

Calibration results

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Normalized Residuals

Reprojection error (cam0): mean 0.377859742579, median 0.321270229635, std: 0.255014934423
Reprojection error (cam1): mean 0.393170651218, median 0.333383213417, std: 0.264777872655
Gyroscope error (imu0): mean 1.09311670193, median 0.985857944348, std: 0.604982310672
Accelerometer error (imu0): mean 1.40308782575, median 1.23304987293, std: 0.901591923196

Residuals

Reprojection error (cam0) [px]: mean 0.377859742579, median 0.321270229635, std: 0.255014934423
Reprojection error (cam1) [px]: mean 0.393170651218, median 0.333383213417, std: 0.264777872655
Gyroscope error (imu0) [rad/s]: mean 0.00262308390923, median 0.00236570176454, std: 0.00145173828347
Accelerometer error (imu0) [m/s^2]: mean 0.0396853166475, median 0.0348759170675, std: 0.0255008705102

Transformation (cam0):

T_ci: (imu0 to cam0):

```
[[ 0.01490974  0.99969875 -0.01949628  0.06884725]
 [-0.99988533  0.01495855  0.0023602 -0.0157336 ]
 [ 0.00265112  0.01945885  0.99980714 -0.00564435]
 [ 0.          0.          0.          1.          ]]
```

T_ic: (cam0 to imu0):

```
[[ 0.01490974 -0.99988533  0.00265112 -0.01674333]
 [ 0.99969875  0.01495855  0.01945885 -0.06848132]
 [-0.01949628  0.0023602  0.99980714  0.00702266]
 [ 0.          0.          0.          1.          ]]
```

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

0.0

Transformation (cam1):

T_ci: (imu0 to cam1):

```
[[ 0.01262721  0.99971091 -0.02046112 -0.04126561]
 [-0.99977947  0.01296617  0.01651923 -0.01524196]
 [ 0.01677975  0.02024802  0.99965417 -0.0057608 ]]
```

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

T_ic: (cam1 to imu0):

```
[[ 0.01262721 -0.99977947 0.01677975 -0.01462087]
```

```
[ 0.99971091 0.01296617 0.02024802 0.04156795]
```

```
[-0.02046112 0.01651923 0.99965417 0.00516625]
```

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

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

0.0

Baselines:

Baseline (cam0 to cam1):

```
[[ 0.99999693 0.00228018 -0.00097048 -0.11008225]
```

```
[-0.00226625 0.99989777 0.01411781 0.00072574]
```

```
[ 0.00100257 -0.01411557 0.99989987 -0.00040813]
```

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

baseline norm: 0.110085395257 [m]

Gravity vector in target coords: [m/s²]

```
[-0.01145758 -9.55733473 -2.19673496]
```

Calibration configuration

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cam0

Camera model: omni

Focal length: [1299.9803892853524, 1296.8705432926204]

Principal point: [365.666175540415, 248.45351471997532]

Omni xi: 1.83133780002

Distortion model: none

Distortion coefficients: []

Type: aprilgrid

Tags:

Rows: 6

Cols: 6

Size: 0.088 [m]
Spacing 0.0264 [m]

cam1

Camera model: omni
Focal length: [1293.8577977970856, 1290.624632696435]
Principal point: [379.03469014137886, 255.1143733203042]
Omni xi: 1.82444444466
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

