Calibration parameters after initialization:

Focal Length: fc = [ 960.50732 960.50732 ]

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: 20

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 = [ 1005.52555 1004.48905 ] ± [ 13.33942 13.16881 ]

Principal point: cc = [ 360.50216 257.42252 ] ± [ 24.35768 23.95595 ]

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

Distortion: kc = [ -0.47112 2.43987 0.00486 -0.00050 0.00000 ] ± [ 0.14638 2.14080 0.00371 0.00830 0.00000 ]

Pixel error: err = [ 0.27982 0.29696 ]

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

Pixel error: err = [ 0.27982 0.29696] (all active images)

fl (mm) = 6.0332 6.0269

Extrinsic parameters:

Translation vector: Tc\_ext = [ -54.724129 -117.058070 1086.221886 ]

Rotation vector: omc\_ext = [ 0.094733 3.132452 0.073444 ]

Rotation matrix: Rc\_ext = [ -0.998150 0.060236 0.008259

0.060556 0.997076 0.046616

-0.005427 0.047030 -0.998879 ]

Pixel error: err = [ 0.16772 0.16515 ]