

Calibration results

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Normalized Residuals

Reprojection error (cam0): mean 0.288018002616, median 0.230298166921, std: 0.229848739896

Reprojection error (cam1): mean 0.29106775261, median 0.23122226747, std: 0.232190951319

Gyroscope error (imu0): mean 9.24665852928, median 6.40992603458, std: 9.23432184543

Accelerometer error (imu0): mean 2.37697460006, median 1.81007734322, std: 1.93490142849

Residuals

Reprojection error (cam0) [px]: mean 0.288018002616, median 0.230298166921, std: 0.229848739896

Reprojection error (cam1) [px]: mean 0.29106775261, median 0.23122226747, std: 0.232190951319

Gyroscope error (imu0) [rad/s]: mean 0.0114116167197, median 0.00791070837931, std: 0.0113963915973

Accelerometer error (imu0) [m/s^2]: mean 0.0336154971683, median 0.0255983592772, std: 0.0273636384203

Transformation (cam0):

T_ci: (imu0 to cam0):

[[-0.99994302 0.00851286 0.00644182 -0.07355531]
[0.0065185 0.00901077 0.99993816 0.00110606]
[0.00845429 0.99992317 -0.00906575 -0.08337573]
[0. 0. 0. 1.]]

T_ic: (cam0 to imu0):

[[-0.99994302 0.0065185 0.00845429 -0.07285345]
[0.00851286 0.00901077 0.99992317 0.08398552]
[0.00644182 0.99993816 -0.00906575 -0.00138802]
[0. 0. 0. 1.]]

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

0.0150948779848

Transformation (cam1):

T_ci: (imu0 to cam1):

[[-0.9999651 0.00765994 0.00333455 0.07054739]
[0.00340009 0.00855844 0.9999576 0.00175724]
[0.00763108 0.99993404 -0.00858418 -0.08393972]

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

T_ic: (cam1 to imu0):

```
[[ -0.9999651  0.00340009  0.00763108  0.07117951]
 [ 0.00765994  0.00855844  0.99993404  0.08337876]
 [ 0.00333455  0.9999576 -0.00858418 -0.00271297]
 [ 0.      0.      0.      1.      ]]
```

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

```
0.0275962466431
```

Baselines:

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Baseline (cam0 to cam1):

```
[[ 0.99999481 -0.0031149 -0.00082487  0.14403699]
 [ 0.00311451  0.99999504 -0.00047884  0.00084036]
 [ 0.00082636  0.00047627  0.99999955 -0.00050378]
 [ 0.      0.      0.      1.      ]]
baseline norm: 0.144040326724 [m]
```

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

```
[-0.00218197 -9.6476654 -1.75811558]
```

Calibration configuration

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cam0

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Camera model: pinhole

Focal length: [293.6507710755137, 293.61243873620003]

Principal point: [179.32970967122912, 130.98717512540065]

Distortion model: radtan

Distortion coefficients: [-0.33321172257319404, 0.12166801905667117, -0.00039907016454379825, 0.00046009159935012637]

Type: aprilgrid

Tags:

Rows: 7

Cols: 10

Size: 0.05 [m]

Spacing 0.015 [m]

cam1

Camera model: pinhole

Focal length: [295.20707667053125, 295.3775739835365]

Principal point: [177.1232538604862, 132.1753053720428]

Distortion model: radtan

Distortion coefficients: [-0.33327820112860845, 0.12213796944379673, -0.0003147983697269987, 0.0005161897491202098]

