**Results of Crowbar Test**

June 16, 2017

**Pre-Crowbar**

|  |  |
| --- | --- |
| -0.0076 | Piston or Bias |
| -0.0072 | Tilt X |
| -0.0334 | Tilt Y |
| -0.0287 | Power |
| 0.0480 | Astig X |
| -0.15661 | Astig Y |
| 0.0310 | Coma X |
| -0.19751 | Coma Y |
| -0.0017 | Primary Spherical |
| 0.0267 | Trefoil X |
| 0.0669 | Trefoil Y |
| -0.0681 | Secondary Astig X |
| 0.0605 | Secondary Astig Y |
| -0.0477 | Secondary Coma X |
| -0.0102 | Secondary Coma Y |
| 0.0509 | Secondary Spherical |
| 0.0658 | Tetrafoil X |
| 0.0333 | Tetrafoil Y |

**Pitch Plus**

|  |  |
| --- | --- |
| -0.13843 | Piston or Bias |
| 0.68788 | Tilt X |
| 3.857 | Tilt Y |
| -0.32544 | Power |
| 0.82796 | Astig X |
| -0.42205 | Astig Y |
| -0.51327 | Coma X |
| -1.251 | Coma Y |
| -0.18987 | Primary Spherical |
| -0.0890 | Trefoil X |
| 1.146 | Trefoil Y |
| 0.74123 | Secondary Astig X |
| 0.0619 | Secondary Astig Y |
| -0.26687 | Secondary Coma X |
| -0.50561 | Secondary Coma Y |
| -0.0088 | Secondary Spherical |
| -0.27150 | Tetrafoil X |
| -0.35838 | Tetrafoil Y |

**Pitch Minus**

|  |  |
| --- | --- |
| 0.15076 | Piston or Bias |
| -0.14187 | Tilt X |
| 0.72882 | Tilt Y |
| 0.33033 | Power |
| -0.24233 | Astig X |
| 0.15341 | Astig Y |
| 0.10866 | Coma X |
| 0.96371 | Coma Y |
| 0.17278 | Primary Spherical |
| -0.37298 | Trefoil X |
| -1.191 | Trefoil Y |
| -0.64517 | Secondary Astig X |
| -0.0010 | Secondary Astig Y |
| 0.0447 | Secondary Coma X |
| 0.53232 | Secondary Coma Y |
| 0.0402 | Secondary Spherical |
| 0.44654 | Tetrafoil X |
| 0.37508 | Tetrafoil Y |

**Push Up**

|  |  |
| --- | --- |
| 0.0940 | Piston or Bias |
| 0.16052 | Tilt X |
| -1.290 | Tilt Y |
| 0.20166 | Power |
| 0.0692 | Astig X |
| 0.0286 | Astig Y |
| -0.0494 | Coma X |
| 0.47209 | Coma Y |
| 0.10397 | Primary Spherical |
| -0.18565 | Trefoil X |
| -0.55239 | Trefoil Y |
| -0.29258 | Secondary Astig X |
| 0.0449 | Secondary Astig Y |
| -0.0419 | Secondary Coma X |
| 0.30088 | Secondary Coma Y |
| -0.0013 | Secondary Spherical |
| 0.26938 | Tetrafoil X |
| 0.12011 | Tetrafoil Y |

**Push Down**

|  |  |
| --- | --- |
| 0.12549 | Piston or Bias |
| -0.76507 | Tilt X |
| -2.402 | Tilt Y |
| 0.26896 | Power |
| -0.23406 | Astig X |
| 0.13846 | Astig Y |
| 0.13032 | Coma X |
| 0.84702 | Coma Y |
| 0.13747 | Primary Spherical |
| -0.32652 | Trefoil X |
| -1.037 | Trefoil Y |
| -0.59527 | Secondary Astig X |
| 0.0004 | Secondary Astig Y |
| 0.0442 | Secondary Coma X |
| 0.48776 | Secondary Coma Y |
| 0.0312 | Secondary Spherical |
| 0.40386 | Tetrafoil X |
| 0.28174 | Tetrafoil Y |

**Push Y+ Direction**

|  |  |
| --- | --- |
| 0.0082 | Piston or Bias |
| 0.50754 | Tilt X |
| -0.0133 | Tilt Y |
| 0.0107 | Power |
| 0.20589 | Astig X |
| -0.0794 | Astig Y |
| -0.0859 | Coma X |
| -0.0380 | Coma Y |
| 0.0322 | Primary Spherical |
| -0.0220 | Trefoil X |
| -1.484E-05 | Trefoil Y |
| -0.17635 | Secondary Astig X |
| 0.0430 | Secondary Astig Y |
| -0.0756 | Secondary Coma X |
| 0.0510 | Secondary Coma Y |
| 0.0132 | Secondary Spherical |
| 0.0232 | Tetrafoil X |
| 0.0040 | Tetrafoil Y |

**Push Y- Direction**

|  |  |
| --- | --- |
| -0.0266 | Piston or Bias |
| 0.47240 | Tilt X |
| 0.70438 | Tilt Y |
| -0.0748 | Power |
| 0.18249 | Astig X |
| -0.0495 | Astig Y |
| -0.14993 | Coma X |
| -0.29361 | Coma Y |
| -0.0251 | Primary Spherical |
| 0.0100 | Trefoil X |
| 0.24156 | Trefoil Y |
| -0.0599 | Secondary Astig X |
| 0.0060 | Secondary Astig Y |
| -0.11238 | Secondary Coma X |
| -0.0653 | Secondary Coma Y |
| 0.0134 | Secondary Spherical |
| -0.0033 | Tetrafoil X |
| -0.0840 | Tetrafoil Y |

**Pounding**

|  |  |
| --- | --- |
| -0.0060 | Piston or Bias |
| 0.0855 | Tilt X |
| -0.0539 | Tilt Y |
| -0.0299 | Power |
| 0.10046 | Astig X |
| -0.0449 | Astig Y |
| 0.0191 | Coma X |
| 0.0379 | Coma Y |
| 0.0171 | Primary Spherical |
| 0.0424 | Trefoil X |
| -0.14400 | Trefoil Y |
| -0.16485 | Secondary Astig X |
| 0.0396 | Secondary Astig Y |
| -0.0544 | Secondary Coma X |
| 0.10434 | Secondary Coma Y |
| 0.0337 | Secondary Spherical |
| 0.0523 | Tetrafoil X |
| 0.0307 | Tetrafoil Y |

**Pre-Crowbar**

The mirror before any adjustments were made.

**Pitch Plus**

Movement of the mirror such that it is tilted in the plus direction.

**Pitch Minus**

Movement of the mirror such that it is tilted in the minus direction.

**Push Up**

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+**

A shift of the mirror in the Y+ direction according to MOSES coordinates.

**Push Y-**

A shift in the mirror in the Y- direction in the mirror mount.

**Pounding**

Shifting of the mirror in various directions with the purpose to settle it into a position of least tension, and therefore, lowest energy.