

## Calibration results

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### Normalized Residuals

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Reprojection error (cam0): mean 0.448904022876, median 0.318087524674, std: 0.414112834308

Gyroscope error (imu0): mean 1.34299294479, median 1.1973707844, std: 0.998970030357

Accelerometer error (imu0): mean 4.70153549989, median 3.54687350315, std: 3.55084690564

### Residuals

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Reprojection error (cam0) [px]: mean 0.448904022876, median 0.318087524674, std: 0.414112834308

Gyroscope error (imu0) [rad/s]: mean 0.0949639418346, median 0.0846669001246, std: 0.070637848266

Accelerometer error (imu0) [m/s<sup>2</sup>]: mean 0.664897526792, median 0.501603661218, std: 0.50216558518

### Transformation (cam0):

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T\_ci: (imu0 to cam0):

```
[[ 0.00199812  0.99977399 -0.02116558  0.04081412]
 [-0.99975857  0.00246034  0.02183479 -0.02259298]
 [ 0.02188193  0.02111684  0.99953752  0.02261085]
 [ 0.         0.         0.         1.         ]]
```

T\_ic: (cam0 to imu0):

```
[[ 0.00199812 -0.99975857  0.02188193 -0.02316385]
 [ 0.99977399  0.00246034  0.02111684 -0.04122677]
 [-0.02116558  0.02183479  0.99953752 -0.02124322]
 [ 0.         0.         0.         1.         ]]
```

timeshift cam0 to imu0: [s] (t\_imu = t\_cam + shift)

0.0006756106534462393

Gravity vector in target coords: [m/s<sup>2</sup>]

[-0.08225096 8.29435031 -5.23119591]

Calibration configuration

-----  
Camera model: pinhole  
Focal length: [461.7947310011125, 460.24678913375317]  
Principal point: [359.8335340985467, 233.72090134082393]  
Distortion model: equidistant  
Distortion coefficients: [0.0023809655849981798, 0.000379091478428235, 0.0018750627605088345, 0.000379091478428235, 0.0018750627605088345, 0.000379091478428235]  
Type: aprilgrid  
Tags:  
 Rows: 6  
 Cols: 6  
 Size: 0.02 [m]  
 Spacing 0.006 [m]