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

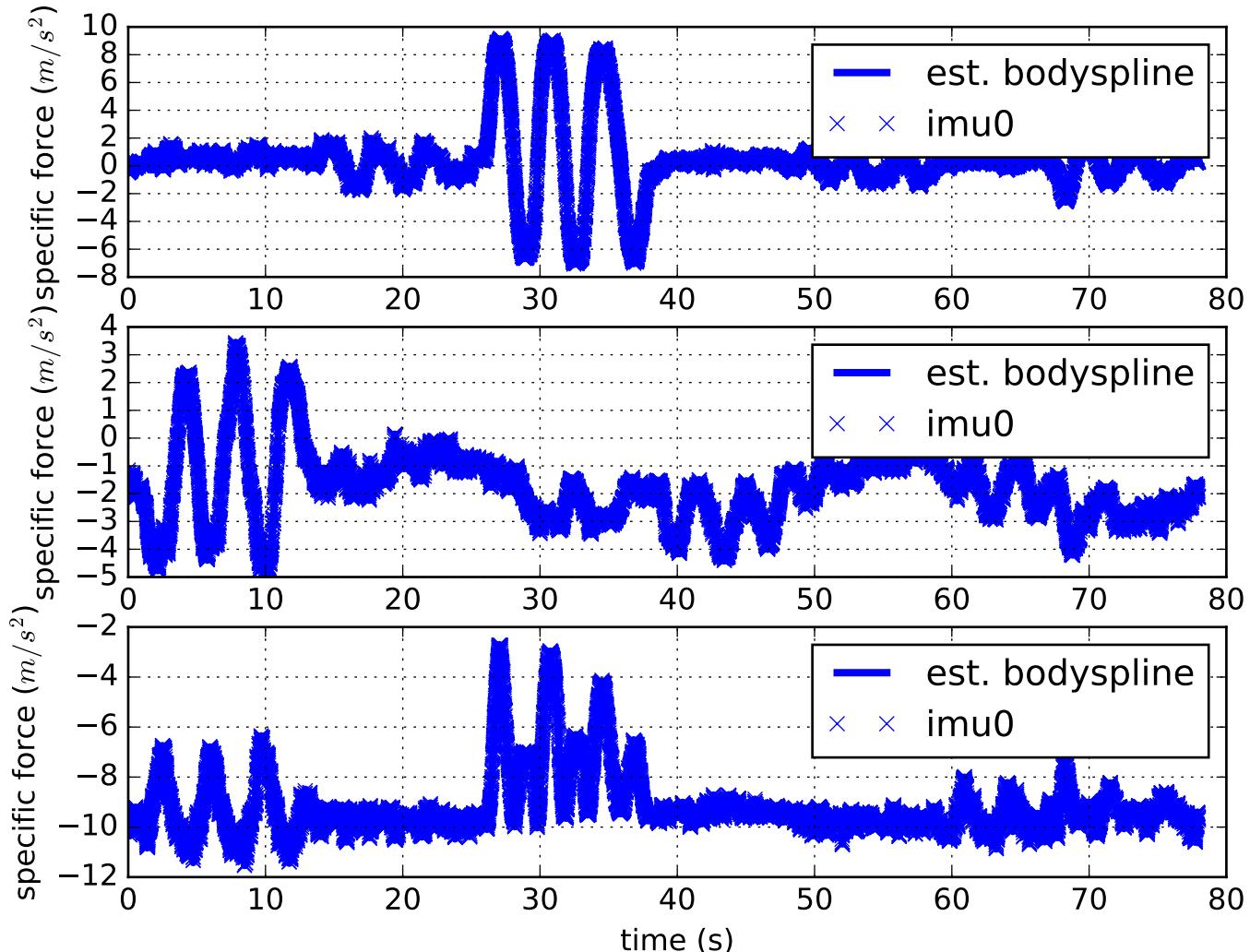
 Random walk: 2.908882e-05

T_i_b

