Calibration results
==========
Normalized Residuals

Reprojection error (cam0): mean 4.67249144985, median 4.09579350702, std: 3.04545674202
Gyroscope error (imu0): mean 0.00348694506757, median 3.47998955456e-05, std: 0.0336143198301
Accelerometer error (imu0): mean 4.27908342459e-05, median 5.96280037333e-08, std: 0.000413862298371

Residuals

Reprojection error (cam0) [px]: mean 4.67249144985, median 4.09579350702, std: 3.04545674202
Gyroscope error (imu0) [rad/s]: mean 9.22150296086e-06, median 9.2031085547e-08, std: 8.88957364782e-05
Accelerometer error (imu0) [m/s^2]: mean 1.12558603333e-06, median 1.56847720733e-09, std: 1.08863879608e-05

Transformation (cam0):

T_ci: (imu0 to cam0):
[[-0.97885308 0.20358738 0.0199706 -0.00008082]
 [-0.20091882 -0.9751646   0.09319674 0.00028525]
 [0.0384483   0.08721345 0.99544741 0.00045131]
 [0.   0.   0.   1.   ]]

T_ic: (cam0 to imu0):
[[-0.97885308 -0.20091882 0.0384483 -0.00003915]
 [0.20358738 -0.9751646   0.08721345 0.00025525]
 [0.0199706   0.09319674 0.99544741 -0.00047422]
 [0.   0.   0.   1.   ]]

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
-0.0375413436406

Gravity vector in target coords: [m/s^2]
[-2.18792544 -9.55883221 -0.10065765]

