

Calibration results

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Normalized Residuals

Reprojection error (cam0): mean 0.374309261803, median 0.315937785464, std: 0.256606937054
Reprojection error (cam1): mean 0.392206547509, median 0.332574798326, std: 0.265209239146
Gyroscope error (imu0): mean 1.09408727424, median 0.986612298425, std: 0.604962361719
Accelerometer error (imu0): mean 1.40340136091, median 1.23207784693, std: 0.901936064246

Residuals

Reprojection error (cam0) [px]: mean 0.374309261803, median 0.315937785464, std: 0.256606937054
Reprojection error (cam1) [px]: mean 0.392206547509, median 0.332574798326, std: 0.265209239146
Gyroscope error (imu0) [rad/s]: mean 0.002625412931, median 0.00236751194092, std: 0.00145169041321
Accelerometer error (imu0) [m/s^2]: mean 0.039694184761, median 0.0348484240206, std: 0.025510604289

Transformation (cam0):

T_ci: (imu0 to cam0):
[[0.01488676 0.99970958 -0.01895086 0.06883547]
 [-0.99988713 0.01492248 0.00174468 -0.01573539]
 [0.00202697 0.01892275 0.99981889 -0.00607906]
 [0. 0. 0. 1.]]

T_ic: (cam0 to imu0):
[[0.01488676 -0.99988713 0.00202697 -0.01674603]
 [0.99970958 0.01492248 0.01892275 -0.06846563]
 [-0.01895086 0.00174468 0.99981889 0.0074099]
 [0. 0. 0. 1.]]

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
0.0

Transformation (cam1):

T_ci: (imu0 to cam1):
[[0.01266604 0.99971361 -0.02030435 -0.04129103]
 [-0.99978877 0.01299046 0.01592678 -0.01526767]
 [0.01618598 0.02009833 0.99966698 -0.00639669]

```
[ 0.    0.    0.    1.   ]]
```

T_ic: (cam1 to imu0):

```
[[ 0.01266604 -0.99978877 0.01618598 -0.01463791]
```

```
[ 0.99971361 0.01299046 0.02009833 0.0416061 ]
```

```
[-0.02030435 0.01592678 0.99966698 0.00579933]
```

```
[ 0.    0.    0.    1.   ]]
```

timeshift cam1 to imu0: [s] ($t_{imu} = t_{cam} + \text{shift}$)

0.0

Baselines:

Baseline (cam0 to cam1):

```
[[ 0.99999662 0.00221817 -0.00135767 -0.11009961]
```

```
[-0.00219875 0.99989756 0.01414317 0.00070344]
```

```
[ 0.0013889 -0.01414013 0.99989906 -0.00063635]
```

```
[ 0.    0.    0.    1.   ]]
```

baseline norm: 0.110103697973 [m]

Gravity vector in target coords: [m/s²]

```
[-0.01153302 -9.55689969 -2.19862642]
```

Calibration configuration

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cam0

Camera model: eucm

Focal length: [459.50951514281564, 458.2100719933204]

Principal point: [365.3772354518809, 248.76541493237283]

EUCM alpha: 0.598894037491

EUCM beta: 1.10379661967

Distortion model: none

Distortion coefficients: []

Type: aprilgrid

Tags:

Rows: 6

Cols: 6
Size: 0.088 [m]
Spacing 0.0264 [m]

cam1

Camera model: eucm
Focal length: [458.3472227539241, 457.0143759962581]
Principal point: [378.9240417661763, 255.4310416200498]
EUCM alpha: 0.597864612198
EUCM beta: 1.10389187105
Distortion model: none
Distortion coefficients: []
Type: aprilgrid
Tags:
 Rows: 6
 Cols: 6
 Size: 0.088 [m]
 Spacing 0.0264 [m]

