

Calibration results

Normalized Residuals

Reprojection error (cam0): mean 0.472296880481, median 0.397607714186, std: 0.326237993659

Reprojection error (cam1): mean 0.471860895758, median 0.398146372553, std: 0.351695431684

Gyroscope error (imu0): mean 10.4808054995, median 7.45856469945, std: 10.3165568908

Accelerometer error (imu0): mean 2.57962115414, median 1.97744831712, std: 2.30140499243

Residuals

Reprojection error (cam0) [px]: mean 0.472296880481, median 0.397607714186, std: 0.326237993659

Reprojection error (cam1) [px]: mean 0.471860895758, median 0.398146372553, std: 0.351695431684

Gyroscope error (imu0) [rad/s]: mean 0.0129347195958, median 0.00920486912754, std: 0.0127320147847

Accelerometer error (imu0) [m/s^2]: mean 0.0364813522197, median 0.0279653422896, std: 0.0325467815281

Transformation (cam0):

T_ci: (imu0 to cam0):

```
[[-0.99999206 -0.0000202  0.00398544 -0.06972887]
 [ 0.00398493  0.01181466  0.99992226  0.00970526]
 [-0.00006729  0.9999302 -0.01181449 -0.09834232]
 [ 0.        0.        0.        1.      ]]
```

T_ic: (cam0 to imu0):

```
[[-0.99999206  0.00398493 -0.00006729 -0.06977361]
 [-0.0000202  0.01181466  0.9999302  0.09821938]
 [ 0.00398544  0.99992226 -0.01181449 -0.01058847]
 [ 0.        0.        0.        1.      ]]
```

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

0.0263216853503

Transformation (cam1):

T_ci: (imu0 to cam1):

```
[[-0.99997826  0.00650616  0.00107095  0.07388384]
 [ 0.00116035  0.013753   0.99990475  0.0087966 ]
 [ 0.00649082  0.99988426 -0.01376025 -0.09720204]
```

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

T_ic: (cam1 to imu0):

```
[-0.99997826  0.00116035  0.00649082  0.07450294]
[ 0.00650616  0.013753   0.99988426  0.09658911]
[ 0.00107095  0.99990475 -0.01376025 -0.01021241]
[ 0.      0.      0.      1.      ]]
```

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

```
0.00729723658584
```

Baselines:

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Baseline (cam0 to cam1):

```
[ 0.99997446 -0.00283711  0.00656034  0.14428362]
[ 0.00282445  0.99999413  0.0019386 -0.00052101]
[-0.00656581 -0.00192002  0.9999766  0.00069878]
[ 0.      0.      0.      1.      ]]
baseline norm: 0.144286248806 [m]
```

Gravity vector in target coords: [m/s^2]

```
[-0.02233633 -9.64459774 -1.77472772]
```

Calibration configuration

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cam0

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Camera model: pinhole

Focal length: [579.1199420234732, 579.7881172600125]

Principal point: [365.3099294366806, 259.7575434963956]

Distortion model: radtan

Distortion coefficients: [-0.33687855290697194, 0.14112701313536435, 0.0006658466726844685, -3.9628227462547084e-06]

Type: aprilgrid

Tags:

Rows: 7

Cols: 10

Size: 0.05 [m]

Spacing 0.015 [m]

cam1

Camera model: pinhole

Focal length: [583.237806322451, 583.254416630411]

Principal point: [355.87177263648465, 261.4678724725583]

Distortion model: radtan

Distortion coefficients: [-0.32625707631675877, 0.11754680866305944, -1.5340578928203352e-05, 0.0002294609567456131]

Type: aprilgrid

Tags:

Rows: 7

Cols: 10

Size: 0.05 [m]

Spacing 0.015 [m]

IMU configuration

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IMU0:

Model: calibrated

Update rate: 200.0

Accelerometer:

 Noise density: 0.001

 Noise density (discrete): 0.0141421356237

 Random walk: 0.001

Gyroscope:

 Noise density: 8.726646e-05

 Noise density (discrete): 0.00123413411272

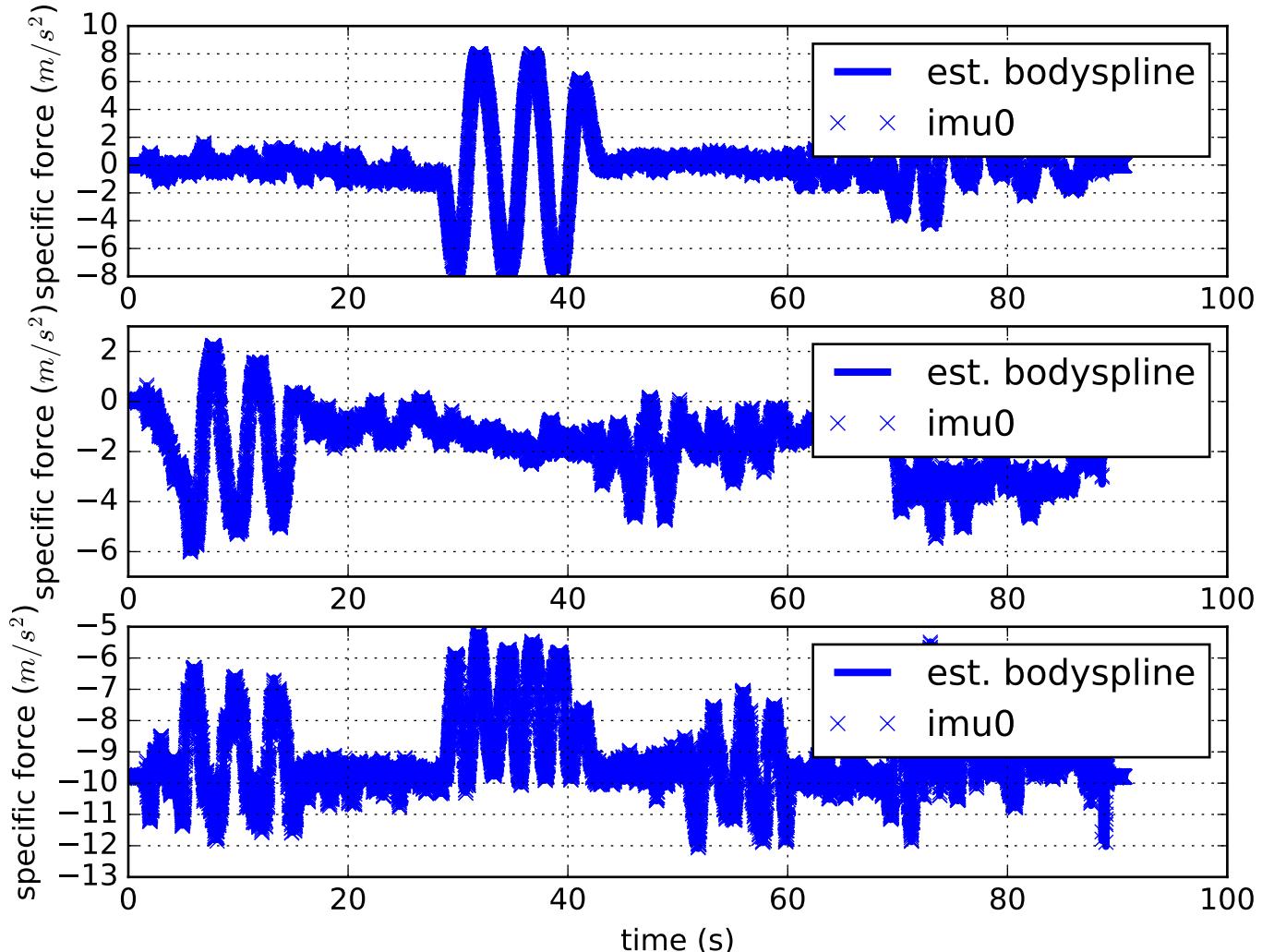
