List of signs	+ -
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	single
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum18" (Sum)

**Table 3.1366. "Sum18" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Trigonometric Function" (Trigonometry)

**Table 3.1367. "Trigonometric Function" Parameters**

Parameter	Value
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Vector Concatenate" (Concatenate)

**Table 3.1368. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	2
Mode	Vector

Parameter	Value
Concatenate dimension	1

### "Vector Concatenate1" (Concatenate)

**Table 3.1369. "Vector Concatenate1" Parameters**

Parameter	Value
Number of inputs	2
Mode	Vector
Concatenate dimension	1

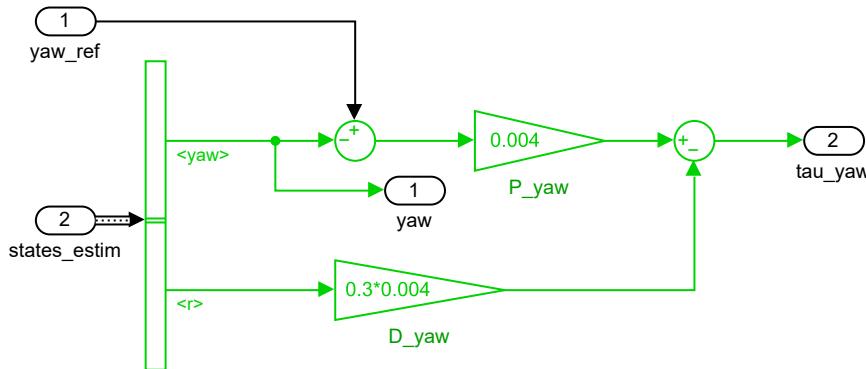
### "yaw" (Inport)

**Table 3.1370. "yaw" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Yaw

**Figure 3.139. flightController/Flight Controller/Yaw**



## Blocks

### Parameters

#### "Bus Selector5" (BusSelector)

**Table 3.1371. "Bus Selector5" Parameters**

Parameter	Value
Output signals	yaw,r
Output as virtual bus	off
InputSignals	X Y Z yaw pitch roll dx dy dz p q r

#### Output Hierarchy:

1. Bus Selector5
  1. <yaw>
  2. <r>

#### "D\_yaw" (Gain)

**Table 3.1372. "D\_yaw" Parameters**

Parameter	Value
Gain	0.3*0.004
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "P\_yaw" (Gain)

**Table 3.1373. "P\_yaw" Parameters**

Parameter	Value
Gain	0.004
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "states\_estim" (Import)

**Table 3.1374. "states\_estim" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum1" (Sum)

**Table 3.1375. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	+ -
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Sum2" (Sum)

**Table 3.1376. "Sum2" Parameters**

Parameter	Value
Icon shape	round
List of signs	+ -
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "tau\_yaw" (Outport)

**Table 3.1377. "tau\_yaw" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "yaw" (Outport)

**Table 3.1378. "yaw" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

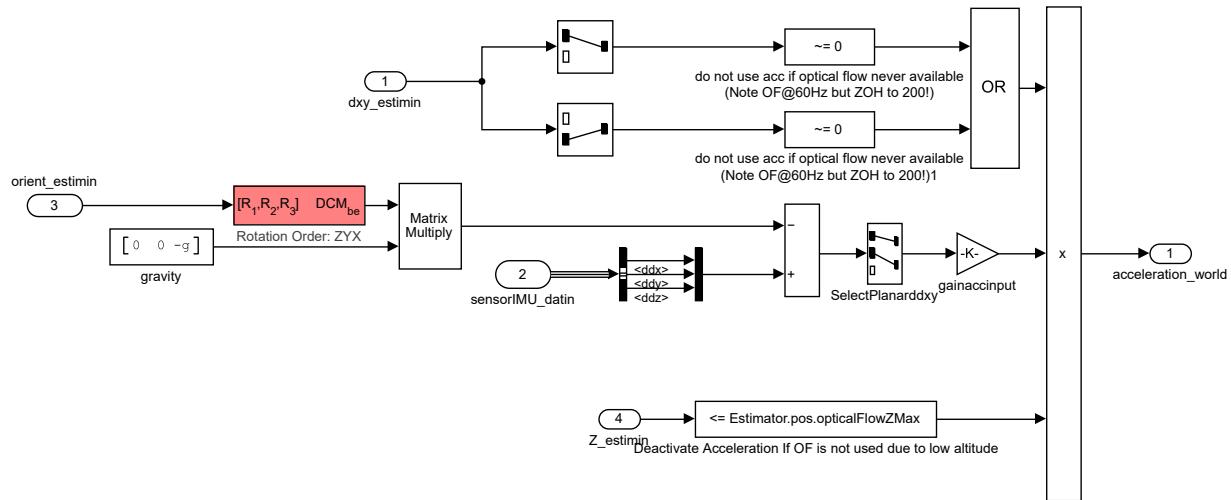
### "yaw\_ref" (Import)

**Table 3.1379. "yaw\_ref" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# AccelerationHandling

**Figure 3.140. stateEstimator/State Estimator/EstimatorXYPosition/EstimatorVelocity/AccelerationHandling**



## Blocks

### Parameters

"acceleration\_world" (Outport)

**Table 3.1380. "acceleration\_world" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	single
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1

Parameter	Value
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Add" (Sum)

**Table 3.1381. "Add" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Bus Selector1" (BusSelector)

**Table 3.1382. "Bus Selector1" Parameters**

Parameter	Value
Output signals	ddx,ddy,ddz
Output as virtual bus	off

Parameter	Value
InputSignals	ddx ddy ddz p q r

**Output Hierarchy:**

1. *Bus Selector1*
  1. <ddx>
  2. <ddy>
  3. <ddz>

**"Deactivate Acceleration If OF is not used due to low altitude" (SubSystem)**

**Table 3.1383. "Deactivate Acceleration If OF is not used due to low altitude" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.opticalFlowZMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

**"do not use acc if optical flow never available (Note OF@60Hz but ZOH to 200!)" (SubSystem)**

**Table 3.1384. "do not use acc if optical flow never available (Note OF@60Hz but ZOH to 200!)" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	$\sim =$
SimulinkmasksConstantValue_MP	0
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

**"do not use acc if optical flow never available (Note OF@60Hz but ZOH to 200!)1" (SubSystem)**

**Table 3.1385. "do not use acc if optical flow never available (Note OF@60Hz but ZOH to 200!)1" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	$\sim =$
SimulinkmasksConstantValue_MP	0
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

**"dxy\_estimin" (Inport)**

**Table 3.1386. "dxy\_estimin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"gainaccininput" (Gain)**

**Table 3.1387. "gainaccininput" Parameters**

Parameter	Value
Gain	Estimator.pos.accelerationInputGain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	single

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "gravity" (Constant)

**Table 3.1388. "gravity" Parameters**

Parameter	Value
Constant value	[0 0 -g]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Logical Operator" (Logic)

**Table 3.1389. "Logical Operator" Parameters**

Parameter	Value
Operator	OR
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Mux6" (Mux)

**Table 3.1390. "Mux6" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

### "orient\_estimin" (Inport)

**Table 3.1391. "orient\_estimin" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.1392. "Product" Parameters**

Parameter	Value
Number of inputs	3
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Product1" (Product)**
**Table 3.1393. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Rotation Angles to Direction Cosine Matrix" (SubSystem)**
**Table 3.1394. "Rotation Angles to Direction Cosine Matrix" Parameters**

Parameter	Value
shared_aeroblkssharedaeroblktransformblockAng2DCMPParamRotationOrder	ZYX

**"Selector" (Selector)**
**Table 3.1395. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	1
Output Size	1
Input port size	2
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)

Parameter	Value
Index	1
Output Size	1

### "Selector1" (Selector)

**Table 3.1396. "Selector1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	2
Output Size	1
Input port size	2
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	2
Output Size	1

### "SelectPlanarddxy" (Selector)

**Table 3.1397. "SelectPlanarddxy" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

**"sensorIMU\_datin" (Import)**

**Table 3.1398. "sensorIMU\_datin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

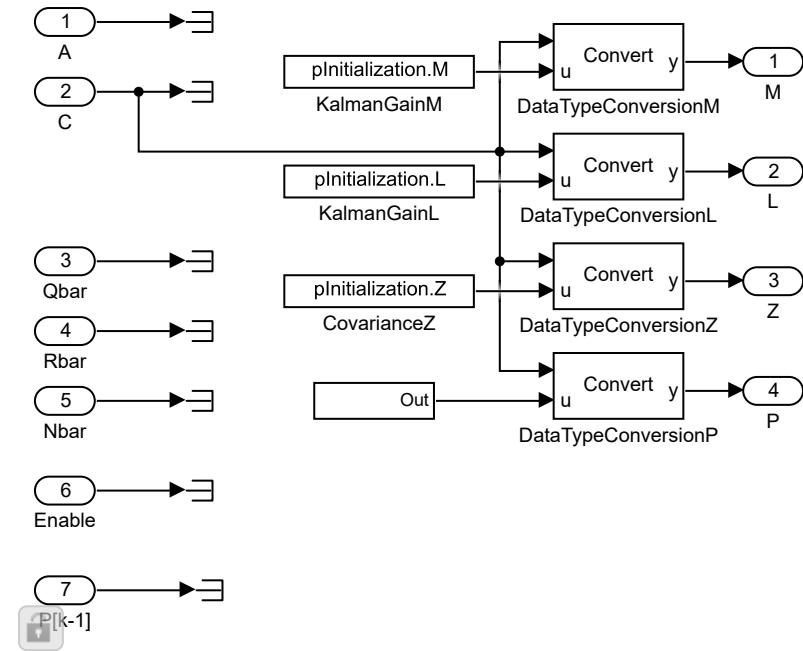
**"Z\_estimin" (Import)**

**Table 3.1399. "Z\_estimin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# CalculatePL

**Figure 3.141. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/CalculatePL**



## Blocks

### Parameters

"A" (Inport)

**Table 3.1400. "A" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "C" (Import)

**Table 3.1401. "C" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "CovarianceZ" (Constant)

**Table 3.1402. "CovarianceZ" Parameters**

Parameter	Value
Constant value	pInitialization.Z
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "DataTypeConversionL" (SubSystem)

**Table 3.1403. "DataTypeConversionL" Parameters**

Parameter	Value
SimulinkmasksInputAndOutputToHaveEqual_MP	Real World Value
SimulinkmasksIntegerRoundingMode_MP	Floor
SimulinkmasksSaturateToMaxOrMinWhenOverflowsOccur_MP	off

### "DataTypeConversionM" (SubSystem)

**Table 3.1404. "DataTypeConversionM" Parameters**

Parameter	Value
SimulinkmasksInputAndOutputToHaveEqual_MP	Real World Value
SimulinkmasksIntegerRoundingMode_MP	Floor
SimulinkmasksSaturateToMaxOrMinWhenOverflowsOccur_MP	off

### "DataTypeConversionP" (SubSystem)

**Table 3.1405. "DataTypeConversionP" Parameters**

Parameter	Value
SimulinkmasksInputAndOutputToHaveEqual_MP	Real World Value
SimulinkmasksIntegerRoundingMode_MP	Floor
SimulinkmasksSaturateToMaxOrMinWhenOverflowsOccur_MP	off

### "DataTypeConversionZ" (SubSystem)

**Table 3.1406. "DataTypeConversionZ" Parameters**

Parameter	Value
SimulinkmasksInputAndOutputToHaveEqual_MP	Real World Value
SimulinkmasksIntegerRoundingMode_MP	Floor
SimulinkmasksSaturateToMaxOrMinWhenOverflowsOccur_MP	off

### "Enable" (Inport)

**Table 3.1407. "Enable" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Ground" (SubSystem)****Table 3.1408. "Ground" Parameters**

Parameter	Value
Simulinkblkprm_promptsUNIFIEDDATATYPE	single
Simulinkblkprm_promptsSigSpecDims	1

**"KalmanGainL" (Constant)****Table 3.1409. "KalmanGainL" Parameters**

Parameter	Value
Constant value	pInitialization.L
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"KalmanGainM" (Constant)****Table 3.1410. "KalmanGainM" Parameters**

Parameter	Value
Constant value	pInitialization.M
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "L" (Outport)

**Table 3.1411. "L" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "M" (Outport)

**Table 3.1412. "M" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Nbar" (Import)

**Table 3.1413. "Nbar" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "P" (Outport)

**Table 3.1414. "P" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	4
Icon display	Port number
Output function call	off
Minimum	[]

<b>Parameter</b>	<b>Value</b>
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "P[k-1]" (Import)

**Table 3.1415. "P[k-1]" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	7
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Qbar" (Import)

**Table 3.1416. "Qbar" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	3
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Rbar" (Import)

**Table 3.1417. "Rbar" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Z" (Outport)

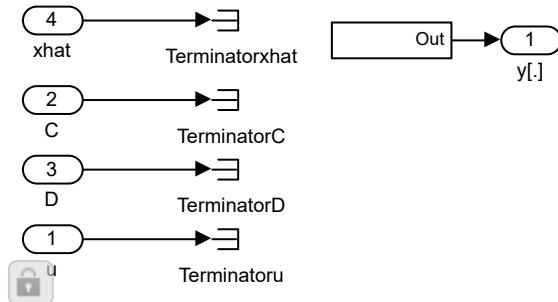
**Table 3.1418. "Z" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog

Parameter	Value
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## CalculateYhat

**Figure 3.142. stateEstimator/State Estimator/EstimatorAltitude/KalmanFilter\_altitude/CalculateYhat**



## Blocks

### Parameters

"C" (Inport)

**Table 3.1419. "C" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "D" (Import)

**Table 3.1420. "D" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Ground" (SubSystem)

**Table 3.1421. "Ground" Parameters**

Parameter	Value
Simulinkblkprm_promptsUNIFIEDDATATYPE	single
Simulinkblkprm_promptsSigSpecDims	1

### "u" (Import)

**Table 3.1422. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "xhat" (Import)

**Table 3.1423. "xhat" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1

<b>Parameter</b>	<b>Value</b>
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

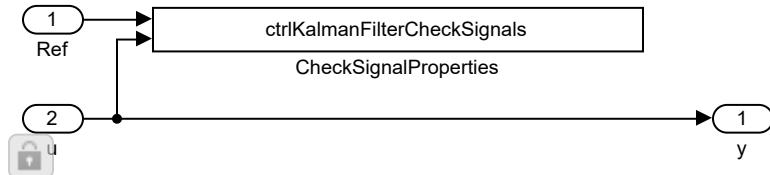
### "y[.]" (Outport)

**Table 3.1424. "y[.]" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# checkEnable

**Figure 3.143. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/checkEnable**



## Blocks

### Parameters

"CheckSignalProperties" (S-Function)

**Table 3.1425. "CheckSignalProperties" Parameters**

Parameter	Value
S-function name	ctrlKalmanFilterCheckSignals
S-function parameters	parentBlockPath, portName, isContinuousTime, pInitialization.Ts, Ns, Nu, Nw, Ny
S-function modules	"

"Ref" (Inport)

**Table 3.1426. "Ref" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"u" (Inport)**
**Table 3.1427. "u" Parameters**

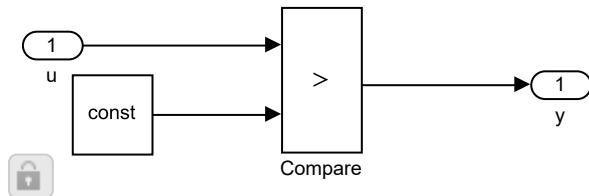
Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"y" (Outport)**
**Table 3.1428. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# Compare To Constant

**Figure 3.144. stateEstimator/State Estimator/Complementary Filter/Compare To Constant**



## Blocks

### Parameters

"Compare" (RelationalOperator)

**Table 3.1429. "Compare" Parameters**

Parameter	Value
Relational operator	>
Require all inputs to have the same data type	on
Output data type	boolean
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Integer rounding mode	Nearest

"Constant" (Constant)

**Table 3.1430. "Constant" Parameters**

Parameter	Value
Constant value	const
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

### "u" (Inport)

**Table 3.1431. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y" (Outport)

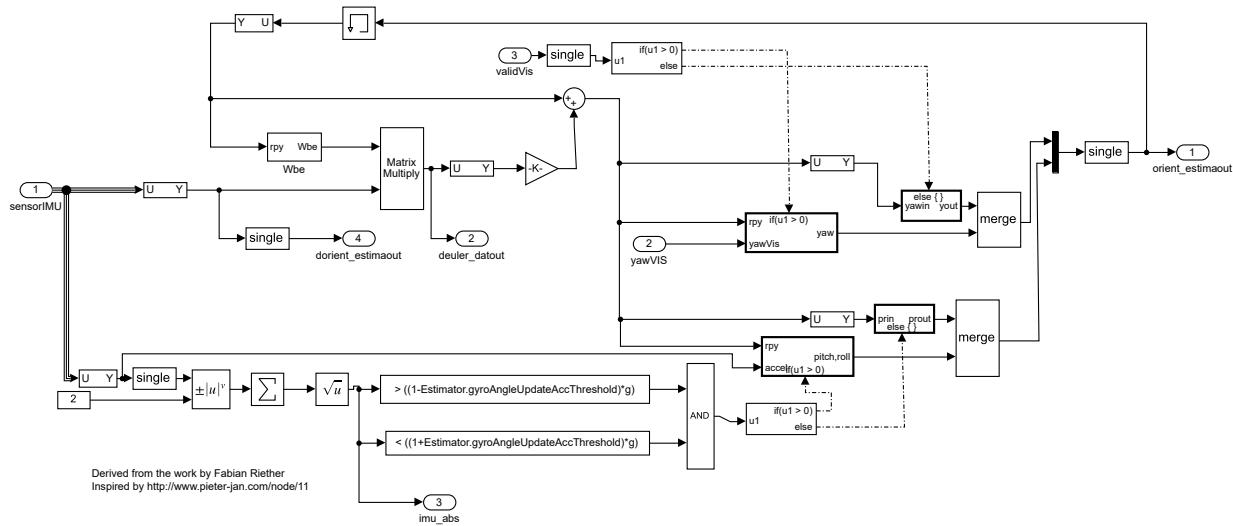
**Table 3.1432. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## Complementary Filter

Figure 3.145. stateEstimator/State Estimator/Complementary Filter



## Blocks

### Parameters

#### "Compare To Constant" (SubSystem)

Table 3.1433. "Compare To Constant" Parameters

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	((1-Estimator.gyroAngleUpdateAccThreshold)*g)
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Compare To Constant1" (SubSystem)

**Table 3.1434. "Compare To Constant1" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<
SimulinkmasksConstantValue_MP	((1+Estimator.gyroAngleUpdateAccThreshold)*g)
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Constant" (Constant)

**Table 3.1435. "Constant" Parameters**

Parameter	Value
Constant value	2
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Data Type Conversion" (DataTypeConversion)

**Table 3.1436. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion1" (DataTypeConversion)

**Table 3.1437. "Data Type Conversion1" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion2" (DataTypeConversion)

**Table 3.1438. "Data Type Conversion2" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Conversion3" (DataTypeConversion)

**Table 3.1439. "Data Type Conversion3" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "deuler\_datout" (Outport)

**Table 3.1440. "deuler\_datout" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "dorient\_estimaout" (Outport)

**Table 3.1441. "dorient\_estimaout" Parameters**

Parameter	Value
Port number	4
Icon display	Port number

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Parameter	Value
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Gain" (Gain)

**Table 3.1442. "Gain" Parameters**

Parameter	Value
Gain	Ts/Estimator.gyroscopeSensitivity
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "If" (If)

**Table 3.1443. "If" Parameters**

Parameter	Value
Number of inputs	1
If expression (e.g. $u1 \sim= 0$ )	$u1 > 0$
Show else condition	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1

### "If1" (If)

**Table 3.1444. "If1" Parameters**

Parameter	Value
Number of inputs	1
If expression (e.g. $u1 \sim= 0$ )	$u1 > 0$
Show else condition	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1

### "imu\_abs" (Outport)

**Table 3.1445. "imu\_abs" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	single
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

Parameter	Value
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Logical Operator" (Logic)

**Table 3.1446. "Logical Operator" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	fixdt(1,16)
Sample time (-1 for inherited)	-1

### "Math Function" (Math)

**Table 3.1447. "Math Function" Parameters**

Parameter	Value
Function	pow
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Memory" (Memory)

**Table 3.1448. "Memory" Parameters**

Parameter	Value
Initial condition	single(Estimator.complementaryFilterInit)
Inherit sample time	on
Direct feedthrough of input during linearization	off
Treat as a unit delay when linearizing with discrete sample time	off
State name must resolve to Simulink signal object	off

### "Merge" (Merge)

**Table 3.1449. "Merge" Parameters**

Parameter	Value
Number of inputs	2
Initial output	[]
Allow unequal port widths	off
Input port offsets	[]

### "Merge1" (Merge)

**Table 3.1450. "Merge1" Parameters**

Parameter	Value
Number of inputs	2
Initial output	[]

Parameter	Value
Allow unequal port widths	off
Input port offsets	[]

### "Mux" (Mux)

**Table 3.1451. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "orient\_estimaout" (Outport)

**Table 3.1452. "orient\_estimaout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Product" (Product)

**Table 3.1453. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Selector" (Selector)

**Table 3.1454. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3 2 1]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3 2 1]
Output Size	1

### "Selector1" (Selector)

**Table 3.1455. "Selector1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[4 5 6]
Output Size	1
Input port size	6
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[4 5 6]
Output Size	1

### "Selector2" (Selector)

**Table 3.1456. "Selector2" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2 3]
Output Size	1
Input port size	6
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2 3]
Output Size	1

### "Selector3" (Selector)

**Table 3.1457. "Selector3" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based

Parameter	Value
Index Option	Index vector (dialog)
Index	[2 1]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[2 1]
Output Size	1

### "Selector4" (Selector)

**Table 3.1458. "Selector4" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3]
Output Size	1

### "Selector5" (Selector)

**Table 3.1459. "Selector5" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3 2 1]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1

Parameter	Value
Index Option	Index vector (dialog)
Index	[3 2 1]
Output Size	1

### "sensorIMU" (Inport)

**Table 3.1460.** "sensorIMU" Parameters

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	single

### "Sqrt" (Sqrt)

**Table 3.1461.** "Sqrt" Parameters

Parameter	Value
Function	sqrt
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Exact
Number of iterations	3

### "Sum" (Sum)

**Table 3.1462. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum of Elements" (Sum)

**Table 3.1463. "Sum of Elements" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"validVis" (Inport)**

**Table 3.1464. "validVis" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

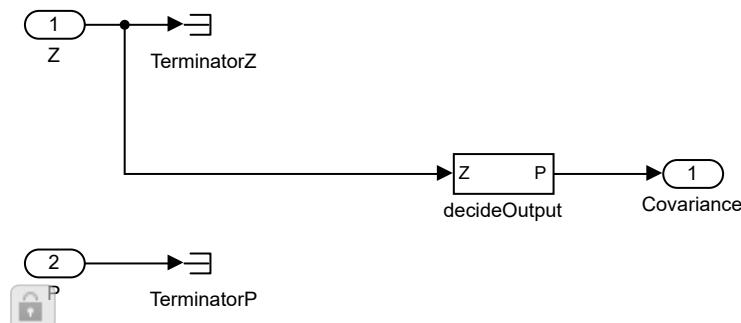
**"yawVIS" (Inport)**

**Table 3.1465. "yawVIS" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## CovarianceOutputConfigurator

**Figure 3.146. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/CovarianceOutputConfigurator**



## Blocks

### Parameters

#### "Covariance" (Outport)

**Table 3.1466. "Covariance" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

#### "P" (Inport)

**Table 3.1467. "P" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

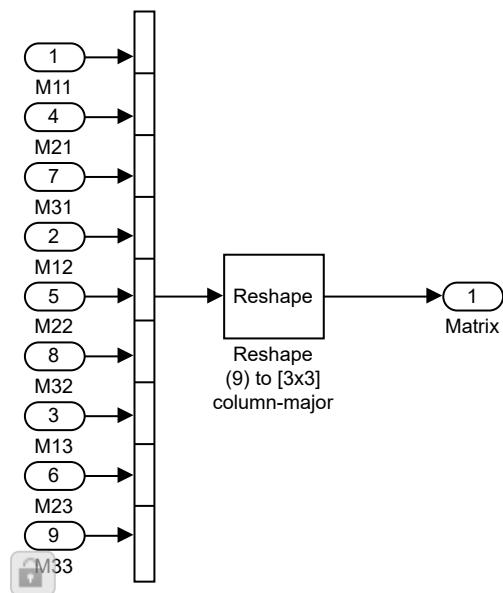
### "Z" (Inport)

**Table 3.1468. "Z" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Create 3x3 Matrix

**Figure 3.147. stateEstimator/State Estimator/Complementary Filter/Wbe/Create 3x3 Matrix**



## Blocks

### Parameters

#### "M11" (Import)

**Table 3.1469. "M11" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "M12" (Import)

**Table 3.1470. "M12" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "M13" (Import)

**Table 3.1471. "M13" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M21" (Import)

**Table 3.1472. "M21" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M22" (Import)

**Table 3.1473. "M22" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M23" (Import)

**Table 3.1474. "M23" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M31" (Import)

**Table 3.1475. "M31" Parameters**

Parameter	Value
Port number	7
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M32" (Import)

**Table 3.1476. "M32" Parameters**

Parameter	Value
Port number	8
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M33" (Import)

**Table 3.1477. "M33" Parameters**

Parameter	Value
Port number	9
Port dimensions (-1 for inherited)	1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"Matrix" (Outport)****Table 3.1478. "Matrix" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	[3 3]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

**"Reshape (9) to [3x3] column-major" (Reshape)****Table 3.1479. "Reshape (9) to [3x3] column-major" Parameters**

Parameter	Value
Output dimensionality	Customize
Output dimensions	[3,3]

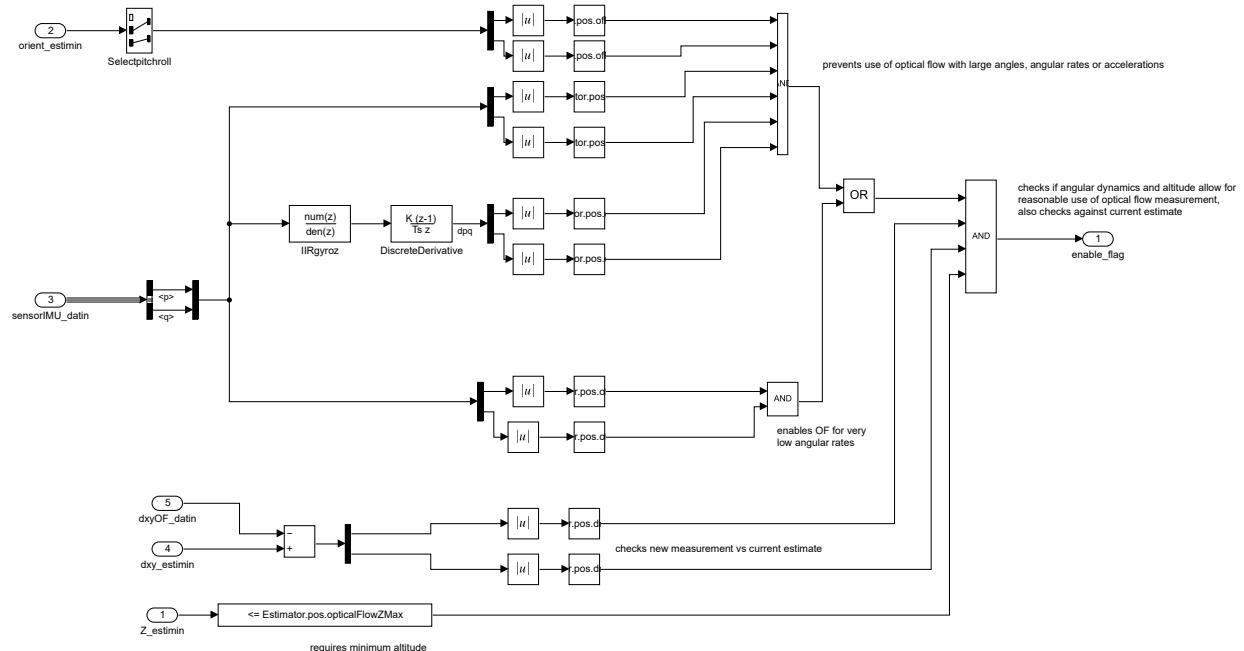
### "Vector Concatenate" (Concatenate)

**Table 3.1480. "Vector Concatenate" Parameters**

Parameter	Value
Number of inputs	9
Mode	Vector
Concatenate dimension	1

## DataHandling

**Figure 3.148. stateEstimator/State Estimator/EstimatorXYPosition/EstimatorVelocity/DataHandling**



## Blocks

### Parameters

### "Abs" (Abs)

**Table 3.1481. "Abs" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs1" (Abs)

**Table 3.1482. "Abs1" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs2" (Abs)

**Table 3.1483. "Abs2" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs3" (Abs)

**Table 3.1484. "Abs3" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs4" (Abs)

**Table 3.1485. "Abs4" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs5" (Abs)

**Table 3.1486. "Abs5" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs6" (Abs)

**Table 3.1487. "Abs6" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs7" (Abs)

**Table 3.1488. "Abs7" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs8" (Abs)

**Table 3.1489. "Abs8" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs9" (Abs)

**Table 3.1490. "Abs9" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Add" (Sum)

**Table 3.1491. "Add" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Bus Selector" (BusSelector)

**Table 3.1492. "Bus Selector" Parameters**

Parameter	Value
Output signals	p,q
Output as virtual bus	off
InputSignals	ddx ddy ddz p q r