Calibration configuration
==========

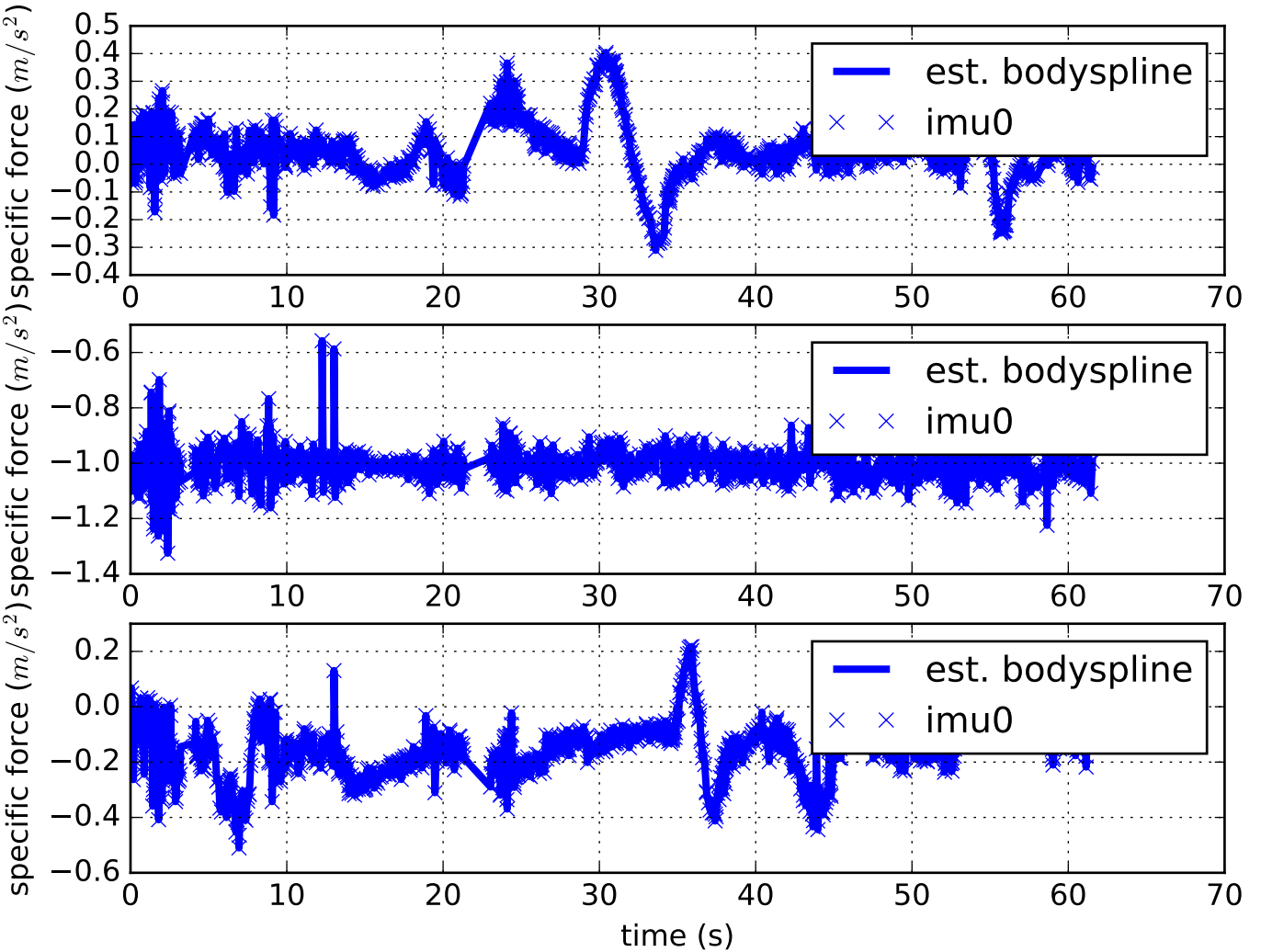
cam0

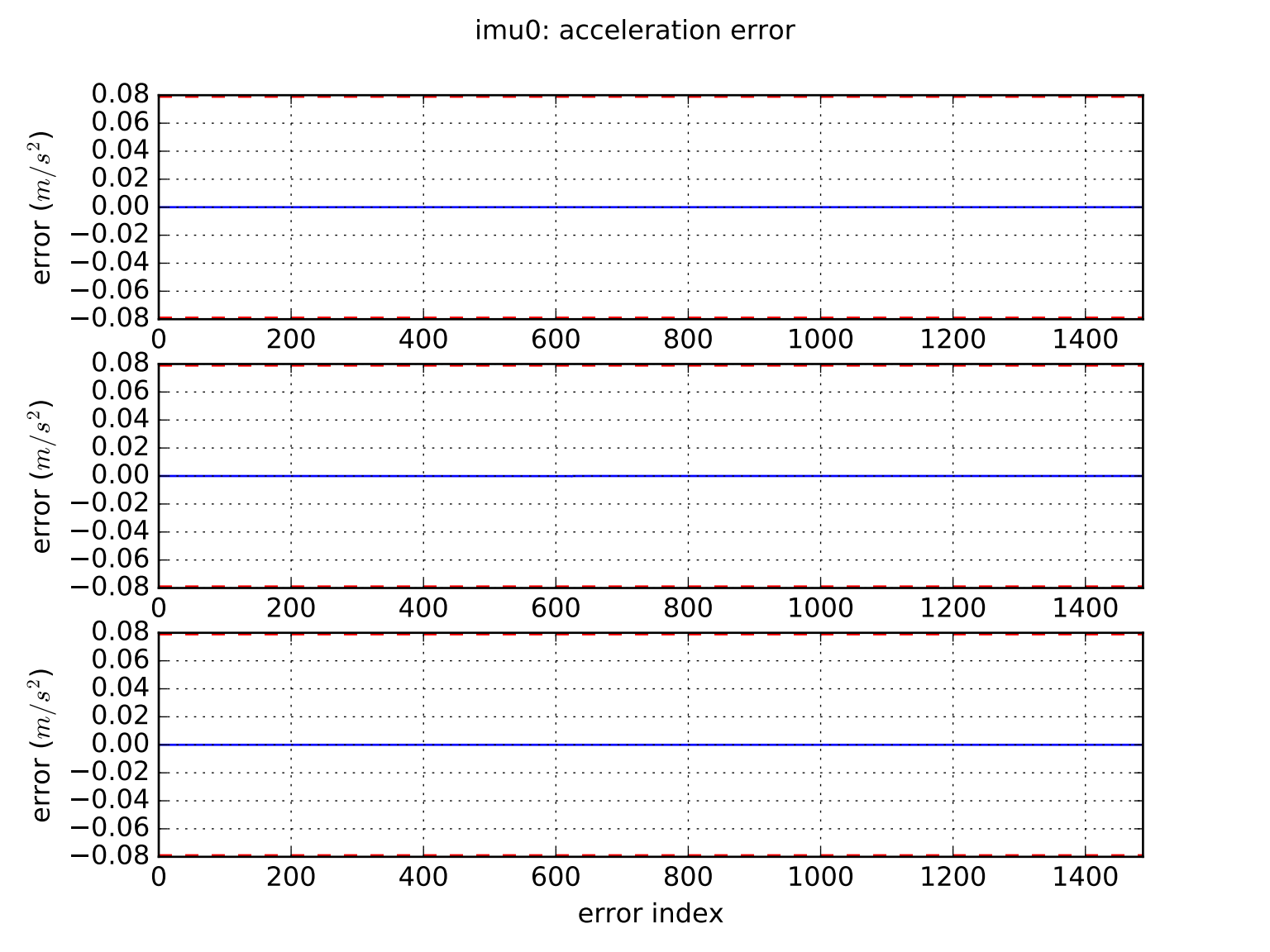
  Camera model: pinhole
  Focal length: [461.629, 460.152]
  Principal point: [362.68, 246.049]
  Distortion model: radtan
  Distortion coefficients: [-0.27695497, 0.06712482, 0.00087538, 0.00011556]
  Type: aprilgrid
  Tags:
    Rows: 6
    Cols: 6
    Size: 0.02 [m]
    Spacing 0.006 [m]