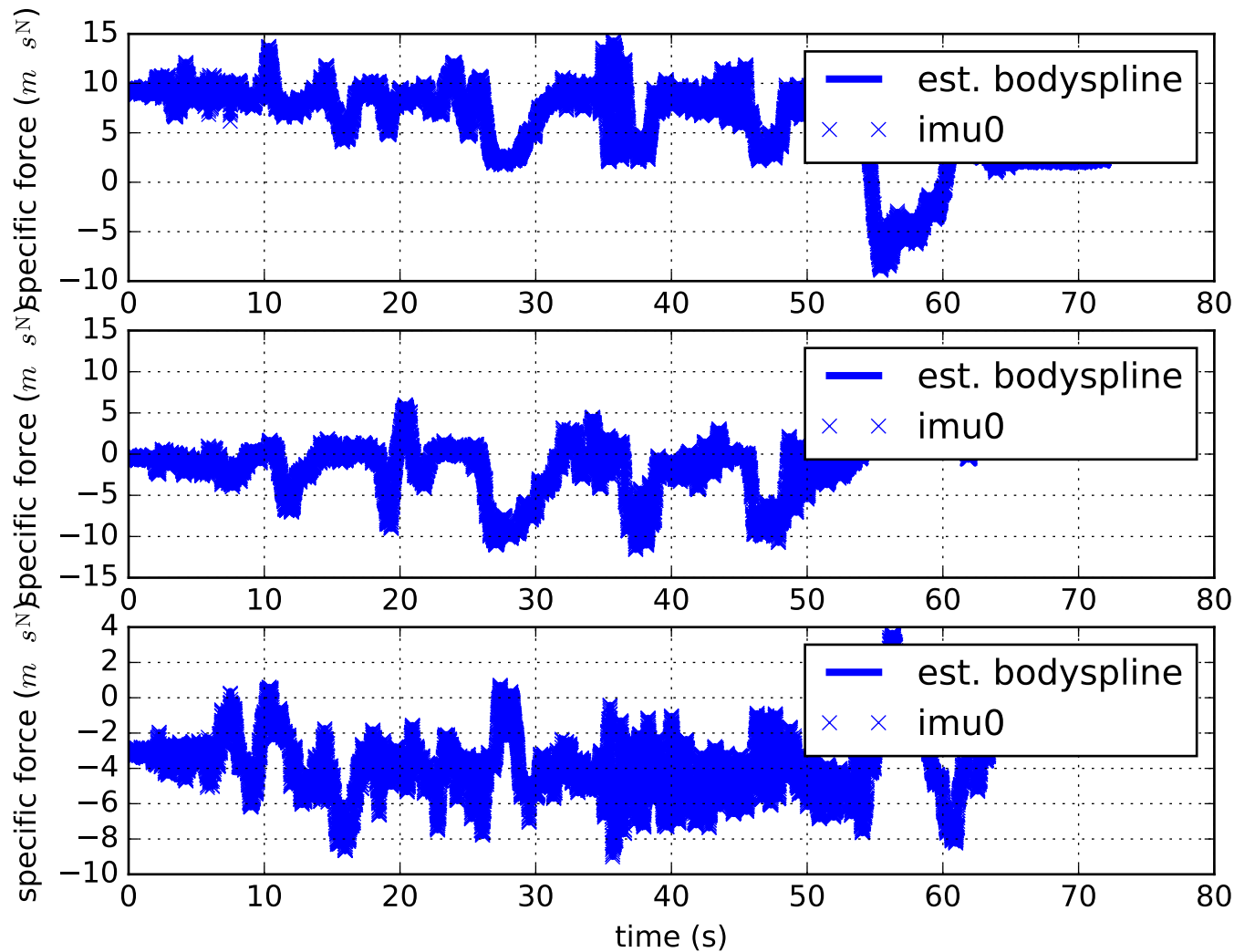
T_i_b

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