### Output Hierarchy:

1. Bus Selector
  1. <p>
  2. <q>

### "Demux1" (Demux)

**Table 3.1493. "Demux1" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

**"Demux2" (Demux)****Table 3.1494. "Demux2" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

**"Demux3" (Demux)****Table 3.1495. "Demux3" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

**"Demux4" (Demux)****Table 3.1496. "Demux4" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

**"Demux5" (Demux)****Table 3.1497. "Demux5" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

### "DiscreteDerivative" (SubSystem)

**Table 3.1498. "DiscreteDerivative" Parameters**

Parameter	Value
SimulinkmasksGainValue_MP	1.0
SimulinkmasksInitialConditionForPreviousWeightedInputKuTs_MP	0.0
SimulinkmasksInputProcessing_MP	Elements as channels (sample based)
SimulinkmasksOutputMinimum_MP	[]
SimulinkmasksOutputMaximum_MP	[]
SimulinkmasksOutputDataType_MP	Inherit: Inherit via internal rule
SimulinkmasksLockOutputDataTypeAgainstFxpTools_MP	off
SimulinkmasksIntegerRoundingMode_MP	Floor
SimulinkmasksSaturateToMaxOrMinWhenOverflowsOccur_MP	off

### "dxy\_estimin" (Inport)

**Table 3.1499. "dxy\_estimin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "dxyOF\_datin" (Inport)

**Table 3.1500. "dxyOF\_datin" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

### "enable\_flag" (Outport)

**Table 3.1501. "enable\_flag" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "IIRgyroz" (DiscreteFilter)

**Table 3.1502. "IIRgyroz" Parameters**

Parameter	Value
Numerator coefficients source	Dialog
Numerator coefficients	Estimator.IMU.filterGyroNum
Denominator coefficients source	Dialog

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<b>Parameter</b>	<b>Value</b>
Denominator coefficients	Estimator.IMU.filterGyroDen
Initial states source	Dialog
Initial states	0
Input processing	Elements as channels (sample based)
External reset	None
Initial states on denominator side	0
Filter structure	Direct form II
Sample time (-1 for inherited)	-1
Optimize by skipping divide by leading denominator coefficient (a0)	off
Numerator coefficient minimum	[]
Numerator coefficient maximum	[]
Denominator coefficient minimum	[]
Denominator coefficient maximum	[]
Output minimum	[]
Output maximum	[]
State data type	Inherit: Same as input
Multiplicand data type	Inherit: Same as input
Numerator coefficient data type	Inherit: Inherit via internal rule
Denominator coefficient data type	Inherit: Inherit via internal rule
Numerator product output data type	Inherit: Inherit via internal rule
Denominator product output data type	Inherit: Inherit via internal rule
Numerator accumulator data type	Inherit: Inherit via internal rule
Denominator accumulator data type	Inherit: Inherit via internal rule
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
State name must resolve to Simulink signal object	off

### "Logical Operator" (Logic)

**Table 3.1503. "Logical Operator" Parameters**

<b>Parameter</b>	<b>Value</b>
Operator	AND

Parameter	Value
Number of input ports	6
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Logical Operator1" (Logic)

**Table 3.1504. "Logical Operator1" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Logical Operator2" (Logic)

**Table 3.1505. "Logical Operator2" Parameters**

Parameter	Value
Operator	OR
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Logical Operator3" (Logic)

**Table 3.1506. "Logical Operator3" Parameters**

Parameter	Value
Operator	AND
Number of input ports	4
Icon shape	rectangular

Parameter	Value
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "maxdw1" (SubSystem)

**Table 3.1507. "maxdw1" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.ofDPQMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxdw2" (SubSystem)

**Table 3.1508. "maxdw2" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.ofDPQMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxp" (SubSystem)

**Table 3.1509. "maxp" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.ofPitchRollMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxp2" (SubSystem)

**Table 3.1510. "maxp2" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.ofPQHovMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxq" (SubSystem)

**Table 3.1511. "maxq" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.ofPitchRollMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxq2" (SubSystem)

**Table 3.1512. "maxq2" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.ofPQHovMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxw1" (SubSystem)

**Table 3.1513. "maxw1" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.ofPQMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxw2" (SubSystem)

**Table 3.1514. "maxw2" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.ofPQMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxw3" (SubSystem)

**Table 3.1515. "maxw3" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.deltaDXYMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxw4" (SubSystem)

**Table 3.1516. "maxw4" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.deltaDXYMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "minHeightforOF" (SubSystem)

**Table 3.1517. "minHeightforOF" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.opticalFlowZMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Mux5" (Mux)

**Table 3.1518. "Mux5" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "orient\_estimin" (Inport)

**Table 3.1519. "orient\_estimin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Selectpitchroll" (Selector)

**Table 3.1520. "Selectpitchroll" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2 3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[2 3]
Output Size	1

**"sensorIMU\_datin" (Import)**

**Table 3.1521. "sensorIMU\_datin" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

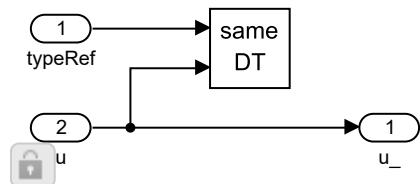
**"Z\_estimin" (Import)**

**Table 3.1522. "Z\_estimin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## **DataTypeConversionA**

**Figure 3.149. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/DataTypeConversionA**



## **Blocks**

### **Parameters**

### "Data Type Duplicate" (DataTypeDuplicate)

**Table 3.1523. "Data Type Duplicate" Parameters**

Parameter	Value
Number of input ports	2

### "typeRef" (Inport)

**Table 3.1524. "typeRef" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "u" (Inport)

**Table 3.1525. "u" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "u\_" (Outport)

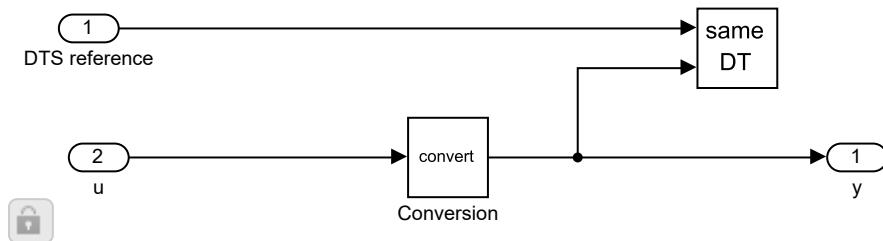
**Table 3.1526. "u\_" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Data Type Conversion L

**Figure 3.150. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/CalculatePL/Data Type Conversion L**



## Blocks

## Parameters

### "Conversion" (DataTypeConversion)

**Table 3.1527. "Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	on
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Data Type Duplicate" (DataTypeDuplicate)

**Table 3.1528. "Data Type Duplicate" Parameters**

Parameter	Value
Number of input ports	2

### "DTS reference" (Import)

**Table 3.1529. "DTS reference" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "u" (Import)

**Table 3.1530. "u" Parameters**

Parameter	Value
Port number	2

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

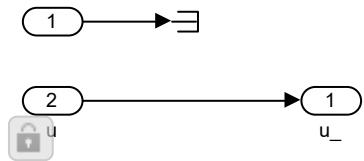
### "y" (Outport)

**Table 3.1531. "y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

# Data Type Conversion

**Figure 3.151. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/Data Type Conversion**



## Blocks

### Parameters

"In1" (Input)

**Table 3.1532. "In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"u" (Input)

**Table 3.1533. "u" Parameters**

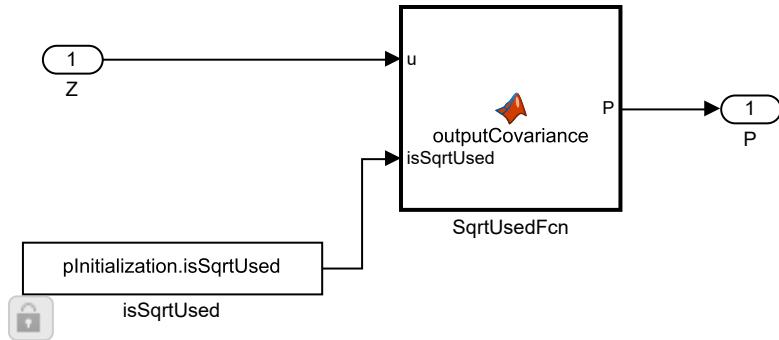
Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"u\_" (Outport)****Table 3.1534. "u\_" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# decideOutput

**Figure 3.152. stateEstimator/State Estimator/EstimatorAltitude/KalmanFilter\_altitude/CovarianceOutputConfigurator/decideOutput**



## Blocks

### Parameters

#### "isSqrtUsed" (Constant)

**Table 3.1535. "isSqrtUsed" Parameters**

Parameter	Value
Constant value	pInitialization.isSqrtUsed
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "P" (Outport)

**Table 3.1536. "P" Parameters**

Parameter	Value
Port number	1

<b>Parameter</b>	<b>Value</b>
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

### "SqrtUsedFcn" (MATLAB Function)

**Table 3.1537. SqrtUsedFcn Function Properties**

<b>Property</b>	<b>Value</b>
Update Method	INHERITED
Sample Time	-1
Support variable-size arrays	1
Saturate on integer overflow	1
Treat these inherited Simulink signal types as fi objects	Fixed-point
MATLAB Function block fimath	Same as MATLAB Default

Property	Value
Input fi math	fimath(... )
Description	

**Table 3.1538. SqrtUsedFcn Argument Summary**

Name	Scope	Port	Data Type	Size
u	Input	1	double	[2, 2]
P	Output	1	double	[2, 2]
isSqrtUsed	Input	2	boolean	1

### SqrtUsedFcn Function Script

```
function P = outputCovariance(u,isSqrtUsed)

% Determine if the Square-Root algorithm was used
if isSqrtUsed
    P = u*u.';
else
    P = u;
end
end
```

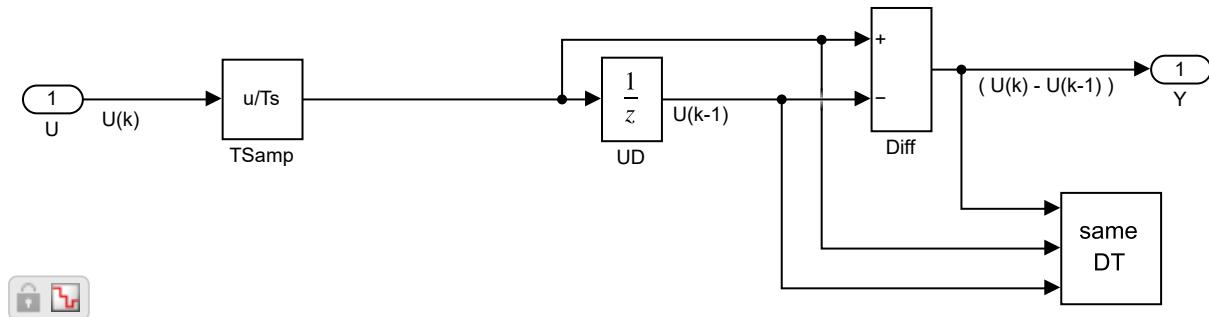
### "Z" (Inport)

**Table 3.1539. "Z" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# DiscreteDerivative

**Figure 3.153. stateEstimator/State Estimator/EstimatorXYPosition/  
EstimatorVelocity/DataHandling/DiscreteDerivative**



## Blocks

### Parameters

"Data Type Duplicate" (DataTypeDuplicate)

**Table 3.1540. "Data Type Duplicate" Parameters**

Parameter	Value
Number of input ports	3

"Diff" (Sum)

**Table 3.1541. "Diff" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+ -
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	OutMin
Output maximum	OutMax
Output data type	diffDT

Parameter	Value
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "TSamp" (SampleTimeMath)

**Table 3.1542. "TSamp" Parameters**

Parameter	Value
Operation	/
Weight value	inverseGainval
Implement using	Offline Scaling Adjustment
Output data type	Inherit: Inherit via internal rule
Integer rounding mode	Floor
Saturate on integer overflow	off

### "U" (Inport)

**Table 3.1543. "U" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "UD" (UnitDelay)

**Table 3.1544. "UD" Parameters**

Parameter	Value
Initial condition	ICPrevScaledInput
Input processing	Elements as channels (sample based)
Sample time (-1 for inherited)	-1
State name must resolve to Simulink signal object	off

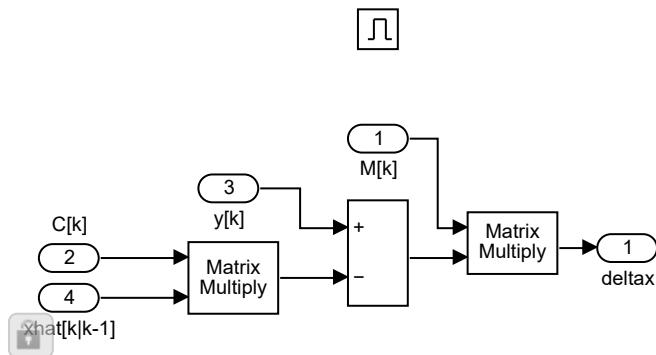
**"Y" (Outport)****Table 3.1545. "Y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	OutMin
Maximum	OutMax
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	0
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	on

## Enabled Subsystem

**Checksum:** 1277865794 1930652823 2643834486 619737617

**Figure 3.154. stateEstimator/State Estimator/EstimatorAltitude/KalmanFilter\_altitude/UseCurrentEstimator/Enabled Subsystem**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1546.**

Description:  
Data Type: double  
Signal Type: real  
Width: 2  
Dimensions: [2 1 2 ]

**Table 3.1547.**

Description:  
Data Type: double  
Signal Type: real  
Width: 2  
Dimensions: [1 2 ]

**Table 3.1548.**

Description:  
Data Type: double  
Signal Type: real

Width: 2

Dimensions: [1 2 ]

**Table 3.1549.**

Description:

Data Type: double

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1550.**

Description:

Data Type: double

Signal Type: real

Width: 2

Dimensions: [1 2 ]

## Blocks

### Parameters

#### "Add1" (Sum)

**Table 3.1551. "Add1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "C[k]" (Import)

**Table 3.1552. "C[k]" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "deltax" (Outport)

**Table 3.1553. "deltax" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

<b>Parameter</b>	<b>Value</b>
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	reset
Initial output	0
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Enable" (EnablePort)

**Table 3.1554. "Enable" Parameters**

<b>Parameter</b>	<b>Value</b>
States when enabling	held
Propagate sizes of variable-size signals	Only when enabling
Show output port	off
Enable zero-crossing detection	on
Port dimensions	1
Sample time	-1
Minimum	[]
Maximum	[]
Data type	double
Interpolate data	on

### "M[k]" (Inport)

**Table 3.1555. "M[k]" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.1556. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product2" (Product)

**Table 3.1557. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"xhat[k|k-1]" (Import)**
**Table 3.1558. "xhat[k|k-1]" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"y[k]" (Import)**
**Table 3.1559. "y[k]" Parameters**

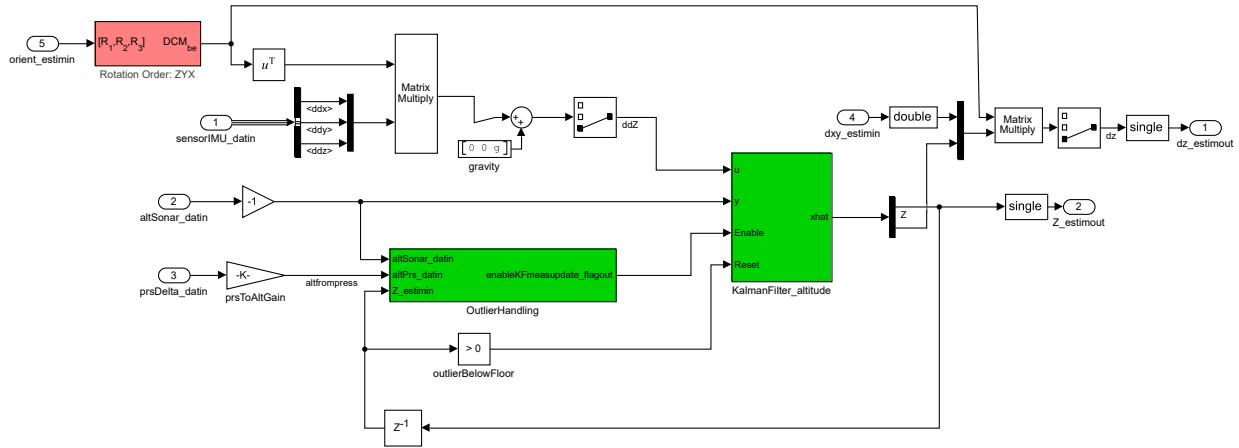
Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# EstimatorAltitude

**Figure 3.155. stateEstimator/State Estimator/EstimatorAltitude**



## Blocks

### Parameters

"altSonar\_datin" (Input)

**Table 3.1560. "altSonar\_datin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"Bus Selector2" (BusSelector)

**Table 3.1561. "Bus Selector2" Parameters**

Parameter	Value
Output signals	ddx,ddy,ddz
Output as virtual bus	off

Parameter	Value
InputSignals	ddx ddy ddz p q r

**Output Hierarchy:**

1. *Bus Selector2*
  1. <ddx>
  2. <ddy>
  3. <ddz>

**"Data Type Conversion" (DataTypeConversion)**

**Table 3.1562. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

**"Data Type Conversion1" (DataTypeConversion)**

**Table 3.1563. "Data Type Conversion1" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	double
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Data Type Conversion2" (DataTypeConversion)

**Table 3.1564. "Data Type Conversion2" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	on
Sample time (-1 for inherited)	-1

### "Delay2" (Delay)

**Table 3.1565. "Delay2" Parameters**

Parameter	Value
Delay length source	Dialog
Delay length	1
Delay upper limit	100
Initial condition source	Dialog
Initial condition	0
External reset	None
Show enable port	off
Prevent direct feedthrough	off
Diagnostic for delay length	None
Remove delay length check in generated code	off
Input processing	Elements as channels (sample based)
Use circular buffer for state	off
Sample time (-1 for inherited)	-1
State name must resolve to Simulink signal object	off

**"Demux" (Demux)****Table 3.1566. "Demux" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

**"dxy\_estimin" (Inport)****Table 3.1567. "dxy\_estimin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"dz\_estimout" (Outport)****Table 3.1568. "dz\_estimout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

Parameter	Value
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "gravity" (Constant)

**Table 3.1569. "gravity" Parameters**

Parameter	Value
Constant value	[0 0 g]
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "invertzaxisGain" (Gain)

**Table 3.1570. "invertzaxisGain" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	double

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "KalmanFilter\_altitude" (SubSystem)

**Table 3.1571. "KalmanFilter\_altitude" Parameters**

Parameter	Value
ControllibblocksMaskPromptKFTimeDomain	Discrete-Time
ControllibblocksMaskPromptKFUseCurrentMeasurement	on
ControllibblocksMaskPromptKFModelSource	Individual A, B, C, D matrices
ControllibblocksMaskPromptKFA	[1 Ts; 0 1]
ControllibblocksMaskPromptKFB	[0;Ts]
ControllibblocksMaskPromptKFC	[1 0]
ControllibblocksMaskPromptKFD	[0]
ControllibblocksMaskPromptKFSource	Dialog
ControllibblocksMaskPromptKFX0DT	[init.posNED(3) 0]
ControllibblocksMaskPromptKFUseGH	on
ControllibblocksMaskPromptKFG	Estimator.alt.kf.G
ControllibblocksMaskPromptKFTimeInvariantG	on
ControllibblocksMaskPromptKFH	Estimator.alt.kf.H
ControllibblocksMaskPromptKFTimeInvariantH	on
ControllibblocksMaskPromptKFQ	Estimator.alt.kf.Q
ControllibblocksMaskPromptKFTimeInvariantQ	on
ControllibblocksMaskPromptKFR	Estimator.alt.kf.R
ControllibblocksMaskPromptKFTimeInvariantR	on
ControllibblocksMaskPromptKFN	Estimator.alt.kf.N
ControllibblocksMaskPromptKFTimeInvariantN	on
ControllibblocksMaskPromptKFAddInputPort	on
ControllibblocksMaskPromptKFAddEnablePort	on
Simulinkblkprm_promptsDelayBlkExternalReset	Level hold
ControllibblocksMaskPromptKFOutputEstimatedY	off
ControllibblocksMaskPromptKFOutputPZ	off
ControllibblocksMaskPromptKFTs	-1

### "Math Function" (Math)

**Table 3.1572. "Math Function" Parameters**

Parameter	Value
Function	transpose
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Mux" (Mux)

**Table 3.1573. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Mux2" (Mux)

**Table 3.1574. "Mux2" Parameters**

Parameter	Value
Number of inputs	3
Display option	bar

**"orient\_estimin" (Import)**
**Table 3.1575. "orient\_estimin" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"outlierBelowFloor" (SubSystem)**
**Table 3.1576. "outlierBelowFloor" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>
SimulinkmasksConstantValue_MP	0
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

**"Product" (Product)**
**Table 3.1577. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

Parameter	Value
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.1578. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "prsDelta\_datin" (Import)

**Table 3.1579. "prsDelta\_datin" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "prsToAltGain" (Gain)

**Table 3.1580. "prsToAltGain" Parameters**

Parameter	Value
Gain	1/Sensors.altToPrsGain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Rotation Angles to Direction Cosine Matrix" (SubSystem)

**Table 3.1581. "Rotation Angles to Direction Cosine Matrix" Parameters**

Parameter	Value
shared_aeroblkssharedaeroblktransformblockAng2DCMPParamRotationOrder	ZYX

### "Selector4" (Selector)

**Table 3.1582. "Selector4" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)

Parameter	Value
Index	[3]
Output Size	1

### "Selector5" (Selector)

**Table 3.1583. "Selector5" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3]
Output Size	1

### "sensorIMU\_datin" (Import)

**Table 3.1584. "sensorIMU\_datin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum" (Sum)

**Table 3.1585. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	++

Parameter	Value
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Z\_estimout" (Outport)

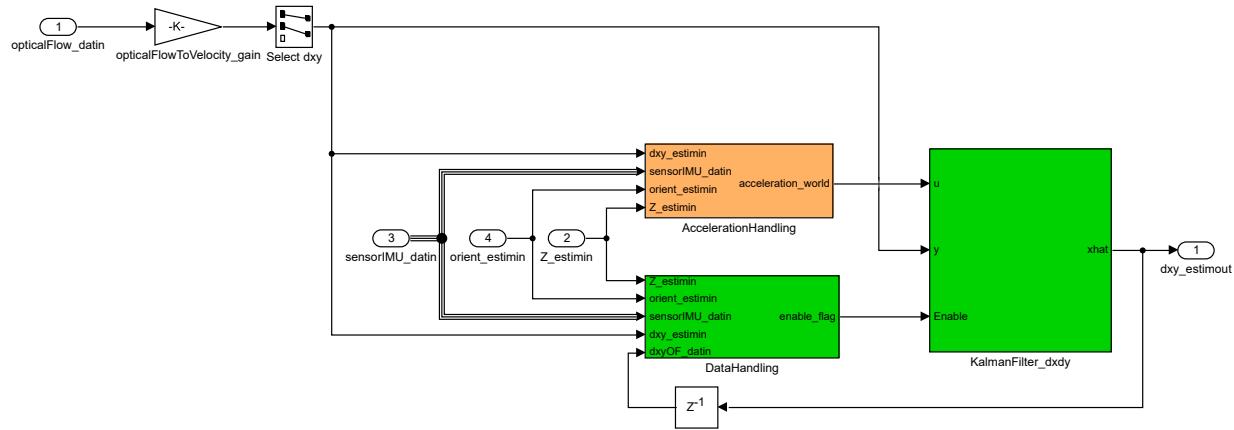
**Table 3.1586. "Z\_estimout" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	off

## EstimatorVelocity

**Figure 3.156. stateEstimator/State Estimator/EstimatorXYPosition/EstimatorVelocity**



## Blocks

### Parameters

#### "Delay" (Delay)

**Table 3.1587. "Delay" Parameters**

Parameter	Value
Delay length source	Dialog
Delay length	1
Delay upper limit	100
Initial condition source	Dialog
Initial condition	0
External reset	None
Show enable port	off
Prevent direct feedthrough	off
Diagnostic for delay length	None

Parameter	Value
Remove delay length check in generated code	off
Input processing	Elements as channels (sample based)
Use circular buffer for state	off
Sample time (-1 for inherited)	-1
State name must resolve to Simulink signal object	off

### "dxy\_estimout" (Outport)

**Table 3.1588. "dxy\_estimout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "KalmanFilter\_dx dy" (SubSystem)

**Table 3.1589. "KalmanFilter\_dx dy" Parameters**

Parameter	Value
ControllibblocksMaskPromptKFTimeDomain	Discrete-Time
ControllibblocksMaskPromptKFUseCurrentMeasurement	on
ControllibblocksMaskPromptKFModelSource	Individual A, B, C, D matrices
ControllibblocksMaskPromptKFA	eye(2)
ControllibblocksMaskPromptKFB	Ts*eye(2)
ControllibblocksMaskPromptKFC	eye(2)
ControllibblocksMaskPromptKFD	0
ControllibblocksMaskPromptKFSource	Dialog
ControllibblocksMaskPromptKFX0DT	0
ControllibblocksMaskPromptKFUseGH	on
ControllibblocksMaskPromptKFG	Estimator.pos.kfVelo.G
ControllibblocksMaskPromptKFTimeInvariantG	on
ControllibblocksMaskPromptKFH	Estimator.pos.kfVelo.H
ControllibblocksMaskPromptKFTimeInvariantH	on
ControllibblocksMaskPromptKFQ	Estimator.pos.kfVelo.Q
ControllibblocksMaskPromptKFTimeInvariantQ	on
ControllibblocksMaskPromptKFR	Estimator.pos.kfVelo.R
ControllibblocksMaskPromptKFTimeInvariantR	on
ControllibblocksMaskPromptKFN	Estimator.pos.kfVelo.N
ControllibblocksMaskPromptKFTimeInvariantN	on
ControllibblocksMaskPromptKFAddInputPort	on
ControllibblocksMaskPromptKFAddEnablePort	on
Simulinkblkprm_promptsDelayBlkExternalReset	None
ControllibblocksMaskPromptKFOutputEstimatedY	off
ControllibblocksMaskPromptKFOutputPZ	off
ControllibblocksMaskPromptKFTs	-1

### "opticalFlow\_datin" (Inport)

**Table 3.1590. "opticalFlow\_datin" Parameters**

Parameter	Value
Port number	1

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "opticalFlowToVelocity\_gain" (Gain)

**Table 3.1591. "opticalFlowToVelocity\_gain" Parameters**

Parameter	Value
Gain	Estimator.pos.opticalFlowToVelocityGain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "orient\_estimin" (Inport)

**Table 3.1592. "orient\_estimin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Select dxy" (Selector)

**Table 3.1593. "Select dxy" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

### "sensorIMU\_datin" (Import)

**Table 3.1594. "sensorIMU\_datin" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

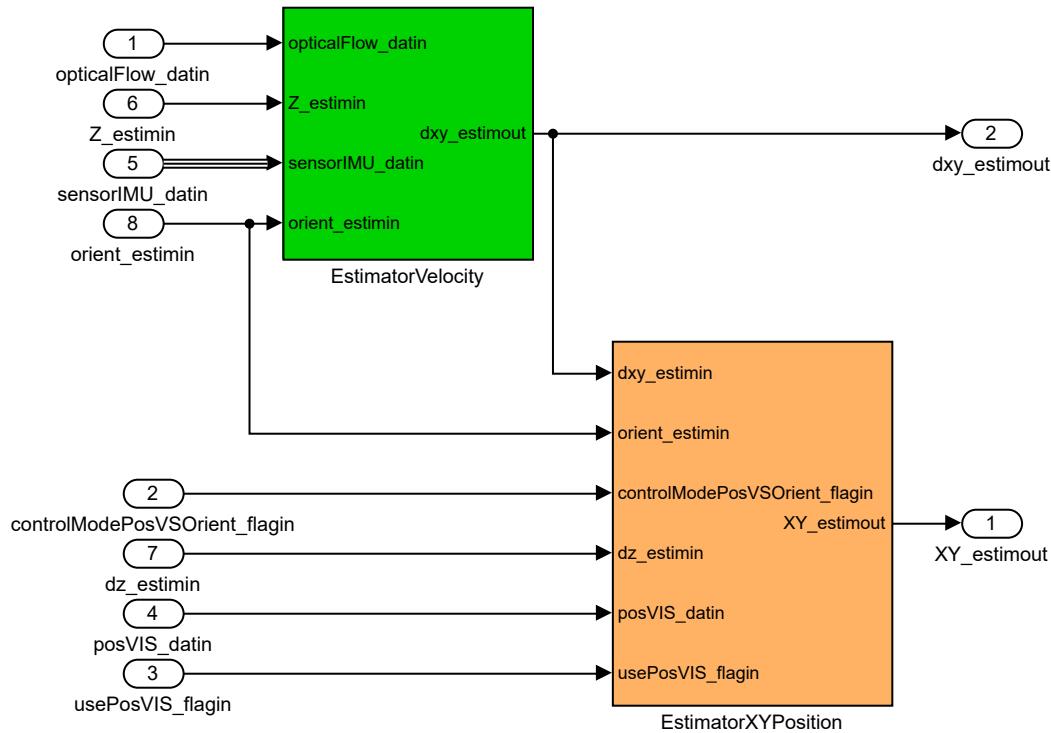
### "Z\_estimin" (Import)

**Table 3.1595. "Z\_estimin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# EstimatorXYPosition

**Figure 3.157. stateEstimator/State Estimator/EstimatorXYPosition**



## Blocks

### Parameters

"controlModePosVSOrientation\_flagin" (Import)

**Table 3.1596. "controlModePosVSOrientation\_flagin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "dxy\_estimout" (Outport)

**Table 3.1597. "dxy\_estimout" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "dz\_estimin" (Inport)

**Table 3.1598. "dz\_estimin" Parameters**

Parameter	Value
Port number	7
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"opticalFlow\_datin" (Import)**

**Table 3.1599. "opticalFlow\_datin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"orient\_estimin" (Import)**

**Table 3.1600. "orient\_estimin" Parameters**

Parameter	Value
Port number	8
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"posVIS\_datin" (Import)**

**Table 3.1601. "posVIS\_datin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"sensorIMU\_datin" (Import)**

**Table 3.1602. "sensorIMU\_datin" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"usePosVIS\_flagin" (Import)**

**Table 3.1603. "usePosVIS\_flagin" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"XY\_estimout" (Outport)**

**Table 3.1604. "XY\_estimout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit

<b>Parameter</b>	<b>Value</b>
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