IMU configuration

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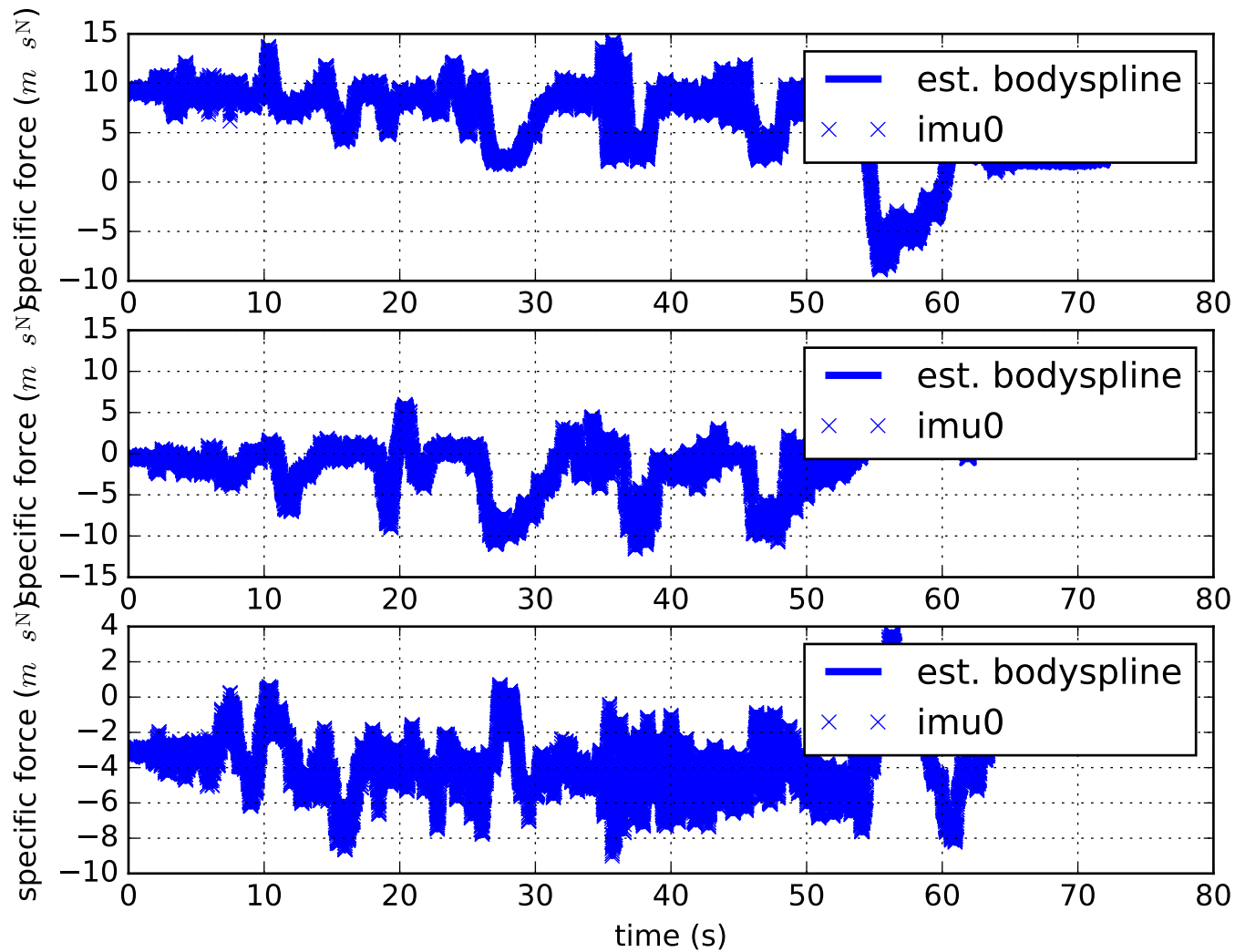
IMU0:

Model: calibrated
Update rate: 200.0
Accelerometer:
 Noise density: 0.002
 Noise density (discrete): 0.0282842712475
 Random walk: 0.003
Gyroscope:
 Noise density: 0.00016968
 Noise density (discrete): 0.00239963757263
 Random walk: 1.9393e-05
T_i_b
[[1. 0. 0. 0.]

