fiducials\_image\_27

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -8877 | -9045 | -8877 | -9045 | -8877 | -9044 | -8877 | -9045 |
| 8937 | 8770 | 8951 | 8756 | 8936 | 8771 | 8938 | 8770 |
| -8879 | 8769 | -8866 | 8767 | -8879 | 8769 | -8878 | 8768 |
| 8939 | -9043 | 8939 | -9043 | 8943 | -9042 | 8939 | -9043 |
| -9381 | -139 | -9375 | -138 | -9382 | -138 | -9381 | -139 |
| 9442 | -136 | 9448 | -151 | 9442 | -137 | 9442 | -137 |
| 30 | 9274 | 43 | 9267 | 29 | 9274 | 30 | 9273 |
| 30 | -9549 | 31 | -9549 | 31 | -9549 | 31 | -9549 |

control\_image\_27

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -777 | 7945 | -766 | 7947 | -776 | 7946 | -777 | 7944 |
| -171 | -643 | -168 | -643 | -176 | -640 | -172 | -643 |
| 1619 | -7015 | 1627 | -7019 | 1624 | -7005 | 1620 | -7011 |
| 7620 | -7788 | 7628 | -7793 | 7638 | -7799 | 7617 | -7787 |
| 1558 | 9068 | 1557 | 9068 | 1557 | 9068 | 1557 | 9066 |
| 3776 | 488 | 3784 | 491 | 3783 | 492 | 3774 | 486 |
| -612 | -4266 | -613 | -4267 | -612 | -4262 | -614 | -4265 |
| 4460 | -7967 | 4452 | -7971 | 4461 | -7965 | 4461 | -7965 |

tie\_image\_27

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -818 | 1123 | -9279 | 9328 | -817 | 1123 | -818 | 1123 |
| 7961 | -483 | -8407 | 9169 | 7963 | -482 | 7961 | -483 |
| -874 | -8935 | -9293 | 8323 | -874 | -8937 | -874 | -8936 |
| 7600 | -7815 | -8444 | 8435 | 7601 | -7816 | 7600 | -7816 |
| -765 | 7949 | -9279 | 10011 | -766 | 7949 | -765 | 7949 |
| 7210 | 8547 | -8482 | 10072 | 7211 | 8545 | 7210 | 8546 |

mean\_\_std\_fiducials\_image\_27

|  |  |  |  |
| --- | --- | --- | --- |
| -8877.0 | -9044.75 | 0.0 | 0.5 |
| 8940.5 | 8766.75 | 7.05 | 7.18 |
| -8875.5 | 8768.25 | 6.35 | 0.96 |
| 8940.0 | -9042.75 | 2.0 | 0.5 |
| -9379.75 | -138.5 | 3.2 | 0.58 |
| 9443.5 | -140.25 | 3.0 | 7.18 |
| 33.0 | 9272.0 | 6.68 | 3.37 |
| 30.75 | -9549.0 | 0.5 | 0.0 |

mean\_\_std\_control\_image\_27

|  |  |  |  |
| --- | --- | --- | --- |
| -774.0 | 7945.5 | 5.35 | 1.29 |
| -171.75 | -642.25 | 3.3 | 1.5 |
| 1622.5 | -7012.5 | 3.7 | 5.97 |
| 7625.75 | -7791.75 | 9.39 | 5.5 |
| 1557.25 | 9067.5 | 0.5 | 1.0 |
| 3779.25 | 489.25 | 4.99 | 2.75 |
| -612.75 | -4265.0 | 0.96 | 2.16 |
| 4458.5 | -7967.0 | 4.36 | 2.83 |

mean\_\_std\_tie\_image\_27

|  |  |  |  |
| --- | --- | --- | --- |
| -2933.0 | 3174.25 | 4230.67 | 4102.5 |
| 3869.5 | 1930.25 | 8184.33 | 4825.83 |
| -2978.75 | -4621.25 | 4209.5 | 8629.5 |
| 3589.25 | -3753.0 | 8022.17 | 8125.33 |
| -2893.75 | 8464.5 | 4256.83 | 1031.0 |
| 3287.25 | 8927.5 | 7846.17 | 763.0 |