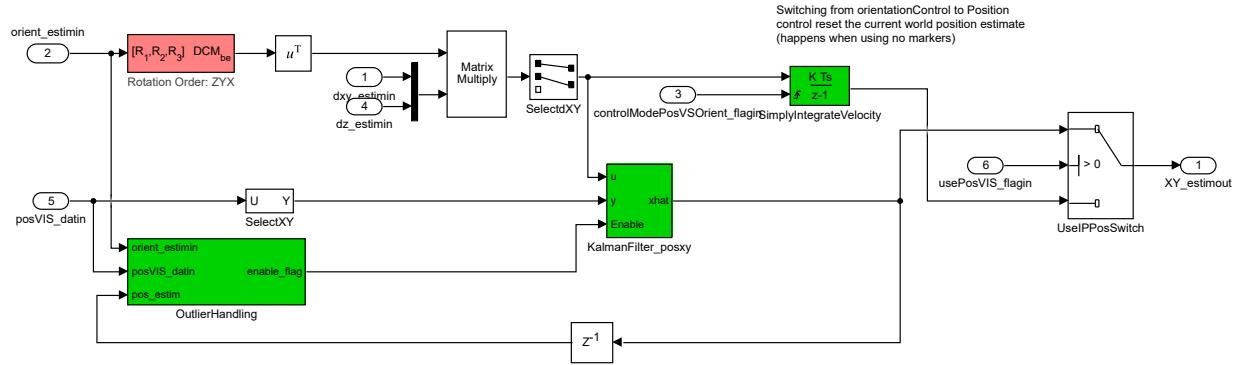
### "Z\_estimin" (Import)

**Table 3.1605. "Z\_estimin" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# EstimatorXYPosition

**Figure 3.158. stateEstimator/State Estimator/EstimatorXYPosition/EstimatorXYPosition**



## Blocks

### Parameters

"controlModePosVSOrientation\_flagin" (Inport)

**Table 3.1606. "controlModePosVSOrientation\_flagin" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"Delay" (Delay)

**Table 3.1607. "Delay" Parameters**

Parameter	Value
Delay length source	Dialog
Delay length	1
Delay upper limit	100

Parameter	Value
Initial condition source	Dialog
Initial condition	0
External reset	None
Show enable port	off
Prevent direct feedthrough	off
Diagnostic for delay length	None
Remove delay length check in generated code	off
Input processing	Elements as channels (sample based)
Use circular buffer for state	off
Sample time (-1 for inherited)	-1
State name must resolve to Simulink signal object	off

### "dxy\_estimin" (Import)

**Table 3.1608. "dxy\_estimin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "dz\_estimin" (Import)

**Table 3.1609. "dz\_estimin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "KalmanFilter\_posxy" (SubSystem)

**Table 3.1610. "KalmanFilter\_posxy" Parameters**

Parameter	Value
ControllibblocksMaskPromptKFTimeDomain	Discrete-Time
ControllibblocksMaskPromptKFUseCurrentMeasurement	on
ControllibblocksMaskPromptKFModelSource	Individual A, B, C, D matrices
ControllibblocksMaskPromptKFA	eye(2)
ControllibblocksMaskPromptKFB	Ts*eye(2)
ControllibblocksMaskPromptKFC	eye(2)
ControllibblocksMaskPromptKFD	0
ControllibblocksMaskPromptKFSource	Dialog
ControllibblocksMaskPromptKFX0DT	[.1 0]
ControllibblocksMaskPromptKFUseGH	on
ControllibblocksMaskPromptKFG	Estimator.pos.kfPos.G
ControllibblocksMaskPromptKFTimeInvariantG	on
ControllibblocksMaskPromptKFH	Estimator.pos.kfPos.H
ControllibblocksMaskPromptKFTimeInvariantH	on
ControllibblocksMaskPromptKFQ	Estimator.pos.kfPos.Q
ControllibblocksMaskPromptKFTimeInvariantQ	on
ControllibblocksMaskPromptKFR	Estimator.pos.kfPos.R
ControllibblocksMaskPromptKFTimeInvariantR	on
ControllibblocksMaskPromptKFN	Estimator.pos.kfPos.N
ControllibblocksMaskPromptKFTimeInvariantN	on
ControllibblocksMaskPromptKFAddInputPort	on
ControllibblocksMaskPromptKFAddEnablePort	on
Simulinkblkprm_promptsDelayBlkExternalReset	None
ControllibblocksMaskPromptKFOutputEstimatedY	off
ControllibblocksMaskPromptKFOutputPZ	off
ControllibblocksMaskPromptKFTs	-1

### "Math Function" (Math)

**Table 3.1611. "Math Function" Parameters**

Parameter	Value
Function	transpose

Parameter	Value
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Mux2" (Mux)

**Table 3.1612. "Mux2" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "orient\_estimin" (Inport)

**Table 3.1613. "orient\_estimin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "posVIS\_datin" (Import)

**Table 3.1614. "posVIS\_datin" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product" (Product)

**Table 3.1615. "Product" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Rotation Angles to Direction Cosine Matrix" (SubSystem)

**Table 3.1616. "Rotation Angles to Direction Cosine Matrix" Parameters**

Parameter	Value
shared_aeroblksharedaeroblktransformblockAng2DCMPParamRotationOrder	ZYX

### "SelectdXY" (Selector)

**Table 3.1617. "SelectdXY" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

### "SelectXY" (Selector)

**Table 3.1618. "SelectXY" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	4
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

### "SimplyIntegrateVelocity" (DiscreteIntegrator)

**Table 3.1619. "SimplyIntegrateVelocity" Parameters**

Parameter	Value
Integrator method	Integration: Forward Euler
Gain value	1.0

Parameter	Value
External reset	rising
Initial condition source	internal
Initial condition	0
Sample time (-1 for inherited)	Ts
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Limit output	off
Upper saturation limit	inf
Lower saturation limit	-inf
Show saturation port	off
Show state port	off
Ignore limit and reset when linearizing	off
State name must resolve to Simulink signal object	off

### "UseIPPosSwitch" (Switch)

**Table 3.1620. "UseIPPosSwitch" Parameters**

Parameter	Value
Criteria for passing first input	u2 > Threshold
Threshold	0
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

**"usePosVIS\_flagin" (Inport)**
**Table 3.1621. "usePosVIS\_flagin" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

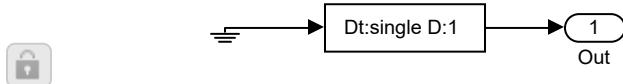
**"XY\_estimout" (Outport)**
**Table 3.1622. "XY\_estimout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

# Ground

**Figure 3.159. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/CalculatePL/Ground**

Specification is to avoid underspecified data type warnings in the code generation process



# Blocks

## Parameters

### "Out" (Outport)

**Table 3.1623. "Out" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	off

### "Signal Specification" (SignalSpecification)

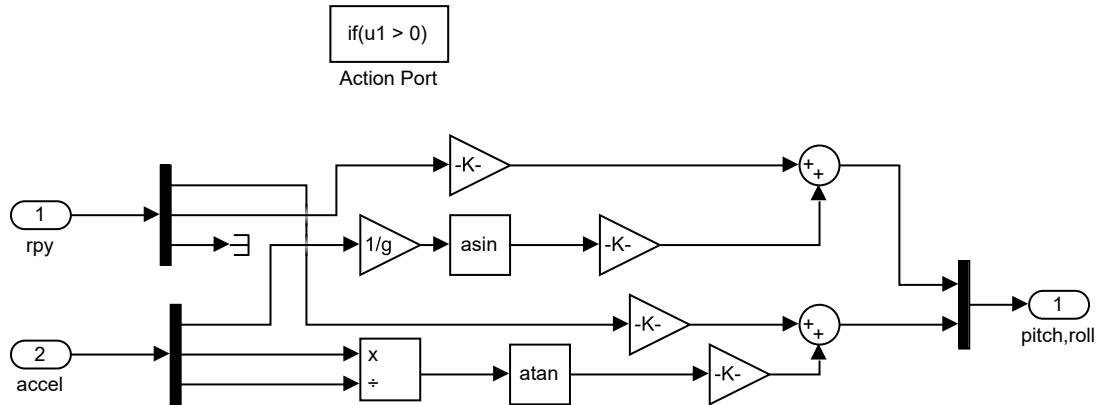
**Table 3.1624. "Signal Specification" Parameters**

Parameter	Value
Minimum	[]
Maximum	[]
Data type	single
Lock output data type setting against changes by the fixed-point tools	off
Require nonvirtual bus	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Dimensions (-1 for inherited)	1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1

## If Action Subsystem

Checksum: 3262974467 3792427503 3565877728 3972831918

**Figure 3.160. stateEstimator/State Estimator/Complementary Filter/If Action Subsystem**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1625.**

Description:  
Data Type: single  
Signal Type: real  
Width: 3  
Dimensions: [1 3 ]

**Table 3.1626.**

Description:  
Data Type: single  
Signal Type: real  
Width: 3  
Dimensions: [1 3 ]

### Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1627.**

Description:  
Data Type: single  
Signal Type: real  
Width: 2  
Dimensions: [1 2 ]

## Blocks

## Parameters

### "accel" (Import)

**Table 3.1628. "accel" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Action Port" (ActionPort)

**Table 3.1629. "Action Port" Parameters**

Parameter	Value
States when execution is resumed	held
Propagate sizes of variable-size signals	Only when execution is resumed

### "Demux" (Demux)

**Table 3.1630. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Demux1" (Demux)

**Table 3.1631. "Demux1" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Divide" (Product)

**Table 3.1632. "Divide" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain" (Gain)

**Table 3.1633. "Gain" Parameters**

Parameter	Value
Gain	1-Estimator.gyroAngleUpdateAccWeight
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain1" (Gain)

**Table 3.1634. "Gain1" Parameters**

Parameter	Value
Gain	Estimator.gyroAngleUpdateAccWeight
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain2" (Gain)

**Table 3.1635. "Gain2" Parameters**

Parameter	Value
Gain	1/g
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain3" (Gain)

**Table 3.1636. "Gain3" Parameters**

Parameter	Value
Gain	Estimator.gyroAngleUpdateAccWeight
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain4" (Gain)

**Table 3.1637. "Gain4" Parameters**

Parameter	Value
Gain	1-Estimator.gyroAngleUpdateAccWeight
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Mux" (Mux)

**Table 3.1638. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "pitch,roll" (Outport)

**Table 3.1639. "pitch,roll" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "rpy" (Import)

**Table 3.1640. "rpy" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Sum" (Sum)

**Table 3.1641. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum1" (Sum)

**Table 3.1642. "Sum1" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions

Parameter	Value
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function" (Trigonometry)

**Table 3.1643. "Trigonometric Function" Parameters**

Parameter	Value
Function	atan
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Trigonometric Function1" (Trigonometry)

**Table 3.1644. "Trigonometric Function1" Parameters**

Parameter	Value
Function	asin
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

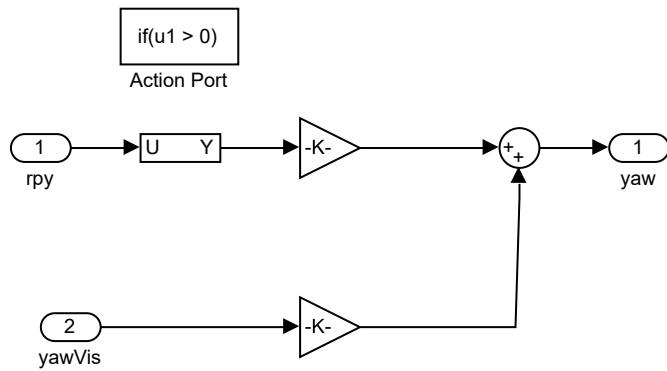
## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## If Action Subsystem1

**Checksum:** 405433032 1776164635 2492389893 325592003

**Figure 3.161. stateEstimator/State Estimator/Complementary Filter/If Action Subsystem1**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1645.**

Description:

Data Type: single

Signal Type: real

Width: 3

Dimensions: [1 3 ]

**Table 3.1646.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1647.**

Description:

Data Type: single

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Blocks

### Parameters

#### "Action Port" (ActionPort)

**Table 3.1648. "Action Port" Parameters**

Parameter	Value
States when execution is resumed	held
Propagate sizes of variable-size signals	Only when execution is resumed

#### "Gain" (Gain)

**Table 3.1649. "Gain" Parameters**

Parameter	Value
Gain	1-Estimator.gyroAngleUpdateVisW eight
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]

Parameter	Value
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain1" (Gain)

**Table 3.1650. "Gain1" Parameters**

Parameter	Value
Gain	Estimator.gyroAngleUpdateVisWeight
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "rpy" (Import)

**Table 3.1651. "rpy" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Selector4" (Selector)

**Table 3.1652. "Selector4" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[3]
Output Size	1

### "Sum" (Sum)

**Table 3.1653. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

Parameter	Value
Sample time (-1 for inherited)	-1

### "yaw" (Outport)

**Table 3.1654. "yaw" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "yawVis" (Import)

**Table 3.1655. "yawVis" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

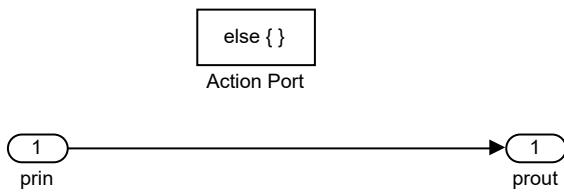
## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## If Action Subsystem2

Checksum: 3053829507 4047136033 3416153277 2285302614

**Figure 3.162. stateEstimator/State Estimator/Complementary Filter/If Action Subsystem2**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1656.**

Description:

Data Type: single

Signal Type: real

Width: 2

Dimensions: [1 2 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1657.**

Description:

Data Type: single

Signal Type: real

Width: 2

Dimensions: [1 2 ]

## Blocks

### Parameters

#### "Action Port" (ActionPort)

**Table 3.1658. "Action Port" Parameters**

Parameter	Value
States when execution is resumed	held
Propagate sizes of variable-size signals	Only when execution is resumed

#### "prin" (Inport)

**Table 3.1659. "prin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"prout" (Outport)****Table 3.1660. "prout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

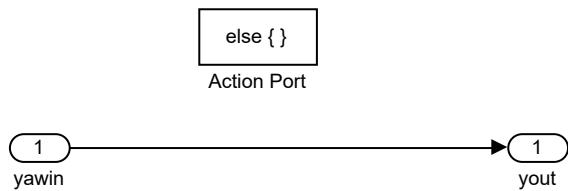
## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## If Action Subsystem3

**Checksum:** 2355045367 2788164566 3486951224 2233759666

**Figure 3.163. stateEstimator/State Estimator/Complementary Filter/If Action Subsystem3**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1661.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1]

### Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1662.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1]

## Blocks

### Parameters

### "Action Port" (ActionPort)

**Table 3.1663. "Action Port" Parameters**

Parameter	Value
States when execution is resumed	held
Propagate sizes of variable-size signals	Only when execution is resumed

### "yawin" (Inport)

**Table 3.1664. "yawin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "yout" (Outport)

**Table 3.1665. "yout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off

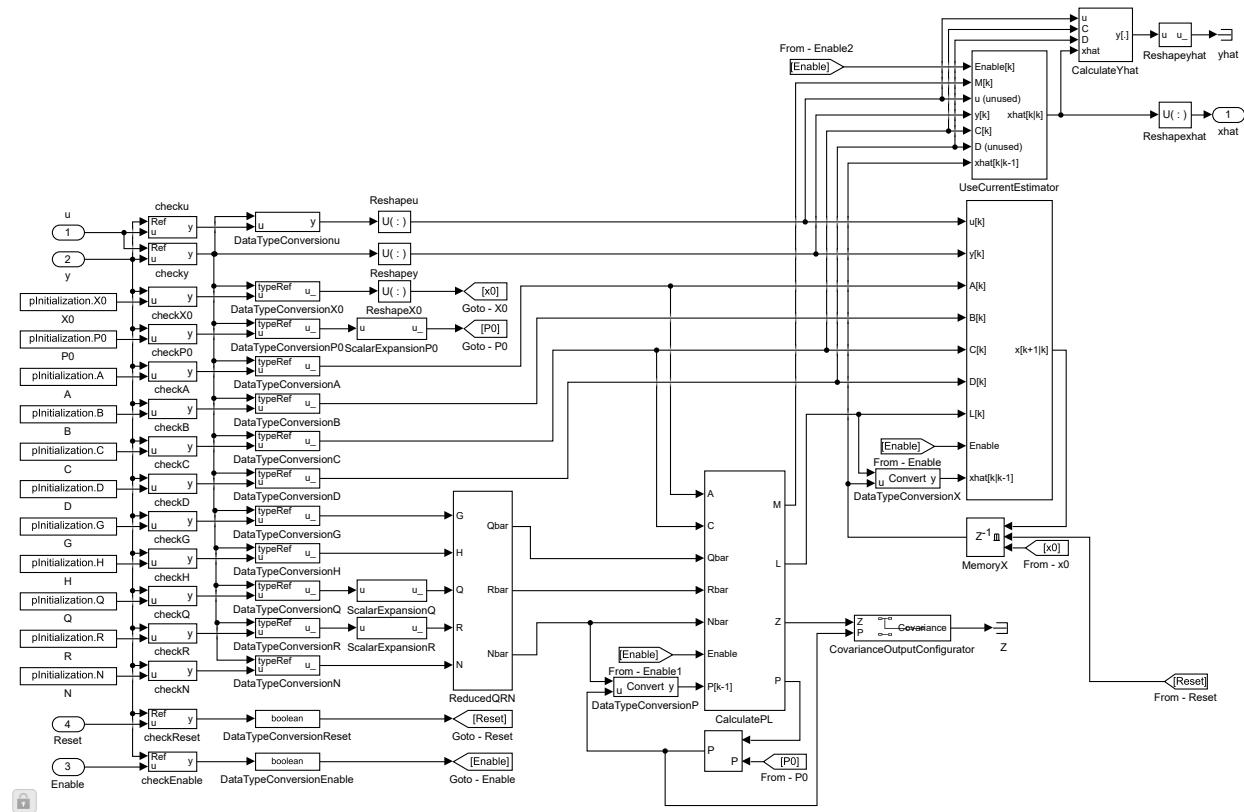
Parameter	Value
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## KalmanFilter\_altitude

**Figure 3.164. stateEstimator/State Estimator/EstimatorAltitude/KalmanFilter\_altitude**



## Blocks

### Parameters

#### "A" (Constant)

**Table 3.1666. "A" Parameters**

Parameter	Value
Constant value	pInitialization.A
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### "B" (Constant)

**Table 3.1667. "B" Parameters**

Parameter	Value
Constant value	pInitialization.B
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "C" (Constant)

**Table 3.1668. "C" Parameters**

Parameter	Value
Constant value	pInitialization.C
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "checkEnable" (SubSystem)

**Table 3.1669. "checkEnable" Parameters**

Parameter	Value
Sample time	pInitialization.Ts
Number of states	pInitialization.Ns
Number of inputs	pInitialization.Nu
Number of process noise inputs	pInitialization.Nw
Number of outputs	pInitialization.Ny

### "checkReset" (SubSystem)

**Table 3.1670. "checkReset" Parameters**

Parameter	Value
Sample time	pInitialization.Ts
Number of states	pInitialization.Ns
Number of inputs	pInitialization.Nu
Number of process noise inputs	pInitialization.Nw
Number of outputs	pInitialization.Ny

### "checku" (SubSystem)

**Table 3.1671. "checku" Parameters**

Parameter	Value
Sample time	pInitialization.Ts
Number of states	pInitialization.Ns
Number of inputs	pInitialization.Nu
Number of process noise inputs	pInitialization.Nw
Number of outputs	pInitialization.Ny

### "checky" (SubSystem)

**Table 3.1672. "checky" Parameters**

Parameter	Value
Sample time	pInitialization.Ts
Number of states	pInitialization.Ns
Number of inputs	pInitialization.Nu
Number of process noise inputs	pInitialization.Nw
Number of outputs	pInitialization.Ny

### "D" (Constant)

**Table 3.1673. "D" Parameters**

Parameter	Value
Constant value	pInitialization.D
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "**DataTypeConversionEnable**" (**DataTypeConversion**)

**Table 3.1674. "DataTypeConversionEnable" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "**DataTypeConversionP**" (**SubSystem**)

**Table 3.1675. "DataTypeConversionP" Parameters**

Parameter	Value
SimulinkmasksInputAndOutputToHaveEqual_MP	Real World Value
SimulinkmasksIntegerRoundingMode_MP	Floor
SimulinkmasksSaturateToMaxOrMinWhenOverflowsOccur_MP	off

### "**DataTypeConversionReset**" (**DataTypeConversion**)

**Table 3.1676. "DataTypeConversionReset" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "DataTypeConversionX" (SubSystem)

**Table 3.1677. "DataTypeConversionX" Parameters**

Parameter	Value
SimulinkmasksInputAndOutputToHaveEqual_MP	Real World Value
SimulinkmasksIntegerRoundingMode_MP	Floor
SimulinkmasksSaturateToMaxOrMinWhenOverflowsOccur_MP	off

### "Enable" (Inport)

**Table 3.1678. "Enable" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "From - Enable" (From)

**Table 3.1679. "From - Enable" Parameters**

Parameter	Value
Goto tag	Enable
Icon display	Tag

### "From - Enable1" (From)

**Table 3.1680. "From - Enable1" Parameters**

Parameter	Value
Goto tag	Enable
Icon display	Tag

### "From - Enable2" (From)

**Table 3.1681. "From - Enable2" Parameters**

Parameter	Value
Goto tag	Enable
Icon display	Tag

### "From - P0" (From)

**Table 3.1682. "From - P0" Parameters**

Parameter	Value
Goto tag	P0
Icon display	Tag

### "From - Reset" (From)

**Table 3.1683. "From - Reset" Parameters**

Parameter	Value
Goto tag	Reset
Icon display	Tag

### "From - x0" (From)

**Table 3.1684. "From - x0" Parameters**

Parameter	Value
Goto tag	x0
Icon display	Tag

### "G" (Constant)

**Table 3.1685. "G" Parameters**

Parameter	Value
Constant value	pInitialization.G
Interpret vector parameters as 1-D	off
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Goto - Enable" (Goto)

**Table 3.1686. "Goto - Enable" Parameters**

Parameter	Value
Tag	Enable
Icon display	Tag
Tag visibility	local

### "Goto - P0" (Goto)

**Table 3.1687. "Goto - P0" Parameters**

Parameter	Value
Tag	P0
Icon display	Tag
Tag visibility	local

### "Goto - Reset" (Goto)

**Table 3.1688. "Goto - Reset" Parameters**

Parameter	Value
Tag	Reset
Icon display	Tag
Tag visibility	local

**"Goto - X0" (Goto)****Table 3.1689. "Goto - X0" Parameters**

Parameter	Value
Tag	x0
Icon display	Tag
Tag visibility	local

**"H" (Constant)****Table 3.1690. "H" Parameters**

Parameter	Value
Constant value	pInitialization.H
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"MemoryX" (Delay)****Table 3.1691. "MemoryX" Parameters**

Parameter	Value
Delay length source	Dialog
Delay length	1
Delay upper limit	100
Initial condition source	Input port
Initial condition	0.0
External reset	Level hold
Show enable port	off
Prevent direct feedthrough	off
Diagnostic for delay length	None

Parameter	Value
Remove delay length check in generated code	off
Input processing	Elements as channels (sample based)
Use circular buffer for state	off
Sample time (-1 for inherited)	pInitialization.Ts
State name must resolve to Simulink signal object	off

### "N" (Constant)

**Table 3.1692. "N" Parameters**

Parameter	Value
Constant value	pInitialization.N
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "P0" (Constant)

**Table 3.1693. "P0" Parameters**

Parameter	Value
Constant value	pInitialization.P0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"Q" (Constant)****Table 3.1694. "Q" Parameters**

Parameter	Value
Constant value	pInitialization.Q
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"R" (Constant)****Table 3.1695. "R" Parameters**

Parameter	Value
Constant value	pInitialization.R
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

**"Reset" (Inport)****Table 3.1696. "Reset" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Reshapeu" (Reshape)

**Table 3.1697. "Reshapeu" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

### "ReshapeX0" (Reshape)

**Table 3.1698. "ReshapeX0" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

### "Reshapexhat" (Reshape)

**Table 3.1699. "Reshapexhat" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

### "Reshapey" (Reshape)

**Table 3.1700. "Reshapey" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

### "u" (Inport)

**Table 3.1701. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "X0" (Constant)

**Table 3.1702. "X0" Parameters**

Parameter	Value
Constant value	pInitialization.X0
Interpret vector parameters as 1-D	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "xhat" (Outport)

**Table 3.1703. "xhat" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "y" (Import)

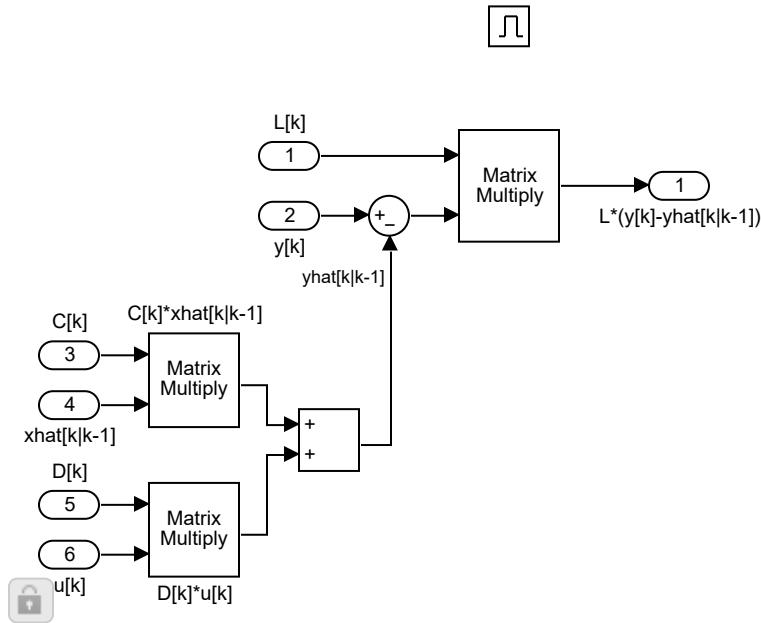
**Table 3.1704. "y" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## MeasurementUpdate

**Checksum:** 1340394909 2806734925 2920165082 318081375

**Figure 3.165. stateEstimator/State Estimator/EstimatorAltitude/KalmanFilter\_altitude/Observer/MeasurementUpdate**



## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1705.**

Description:  
Data Type: double  
Signal Type: real  
Width: 2  
Dimensions: [2 1 2 ]

**Table 3.1706.**

Description:  
Data Type: double  
Signal Type: real  
Width: 1

Dimensions: [2 1 1 ]

**Table 3.1707.**

Description:

Data Type: double

Signal Type: real

Width: 2

Dimensions: [1 2 ]

**Table 3.1708.**

Description:

Data Type: double

Signal Type: real

Width: 1

Dimensions: [1 1 ]

**Table 3.1709.**

Description:

Data Type: double

Signal Type: real

Width: 2

Dimensions: [1 2 ]

**Table 3.1710.**

Description:

Data Type: double

Signal Type: real

Width: 1

Dimensions: [1 1 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1711.**

Description:

Data Type: double

Signal Type: real

Width: 2

Dimensions: [2 2 1 ]

## Blocks

### Parameters

#### "Add1" (Sum)

**Table 3.1712. "Add1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

#### "C[k]" (Import)

**Table 3.1713. "C[k]" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"C[k]\*xhat[k|k-1]" (Product)**
**Table 3.1714. "C[k]\*xhat[k|k-1]" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"D[k]" (Import)**
**Table 3.1715. "D[k]" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"D[k]\*u[k]" (Product)**
**Table 3.1716. "D[k]\*u[k]" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions

Parameter	Value
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Enable" (EnablePort)

**Table 3.1717. "Enable" Parameters**

Parameter	Value
States when enabling	held
Propagate sizes of variable-size signals	Only when enabling
Show output port	off
Enable zero-crossing detection	on
Port dimensions	1
Sample time	-1
Minimum	[]
Maximum	[]
Data type	double
Interpolate data	on

### "L\*(y[k]-yhat[k|k-1])" (Outport)

**Table 3.1718. "L\*(y[k]-yhat[k|k-1])" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	reset
Initial output	0
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "L[k]" (Inport)

**Table 3.1719. "L[k]" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Product3" (Product)

**Table 3.1720. "Product3" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions

Parameter	Value
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum" (Sum)

**Table 3.1721. "Sum" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "u[k]" (Inport)

**Table 3.1722. "u[k]" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "xhat[k|k-1]" (Import)

**Table 3.1723. "xhat[k|k-1]" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y[k]" (Import)

**Table 3.1724. "y[k]" Parameters**

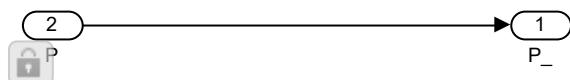
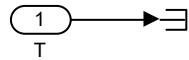
Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# MemoryP

**Figure 3.166. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/MemoryP**



## Blocks

### Parameters

"P" (Inport)

**Table 3.1725. "P" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

"P\_" (Outport)

**Table 3.1726. "P\_" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]

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<b>Parameter</b>	<b>Value</b>
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