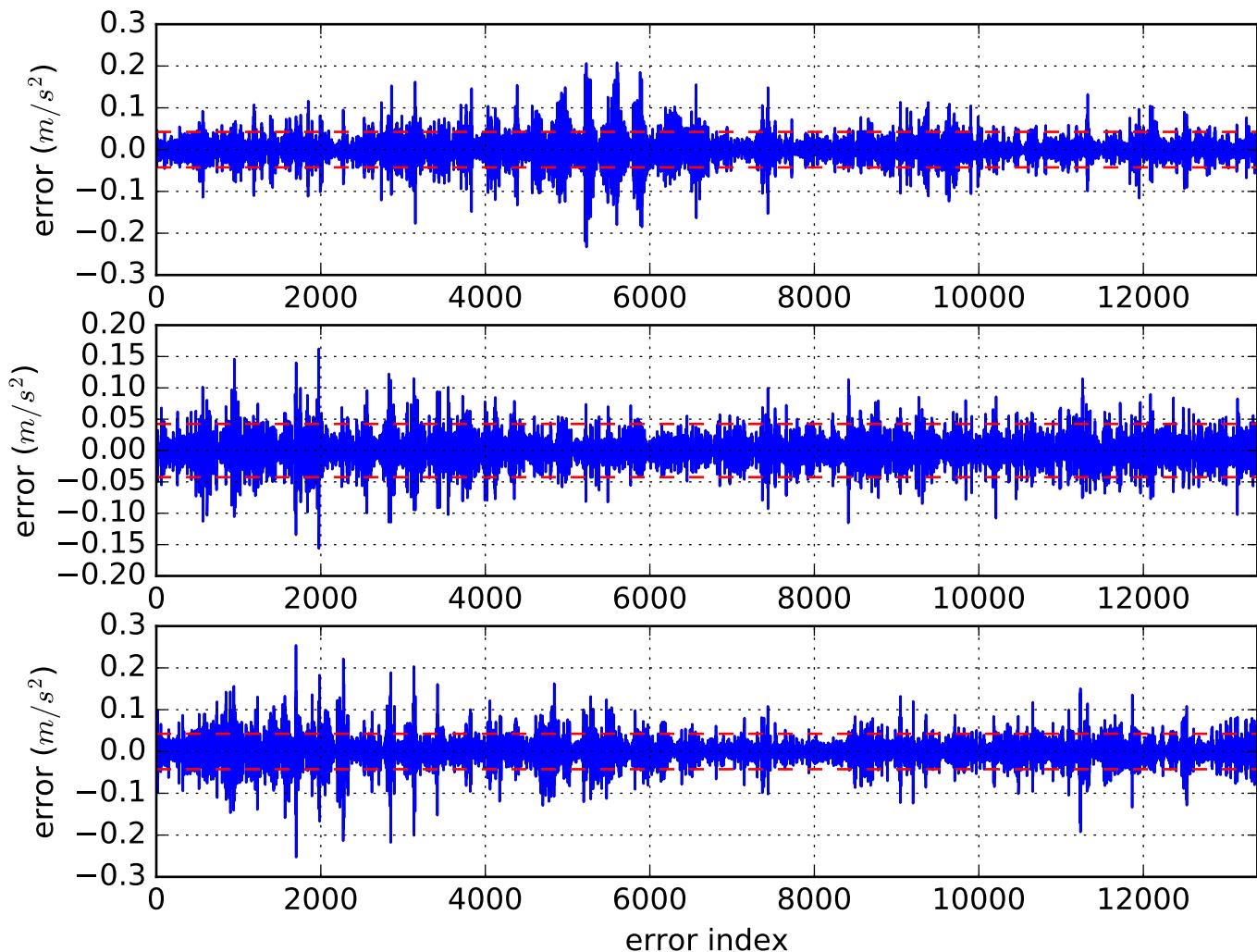
[[1. 0. 0. 0.]
 [0. 1. 0. 0.]
 [0. 0. 1. 0.]
 [0. 0. 0. 1.]]

time offset with respect to IMU0: 0.0 [s]