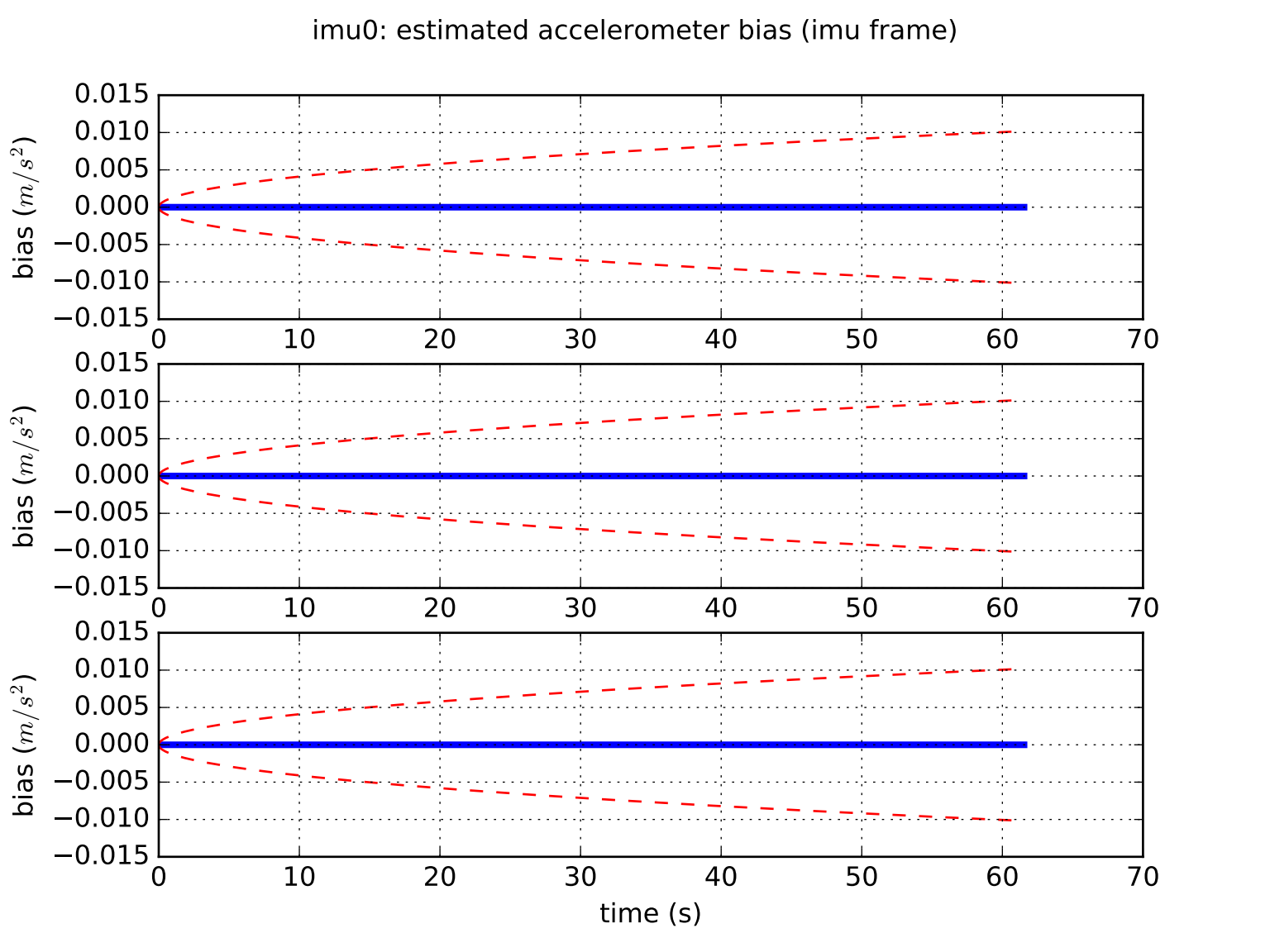
IMU configuration