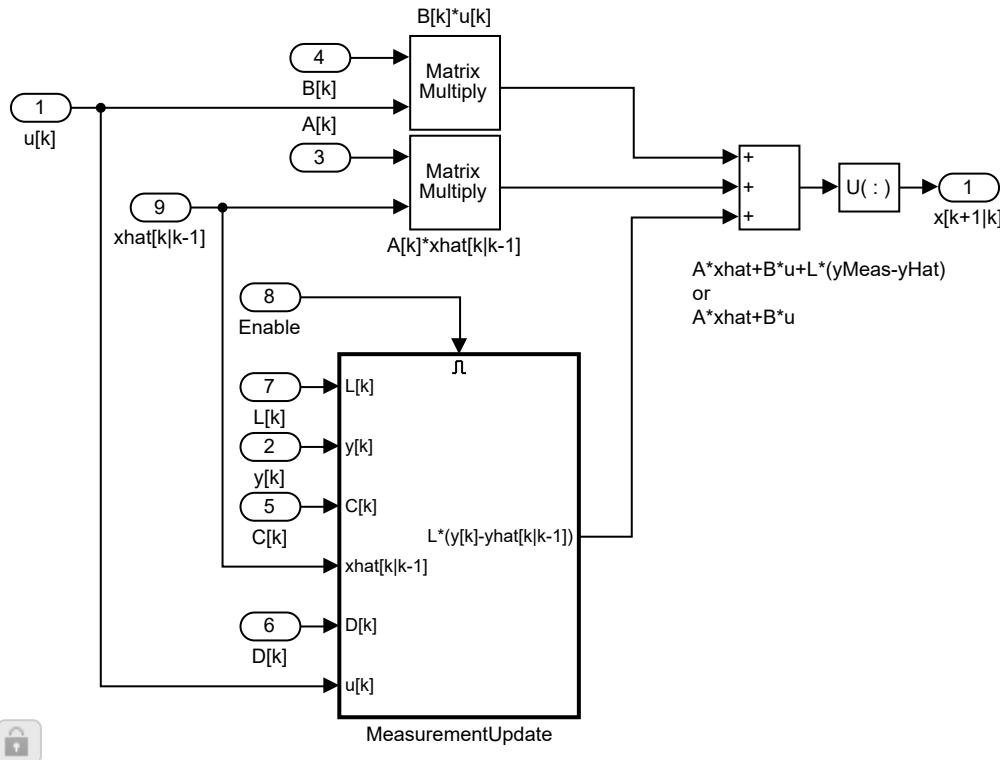
### "T" (Import)

**Table 3.1727. "T" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# Observer

**Figure 3.167. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/Observer**



## Blocks

### Parameters

"A[k]" (Import)

**Table 3.1728. "A[k]" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Inherit: auto

### "A[k]\*xhat[k|k-1]" (Product)

**Table 3.1729. "A[k]\*xhat[k|k-1]" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Add" (Sum)

**Table 3.1730. "Add" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor

Parameter	Value
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "B[k]" (Import)

**Table 3.1731. "B[k]" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "B[k]\*u[k]" (Product)

**Table 3.1732. "B[k]\*u[k]" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Matrix(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "C[k]" (Import)

**Table 3.1733. "C[k]" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "D[k]" (Import)

**Table 3.1734. "D[k]" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Enable" (Import)

**Table 3.1735. "Enable" Parameters**

Parameter	Value
Port number	8
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "L[k]" (Import)

**Table 3.1736. "L[k]" Parameters**

Parameter	Value
Port number	7
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Reshape" (Reshape)

**Table 3.1737. "Reshape" Parameters**

Parameter	Value
Output dimensionality	1-D array
Output dimensions	[1,1]

### "u[k]" (Import)

**Table 3.1738. "u[k]" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "x[k+1 | k]" (Outport)

**Table 3.1739. "x[k+1 | k]" Parameters**

Parameter	Value
Port number	1
Icon display	Port number

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<b>Parameter</b>	<b>Value</b>
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	pInitialization.Ts
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

**"xhat[k|k-1]" (Import)**

**Table 3.1740. "xhat[k|k-1]" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	9
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

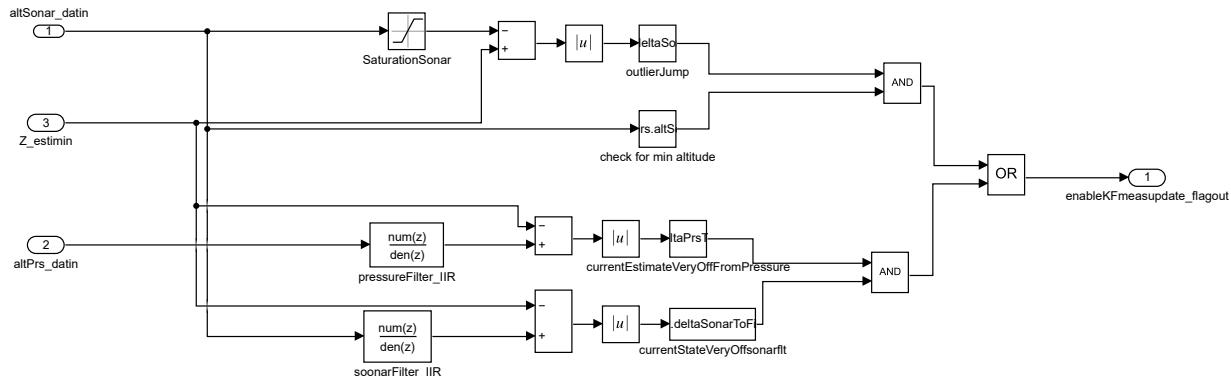
"y[k]" (Import)

**Table 3.1741. "y[k]" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## OutlierHandling

**Figure 3.168. stateEstimator/State Estimator/EstimatorAltitude/OutlierHandling**



## Blocks

### Parameters

"Absestdiff" (Abs)

**Table 3.1742. "Absestdiff" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Absestdiff1" (Abs)

**Table 3.1743. "Absestdiff1" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Absestdiff2" (Abs)

**Table 3.1744. "Absestdiff2" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Add" (Sum)

**Table 3.1745. "Add" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Add1" (Sum)

**Table 3.1746. "Add1" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Add2" (Sum)

**Table 3.1747. "Add2" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "altPrs\_datin" (Inport)

**Table 3.1748. "altPrs\_datin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "altSonar\_datin" (Inport)

**Table 3.1749. "altSonar\_datin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "check for min altitude" (SubSystem)

**Table 3.1750. "check for min altitude" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<
SimulinkmasksConstantValue_MP	-Sensors.altSensorMin
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "currentEstimateVeryOffFromPressure" (SubSystem)

**Table 3.1751. "currentEstimateVeryOffFromPressure" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>=
SimulinkmasksConstantValue_MP	Estimator.alt.deltaPrsToCurrentThreshold
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "currentStateVeryOffsonarflt" (SubSystem)

**Table 3.1752. "currentStateVeryOffsonarflt" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	>=
SimulinkmasksConstantValue_MP	Estimator.alt.deltaSonarToFilteredThreshold
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "enableKFmeasupdate\_flagout" (Outport)

**Table 3.1753. "enableKFmeasupdate\_flagout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "findingoutliers" (Logic)

**Table 3.1754. "findingoutliers" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "newupdateneeded" (Logic)

**Table 3.1755. "newupdateneeded" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "nicemeasurementor newupdateneeded" (Logic)

**Table 3.1756. "nicemeasurementor newupdateneeded" Parameters**

Parameter	Value
Operator	OR
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "outlierJump" (SubSystem)

**Table 3.1757. "outlierJump" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.alt.deltaSonarToCurrentMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

**"pressureFilter\_IIR" (DiscreteFilter)**
**Table 3.1758. "pressureFilter\_IIR" Parameters**

Parameter	Value
Numerator coefficients source	Dialog
Numerator coefficients	Estimator.alt.filterPrsNum
Denominator coefficients source	Dialog
Denominator coefficients	Estimator.alt.filterPrsDen
Initial states source	Dialog
Initial states	0
Input processing	Elements as channels (sample based)
External reset	None
Initial states on denominator side	0
Filter structure	Direct form II
Sample time (-1 for inherited)	-1
Optimize by skipping divide by leading denominator coefficient (a0)	off
Numerator coefficient minimum	[]
Numerator coefficient maximum	[]
Denominator coefficient minimum	[]
Denominator coefficient maximum	[]
Output minimum	[]
Output maximum	[]
State data type	Inherit: Same as input
Multiplicand data type	Inherit: Same as input
Numerator coefficient data type	Inherit: Inherit via internal rule
Denominator coefficient data type	Inherit: Inherit via internal rule
Numerator product output data type	Inherit: Inherit via internal rule
Denominator product output data type	Inherit: Inherit via internal rule
Numerator accumulator data type	Inherit: Inherit via internal rule
Denominator accumulator data type	Inherit: Inherit via internal rule
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
State name must resolve to Simulink signal object	off

### "SaturationSonar" (Saturate)

**Table 3.1759. "SaturationSonar" Parameters**

Parameter	Value
Upper limit	-Sensors.altSensorMin
Lower limit	-inf
Treat as gain when linearizing	on
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor

### "soonarFilter\_IIR" (DiscreteFilter)

**Table 3.1760. "soonarFilter\_IIR" Parameters**

Parameter	Value
Numerator coefficients source	Dialog
Numerator coefficients	Estimator.alt.filterSonarNum
Denominator coefficients source	Dialog
Denominator coefficients	Estimator.alt.filterSonarDen
Initial states source	Dialog
Initial states	0
Input processing	Elements as channels (sample based)
External reset	None
Initial states on denominator side	0
Filter structure	Direct form II
Sample time (-1 for inherited)	-1
Optimize by skipping divide by leading denominator coefficient (a0)	off
Numerator coefficient minimum	[]
Numerator coefficient maximum	[]
Denominator coefficient minimum	[]
Denominator coefficient maximum	[]

Parameter	Value
Output minimum	[]
Output maximum	[]
State data type	Inherit: Same as input
Multiplicand data type	Inherit: Same as input
Numerator coefficient data type	Inherit: Inherit via internal rule
Denominator coefficient data type	Inherit: Inherit via internal rule
Numerator product output data type	Inherit: Inherit via internal rule
Denominator product output data type	Inherit: Inherit via internal rule
Numerator accumulator data type	Inherit: Inherit via internal rule
Denominator accumulator data type	Inherit: Inherit via internal rule
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
State name must resolve to Simulink signal object	off

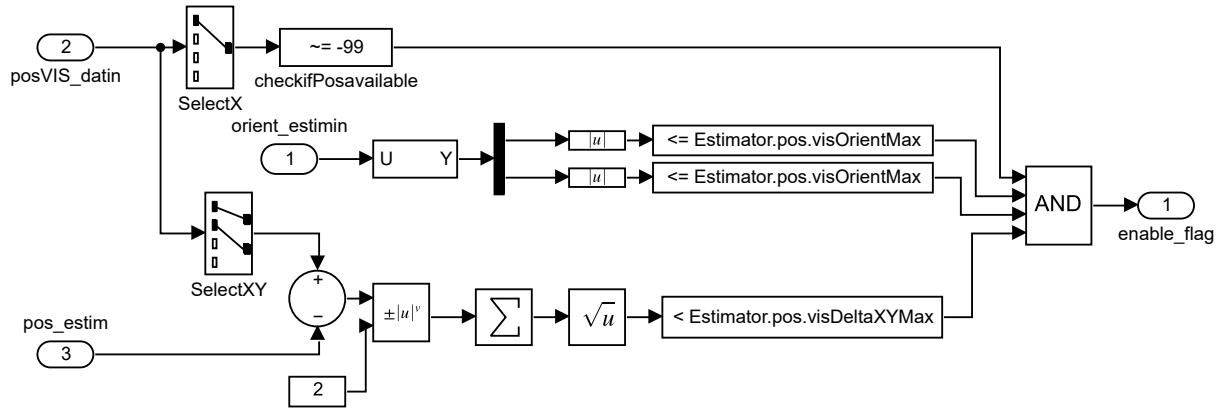
### **"Z\_estimin" (Import)**

**Table 3.1761. "Z\_estimin" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

# OutlierHandling

**Figure 3.169. stateEstimator/State Estimator/EstimatorXYPosition/EstimatorXYPosition/OutlierHandling**



## Blocks

### Parameters

"Abs" (Abs)

**Table 3.1762. "Abs" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Abs1" (Abs)

**Table 3.1763. "Abs1" Parameters**

Parameter	Value
Enable zero-crossing detection	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off

### "Add1" (Sum)

**Table 3.1764. "Add1" Parameters**

Parameter	Value
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	single
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "checkifPosavailable" (SubSystem)

**Table 3.1765. "checkifPosavailable" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	$\sim=$

Parameter	Value
SimulinkmasksConstantValue_MP	-99
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "Constant" (Constant)

**Table 3.1766. "Constant" Parameters**

Parameter	Value
Constant value	2
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Demux" (Demux)

**Table 3.1767. "Demux" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

### "enable\_flag" (Outport)

**Table 3.1768. "enable\_flag" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

<b>Parameter</b>	<b>Value</b>
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Logical Operator3" (Logic)

**Table 3.1769. "Logical Operator3" Parameters**

<b>Parameter</b>	<b>Value</b>
Operator	AND
Number of input ports	4
Icon shape	rectangular
Require all inputs and output to have the same data type	off
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Math Function" (Math)

**Table 3.1770. "Math Function" Parameters**

<b>Parameter</b>	<b>Value</b>
Function	pow
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "maxp3" (SubSystem)

**Table 3.1771. "maxp3" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.visOrientMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "maxq3" (SubSystem)

**Table 3.1772. "maxq3" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<=
SimulinkmasksConstantValue_MP	Estimator.pos.visOrientMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "orient\_estimin" (Inport)

**Table 3.1773. "orient\_estimin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "planarjumpsVISPOS" (SubSystem)

**Table 3.1774. "planarjumpsVISPOS" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	<
SimulinkmasksConstantValue_MP	Estimator.pos.visDeltaXYMax
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

### "pos\_estim" (Import)

**Table 3.1775. "pos\_estim" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "posVIS\_datin" (Import)

**Table 3.1776. "posVIS\_datin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Selector" (Selector)

**Table 3.1777. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2 3]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[2 3]
Output Size	1

### "SelectX" (Selector)

**Table 3.1778. "SelectX" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1]
Output Size	1
Input port size	4
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1]
Output Size	1

### "SelectXY" (Selector)

**Table 3.1779. "SelectXY" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based

Parameter	Value
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1
Input port size	4
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2]
Output Size	1

### "Sqrt" (Sqrt)

**Table 3.1780. "Sqrt" Parameters**

Parameter	Value
Function	<code>sqrt</code>
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Exact
Number of iterations	3

### "Sum of Elements" (Sum)

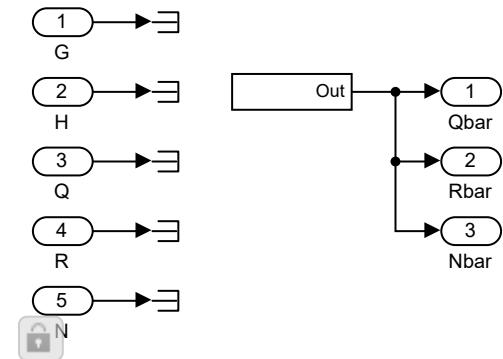
**Table 3.1781. "Sum of Elements" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off

Parameter	Value
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

## ReducedQRN

**Figure 3.170. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/ReducedQRN**



## Blocks

### Parameters

"G" (Inport)

**Table 3.1782. "G" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]

Parameter	Value
Maximum	[]
Data type	Inherit: auto

### "Ground" (SubSystem)

**Table 3.1783. "Ground" Parameters**

Parameter	Value
Simulinkblkprm_promptsUNIFIEDDATATYPE	single
Simulinkblkprm_promptsSigSpecDims	1

### "H" (Inport)

**Table 3.1784. "H" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "N" (Inport)

**Table 3.1785. "N" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Nbar" (Outport)

**Table 3.1786. "Nbar" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	pInitialization.Ts
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Q" (Inport)

**Table 3.1787. "Q" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Qbar" (Outport)

**Table 3.1788. "Qbar" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	pInitialization.Ts
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "R" (Inport)

**Table 3.1789. "R" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

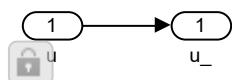
### "Rbar" (Outport)

**Table 3.1790. "Rbar" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	pInitialization.Ts
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Reshapeyhat

**Figure 3.171. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/Reshapeyhat**



## Blocks

### Parameters

#### "u" (Import)

**Table 3.1791. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### "u\_" (Outport)

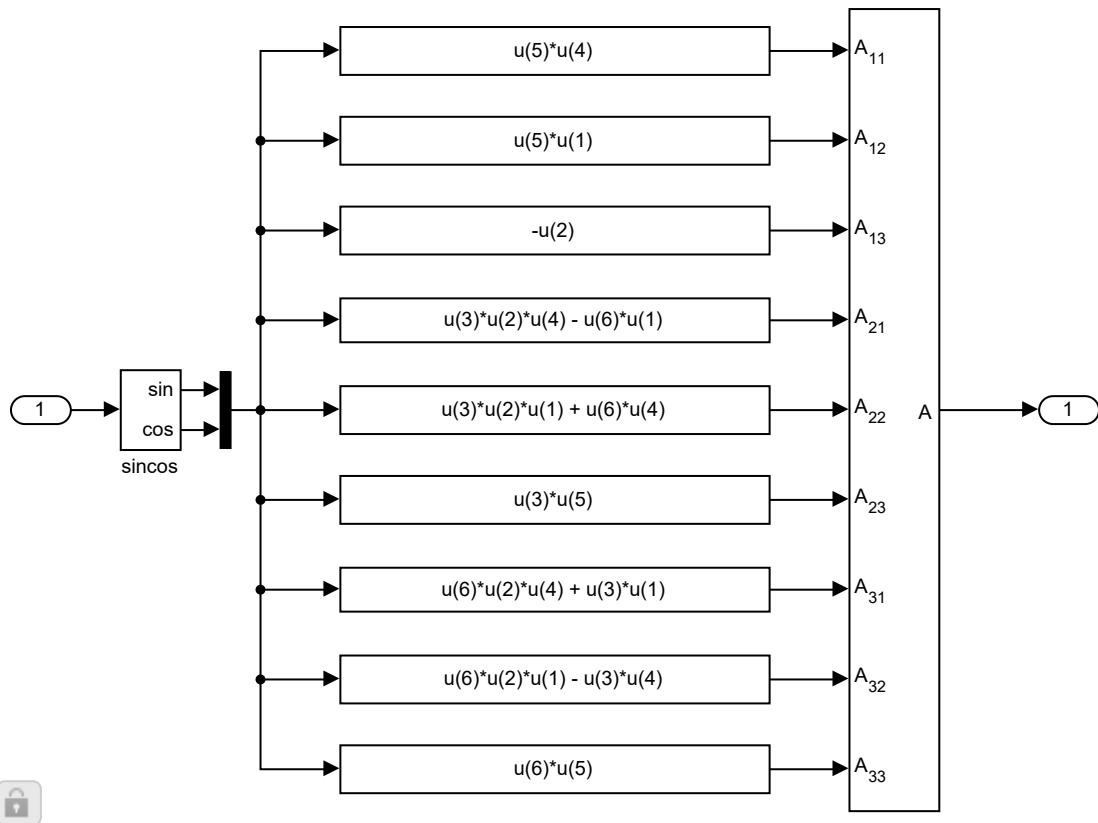
**Table 3.1792. "u\_" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Rotation Angles to Direction Cosine Matrix

**Figure 3.172. stateEstimator/State Estimator/EstimatorAltitude/Rotation Angles to Direction Cosine Matrix**



## Blocks

## Parameters

### "Fcn11" (Fcn)

**Table 3.1793. "Fcn11" Parameters**

Parameter	Value
Expression	$u(5)*u(4)$
Sample time (-1 for inherited)	-1

### "Fcn12" (Fcn)

**Table 3.1794. "Fcn12" Parameters**

Parameter	Value
Expression	$u(5)*u(1)$
Sample time (-1 for inherited)	-1

### "Fcn13" (Fcn)

**Table 3.1795. "Fcn13" Parameters**

Parameter	Value
Expression	$-u(2)$
Sample time (-1 for inherited)	-1

### "Fcn21" (Fcn)

**Table 3.1796. "Fcn21" Parameters**

Parameter	Value
Expression	$u(3)*u(2)*u(4) - u(6)*u(1)$
Sample time (-1 for inherited)	-1

### "Fcn22" (Fcn)

**Table 3.1797. "Fcn22" Parameters**

Parameter	Value
Expression	$u(3)*u(2)*u(1) + u(6)*u(4)$
Sample time (-1 for inherited)	-1

### "Fcn23" (Fcn)

**Table 3.1798. "Fcn23" Parameters**

Parameter	Value
Expression	$u(3)*u(5)$
Sample time (-1 for inherited)	-1

### "Fcn31" (Fcn)

**Table 3.1799. "Fcn31" Parameters**

Parameter	Value
Expression	$u(6)*u(2)*u(4) + u(3)*u(1)$
Sample time (-1 for inherited)	-1

### "Fcn32" (Fcn)

**Table 3.1800. "Fcn32" Parameters**

Parameter	Value
Expression	$u(6)*u(2)*u(1) - u(3)*u(4)$
Sample time (-1 for inherited)	-1

### "Fcn33" (Fcn)

**Table 3.1801. "Fcn33" Parameters**

Parameter	Value
Expression	$u(6)*u(5)$
Sample time (-1 for inherited)	-1

### "In1" (Import)

**Table 3.1802. "In1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	3
Sample time (-1 for inherited)	-1

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Mux" (Mux)

**Table 3.1803. "Mux" Parameters**

Parameter	Value
Number of inputs	2
Display option	bar

### "Out1" (Outport)

**Table 3.1804. "Out1" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	1
Port dimensions (-1 for inherited)	[3,3]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0

Parameter	Value
Interpret vector parameters as 1-D	off

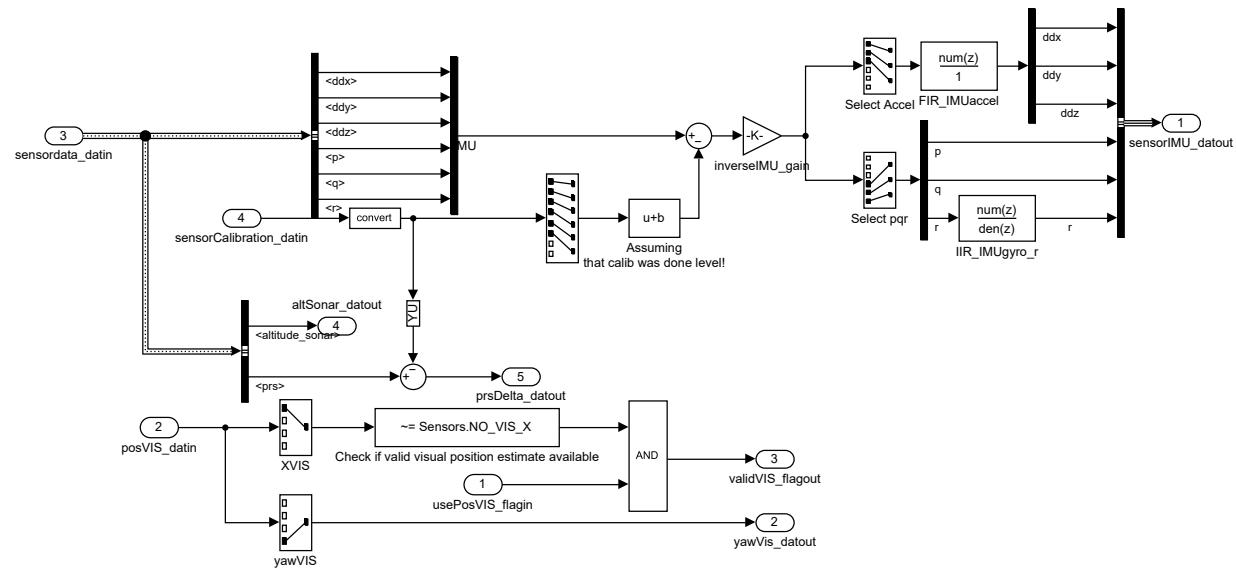
## "sincos" (Trigonometry)

**Table 3.1805. "sincos" Parameters**

Parameter	Value
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

# SensorPreprocessing

**Figure 3.173. stateEstimator/State Estimator/SensorPreprocessing**



## Blocks

## Parameters

### "altSonar\_datout" (Outport)

**Table 3.1806. "altSonar\_datout" Parameters**

Parameter	Value
Port number	4
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Assuming that calib was done level!" (Bias)

**Table 3.1807. "Assuming that calib was done level!" Parameters**

Parameter	Value
Bias	[0 0 +g 0 0 0]
Saturate on integer overflow	off

### "Bus Creator3" (BusCreator)

**Table 3.1808. "Bus Creator3" Parameters**

Parameter	Value
Number of inputs	6
Display option	bar
Data type	Inherit: auto
Output as nonvirtual bus	off
Use names from inputs instead of from bus object	on

### "Bus Selector" (BusSelector)

**Table 3.1809. "Bus Selector" Parameters**

Parameter	Value
Output signals	ddx,ddy,ddz,p,q,r
Output as virtual bus	off
InputSignals	ddx ddy ddz p q r altitude_sonar prs vbat_V vbat_percentage

#### Output Hierarchy:

1. *Bus Selector*
  1. <ddx>
  2. <ddy>
  3. <ddz>
  4. <p>
  5. <q>
  6. <r>

### "Bus Selector1" (BusSelector)

**Table 3.1810. "Bus Selector1" Parameters**

Parameter	Value
Output signals	altitude_sonar,prs

Parameter	Value
Output as virtual bus	off
InputSignals	ddx ddy ddz p q r altitude_sonar prs vbat_V vbat_percentage

**Output Hierarchy:**

1. *Bus Selector1*
  1. <altitude\_sonar>
  2. <prs>

**"Check if valid visual position estimate available" (SubSystem)**

**Table 3.1811. "Check if valid visual position estimate available" Parameters**

Parameter	Value
SimulinkmasksOperator_MP	$\sim=$
SimulinkmasksConstantValue_MP	Sensors.NO_VIS_X
SimulinkmasksOutputDataType_MP	boolean
SimulinkmasksEnableZerocrossingDetection_MP	on

**"Data Type Conversion" (DataTypeConversion)**

**Table 3.1812. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via back propagation
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Demux1" (Demux)

**Table 3.1813. "Demux1" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "Demux2" (Demux)

**Table 3.1814. "Demux2" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

### "FIR\_IMUaccel" (DiscreteFir)

**Table 3.1815. "FIR\_IMUaccel" Parameters**

Parameter	Value
Coefficient source	Dialog parameters
Filter structure	Direct form
Coefficients	Estimator.IMU.filterAccel.Coefficients
Input processing	Elements as channels (sample based)
External reset	None
Show enable port	off
Initial states	0
Sample time (-1 for inherited)	-1
Coefficient minimum	[]
Coefficient maximum	[]
Output minimum	[]
Output maximum	[]
Tap sum data type	Inherit: Same as input
Coefficient data type	Inherit: Same word length as input
Product output data type	Inherit: Inherit via internal rule
Accumulator data type	Inherit: Inherit via internal rule

Parameter	Value
State data type	Inherit: Same as accumulator
Output data type	Inherit: Same as accumulator
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
State name must resolve to Simulink signal object	off

### "IIR\_IMUgyro\_r" (DiscreteFilter)

**Table 3.1816. "IIR\_IMUgyro\_r" Parameters**

Parameter	Value
Numerator coefficients source	Dialog
Numerator coefficients	Estimator.IMU.filterGyroNum
Denominator coefficients source	Dialog
Denominator coefficients	Estimator.IMU.filterGyroDen
Initial states source	Dialog
Initial states	0
Input processing	Elements as channels (sample based)
External reset	None
Initial states on denominator side	0
Filter structure	Direct form II
Sample time (-1 for inherited)	-1
Optimize by skipping divide by leading denominator coefficient (a0)	off
Numerator coefficient minimum	[]
Numerator coefficient maximum	[]
Denominator coefficient minimum	[]
Denominator coefficient maximum	[]
Output minimum	[]
Output maximum	[]
State data type	Inherit: Same as input
Multiplicand data type	Inherit: Same as input
Numerator coefficient data type	Inherit: Inherit via internal rule
Denominator coefficient data type	Inherit: Inherit via internal rule

Parameter	Value
Numerator product output data type	Inherit: Inherit via internal rule
Denominator product output data type	Inherit: Inherit via internal rule
Numerator accumulator data type	Inherit: Inherit via internal rule
Denominator accumulator data type	Inherit: Inherit via internal rule
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
State name must resolve to Simulink signal object	off

### "inverseIMU\_gain" (Gain)

**Table 3.1817. "inverseIMU\_gain" Parameters**

Parameter	Value
Gain	Estimator.inverseIMUGain
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	single
Output minimum	[]
Output maximum	[]
Output data type	single
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Logical Operator" (Logic)

**Table 3.1818. "Logical Operator" Parameters**

Parameter	Value
Operator	AND
Number of input ports	2
Icon shape	rectangular
Require all inputs and output to have the same data type	off

Parameter	Value
Output data type	boolean
Sample time (-1 for inherited)	-1

### "Mux1" (Mux)

**Table 3.1819. "Mux1" Parameters**

Parameter	Value
Number of inputs	6
Display option	bar

### "posVIS\_datin" (Inport)

**Table 3.1820. "posVIS\_datin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "prsDelta\_datout" (Outport)

**Table 3.1821. "prsDelta\_datout" Parameters**

Parameter	Value
Port number	5
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit

<b>Parameter</b>	<b>Value</b>
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Select Accel" (Selector)

**Table 3.1822. "Select Accel" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1 2 3]
Output Size	1
Input port size	6
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1 2 3]
Output Size	1

### "Select pqr" (Selector)

**Table 3.1823. "Select pqr" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[4 5 6]

Parameter	Value
Output Size	1
Input port size	6
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[4 5 6]
Output Size	1

### "Selector2" (Selector)

**Table 3.1824. "Selector2" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1:6]
Output Size	1
Input port size	8
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1:6]
Output Size	1

### "Selector4" (Selector)

**Table 3.1825. "Selector4" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[7]
Output Size	1
Input port size	8
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[7]

Parameter	Value
Output Size	1

### "sensorCalibration\_datin" (Import)

**Table 3.1826. "sensorCalibration\_datin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "sensordata\_datin" (Import)

**Table 3.1827. "sensordata\_datin" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "sensorIMU\_datout" (Outport)

**Table 3.1828. "sensorIMU\_datout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off

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<b>Parameter</b>	<b>Value</b>
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Sum1" (Sum)

**Table 3.1829. "Sum1" Parameters**

<b>Parameter</b>	<b>Value</b>
Icon shape	round
List of signs	+-
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Sum2" (Sum)

**Table 3.1830. "Sum2" Parameters**

Parameter	Value
Icon shape	round
List of signs	-+
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "usePosVIS\_flagin" (Inport)

**Table 3.1831. "usePosVIS\_flagin" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "validVIS\_flagout" (Outport)

**Table 3.1832. "validVIS\_flagout" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off

<b>Parameter</b>	<b>Value</b>
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "XVIS" (Selector)

