

Haptic Virtual Reality And Rehabilitation



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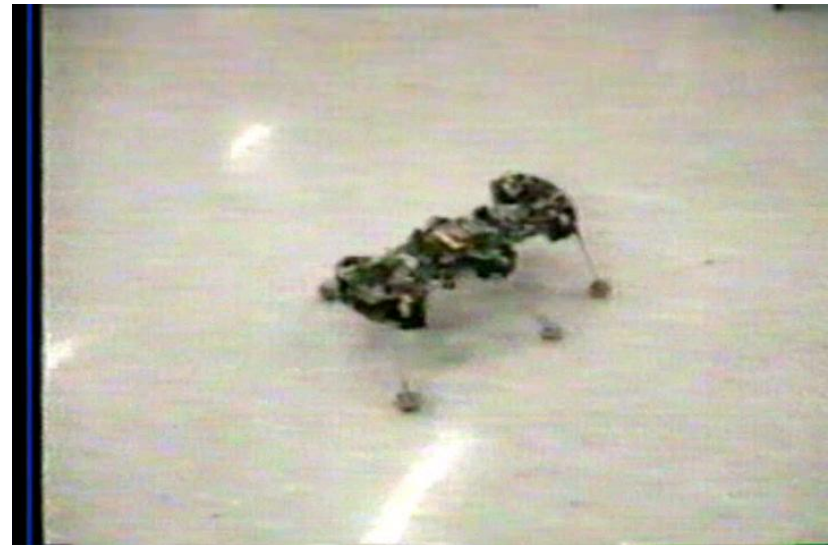
"Roboterapie, Tehnologii Virtuale si Informatice: Implicatii si Aplicatii in Stiintele
Cognitive Clinice"
22-23 septembrie 2010, Bucuresti