fiducials\_image\_28

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -8884 | -9038 | -8884 | -9039 | -8883 | -9039 | -8884 | -9038 |
| 8944 | 8764 | 8944 | 8763 | 8944 | 8766 | 8944 | 8764 |
| -8873 | 8775 | -8873 | 8775 | -8873 | 8775 | -8873 | 8775 |
| 8931 | -9050 | 8931 | -9050 | 8930 | -9049 | 8932 | -9050 |
| -9382 | -132 | -9382 | -131 | -9383 | -132 | -9382 | -132 |
| 9441 | -144 | 9441 | -144 | 9441 | -143 | 9441 | -144 |
| 36 | 9275 | 37 | 9274 | 37 | 9300 | 37 | 9274 |
| 23 | -9548 | 23 | -9549 | 23 | -9549 | 24 | -9548 |

control\_image\_28

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -8827 | 8164 | -8823 | 8167 | -8829 | 8166 | -8833 | 8163 |
| -7962 | -540 | -7959 | -540 | -7961 | -540 | -7963 | -539 |
| -6073 | -6839 | -6071 | -6833 | -6072 | -6836 | -6072 | -6836 |
| -91 | -7442 | -84 | -7449 | -91 | -7442 | -95 | -7441 |
| -6504 | 9396 | -6505 | 9398 | -6504 | 9395 | -6504 | 9395 |
| -4077 | 716 | -4068 | 720 | -4078 | 715 | -4079 | 715 |
| -8283 | -4173 | -8273 | -4168 | -8284 | -4172 | -8283 | -4172 |
| -3249 | -7705 | -3249 | -7708 | -3248 | -7703 | -3247 | -7702 |

tie\_image\_28

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| -8694 | 1218 | -8659 | 1213 | -8696 | 1215 | -8695 | 1218 |
| 101 | -140 | 103 | -137 | 102 | -140 | 101 | -140 |
| -8395 | -8799 | -8393 | -8799 | -8395 | -8799 | -8395 | -8799 |
| -111 | -7469 | -113 | -7467 | -110 | -7470 | -111 | -7470 |
| -8821 | 8167 | -8823 | 8152 | -8822 | 8165 | -8821 | 8166 |
| -783 | 9048 | -786 | 9047 | -781 | 9048 | -782 | 9048 |

mean\_\_std\_fiducials\_image\_28

|  |  |  |  |
| --- | --- | --- | --- |
| -8883.75 | -9038.5 | 0.5 | 0.58 |
| 8944.0 | 8764.25 | 0.0 | 1.26 |
| -8873.0 | 8775.0 | 0.0 | 0.0 |
| 8931.0 | -9049.75 | 0.82 | 0.5 |
| -9382.25 | -131.75 | 0.5 | 0.5 |
| 9441.0 | -143.75 | 0.0 | 0.5 |
| 36.75 | 9280.75 | 0.5 | 12.84 |
| 23.25 | -9548.5 | 0.5 | 0.58 |

mean\_\_std\_control\_image\_28

|  |  |  |  |
| --- | --- | --- | --- |
| -8828.0 | 8165.0 | 4.16 | 1.83 |
| -7961.25 | -539.75 | 1.71 | 0.5 |
| -6072.0 | -6836.0 | 0.82 | 2.45 |
| -90.25 | -7443.5 | 4.57 | 3.7 |
| -6504.25 | 9396.0 | 0.5 | 1.41 |
| -4075.5 | 716.5 | 5.07 | 2.38 |
| -8280.75 | -4171.25 | 5.19 | 2.22 |
| -3248.25 | -7704.5 | 0.96 | 2.65 |

mean\_\_std\_tie\_image\_28

|  |  |  |  |
| --- | --- | --- | --- |
| -8686.0 | 1216.0 | 18.02 | 2.45 |
| 101.75 | -139.25 | 0.96 | 1.5 |
| -8394.5 | -8799.0 | 1.0 | 0.0 |
| -111.25 | -7469.0 | 1.26 | 1.41 |
| -8821.75 | 8162.5 | 0.96 | 7.05 |
| -783.0 | 9047.75 | 2.16 | 0.5 |