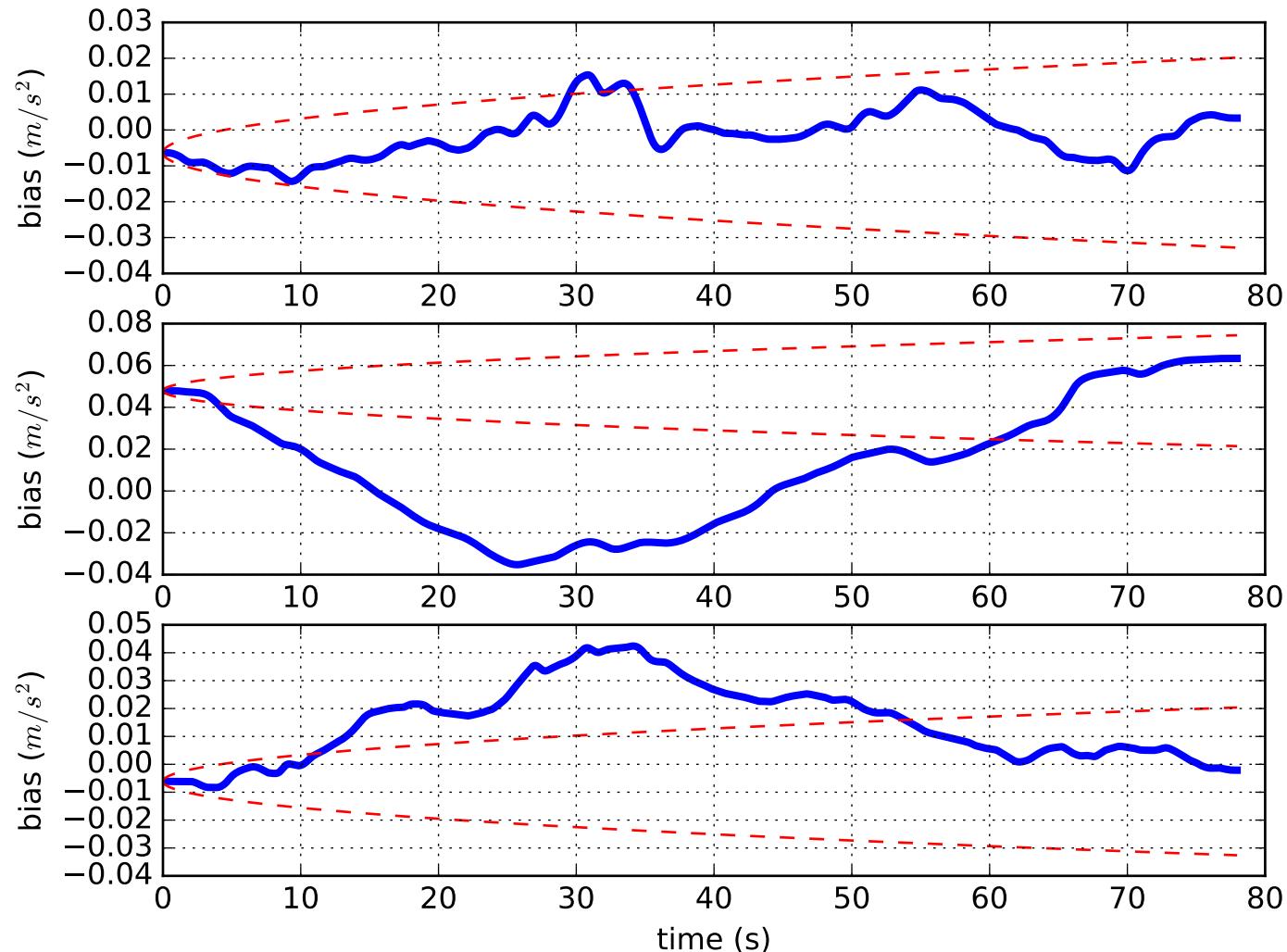
Comparison of predicted and measured specific force (imu0 frame)



