

Project Title: FPGA 6-DOF Motion Platform

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We plan to build an FPGA-controlled Stewart platform. This is a device that uses six, typically linear, actuators mounted in pairs on a stationary base plate to manipulate items on a top plate with six degrees of freedom. Stewart platforms are used in certain industrial positioning systems but are probably more popularly associated with their use as the bases of racecar and flight simulators. For cost reasons, rather than linear actuators, this project will use servos.

The base functionality we're aiming to provide is a feedback control system that calculates the inverse kinematics and respective motor commands (which will likely require interfacing the FPGA with a separate driver board) necessary to keep a marble placed on the top plate in a constant position. Extensions will progressively extend the functionality of the platform, for example, getting the marble to follow certain programmed paths or manually controlling its position via a handheld controller.