Outline of this presentation

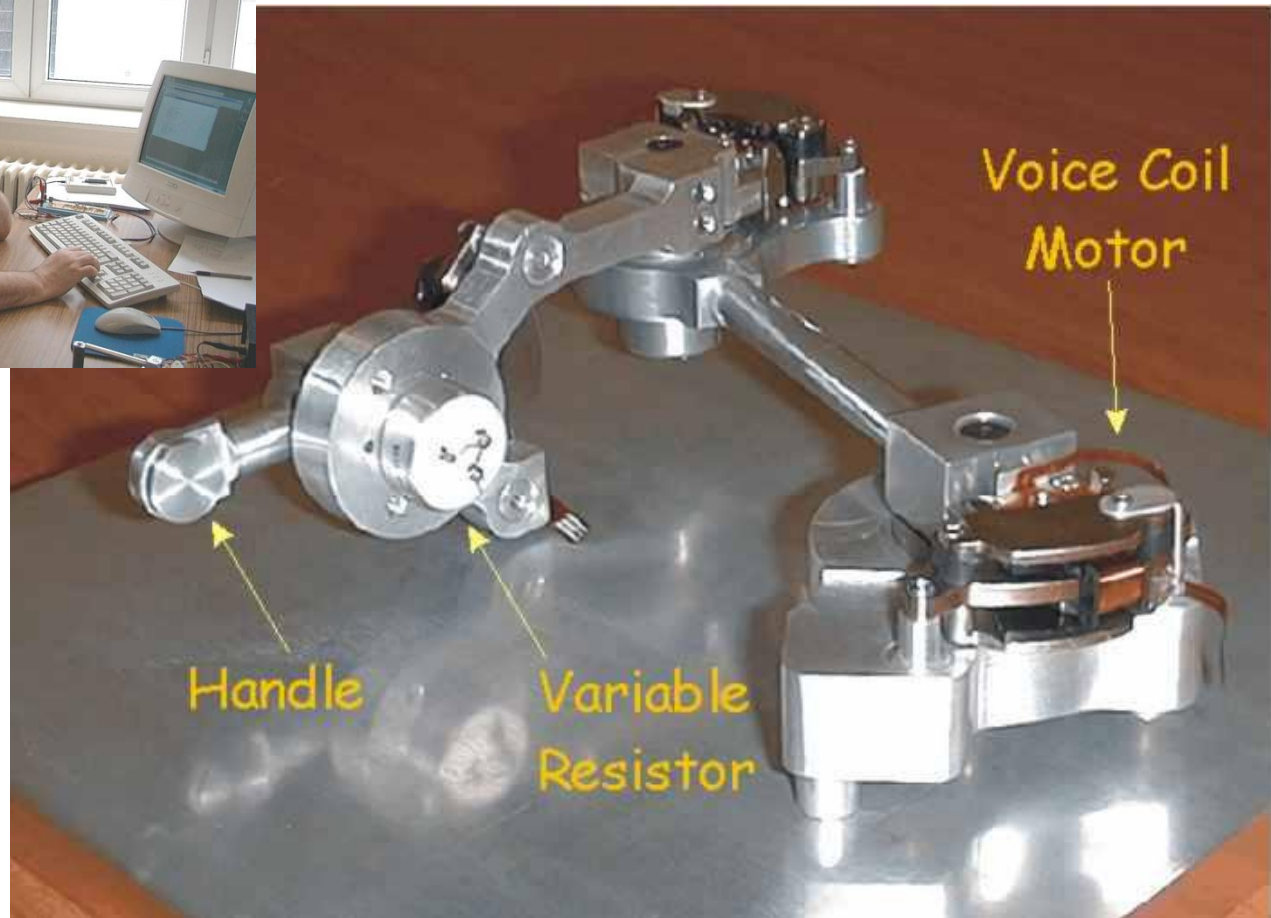


1. Mechatronics Expertise
2. Adaptive Haptic Rehabilitation
3. Marionette - About know-how

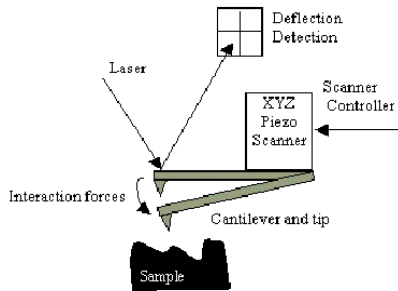
Robotic Expertise - up to 2000



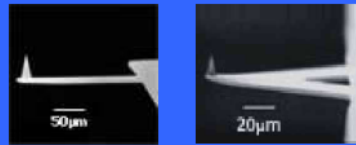
3 DOF haptic device - 2002



Manual lithography in CD sample - 2002

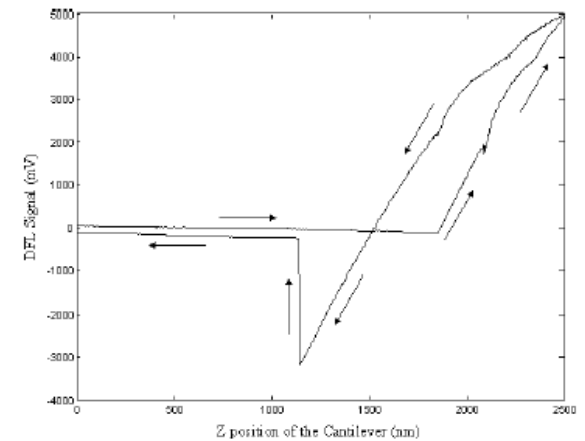
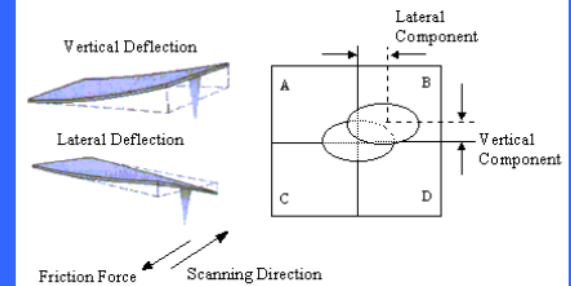


