

## Calibration results

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### Normalized Residuals

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Reprojection error (cam0): mean 0.71885367805, median 0.342136614898, std: 0.951655452543  
Gyroscope error (imu0): mean 1.27608857228, median 0.906428784095, std: 5.17229462433  
Accelerometer error (imu0): mean 1.34107060049, median 0.847963055494, std: 6.27141196865

### Residuals

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Reprojection error (cam0) [px]: mean 0.71885367805, median 0.342136614898, std: 0.951655452543  
Gyroscope error (imu0) [rad/s]: mean 0.000917546514032, median 0.000651749877816, std: 0.00371903  
Accelerometer error (imu0) [m/s<sup>2</sup>]: mean 0.0218140749278, median 0.0137931065089, std: 0.102011818

### Transformation (cam0):

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T\_ci: (imu0 to cam0):

[[ -0.99994172 -0.01040789 0.00286796 0.03899633]  
[ -0.00250096 -0.03510446 -0.99938052 -0.02349503]  
[ 0.01050212 -0.99932945 0.03507638 -0.20709537]  
[ 0. 0. 0. 1. ]]

T\_ic: (cam0 to imu0):

[[ -0.99994172 -0.00250096 0.01050212 0.04111024]  
[ -0.01040789 -0.03510446 -0.99932945 -0.20737541]  
[ 0.00286796 -0.99938052 0.03507638 -0.01632816]  
[ 0. 0. 0. 1. ]]

timeshift cam0 to imu0: [s] (t\_imu = t\_cam + shift)  
0.024336217126

Gravity vector in target coords: [m/s<sup>2</sup>]  
[-0.03065909 -9.67851708 -1.57917385]

Calibration configuration

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Camera model: pinhole  
Focal length: [1201.6, 1201.3]  
Principal point: [1036.8, 778.7]  
Distortion model: radtan  
Distortion coefficients: [-0.0951, 0.0893, 0.0005511, 8.2603e-05]  
Type: checkerboard  
Rows  
  Count: 11  
  Distance: 0.03 [m]  
Cols  
  Count: 8  
  Distance: 0.03 [m]

#### IMU configuration

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#### IMU0:

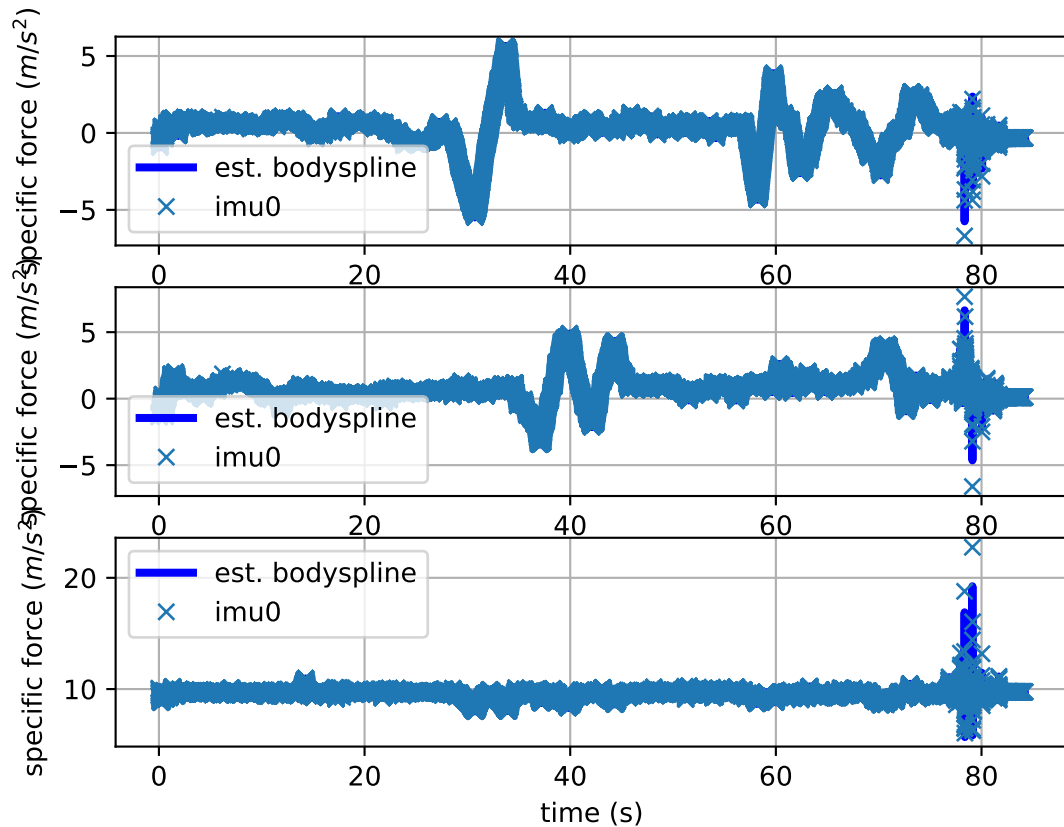
-----  
Model: calibrated  
Update rate: 200.0  
Accelerometer:  
  Noise density: 0.0011501915187  
  Noise density (discrete): 0.0162661644508  
  Random walk: 3.72985406906e-05  
Gyroscope:  
  Noise density: 5.08431292483e-05  
  Noise density (discrete): 0.000719030429364  
  Random walk: 6.50982341241e-07

