

# force dimension

## omega.3 - micromanipulation

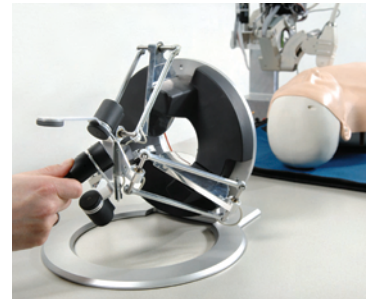
Micromanipulators are small robots built to perform displacement and assembly tasks on objects often thinner than a human hair. Yet, while robots can accurately perform small movements, they often need to be directed by a human operator to carry out complex and dynamic tasks. Haptics offers a highly intuitive and interactive way of handling the very small. With such a setup, manipulating a micro-bead "feels" just like handling a golf ball.



developed by EPFL, Switzerland

## omega.6 - teleoperation

Sonographers derive a significant amount of tactile feedback from holding the ultrasound unit. For example, the feel of the ultrasound head against the patient's body helps position the head between the patient's ribs. Philips Applied Technologies' system incorporates accurate haptic feedback from the ultrasound head so that the sonographer can feel the reactive forces imposed on the head as it moves over the patient's body.



developed by Philips, The Netherlands

## omega.7 - surgical robotics

In collaboration with surgeons from the University of Cincinnati, a team of researchers from SRI International and Force Dimension evaluated the benefits of robotic surgery on air and space flights by performing incision and suturing tasks aboard a NASA C-9 aircraft, using two omega.7 force feedback interfaces. These experiments demonstrated the extraordinary capabilities of the omega.7 in extreme environment conditions.



developed by SRI International, USA

# force dimension

## omega.x

<b>workspace</b>	translation	Ø 160 x 110 mm	
	rotation	240 x 140 x 320 180 deg	(omega.6 7)
<b>forces</b>	grasping	25 mm	(omega.7)
	translation	12.0 N	
<b>resolution</b>	grasping	± 8.0 N	(omega.7)
	translation	< 0.01 mm	
	rotation	0.09 deg	(omega.6 7)
	grasping	0.006 mm	(omega.7)

## electronics

<b>interface</b>	standard	USB 2.0
	refresh rate	up to 8 KHz
<b>power</b>	universal	110V - 240V

## software

<b>platforms</b>	Microsoft	Windows XP / Vista / 7
	Linux	kernel 2.6
	Apple	OS X 10.5 / 10.6
	QNX	Neutrino 6.3 / 6.4 / 6.5
	tenAsys	INtime 4.0
<b>software</b>	haptic SDK	
	robotic SDK	

## features

<b>structure</b>	delta-based parallel kinematics	
	hand-centered rotations	(omega.6 7)
	rotations decoupled from translations	(omega.6 7)
	active gravity compensation	
<b>calibration</b>	automatic	
	driftless	
<b>user input</b>	1 programmable button	
<b>safety</b>	velocity monitoring	
	electromagnetic damping	
<b>option</b>	right- or left-handed	(omega.6 7)

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