

## Calibration results

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### Normalized Residuals

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Reprojection error (cam0): mean 0.447704922776, median 0.316544251012, std: 0.413731225366  
Gyroscope error (imu0): mean 1.34123494564, median 1.19502154712, std: 0.997117407191  
Accelerometer error (imu0): mean 4.70364336196, median 3.55538559836, std: 3.55187819037

### Residuals

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Reprojection error (cam0) [px]: mean 0.447704922776, median 0.316544251012, std: 0.413731225366  
Gyroscope error (imu0) [rad/s]: mean 0.094839632523, median 0.0845007839633, std: 0.0705068480264  
Accelerometer error (imu0) [m/s<sup>2</sup>]: mean 0.665195623505, median 0.502807453266, std: 0.50231143087

### Transformation (cam0):

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T\_ci: (imu0 to cam0):

```
[[ 0.00181234  0.99974951 -0.0223078  0.04067712]
 [-0.99977522  0.00228271  0.02107819 -0.02255586]
 [ 0.02112383  0.02226459  0.99952893  0.02276704]
 [ 0.          0.          0.          1.          ]]
```

T\_ic: (cam0 to imu0):

```
[[ 0.00181234 -0.99977522  0.02112383 -0.02310544]
 [ 0.99974951  0.00228271  0.02226459 -0.04112234]
 [-0.0223078  0.02107819  0.99952893 -0.02137346]
 [ 0.          0.          0.          1.          ]]
```

timeshift cam0 to imu0: [s] (t\_imu = t\_cam + shift)  
0.000677391640416

Gravity vector in target coords: [m/s<sup>2</sup>]  
[-0.08295833 8.29374366 -5.23214649]

Calibration configuration

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Camera model: pinhole

Focal length: [462.12944774797097, 460.6903712397771]

Principal point: [360.64407683212477, 234.12444997611715]

Distortion model: equidistant

Distortion coefficients: [-0.004067913331646666, 0.020049233258848963, -0.022142704116853543, 0.01

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.]

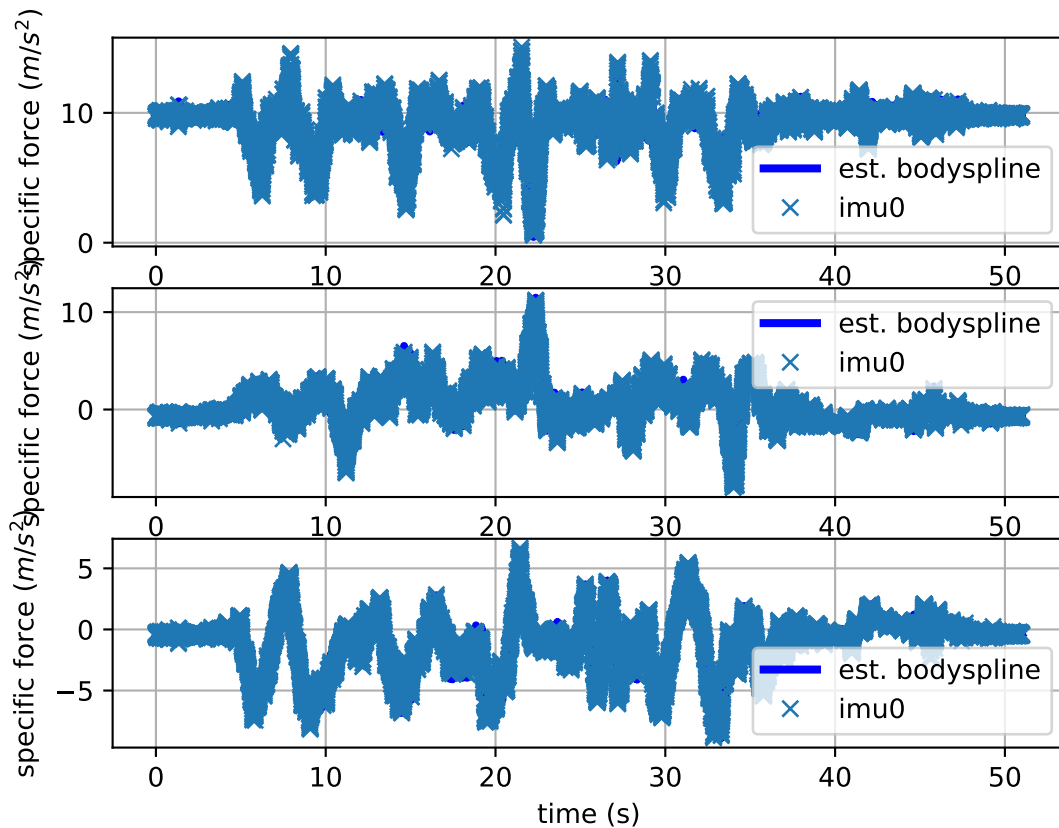
[ 0. 1. 0. 0.]