#### T\_i\_b

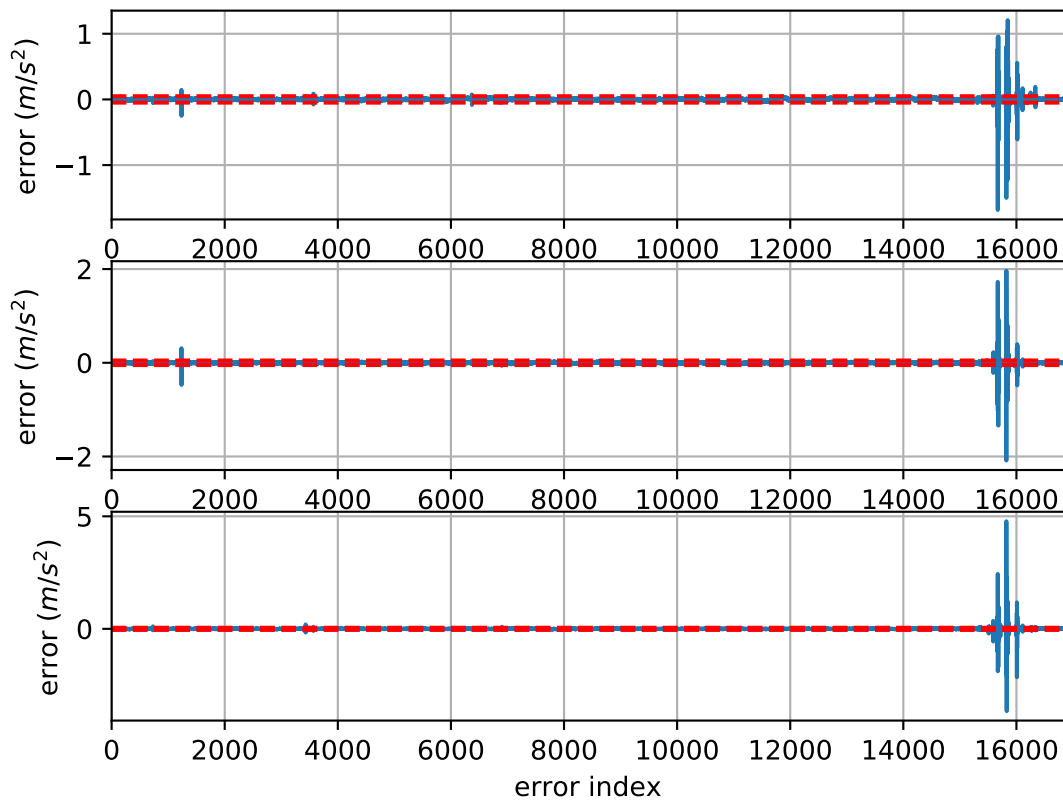
[[ 1. 0. 0. 0.]  
 [ 0. 1. 0. 0.]  
 [ 0. 0. 1. 0.]  
 [ 0. 0. 0. 1.]]

