

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Cooperative and Robotic Space Systems (6)

Author: Dr. Cameron Dickinson
MDA, Canada, cameron.dickinson@mdacorporation.com

INTRODUCING TRAIL: THE TRAINING ARTIFICIAL INTELLIGENCE LABORATORY

Abstract

MDA, supplier of the Shuttle Canadarm and ISS Canadarm2 robotic manipulator systems, has upgraded its robotic testbed facility in anticipation of development of the upcoming Lunar Gateway Canadarm3 manipulator. This upgrade opens the lab up to possibilities in Artificial Intelligence Research Development.

TRAIL, the TRaining Artificial Intelligence Laboratory, is an upgrade to current infrastructure at MDA's Brampton facility. This infrastructure allows robotics data to be produced in an AI-ready format as part of the baseline operations of the manipulator. This decreases the need for tedious cleaning and time synchronization of data streams. The lab has been outfitted with 11 cameras at a variety of viewing angles, movable lighting, and green screens to remove irrelevant background elements and enable domain randomization. All of the visual data is combined with robot telemetry to provide a complete dataset.

MDA is currently in the process of releasing its first TRAIL dataset, which seeks to address the problem of "clearance monitoring". This dataset was created to train AI algorithms on whether the robot is too close to an obstacle (such as the Gateway station) during operations. This involved running the robot through a set of trajectories, and altering lighting conditions and obstacle locations to create a dataset of several hundred individual operations.