[ 0. 0. 1. 0.]

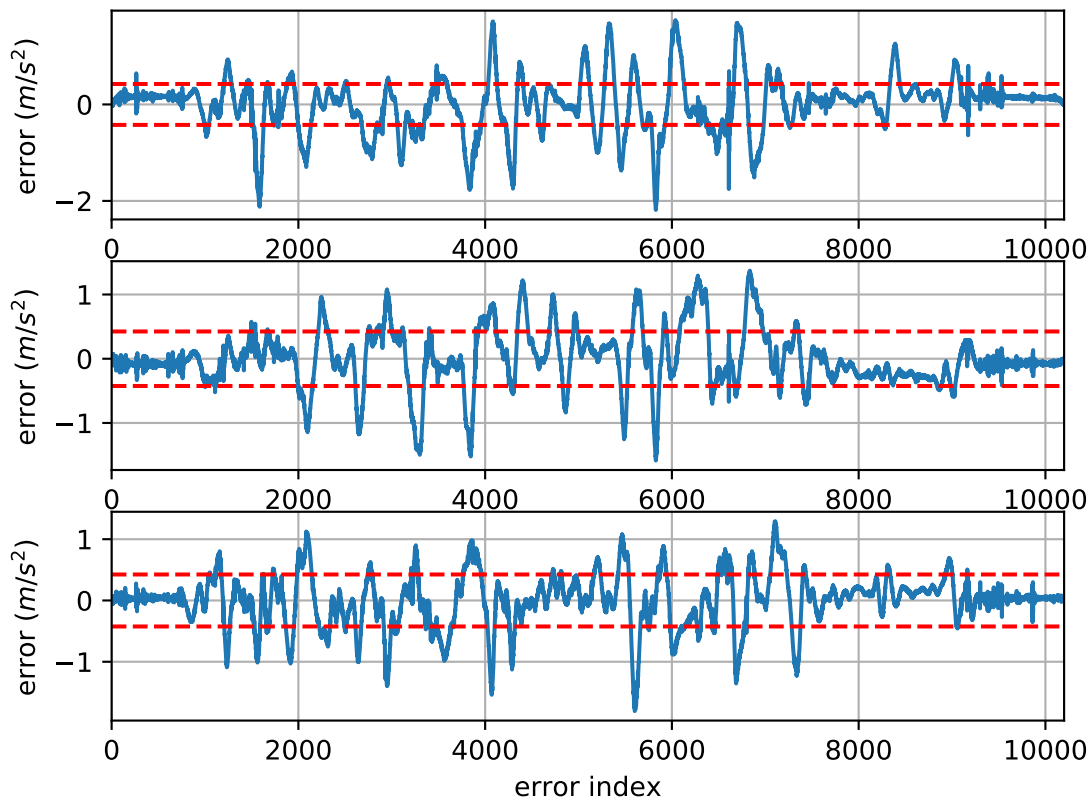
[ 0. 0. 0. 1.]]

time offset with respect to IMU0: 0.0 [s]