time offset with respect to IMU0: 0.0 [s]

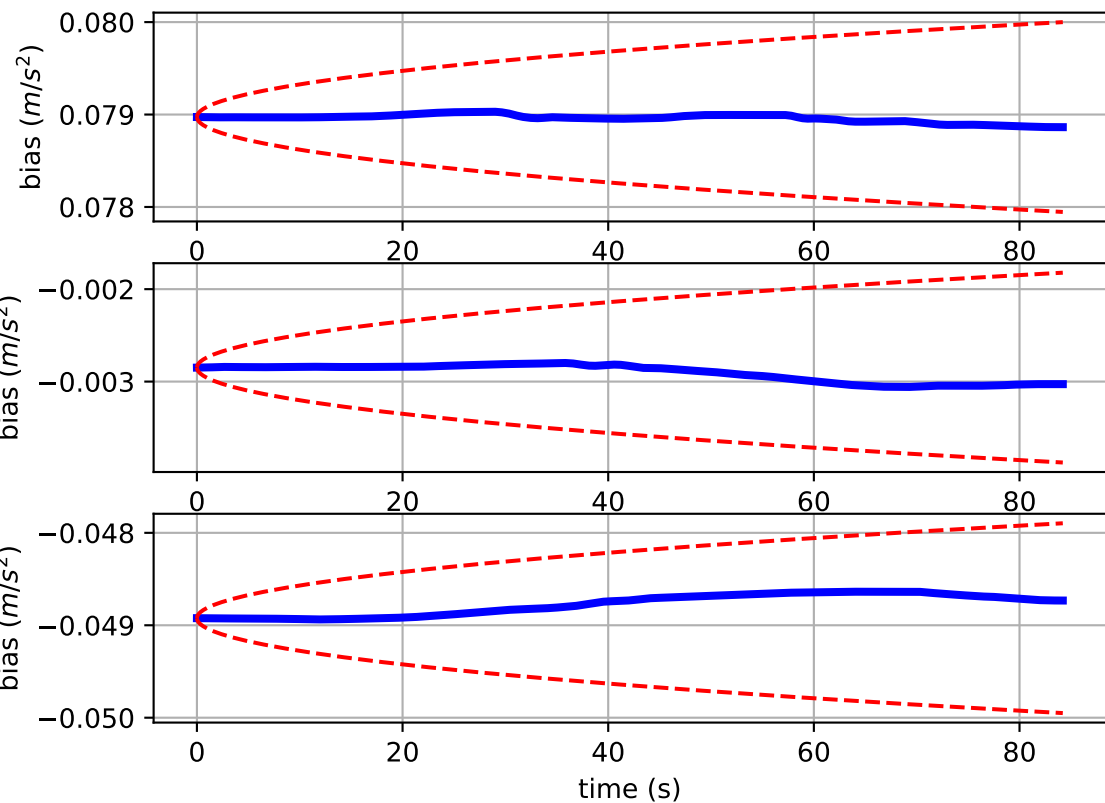
Comparison of predicted and measured specific force (imu0 frame)