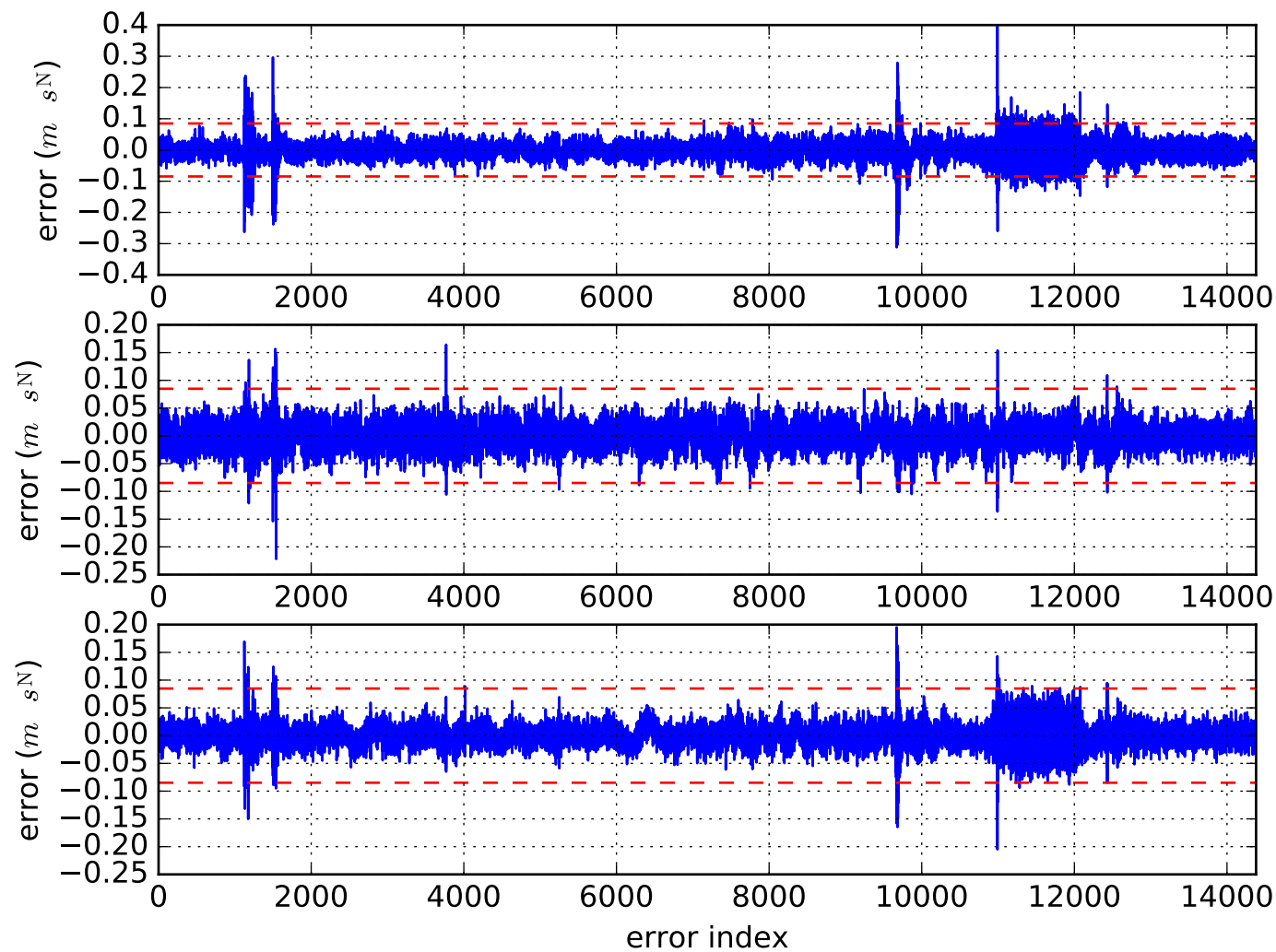
[0. 0. 0. 1.]

time offset with respect to IMU0: 0.0 [s]

