

VRAI group

Charles Baur
charles.baur@epfl.ch

François Conti
Sébastien Grange
Patrick Helmer
Patrice Rouiller

DMT-ISR
EPFL
CH – 1015 Lausanne
(Switzerland)
tel (+41) 21 693-2569
fax (+41) 21 693-6540

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dimension

forcedimension.com
info@forcedimension.com

Partners



The DELTA Haptic Device

Why a DELTA structure ?

STIFFER, LIGHTER, STRONGER

Robotic structures that display parallel kinematics (like the DELTA configuration) offer far better characteristics than standard serial configurations.

The 3-DOF DELTA structure can accept different grippers on its extremity. For example with an active wrist, the system becomes a 6 degree-of-freedom haptic device.

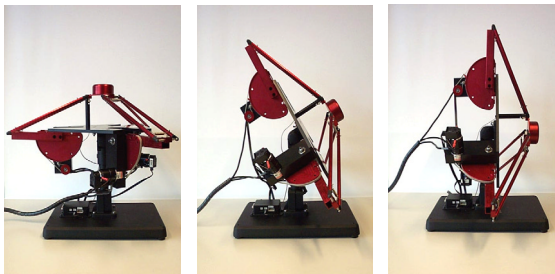
To improve sensitivity and decrease friction threshold, a 6-DOF force sensor can be added to the gripper. Such a version of the device is currently under evaluation.

3-DOF haptic device

6-DOF haptic device



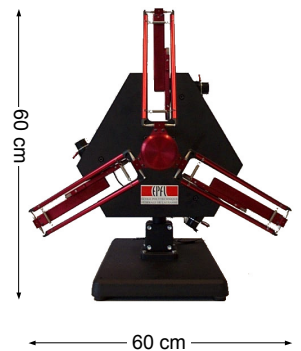
DELTA base (3 translations)



wrist (3 rotations)

Specifications

workspace	translation	cylinder \varnothing 360 mm x 200 mm
	rotation	$\pm 20^\circ$ for the three rotations
continuous	force	20 N in the entire workspace
	torque	0.2 Nm in the entire workspace
resolution	linear	< 0.1 mm
	angular	< 0.04°
sensitivity	linear	max 1/16 (without 6-DOF force sensor)
(F,M) friction / max	angular	max 1/5 (without 6-DOF force sensor)
software		Windows API
system requirements		Pentium 300MHz or equivalent



6 degree-of-freedom haptic applications

micro & nano technology



- manipulation under microscope
- manipulation planning
- interaction with an AFM
- carbon nanotube manipulation

medical applications



- surgery simulators
- teaching and training
- active & intelligent tool holder
- preoperative planning
- augmented reality surgery

simulation



- virtual environment with 6-DOF haptic device
- real-time rigid/dynamic body simulation
- fusion with active vision systems

teleoperation



- teleoperation in hazardous environment
- immersive remote driving & haptic GUI
- haptic sensing of obstacles