

## Simulated Robotic Manipulation Benchmark

Reference No / Version	RAL-SI-2020-P[19-0842]_9-V1.1 for the latest versions of the benchmark please refer to <a href="https://research.csiro.au/robotics/manipulation-benchmark/">https://research.csiro.au/robotics/manipulation-benchmark/</a>
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Adopted Protocol	Simulated Robotic Manipulation Protocol – Task9 (RAL-SI-2020-P[19-0842]_9-V1.1)
Scoring	<ul style="list-style-type: none"> <li>For scoring, the following must be recorded at 10Hz throughout the duration of the simulation. This is to be exported to a csv with the following information to be recorded in the listed order: <ul style="list-style-type: none"> <li>Position (x,y,z)*</li> <li>Rotation (w,x,y,z)*</li> <li>Joint Torques (J1,J2,J3,J4,J5,J6)</li> <li>Finger Rotations (Finger 1, Finger 2, Finger 3)</li> <li>Force (Fx,Fy,Fz)*</li> <li>Moments (Mx, My, Mz)*</li> <li>Position (x,y,z) †</li> <li>Rotation (w,x,y,z) †</li> </ul> </li> <li>20 Repeats of the simulation are required (used to determine if the simulator is deterministic)</li> <li>Use the performance_metric.py script which can be found at <a href="https://research.csiro.au/robotics/manipulation-benchmark/">https://research.csiro.au/robotics/manipulation-benchmark/</a> to generate results.</li> <li>Sum errors for each of the following categories for all tasks in a subgroup: Euclidean distance, rotation, pose, velocity, acceleration, torque, force, moments.</li> </ul> <p><i>*From the 'Measurement Frame' as listed in Figures 1 and 2 in the protocol (also referred to as the 'ft_mount_measurement_joint' in the URDF).</i></p> <p><i>†From the object frame depicted in Figures 1 and 2 in the protocol.</i></p>
Details of Setup	<ul style="list-style-type: none"> <li>Detailed information on: <ul style="list-style-type: none"> <li>Simulator/Physics Engine used;</li> <li>Tuned parameters and their values; and</li> <li>Anything else required to reproduce results.</li> </ul> </li> </ul>
Results to Submit	<ul style="list-style-type: none"> <li>CSV files from all 20 repeats as used for scoring.</li> <li>CSV files for all other tasks from subgroup 2 (i.e. Tasks 3-8,10).</li> </ul>