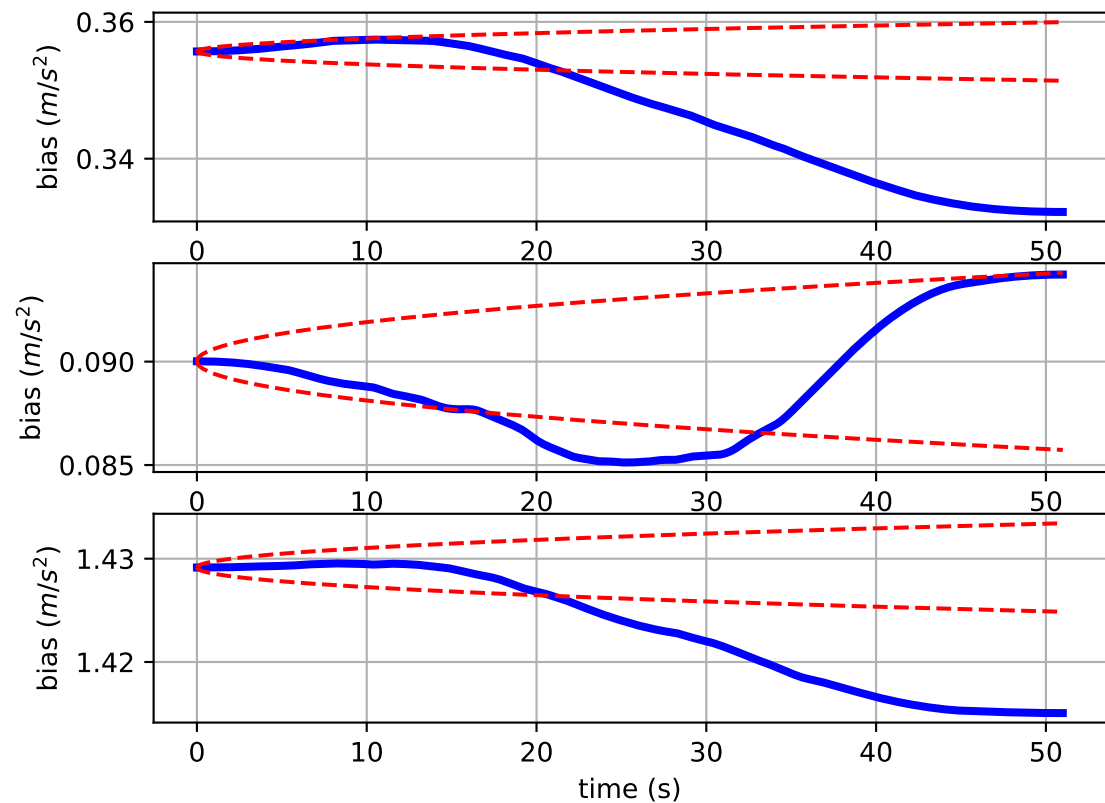
Comparison of predicted and measured specific force (imu0 frame)



