

Calibration results

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Normalized Residuals

Reprojection error (cam0): mean 1.79058698069, median 1.40025460241, std: 1.42907906784
Reprojection error (cam1): mean 1.76712084599, median 1.4219308717, std: 1.29632973935
Gyroscope error (imu0): mean 3.12380667184, median 2.30047007896, std: 2.60193931349
Accelerometer error (imu0): mean 3.23582352953, median 3.02425550129, std: 1.83838174064

Residuals

Reprojection error (cam0) [px]: mean 1.79058698069, median 1.40025460241, std: 1.42907906784
Reprojection error (cam1) [px]: mean 1.76712084599, median 1.4219308717, std: 1.29632973935
Gyroscope error (imu0) [rad/s]: mean 0.00381644957471, median 0.00281055422976, std: 0.00317886835825
Accelerometer error (imu0) [m/s²]: mean 0.0380921145896, median 0.0356015357612, std: 0.0216414298508

Transformation (cam0):

T_ci: (imu0 to cam0):
[[-0.02527291 -0.99968057 -0.00019524 0.06475132]
 [-0.030042 0.0009547 -0.99954818 0.00002514]
 [0.99922908 -0.02525563 -0.03005653 -0.10387514]
 [0. 0. 0. 1.]]

T_ic: (cam0 to imu0):
[[-0.02527291 -0.030042 0.99922908 0.10543227]
 [-0.99968057 0.0009547 -0.02525563 0.06210718]
 [-0.00019524 -0.99954818 -0.03005653 -0.00308435]
 [0. 0. 0. 1.]]

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
0.040447148975993094

Transformation (cam1):

T_ci: (imu0 to cam1):
[[-0.0133725 -0.99990796 -0.00229164 -0.05632032]
 [-0.02259123 0.00259339 -0.99974142 -0.00035573]
 [0.99965535 -0.01331727 -0.02262383 -0.10533042]

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

T_ic: (cam1 to imu0):

```
[[ -0.0133725 -0.02259123 0.99965535 0.10453294]  
[ -0.99990796 0.00259339 -0.01331727 -0.05771692]  
[ -0.00229164 -0.99974142 -0.02262383 -0.00286769]  
[ 0.    0.    0.    1.   ]]
```

timeshift cam1 to imu0: [s] (t_imu = t_cam + shift)
0.04318592134937912

Baselines:

Baseline (cam0 to cam1):

```
[[ 0.99992697 0.00173773 0.01195999 -0.1198246 ]  
[ -0.00182643 0.99997088 0.00740945 0.00050704]  
[ -0.01194677 -0.00743076 0.99990102 -0.00069181]  
[ 0.    0.    0.    1.   ]]
```

baseline norm: 0.1198276715111968 [m]

Gravity vector in target coords: [m/s^2]
[-0.06803694 -9.6169573 -1.91779202]

Calibration configuration

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cam0

Camera model: pinhole

Focal length: [1384.493277116111, 1385.8100341868333]

Principal point: [1211.443388021375, 613.5264361991738]

Distortion model: radtan

Distortion coefficients: [-0.1505288023788147, -0.013473934426044394, -0.0018435992532596346, 0.0007846165456336996]

Type: apriltgrid

Tags:

Rows: 6

Cols: 6

Size: 0.088 [m]

Spacing 0.0264 [m]

cam1

Camera model: pinhole

Focal length: [1376.241328564855, 1377.738565959169]

Principal point: [1203.7993329477308, 679.198570367358]

Distortion model: radtan

Distortion coefficients: [-0.15432155304751743, 0.006297113321067032, -0.0011766246835092132, 0.0015438293625462023]

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: 100.0

Accelerometer:

Noise density: 0.0011772

Noise density (discrete): 0.011772

Random walk: 2.39e-05

Gyroscope:

Noise density: 0.00012217304

Noise density (discrete): 0.0012217304

Random walk: 1.36e-06

T_i_b

[[1. 0. 0. 0.]