 Random walk: 2.908882e-05

T_i_b

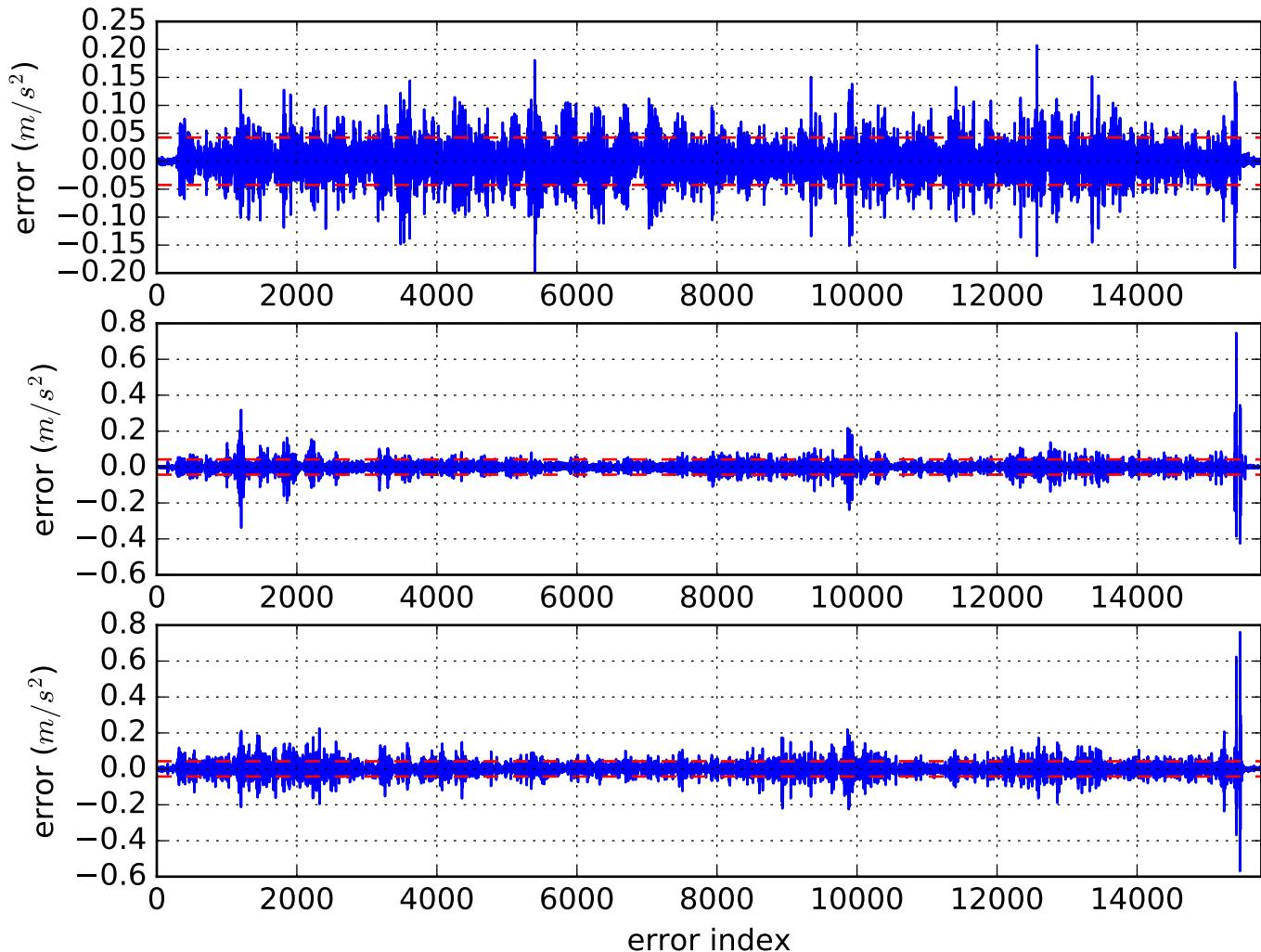
[[1. 0. 0. 0.]
[0. 1. 0. 0.]
[0. 0. 1. 0.]
[0. 0. 0. 1.]]