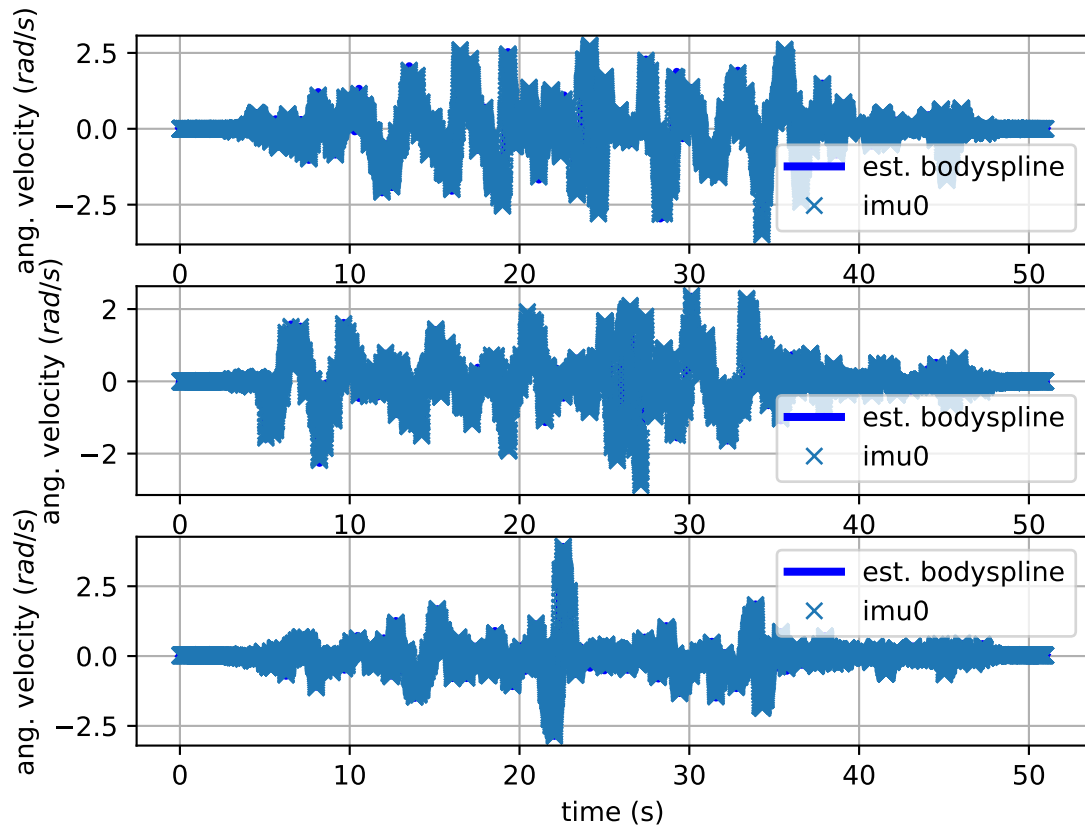
imu0: acceleration error



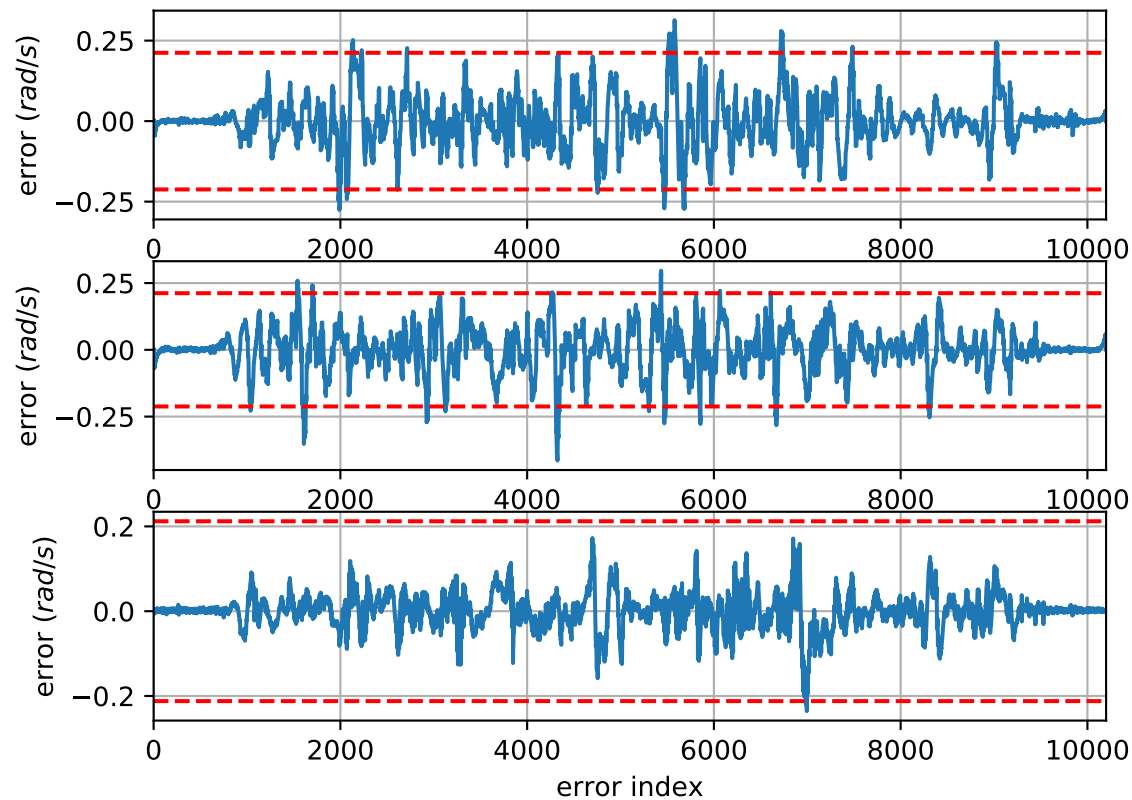
imu0: estimated accelerometer bias (imu frame)