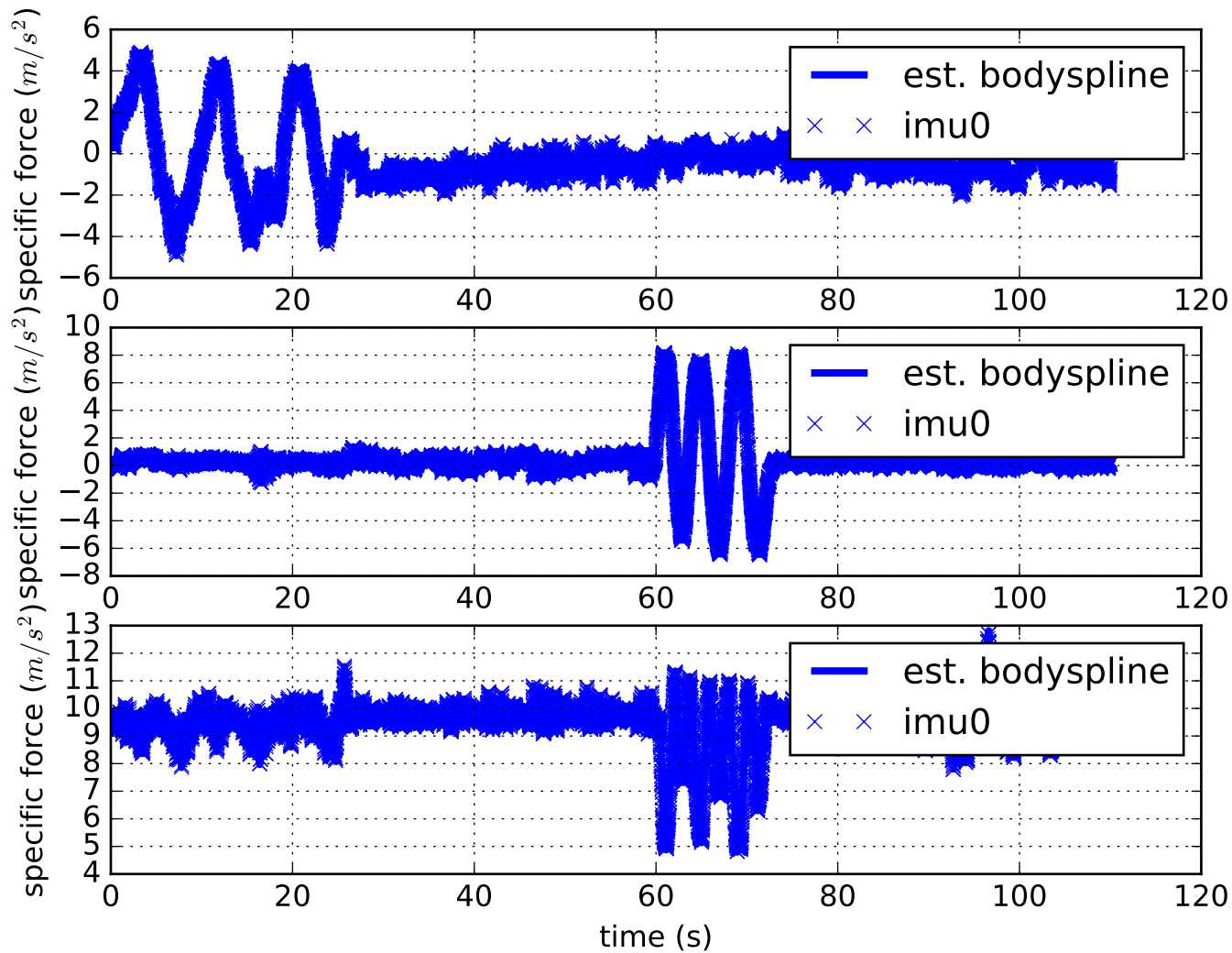
[0. 1. 0. 0.]

[0. 0. 1. 0.]