**Table 3.1833. "XVIS" Parameters**

<b>Parameter</b>	<b>Value</b>
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	1
Output Size	1
Input port size	4
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	1
Output Size	1

### "yawVIS" (Selector)

**Table 3.1834. "yawVIS" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	4
Output Size	1
Input port size	4
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	4
Output Size	1

### "yawVis\_datout" (Outport)

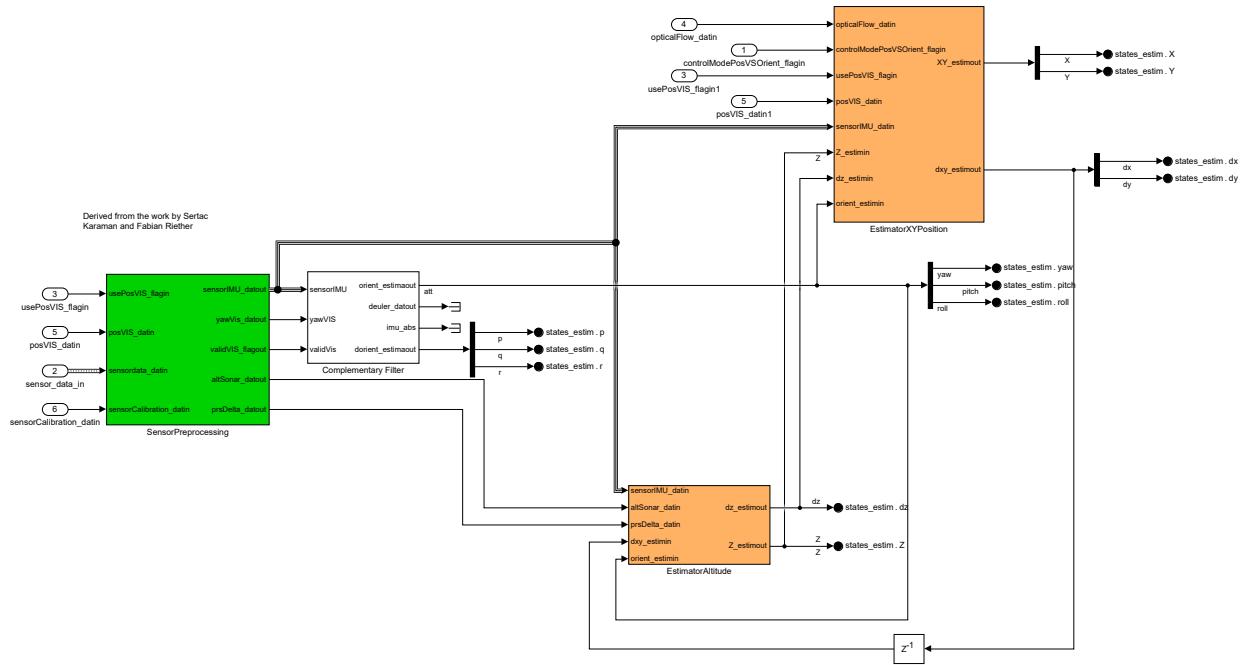
**Table 3.1835. "yawVis\_datout" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

Parameter	Value
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## State Estimator

Figure 3.174. stateEstimator/State Estimator



## Blocks

### Parameters

"controlModePosVSOrientation\_flagin" (Inport)

Table 3.1836. "controlModePosVSOrientation\_flagin" Parameters

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1

Parameter	Value
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	boolean

### "Delay1" (Delay)

**Table 3.1837. "Delay1" Parameters**

Parameter	Value
Delay length source	Dialog
Delay length	1
Delay upper limit	100
Initial condition source	Dialog
Initial condition	0
External reset	None
Show enable port	off
Prevent direct feedthrough	off
Diagnostic for delay length	None
Remove delay length check in generated code	off
Input processing	Elements as channels (sample based)
Use circular buffer for state	off
Sample time (-1 for inherited)	-1
State name must resolve to Simulink signal object	off

### "Demux" (Demux)

**Table 3.1838. "Demux" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

**"Demux1" (Demux)****Table 3.1839. "Demux1" Parameters**

Parameter	Value
Number of outputs	3
Display option	bar
Bus selection mode	off

**"Demux3" (Demux)****Table 3.1840. "Demux3" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

**"Demux4" (Demux)****Table 3.1841. "Demux4" Parameters**

Parameter	Value
Number of outputs	2
Display option	bar
Bus selection mode	off

**"opticalFlow\_datin" (Import)****Table 3.1842. "opticalFlow\_datin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Out Bus Element" (Outport)

**Table 3.1843. "Out Bus Element" Parameters**

Parameter	Value
Port number	1
Port name	states_estim
Element	X
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element1" (Outport)

**Table 3.1844. "Out Bus Element1" Parameters**

Parameter	Value
Port number	1
Port name	states_estim
Element	Y

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<b>Parameter</b>	<b>Value</b>
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element10" (Outport)

**Table 3.1845. "Out Bus Element10" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port name	states_estim
Element	q
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element11" (Outport)

**Table 3.1846. "Out Bus Element11" Parameters**

Parameter	Value
Port number	1
Port name	states_estim
Element	r
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit

<b>Parameter</b>	<b>Value</b>
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element2" (Outport)

**Table 3.1847. "Out Bus Element2" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port name	states_estim
Element	Z
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off

Parameter	Value
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element3" (Outport)

**Table 3.1848. "Out Bus Element3" Parameters**

Parameter	Value
Port number	1
Port name	states_estim
Element	yaw
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element4" (Outport)

**Table 3.1849. "Out Bus Element4" Parameters**

Parameter	Value
Port number	1
Port name	states_estim
Element	pitch
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element5" (Outport)

**Table 3.1850. "Out Bus Element5" Parameters**

Parameter	Value
Port number	1
Port name	states_estim
Element	roll

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<b>Parameter</b>	<b>Value</b>
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element6" (Outport)

**Table 3.1851. "Out Bus Element6" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port name	states_estim
Element	dx
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element7" (Outport)

**Table 3.1852. "Out Bus Element7" Parameters**

Parameter	Value
Port number	1
Port name	states_estim
Element	dy
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit

<b>Parameter</b>	<b>Value</b>
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element8" (Outport)

**Table 3.1853. "Out Bus Element8" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port name	states_estim
Element	dz
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off

Parameter	Value
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Out Bus Element9" (Outport)

**Table 3.1854. "Out Bus Element9" Parameters**

Parameter	Value
Port number	1
Port name	states_estim
Element	p
Is a bus element port block	on
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "posVIS\_datin" (Import)

**Table 3.1855. "posVIS\_datin" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "posVIS\_datin1" (ImportShadow)

**Table 3.1856. "posVIS\_datin1" Parameters**

Parameter	Value
Port number	5
Port name	posVIS_datin
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

**"sensor\_data\_in" (Inport)**

**Table 3.1857. "sensor\_data\_in" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"sensorCalibration\_datin" (Inport)**

**Table 3.1858. "sensorCalibration\_datin" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"usePosVIS\_flagin" (Inport)**

**Table 3.1859. "usePosVIS\_flagin" Parameters**

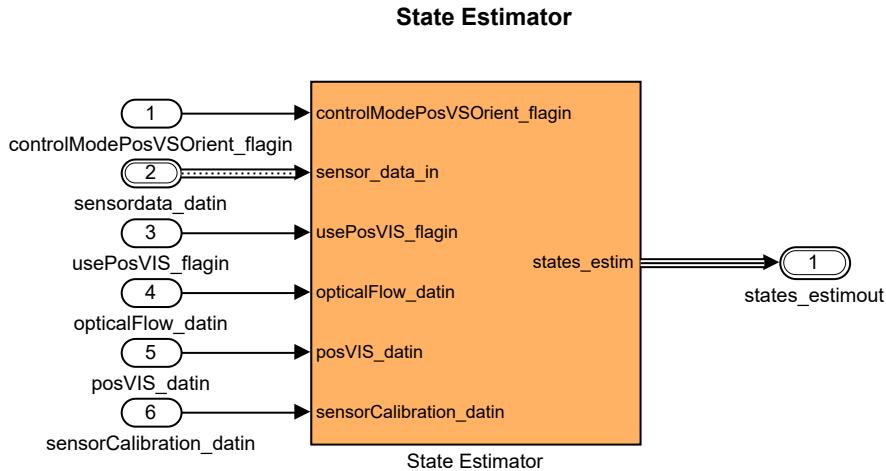
Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**"usePosVIS\_flagin1" (InportShadow)****Table 3.1860. "usePosVIS\_flagin1" Parameters**

Parameter	Value
Port number	3
Port name	usePosVIS_flagin1
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

## stateEstimator

**Checksum:** 3821274937 739491390 3999857022 3957422997

**Figure 3.175. stateEstimator**


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## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1861.**

Description:  
Data Type: boolean  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.1862.**

Description:  
Data Type: single  
Signal Type: real  
Width: 3  
Dimensions: [1 3 ]

**Table 3.1863.**

Description:  
Data Type: single  
Signal Type: real  
Width: 4  
Dimensions: [1 4 ]

**Table 3.1864.**

Description:  
Data Type: single  
Signal Type: real  
Width: 8  
Dimensions: [1 8 ]

**Table 3.1865.**

Description:  
Data Type: sensordata\_t  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

**Table 3.1866.**

Description:  
Data Type: single  
Signal Type: real  
Width: 1  
Dimensions: [1 1 ]

## Output Signals

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1867.**

Description:  
Data Type: single  
Signal Type: real

Width: 12

Dimensions: [-2 12 1]

## Blocks

### Parameters

#### "controlModePosVSOrIent\_flagIn" (Input)

**Table 3.1868. "controlModePosVSOrIent\_flagIn" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	Ts
Minimum	[]
Maximum	[]
Data type	boolean

#### "opticalFlow\_datin" (Input)

**Table 3.1869. "opticalFlow\_datin" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	Ts
Minimum	[]
Maximum	[]
Data type	single

#### "posVIS\_datin" (Input)

**Table 3.1870. "posVIS\_datin" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	Ts

Parameter	Value
Minimum	[]
Maximum	[]
Data type	single

### "sensorCalibration\_datin" (Import)

**Table 3.1871. "sensorCalibration\_datin" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	Ts
Minimum	[]
Maximum	[]
Data type	single

### "sensordata\_datin" (Import)

**Table 3.1872. "sensordata\_datin" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	Ts
Minimum	[]
Maximum	[]
Data type	Bus: sensordata_t

### "states\_estimout" (Outport)

**Table 3.1873. "states\_estimout" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]

Parameter	Value
Data type	Bus: statesEstim_t
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	on
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "usePosVIS\_flagin" (Inport)

**Table 3.1874. "usePosVIS\_flagin" Parameters**

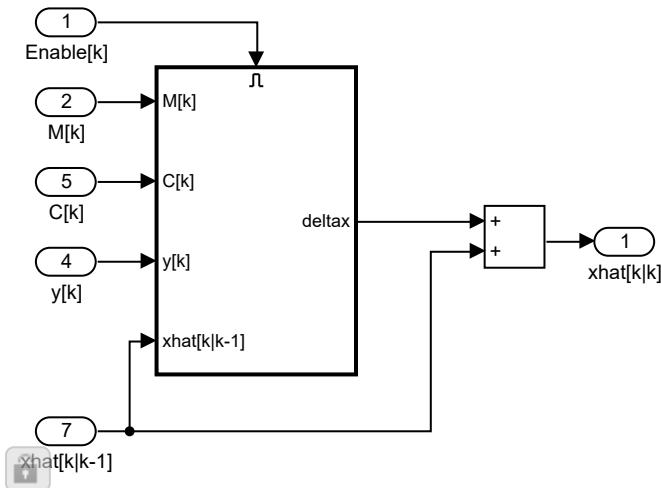
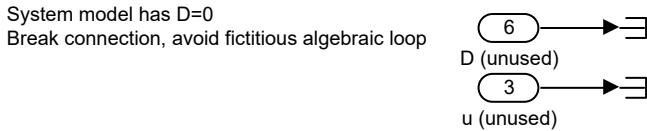
Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	Ts
Minimum	[]
Maximum	[]
Data type	single

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

# UseCurrentEstimator

**Figure 3.176. stateEstimator/State Estimator/EstimatorAltitude/  
KalmanFilter\_altitude/UseCurrentEstimator**



## Blocks

### Parameters

#### "Add" (Sum)

**Table 3.1875. "Add" Parameters**

Parameter	Value
Icon shape	rectangular
List of signs	++
Sum over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Accumulator data type	Inherit: Inherit via internal rule

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock data type settings against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "C[k]" (Import)

**Table 3.1876. "C[k]" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "D (unused)" (Import)

**Table 3.1877. "D (unused)" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "Enable[k]" (Import)

**Table 3.1878. "Enable[k]" Parameters**

Parameter	Value
Port number	1

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "M[k]" (Import)

**Table 3.1879. "M[k]" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "u (unused)" (Import)

**Table 3.1880. "u (unused)" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "xhat[k|k-1]" (Import)

**Table 3.1881. "xhat[k|k-1]" Parameters**

Parameter	Value
Port number	7
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts

Parameter	Value
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "xhat[k|k]" (Outport)

**Table 3.1882. "xhat[k|k]" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	pInitialization.Ts
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "y[k]" (Inport)

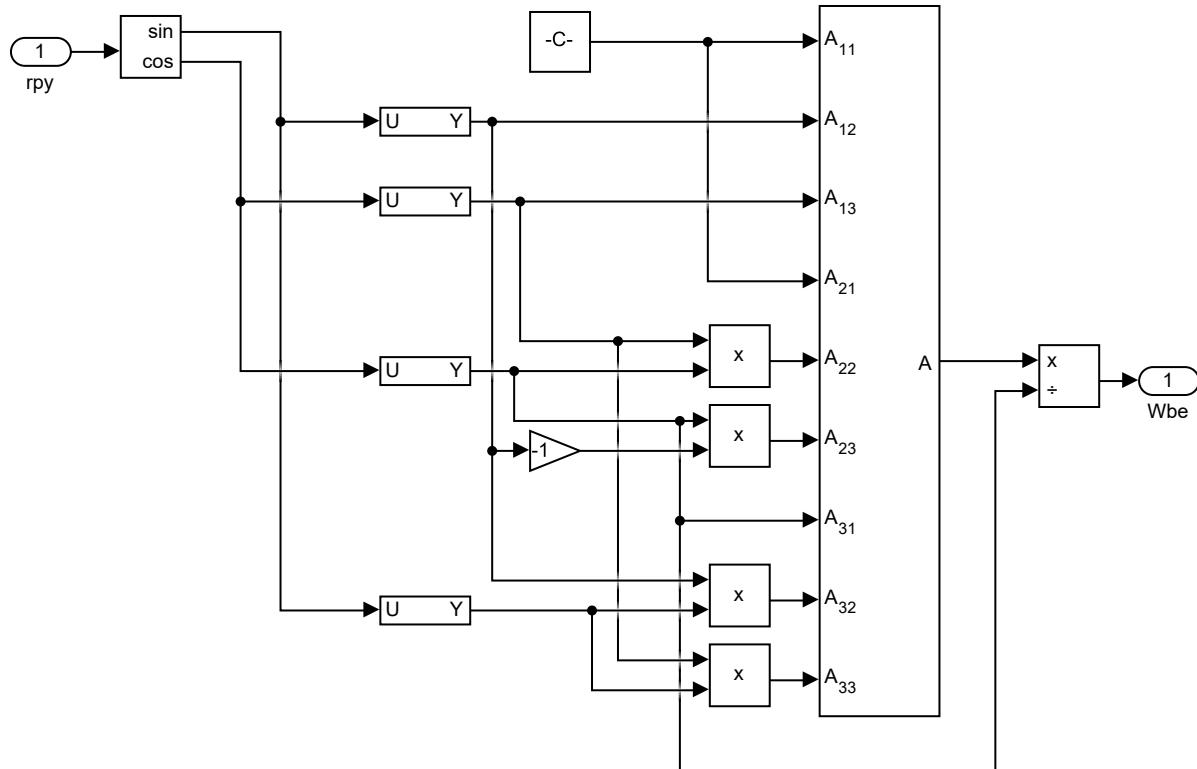
**Table 3.1883. "y[k]" Parameters**

Parameter	Value
Port number	4

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	pInitialization.Ts
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Wbe

**Figure 3.177. stateEstimator/State Estimator/Complementary Filter/Wbe**



## Blocks

### Parameters

### "Constant" (Constant)

**Table 3.1884. "Constant" Parameters**

Parameter	Value
Constant value	single(0)
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Divide" (Product)

**Table 3.1885. "Divide" Parameters**

Parameter	Value
Number of inputs	*/
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Gain" (Gain)

**Table 3.1886. "Gain" Parameters**

Parameter	Value
Gain	-1
Multiplication	Element-wise(K.*u)
Parameter minimum	[]
Parameter maximum	[]
Parameter data type	Inherit: Inherit via internal rule
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product1" (Product)

**Table 3.1887. "Product1" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Product2" (Product)****Table 3.1888. "Product2" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

**"Product3" (Product)****Table 3.1889. "Product3" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "Product4" (Product)

**Table 3.1890. "Product4" Parameters**

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.* )
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### "rpy" (Import)

**Table 3.1891. "rpy" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	single

### "Selector" (Selector)

**Table 3.1892. "Selector" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)

Parameter	Value
Index	[1]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1]
Output Size	1

### "Selector1" (Selector)

**Table 3.1893. "Selector1" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[1]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[1]
Output Size	1

### "Selector2" (Selector)

**Table 3.1894. "Selector2" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)

Parameter	Value
Index	[2]
Output Size	1

### "Selector3" (Selector)

**Table 3.1895. "Selector3" Parameters**

Parameter	Value
Number of input dimensions	1
Index mode	One-based
Index Option	Index vector (dialog)
Index	[2]
Output Size	1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog)
Index	[2]
Output Size	1

### "Trigonometric Function" (Trigonometry)

**Table 3.1896. "Trigonometric Function" Parameters**

Parameter	Value
Function	sincos
Approximation method	None
Number of iterations	11
Angle unit	radian
Number of data points	16
Remove protection against out-of-range input	off
Sample time (-1 for inherited)	-1

### "Wbe" (Outport)

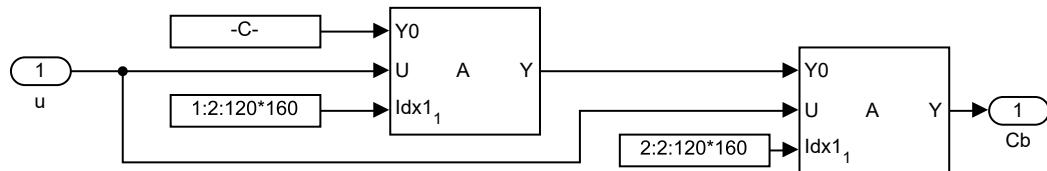
**Table 3.1897. "Wbe" Parameters**

Parameter	Value
Port number	1

Parameter	Value
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

## Cb select

Figure 3.178. conversionYUV/Cb select



## Blocks

### Parameters

### "Assignment" (Assignment)

**Table 3.1898. "Assignment" Parameters**

Parameter	Value
Number of output dimensions	1
Index mode	One-based
Initialize output (Y)	Initialize using input port <Y0>
Index Option	Index vector (port)
Index	1
Output Size	1
Action if any output element is not assigned	Warning
Sample time (-1 for inherited)	-1
Index Option	Index vector (port)
Index	1
Output Size	1

### "Assignment1" (Assignment)

**Table 3.1899. "Assignment1" Parameters**

Parameter	Value
Number of output dimensions	1
Index mode	One-based
Initialize output (Y)	Initialize using input port <Y0>
Index Option	Index vector (port)
Index	1
Output Size	1
Action if any output element is not assigned	Warning
Sample time (-1 for inherited)	-1
Index Option	Index vector (port)
Index	1
Output Size	1

### "Cb" (Outport)

**Table 3.1900. "Cb" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Constant" (Constant)

**Table 3.1901. "Constant" Parameters**

Parameter	Value
Constant value	<code>zeros(1,120*160)</code>
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	<code>uint8</code>
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

### "Constant1" (Constant)

**Table 3.1902. "Constant1" Parameters**

Parameter	Value
Constant value	1:2:120*160
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant2" (Constant)

**Table 3.1903. "Constant2" Parameters**

Parameter	Value
Constant value	2:2:120*160
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "u" (Inport)

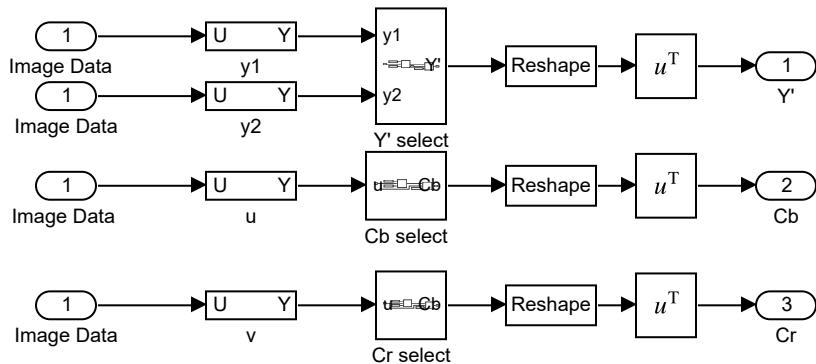
**Table 3.1904. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## conversionYUV

Checksum: 934208148 1772283476 951261446 2860682813

**Figure 3.179. conversionYUV**



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## Interface

### Input Signals

The following tables describe external signals used to compute the subsystem's inputs. The name of the input signal is the name of the input port that accepts the signal. The number in angle brackets is the number of the input port. A dimension of [1 1] indicates a scalar signal.

**Table 3.1905.**

Description:  
Data Type: uint8  
Signal Type: real  
Width: 38400  
Dimensions: [2 4 9600 ]

**Output Signals**

The following tables describe the signals output by this system. The name of the output signal is the name of the signal's parent block, i.e., the block that computes the signal. The number in angle brackets is the number of the port that emits the signal.

**Table 3.1906.**

Description:  
Data Type: uint8  
Signal Type: real  
Width: 19200  
Dimensions: [2 120 160 ]

**Table 3.1907.**

Description:  
Data Type: uint8  
Signal Type: real  
Width: 19200  
Dimensions: [2 120 160 ]

**Table 3.1908.**

Description:  
Data Type: uint8  
Signal Type: real  
Width: 19200  
Dimensions: [2 120 160 ]

**Blocks**

**Parameters**

### " Image Data " (ImportShadow)

**Table 3.1909. " Image Data " Parameters**

Parameter	Value
Port number	1
Port name	Image Data
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	[4 9600]
Variable-size signal	Inherit
Sample time (-1 for inherited)	[0.20000000000000001,0]
Signal type	real
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Cb" (Outport)

**Table 3.1910. "Cb" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

## Chapter 3. Subsystems

---

Parameter	Value
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	[120 160]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Signal type	real
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Cr" (Outport)

**Table 3.1911. "Cr" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	[120 160]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Signal type	real
Ensure outport is virtual	off
Source of initial output value	Dialog

Parameter	Value
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Image Data" (Inport)

**Table 3.1912. "Image Data" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	[4 9600]
Sample time (-1 for inherited)	[0.20000000000000001,0]
Minimum	[]
Maximum	[]
Data type	uint8

### "Image Data" (InportShadow)

**Table 3.1913. "Image Data" Parameters**

Parameter	Value
Port number	1
Port name	Image Data
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	[4 9600]

<b>Parameter</b>	<b>Value</b>
Variable-size signal	Inherit
Sample time (-1 for inherited)	[0.20000000000000001,0]
Signal type	real
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

### "Image Data " (InportShadow)

**Table 3.1914. "Image Data " Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Port name	Image Data
Is a bus element port block	off
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	[4 9600]
Variable-size signal	Inherit
Sample time (-1 for inherited)	[0.20000000000000001,0]
Signal type	real
Latch input by delaying outside signal	off
Latch input for feedback signals of function-call subsystem outputs	off
Interpolate data	on

**"Reshape" (Reshape)****Table 3.1915. "Reshape" Parameters**

Parameter	Value
Output dimensionality	Customize
Output dimensions	[160 120]

**"Reshape1" (Reshape)****Table 3.1916. "Reshape1" Parameters**

Parameter	Value
Output dimensionality	Customize
Output dimensions	[160 120]

**"Reshape2" (Reshape)****Table 3.1917. "Reshape2" Parameters**

Parameter	Value
Output dimensionality	Customize
Output dimensions	[160 120]

**"Transpose" (Math)****Table 3.1918. "Transpose" Parameters**

Parameter	Value
Function	transpose
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Floor
Saturate on integer overflow	on

Parameter	Value
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Transpose1" (Math)

**Table 3.1919. "Transpose1" Parameters**

Parameter	Value
Function	transpose
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input
Lock output data type setting against changes by the fixed-point tool s	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "Transpose2" (Math)

**Table 3.1920. "Transpose2" Parameters**

Parameter	Value
Function	transpose
Algorithm method	Exact
Signed power	on
Sample time (-1 for inherited)	-1
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Same as first input

Parameter	Value
Lock output data type setting against changes by the fixed-point tool s	off
Integer rounding mode	Floor
Saturate on integer overflow	on
Intermediate results data type	Inherit: Inherit via internal rule
Method	Newton-Raphson
Number of iterations	3

### "u" (Selector)

**Table 3.1921. "u" Parameters**

Parameter	Value
Number of input dimensions	2
Index mode	One-based
Index Option	Index vector (dialog) Select all
Index	2 1
Output Size	1 1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog),Select all
Index	2,1
Output Size	1,1

### "v" (Selector)

**Table 3.1922. "v" Parameters**

Parameter	Value
Number of input dimensions	2
Index mode	One-based
Index Option	Index vector (dialog) Select all
Index	4 1

Parameter	Value
Output Size	1 1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog),Select all
Index	4,1
Output Size	1,1

### "Y" (Outport)

**Table 3.1923. "Y" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	[120 160]
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Signal type	real
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "y1" (Selector)

**Table 3.1924. "y1" Parameters**

Parameter	Value
Number of input dimensions	2
Index mode	One-based
Index Option	Index vector (dialog) Select all
Index	1 1
Output Size	1 1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog),Select all
Index	1,1
Output Size	1,1

### "y2" (Selector)

**Table 3.1925. "y2" Parameters**

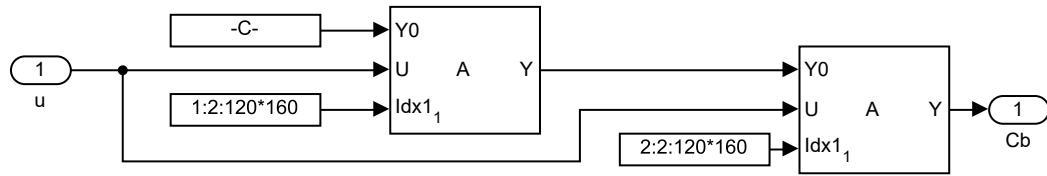
Parameter	Value
Number of input dimensions	2
Index mode	One-based
Index Option	Index vector (dialog) Select all
Index	3 1
Output Size	1 1
Input port size	3
Sample time (-1 for inherited)	-1
Index Option	Index vector (dialog),Select all
Index	3,1
Output Size	1,1

## Block Execution Order

"asbQuadcopter" is a multitasking model. Block execution order is not available for multitasking models.

