Combined system method

Querying the robot controller to trigger the 1DoF platform

This report shows the data acquired by L515 RealSense camera and the latency of the combined system with a new method. This method waits the first motion data sent back from the robot controller to trigger the 1DoF platform. The motion traces that have been tested can be found on ShareDrive: Y:\PRJ-RPL\2RESEARCH\2\_ProjectData\IEC\Motion\_traces\Traces\_Jun2024\_expt

The “XX\_resp\_XX.txt” files are the 1DoF motion traces.

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# Combined system overall latency

|  |  |
| --- | --- |
| (s) | Combined system latency |
| Mean | -0.2 |
| Std | 0.7 |
| 1st percentile | -1.7 |
| 99th percentile | 1.4 |

# 1.Mean\_Motion1 (test2)

|  |  |
| --- | --- |
| Trace | 1.Mean\_Motion\_1D |
| Mean (mm) | 0.6 |
| Std (mm) | 0.8 |
| 1st percentile (mm) | -1.2 |
| 99th percentile (mm) | 2.6 |
| Trace | 1.Mean\_Motion\_6D |
| Mean (mm) | 0.4 |
| Std (mm) | 0.6 |
| 1st percentile (mm) | -0.9 |
| 99th percentile (mm) | 1.8 |
| Latency (s) | 0.06 |

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| Figure 1.1: 1.Mean\_Motion motion trace test 2 |

# 1.Mean\_Motion1 (test3)

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| Trace | 1.Mean\_Motion\_1D |
| Mean (mm) | 0.1 |
| Std (mm) | 0.7 |
| 1st percentile (mm) | -1.7 |
| 99th percentile (mm) | 2.0 |
| Trace | 1.Mean\_Motion\_6D |
| Mean (mm) | 0.8 |
| Std (mm) | 0.5 |
| 1st percentile (mm) | -0.4 |
| 99th percentile (mm) | 2.0 |
| Latency (s) | 0.04 |

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| Figure 1.2: 1.Mean\_Motion motion trace test 3 |

# 2.Mean\_Motion2\_(test1)

|  |  |
| --- | --- |
| Trace | 2.Mean\_Motion\_1D |
| Mean (mm) | 0.2 |
| Std (mm) | 0.9 |
| 1st percentile (mm) | -2.0 |
| 99th percentile (mm) | 2.5 |
| Trace | 2.Mean\_Motion\_6D |
| Mean (mm) | -0.2 |
| Std (mm) | 0.6 |
| 1st percentile (mm) | -1.5 |
| 99th percentile (mm) | 1.1 |
| Latency (s) | 0.15 |

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| Figure 2.1: 2.Mean\_Motion2 motion trace test 1 |

# 2.Mean\_Motion (test2)

|  |  |
| --- | --- |
| Trace | 2.Mean\_Motion\_1D |
| Mean (mm) | 0.5 |
| Std (mm) | 0.9 |
| 1st percentile (mm) | -1.7 |
| 99th percentile (mm) | 2.8 |
| Trace | 2.Mean\_Motion\_6D |
| Mean (mm) | -0.1 |
| Std (mm) | 0.5 |
| 1st percentile (mm) | -1.4 |
| 99th percentile (mm) | 1.2 |
| Latency (s) | 0.13 |

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| Figure 2.2: 2.Mean\_Motion2 motion trace test 2 |

# 2.Mean\_Motion (test3)

|  |  |
| --- | --- |
| Trace | 2.Mean\_Motion\_1D |
| Mean (mm) | 0.9 |
| Std (mm) | 0.9 |
| 1st percentile (mm) | -1.6 |
| 99th percentile (mm) | 3.1 |
| Trace | 2.Mean\_Motion\_6D |
| Mean (mm) | -0.4 |
| Std (mm) | 0.6 |
| 1st percentile (mm) | -1.8 |
| 99th percentile (mm) | 0.9 |
| Latency (s) | 0.13 |

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| Figure 2.3: 2.Mean\_Motion2 motion trace test 3 |

# 3.Mean\_Motion3 (test1)

|  |  |
| --- | --- |
| Trace | 3.Mean\_Motion\_1D |
| Mean (mm) | -0.6 |
| Std (mm) | 1.0 |
| 1st percentile (mm) | -3.0 |
| 99th percentile (mm) | 0.7 |
| Trace | 3.Mean\_Motion\_6D |
| Mean (mm) | -0.6 |
| Std (mm) | 0.7 |
| 1st percentile (mm) | -2.2 |
| 99th percentile (mm) | 1.2 |
| Latency (s) | 0.09 |

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| Figure 3.1: 3.Mean\_Motion3 motion trace test 1 |

# 3.Mean\_Motion3 (test2)

|  |  |
| --- | --- |
| Trace | 3.Mean\_Motion\_1D |
| Mean (mm) | -0.7 |
| Std (mm) | 1.1 |
| 1st percentile (mm) | -3.2 |
| 99th percentile (mm) | 2.0 |
| Trace | 3.Mean\_Motion\_6D |
| Mean (mm) | -0.2 |
| Std (mm) | 0.7 |
| 1st percentile (mm) | -1.8 |
| 99th percentile (mm) | 1.9 |
| Latency (s) | 0.14 |

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| Figure 3.2: 3.Mean\_Motion3 motion trace test 2 |

# 4.Mean\_Motion4 (test1)

|  |  |
| --- | --- |
| Trace | 4.Mean\_Motion\_1D |
| Mean (mm) | -0.7 |
| Std (mm) | 1.1 |
| 1st percentile (mm) | -3.2 |
| 99th percentile (mm) | 2.0 |
| Trace | 4.Mean\_Motion\_6D |
| Mean (mm) | -0.2 |
| Std (mm) | 0.7 |
| 1st percentile (mm) | -1.8 |
| 99th percentile (mm) | 1.9 |
| Latency (s) | 0.14 |

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| **A screenshot of a graph  Description automatically generated** |
| Figure 4.1: 4.Mean\_Motion4 motion trace test 1 |

# 4.Mean\_Motion4 (test2)

|  |  |
| --- | --- |
| Trace | 4.Mean\_Motion\_1D |
| Mean (mm) | -0.7 |
| Std (mm) | 1.1 |
| 1st percentile (mm) | -3.2 |
| 99th percentile (mm) | 2.0 |
| Trace | 4.Mean\_Motion\_6D |
| Mean (mm) | -0.2 |
| Std (mm) | 0.7 |
| 1st percentile (mm) | -1.8 |
| 99th percentile (mm) | 1.9 |
| Latency (s) | 0.14 |

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| **A screenshot of a graph  Description automatically generated** |
| Figure 4.2: 4.Mean\_Motion4 motion trace test 2 |

# 4.Mean\_Motion4 (test4)

|  |  |
| --- | --- |
| Trace | 4.Mean\_Motion\_1D |
| Mean (mm) | -0.7 |
| Std (mm) | 1.1 |
| 1st percentile (mm) | -3.2 |
| 99th percentile (mm) | 2.0 |
| Trace | 4.Mean\_Motion\_6D |
| Mean (mm) | -0.2 |
| Std (mm) | 0.7 |
| 1st percentile (mm) | -1.8 |
| 99th percentile (mm) | 1.9 |
| Latency (s) | 0.14 |

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| **A screenshot of a graph  Description automatically generated** |
| Figure 4.2: 4.Mean\_Motion4 motion trace test 3 |