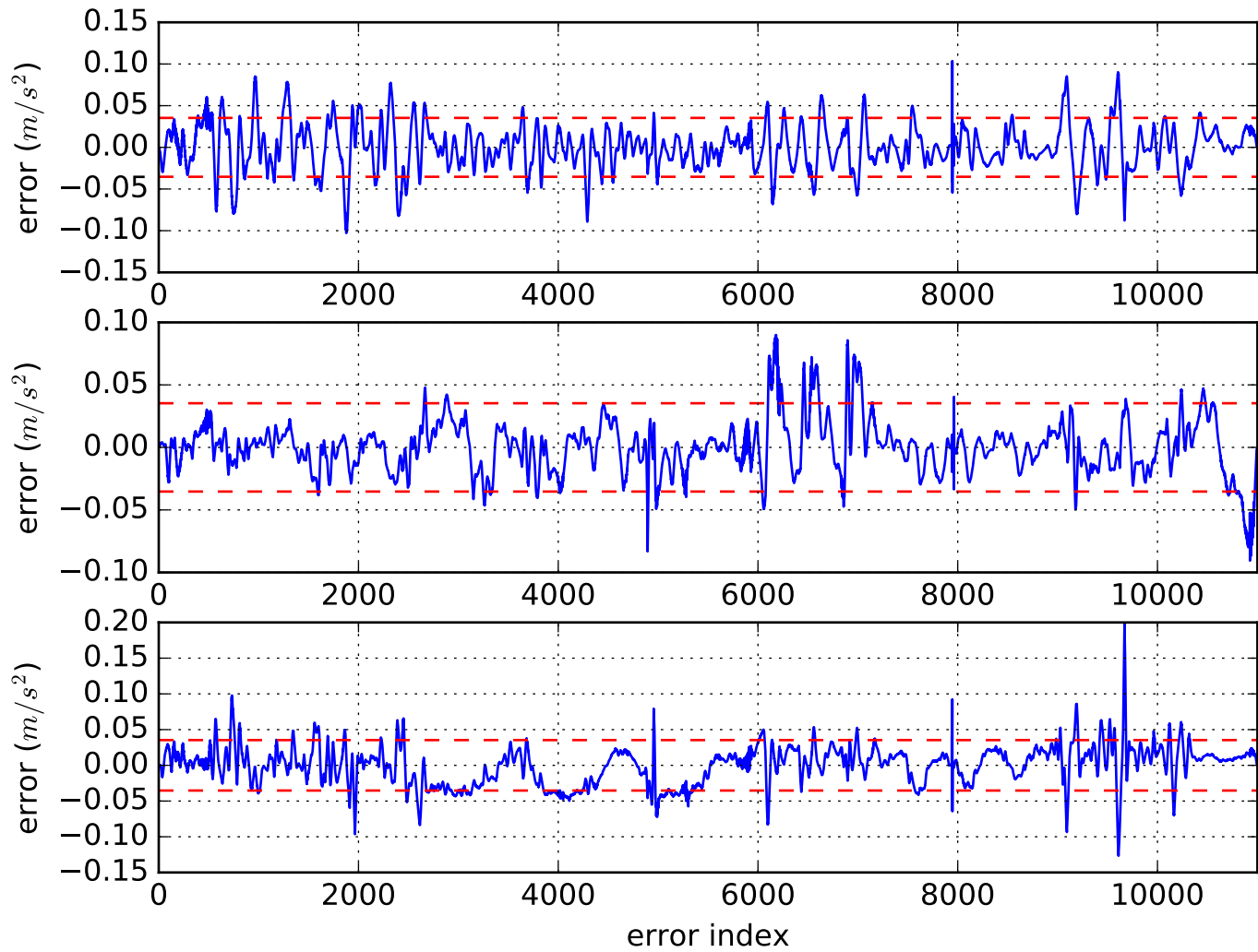
[0. 0. 0. 1.]]

time offset with respect to IMU0: 0.0 [s]