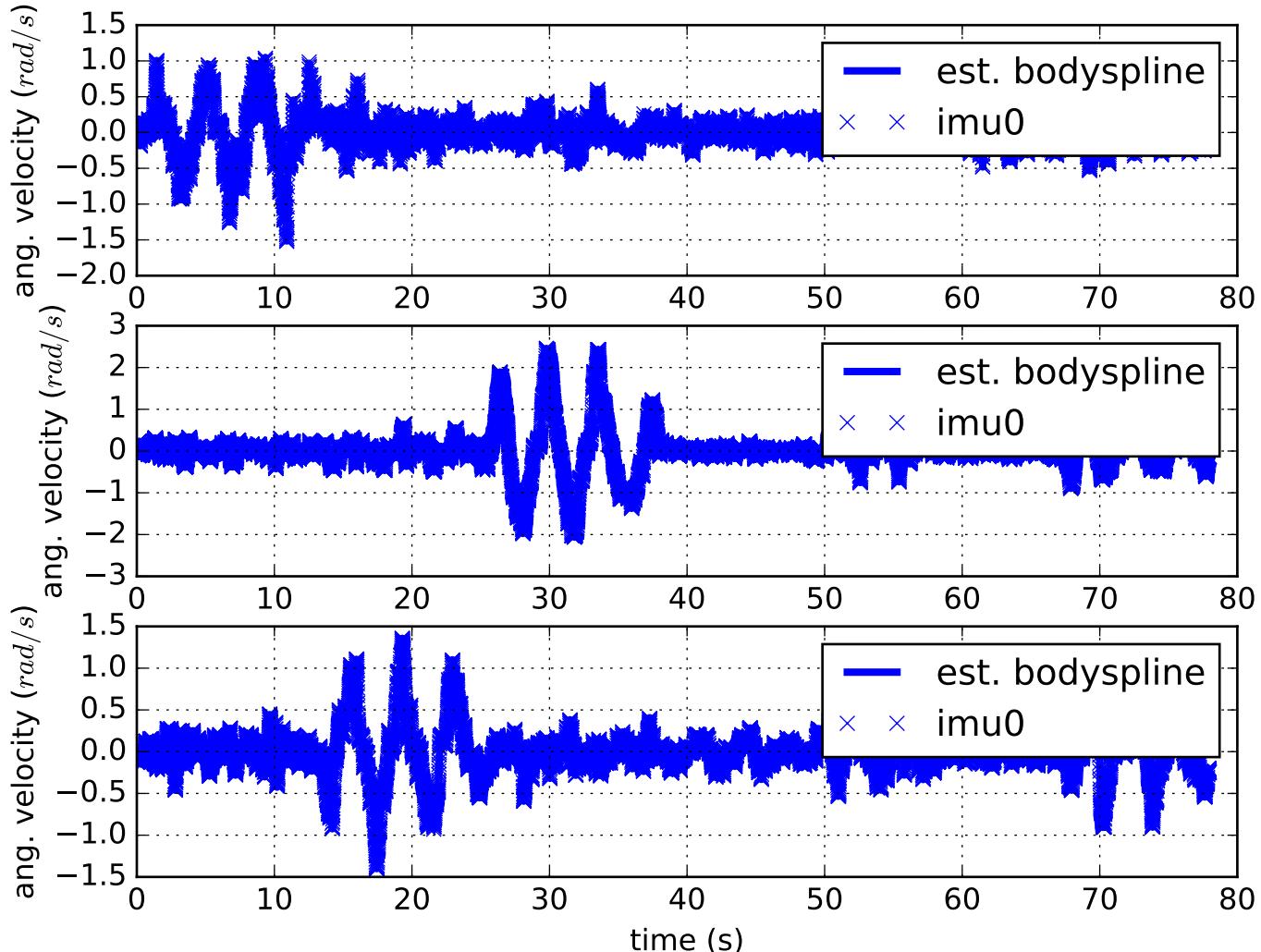
imu0: acceleration error