## Cr select

**Figure 3.180. conversionYUV/Cr select**



## Blocks

### Parameters

#### "Assignment" (Assignment)

**Table 3.1926. "Assignment" Parameters**

Parameter	Value
Number of output dimensions	1
Index mode	One-based
Initialize output (Y)	Initialize using input port <Y0>
Index Option	Index vector (port)
Index	1
Output Size	1
Action if any output element is not assigned	Warning
Sample time (-1 for inherited)	-1
Index Option	Index vector (port)
Index	1
Output Size	1

### "Assignment1" (Assignment)

**Table 3.1927. "Assignment1" Parameters**

Parameter	Value
Number of output dimensions	1
Index mode	One-based
Initialize output (Y)	Initialize using input port <Y0>
Index Option	Index vector (port)
Index	1
Output Size	1
Action if any output element is not assigned	Warning
Sample time (-1 for inherited)	-1
Index Option	Index vector (port)
Index	1
Output Size	1

### "Cb" (Outport)

**Table 3.1928. "Cb" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held

Parameter	Value
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "Constant" (Constant)

**Table 3.1929. "Constant" Parameters**

Parameter	Value
Constant value	zeros(1,120*160)
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant1" (Constant)

**Table 3.1930. "Constant1" Parameters**

Parameter	Value
Constant value	1:2:120*160
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant2" (Constant)

**Table 3.1931. "Constant2" Parameters**

Parameter	Value
Constant value	2:2:120*160
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

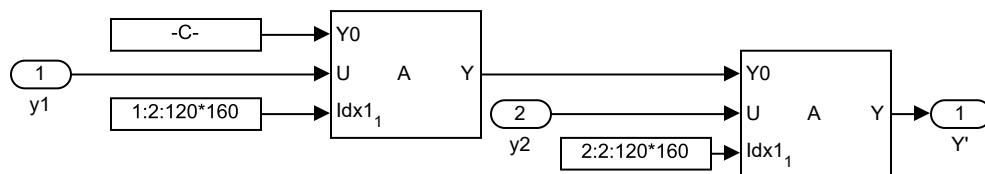
### "u" (Import)

**Table 3.1932. "u" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## Y' select

**Figure 3.181. conversionYUV/Y' select**



## Blocks

### Parameters

#### "Assignment" (Assignment)

**Table 3.1933. "Assignment" Parameters**

Parameter	Value
Number of output dimensions	1
Index mode	One-based
Initialize output (Y)	Initialize using input port <Y0>
Index Option	Index vector (port)
Index	1
Output Size	1
Action if any output element is not assigned	Warning
Sample time (-1 for inherited)	-1
Index Option	Index vector (port)
Index	1
Output Size	1

#### "Assignment1" (Assignment)

**Table 3.1934. "Assignment1" Parameters**

Parameter	Value
Number of output dimensions	1
Index mode	One-based
Initialize output (Y)	Initialize using input port <Y0>
Index Option	Index vector (port)
Index	1
Output Size	1
Action if any output element is not assigned	Warning
Sample time (-1 for inherited)	-1
Index Option	Index vector (port)
Index	1
Output Size	1

### "Constant" (Constant)

**Table 3.1935. "Constant" Parameters**

Parameter	Value
Constant value	<code>zeros(1,120*160)</code>
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	<code>uint8</code>
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant1" (Constant)

**Table 3.1936. "Constant1" Parameters**

Parameter	Value
Constant value	<code>1:2:120*160</code>
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Constant2" (Constant)

**Table 3.1937. "Constant2" Parameters**

Parameter	Value
Constant value	<code>2:2:120*160</code>
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]

<b>Parameter</b>	<b>Value</b>
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### "Y" (Outport)

**Table 3.1938. "Y" Parameters**

<b>Parameter</b>	<b>Value</b>
Port number	1
Icon display	Port number
Output function call	off
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Bus virtuality	inherit
Unit (e.g., m, m/s^2, N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]
MustResolveToSignalObject	off
Specify output when source is unconnected	off
Constant value	0
Interpret vector parameters as 1-D	off

### "y1" (Import)

**Table 3.1939. "y1" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### "y2" (Import)

**Table 3.1940. "y2" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

---

# Chapter 4. System Design Variables

## Design Variable Summary

**Table 4.1. Design Variables**

Variable Name	Parent Blocks	Size	Bytes	Class	Value
AtmosphereBus	<a href="#">Environment</a> <a href="#">Nonlinear Airframe Environment</a> <a href="#">Environment (Constant)</a> <a href="#">Sensors (Dynamics)</a>	1x1	287	Simulink. Bus	< Simulink.Bus>
CommandBus	<a href="#">AC Cmd</a> <a href="#">AC Cmd</a> <a href="#">Bus Creator</a> <a href="#">FCS Commands</a>	1x1	393	Simulink. Bus	< Simulink.Bus>
Controller	<a href="#">FCS</a>	1x1	1120	struct	Ts2Q: [4 ×4 double] Q2Ts: [4 ×4 double] takeoffGain : 0.4500 totalThrustMaxRelative: 0.9200 motorsThrustPerMotorMax: 0.3266
EnvironmentBus	<a href="#">Environment</a> <a href="#">Nonlinear Airframe Environment</a> <a href="#">Environment (Constant)</a> <a href="#">Sensors (Dynamics)</a>	1x1	283	Simulink. Bus	< Simulink.Bus>
Estimator	<a href="#">FCS</a>	1x1	8596	struct	inverseIM UGain: [0.9941 0.996 2 1.0055 1.0014 0.99 36 1.0000] IMU: [1×1 struct] gyroAngleUpdate AccThreshold: 0.0020 gyroAngleUpdateAccWeight: 1.0000e-03

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Variable Name	Parent Blocks	Size	Bytes	Class	Value
					gyroAngleUpdateVisWeight: 0.2000 gyroscopeSensitivity: 1 complementaryFilterInit: [0 0 0] alt: [ 1x1 struct] pos: [ 1x1 struct]
HAL_acc_SI_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	237	Simulink. Bus	< Simulink.Bus>
HAL_acquisition_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	1879	Simulink. Bus	< Simulink.Bus>
HAL_echo_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	511	Simulink. Bus	< Simulink.Bus>
HAL_fifo_gyro_SI_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	167	Simulink. Bus	< Simulink.Bus>
HAL_gyro_SI_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	313	Simulink. Bus	< Simulink.Bus>
HAL_list_echo_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	177	Simulink. Bus	< Simulink.Bus>
HAL_mag_n_mG_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	167	Simulink. Bus	< Simulink.Bus>
HAL_pressure_SI_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	151	Simulink. Bus	< Simulink.Bus>
HAL_ultrasound_SI_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	627	Simulink. Bus	< Simulink.Bus>
HAL_vbat_SI_t	<a href="#">FCS Sensors (Dynamics)</a>	1x1	155	Simulink. Bus	< Simulink.Bus>
Sensors	<a href="#">FCS Sensors (Dynamics)</a>	1x1	6832	struct	IMUAccelG ain: [1.0060 1.0038 0. 9945] IMUGyroG ain: [0.9986 1.0064 1. 0000] IMU: [ 1x1 struct] Sonar: [1x1 struct] NO_VIS_X: -99 NO_VIS_Y AW: -9

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Variable Name	Parent Blocks	Size	Bytes	Class	Value
					dumm y: [1×1 struct] sensorDel ay: 1 airDensity : 1.2250 altToPrsGa in: 12.0173 altToPrsBia s: 1.0127e+05 inverseIMU Gain: [0.9941 0.9962 1.0055 1.0014 0.993 6 1.0000] altSensorM in: 0.4400 velocityToOpticalF lowGain: 1 cameraResol ution: [160 120]
SensorsB us	<a href="#">FCS Sensors (Dynamics)</a>	1x1	305	Simulink. Bus	< Simulink.Bus>
States	<a href="#">Sensors (Dynamics)</a>	1x1	1776	struct	V_body: [3×1 do uble] Omega_body: [3× 1 double] Euler: [3×1 dou ble] Accel_body: [3×1 double] dOmega_body: [3× 1 double] V_ned: [3×1 do uble] X_ned: [3×1 do uble] LLA: [42.2999 -71.3504 71.3232] DCM_be: [3×3 d ouble]
StatesBus	<a href="#">Nonlinear Airframe States Environment (Constant) States</a> <a href="#">Sensors (Dynamics) States</a>	1x1	701	Simulink. Bus	< Simulink.Bus>
TFinal	<a href="#">FCS</a>	1x1	8	double	30

## Chapter 4. System Design Variables

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Variable Name	Parent Blocks	Size	Bytes	Class	Value
Ts	<a href="#">VR Sink</a> <a href="#">Nonlinear Airframe</a> <a href="#">Live Time Ticks</a> <a href="#">Position/Attitude Reference</a> <a href="#">Rate Transition3</a> <a href="#">FCS</a> <a href="#">Sensors (Dynamics)</a> <a href="#">VR Sink</a>	1x1	8	double	0.0050
VTs	<a href="#">Sensors (Dynamics)</a>	1x1	8	double	0.2000
Vehicle	<a href="#">Gain</a> <a href="#">Gain1</a> <a href="#">Deg from North</a> <a href="#">Nonlinear Airframe</a> <a href="#">FCS</a> <a href="#">Deg from North</a> <a href="#">Gain1</a> <a href="#">Gain</a>	1x1	7760	struct	SixDOF: [1×1 struct] PositionOnEarth: [1×1 struct] Airframe: [1×1 struct] Rotor: [1×1 struct] Motor: [1×1 struct]
enableLanding	<a href="#">FCS</a>	1x1	1	logical	0
extraSensorData_t	<a href="#">FCS</a> <a href="#">Sensors (Dynamics)</a>	1x1	243	Simulink. Bus	< Simulink.Bus>
g	<a href="#">Environment (Constant)</a> <a href="#">FCS</a>	1x1	8	double	9.8100
init	<a href="#">Floor contact</a> <a href="#">Nonlinear Airframe</a> <a href="#">FCS</a> <a href="#">Floor contact</a>	1x1	1176	struct	date: [2017 1 1 0 0 0] posLLA: [42.299 9 -71.3504 71.3232] posNED: [57 95 -0.0460] vb: [0 0 0] euler: [0 0 0] angRates: [0 0 0]
landingAltitude	<a href="#">FCS</a>	1x1	8	double	-0.6000
rho	<a href="#">Environment (Constant)</a>	1x1	8	double	1.1840
sensorCalibrationData	<a href="#">Sensors (Dynamics)</a>	1x8	64	double	[0.09 -0.06 -9.473 -0.095 -0.0075 0.0015 1 01270.95 0.2 ]
sensordata_t	<a href="#">FCS</a>	1x1	597	Simulink. Bus	< Simulink.Bus>
statesEstimate_t	<a href="#">FCS</a>	1x1	641	Simulink. Bus	< Simulink.Bus>

Variable Name	Parent Blocks	Size	Bytes	Class	Value
takeOffDuration	<a href="#">Compare To Constant</a> <a href="#">FCS</a>	1x1	8	double	0

**Table 4.2. Functions used in Design Variable Expressions**

Function Name	Parent Blocks	Calling character vector
min	<a href="#">Floor contact</a>	min
pi	<a href="#">Integrator</a> <a href="#">Integrator</a>	-2*pi 2*pi

## Design Variable Details

**Table 4.3. AtmosphereBus**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">AtmosphereBus.Elements(1)</a> , <a href="#">AtmosphereBus.Elements(2)</a> , <a href="#">AtmosphereBus.Elements(3)</a> , <a href="#">AtmosphereBus.Elements(4)</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.4. AtmosphereBus.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	K
Name	air_temp
DataType	double
Complexity	real
Dimensions	1

**Table 4.5. AtmosphereBus.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	speed_sound
DataType	double
Complexity	real
Dimensions	1

**Table 4.6. AtmosphereBus.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	pressure
DataType	double
Complexity	real
Dimensions	1

**Table 4.7. AtmosphereBus.Elements(4)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	air_density
DataType	double
Complexity	real

Dimensions	1
------------	---

**Used by Blocks:**

- [asbQuadcopter/Airframe/Environment](#)
- [asbQuadcopter/Airframe/Nonlinear Airframe](#)
- [asbQuadcopter/Environment/Environment](#)
- [asbQuadcopter/Environment/Environment \(Constant\)/Bus Creator](#)
- [asbQuadcopter/Environment/Environment \(Constant\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Environment](#)

**Resolved in:** base workspace

**Table 4.8. CommandBus**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	[ <a href="#">CommandBus.Elements(1)</a> , <a href="#">CommandBus.Elements(2)</a> , <a href="#">CommandBus.Elements(3)</a> , <a href="#">CommandBus.Elements(4)</a> , <a href="#">CommandBus.Elements(5)</a> ]
Description	
DataScope	Auto
HeaderFile	

**Table 4.9. CommandBus.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	controlModePosVSOrrient
DataType	boolean
Complexity	real
Dimensions	1

**Table 4.10. CommandBus.Elements(2)**

Property	Value
Min	

Max	
DimensionsMode	Fixed
Description	
Unit	
Name	pos_ref
DataType	single
Complexity	real
Dimensions	3

**Table 4.11. CommandBus.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	takeoff_flag
DataType	boolean
Complexity	real
Dimensions	1

**Table 4.12. CommandBus.Elements(4)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	orient_ref
DataType	single
Complexity	real
Dimensions	3

**Table 4.13. CommandBus.Elements(5)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	live_time_ticks
DataType	uint32
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/Command/AC Cmd](#)
- [asbQuadcopter/Command/Signal Editor/AC Cmd](#)
- [asbQuadcopter/Command/Signal Editor/Bus Creator](#)
- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Visualization/Visualization/Commands](#)

**Resolved in:** base workspace

**Table 4.14. Controller**

Field	Value
Ts2Q	[ 1 1 1 1 ; 0.0024137 -0.0024137 0.0024137 -0.0024137 ; -0.044123 -0.044123 0.044123 0.044123 ; -0.044123 0.044123 0.044123 0.044123 -0.044123 ]
Q2Ts	[0.25 103.5736 -5.66592 -5.66592 ; 0.25 -103.5736 -5.66592 5.66592 ; 0.25 103.5736 5.66592 5.66592 ; 0.25 -103.5736 5.66592 -5.66592 ]
takeoffGain	0.4500
totalThrustMaxRelative	0.9200
motorsThrustPerMotorMax	0.3266

**Used by Blocks:**

- [asbQuadcopter/FCS](#)

**Resolved in:** base workspace

**Table 4.15. EnvironmentBus**

Property	Value

## Chapter 4. System Design Variables

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Alignment	-1
PreserveElementDimensions	false
Elements	[ <a href="#">EnvironmentBus.Elements(1)</a> , <a href="#">EnvironmentBus.Elements(2)</a> , <a href="#">EnvironmentBus.Elements(3)</a> ]
Description	
DataScope	Auto
HeaderFile	

**Table 4.16. [EnvironmentBus.Elements\(1\)](#)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	Gravity_ned
DataType	double
Complexity	real
Dimensions	[3 1 ]

**Table 4.17. [EnvironmentBus.Elements\(2\)](#)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	AtmosphereBus
DataType	Bus: AtmosphereBus
Complexity	real
Dimensions	1

**Table 4.18. [EnvironmentBus.Elements\(3\)](#)**

Property	Value
Min	

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Max	
DimensionsMode	Fixed
Description	
Unit	
Name	MagneticField_ned
DataType	double
Complexity	real
Dimensions	[3 1 ]

**Used by Blocks:**

- [asbQuadcopter/Airframe/Environment](#)
- [asbQuadcopter/Airframe/Nonlinear Airframe](#)
- [asbQuadcopter/Environment/Environment](#)
- [asbQuadcopter/Environment/Environment \(Constant\)/Bus Creator](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Environment](#)

**Resolved in:** base workspace

**Table 4.19. Estimator**

Field	Value
inverseIMUGain	[0.99408 0.99618 1.0055 1.0014 0.9936 1 ]
IMU	<a href="#">Estimator.IMU</a>
gyroAngleUpdateAccThreshold	0.0020
gyroAngleUpdateAccWeight	1.0000e-03
gyroAngleUpdateVisWeight	0.2000
gyroscopeSensitivity	1
complementaryFilterInit	[0 0 0 ]
alt	<a href="#">Estimator.alt</a>
pos	<a href="#">Estimator.pos</a>

**Table 4.20. Estimator.IMU**

Field	Value
filterAccel	<a href="#">Estimator.IMU.filterAccel</a>
filterGyroNum	[0.28212 1.2725 2.4208 2.4208 1.2725 0.28212 ]
filterGyroDen	[1 2.2287 2.5245 1.5773 0.54102 0.079562 ]

**Table 4.21. Estimator.alt**

Field	Value
filterPrsNum	[3.7568e-06 1.1271e-05 1.1271e-05 3.7568e-06 ]
filterPrsDen	[1 -2.9372 2.8763 -0.9391 ]
filterSonarNum	[3.7568e-06 1.1271e-05 1.1271e-05 3.7568e-06 ]
filterSonarDen	[1 -2.9372 2.8763 -0.9391 ]
kf	<a href="#">Estimator.alt.kf</a>
deltaSonarToCurrentMax	0.3000
deltaPrsToCurrentThreshold	0.8000
deltaSonarToFilteredThreshold	0.4000

**Table 4.22. Estimator.pos**

Field	Value
opticalFlowZMax	-0.4000
accelerationInputGain	0.2000
opticalFlowToVelocityGain	1
ofPitchRollMax	0.6000
ofPQMax	7
ofPQHovMax	0.5000
ofDPQMax	80
deltaDXYMax	5
kfVelo	<a href="#">Estimator.pos.kfVelo</a>
kfPos	<a href="#">Estimator.pos.kfPos</a>
visOrientMax	0.1800
visDeltaXYMax	1

### **Estimator.IMU.filterAccel (digitalFilter, )**

Note: this object has no unfiltered properties.

**Table 4.23. Estimator.alt.kf**

Field	Value
G	[0 ; 1 ]
H	0
Q	5.0000e-04
R	0.1000
N	0

**Table 4.24. Estimator.pos.kfVelo**

Field	Value
G	[1 0 ; 0 1 ]
H	0
Q	[0.09 0 ; 0 0.09 ]
R	[5 0 ; 0 5 ]
N	0

**Table 4.25. Estimator.pos.kfPos**

Field	Value
G	[0.1 0 ; 0 0.1 ]
H	0
Q	[0.001 0 ; 0 0.001 ]
R	[0.3 0 ; 0 0.3 ]
N	0

**Used by Blocks:**

- [asbQuadcopter/FCS](#)

**Resolved in:** base workspace

**Table 4.26. HAL\_acc\_SI\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">[HAL_acc_SI_t.Elements(1), HAL_acc_SI_t.Elements(2), HAL_acc_SI_t.Elements(3), HAL_acc_SI_t.Elements(4)]</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.27. HAL\_acc\_SI\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed

Description	
Unit	
Name	x
DataType	single
Complexity	real
Dimensions	1

**Table 4.28. HAL acc SI t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	y
DataType	single
Complexity	real
Dimensions	1

**Table 4.29. HAL acc SI t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	z
DataType	single
Complexity	real
Dimensions	1

**Table 4.30. HAL acc SI t.Elements(4)**

Property	Value
Min	

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Max	
DimensionsMode	Fixed
Description	
Unit	
Name	temperature
DataType	single
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/Bus Creator4](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acc SI creator/Bus Creator](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition\\_t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.31. HAL\_acquisition\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	[ <a href="#">HAL acquisition t.Elements(1)</a> , <a href="#">HAL acquisition t.Elements(2)</a> , <a href="#">HAL acquisition t.Elements(3)</a> , <a href="#">HAL acquisition t.Elements(4)</a> , <a href="#">HAL acquisition t.Elements(5)</a> , <a href="#">HAL acquisition t.Elements(6)</a> , <a href="#">HAL acquisition t.Elements(7)</a> , <a href="#">HAL acquisition t.Elements(8)</a> , <a href="#">HAL acquisition t.Elements(9)</a> , <a href="#">HAL acquisition t.Elements(10)</a> , <a href="#">HAL acquisition t.Elements(11)</a> , <a href="#">HAL acquisition t.Elements(12)</a> , <a href="#">HAL acquisition t.Elements(13)</a> , <a href="#">HAL acquisition t.Elements(14)</a> , <a href="#">HAL acquisition t.Elements(15)</a> , <a href="#">HAL acquisition t.Elements(16)</a> , <a href="#">HAL acquisition t.Elements(17)</a> , <a href="#">HAL acquisition t.Elements(18)</a> , <a href="#">HAL acquisition t.Elements(19)</a> , <a href="#">HAL acquisition t.Elements(20)</a> , <a href="#">HAL acquisition t.Elements(21)</a> ]
Description	
DataScope	Auto
HeaderFile	

**Table 4.32. HAL acquisition t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	number_HAL_read_call
DataType	int32
Complexity	real
Dimensions	1

**Table 4.33. HAL acquisition t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	timestamp
DataType	uint32
Complexity	real
Dimensions	1

**Table 4.34. HAL acquisition t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	status
DataType	uint16
Complexity	real

Dimensions	1
------------	---

**Table 4.35. HAL acquisition t.Elements(4)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	used
DataType	uint8
Complexity	real
Dimensions	1

**Table 4.36. HAL acquisition t.Elements(5)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	count_user
DataType	uint8
Complexity	real
Dimensions	1

**Table 4.37. HAL acquisition t.Elements(6)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_acc_SI

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DataType	Bus: HAL_acc_SI_t
Complexity	real
Dimensions	1

**Table 4.38. HAL acquisition t.Elements(7)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_gyro_SI
DataType	Bus: HAL_gyro_SI_t
Complexity	real
Dimensions	1

**Table 4.39. HAL acquisition t.Elements(8)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_fifo_count
DataType	uint16
Complexity	real
Dimensions	1

**Table 4.40. HAL acquisition t.Elements(9)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	

Unit	
Name	fifo_timestamp
DataType	uint32
Complexity	real
Dimensions	1

**Table 4.41. HAL acquisition t.Elements(10)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_fifo_gyro_SI_TempCorr
DataType	Bus: HAL_fifo_gyro_SI_t
Complexity	real
Dimensions	5

**Table 4.42. HAL acquisition t.Elements(11)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_fifo_acce_SI_TempCorr
DataType	Bus: HAL_fifo_gyro_SI_t
Complexity	real
Dimensions	5

**Table 4.43. HAL acquisition t.Elements(12)**

Property	Value
Min	
Max	

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DimensionsMode	Fixed
Description	
Unit	
Name	HAL_fifo_gyro_SI
DataType	Bus: HAL_fifo_gyro_SI_t
Complexity	real
Dimensions	5

**Table 4.44. HAL acquisition t.Elements(13)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_fifo_acce_SI
DataType	Bus: HAL_fifo_gyro_SI_t
Complexity	real
Dimensions	5

**Table 4.45. HAL acquisition t.Elements(14)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_ref_IMU_temp
DataType	single
Complexity	real
Dimensions	1

**Table 4.46. HAL acquisition t.Elements(15)**

Property	Value

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Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_fifo_fsync
DataType	uint8
Complexity	real
Dimensions	5

**Table 4.47. HAL\_acquisition.t.Elements(16)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_fifo_size
DataType	int32
Complexity	real
Dimensions	1

**Table 4.48. HAL\_acquisition.t.Elements(17)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_magn_mG
DataType	Bus: HAL_magn_mG_t
Complexity	real
Dimensions	1

**Table 4.49. HAL acquisition t.Elements(18)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_pressure_SI
DataType	Bus: HAL_pressure_SI_t
Complexity	real
Dimensions	1

**Table 4.50. HAL acquisition t.Elements(19)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_ultrasound_SI
DataType	Bus: HAL_ultrasound_SI_t
Complexity	real
Dimensions	1

**Table 4.51. HAL acquisition t.Elements(20)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	padding
DataType	uint8
Complexity	real

Dimensions

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**Table 4.52. HAL acquisition t.Elements(21)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_vbat_SI
DataType	Bus: HAL_vbat_SI_t
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/Bus Creator4](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition\\_t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.53. HAL\_echo\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	[ <a href="#">HAL_echo_t.Elements(1)</a> , <a href="#">HAL_echo_t.Elements(2)</a> , <a href="#">HAL_echo_t.Elements(3)</a> , <a href="#">HAL_echo_t.Elements(4)</a> , <a href="#">HAL_echo_t.Elements(5)</a> , <a href="#">HAL_echo_t.Elements(6)</a> , <a href="#">HAL_echo_t.Elements(7)</a> ]
Description	
DataScope	Auto
HeaderFile	

**Table 4.54. HAL echo t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	begin_echo_index
DataType	uint16
Complexity	real
Dimensions	1

**Table 4.55. HAL echo t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	end_echo_index
DataType	uint16
Complexity	real
Dimensions	1

**Table 4.56. HAL echo t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	max_value_index
DataType	int16
Complexity	real

Dimensions	1
------------	---

**Table 4.57. HAL echo t.Elements(4)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	max_value
DataType	int32
Complexity	real
Dimensions	1

**Table 4.58. HAL echo t.Elements(5)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	precedent
DataType	uint16
Complexity	real
Dimensions	1

**Table 4.59. HAL echo t.Elements(6)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	d_echo

DataType	int16
Complexity	real
Dimensions	1

**Table 4.60. HAL echo t.Elements(7)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	pre_max_index
DataType	uint16
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/Bus Creator4](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition\\_t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL ultrasound SI creator/Bus Creator2](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL ultrasound SI creator/HAL list echo t creator/Bus Creator7](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/ Sensor System/IMU Pressure/HAL acquisition creator/HAL ultrasound SI creator/ HAL list echo t creator/HAL echo t creator/Bus Creator6](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/ Sensor System/IMU Pressure/HAL acquisition creator/HAL ultrasound SI creator/ HAL list echo t creator/HAL echo t creator/HAL echo t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL ultrasound SI creator/HAL list echo t creator1/Bus Creator7](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/ Sensor System/IMU Pressure/HAL acquisition creator/HAL ultrasound SI creator/ HAL list echo t creator1/HAL echo t creator/Bus Creator6](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/ Sensor System/IMU Pressure/HAL acquisition creator/HAL ultrasound SI creator/ HAL list echo t creator1/HAL echo t creator/HAL echo t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)

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- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.61. HAL\_fifo\_gyro\_SI\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	[ <a href="#">HAL_fifo_gyro_SI_t.Elements(1)</a> , <a href="#">HAL_fifo_gyro_SI_t.Elements(2)</a> , <a href="#">HAL_fifo_gyro_SI_t.Elements(3)</a> ]
Description	
DataScope	Auto
HeaderFile	

**Table 4.62. HAL\_fifo\_gyro\_SI\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	x
DataType	single
Complexity	real
Dimensions	1

**Table 4.63. HAL\_fifo\_gyro\_SI\_t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	y
DataType	single
Complexity	real

Dimensions	1
------------	---

**Table 4.64. HAL fifo gyro SI t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	z
DataType	single
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/Bus Creator4](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition\\_t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL fifo gyro SI t creator/Bus Creator](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL fifo gyro SI t creator1/Bus Creator](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL fifo gyro SI t creator2/Bus Creator](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL fifo gyro SI t creator3/Bus Creator](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.65. HAL\_gyro\_SI\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false

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Elements	<a href="#">[HAL_gyro_SI.t.Elements(1), HAL_gyro_SI.t.Elements(2), HAL_gyro_SI.t.Elements(3), HAL_gyro_SI.t.Elements(4), HAL_gyro_SI.t.Elements(5)]</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.66. HAL gyro SI t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	x
DataType	single
Complexity	real
Dimensions	1

**Table 4.67. HAL gyro SI t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	y
DataType	single
Complexity	real
Dimensions	1

**Table 4.68. HAL gyro SI t.Elements(3)**

Property	Value
Min	
Max	

DimensionsMode	Fixed
Description	
Unit	
Name	z
DataType	single
Complexity	real
Dimensions	1

**Table 4.69. HAL gyro SI t.Elements(4)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	temperature
DataType	single
Complexity	real
Dimensions	1

**Table 4.70. HAL gyro SI t.Elements(5)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	temperature_lsb
DataType	int32
Complexity	real
Dimensions	1

### Used by Blocks:

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL\\_acquisition\\_creator/Bus Creator4](#)

## Chapter 4. System Design Variables

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- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition\\_t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL gyro SI creator/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.71. HAL\_list\_echo\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">[HAL_list_echo_t.Elements(1), HAL_list_echo_t.Elements(2)]</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.72. HAL\_list\_echo\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	tab_echo
DataType	Bus: HAL_echo_t
Complexity	real
Dimensions	30

**Table 4.73. HAL\_list\_echo\_t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	

## Chapter 4. System Design Variables

---

Unit	
Name	number_of_echoes
DataType	uint8
Complexity	real
Dimensions	1

### Used by Blocks:

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/Bus Creator4](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL ultrasound SI creator/Bus Creator2](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL ultrasound SI creator/HAL list echo t creator/Bus Creator7](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL ultrasound SI creator/HAL list echo t creator1/Bus Creator7](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.74. HAL\_magn\_mG\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	[ <a href="#">HAL_magn_mG_t.Elements(1)</a> , <a href="#">HAL_magn_mG_t.Elements(2)</a> , <a href="#">HAL_magn_mG_t.Elements(3)</a> ]
Description	
DataScope	Auto
HeaderFile	

**Table 4.75. HAL\_magn\_mG\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed

Description	
Unit	
Name	x
DataType	single
Complexity	real
Dimensions	1

**Table 4.76. HAL magn mG t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	y
DataType	single
Complexity	real
Dimensions	1

**Table 4.77. HAL magn mG t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	z
DataType	single
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/Bus Creator4](#)

## Chapter 4. System Design Variables

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- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition\\_t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL magn\\_mG\\_t creator1/Bus Creator](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.78. HAL\_pressure\_SI\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">[HAL_pressure_SI_t.Elements(1), HAL_pressure_SI_t.Elements(2)]</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.79. HAL\_pressure\_SI\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	temperature
DataType	double
Complexity	real
Dimensions	1

**Table 4.80. HAL\_pressure\_SI\_t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	

## Chapter 4. System Design Variables

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Unit	
Name	pressure
DataType	single
Complexity	real
Dimensions	1

### Used by Blocks:

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/Bus Creator4](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL pressure SI creator/Bus Creator3](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.81. HAL\_ultrasound\_SI\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">[HAL_ultrasound_SI_t.Elements(1), HAL_ultrasound_SI_t.Elements(2), HAL_ultrasound_SI_t.Elements(3), HAL_ultrasound_SI_t.Elements(4), HAL_ultrasound_SI_t.Elements(5), HAL_ultrasound_SI_t.Elements(6), HAL_ultrasound_SI_t.Elements(7), HAL_ultrasound_SI_t.Elements(8)]</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.82. HAL\_ultrasound\_SI\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	

Unit	
Name	altitude
DataType	single
Complexity	real
Dimensions	1

**Table 4.83. HAL ultrasound SI t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	raw_altitude
DataType	single
Complexity	real
Dimensions	1

**Table 4.84. HAL ultrasound SI t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	nb_echo
DataType	uint16
Complexity	real
Dimensions	1

**Table 4.85. HAL ultrasound SI t.Elements(4)**

Property	Value
Min	
Max	

## Chapter 4. System Design Variables

---

DimensionsMode	Fixed
Description	
Unit	
Name	measure_ref
DataType	int32
Complexity	real
Dimensions	1

**Table 4.86. HAL ultrasound SI t.Elements(5)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	measure_status
DataType	int32
Complexity	real
Dimensions	1

**Table 4.87. HAL ultrasound SI t.Elements(6)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	new_data
DataType	uint8
Complexity	real
Dimensions	1

**Table 4.88. HAL ultrasound SI t.Elements(7)**

Property	Value

## Chapter 4. System Design Variables

---

Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_list_echo
DataType	Bus: HAL_list_echo_t
Complexity	real
Dimensions	1

**Table 4.89. HAL\_ultrasound\_SI\_t.Elements(8)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HAL_list_echo_p
DataType	Bus: HAL_list_echo_t
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/Bus Creator4](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition\\_t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL ultrasound SI creator/Bus Creator2](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.90. HAL\_vbat\_SI\_t**

Property	Value

## Chapter 4. System Design Variables

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Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">[HAL_vbat_SI.t.Elements(1), HAL_vbat_SI.t.Elements(2)]</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.91. HAL\_vbat\_SI.t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	vbat_V
DataType	single
Complexity	real
Dimensions	1

**Table 4.92. HAL\_vbat\_SI.t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	vbat_percentage
DataType	uint32
Complexity	real
Dimensions	1

### Used by Blocks:

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU\\_Pressure/ HAL\\_acquisition\\_creator/Bus Creator4](#)

## Chapter 4. System Design Variables

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- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL acquisition\\_t](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/ HAL acquisition creator/HAL vbat SI creator/Bus Creator5](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/sensordata\\_datout](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/sensordata\\_data](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**SampleTime.** 0.0600

**Used by Blocks:**

- [asbQuadcopter/Visualization/Visualization/Simulink 3D/VR Sink](#)