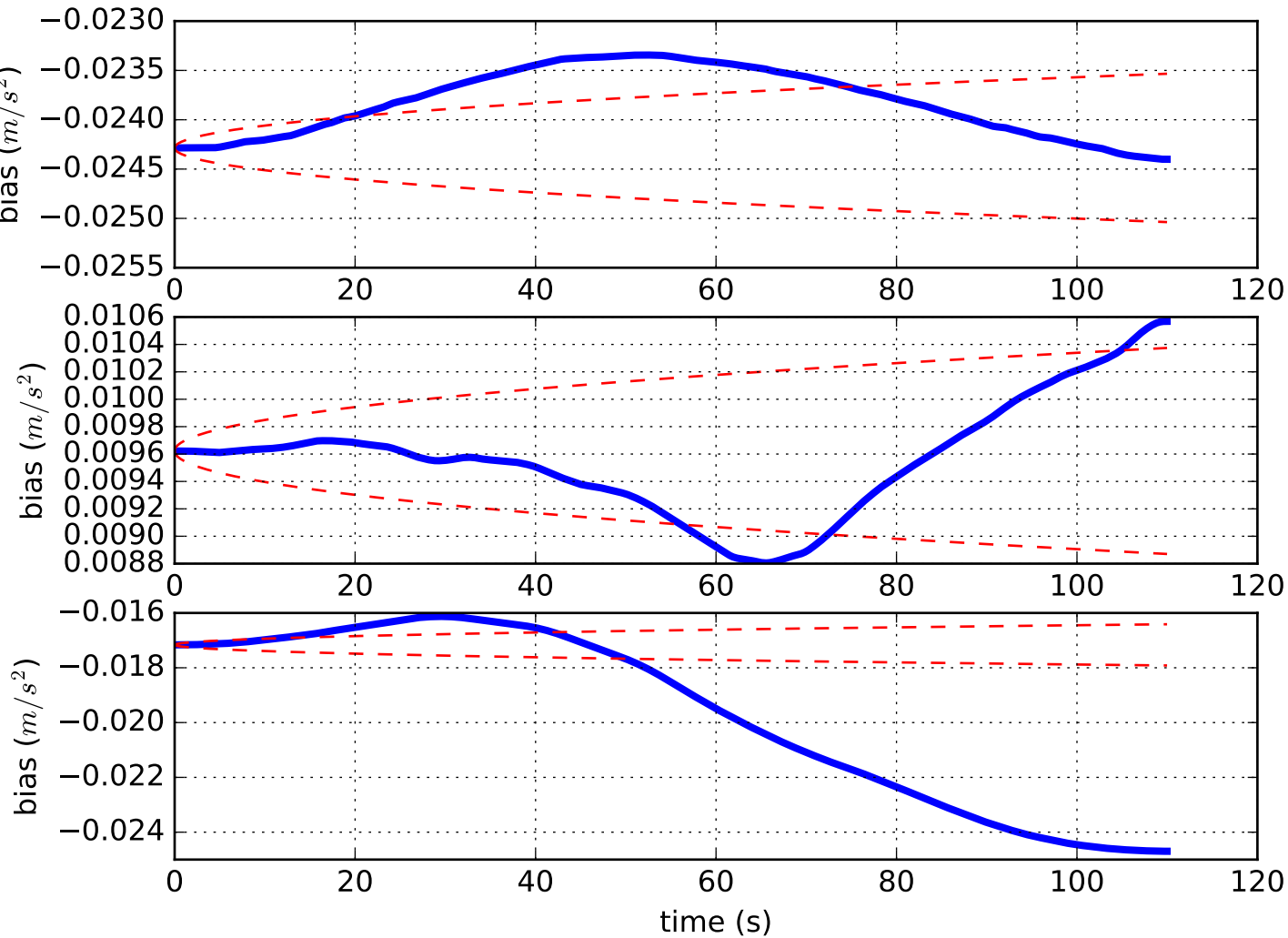
Comparison of predicted and measured specific force (imu0 frame)