time offset with respect to IMU0: 0.0 [s]

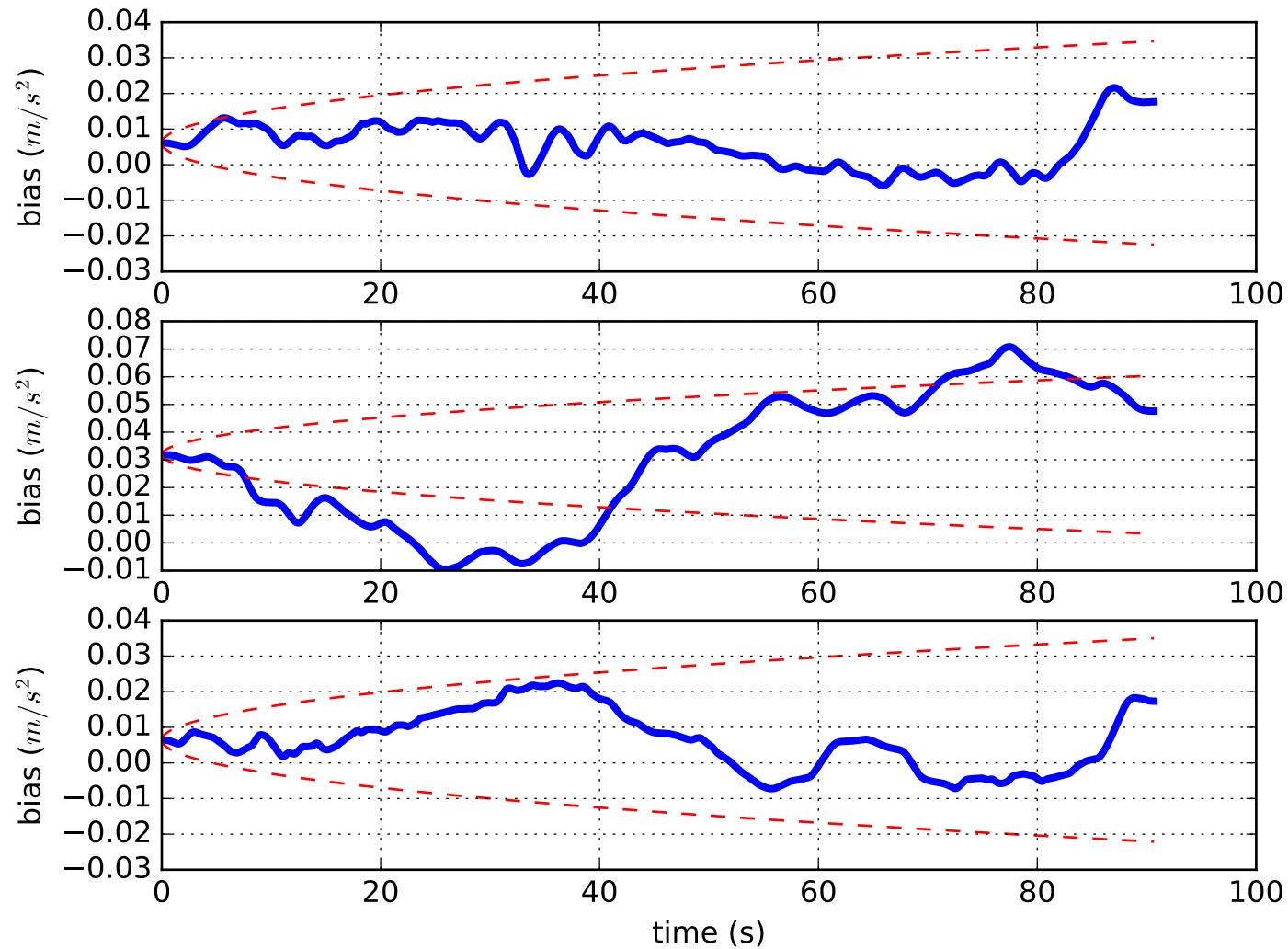
Comparison of predicted and measured specific force (imu0 frame)