==========

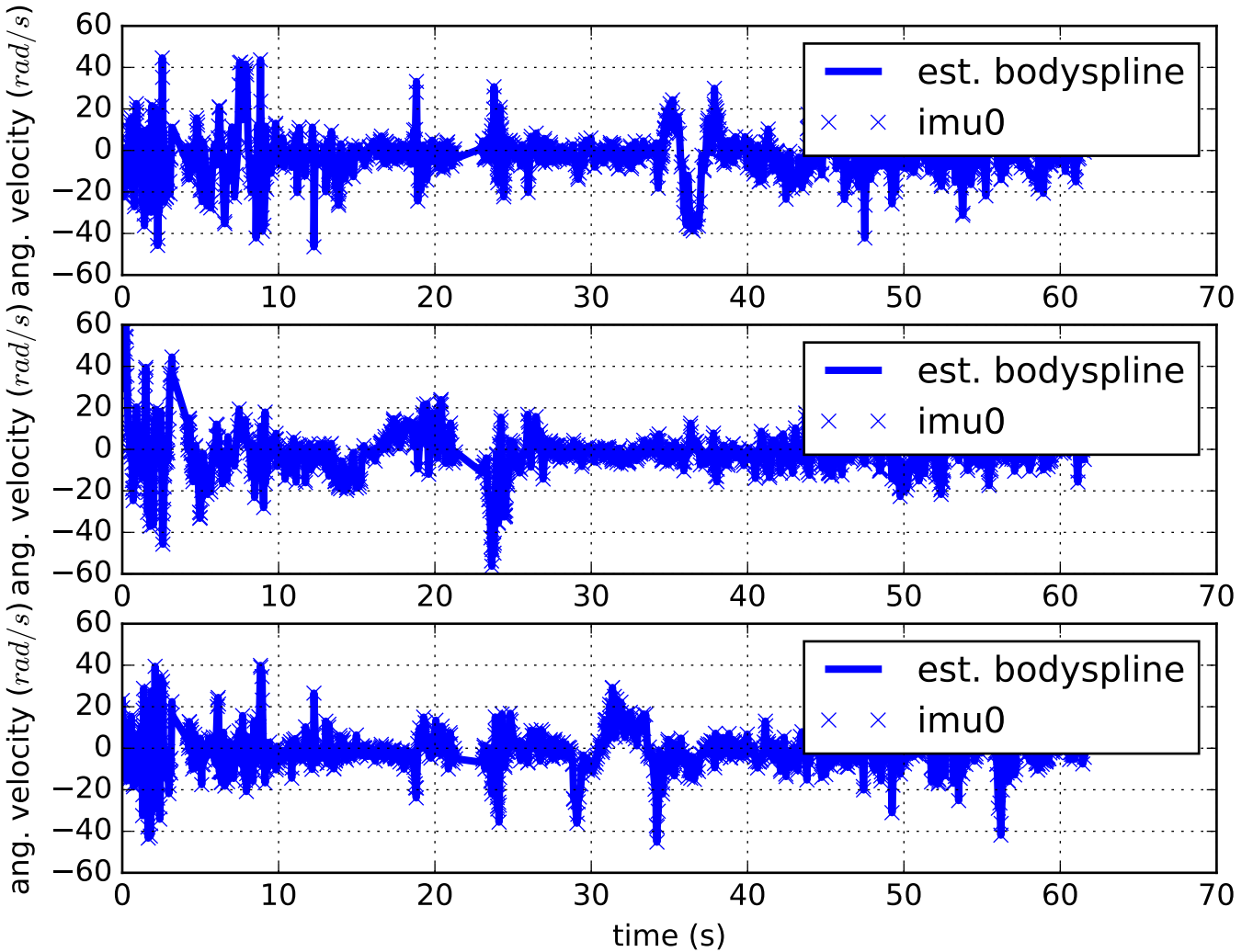
IMU0:

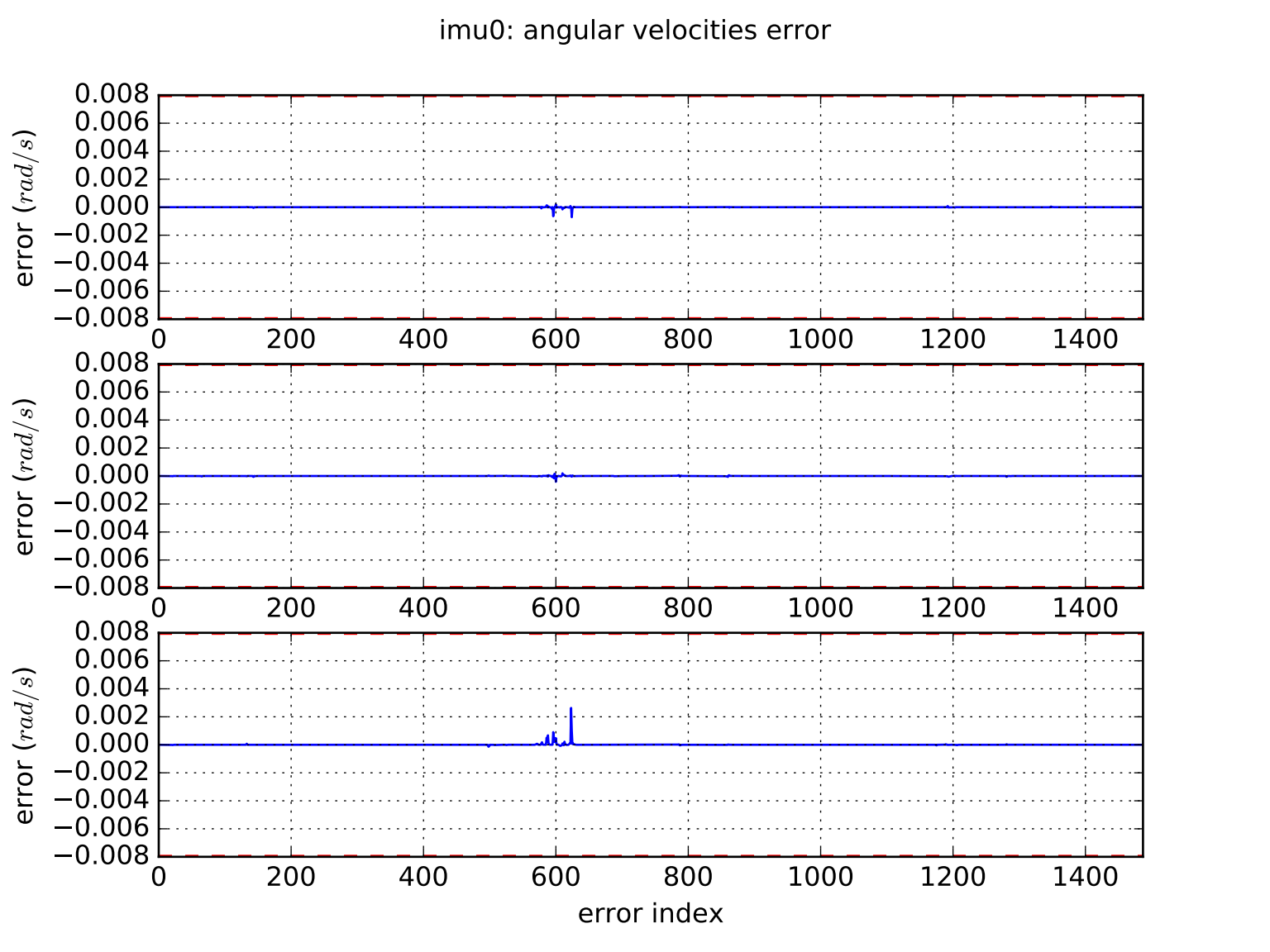
  Model: calibrated
  Update rate: 200.0
  Accelerometer:
    Noise density: 0.00186
    Noise density (discrete): 0.0263043722601
    Random walk: 0.000433
  Gyroscope:
    Noise density: 0.000187
    Noise density (discrete): 0.00264457936164
    Random walk: 2.66e-05
  T_i_b
    [[1. 0. 0. 0.]
     [0. 1. 0. 0.]
     [0. 0. 1. 0.]
     [0. 0. 0. 1.]]
  time offset with respect to IMU0: 0.0 [s]

