

## Calibration results

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### Normalized Residuals

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Reprojection error (cam0): mean 0.29449129405, median 0.261180771999, std: 0.184178530449

Gyroscope error (imu0): mean 0.244396506703, median 0.183344405421, std: 0.200305906632

Accelerometer error (imu0): mean 0.508492327471, median 0.465230774895, std: 0.280783317749

### Residuals

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Reprojection error (cam0) [px]: mean 0.29449129405, median 0.261180771999, std: 0.184178530449

Gyroscope error (imu0) [rad/s]: mean 0.0244396506703, median 0.0183344405421, std: 0.0200305906632

Accelerometer error (imu0) [m/s<sup>2</sup>]: mean 0.101698465494, median 0.0930461549789, std: 0.0561566635497

### Transformation (cam0):

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T\_ci: (imu0 to cam0):

[[ 0.00913099 0.99991692 0.00909838 -0.03392602]

[-0.01221164 -0.00898658 0.99988505 -0.01121522]

[ 0.99988374 -0.00924104 0.01212857 -0.30857458]

[ 0. 0. 0. 1. ]]

T\_ic: (cam0 to imu0):

[[ 0.00913099 -0.01221164 0.99988374 0.30871153]

[ 0.99991692 -0.00898658 -0.00924104 0.03097086]

[ 0.00909838 0.99988505 0.01212857 0.01526517]

[ 0. 0. 0. 1. ]]

timeshift cam0 to imu0: [s] (t\_imu = t\_cam + shift)

-0.0114635408429

Gravity vector in target coords: [m/s<sup>2</sup>]

[ 0.09636915 -9.69488116 -1.47255398]

### Calibration configuration

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cam0

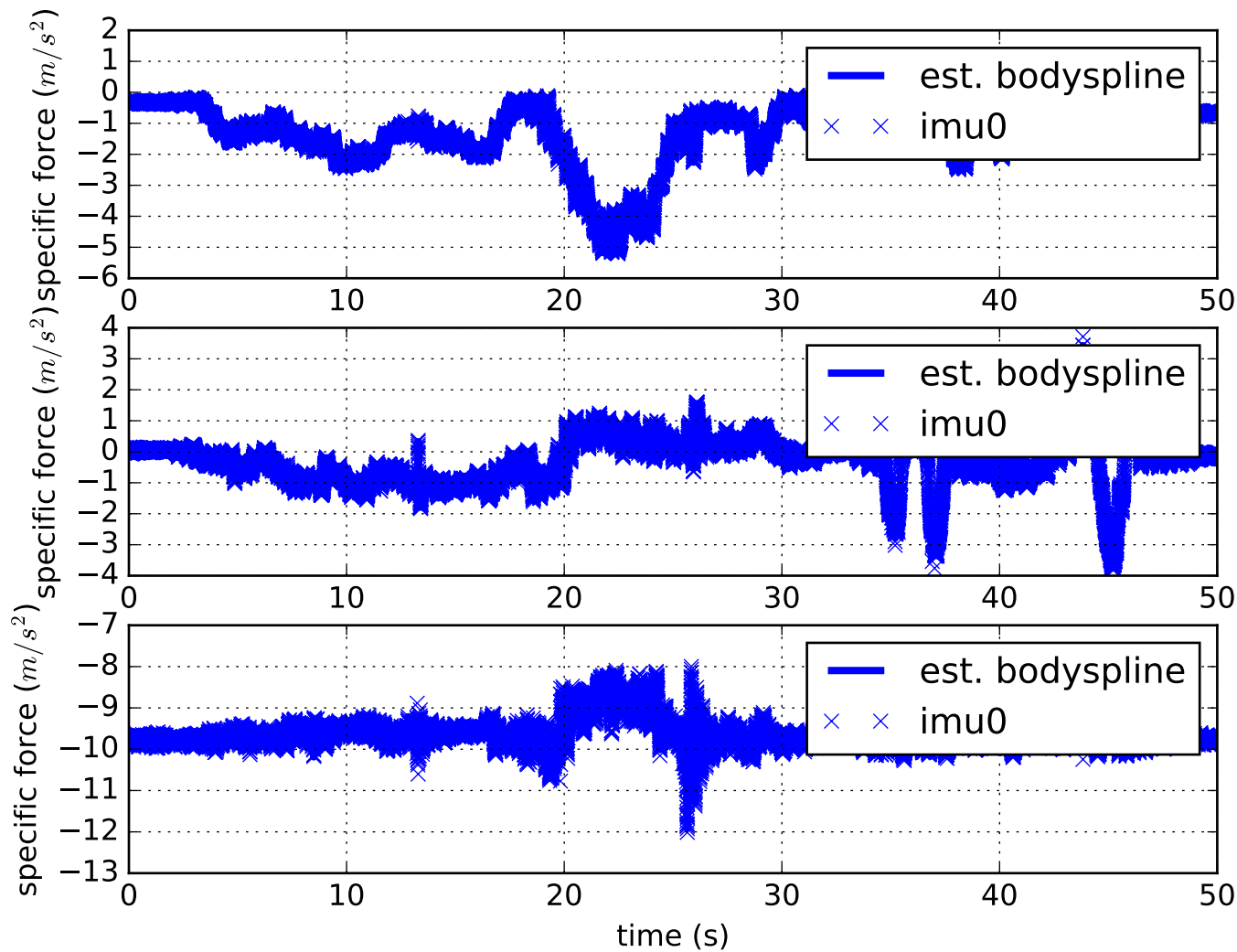
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Camera model: pinhole  
Focal length: [859.3439686221952, 858.474721003607]  
Principal point: [646.7408841989316, 523.7896653375846]  
Distortion model: equidistant  
Distortion coefficients: [-0.03296527751484443, 0.04097100702363113, -0.07384725316720045, 0.04425672598228086]  
Type: aprilgrid  
Tags:  
  Rows: 6  
  Cols: 6  
  Size: 0.083 [m]  
  Spacing 0.0249 [m]