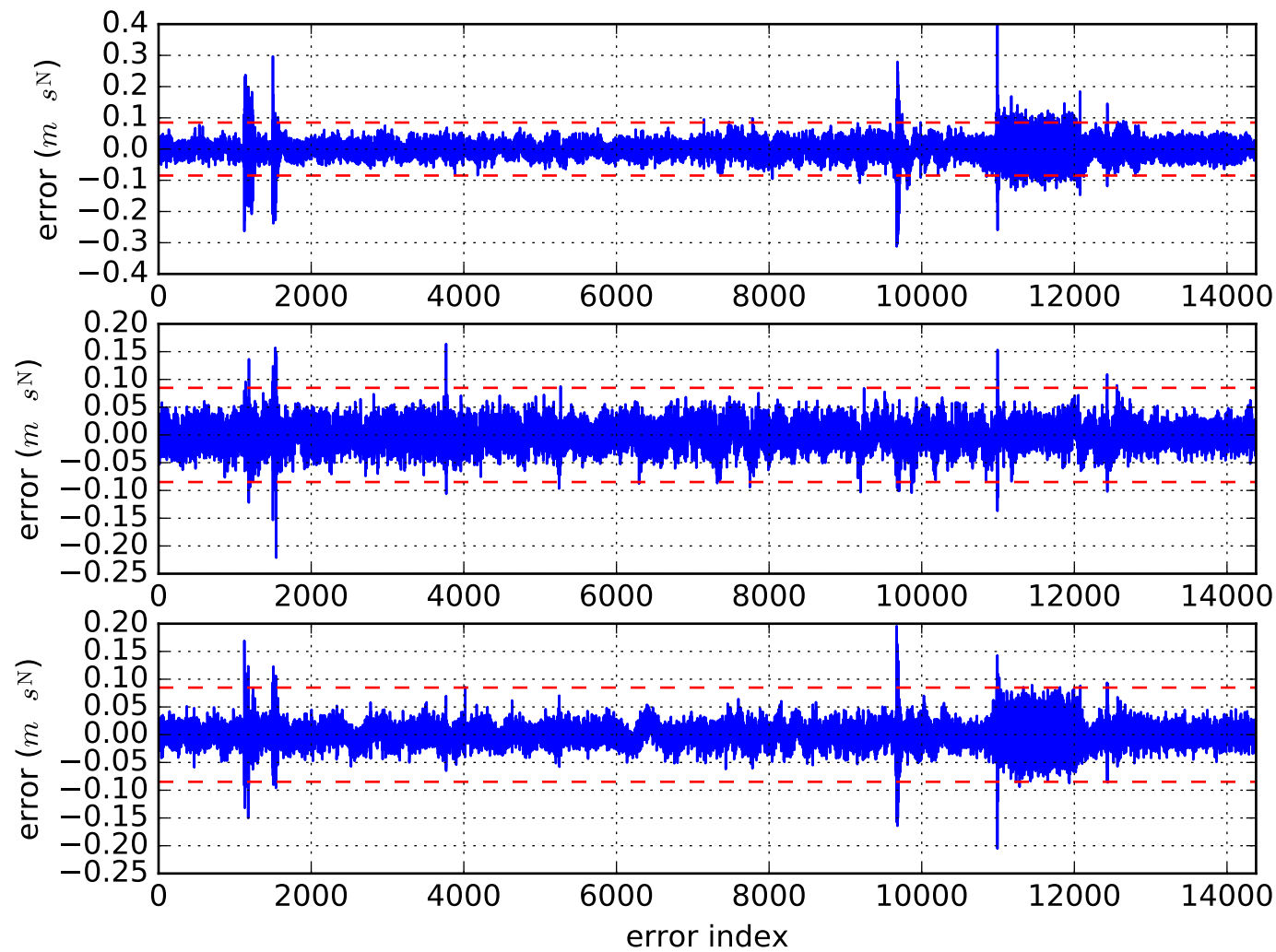
```
[ 0.  1.  0.  0.]  
[ 0.  0.  1.  0.]  
[ 0.  0.  0.  1.]
```

time offset with respect to IMU0: 0.0 [s]