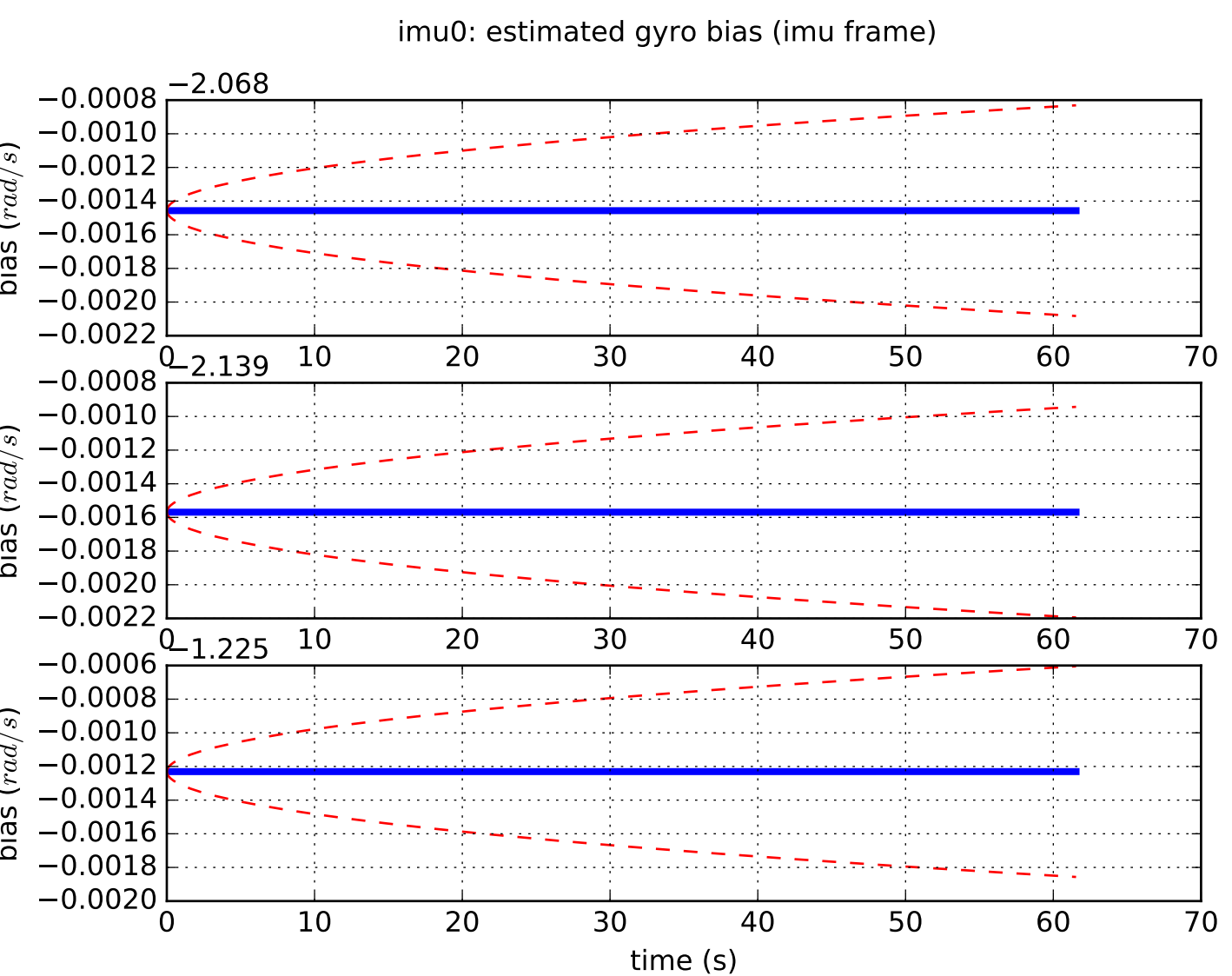

Comparison of predicted and measured specific force (imu0 frame)
specific force (m/s^2)
est. bodyspline
imu0
time (s)