IMU configuration  
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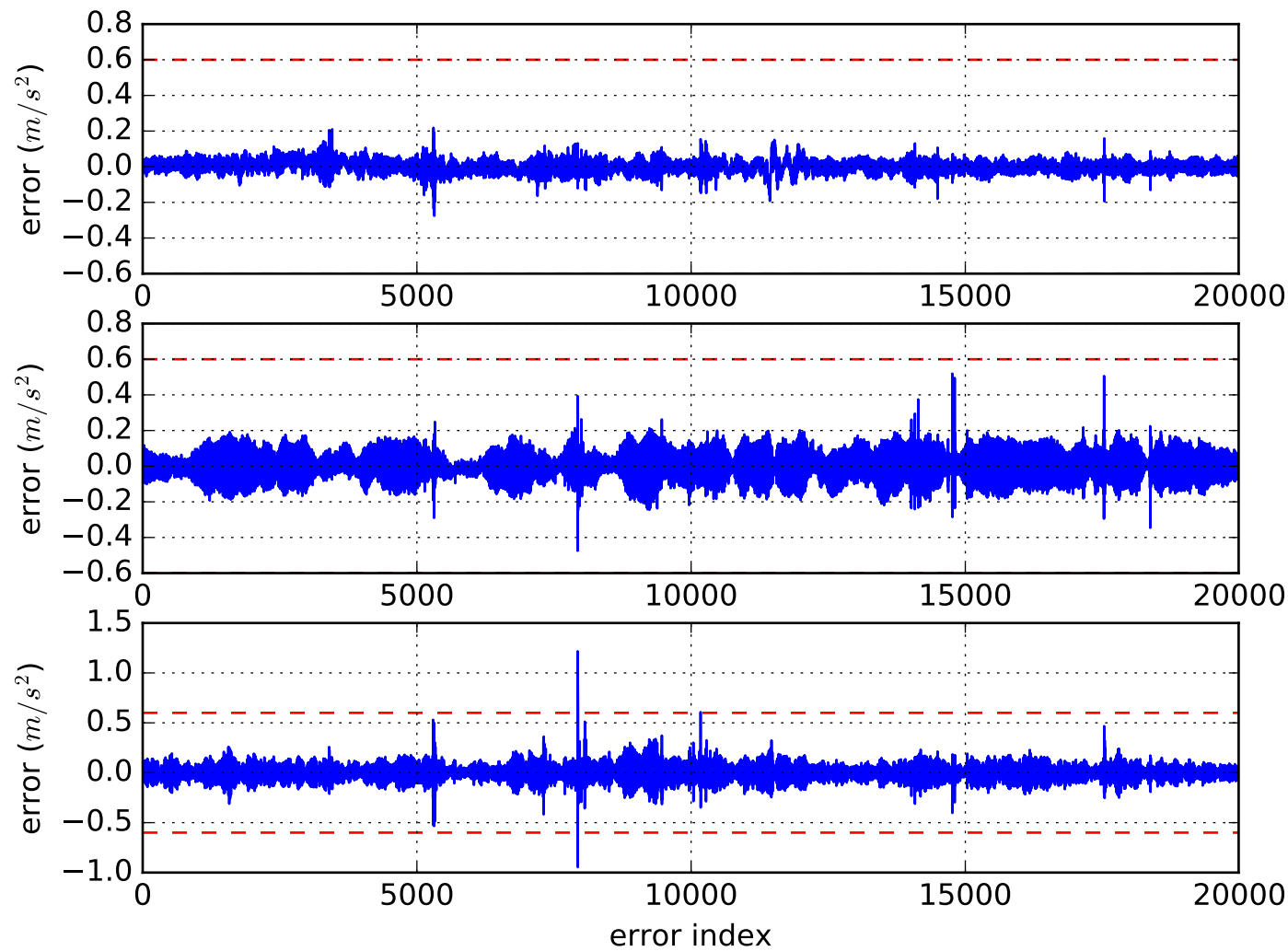
IMU0:  
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Model: calibrated  
Update rate: 400.0  
Accelerometer:  
  Noise density: 0.01  
  Noise density (discrete): 0.2  
  Random walk: 0.0002  
Gyroscope:  
  Noise density: 0.005  
  Noise density (discrete): 0.1  
  Random walk: 4e-06  
T<sub>i\_b</sub>  
  [[ 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]