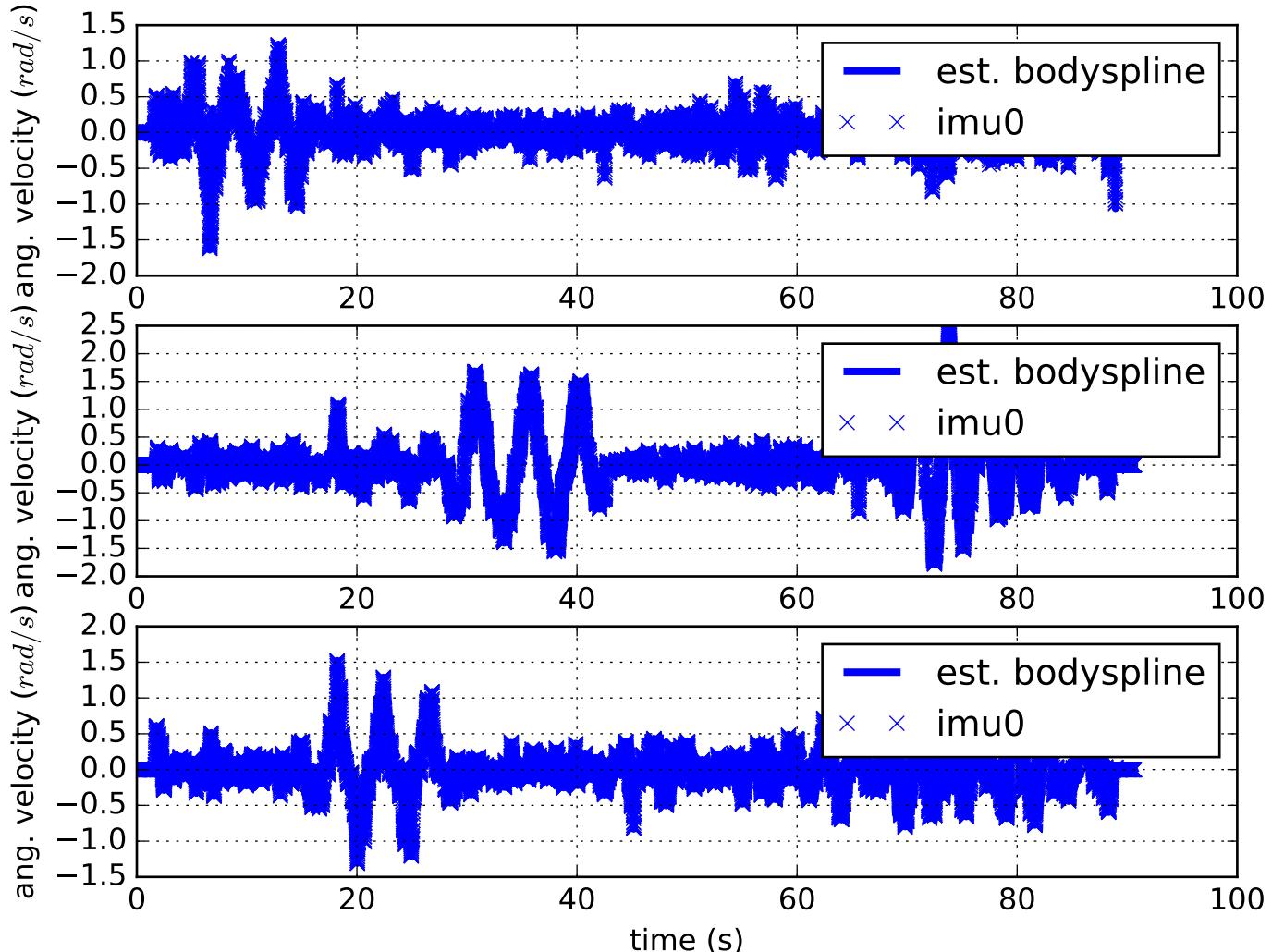
imu0: acceleration error



