Autonomous Vehicle Simulation (AVS) Laboratory, University of Colorado

Basilisk Technical Memorandum

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MODULE TO CONVERT THE RATE MESSAGE BETWEEN TWO MESSAGE FORMATS

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Status: 1st release
Scope/Contents
This module reads in a message of type `IMUSensorBodyFswMsg`, extracts the rate vector, and returns it in an output message of type `NavAttIntMsg`. The remainder of the output message is zeroed.

Rev	Change Description	By	Date
1.0	First release	H. Schaub	June 30, 2018

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1 Model Description

This module is embarrassingly simple. The purpose is to read in the body message from one message type `IMUSensorBodyFswMsg`, and store it in an output message of another type `NavAttIntMsg`. The body rate vector is stored in the variable `AngVelBody` in the incoming message. The output message of type `NavAttIntMsg` is used as a common attitude input message by the FSW modules. This output message is first zeroed, and then the rate vector is copied into the variable `omega_BN_B`.

2 Module Functions

- **Message Conversion**: The rate info from one message type is copied over to another message

3 Module Assumptions and Limitations

No assumptions are made for this module.

4 Test Description and Success Criteria

The single check has the rate vector of the input message is set to specific values. The rate info of the output vector is then compared to truth model. Further, the MRP and heading vectors should be zero vectors.

5 Test Parameters

Test and simulation parameters and inputs go here. Basically, describe your test in the section above, but put any specific numbers or inputs to the tests in this section.

The unit test verify that the module output guidance message vectors match expected values.

Table 2: Error tolerance for each test.

Output Value Tested	Tolerated Error
`outputVector`	1e-12

6 Test Results

The following table shows the results of the unit test described above.

Table 3: Test results

Check	Pass/Fail
1	PASSED

The test output are shown in the following tables.

Table 4: Unit test output table for MRPs.

time [s]	Output 1	Error	Output 2	Error	Output 3 $\boldsymbol{\sigma}$	Error
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0	0	0	0	0	0

Table 5: Unit test output table for rate values.

time [s]	Output 1	Error	Output 2	Error	Output 3 $\boldsymbol{\omega}_{B/N}$	Error
0	-0.1	0	0.2	0	-0.3	0
0.5	-0.1	0	0.2	0	-0.3	0
1	-0.1	0	0.2	0	-0.3	0

Table 6: Unit test output table for sun heading vector.

time [s]	Output 1	Error	Output 2	Error	Output 3 $\boldsymbol{d}$	Error
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0	0	0	0	0	0