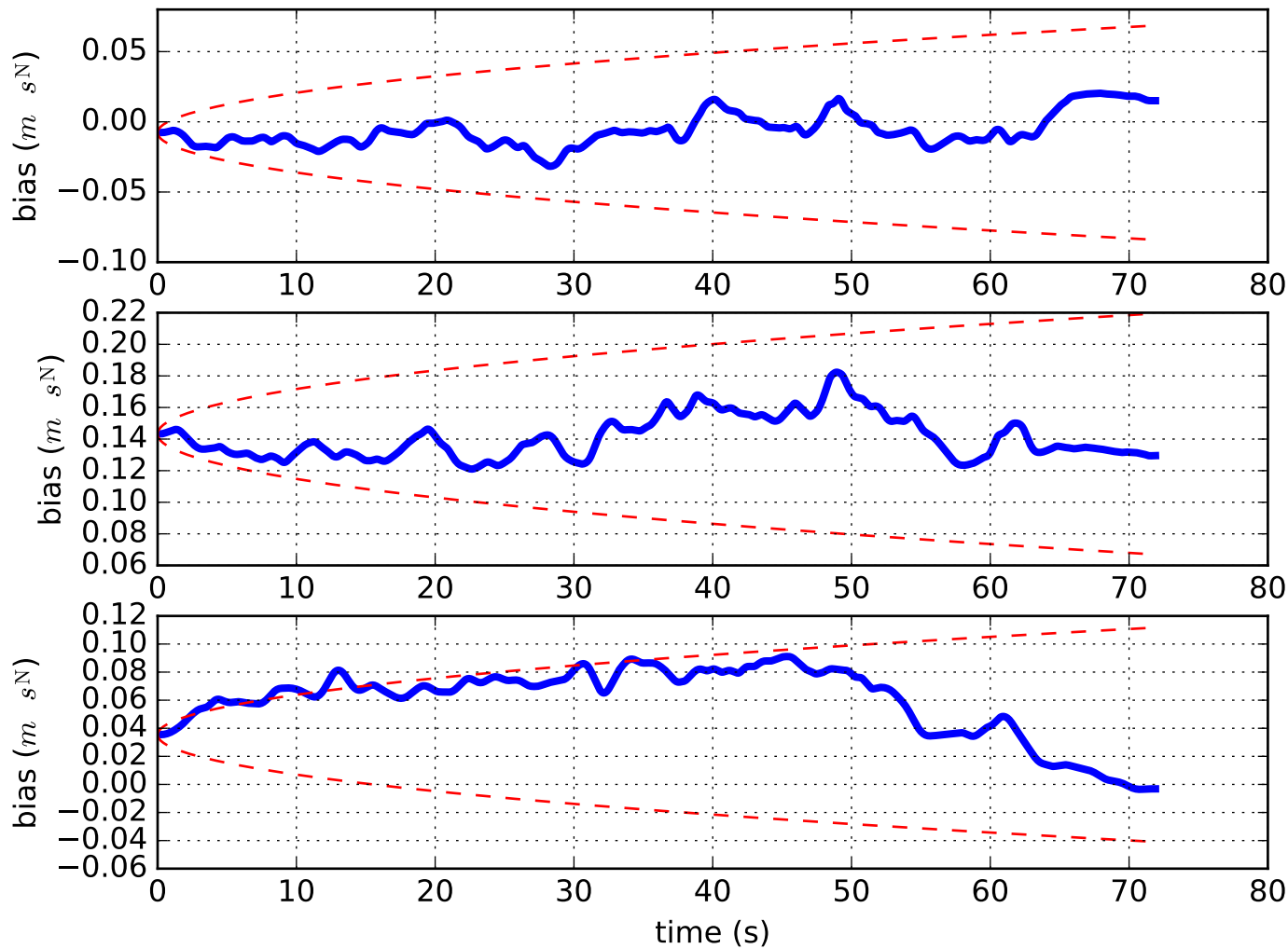
Comparison of predicted and measured specific force (imu0 frame)