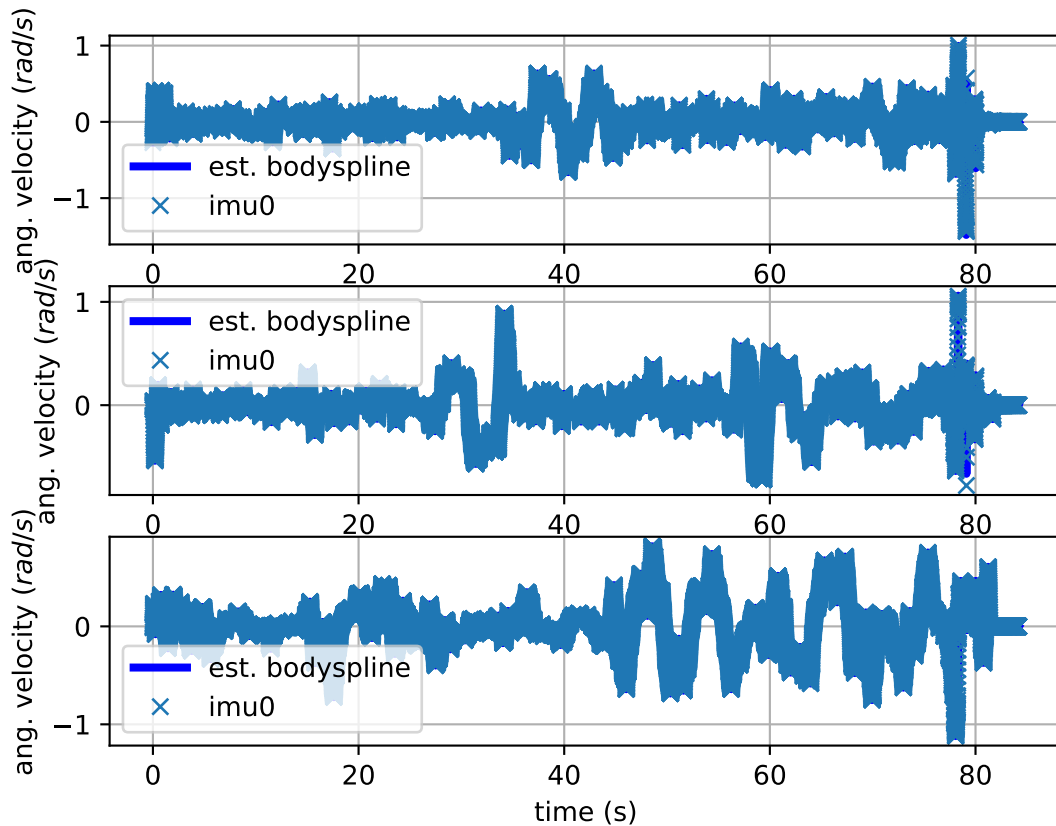
imu0: acceleration error



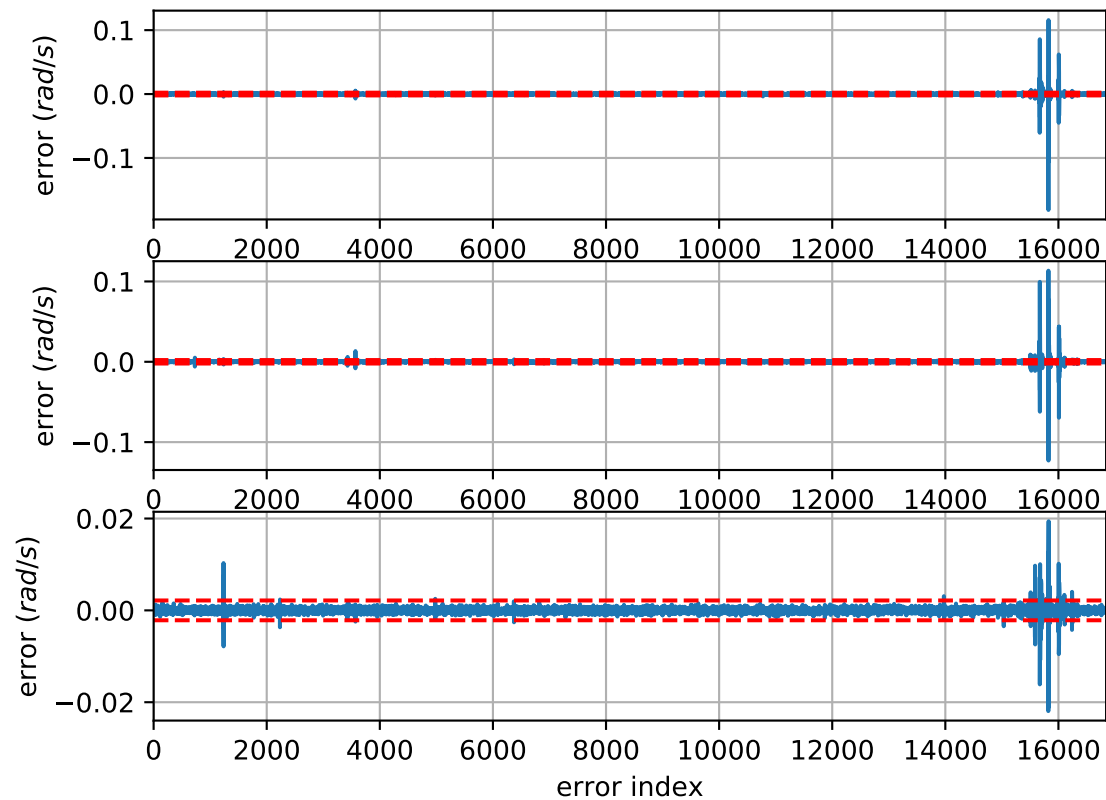
imu0: estimated accelerometer bias (imu frame)