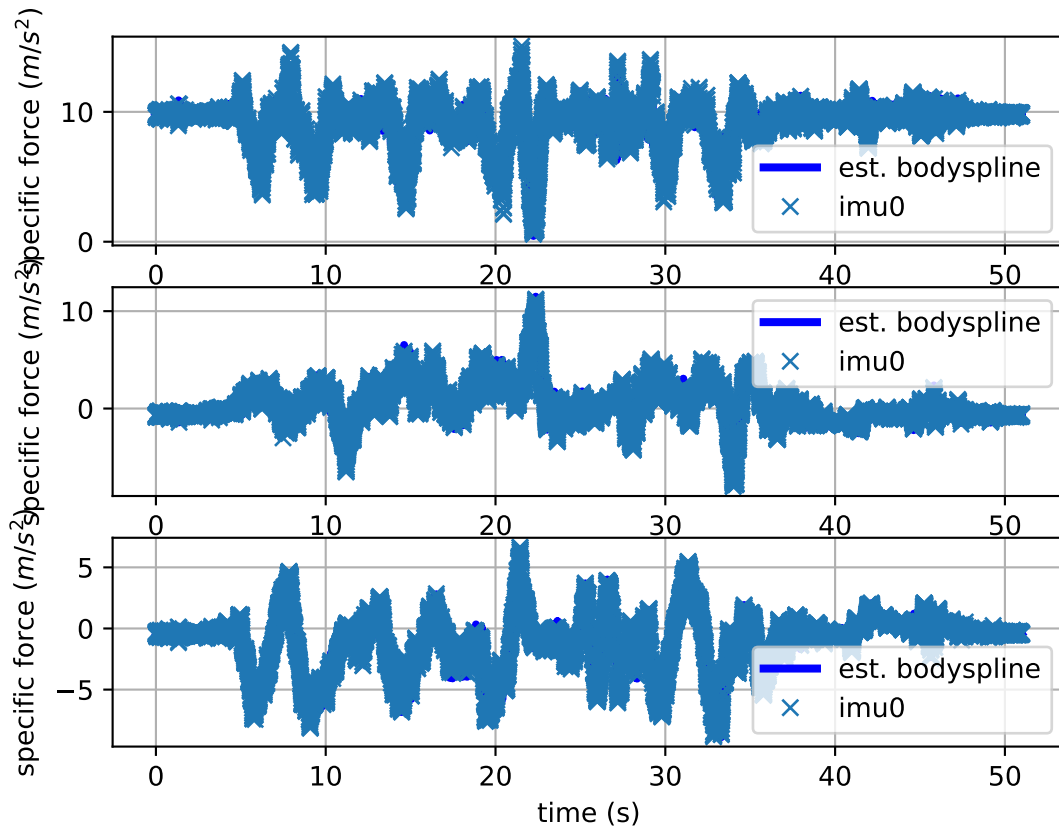
#### IMU configuration

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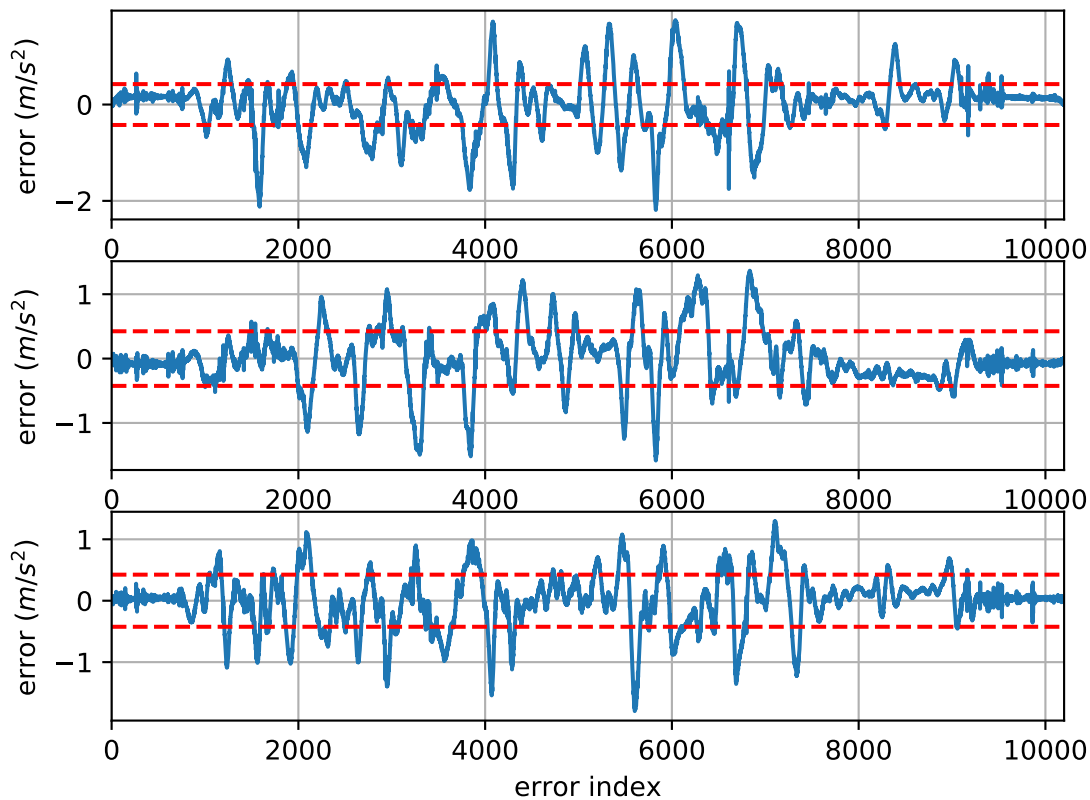
#### IMU0:

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Model: calibrated  
Update rate: 200.0  
Accelerometer:  
 Noise density: 0.01  
 Noise density (discrete): 0.141421356237  
 Random walk: 0.0002  
Gyroscope:  
 Noise density: 0.005  
 Noise density (discrete): 0.0707106781187  
 Random walk: 4e-06  
T\_i\_b  
 [[1. 0. 0. 0.]  
 [0. 1. 0. 0.]  
 [0. 0. 1. 0.]  
 [0. 0. 0. 1.]]  
time offset with respect to IMU0: 0.0 [s]

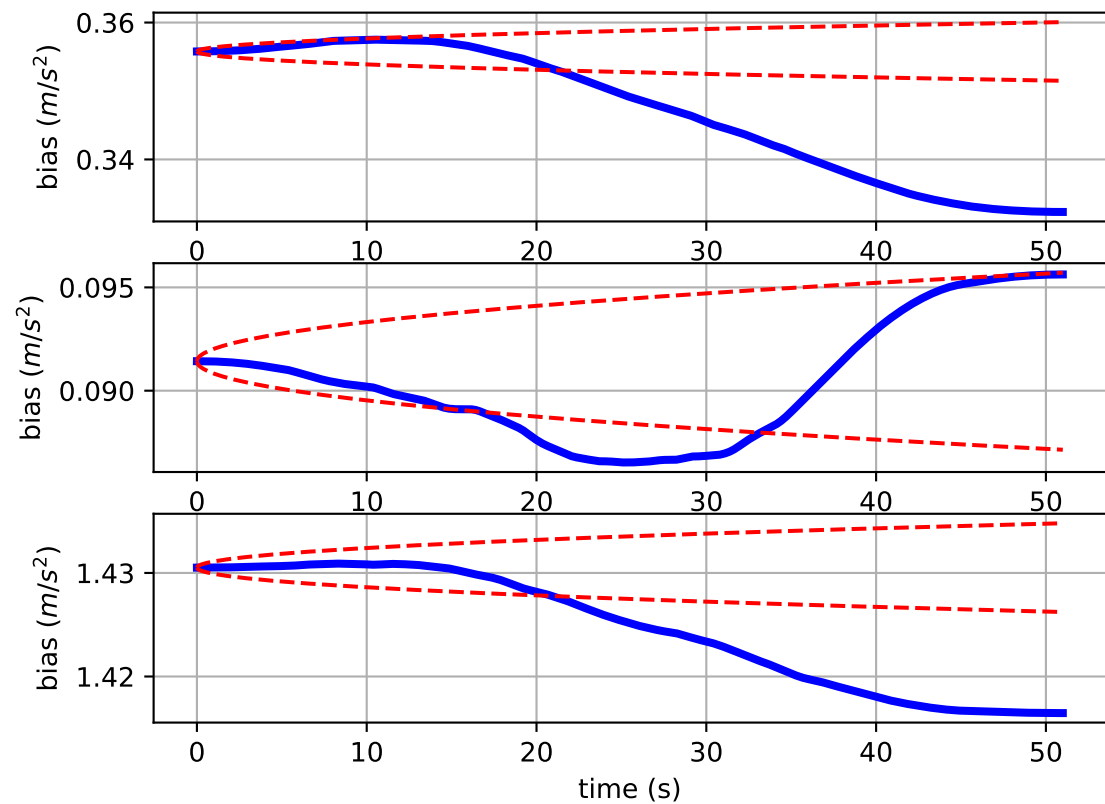
Comparison of predicted and measured specific force (imu0 frame)