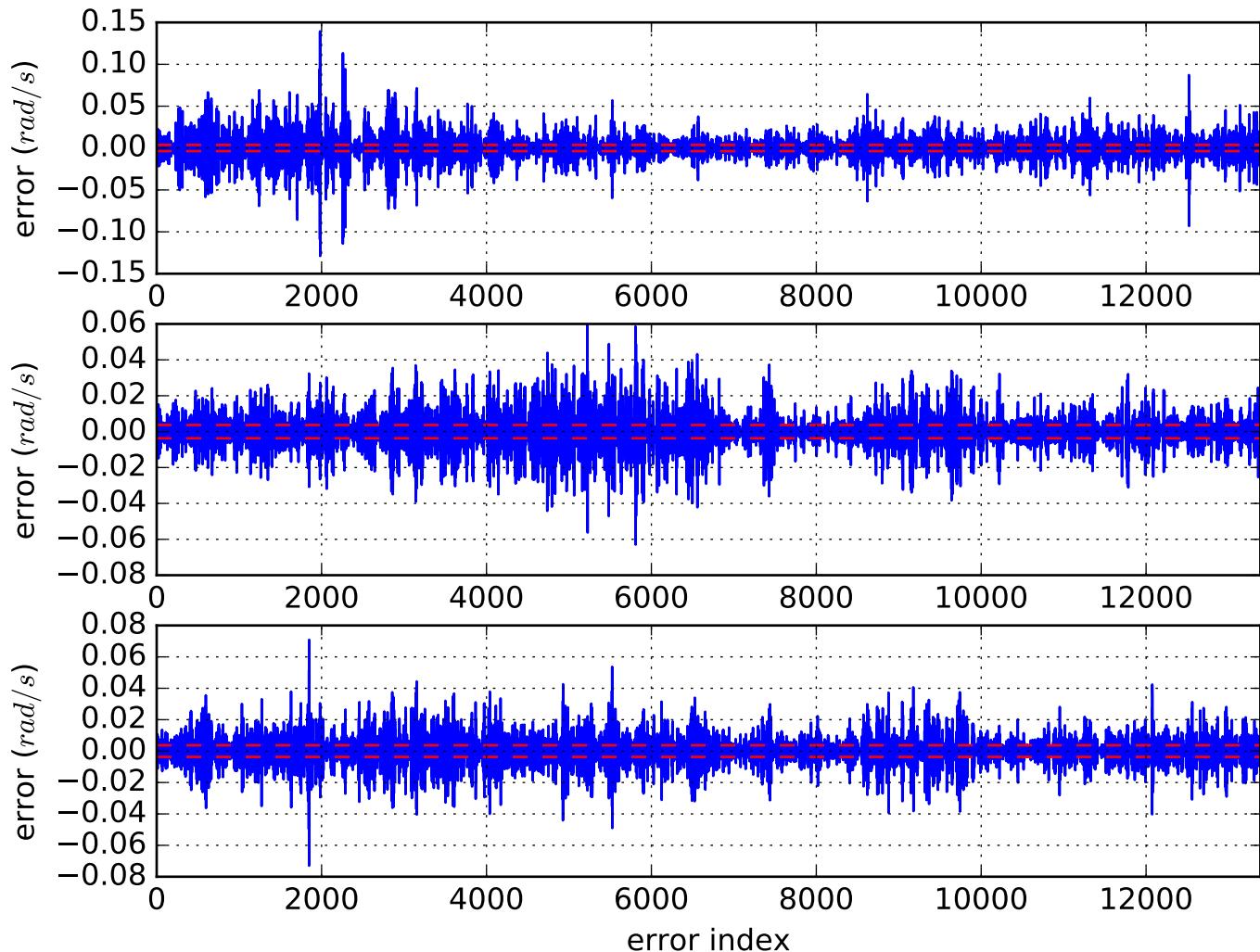
imu0: estimated accelerometer bias (imu frame)