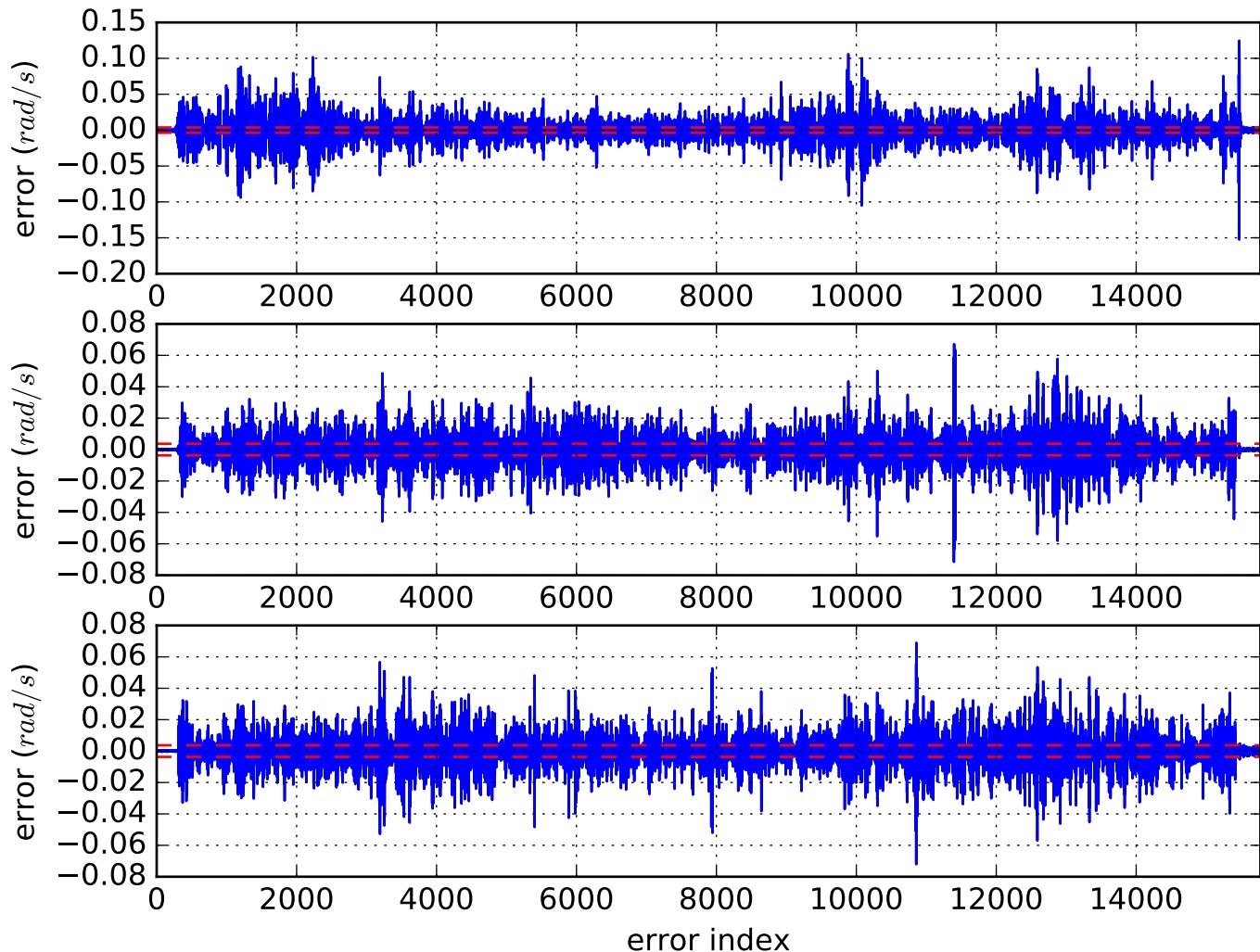
imu0: estimated accelerometer bias (imu frame)