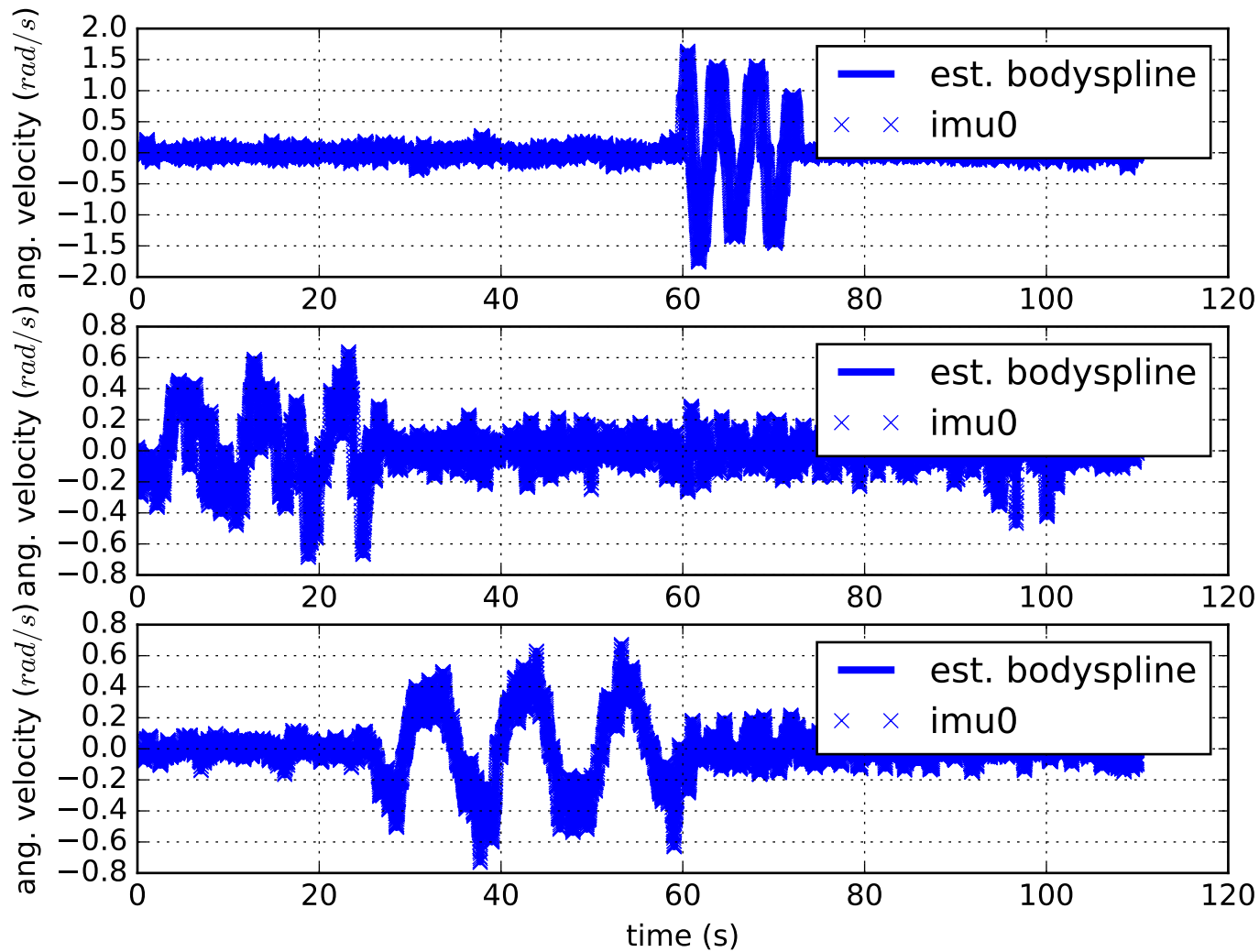
imu0: acceleration error