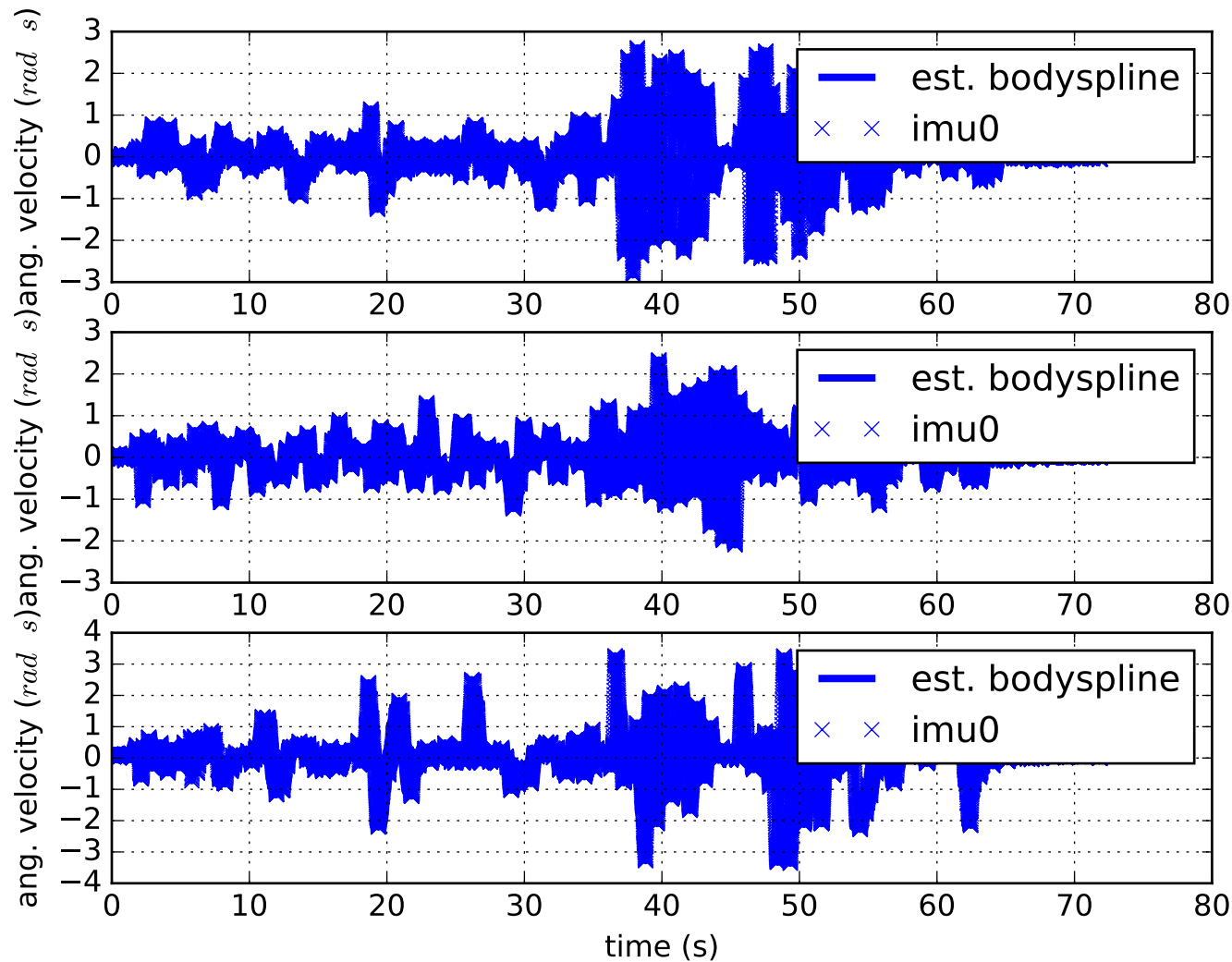
imu0: acceleration error