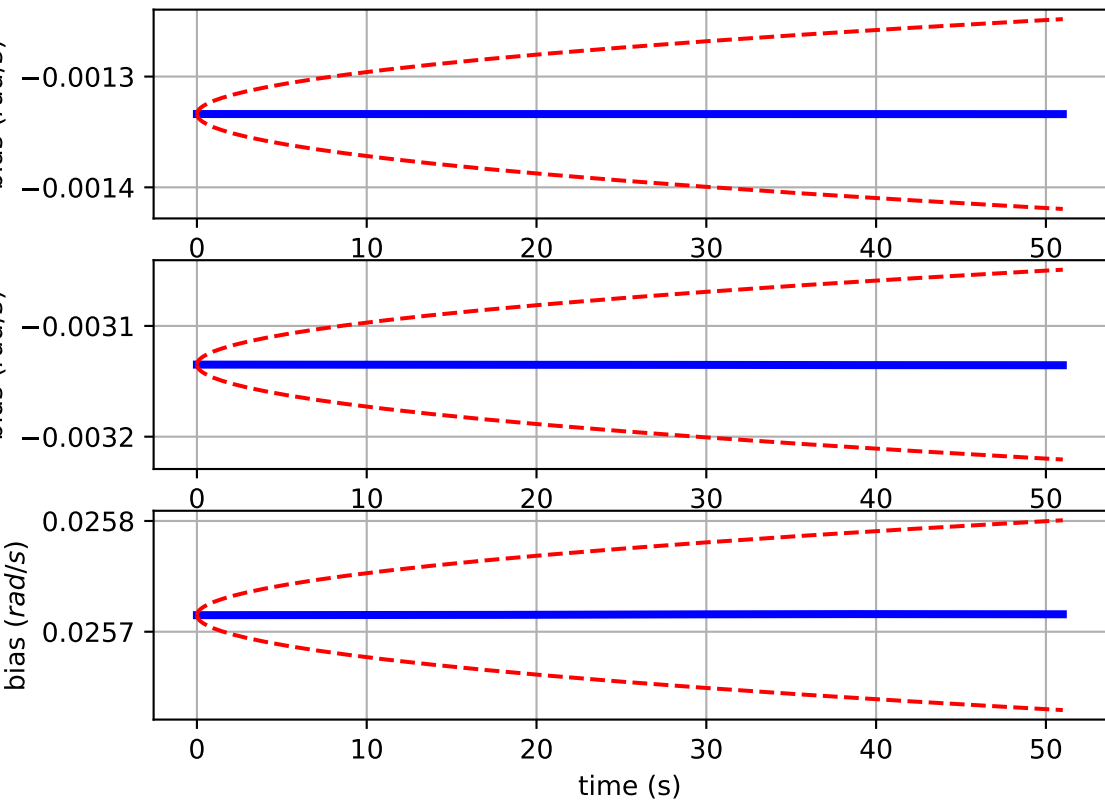
Comparison of predicted and measured angular velocities (body frame)



imu0: angular velocities error



imu0: estimated gyro bias (imu frame)





cam0: reprojection errors