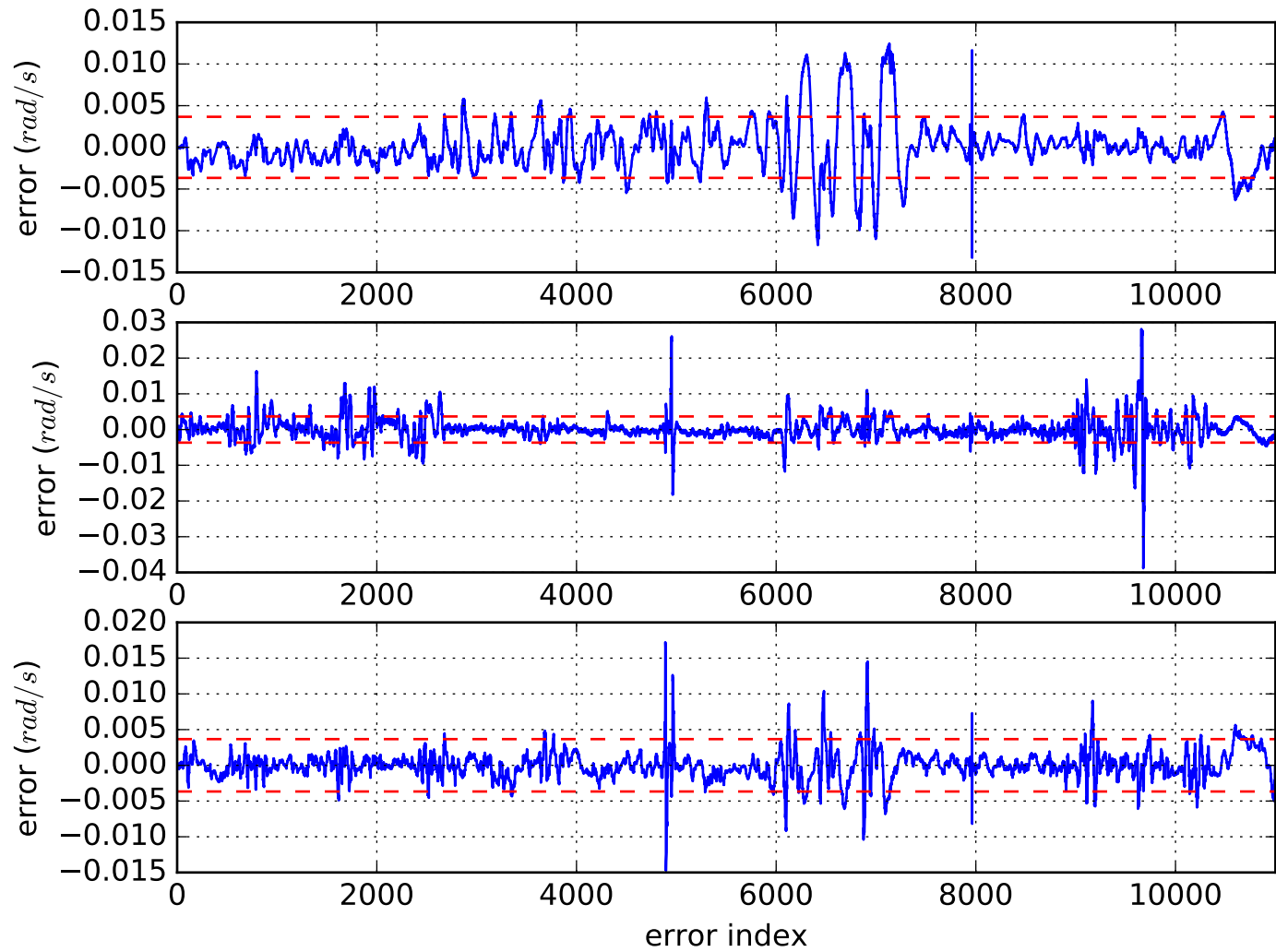
imu0: estimated accelerometer bias (imu frame)