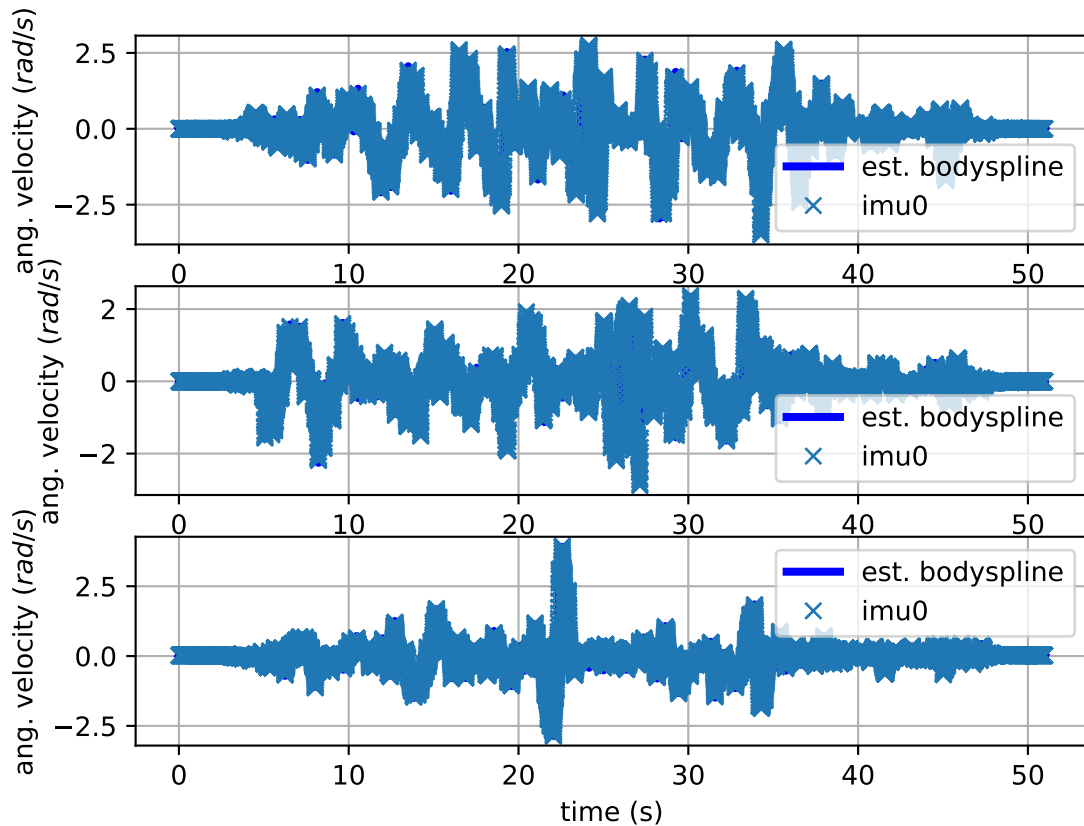
imu0: acceleration error



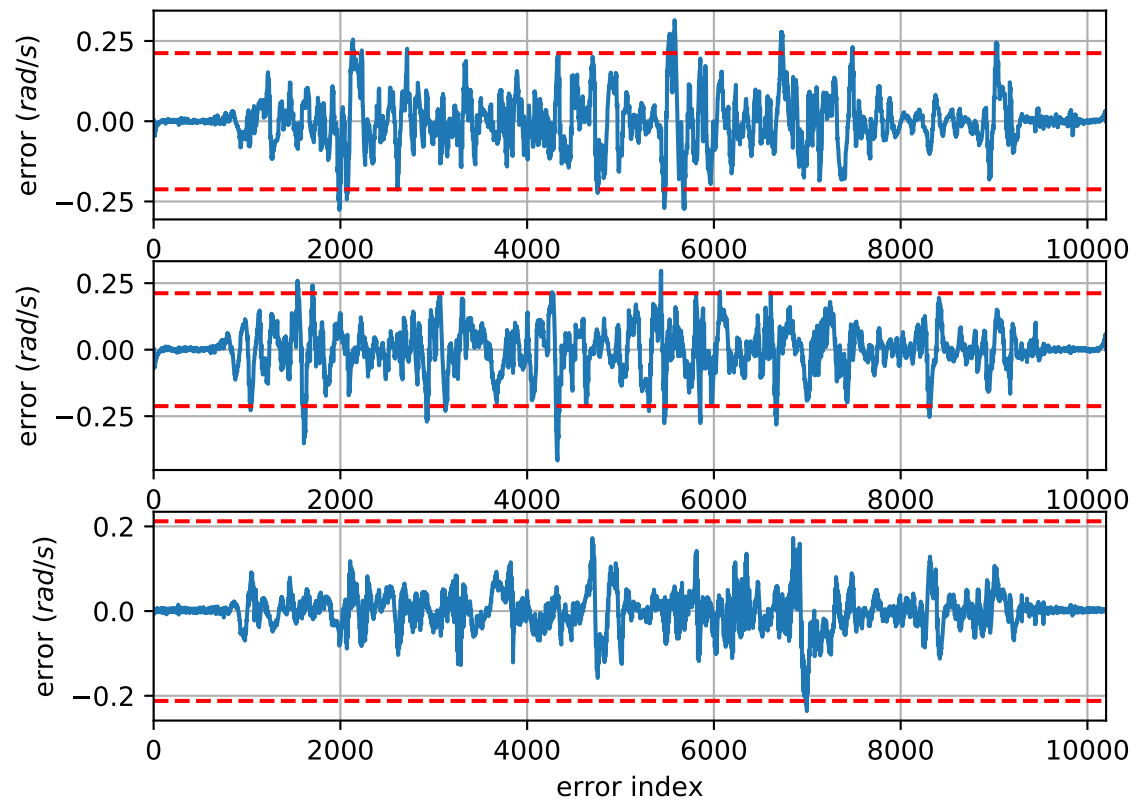
imu0: estimated accelerometer bias (imu frame)