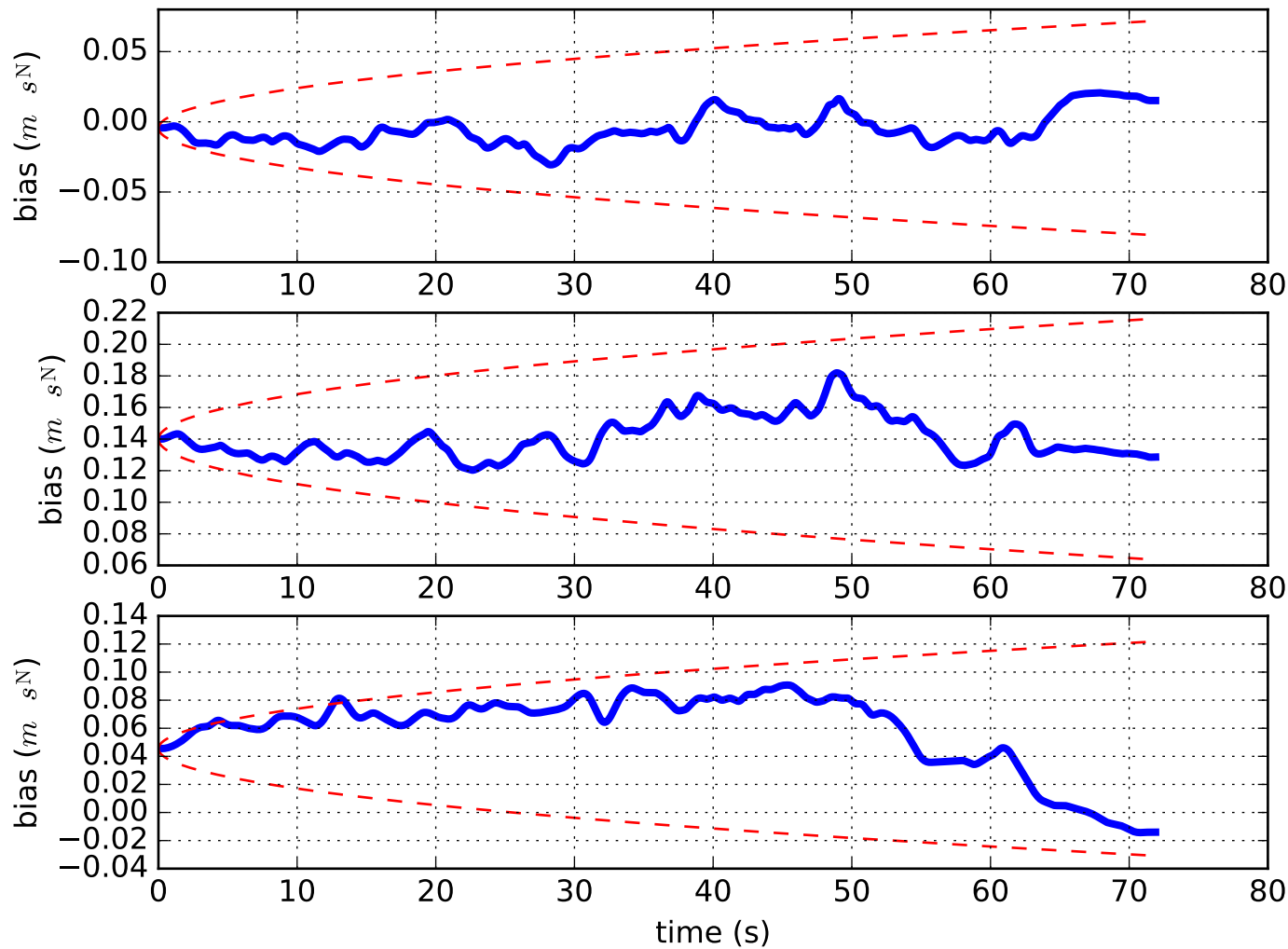
Comparison of predicted and measured specific force (imu0 frame)