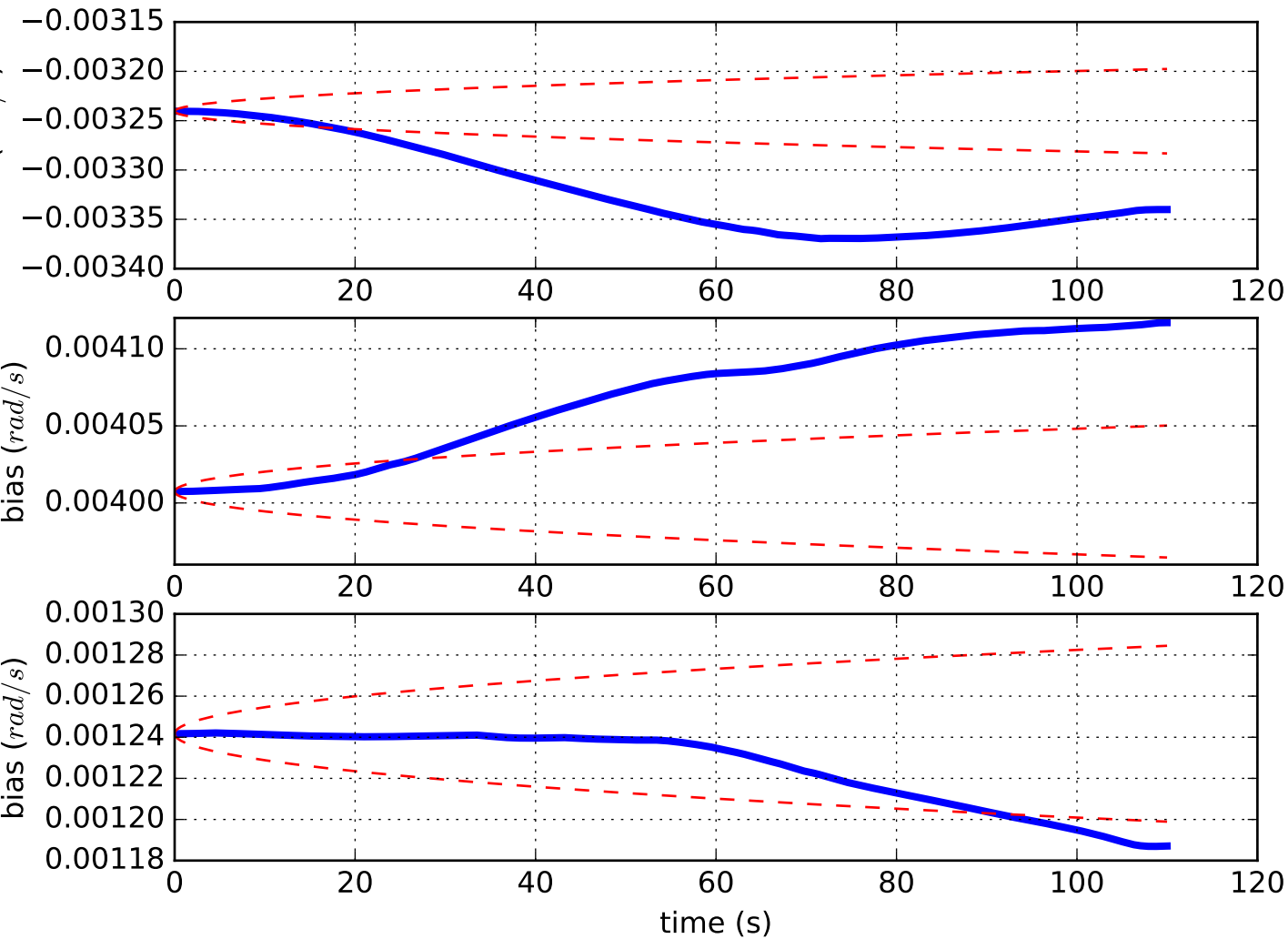
Comparison of predicted and measured angular velocities (body frame)