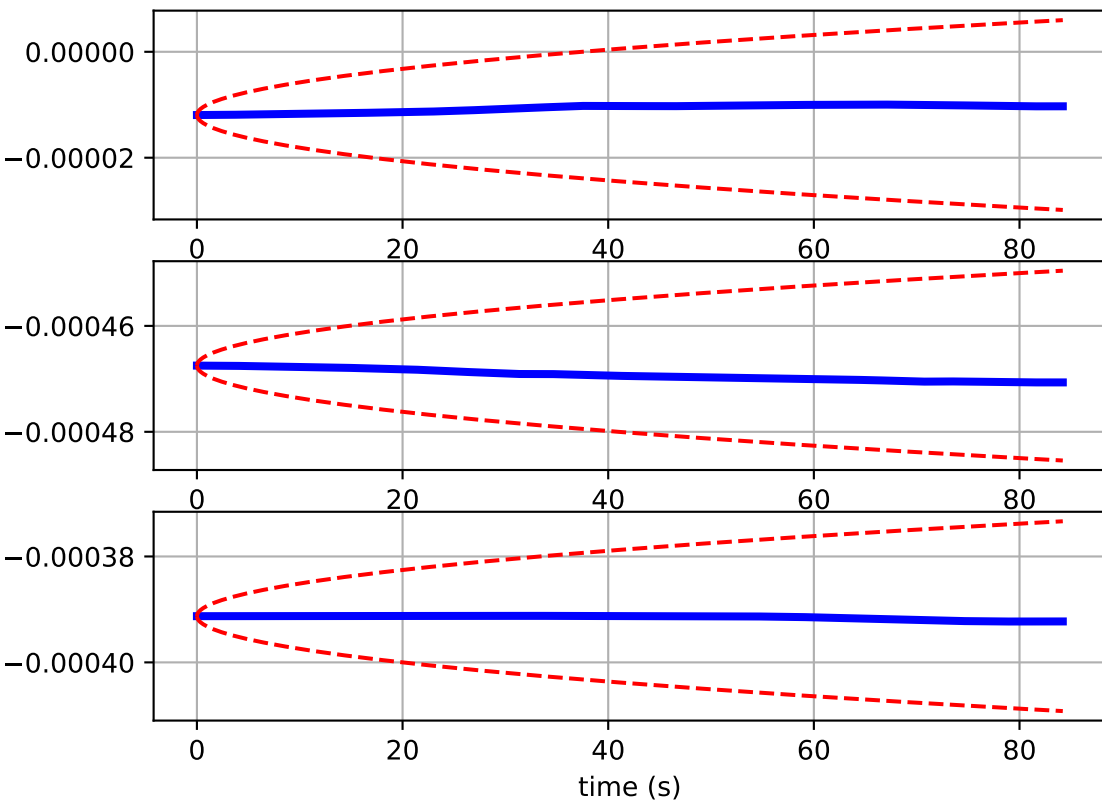
# Comparison of predicted and measured angular velocities (body frame)



imu0: angular velocities error



imu0: estimated gyro bias (imu frame)





cam0: reprojection errors

