Crowbar Test with Subtracted Reference

MiKaela Barker

June 27, 2017

Measurements taken have a subtracted reference made by averaging several references. These references are formed from the average of four rotation angles of the MOSES I primary mirror. Experimentation completed June 16, 2017, for MOSES III instrumentation testing. Measurements shown are an average of 32 single interferogram measurements using 4Sight software. Zernike values are taken from the in-program Zernike polynomial worksheet. For use in comparing placement of the mirror to overall mirror surface aberrations, in order to prepare to correct mirror figure. Definitions for each of the tests can be found in Section 3.

1 Graph of Individual Tests

The first ten Zernike polinomials are taken from the 4Sight software and used to generate visual graphs to determine the ideal positioning of the MOSES II mirror in its flight mount. The following are several graphs showing this. The first shows all tests and all polinomials. The following are individual tests.

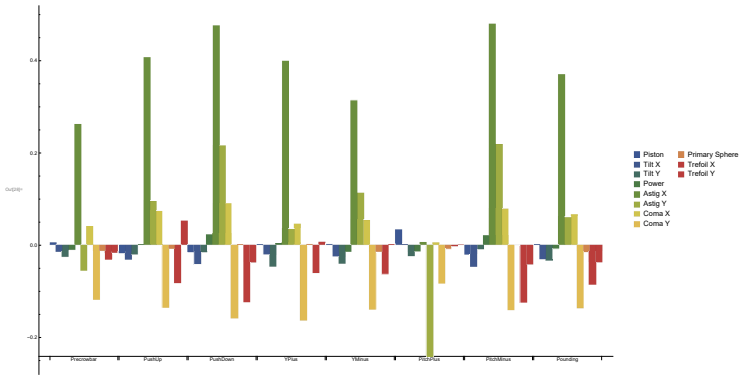

Figure 1: Chart of All Test Zernikes

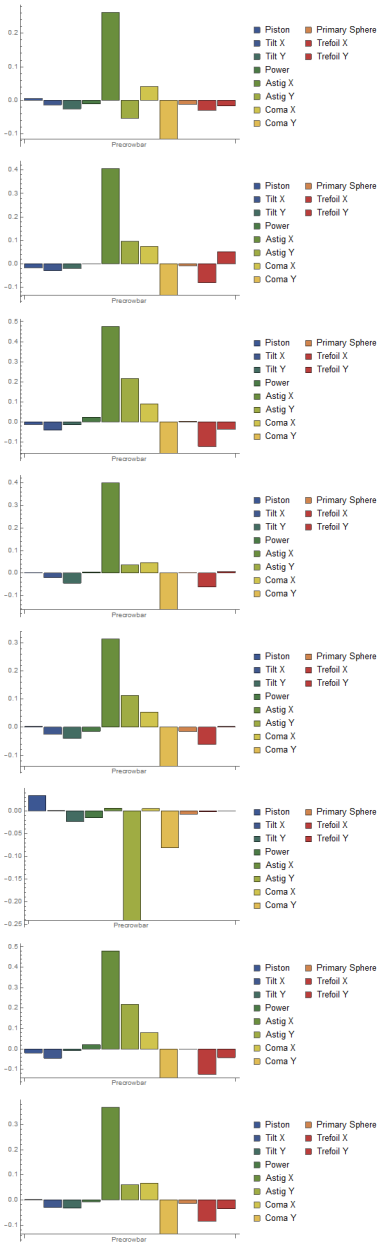

Figure 2: *LabelinngSystem*

2 Zernike Values

Piston	0.0055
Tilt X	-0.0135
Tilt Y	-0.0255
Power	-0.0102
Astig X	0.26193
Astig Y	-0.0531
Coma X	0.0412
Coma Y	-0.11578
Primary Sphere	-0.0119
Trefoil X	-0.0295
Trefoil Y	-0.0168

Table 1: Pre-crowbar Zernikes

Piston	-0.0172
Tilt X	-0.0295
Tilt Y	-0.0199
Power	0.0068
Astig X	0.4065
Astig Y	0.0958
Coma X	0.0744
Coma Y	-0.1344
Primary Sphere	-0.0083
Trefoil X	-0.0806
Trefoil Y	0.0524

Table 2: Push-Up Zernikes

Piston	-0.0140
Tilt X	-0.0417
Tilt Y	-0.0157
Power	0.0228
Astig X	0.47535
Astig Y	0.21550
Coma X	0.0902
Coma Y	-0.15770
Primary Sphere	0.0023
Trefoil X	-0.12311
Trefoil Y	-0.0369

Table 3: Push-Down Zernikes

Piston	0.0023
Tilt X	-0.0198
Tilt Y	-0.0449
Power	0.0042
Astig X	0.4000
Astig Y	0.0352
Coma X	0.0469
Coma Y	-0.1621
Primary Sphere	0.0017
Trefoil X	-0.0621
Trefoil Y	0.0069

Table 4: Plus-Y Zernikes

Piston	0.0030
Tilt X	-0.0249
Tilt Y	-0.0402
Power	-0.0151
Astig X	0.31394
Astig Y	0.11321
Coma X	0.0535
Coma Y	-0.13815
Primary Sphere	-0.0151
Trefoil X	-0.0618
Trefoil Y	0.0027

Table 5: Minus-Y Zernikes

Piston	0.0340
Tilt X	0.0008
Tilt Y	-0.0233
Power	-0.0150
Astig X	0.0063
Astig Y	-0.24092
Coma X	0.0056
Coma Y	-0.0815
Primary Sphere	-0.0073
Trefoil X	-0.0021
Trefoil Y	0.0003

Table 6: Pitch-Plus Zernikes

Piston	-0.0194
Tilt X	-0.0457
Tilt Y	-0.0090
Power	0.0206
Astig X	0.48005
Astig Y	0.21838
Coma X	0.0794
Coma Y	-0.14061
Primary Sphere	-0.00006397
Trefoil X	-0.12392
Trefoil Y	-0.0420

Table 7: Pitch-Minus Zernikes

Piston	0.0013
Tilt X	-0.0301
Tilt Y	-0.0329
Power	-0.0072
Astig X	0.36879
Astig Y	0.0599
Coma X	0.0664
Coma Y	-0.13620
Primary Sphere	-0.0138
Trefoil X	-0.0846
Trefoil Y	-0.0358

Table 8: Pounding Zernikes

3 Test Name Descriptions

Pre-Crowbar displayes the measuremnts of the mirror before any adjustments were made. Pitch Plus shows a movement of the mirror such that it is tilted in the plus direction. Pitch Minus is the opposite—the mirror is tilted in the minus direction. Push Up is a shift of the mirror upwards from center in the mount. Push Down, a shift of the mirror downwards from center in the mount. Push Y Plus is a shift of the mirror in the Y+ direction according to MOSES coordinates. Push Y Minus is a shift in the mirror in the Y- direction in the mirror mount. Pounding is the shifting of the mirror in various directions with the purpose to settle it into a position of least tension, and therefore, lowest energy.