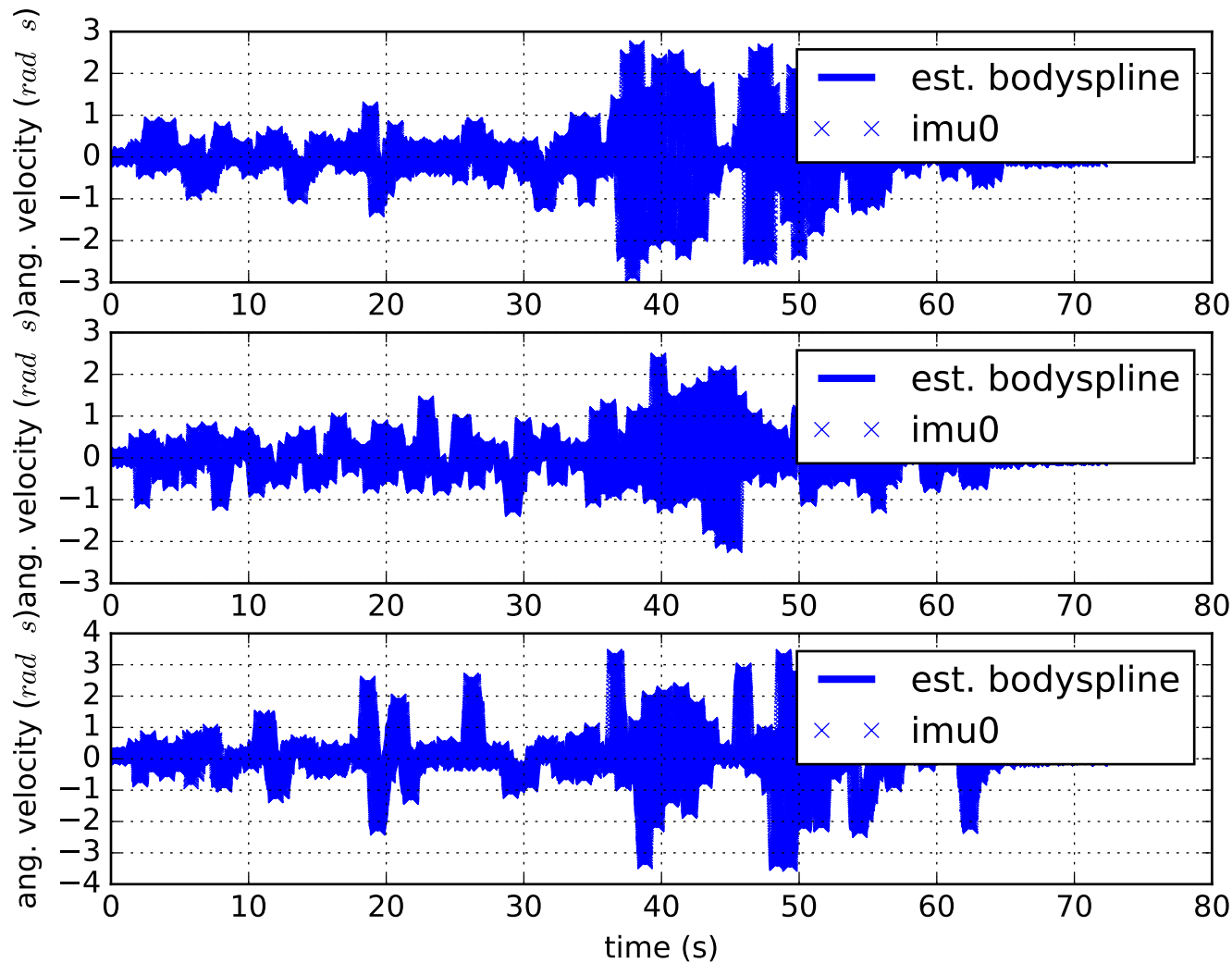
imu0: acceleration error