residual\_image\_27

|  |  |
| --- | --- |
| -0.0042 | -0.007 |
| 0.0007 | -0.0046 |
| -0.0025 | 0.0074 |
| 0.006 | 0.0216 |
| 0.0066 | -0.0029 |
| -0.0061 | -0.0187 |
| 0.0015 | 0.0077 |
| -0.002 | -0.0034 |

residual\_image\_28

|  |  |
| --- | --- |
| 0.0049 | 0.0061 |
| 0.008 | -0.0207 |
| -0.0119 | -0.0259 |
| -0.007 | 0.0043 |
| 0.0018 | -0.0136 |
| -0.0058 | -0.0169 |
| 0.0057 | 0.0603 |
| 0.0041 | 0.0064 |

residual\_test

|  |  |
| --- | --- |
| -0.0074 | -0.0047 |
| -0.0066 | -0.0029 |
| 0.0152 | -0.0097 |
| 0.0128 | 0.005 |
| -0.0012 | 0.0039 |
| -0.0039 | 0.0021 |
| -0.0036 | -0.0068 |
| -0.0106 | 0.0144 |
| 0.004 | 0.0024 |
| 0.0018 | -0.0028 |
| 0.0015 | 0.0001 |
| -0.0098 | 0.0098 |
| -0.0096 | -0.0081 |
| 0.0016 | -0.0058 |
| 0.0037 | 0.0053 |
| 0.0121 | -0.0024 |

radial\_lens

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 149.9089 | -0.0117 | -0.0083 | -0.0083 | 149.8932 | -0.0117 | -0.0083 | -0.0083 |
| 149.9124 | -0.0117 | 0.0083 | 0.0083 | 149.9062 | -0.0117 | 0.0083 | 0.0083 |
| 149.9116 | -0.0117 | -0.0083 | 0.0083 | 149.8946 | -0.0117 | -0.0083 | 0.0083 |
| 149.909 | -0.0117 | 0.0083 | -0.0083 | 149.9121 | -0.0117 | 0.0083 | -0.0083 |
| 111.9874 | -0.0122 | -0.0122 | -0.0 | 111.9922 | -0.0122 | -0.0122 | -0.0 |
| 112.0059 | -0.0122 | 0.0122 | -0.0 | 112.0062 | -0.0122 | 0.0122 | -0.0 |
| 112.0087 | -0.0122 | 0.0 | 0.0122 | 112.0613 | -0.0122 | 0.0 | 0.0122 |
| 112.0074 | -0.0122 | 0.0 | -0.0122 | 111.9976 | -0.0122 | 0.0 | -0.0122 |
| 96.6965 | -0.0094 | -0.0009 | 0.0093 | 144.4587 | -0.013 | -0.0095 | 0.0089 |
| 6.4628 | -0.0 | -0.0 | -0.0 | 95.2027 | -0.0091 | -0.0091 | -0.0005 |
| 83.9812 | -0.0069 | 0.0015 | -0.0067 | 107.8202 | -0.0115 | -0.0077 | -0.0085 |
| 128.3218 | -0.014 | 0.0099 | -0.0099 | 86.9606 | -0.0074 | -0.0001 | -0.0074 |
| 111.0682 | -0.0121 | 0.002 | 0.0119 | 137.5222 | -0.0139 | -0.0079 | 0.0115 |
| 45.2235 | -0.0013 | 0.0013 | 0.0002 | 49.8858 | -0.0017 | -0.0017 | 0.0004 |
| 49.7083 | -0.0017 | -0.0003 | -0.0017 | 109.9201 | -0.0119 | -0.0107 | -0.0052 |
| 107.0444 | -0.0114 | 0.0056 | -0.0099 | 98.1332 | -0.0097 | -0.0038 | -0.0089 |
| 52.9064 | -0.002 | -0.0014 | 0.0015 | 104.9493 | -0.011 | -0.0108 | 0.0017 |
| 51.8894 | -0.0019 | 0.0017 | 0.0009 | 0.8689 | -0.0 | 0.0 | -0.0 |
| 64.2599 | -0.0035 | -0.0019 | -0.0029 | 143.7754 | -0.0131 | -0.0091 | -0.0094 |
| 60.3641 | -0.0029 | 0.0021 | -0.0021 | 87.2683 | -0.0075 | -0.0001 | -0.0075 |
| 108.1532 | -0.0116 | -0.0037 | 0.0109 | 144.3841 | -0.013 | -0.0095 | 0.0089 |
| 114.6517 | -0.0126 | 0.0043 | 0.0119 | 109.7155 | -0.0118 | -0.001 | 0.0118 |