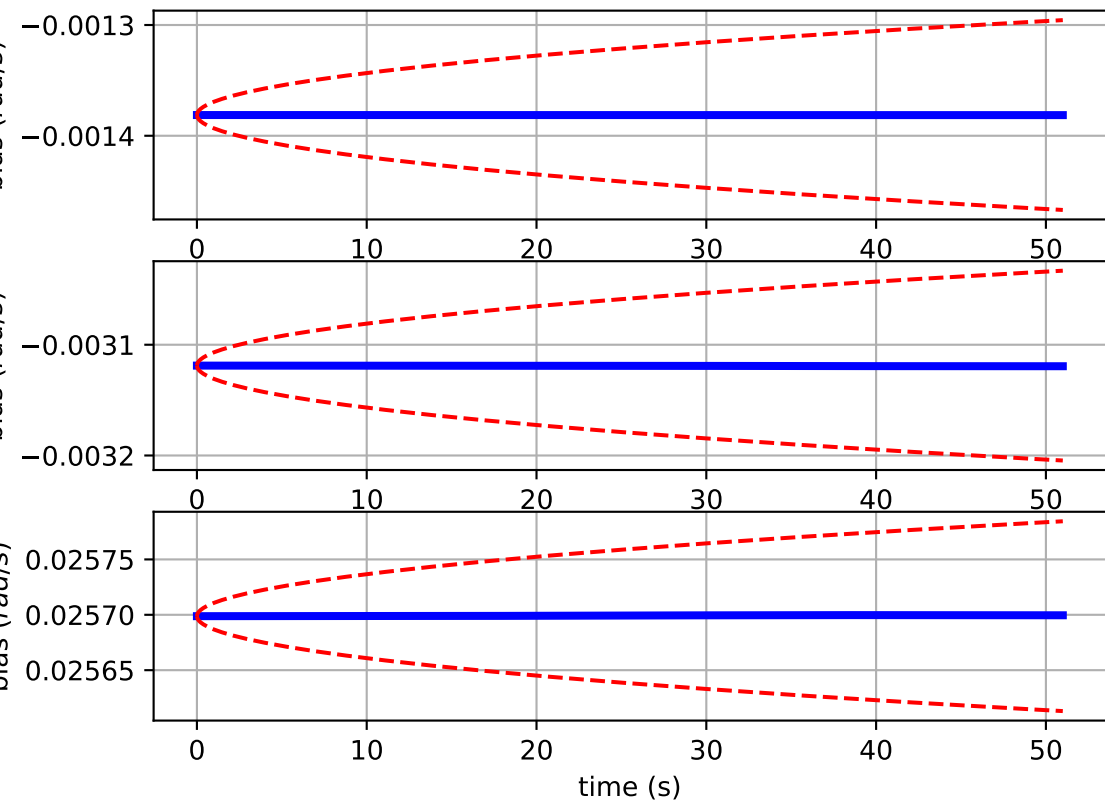
Comparison of predicted and measured angular velocities (body frame)



imu0: angular velocities error



imu0: estimated gyro bias (imu frame)





cam0: reprojection errors