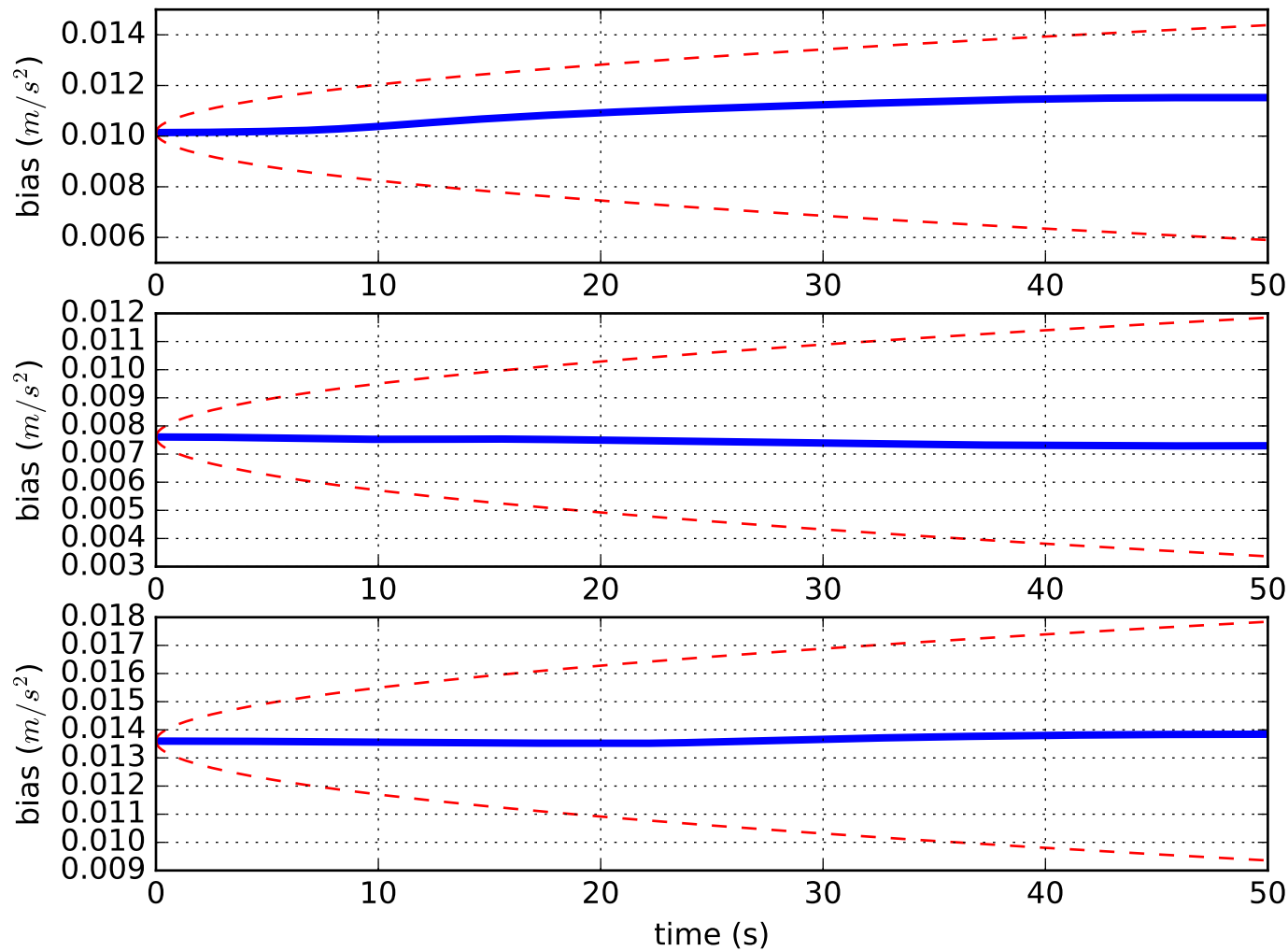
Comparison of predicted and measured specific force (imu0 frame)



