New Scale News

NEW SCALE TECHNOLOGIES

April 2015

World's smallest hexapod positioner in a handheld surgical tool (Carnegie Mellon University)

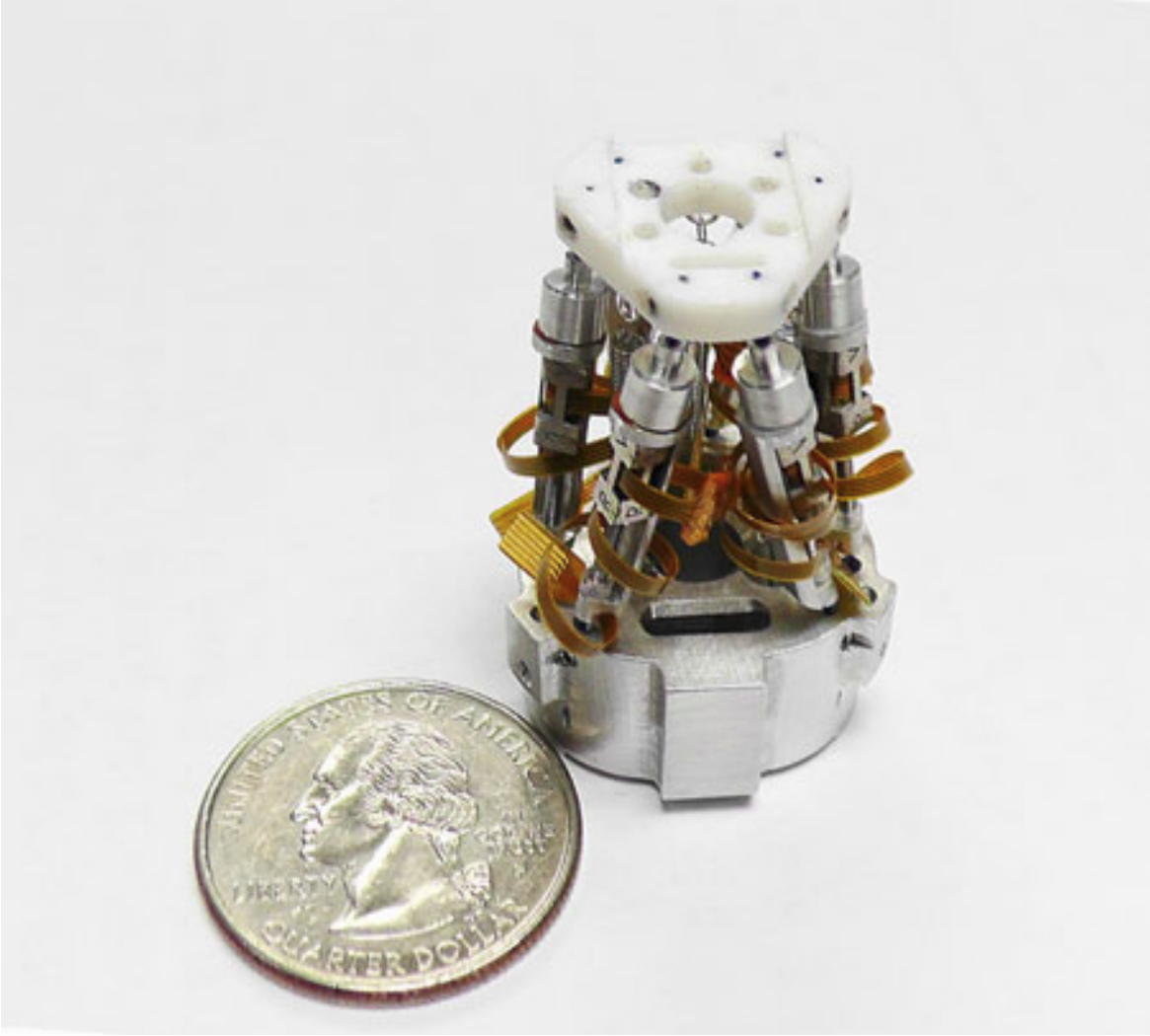
Ten years ago we were talking about the excitement of someday being able to make a hexapod positioner as small as a coffee cup. What a difference a decade makes! Through a collaboration with the robotics institute at Carnegie Mellon University, we now have piezoelectric hexapod that's as small as a shot glass.

The world's smallest hexapod

"Miniature" commercial hexapods are as small as 100 mm diameter. Our latest proof-of-concept hexapod is for CMU is just 23 mm diameter.

It has six of our piezoelectric SQUIGGLE motors integrated with miniature bearing assemblies, motor mounts, flexures and spring preloads. All of our micro-mechatronic engineering skills were brought to bear.

What is a hexapod positioner?
Also called a Gough-Stewart platform, it is a parallel kinematic motion device with six actuators arranged between a top platform and a bottom platform. The actuators move the top platform with six degrees of freedom (6 DOF): lateral, longitudinal, vertical, pitch, roll and yaw.



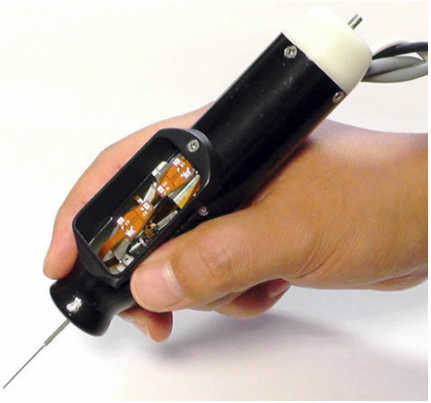
New Scale micro hexapod developed with Carnegie Mellon University | Images courtesy CMU

We created miniature drive electronics to control the motion of the actuators. The hexapod and all drive electronics are integrated into a handheld "Active Tremor-Canceling Microsurgical Instrument" being developed at CMU.

The manipulator senses its own motion, selectively filters out erroneous motion such as hand tremor, and produces stabilized motion at the tool tip via active error

compensation.

> **Read more about the CMU project**
> **Get the technical paper from IEEE** ($31 /$13 members)



CMU's Active Tremor-Canceling Microsurgical Instrument

Micro hexapod performance and applications

Performance (in the tremor-cancelling instrument)

- Base diameter: 23 mm
- Height: 37 mm
- Motion volume (at tool tip): 4 mm diameter cylinder, 4 mm long
- Tracking errror: < 20 micrometer
- Side load tolerance: 0.25N
- 3.3 V input - can be powered by batteries

Applications

This new micro hexapod opens up new possibilities for positioning and alignment, especially in portable and handheld devices.

- Handshake stabilization for surgical tools
- Assistive technology for people with tremors
- Alignment of optical fiber arrays

> **Contact us to discuss your application**

About Us
New Scale Technologies develops small, precise and smart motion systems for critical adjustments of optics, and many other micro positioning applications. Our simple and elegant solutions deliver best-in-class performance in handheld, portable and mobile instruments for medical, scientific and industrial applications. Our customers benefit from complete, "all-in-one" motion solutions that are tailored to their unique requirements and easily integrated into their next-generation instruments.

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