X = 30.1; Y = 30.07

Calibration parameters after initialization:

Focal Length: fc = [ 1262.09541 1262.09541 ]

Principal point: cc = [ 319.50000 239.50000 ]

Skew: alpha\_c = [ 0.00000 ] => angle of pixel = 90.00000 degrees

Distortion: kc = [ 0.00000 0.00000 0.00000 0.00000 0.00000 ]

Main calibration optimization procedure - Number of images: 24

Gradient descent iterations: 1...2...3...4...5...6...7...8...9...10...11...12...13...14...15...16...17...18...19...20...21...22...23...24...25...26...27...28...29...30...done

Estimation of uncertainties...done

Calibration results after optimization (with uncertainties):

Focal Length: fc = [ 1313.62241 1309.08336 ] ± [ 11.86087 11.95726 ]

Principal point: cc = [ 356.33328 273.83764 ] ± [ 20.14157 22.63726 ]

Skew: alpha\_c = [ 0.00000 ] ± [ 0.00000 ] => angle of pixel axes = 90.00000 ± 0.00000 degrees

Distortion: kc = [ -0.20985 -2.76088 0.00066 -0.00185 0.00000 ] ± [ 0.09184 1.67041 0.00287 0.00281 0.00000 ]

Pixel error: err = [ 0.41964 0.45171 ]

fc\*.006 = [7.8817, 7.8545]

Note: The numerical errors are approximately three times the standard deviations (for reference).

Old Extrinsic parameters:

Translation vector: Tc\_ext = [ -122.056871 -58.155056 556.079854 ]

Rotation vector: omc\_ext = [ 2.218129 2.210288 0.034832 ]

Rotation matrix: Rc\_ext = [ 0.003442 0.999733 0.022836

0.999956 -0.003639 0.008597

0.008677 0.022806 -0.999702 ]

Pixel error: err = [ 0.34738 0.16980 ]

New Extrinsic parameters (after camera realignment on 11/3/2016):

Translation vector: Tc\_ext = [ -133.626596 -58.231018 554.940826 ]

Rotation vector: omc\_ext = [ 2.210490 2.208625 0.041742 ]

Rotation matrix: Rc\_ext = [ 0.000734 0.999532 0.030575

0.999974 -0.000954 0.007189

0.007215 0.030569 -0.999507 ]

Pixel error: err = [ 0.52885 0.52113 ]