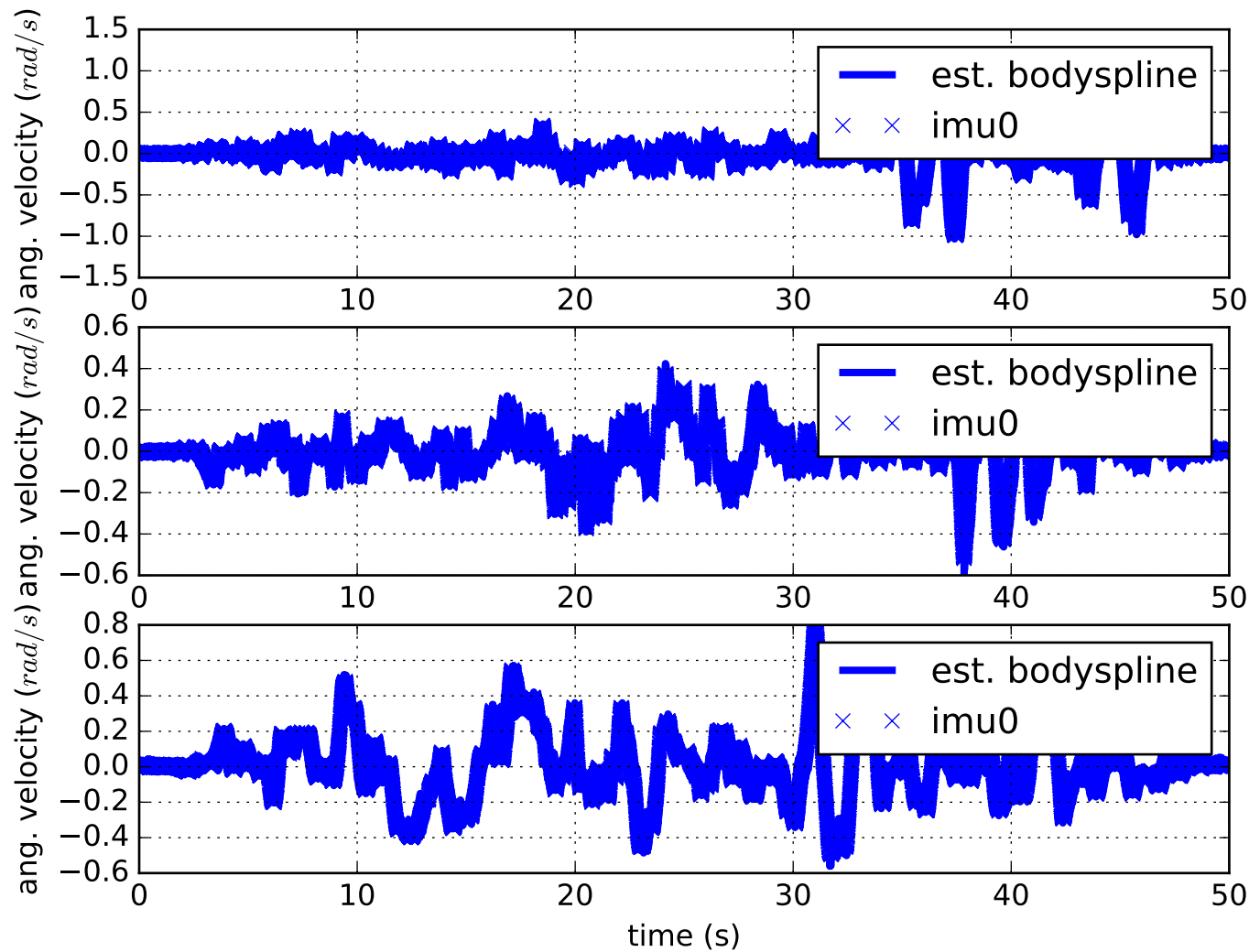
imu0: acceleration error