decentering\_lens

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 149.9089 | -0.0058 | 0.0025 | 149.8932 | -0.0058 | 0.0025 |
| 149.9124 | -0.0058 | 0.0025 | 149.9062 | -0.0058 | 0.0025 |
| 149.9116 | -0.0063 | -0.0036 | 149.8946 | -0.0063 | -0.0036 |
| 149.909 | -0.0063 | -0.0036 | 149.9121 | -0.0063 | -0.0036 |
| 111.9874 | -0.0051 | -0.0002 | 111.9922 | -0.0051 | -0.0002 |
| 112.0059 | -0.0051 | -0.0002 | 112.0062 | -0.0051 | -0.0002 |
| 112.0087 | -0.0017 | -0.0005 | 112.0613 | -0.0017 | -0.0005 |
| 112.0074 | -0.0017 | -0.0005 | 111.9976 | -0.0017 | -0.0005 |
| 96.6965 | -0.0013 | -0.0006 | 144.4587 | -0.0061 | -0.0033 |
| 6.4628 | -0.0 | 0.0 | 95.2027 | -0.0036 | 0.0 |
| 83.9812 | -0.0011 | -0.0007 | 107.8202 | -0.0028 | 0.0013 |
| 128.3218 | -0.0046 | -0.0026 | 86.9606 | -0.001 | -0.0002 |
| 111.0682 | -0.0017 | 0.0001 | 137.5222 | -0.0044 | -0.0029 |
| 45.2235 | -0.0008 | 0.0001 | 49.8858 | -0.001 | -0.0002 |
| 49.7083 | -0.0003 | 0.0 | 109.9201 | -0.0041 | 0.0011 |
| 107.0444 | -0.0024 | -0.0017 | 98.1332 | -0.0016 | 0.0006 |
| 52.9064 | -0.0007 | -0.0004 | 104.9493 | -0.0044 | -0.0006 |
| 51.8894 | -0.0009 | 0.0003 | 0.8689 | -0.0 | -0.0 |
| 64.2599 | -0.0009 | 0.0004 | 143.7754 | -0.0052 | 0.0023 |
| 60.3641 | -0.001 | -0.0006 | 87.2683 | -0.001 | -0.0002 |
| 108.1532 | -0.002 | -0.0014 | 144.3841 | -0.0061 | -0.0033 |
| 114.6517 | -0.0021 | 0.0007 | 109.7155 | -0.0017 | -0.0007 |