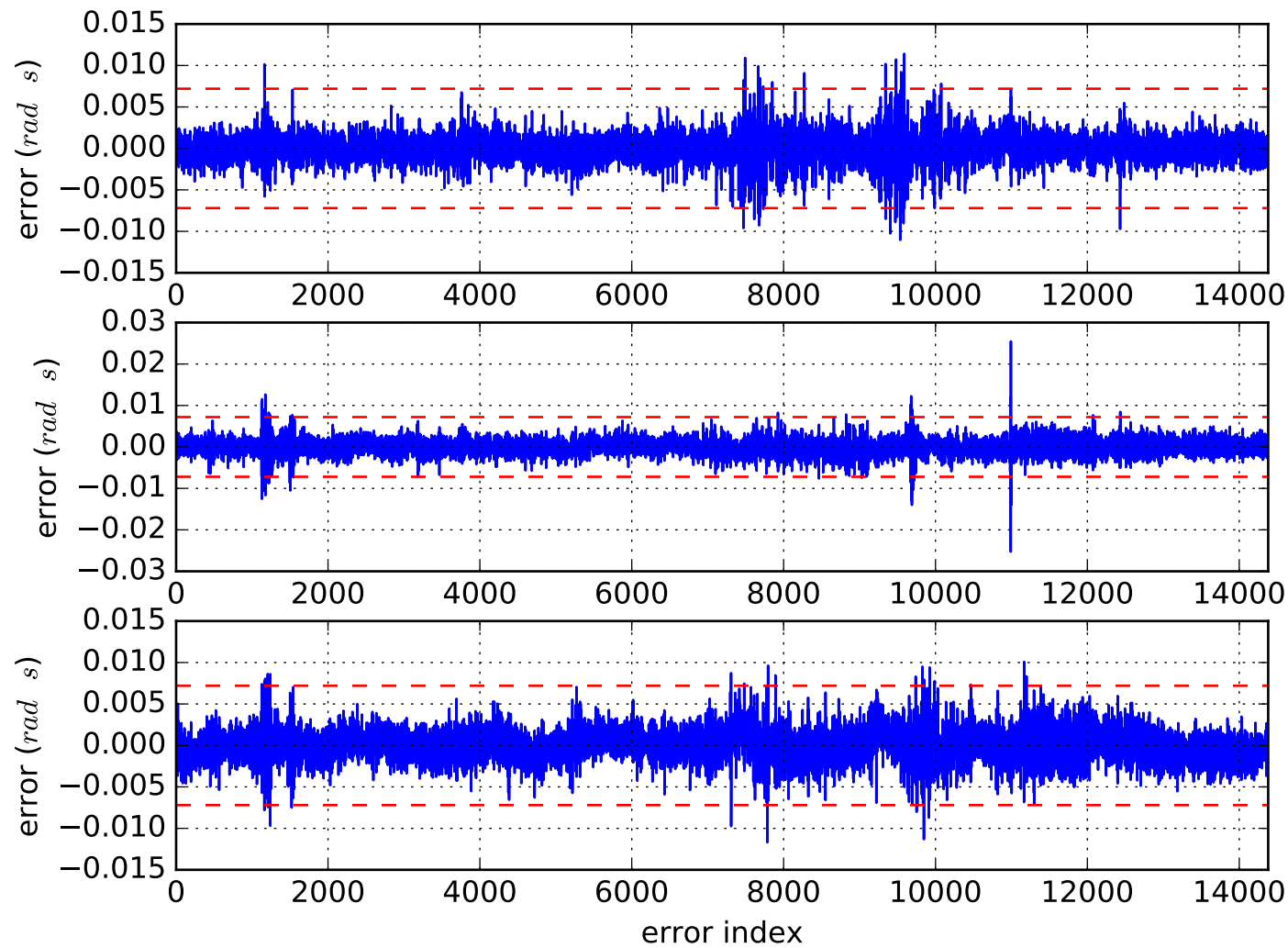
imu0: estimated accelerometer bias (imu frame)