**Resolved in:** mask workspace (asbQuadcopter/Visualization/Visualization/ Simulink 3D/VR Sink)

**Table 4.93. Sensors**

Field	Value
IMUAccelGain	[1.006 1.0038 0.99454 ]
IMUGyroGain	[0.99861 1.0064 0.99997 ]
IMU	<a href="#">Sensors.IMU</a>
Sonar	<a href="#">Sensors.Sonar</a>
NO_VIS_X	-99
NO_VIS_YAW	-9
dummy	<a href="#">Sensors.dummy</a>
sensorDelay	1
airDensity	1.2250
altToPrsGain	12.0173
altToPrsBias	1.0127e+05
inverseIMUGain	[0.99408 0.99618 1.0055 1.0014 0.9936 1 ]
altSensorMin	0.4400
velocityToOpticalFlowGain	1
cameraResolution	[160 120 ]

**Table 4.94. Sensors.IMU**

Field	Value
cg	[0 0 0 ]
location	[0 0 0 ]

## Chapter 4. System Design Variables

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accNatFreq	190
accDamping	0.7070
accScaleCross	[1.006 0 0 ; 0 1.0038 0 ; 0 0 0.99454 ]
accBias	[0.09 -0.06 0.337 ]
accLimits	[-50 -50 -50 50 50 50 ]
gyroNatFreq	190
gyroDamping	0.7070
gyroScaleCross	[0.99861 0 0 ; 0 1.0064 0 ; 0 0 0.99997 ]
gyroBias	[-0.0095 -0.0075 0.0015 ]
gyroGBias	[0 0 0 ]
gyroLimits	[-10 -10 -10 10 10 10 ]
noiseSeeds	[41 ; 41 ; 41 ; 41 ; 41 ; 41 ]
noiseWeights	[0.8 0.8 0.8 0.025 0.025 0.025 ]
noisePower	[0.00021832 0.00018641 0.00037251 1.0652e-08 1.3021e-08 1.1929e-08 ]

**Table 4.95. Sensors.Sonar**

Field	Value
noisePower	1
noiseSeeds	41

**Table 4.96. Sensors.dummy**

Field	Value
posVISNoVisionAvail	[-99 ; 0 ; 0 ; -9 ]
usePosVISFlag	0
batteryStatus	[3.5 70 ]

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/Camera/VelocityToOpticalFlow\\_Gain](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU\\_Pressure/Assumes takeoff was level1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU\\_Pressure/CG location](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU\\_Pressure/ HAL acquisition creator/ HAL vbat SI creator/ DUMMY batteryStatus](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU\\_Pressure/Saturation](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU\\_Pressure/Three-axis Inertial Measurement Unit](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU\\_Pressure/altToprs\\_gain](#)

## Chapter 4. System Design Variables

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- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/ DUMMY\\_FLAG\\_usePosVIS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/ DUMMY\\_posVIS](#)

**Resolved in:** base workspace

**Table 4.97. SensorsBus**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">[SensorsBus.Elements(1), SensorsBus.Elements(2), SensorsBus.Elements(3)]</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.98. SensorsBus.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	VisionSensors
DataType	Bus: extraSensorData_t
Complexity	real
Dimensions	1

**Table 4.99. SensorsBus.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	HALSensors
DataType	Bus: HAL_acquisition_t

Complexity	real
Dimensions	1

**Table 4.100. SensorsBus.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	SensorCalibration
DataType	single
Complexity	real
Dimensions	8

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

**Table 4.101. StatesBus**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">StatesBus.Elements(1)</a> , <a href="#">StatesBus.Elements(2)</a> , <a href="#">StatesBus.Elements(3)</a> , <a href="#">StatesBus.Elements(4)</a> , <a href="#">StatesBus.Elements(5)</a> , <a href="#">StatesBus.Elements(6)</a> , <a href="#">StatesBus.Elements(7)</a> , <a href="#">StatesBus.Elements(8)</a> , <a href="#">StatesBus.Elements(9)</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.102. StatesBus.Elements(1)**

Property	Value
Min	

Max	
DimensionsMode	Fixed
Description	
Unit	
Name	V_body
DataType	double
Complexity	real
Dimensions	[3 1 ]

**Table 4.103. StatesBus.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	Omega_body
DataType	double
Complexity	real
Dimensions	[3 1 ]

**Table 4.104. StatesBus.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	Euler
DataType	double
Complexity	real
Dimensions	[3 1 ]

**Table 4.105. StatesBus.Elements(4)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	Accel_body
DataType	double
Complexity	real
Dimensions	[3 1 ]

**Table 4.106. StatesBus.Elements(5)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	dOmega_body
DataType	double
Complexity	real
Dimensions	[3 1 ]

**Table 4.107. StatesBus.Elements(6)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	V_ned
DataType	double
Complexity	real

Dimensions	[3 1 ]
------------	--------

**Table 4.108. StatesBus.Elements(7)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	X_ned
DataType	double
Complexity	real
Dimensions	[3 1 ]

**Table 4.109. StatesBus.Elements(8)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	Latitude, Longitude, Altitude
Unit	
Name	LLA
DataType	double
Complexity	real
Dimensions	[1 3 ]

**Table 4.110. StatesBus.Elements(9)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	DCM_be

DataType	double
Complexity	real
Dimensions	[3 3 ]

**Used by Blocks:**

- [asbQuadcopter/Airframe/Nonlinear Airframe](#)
- [asbQuadcopter/Airframe/States](#)
- [asbQuadcopter/Environment/Environment \(Constant\)/States](#)
- [asbQuadcopter/Environment/States](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/Camera/states](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/States](#)
- [asbQuadcopter/Visualization/Visualization/States](#)

**Resolved in:** base workspace

TFinal. 30

**Used by Blocks:**

- [asbQuadcopter/FCS](#)

**Resolved in:** base workspace

Ts. 0.0050

**Used by Blocks:**

- [asbQuadcopter/Airframe/Nonlinear Airframe](#)
- [asbQuadcopter/Command/Signal Editor/Live Time Ticks](#)
- [asbQuadcopter/Command/Signal Editor/Position//Attitude Reference](#)
- [asbQuadcopter/Command/Signal Editor/Position//Attitude Reference/fromWS\\_Signal 1](#)
- [asbQuadcopter/Command/Signal Editor/Rate Transition3](#)
- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/IMU Pressure/Three-axis Inertial Measurement Unit](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/Rate Transition1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensor System/Rate Transition2](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/ DUMMY FLAG\\_usePosVIS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/ DUMMY\\_posVIS](#)
- [asbQuadcopter/Visualization/Visualization/Simulink 3D/VR Sink](#)

**Resolved in:** base workspace

VSS\_COMMAND. 0

**Used by Blocks:**

- [asbQuadcopter/Command](#)

**Resolved in:** base workspace

**Table 4.111. VSS\_COMMAND\_JOYSTICK**

Property	Value
Condition	VSS_COMMAND==1

**Used by Blocks:**

- [asbQuadcopter/Command](#)

**Resolved in:** base workspace

**Table 4.112. VSS\_COMMAND\_PRESAVED**

Property	Value
Condition	VSS_COMMAND==2

**Used by Blocks:**

- [asbQuadcopter/Command](#)

**Resolved in:** base workspace

**Table 4.113. VSS\_COMMAND\_SIGEDIT**

Property	Value
Condition	VSS_COMMAND==0

**Used by Blocks:**

- [asbQuadcopter/Command](#)

**Resolved in:** base workspace

**Table 4.114. VSS\_COMMAND\_SPREADSHEET**

Property	Value
Condition	VSS_COMMAND==3

**Used by Blocks:**

- [asbQuadcopter/Command](#)

**Resolved in:** base workspace

VSS\_ENVIRONMENT. 0

**Used by Blocks:**

- [asbQuadcopter/Environment](#)

**Resolved in:** base workspace

**Table 4.115. VSS\_ENVIRONMENT\_CST**

Property	Value
Condition	VSS_ENVIRONMENT==0

**Used by Blocks:**

- [asbQuadcopter/Environment](#)

**Resolved in:** base workspace

**Table 4.116. VSS\_ENVIRONMENT\_VARIABLE**

Property	Value
Condition	VSS_ENVIRONMENT==1

**Used by Blocks:**

- [asbQuadcopter/Environment](#)

**Resolved in:** base workspace

VSS\_SENSORS. 1

**Used by Blocks:**

- [asbQuadcopter/Sensors](#)

**Resolved in:** base workspace

**Table 4.117. VSS\_SENSORS\_DYNAMICS**

Property	Value
Condition	VSS_SENSORS==1

**Used by Blocks:**

- [asbQuadcopter/Sensors](#)

**Resolved in:** base workspace

**Table 4.118. VSS\_SENSORS\_FEEDTHROUGH**

Property	Value
Condition	VSS_SENSORS==0

**Used by Blocks:**

- [asbQuadcopter/Sensors](#)

**Resolved in:** base workspace

VSS\_VEHICLE. 1

**Used by Blocks:**

- [asbQuadcopter/Airframe](#)

**Resolved in:** base workspace

**Table 4.119. VSS\_VEHICLE\_LINEAR**

Property	Value
Condition	VSS_VEHICLE==0

**Used by Blocks:**

- [asbQuadcopter/Airframe](#)

**Resolved in:** base workspace

**Table 4.120. VSS\_VEHICLE\_NONLINEAR**

Property	Value
Condition	VSS_VEHICLE==1

**Used by Blocks:**

- [asbQuadcopter/Airframe](#)

**Resolved in:** base workspace

VSS\_VISUALIZATION. 3

**Used by Blocks:**

- [asbQuadcopter/Visualization/Visualization](#)

**Resolved in:** base workspace

**Table 4.121. VSS\_VISUALIZATION\_FLIGHTGEAR**

Property	Value
Condition	VSS_VISUALIZATION==2

**Used by Blocks:**

- [asbQuadcopter/Visualization/Visualization](#)

**Resolved in:** base workspace

**Table 4.122. VSS\_VISUALIZATION\_SCOPES**

Property	Value

Condition	VSS_VISUALIZATION==0
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**Used by Blocks:**

- [asbQuadcopter/Visualization/Visualization](#)

**Resolved in:** base workspace

**Table 4.123. VSS\_VISUALIZATION\_SL3D**

Property	Value
Condition	VSS_VISUALIZATION==3

**Used by Blocks:**

- [asbQuadcopter/Visualization/Visualization](#)

**Resolved in:** base workspace

**Table 4.124. VSS\_VISUALIZATION\_WORKSPACE**

Property	Value
Condition	VSS_VISUALIZATION==1

**Used by Blocks:**

- [asbQuadcopter/Visualization/Visualization](#)

**Resolved in:** base workspace

**Table 4.125. Vehicle**

Field	Value
SixDOF	<a href="#">Vehicle.SixDOF</a>
PositionOnEarth	<a href="#">Vehicle.PositionOnEarth</a>
Airframe	<a href="#">Vehicle.Airframe</a>
Rotor	<a href="#">Vehicle.Rotor</a>
Motor	<a href="#">Vehicle.Motor</a>

**Table 4.126. Vehicle.SixDOF**

Field	Value
initGreenwich	0
quatGain	1

**Table 4.127. Vehicle.PositionOnEarth**

Field	Value
href	-71.3232
FlatEarthToLLA	<a href="#">Vehicle.PositionOnEarth.FlatEarthToLLA</a>

**Table 4.128. Vehicle.Airframe**

Field	Value
mass	0.0630
inertia	[5.8286e-05 0 0 ; 0 7.1691e-05 0 ; 0 0 0.0001 ]
d	0.0624
xy	0.0441
h	-0.0159
Cdx	0
Cdy	0
diameter	0.0100

**Table 4.129. Vehicle.Rotor**

Field	Value
blades	2
radius	0.0330
chord	0.0080
flappingOffset	0
bladeMass	3.7500e-04
bladeInertia	1.0209e-07
hubMass	0
hubInertia	0
inertia	1.0209e-07
Ct	0.0107
Cq	7.8264e-04
solidity	0.1543
theta0	0.2548
thetaTip	0.1187
theta1	-0.1361
theta34	0.1527

a	5.5000
area	0.0034
lock	0.6051
b	4.7200e-08
k	1.1393e-10
w2ToThrustGain	4.7200e-08

**Table 4.130. Vehicle.Motor**

Field	Value
maxLimit	500
minLimit	10
commandToW2Gain	1.3841e+04
thrustToMotorCommand	1.5307e+03

**Table 4.131. Vehicle.PositionOnEarth.FlatEarthToLLA**

Field	Value
xAxis	0

**Used by Blocks:**

- [asbQuadcopter/Airframe/Nonlinear Airframe](#)
- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Visualization/Extract Flight Instruments/Deg from North](#)
- [asbQuadcopter/Visualization/Extract Flight Instruments/Gain1](#)
- [asbQuadcopter/Visualization/Visualization/Simulink 3D/Subsystem/Gain](#)

**Resolved in:** base workspace

**VideoDimensions.** []

**Used by Blocks:**

- [asbQuadcopter/Visualization/Visualization/Simulink 3D/VR Sink](#)

**Resolved in:** mask workspace (asbQuadcopter/Visualization/Visualization/Simulink 3D/VR Sink)

**enableLanding.** false

**Used by Blocks:**

- [asbQuadcopter/FCS](#)

**Resolved in:** base workspace

**Table 4.132. extraSensorData\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	[extraSensorData_t.Elements(1), extraSensorData_t.Elements(2), extraSensorData_t.Elements(3)]
Description	
DataScope	Auto
HeaderFile	

**Table 4.133. extraSensorData\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	opticalFlow_data
DataType	single
Complexity	real
Dimensions	3

**Table 4.134. extraSensorData\_t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	posVIS_data
DataType	single
Complexity	real
Dimensions	4

**Table 4.135. extraSensorData t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	usePosVIS_flag
DataType	single
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator1](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Bus Creator2](#)
- [asbQuadcopter/Sensors/Sensors \(Dynamics\)/Sensors](#)

**Resolved in:** base workspace

g. 9.8100

**Used by Blocks:**

- [asbQuadcopter/Environment/Environment \(Constant\)/Gravity](#)
- [asbQuadcopter/FCS](#)

**Resolved in:** base workspace

**Table 4.136. init**

Field	Value
date	[2017 1 1 0 0 0 ]
posLLA	[42.2999 -71.3504 71.3232 ]
posNED	[57 95 -0.046 ]
vb	[0 0 0 ]
euler	[0 0 0 ]
angRates	[0 0 0 ]

**Used by Blocks:**

- [asbQuadcopter/Airframe/Nonlinear Airframe](#)
- [asbQuadcopter/FCS](#)
- [asbQuadcopter/Visualization/Extract Flight Instruments/Floor contact](#)

**Resolved in:** base workspace

**landingAltitude.** -0.6000

**Used by Blocks:**

- [asbQuadcopter/FCS](#)

**Resolved in:** base workspace

**Table 4.137. sensordata\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	<a href="#">sensordata_t.Elements(1)</a> , <a href="#">sensordata_t.Elements(2)</a> , <a href="#">sensordata_t.Elements(3)</a> , <a href="#">sensordata_t.Elements(4)</a> , <a href="#">sensordata_t.Elements(5)</a> , <a href="#">sensordata_t.Elements(6)</a> , <a href="#">sensordata_t.Elements(7)</a> , <a href="#">sensordata_t.Elements(8)</a> , <a href="#">sensordata_t.Elements(9)</a> , <a href="#">sensordata_t.Elements(10)</a>
Description	
DataScope	Auto
HeaderFile	

**Table 4.138. sensordata\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	ddx
DataType	single
Complexity	real
Dimensions	1

**Table 4.139. sensordata\_t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	

Unit	
Name	ddy
DataType	single
Complexity	real
Dimensions	1

**Table 4.140. sensordata t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	ddz
DataType	single
Complexity	real
Dimensions	1

**Table 4.141. sensordata t.Elements(4)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	p
DataType	single
Complexity	real
Dimensions	1

**Table 4.142. sensordata t.Elements(5)**

Property	Value
Min	
Max	

DimensionsMode	Fixed
Description	
Unit	
Name	q
DataType	single
Complexity	real
Dimensions	1

**Table 4.143. sensordata t.Elements(6)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	r
DataType	single
Complexity	real
Dimensions	1

**Table 4.144. sensordata t.Elements(7)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	altitude_sonar
DataType	single
Complexity	real
Dimensions	1

**Table 4.145. sensordata t.Elements(8)**

Property	Value

Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	prs
DataType	single
Complexity	real
Dimensions	1

**Table 4.146. sensordata.t.Elements(9)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	vbat_V
DataType	single
Complexity	real
Dimensions	1

**Table 4.147. sensordata.t.Elements(10)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	vbat_percentage
DataType	uint32
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)

## Chapter 4. System Design Variables

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**Resolved in:** base workspace

**Table 4.148. statesEstim\_t**

Property	Value
Alignment	-1
PreserveElementDimensions	false
Elements	[ <a href="#">statesEstim_t.Elements(1)</a> , <a href="#">statesEstim_t.Elements(2)</a> , <a href="#">statesEstim_t.Elements(3)</a> , <a href="#">statesEstim_t.Elements(4)</a> , <a href="#">statesEstim_t.Elements(5)</a> , <a href="#">statesEstim_t.Elements(6)</a> , <a href="#">statesEstim_t.Elements(7)</a> , <a href="#">statesEstim_t.Elements(8)</a> , <a href="#">statesEstim_t.Elements(9)</a> , <a href="#">statesEstim_t.Elements(10)</a> , <a href="#">statesEstim_t.Elements(11)</a> , <a href="#">statesEstim_t.Elements(12)</a> ]
Description	
DataScope	Auto
HeaderFile	

**Table 4.149. statesEstim\_t.Elements(1)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	X
DataType	single
Complexity	real
Dimensions	1

**Table 4.150. statesEstim\_t.Elements(2)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	Y
DataType	single
Complexity	real

Dimensions	1
------------	---

**Table 4.151. statesEstim t.Elements(3)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	Z
DataType	single
Complexity	real
Dimensions	1

**Table 4.152. statesEstim t.Elements(4)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	yaw
DataType	single
Complexity	real
Dimensions	1

**Table 4.153. statesEstim t.Elements(5)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	pitch

## Chapter 4. System Design Variables

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DataType	single
Complexity	real
Dimensions	1

**Table 4.154. statesEstim t.Elements(6)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	roll
DataType	single
Complexity	real
Dimensions	1

**Table 4.155. statesEstim t.Elements(7)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	dx
DataType	single
Complexity	real
Dimensions	1

**Table 4.156. statesEstim t.Elements(8)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	

Unit	
Name	dy
DataType	single
Complexity	real
Dimensions	1

**Table 4.157. statesEstim t.Elements(9)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	dz
DataType	single
Complexity	real
Dimensions	1

**Table 4.158. statesEstim t.Elements(10)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	p
DataType	single
Complexity	real
Dimensions	1

**Table 4.159. statesEstim t.Elements(11)**

Property	Value
Min	
Max	

DimensionsMode	Fixed
Description	
Unit	
Name	q
DataType	single
Complexity	real
Dimensions	1

**Table 4.160. statesEstim.t.Elements(12)**

Property	Value
Min	
Max	
DimensionsMode	Fixed
Description	
Unit	
Name	r
DataType	single
Complexity	real
Dimensions	1

**Used by Blocks:**

- [asbQuadcopter/FCS](#)

**Resolved in:** base workspace

**takeOffDuration.0**

**Used by Blocks:**

- [asbQuadcopter/Command/Signal Editor/Compare To Constant](#)
- [asbQuadcopter/FCS](#)

**Resolved in:** base workspace

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# **Chapter 5. Requirements**

asbQuadcopter does not contain requirements traceability links.

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# Chapter 6. System Model Configuration

Source: Model  
Source Name: asbQuadcopter

**Table 6.1. asbQuadcopter Configuration Set**

Property	Value
Description	
Components	[ <a href="#">asbQuadcopter Configuration Set.Components(1)</a> , <a href="#">asbQuadcopter Configuration Set.Components(2)</a> , <a href="#">asbQuadcopter Configuration Set.Components(3)</a> , <a href="#">asbQuadcopter Configuration Set.Components(4)</a> , <a href="#">asbQuadcopter Configuration Set.Components(5)</a> , <a href="#">asbQuadcopter Configuration Set.Components(6)</a> , <a href="#">asbQuadcopter Configuration Set.Components(7)</a> , <a href="#">asbQuadcopter Configuration Set.Components(8)</a> , <a href="#">asbQuadcopter Configuration Set.Components(9)</a> , <a href="#">asbQuadcopter Configuration Set.Components(10)</a> ]
Name	Configuration

**Table 6.2. asbQuadcopter Configuration Set.Components(1)**

Property	Value
Name	Solver
Description	
Components	
StartTime	0
StopTime	TFinal
AbsTol	auto
AutoScaleAbsTol	on
FixedStep	Ts
InitialStep	auto
MaxOrder	5
ZcThreshold	auto
ConsecutiveZCsStepRelTol	10*128*eps
MaxConsecutiveZCs	1000
ExtrapolationOrder	4
NumberNewtonIterations	1
MaxStep	auto

MinStep	auto
MaxConsecutiveMinStep	1
RelTol	1e-3
EnableMultiTasking	on
ConcurrentTasks	off
SolverName	ode3
SolverType	Fixed-step
SolverJacobianMethodControl	auto
DaesscMode	auto
ShapePreserveControl	DisableAll
ZeroCrossControl	UseLocalSettings
ZeroCrossAlgorithm	Nonadaptive
SolverResetMethod	Fast
PositivePriorityOrder	off
AutoInsertRateTranBlk	off
SampleTimeConstraint	Unconstrained
InsertRTBMode	Whenever possible
SampleTimeProperty	
DecoupledContinuousIntegration	off
MinimalZcImpactIntegration	off
ODENIntegrationMethod	ode3

**Table 6.3. asbQuadcopter Configuration Set.Components(2)**

Property	Value
Name	Data Import/Export
Description	
Components	
Decimation	1
ExternalInput	[t, u]
FinalStateName	xFinal
InitialState	xInitial
LimitDataPoints	on
MaxDataPoints	1000
LoadExternalInput	off
LoadInitialState	off
SaveFinalState	off

SaveOperatingPoint	off
SaveFormat	Array
SaveOutput	off
SaveState	off
SignalLogging	off
DSMLogging	off
InspectSignalLogs	off
SaveTime	off
ReturnWorkspaceOutputs	off
StateSaveName	xout
TimeSaveName	tout
OutputSaveName	yout
SignalLoggingName	logsout
DSMLoggingName	dsmout
OutputOption	RefineOutputTimes
OutputTimes	[]
ReturnWorkspaceOutputsName	out
Refine	1
LoggingToFile	off
DatasetSignalFormat	timeseries
LoggingFileName	out.mat
LoggingIntervals	[-inf, inf]

**Table 6.4. asbQuadcopter Configuration Set.Components(3)**

Property	Value
Name	Optimization
Description	
Components	
BlockReduction	off
BooleanDataType	on
ConditionallyExecuteInputs	on
DefaultParameterBehavior	Tunable
InlineParams	off
UseDivisionForNetSlopeComputation	off
GainParamInheritBuiltInType	off
UseFloatMulNetSlope	off

## Chapter 6. System Model Configuration

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InheritOutputTypeSmallerThanSingle	off
DefaultUnderspecifiedDataType	double
UseSpecifiedMinMax	off
InlineInvariantSignals	off
OptimizeBlockIOStorage	on
BufferReuse	off
GlobalBufferReuse	on
GlobalVariableUsage	None
StrengthReduction	off
AdvancedOptControl	
ExpressionFolding	on
BooleansAsBitfields	off
BitfieldContainerType	uint_T
BitwiseOrLogicalOp	Same as modeled
EnableMemcpy	on
MemcpyThreshold	64
PassReuseOutputArgsAs	Structure reference
PassReuseOutputArgsThreshold	12
LocalBlockOutputs	on
RollThreshold	5
StateBitsets	off
DataBitsets	off
ActiveStateOutputEnumStorageType	Native Integer
ZeroExternalMemoryAtStartup	on
ZeroInternalMemoryAtStartup	on
InitFltsAndDblsToZero	off
NoFixptDivByZeroProtection	off
EfficientFloat2IntCast	off
EfficientMapNaN2IntZero	on
LifeSpan	inf
EvaldLifeSpan	Inf
MaxStackSize	Inherit from target
BufferReusableBoundary	on
SimCompilerOptimization	off
AccelVerboseBuild	off
OptimizeBlockOrder	off

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OptimizeDataStoreBuffers	on
BusAssignmentInplaceUpdate	on
DifferentSizesBufferReuse	off
UseRowMajorAlgorithm	off
OptimizationLevel	level2
OptimizationPriority	Balanced
OptimizationCustomize	on
LabelGuidedReuse	off
MultiThreadedLoops	off
DenormalBehavior	GradualUnderflow
EfficientTunableParamExpr	off

**Table 6.5. asbQuadcopter Configuration Set.Components(4)**

Property	Value
Name	Diagnostics
Description	
Components	
RTPrefix	error
ConsistencyChecking	none
ArrayBoundsChecking	none
SignalInfNanChecking	none
StringTruncationChecking	error
SignalRangeChecking	none
ReadBeforeWriteMsg	UseLocalSettings
WriteAfterWriteMsg	UseLocalSettings
WriteAfterReadMsg	UseLocalSettings
AlgebraicLoopMsg	none
ArtificialAlgebraicLoopMsg	warning
SaveWithDisabledLinksMsg	warning
SaveWithParameterizedLinksMsg	warning
CheckSSInitialOutputMsg	on
UnderspecifiedInitializationDetection	Simplified
MergeDetectMultiDrivingBlocksExec	error
SignalResolutionControl	UseLocalSettings
BlockPriorityViolationMsg	warning
MinStepSizeMsg	warning

## Chapter 6. System Model Configuration

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TimeAdjustmentMsg	none
MaxConsecutiveZCsMsg	error
MaskedZcDiagnostic	warning
IgnoredZcDiagnostic	warning
SolverPrmCheckMsg	none
InheritedTsInSrcMsg	warning
MultiTaskDSMMsg	error
MultiTaskCondExecSysMsg	error
MultiTaskRateTransMsg	error
SingleTaskRateTransMsg	none
TasksWithSamePriorityMsg	warning
SigSpecEnsureSampleTimeMsg	warning
CheckMatrixSingularityMsg	none
IntegerOverflowMsg	warning
Int32ToFloatConvMsg	warning
ParameterDowncastMsg	error
ParameterOverflowMsg	error
ParameterUnderflowMsg	none
ParameterPrecisionLossMsg	none
ParameterTunabilityLossMsg	warning
FixptConstUnderflowMsg	none
FixptConstOverflowMsg	none
FixptConstPrecisionLossMsg	none
UnderSpecifiedDataTypeMsg	none
UnnecessaryDatatypeConvMsg	none
VectorMatrixConversionMsg	none
FcnCallInpInsideContextMsg	error
SignalLabelMismatchMsg	none
UnconnectedInputMsg	none
UnconnectedOutputMsg	none
UnconnectedLineMsg	none
UseOnlyExistingSharedCode	error
SFcnCompatibilityMsg	none
FrameProcessingCompatibilityMsg	error
UniqueDataStoreMsg	none
BusObjectLabelMismatch	warning

## Chapter 6. System Model Configuration

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RootOutportRequireBusObject	warning
AssertControl	UseLocalSettings
AllowSymbolicDim	off
ModelReferenceIOMsg	none
ModelReferenceVersionMismatchMessage	none
ModelReferenceIOMismatchMessage	none
UnknownTsInhSupMsg	warning
ModelReferenceDataLoggingMessage	warning
ModelReferenceNoExplicitFinalValueMsg	none
ModelReferenceSymbolNameMessage	warning
ModelReferenceExtraNoncontSigs	error
StateNameClashWarn	none
OperatingPointInterfaceChecksumMismatchMsg	warning
NonCurrentReleaseOperatingPointMsg	error
PregeneratedLibrarySubsystemCodeDiagnostic	none
InitInArrayFormatMsg	warning
StrictBusMsg	ErrorLevel1
BusNameAdapt	WarnAndRepair
NonBusSignalsTreatedAsBus	none
SFUnusedDataAndEventsDiag	warning
SFUnexpectedBacktrackingDiag	warning
SFInvalidInputDataAccessInChartInitDiag	warning
SFNoUnconditionalDefaultTransitionDiag	warning
SFTransitionOutsideNaturalParentDiag	warning
SFUnreachableExecutionPathDiag	warning
SFUndirectedBroadcastEventsDiag	warning
SFTransitionActionBeforeConditionDiag	warning
SFOutputUsedAsStateInMooreChartDiag	error
SFTemporalDelaySmallerThanSampleTimeDiag	warning
SFSelfTransitionDiag	warning
SFExecutionAtInitializationDiag	none
SFMachineParentedDataDiag	warning
IntegerSaturationMsg	warning
AllowedUnitSystems	all
UnitsInconsistencyMsg	warning
AllowAutomaticUnitConversions	on

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RCSCRenamedMsg	warning
RCSCObservableMsg	warning
ForceCombineOutputUpdateInSim	off
UnderSpecifiedDimensionMsg	none
DebugExecutionForFMUViaOutOfProcess	off
ArithmeticOperatorsInVariantConditions	warning
VariantConditionMismatch	none

**Table 6.6. asbQuadcopter Configuration Set.Components(5)**

Property	Value
Name	Hardware Implementation
Description	
Components	
ProdBitPerChar	8
ProdBitPerShort	16
ProdBitPerInt	32
ProdBitPerLong	32
ProdBitPerLongLong	64
ProdBitPerFloat	32
ProdBitPerDouble	64
ProdBitPerPointer	32
ProdBitPerSizeT	32
ProdBitPerPtrDiffT	32
ProdLargestAtomicInteger	Char
ProdLargestAtomicFloat	None
ProdIntDivRoundTo	Undefined
ProdEndianess	Unspecified
ProdWordSize	32
ProdShiftRightIntArith	on
ProdLongLongMode	off
ProdHWDeviceType	32-bit Generic
TargetBitPerChar	8
TargetBitPerShort	16
TargetBitPerInt	32
TargetBitPerLong	32
TargetBitPerLongLong	64