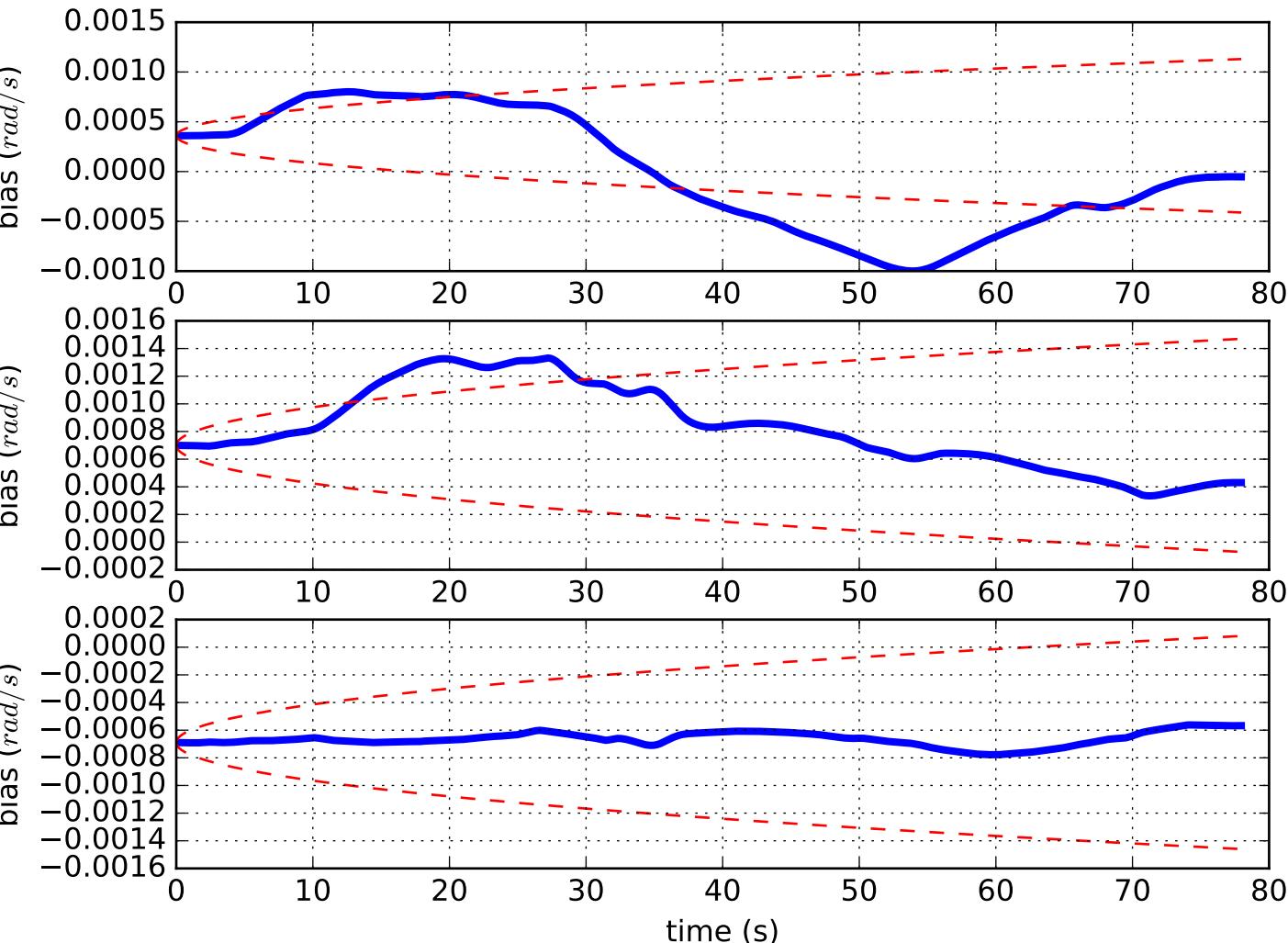
Comparison of predicted and measured angular velocities (body frame)