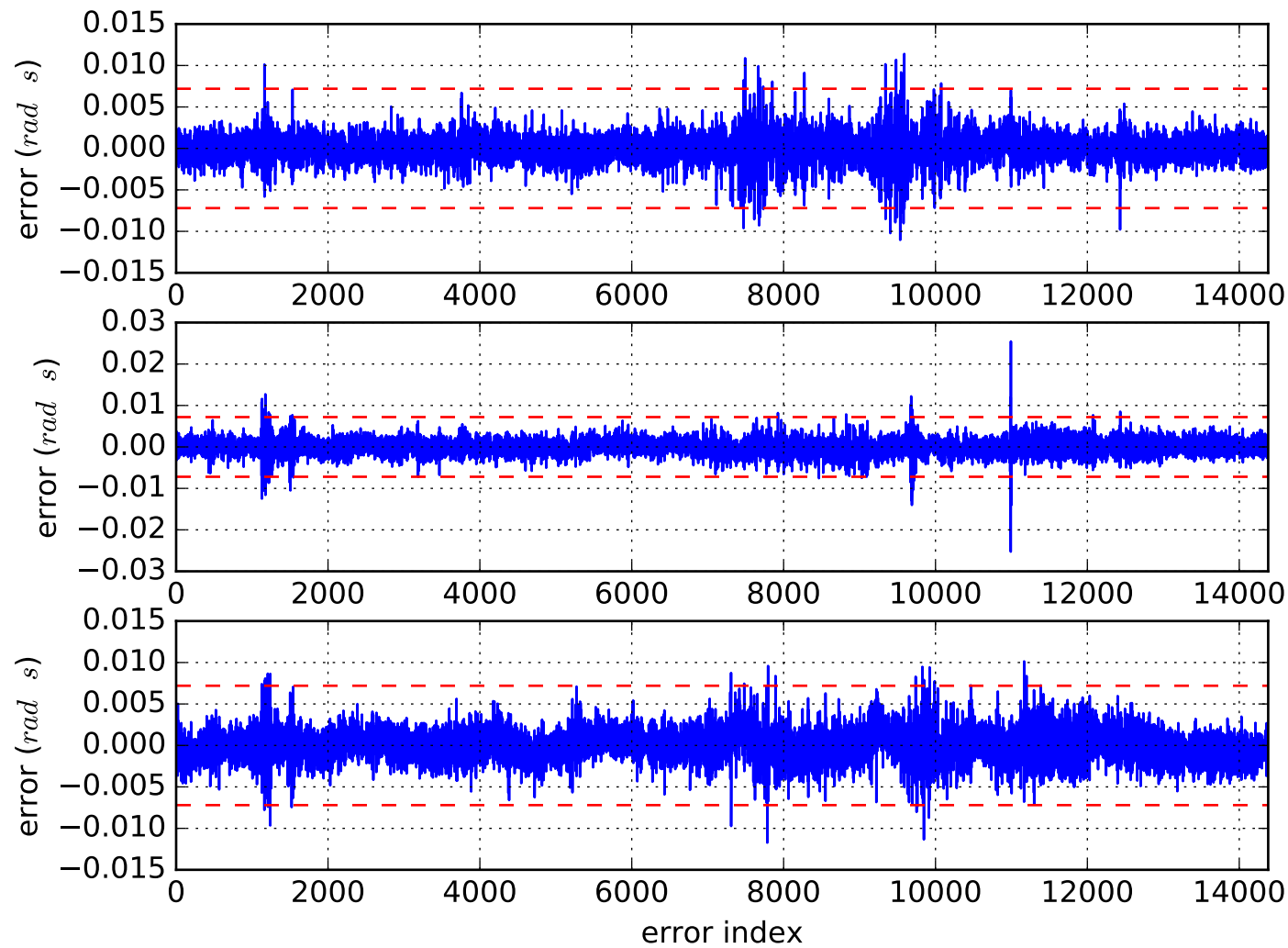
imu0: estimated accelerometer bias (imu frame)