TargetBitPerFloat	32
TargetBitPerDouble	64
TargetBitPerPointer	32
TargetBitPerSizeT	32
TargetBitPerPtrDiffT	32
TargetLargestAtomicInteger	Char
TargetLargestAtomicFloat	None
TargetShiftRightIntArith	on
TargetLongLongMode	off
TargetIntDivRoundTo	Undefined
TargetEndianess	Unspecified
TargetWordSize	32
TargetPreprocMaxBitsSint	32
TargetPreprocMaxBitsUint	32
TargetHWDeviceType	Specified
TargetUnknown	off
ProdEqTarget	on
UseEmbeddedCoderFeatures	on
UseSimulinkCoderFeatures	on
HardwareBoardFeatureSet	EmbeddedCoderHSP

**Table 6.7. asbQuadcopter Configuration Set.Components(6)**

Property	Value
Name	Model Referencing
Description	
Components	
UpdateModelReferenceTargets	IfOutOfDateOrStructuralChange
EnableRefExpFcnMdlSchedulingChecks	on
CheckModelReferenceTargetMessage	error
EnableParallelModelReferenceBuilds	off
ParallelModelReferenceErrorOnInvalidPool	on
ParallelModelReferenceMATLABWorkerInit	None
ModelReferenceNumInstancesAllowed	Multi
PropagateVarSize	Infer from blocks in model
ModelDependencies	
ModelReferencePassRootInputsByReference	on

ModelReferenceMinAlgLoopOccurrences	off
PropagateSignalLabelsOutOfModel	off
SupportModelReferenceSimTargetCustomCode	off

**Table 6.8. asbQuadcopter Configuration Set.Components(7)**

Property	Value
Name	Simulation Target
Description	
Components	
SimCustomSourceCode	
SimCustomHeaderCode	
SimCustomInitializer	
SimCustomTerminator	
SimReservedNameArray	
SimUserSources	
SimUserIncludeDirs	
SimUserLibraries	
SimUserDefines	
SFSimEnableDebug	off
SFSimEcho	on
SimCtrlC	on
SimIntegrity	on
SimUseLocalCustomCode	off
SimParseCustomCode	on
SimAnalyzeCustomCode	off
SimDebugExecutionForCustomCode	off
SimGenImportedTypeDefs	off
CompileTimeRecursionLimit	50
EnableRuntimeRecursion	on
MATLABDynamicMemAlloc	on
MATLABDynamicMemAllocThreshold	65536
LegacyBehaviorForPersistentVarInContinuousTime	off
CustomCodeFunctionArrayLayout	
DefaultCustomCodeFunctionArrayLayout	NotSpecified
CustomCodeUndefinedFunction	UseInterfaceOnly
CustomCodeGlobalsAsFunctionIO	off

## Chapter 6. System Model Configuration

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DefaultCustomCodeDeterministicFunctions	None
CustomCodeDeterministicFunctions	
SimHardwareAcceleration	generic
SimTargetLang	C
GPUAcceleration	off
SimGPUMallocThreshold	200
SimGPUStackLimitPerThread	1024
SimGPUErrorChecks	off
SimGPUComputeCapability	
SimGPUCompilerFlags	
SimDLTargetLibrary	mkl-dnn
SimDLAutoTuning	on

**Table 6.9. asbQuadcopter Configuration Set.Components(8)**

Property	Value
Name	Code Generation
Description	
SystemTargetFile	grt.tlc
HardwareBoard	None
ShowCustomHardwareApp	off
ShowEmbeddedHardwareApp	off
TLCOptions	
GenCodeOnly	off
MakeCommand	make_rtw
GenerateMakefile	on
PackageGeneratedCodeAndArtifacts	off
PackageName	
TemplateMakefile	grt_default_tmf
PostCodeGenCommand	
GenerateReport	off
RTWVerbose	on
RetainRTWFile	off
ProfileTLC	off
TLCDebug	off
TLCCoverage	off
TLCAssert	off

## Chapter 6. System Model Configuration

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RTWUseLocalCustomCode	off
RTWUseSimCustomCode	off
CustomSourceCode	
CustomHeaderCode	
CustomInclude	
CustomSource	
CustomLibrary	
CustomDefine	
CustomBLASCallback	
CustomLAPACKCallback	
CustomFFTCallback	
CustomInitializer	
CustomTerminator	
Toolchain	Automatically locate an installed toolchain
BuildConfiguration	Faster Builds
CustomToolchainOptions	
IncludeHyperlinkInReport	off
LaunchReport	off
PortableWordSizes	off
GenerateErtSFunction	off
CreateSILPILBlock	None
CodeExecutionProfiling	off
CodeExecutionProfileVariable	executionProfile
CodeProfilingSaveOptions	SummaryOnly
CodeProfilingInstrumentation	off
CodeCoverageSettings	<a href="#">asbQuadcopter Configuration Set.Components(8).CodeCoverageSettings</a>
SILDebugging	off
TargetLang	C
GenerateGPUCode	None
IncludeERTFirstTime	off
GenerateTraceInfo	off
GenerateTraceReport	off
GenerateTraceReportSl	off
GenerateTraceReportSf	off
GenerateTraceReportEml	off
GenerateWebview	off

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GenerateCodeMetricsReport	off
GenerateCodeReplacementReport	off
RTWCompilerOptimization	off
ObjectivePriorities	
RTWCustomCompilerOptimizations	
CheckMdlBeforeBuild	Off
GPUKernelNamePrefix	
GPUDeviceID	-1
GPUMallocMode	discrete
GPUMallocThreshold	200
GPUStackLimitPerThread	1024
GPUCuBLAS	on
GPUCuSOLVER	on
GPUCuFFT	on
GPUErrorChecks	off
GPUComputeCapability	3.5
GPUComputeCustomCapability	
GPUCompilerFlags	
GPUMaximumBlocksPerKernel	0
DLTargetLibrary	none
DLAutoTuning	on
DLArmComputeVersion	19.05
DLArmComputeArch	unspecified
Components	<a href="#">[asbQuadcopter Configuration Set.Components(8).Components(1), asbQuadcopter Configuration Set.Components(8).Components(2)]</a>

**Table 6.10. [asbQuadcopter Configuration Set.Components\(9\)](#)**

Property	Value
Description	Simulink Coverage Configuration Component
Components	
Name	Simulink Coverage
CovEnable	off
CovScope	EntireSystem
CovIncludeTopModel	on
RecordCoverage	off

## Chapter 6. System Model Configuration

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CovPath	/
CovSaveName	covdata
CovCompData	
CovMetricSettings	dw
CovFilter	
CovHTMLOptions	
CovNameIncrementing	off
CovForceBlockReductionOff	on
CovEnableCumulative	on
CovSaveCumulativeToWorkspaceVar	on
CovSaveSingleToWorkspaceVar	on
CovCumulativeVarName	covCumulativeData
CovCumulativeReport	off
CovSaveOutputData	on
CovOutputDir	slcov_output/\$ModelName\$
CovDataFileName	\$ModelName\$_cvdata
CovReportOnPause	on
CovModelRefEnable	off
CovModelRefExcluded	
CovExternalEMLEnable	off
CovSFcnEnable	off
CovBoundaryAbsTol	1.0000e-05
CovBoundaryRelTol	0.0100
CovUseTimeInterval	off
CovStartTime	0
CovStopTime	0
CovMetricStructuralLevel	Decision
CovMetricLookupTable	off
CovMetricSignalRange	off
CovMetricSignalSize	off
CovMetricObjectiveConstraint	off
CovMetricSaturateOnIntegerOverflow	off
CovMetricRelationalBoundary	off
CovLogicBlockShortCircuit	off
CovUnsupportedBlockWarning	on
CovMcdcMode	Masking

**Table 6.11. asbQuadcopter Configuration Set.Components(10)**

Property	Value
Description	HDL Coder custom configuration component
Components	
Name	HDL Coder

**Table 6.12. asbQuadcopter Configuration Set.Components(8).CodeCoverageSettings**

Property	Value
TopModelCoverage	off
ReferencedModelCoverage	off
CoverageTool	None

**Table 6.13. asbQuadcopter Configuration Set.Components(8).Components(1)**

Property	Value
Name	Code Appearance
Description	
Components	
ForceParamTrailComments	off
GenerateComments	on
CommentStyle	Auto
IgnoreCustomStorageClasses	on
IgnoreTestpoints	off
MaxIdLength	31
ShowEliminatedStatement	off
OperatorAnnotations	off
SimulinkDataObjDesc	off
SFDataObjDesc	off
MATLABFcnDesc	off
MangleLength	1
SharedChecksumLength	8
CustomSymbolStrGlobalVar	\$R\$N\$M
CustomSymbolStrType	\$N\$R\$M_T
CustomSymbolStrField	\$N\$M
CustomSymbolStrFcn	\$R\$N\$M\$F

## Chapter 6. System Model Configuration

---

CustomSymbolStrFcnArg	rt\$I\$N\$M
CustomSymbolStrBlkIO	rtb_N\$M
CustomSymbolStrTmpVar	\$N\$M
CustomSymbolStrMacro	\$R\$N\$M
CustomSymbolStrEmxType	emxArray_M\$N
CustomSymbolStrEmxFcn	emx\$M\$N
CustomUserTokenString	
CustomCommentsFcn	
DefineNamingRule	None
DefineNamingFcn	
ParamNamingRule	None
ParamNamingFcn	
SignalNamingRule	None
SignalNamingFcn	
InsertBlockDesc	off
InsertPolySpaceComments	off
SimulinkBlockComments	on
BlockCommentType	BlockPathComment
StateflowObjectComments	on
MATLABSourceComments	off
EnableCustomComments	off
InternalIdentifier	Shortened
InlinedPrmAccess	Literals
ReqsInCode	off
UseSimReservedNames	off
ReservedNameArray	
EnumMemberNameClash	error

**Table 6.14. asbQuadcopter Configuration Set.Components(8).Components(2)**

Property	Value
Name	Target
Description	
Components	
IsERTTTarget	off
TargetLibSuffix	
TargetPreCompLibLocation	

## Chapter 6. System Model Configuration

---

TargetLangStandard	C89/C90 (ANSI)
CodeReplacementLibrary	None
UtilityFuncGeneration	Auto
MultiwordTypeDef	System defined
MultiwordLength	2048
DynamicStringBufferSize	256
GenerateFullHeader	on
InferredTypesCompatibility	off
ExistingSharedCode	
GenerateSampleERTMain	off
GenerateTestInterfaces	off
ModelReferenceCompliant	on
ParMdlRefBuildCompliant	on
CompOptLevelCompliant	on
ConcurrentExecutionCompliant	on
IncludeMdlTerminateFcn	on
CombineOutputUpdateFcns	on
CombineSignalStateStructs	off
GroupInternalDataByFunction	off
SuppressErrorStatus	off
IncludeFileDelimiter	Auto
ERTCustomFileBanners	off
SupportAbsoluteTime	on
LogVarNameModifier	rt_
MatFileLogging	on
MultiInstanceERTCode	off
CodeInterfacePackaging	Nonreusable function
PurelyIntegerCode	off
SupportNonFinite	on
SupportComplex	on
SupportContinuousTime	on
SupportNonInlinedSFcns	on
RemoveDisableFunc	off
RemoveResetFunc	off
SupportVariableSizeSignals	off
ParenthesesLevel	Nominal

## Chapter 6. System Model Configuration

---

CastingMode	Nominal
ModelStepFunctionPrototypeControlCompliant	off
CPPClassGenCompliant	on
GRTInterface	off
GenerateAllocFcn	off
UseToolchainInfoCompliant	on
GenerateSharedConstants	on
LUTObjectStructOrderExplicitValues	Size,Breakpoints,Table
LUTObjectStructOrderEvenSpacing	Size,Breakpoints,Table
ArrayLayout	Column-major
UnsupportedSFcnMsg	error
ERTHeaderFileRootName	\$R\$E
ERTSourceFileRootName	\$R\$E
ERTDataFileRootName	\$R_data
ExtMode	off
ExtModeStaticAlloc	off
ExtModeTesting	off
ExtModeStaticAllocSize	1000000
ExtModeTransport	0
ExtModeMexFile	ext_comm
ExtModeMexArgs	
ExtModeIntrfLevel	Level1
RTWCAPISignals	off
RTWCAPIParams	off
RTWCAPISStates	off
RTWCAPIRootIO	off
MultiInstanceErrorCode	Error

**Table 6.15. HDL Coder**

Property	Value
HDLSubsystem	asbQuadcopter
Workflow	Generic ASIC/FPGA
TargetPlatform	
ReferenceDesign	
ReferenceDesignPath	
CoeffPrefix	coeff

## Chapter 6. System Model Configuration

---

InputType	std_logic_vector
OutputType	Same as input type
ScalarizePorts	off
CoeffMultipliers	Multiplier
ResetType	Asynchronous
FIRAdderStyle	linear
MultiplierInputPipeline	0
MultiplierOutputPipeline	0
FoldingFactor	1
NumMultipliers	-1
OptimizeForHDL	off
TimingControllerPostfix	_tc
OptimizeTimingController	on
TimingControllerArch	default
CastBeforeSum	on
TCounterLimitCompOp	>=
CheckHDL	off
EnablePrefix	enb
ClockEnableInputPort	clk_enable
ClockEnableOutputPort	ce_out
ClockInputPort	clk
ClockEdge	Rising
ResetInputPort	reset
SimulatorFlags	
HDLCompileFilePostfix	_compile.do
HDLCompileInit	vlib %s\n
HDLCompileTerm	
HDLCompileVerilogCmd	vlog %s %s\n
HDLCompileVHDCmd	vcom %s %s\n
EnableForGenerateLoops	on
HDLMapFilePostfix	_map.txt
HDLMapSeparator	
HDLSimCmd	vsim -voptargs=-+acc %s.%s\n
HDLSimFilePostfix	_sim.do
HDLSimProjectFilePostfix	_init.do
HDLSimInit	onbreak resume\nonerror resume\n

## Chapter 6. System Model Configuration

---

HDLSimProjectCmd	project addfile %s\n
HDLSimProjectTerm	project compileall\n
HDLSimProjectInit	project new . %s work\n
HDLSimTerm	run -all\n
HDLSimViewWaveCmd	add wave sim:%s\n
HDLSynthTool	None
HDLSynthCmd	
HDLSynthFilePostfix	
HDLSynthInit	
HDLSynthLibCmd	
HDLSynthLibSpec	
HDLSynthTerm	
ReservedWordPostfix	_rsvd
BlockGenerateLabel	_gen
VHDLLibraryName	work
UseSingleLibrary	off
VHDLArchitectureName	rtl
ClockProcessPostfix	_process
ComplexImagPostfix	_im
ComplexRealPostfix	_re
EntityConflictPostfix	_block
InstancePrefix	u_
InstancePostfix	
InstanceGenerateLabel	_gen
OutputGenerateLabel	outputgen
PackagePostfix	_pkg
SplitEntityArch	off
SplitMooreChartStateUpdate	on
SplitEntityFilePostfix	_entity
SplitArchFilePostfix	_arch
VectorPrefix	vector_of_
ClockInputs	Single
TriggerAsClock	off
ConditionalizePipeline	off
InferControlPorts	off
UseRisingEdge	off

## Chapter 6. System Model Configuration

---

TargetDirectory	hdlsrc
TargetSubdirectory	Model
EDAScriptGeneration	on
AddInputRegister	on
AddOutputRegister	on
AddPipelineRegisters	off
PipelinePostfix	_pipe
InputPort	filter_in
OutputPort	filter_out
FracDelayPort	filter_fd
Name	filter
RemoveResetFrom	None
ResetAssertedLevel	Active-high
ReuseAccum	off
ScaleWarnBits	3
SerialPartition	-1
DALUTPartition	-1
DARadix	2
CoefficientSource	Internal
CoefficientMemory	Registers
InputComplex	off
AddRatePort	off
InputDataType	
GenerateHDLCode	on
GenerateModel	on
GenerateTB	off
GenerateCEGenModel	off
ObfuscateGeneratedHDLCode	off
Traceability	off
RuntimeReport	off
ResourceReport	off
OptimizationReport	off
ErrorCheckReport	on
HDLGenerateWebview	off
IPCoreReport	off
Recommendations	off

## Chapter 6. System Model Configuration

---

RequirementComments	on
EnableComments	on
Backannotation	off
HierarchicalDistPipelining	off
PreserveDesignDelays	off
AcquireDesignDelaysForEMLOptimizations	off
ClockRatePipelining	on
CRPWithoutFlattening	on
UseCRPALternativeStrategy	off
IncreaseCRPBudget	on
AdaptivePipelining	off
CloneModules	on
MinDelaysRequiredAtLocalMultirateOutput	1
ClockRatePipelineOutputPorts	off
CriticalPathEstimation	off
TimingDatabaseDirectory	
StaticLatencyPathAnalysis	off
optimizeserializer	on
shareequalwl	on
sharedmulsign	Signed
MultiplierPromotionThreshold	0
RoutingFudgeFactor	0.5000
OptimizationCompatibilityCheck	off
NumCriticalPathsEstimated	1
CriticalPathEstimationFile	criticalPathEstimated
SLPAFile	staticLatPathAnalysis
SLPALoopsFile	staticLatLoops
SLPABackEdgeFile	staticLatLoopBackEdge
SLPAGMMMapMATFile	staticLatGMMMap
HardwarePipeliningCharacterizationFile	
HighlightFeedbackLoops	on
HighlightFeedbackLoopsFile	highlightFeedbackLoop

## Chapter 6. System Model Configuration

---

HighlightClockRatePipeliningDiagnostic	on
HighlightClockRatePipeliningFile	highlightClockRatePipelining
DistributedPipeliningBarriers	on
DistributedPipeliningBarriersFile	highlightDistributedPipeliningBarriers
BlocksWithNoCharacterizationFile	highlightCriticalPathEstimationOfferingBlocks
AXIStreamingTransformFeatureControl	off
AXIInterface512BitDataPortFeatureControl	off
SerializerRatioThreshold	8192
RetimingCP	off
RetimingCPFile	highlightRetimingCP
ClearHighlightingFile	clearhighlighting
FunctionallyEquivalentRetiming	on
DistributedPipeliningPriority	Numerical Integrity
RetimingDetails	on
CriticalPathDetails	off
SignalNamesMangling	off
GuidedRetiming	off
LatencyConstraint	0
ReduceMatchingDelays	on
OptimizationData	
CPGuidanceFile	
CPAnnotationFile	
OptimizeMdlGen	on
MulticyclePathInfo	off
MulticyclePathConstraints	off
FloatingPointTargetConfiguration	
GenerateTargetComps	on
NativeFloatingPoint	off
FPToleranceValue	1.0000e-07

## Chapter 6. System Model Configuration

---

FPToleranceStrategy	DEFAULT
nfpLatency	DEFAULT
nfpDenormals	DEFAULT
sschdlMatrixProductSumCu stomLatency	-1
AlteraBackwardIncompatibl eSinCosPipeline	off
FamilyDevicePackageSpeed	
ToolName	
SynthesisToolChipFamily	
SynthesisToolDeviceName	
SynthesisToolPackageName	
SynthesisToolSpeedValue	
SynthesisTool	
SynthesisProjectAdditionalF iles	
SimulationLibPath	
XilinxSimulatorLibPath	
AdderSharingMinimumBitw idth	0
MultiplierSharingMinimum Bitwidth	0
MultiplyAddSharingMinimu mBitwidth	0
ShareAdders	off
ShareMultipliers	on
ShareMultiplyAdds	on
ShareMATLABBlocks	on
ShareAtomicSubsystems	on
ShareCounterSerDes	off
ShareFloatingPointIPs	on
PipelinedSharing	on
OptimizeCRPSharingRegiste rs	on
ClockRatePipeliningBudgetC heck	off
EnableFPGAWorkflow	off
FPGAWorkflowParameters	
GainMultipliers	Multiplier

## Chapter 6. System Model Configuration

---

ProductOfElementsStyle	linear
UserComment	
CustomFileHeaderComment	
CustomFileFooterComment	
DateComment	on
SafeZeroConcat	on
SumOfElementsStyle	linear
TargetLanguage	VHDL
Oversampling	1
ClockRatePipeliningFraction	1
Verbosity	1
TestBenchName	filter_tb
MultifileTestBench	off
IgnoreDataChecking	0
TestBenchPostfix	_tb
TestBenchDataPostfix	_data
TestBenchStimulus	
TestBenchUserStimulus	
TestBenchFracDelayStimulus	
TestBenchCoeffStimulus	
TestBenchRateStimulus	
ForceClockEnable	on
MinimizeClockEnables	off
MinimizeGlobalResets	off
NoResetInitializationMode	InsideModule
NoResetInitScript	noresetinitscript.tcl
ComplexMulElaboration	MultiplyAddBlock
FlattenBus	off
TestBenchClockEnableDelay	1
ForceClock	on
ClockHighTime	5
ClockLowTime	5
HoldTime	2
InputDataInterval	0
ForceReset	on
ErrorMargin	4

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---

HoldInputDataBetweenSamples	on
InitializeTestBenchInputs	off
ResetLength	2
TestBenchReferencePostFix	_ref
GenerateValidationModel	off
RAMMappingThreshold	256
MapPipelineDelaysToRAM	off
RemoveRedundantCounters	on
ReplaceUnitDelayWithIntegerDelay	on
ConcatenateDelays	on
MergeDelaysOnFanouts	on
FoldDelaysToConstant	on
RAMArchitecture	WithClockEnable
UseMatrixTypesInEML	on
InlineMATLABBlockCode	off
SubsystemReuse	Atomic only
InlineHDLCode	off
MaskParameterAsGeneric	off
InlineSubsystems	on
StringTypeSupport	off
DeleteUnusedBlocks	on
DeleteUnusedBlocksUnderMask	off
DeleteUnusedPorts	on
BalanceDelays	on
TargetFrequency	0
ExtraEffortMargin	1
MaxOversampling	Inf
MaxComputationLatency	1
MultiplierPartitioningThreshold	Inf
TreatDelayBalancingFailure As	Error
TransformDelaysWithControlLogic	on
TransformNonZeroInitValDelay	on

## Chapter 6. System Model Configuration

---

DelayElaborationLimit	20
GenerateCoSimBlock	off
HDLCodeCoverage	off
GenerateHDLTestBench	on
GenerateCoSimModel	None
GenerateSVDPITestBench	None
SimulationTool	Mentor Graphics Modelsim
CoSimModelSetup	CosimBlockAndDut
SynthesisOnDirective	
SynthesisOffDirective	
LoopUnrolling	off
InlineConfigurations	on
UseAggregatesForConst	off
UseVerilogTimescale	on
Timescale	`timescale 1 ns / 1 ns
VerilogFileExtension	.v
SystemVerilogFileExtension	.sv
VHDLFileExtension	.vhd
CodeGenerationOutput	GenerateHDLCode
GeneratedmodelName	
GeneratedmodelNamePrefix	gm_
ValidationmodelNameSuffix	_vnl
UseDotLayout	off
ShowCodeGenPIR	off
SerializeModel	0
SerializeIO	0
AutoRoute	on
AutoPlace	on
InterBlkHorzScale	1.7000
InterBlkVertScale	1.2000
CustomDotPath	
HighlightAncestors	on
HighlightColor	cyan
InitializeBlockRAM	on
InitializeRealPort	off
MapVectorPortToStream	off

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---

UseFileIOInTestBench	on
TurnkeyWorkflow	off
AlteraWorkflow	off
GenerateFILBlock	off
CoSimLibPostfix	_cosim
TestBenchInitializeInputs	off
MinimizeIntermediateSignals	off
GenerateCodeInfo	off
GateayoutWithDTC	off
IncrementalCodeGenForTopModel	off
HDLWFSmartbuild	on
HDLCodingStandard	None
HDLCodingStandardCustomizations	
ReferenceDesignParameter	
HDLLintTool	None
HDLLintInit	
HDLLintTerm	
HDLLintCmd	
ModulePrefix	
DetectBlackBoxNameCollision	Warning
PIRTC	off
UsePipelinedToolboxFunctions	on
savepirtoscript	off
ConcatenateHDLModules	off
ML2PIR	off
OptimBetweenMATLABAndSimulink	off
EnableTestpoints	off
TraceabilityStyle	Line Level
TreatRealsInGeneratedCodeAs	Error
EnumEncodingScheme	default
BuildToProtectModel	off
OptimizeConstants	on

## Chapter 6. System Model Configuration

---

OptimizeFixedPointConstan ts	off
StreamingMatrix	off
HDLDTO	off
UseArrangeSystem	off
TriggerAsClockWithoutSync Registers	off

---

# Chapter 7. Glossary

**Atomic Subsystem.** A subsystem treated as a unit by an implementation of the design documented in this report. The implementation computes the outputs of all the blocks in the atomic subsystem before computing the next block in the parent system's block execution order (sorted list).

**Block Diagram.** A Simulink block diagram represents a set of simultaneous equations that relate a system or subsystem's inputs to its outputs as a function of time. Each block in the diagram represents an equation of the form  $y = f(t, x, u)$  where  $t$  is the current time,  $u$  is a block input,  $y$  is a block output, and  $x$  is a system state (see the Simulink documentation for information on the functions represented by the various types of blocks that make up the diagram). Lines connecting the blocks represent dependencies among the blocks, i.e., inputs whose current values are the outputs of other blocks. An implementation of a design described in this document computes a root or atomic system's outputs at each time step by computing the outputs of the blocks in an order determined by block input/output dependencies.

**Block Parameter.** A variable that determines the output of a block along with its inputs, for example, the gain parameter of a Gain block.

**Block Execution Order.** The order in which Simulink evaluates blocks during simulation of a model. The block execution order determined by Simulink ensures that a block executes only after all blocks on whose outputs it depends are executed.

**Checksum.** A number that indicates whether different versions of a model or atomic subsystem differ functionally or only cosmetically. Different checksums for different versions of the same model or subsystem indicate that the versions differ functionally.

**Design Variable.** A symbolic (MATLAB) variable or expression used as the value of a block parameter. Design variables allow the behavior of the model to be altered by altering the value of the design variable.

**Signal.** A block output, so-called because block outputs typically vary with time.

**Virtual Subsystem.** A subsystem that is purely graphical, i.e., is intended to reduce the visual complexity of the block diagram of which it is a subsystem. An implementation of the design treats the blocks in the subsystem as part of the first nonvirtual ancestor of the virtual subsystem (see Atomic Subsystem).

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# Chapter 8. About this Report

## Report Overview

This report describes the design of the asbQuadcopter system. The report was generated automatically from a Simulink model used to validate the design. It contains the following sections:

**Model Version.** Specifies information about the version of the model from which this design description was generated. Includes the model checksum, a number that indicates whether different versions of the model differ functionally or only cosmetically. Different checksums for different versions indicate that the versions differ functionally.

**Root System.** Describes the design's root system.

**Subsystems.** Describes each of the design's subsystems.

**Design Variables.** Describes system design variables, i.e., MATLAB variables and expressions used as block parameter values.

**System Model Configuration.** Lists the configuration parameters, e.g., start and stop time, of the model used to simulate the system described by this report.

**Requirements.** Shows design requirements associated with elements of the design model. This section appears only if the design model contains requirements links.

**Glossary.** Defines Simulink terms used in this report.

## Root System Description

This section describes a design's root system. It contains the following sections:

**Diagram.** Simulink block diagram that represents the algorithm used to compute the root system's outputs.

**Description.** Description of the root system. This section appears only if the model's root system has a Documentation property or a Doc block.

**Interface.** Name, data type, width, and other properties of the root system's input and output signals. The number of the block port that outputs the signal appears in angle brackets appended to the signal name. This section appears only if the root system has input or output ports.

**Blocks.** This section has two subsections:

- **Parameters.** Describes key parameters of blocks in the root system. This section also includes graphical and/or tabular representations of lookup table data used by lookup table blocks, i.e., blocks that use lookup tables to compute their outputs.
- **Block Execution Order.** Order in which blocks must be executed at each time step in order to ensure that each block's inputs are available when it executes.

**State Charts.** Describes state charts used in the root system. This section appears only if the root system contains Stateflow blocks.

## Subsystem Descriptions

This section describes a design's subsystems. Each subsystem description contains the following sections:

**Checksum.** This section appears only if the subsystem is an atomic subsystem. The checksum indicates whether the version of the model subsystem used to generate this report differs functionally from other versions of the model subsystem. If two model checksums differ, the corresponding versions of the model differ functionally.

**Diagram.** Simulink block diagram that graphically represents the algorithm used to compute the subsystem's outputs.

**Description.** Description of the subsystem. This section appears only if the subsystem has a Documentation property or contains a Doc block.

**Interface.** Name, data type, width, and other properties of the subsystem's input and output signals. The number of the block port that outputs the signal appears in angle brackets appended to the signal name. This section appears only if the subsystem is atomic and has input or output ports.

**Blocks.** Blocks that this subsystem contains. This section has two subsections:

- **Parameters.** Key parameters of blocks in the subsystem. This section also includes graphical and/or tabular representations of lookup table data used by lookup table blocks, blocks that use lookup tables to compute their outputs.
- **Block Execution Order.** Order in which the subsystem's blocks must be executed at each time step in order to ensure that each block's inputs are available when the block executes .This section appears only if the subsystem is atomic. Note: in Acrobat(PDF) reports, the number in square brackets next to the block name is a hyperlink to the block parameter table. The number has no model significance.

**State Charts.** Describes state charts used in the subsystem. This section appears only if the root system contains Stateflow blocks.

## State Chart Descriptions

This section describes the state machines used by Stateflow blocks to compute their outputs, i.e., Stateflow blocks. Each state machine description contains the following sections:

**Chart.** Diagram representing the state machine.

**States.** Describes the state machine's states. Each state description includes the state's diagram and diagrams and/or descriptions of graphical functions, Simulink functions, truth tables, and MATLAB functions parented by the state.

## Chapter 8. About this Report

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**Transitions.** Transitions between the state machine's states. Each transition description specifies the values of key transition properties. Appears only if a transition has properties that do not appear on the chart.

**Junctions.** Transition junctions. Each junction description specifies the values of key junction properties. Appears only if a junction has properties that do not appear on the chart.

**Events.** Events that trigger state transitions. Each event description specifies the values of key event properties.

**Data.** Data types and other properties of the Stateflow block's inputs, outputs, and other state machine data.

**Targets.** Executable implementations of the state machine used to compute the outputs of the corresponding Stateflow block.

**MATLAB Supporting Functions.** List of functions invoked by MATLAB functions defined in the chart.