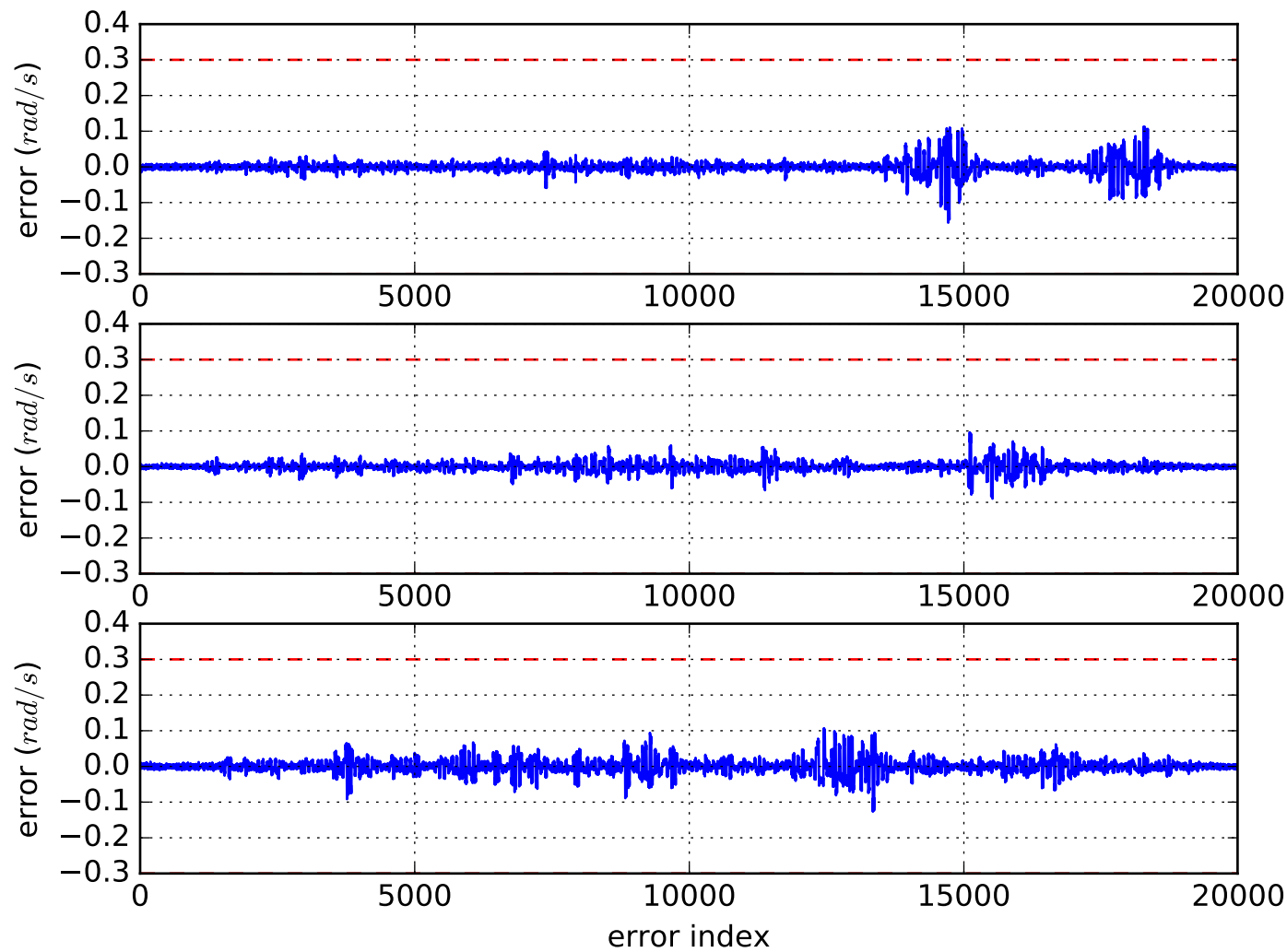
imu0: estimated accelerometer bias (imu frame)