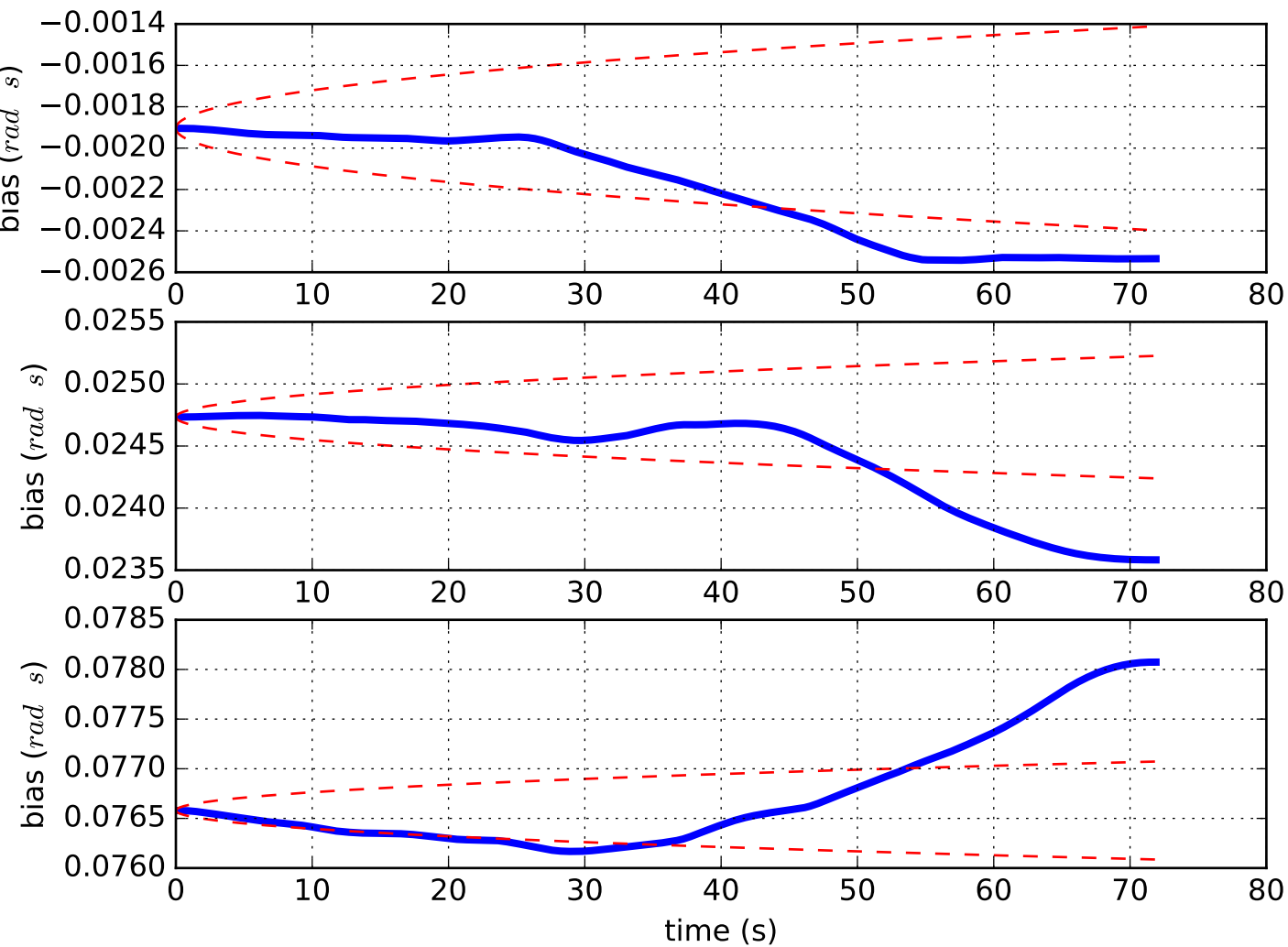
Comparison of predicted and measured angular velocities (body frame)