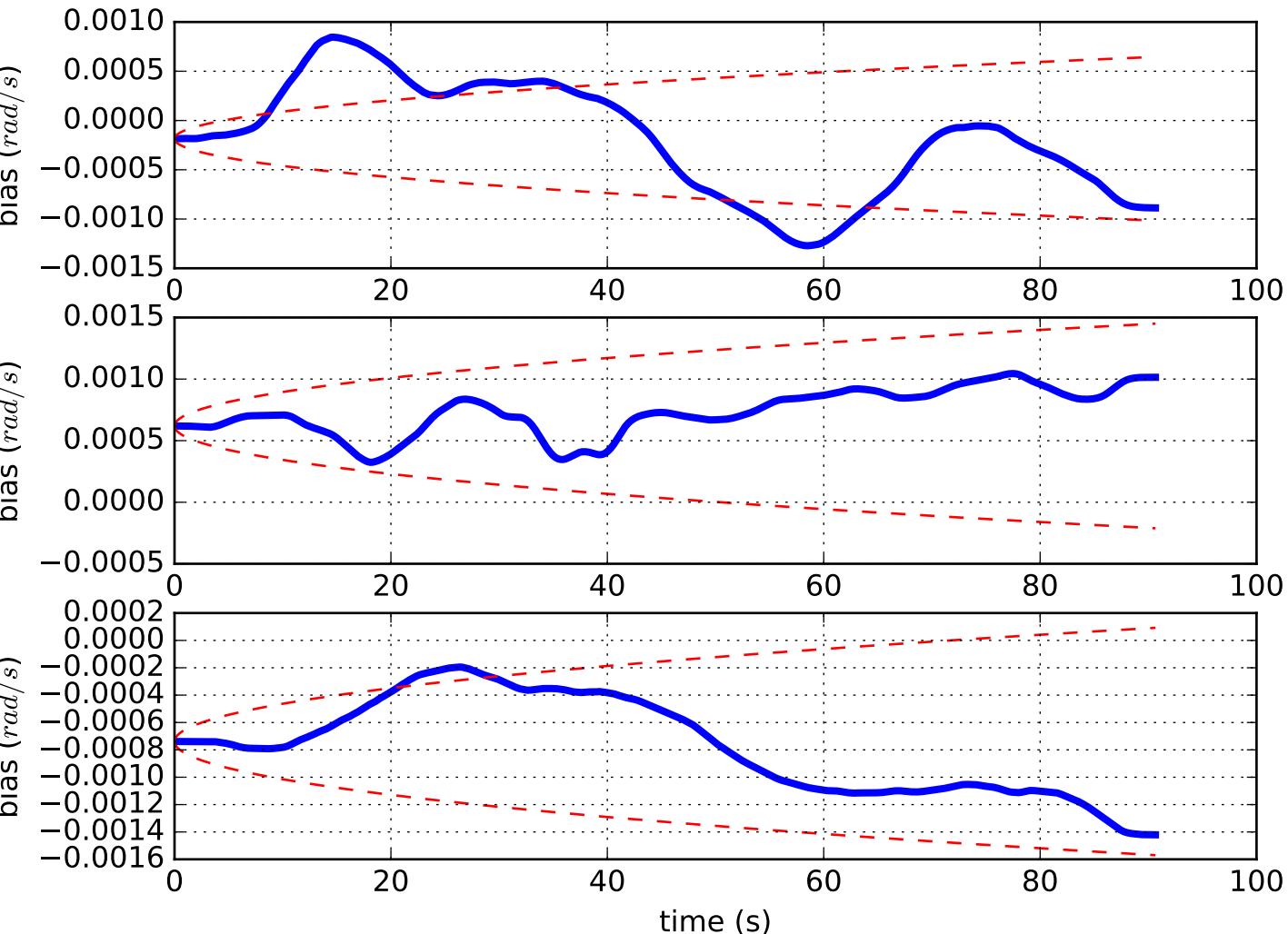
Comparison of predicted and measured angular velocities (body frame)