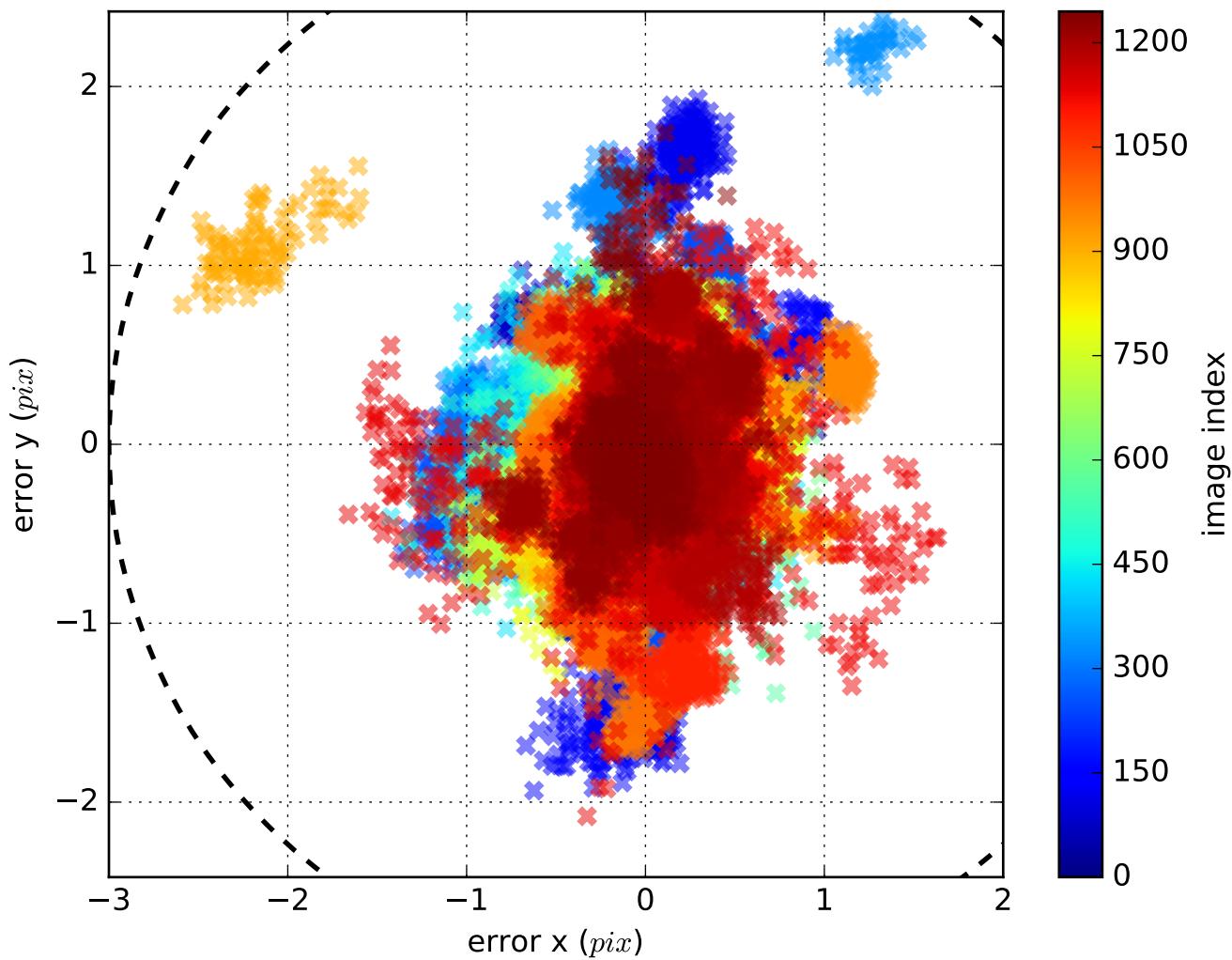
imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors



cam1: reprojection errors