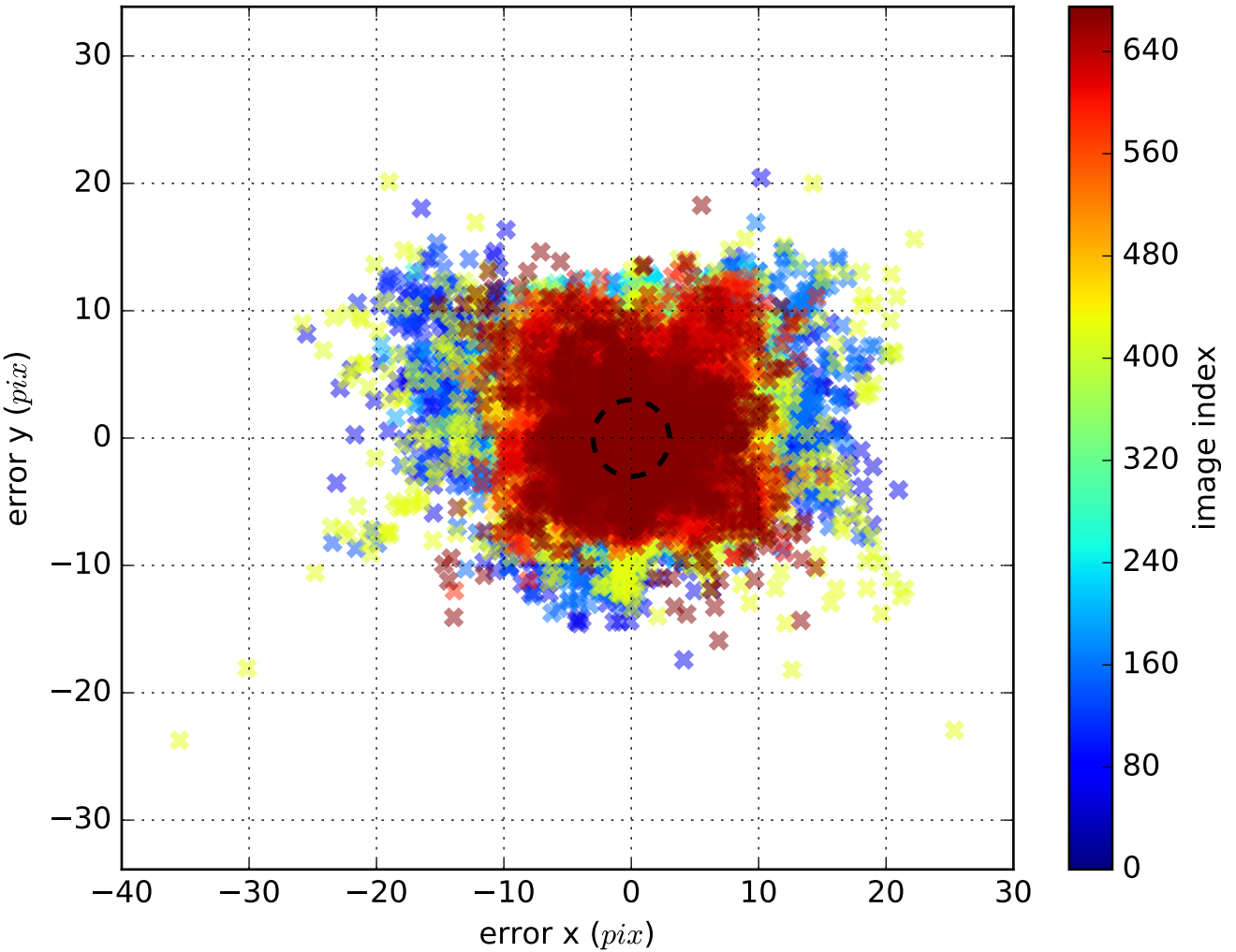

imu0: acceleration error
error (m/s^2)
0.08
0.06
0.04
0.02
0.00
−0.02
−0.04
−0.06
−0.08
0
200
400
600
800
1000
1200
1400
error index


imu0: estimated accelerometer bias (imu frame)
bias (m/s^2)
0.015
0.010
0.005
0.000
−0.005
−0.010
−0.015
0
10
20
30
40
50
60
70
time (s)


Comparison of predicted and measured angular velocities (body frame)
ang. velocity (rad/s)
ang. velocity (rad/s)
ang. velocity (rad/s)
time (s)
est. bodyspline
imu0
est. bodyspline
imu0
est. bodyspline
imu0
60
40
20
0
−20
−40
−60
0
10
20
30
40
50
60
70


imu0: angular velocities error
error (rad/s)
0.008
0.006
0.004
0.002
0.000
−0.002
−0.004
−0.006
−0.008
0
200
400
600
800
1000
1200
1400
error index


imu0: estimated gyro bias (imu frame)
−2.068
−2.139
−1.225
bias (rad/s)
time (s)
0
10
20
30
40
50
60
70


cam0: reprojection errors
error x (pix)
error y (pix)
image index
30
20
10
0
−10
−20
−30
−40
640
560
480
400
320
240
160
80