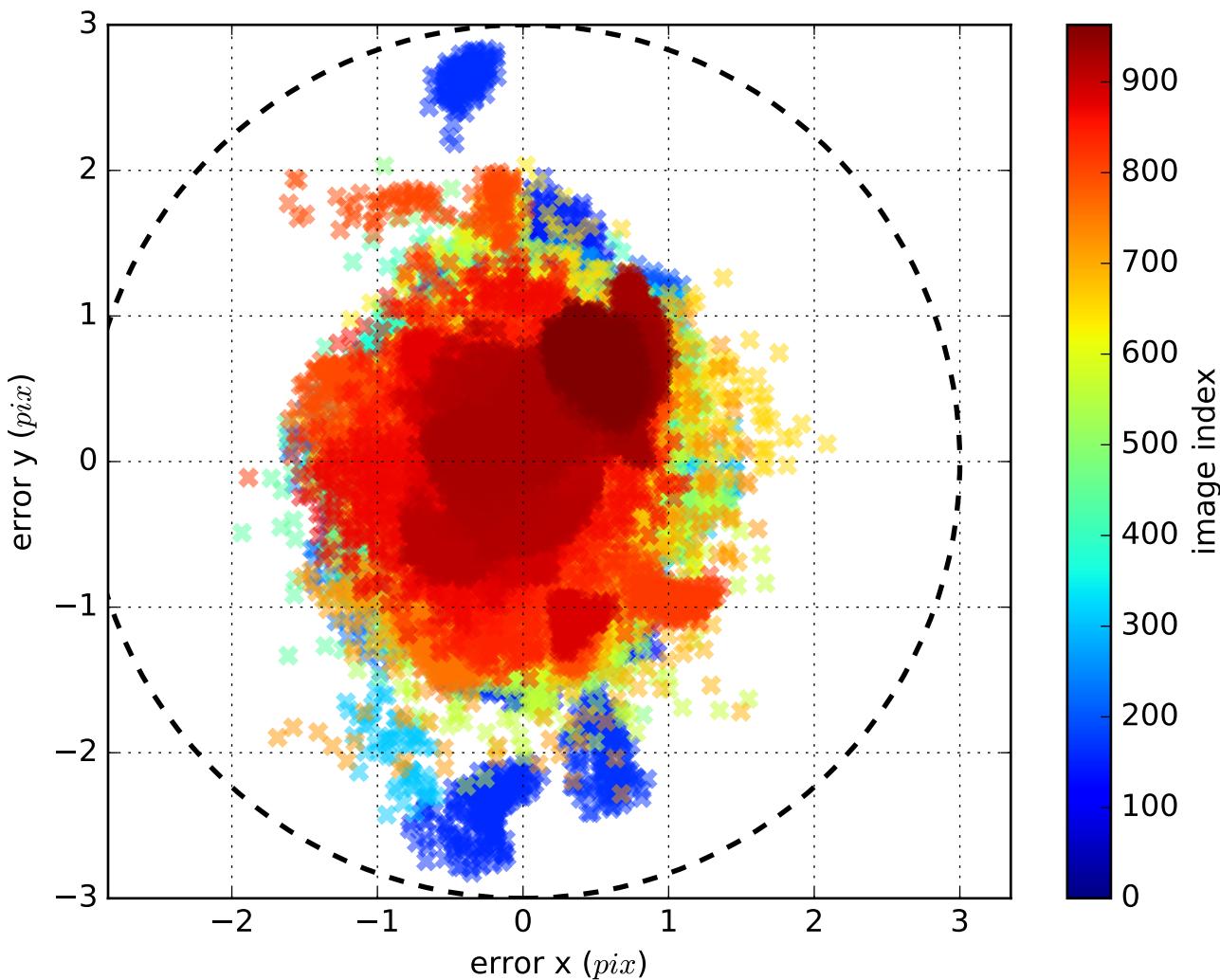
imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors



cam1: reprojection errors