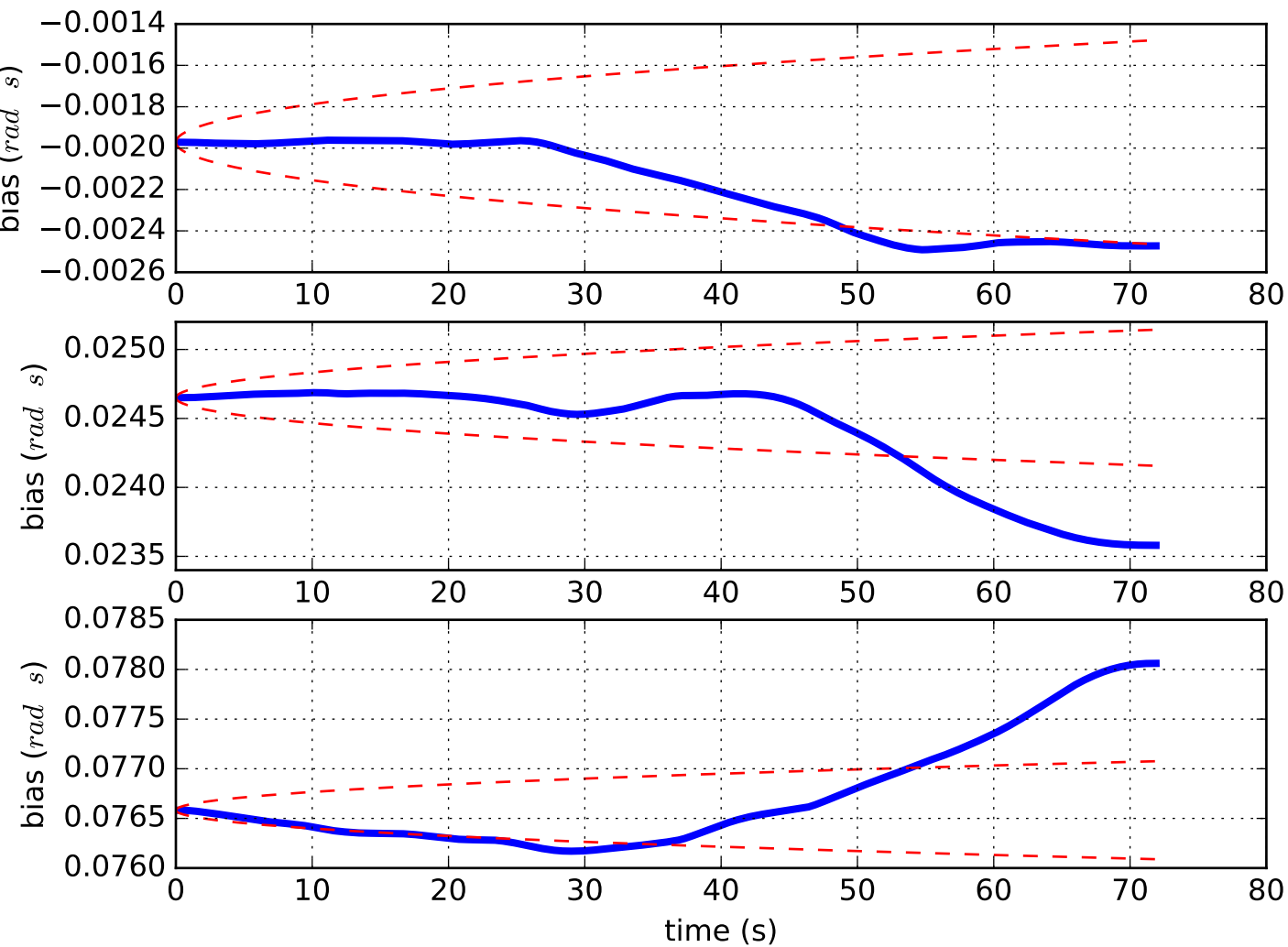
Comparison of predicted and measured angular velocities (body frame)



