

Mini-Hexapod Platform

- Low cost 6-axis control system (<\$15K)
- Precision motions, with step resolutions of 0.003175 millimeters (0.000125")
- Stable motions, with position repeatability better than 0.001 millimeters (0.00005")
- Designed for 2.0 Kg Loads (~5 pounds)
- 25mm (~1.0") range of motion in XYZ
- 20 degree range of rotation about XYZ
- Low backlash, less than 1.0 micron (0.00005")
- Power efficient, holds position with no power
- PC Windows interface for easy motion programming and storing of motion profiles



The Mini-hexapod is a relatively low cost kinematics platform that allows motion with six-degrees of freedom. These motions are in the X, Y, and Z direction, with rotations about those axes. Six linear actuators are placed in a triangular pattern to achieve a rigid, stable, and precise movement while carrying a Load. With its dedicated drive electronics and Windows user interface, the control of the platform's motions is simplified for ease of use.

If your application requires the motions of a hexapod platform with 0.001 millimeter repeatability, then you do not need the more expensive platforms on the market. The Mini-hexapod platform is the answer you have been looking for.

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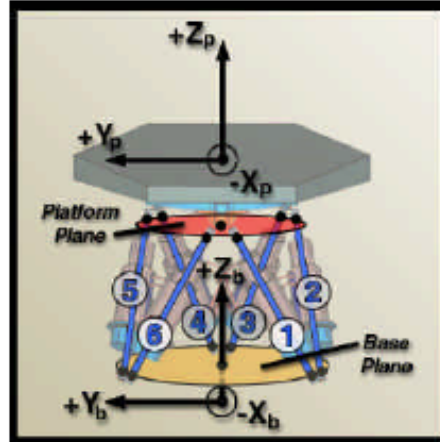
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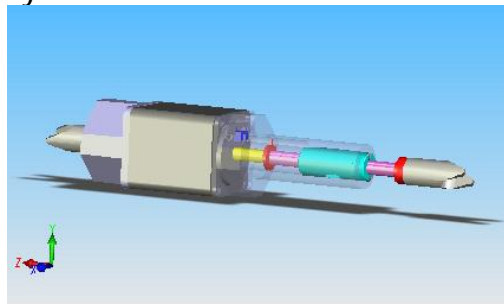
Platform Basics

The Mini-Hexapod platform consists of Base (b) and a movable Platform (p). The Base is fixed and is reference plane for orienting and positioning the Platform plane. The two planes are connected with three pairs of linear actuators, 1 through 6. The actuators are attached to Base and Platform with movable joints to allow motion of the Platform. By adjusting the lengths of each actuator the Platform can be positioned to any position within its range. The positional resolution and precision of motion is determined by the performance of the actuators. Springs are used to keep all moving parts in compression to eliminate or minimize backlash in the system.



Actuators

The actuators are made with small stepper motors with precision lead screws and recirculating ball spline shafts. The motor's rotor is the rotating nut for the leadscrew. The recirculating ball spline shaft keeps the screw from rotating and provides the stiffness (minimized side play) of the actuator. A home sensor is mounted in the actuator and defines the actuator's retracted position. Each actuator has its own micro-stepping drive electronics that is controlled by a microcontroller. This dedicated controller can position any actuator or all the actuators to different positions at different velocities simultaneously



Motor Drive & Software Control

The Mini-Hexapod system comes complete with the platform with its microcontroller, motors drivers, power supply, and all necessary cables, at no extra cost. The Mini-Hexapod Platform is a turn key system complete with PC windows software on a CD. Motion commands are transmitted to the controller through a standard PC serial port.

Some of the features available are:

- Velocities in steps/seconds (sps) from 100 to 500 sps
- Step positions from the fully retracted "home" position to 7,500 steps.
- Each step (resolution) moves the actuators length by 0.000125" (0.003175mm).
- Multi actuator motions are possible with each actuator operating at different velocities.
- Motion programs (scripts) can be written and stored as files on a PC.
- The motion programs have counters, delays and loop functions to enable more sophisticated motions.