atmospheric\_refraction

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 149.9089 | 1210928159.5519 | 1211075309.1122 | 149.8932 | 1210571911.6088 | 1210672011.423 |
| 149.9124 | -1211161433.8039 | -1211009289.4272 | 149.9062 | -1211145353.7824 | -1210725301.8791 |
| 149.9116 | 1210986694.5665 | -1211145103.3911 | 149.8946 | 1210819101.6967 | -1210490502.2962 |
| 149.909 | -1211259433.7712 | 1210750254.8182 | 149.9121 | -1211160304.8318 | 1210996727.1779 |
| 111.9874 | 713979047.625 | 12303.5588 | 111.9922 | 714069790.4554 | 80594.6288 |
| 112.0059 | -714333239.504 | 112601.1424 | 112.0062 | -714338966.1532 | 101204.6513 |
| 112.0087 | -79627.4553 | -714385999.0738 | 112.0613 | -106813.4247 | -715393838.5937 |
| 112.0074 | -38443.2364 | 714362192.5399 | 111.9976 | -77473.4206 | 714174138.0401 |
| 96.6965 | 45581004.0895 | -457366556.5156 | 144.4587 | 1118856892.9498 | -1047284036.8999 |
| 6.4628 | 51271.0829 | 127371.2836 | 95.2027 | 438087110.1876 | 22379707.639 |
| 83.9812 | -67925516.0746 | 293347712.5622 | 107.8202 | 428727817.0819 | 471403340.6795 |
| 128.3218 | -756600705.2692 | 762514891.2066 | 86.9606 | 5212777.4192 | 334266232.6408 |
| 111.0682 | -113830406.9556 | -687177840.2365 | 137.5222 | 748220244.5848 | -1090124249.9442 |
| 45.2235 | -46372528.2238 | -7770126.5479 | 49.8858 | 61799512.4321 | -12803689.7304 |
| 49.7083 | 9618569.8334 | 61695614.0831 | 109.9201 | 607172731.226 | 295276898.9094 |
| 107.0444 | -306948116.3375 | 542765749.6994 | 98.1332 | 190608555.8516 | 440996155.1626 |
| 52.9064 | 50196480.7447 | -56107324.6102 | 104.9493 | 580752510.099 | -89758022.4776 |
| 51.8894 | -62518314.3675 | -33706322.2495 | 0.8689 | -343.6426 | 12.4929 |
| 64.2599 | 75177256.3845 | 112006417.8649 | 143.7754 | 1052608910.807 | 1083875650.3655 |
| 60.3641 | -78440991.7653 | 79690539.3208 | 87.2683 | 6216448.0669 | 337812051.7408 |
| 108.1532 | 207021965.6563 | -608895377.8598 | 144.3841 | 1116913029.7125 | -1045887742.5421 |
| 114.6517 | -258865577.407 | -721102654.8519 | 109.7155 | 59581853.5602 | -668752561.1558 |