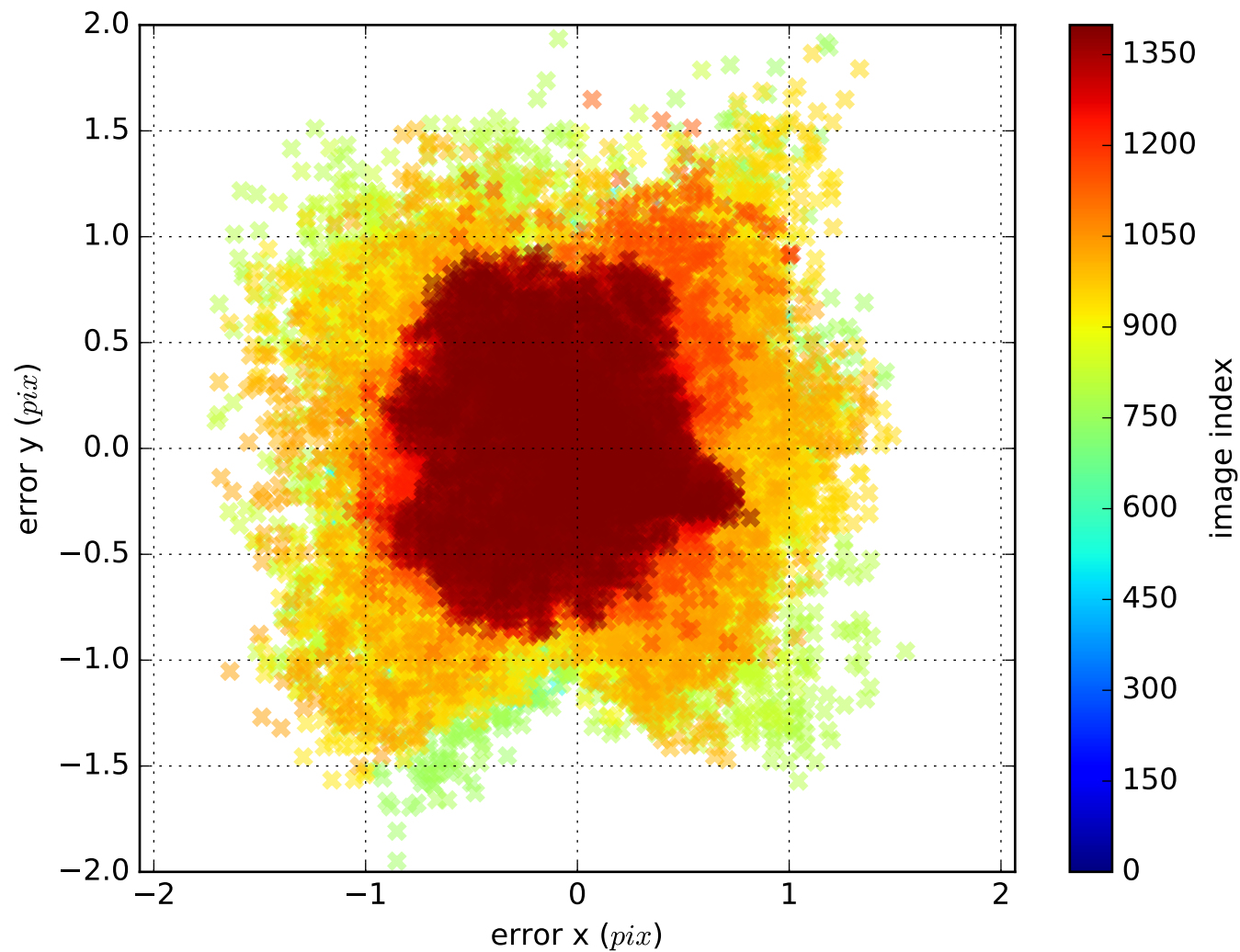
imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors



cam1: reprojection errors