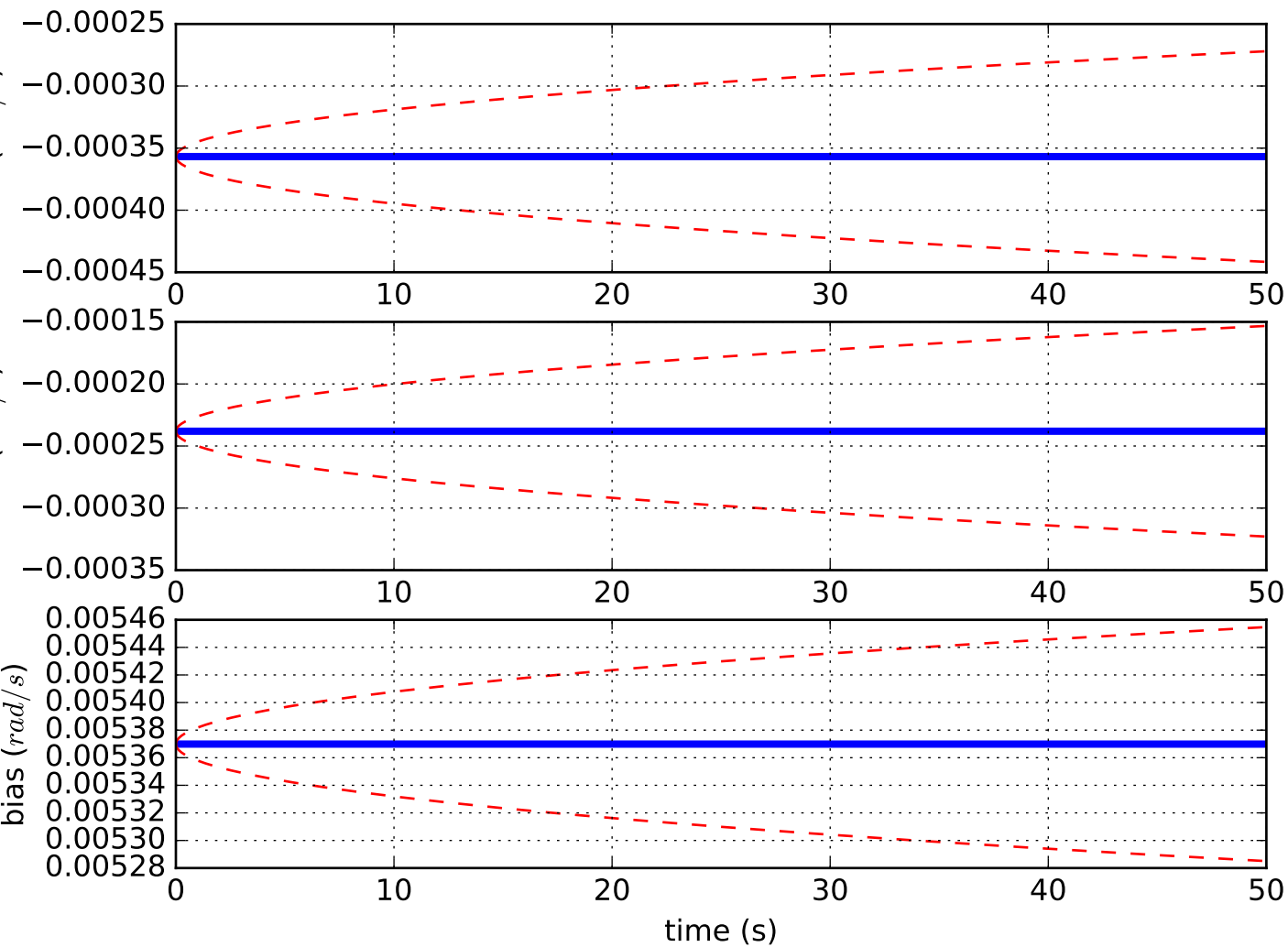
Comparison of predicted and measured angular velocities (body frame)



imu0: angular velocities error



imu0: estimated gyro bias (imu frame)





cam0: reprojection errors