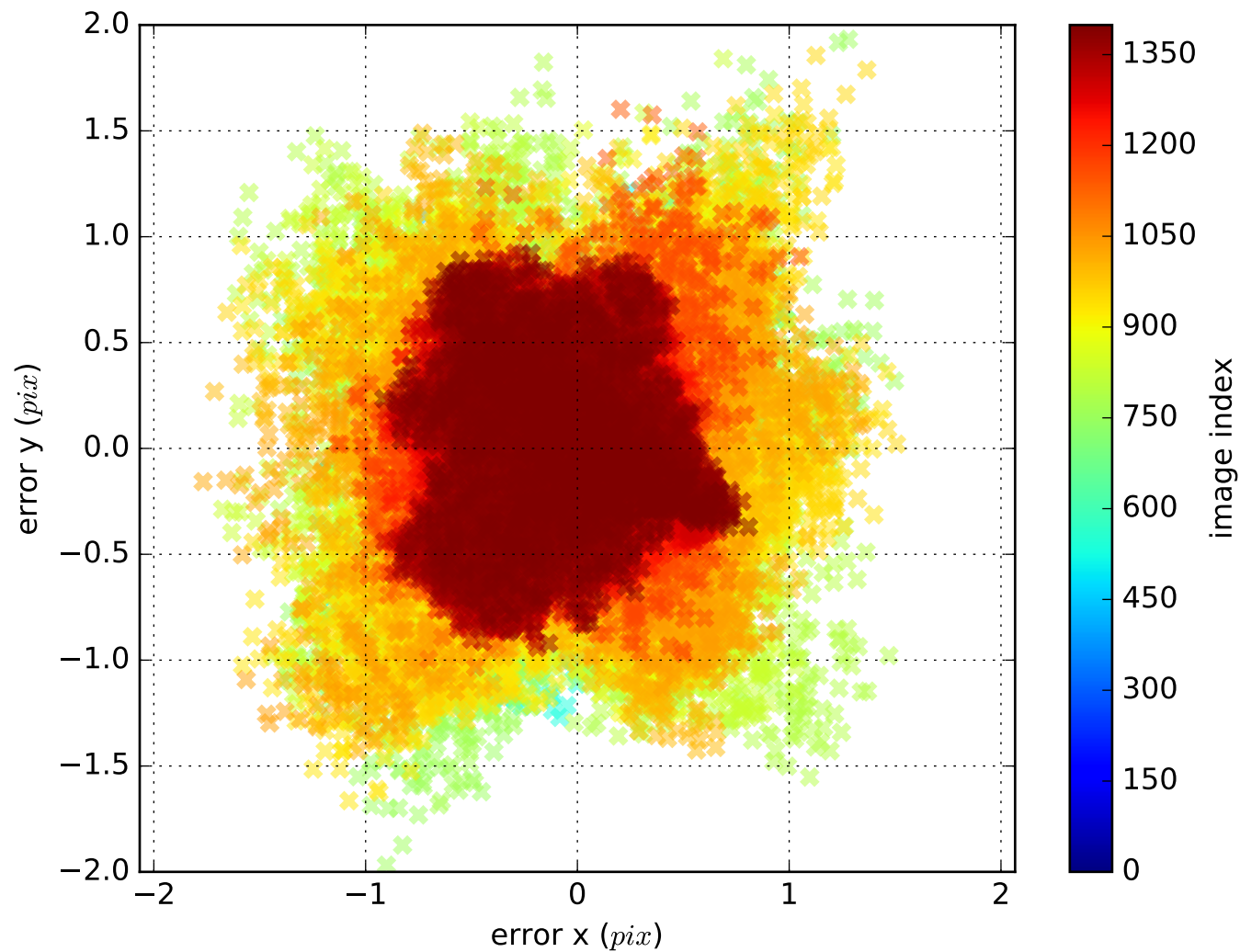
imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors



cam1: reprojection errors

