Spacecraft motion control algorithms implementation and testing are of high importance in space missions design. There is a need for rapidly testing control algorithms for space missions at a low cost. A novel robotic system that emulates orbital motion in a laboratory environment is presented. The system is composed of a six degrees of freedom robotic manipulator fixed on top of an omnidirectional ground vehicle accompanied with on board computer and sensors. The integrated mobile manipulator is used as a testbed to emulate and realize orbital motion and control algorithms. The kinematic relations of the ground vehicle, robotic manipulator and the coupled kinematics are derived. The system is used to emulate an orbit equation trajectory in real time. The system is scalable and capable of emulating servicing missions, satellite rendezvous and chaser follower problems.

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The public is welcome to attend.