measurements

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| -106.001 | -106.002 | -105.992 | -105.989 | -105.995 | -106.008 | -105.986 | -105.995 | -106.003 | -106.016 | -105.994 | -106.003 | 1210928053.543 | 1211075203.098 | 1210571805.609 | 1210671905.422 |
| 106.005 | 106.003 | 106.012 | 105.987 | 106.011 | 105.997 | 106.018 | 105.981 | 106.019 | 106.006 | 106.026 | 105.99 | -1211161327.791 | -1211009183.419 | -1211145247.762 | -1210725195.887 |
| -106.003 | 106.016 | -106.012 | 105.983 | -105.997 | 106.01 | -106.006 | 105.977 | -106.005 | 106.019 | -106.014 | 105.985 | 1210986588.555 | -1211144997.376 | 1210818995.676 | -1210490396.314 |
| 106.018 | -105.973 | 106.005 | -105.991 | 106.024 | -105.979 | 106.011 | -105.997 | 106.032 | -105.988 | 106.019 | -106.005 | -1211259327.745 | 1210750148.827 | -1211160198.819 | 1210996621.169 |
| -111.993 | 0.004 | -111.998 | -0.007 | -111.987 | -0.002 | -111.992 | -0.013 | -112.0 | -0.002 | -112.004 | -0.013 | 713978935.62 | 12303.557 | 714069678.446 | 80594.616 |
| 112.0 | -0.012 | 112.0 | -0.01 | 112.006 | -0.018 | 112.006 | -0.016 | 112.018 | -0.018 | 112.018 | -0.016 | -714333127.491 | 112601.125 | -714338854.14 | 101204.635 |
| 0.006 | 112.015 | 0.011 | 112.067 | 0.012 | 112.009 | 0.017 | 112.061 | 0.012 | 112.021 | 0.017 | 112.074 | -79627.444 | -714385887.053 | -106813.41 | -715393726.521 |
| 0.0 | -112.001 | 0.006 | -111.992 | 0.006 | -112.007 | 0.012 | -111.998 | 0.006 | -112.02 | 0.012 | -112.01 | -38443.232 | 714362080.52 | -77473.41 | 714174026.03 |
| -9.595 | 96.226 | -105.471 | 98.725 | -9.589 | 96.22 | -105.465 | 98.719 | -9.59 | 96.229 | -105.475 | 98.728 | 45580994.498 | -457366460.287 | 1118856787.469 | -1047283938.176 |
| -2.419 | -5.989 | -95.085 | -4.851 | -2.413 | -5.995 | -95.079 | -4.857 | -2.413 | -5.995 | -95.088 | -4.858 | 51268.67 | 127365.288 | 438087015.096 | 22379702.781 |
| 18.939 | -81.81 | -72.55 | -79.759 | 18.945 | -81.816 | -72.544 | -79.765 | 18.946 | -81.823 | -72.552 | -79.774 | -67925497.129 | 293347630.738 | 428727744.527 | 471403260.907 |
| 90.377 | -91.084 | -1.362 | -86.944 | 90.383 | -91.09 | -1.356 | -86.95 | 90.393 | -91.1 | -1.356 | -86.957 | -756600614.881 | 762514800.104 | 5212776.062 | 334266145.683 |
| 18.145 | 109.581 | -77.829 | 113.39 | 18.151 | 109.575 | -77.823 | 113.384 | 18.153 | 109.587 | -77.831 | 113.396 | -113830388.804 | -687177730.649 | 748220166.75 | -1090124136.551 |
| 44.596 | 7.479 | -48.854 | 10.126 | 44.602 | 7.473 | -48.848 | 10.12 | 44.603 | 7.474 | -48.85 | 10.121 | -46372483.622 | -7770119.074 | 61799463.581 | -12803679.61 |
| -7.663 | -49.109 | -98.857 | -48.067 | -7.657 | -49.115 | -98.851 | -48.073 | -7.657 | -49.117 | -98.861 | -48.078 | 9618562.176 | 61695564.966 | 607172632.36 | 295276850.833 |
| 52.688 | -93.171 | -38.94 | -90.073 | 52.694 | -93.177 | -38.934 | -90.079 | 52.699 | -93.186 | -38.938 | -90.088 | -306948063.641 | 542765656.511 | 190608516.912 | 440996065.075 |
| -35.282 | 39.436 | -103.724 | 16.036 | -35.276 | 39.43 | -103.718 | 16.03 | -35.277 | 39.431 | -103.729 | 16.032 | 50196445.467 | -56107285.179 | 580752406.366 | -89758006.446 |
| 45.668 | 24.631 | 0.862 | -0.026 | 45.674 | 24.625 | 0.868 | -0.032 | 45.676 | 24.626 | 0.868 | -0.032 | -62518268.693 | -33706297.623 | -342.774 | 12.461 |
| -35.818 | -53.35 | -100.172 | -103.135 | -35.812 | -53.356 | -100.166 | -103.141 | -35.814 | -53.359 | -100.175 | -103.151 | 75177220.57 | 112006364.507 | 1052608810.627 | 1083875547.217 |
| 42.339 | -43.014 | -1.612 | -87.248 | 42.345 | -43.02 | -1.606 | -87.254 | 42.347 | -43.022 | -1.606 | -87.261 | -78440949.419 | 79690496.298 | 6216446.46 | 337811964.48 |
| -34.82 | 102.403 | -105.397 | 98.695 | -34.814 | 102.397 | -105.391 | 98.689 | -34.818 | 102.408 | -105.4 | 98.698 | 207021930.836 | -608895275.454 | 1116912924.306 | -1045887643.847 |
| 38.732 | 107.915 | -9.742 | 109.289 | 38.738 | 107.909 | -9.736 | 109.283 | 38.742 | 107.921 | -9.737 | 109.294 | -258865538.667 | -721102546.93 | 59581843.821 | -668752451.862 |