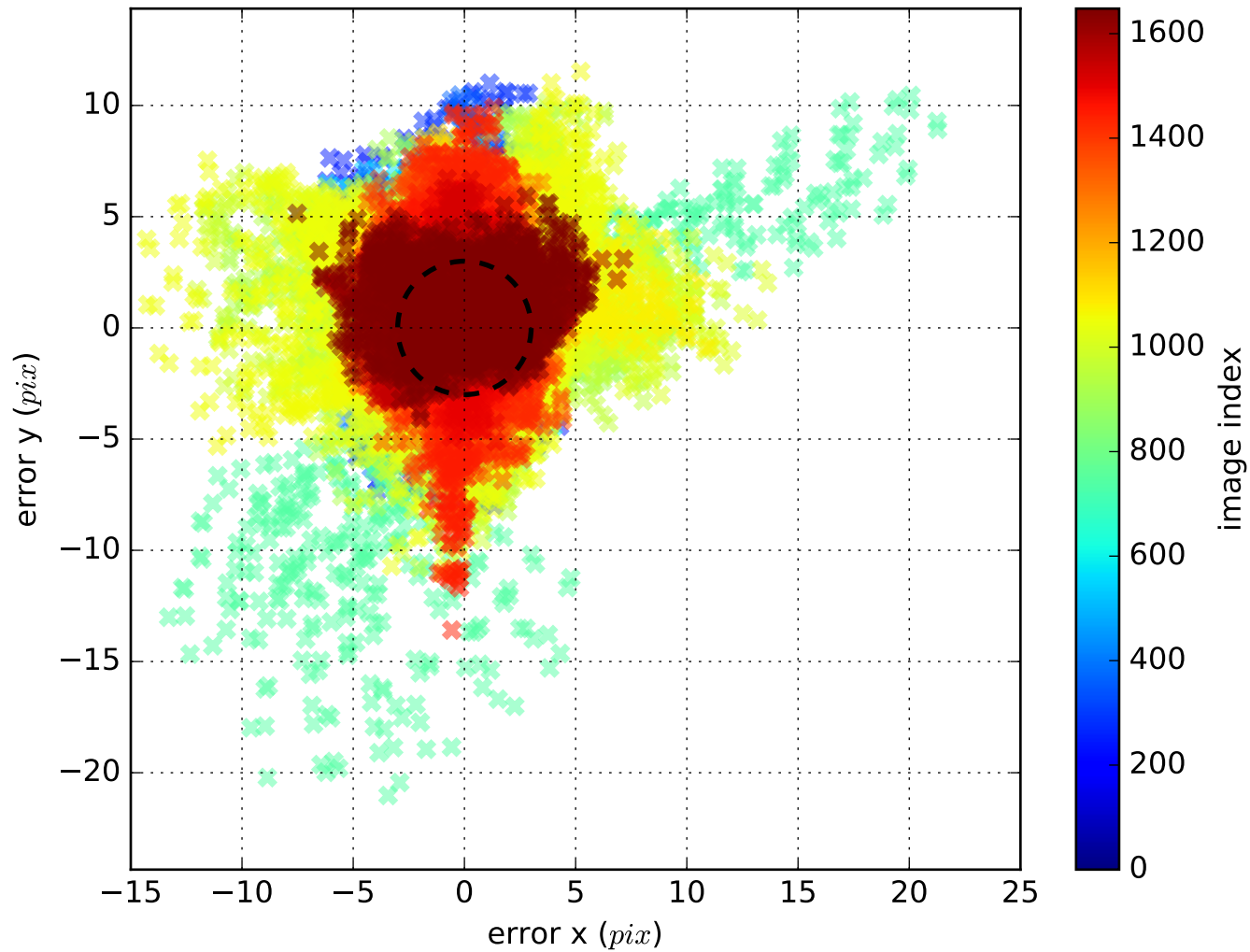
imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors



cam1: reprojection errors