Probe

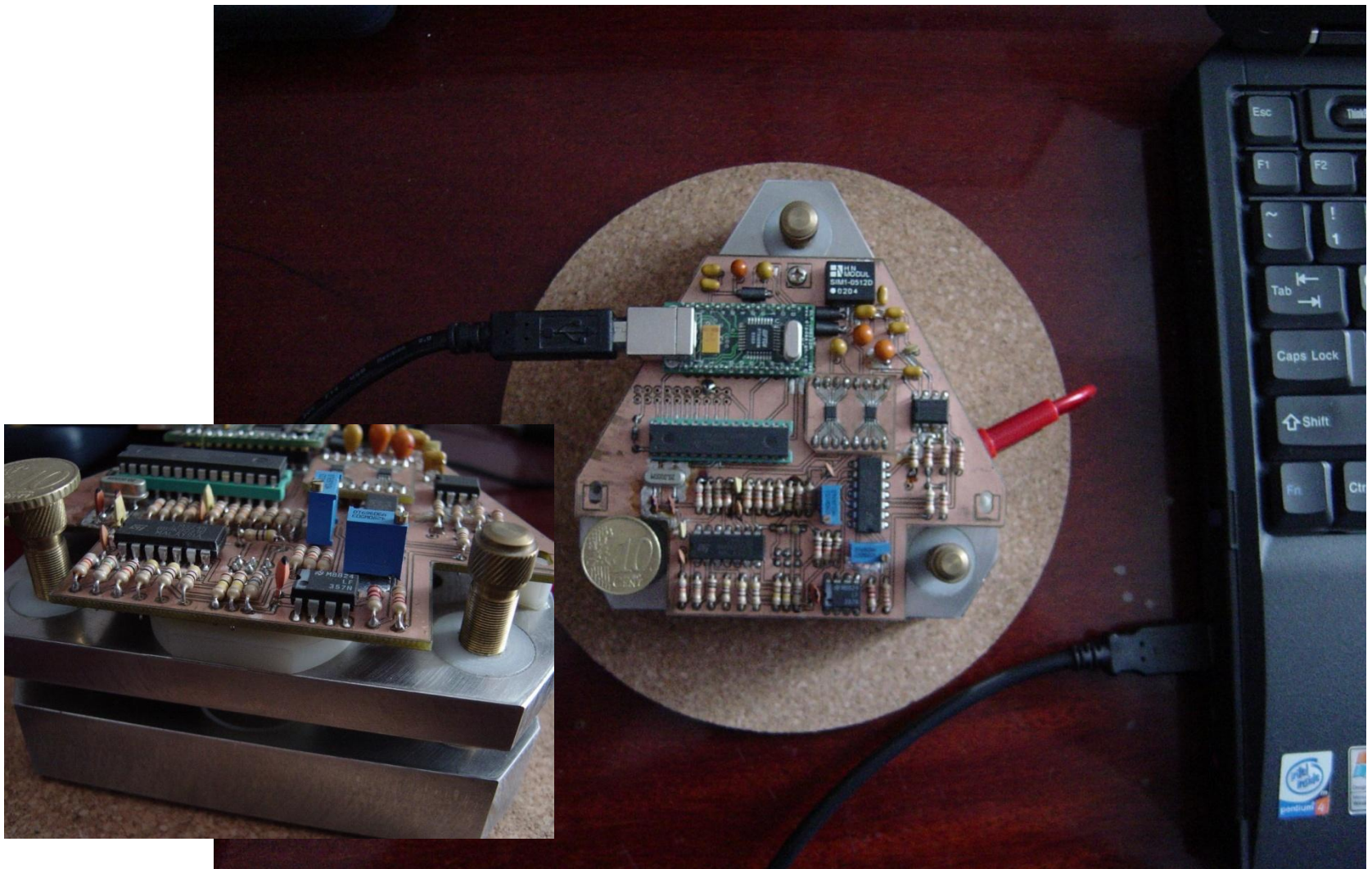


$K : 0.01 \text{ Nm}$ 100 N/m
 $\text{Freq} : 40 \text{ kHz}$ 400 kHz

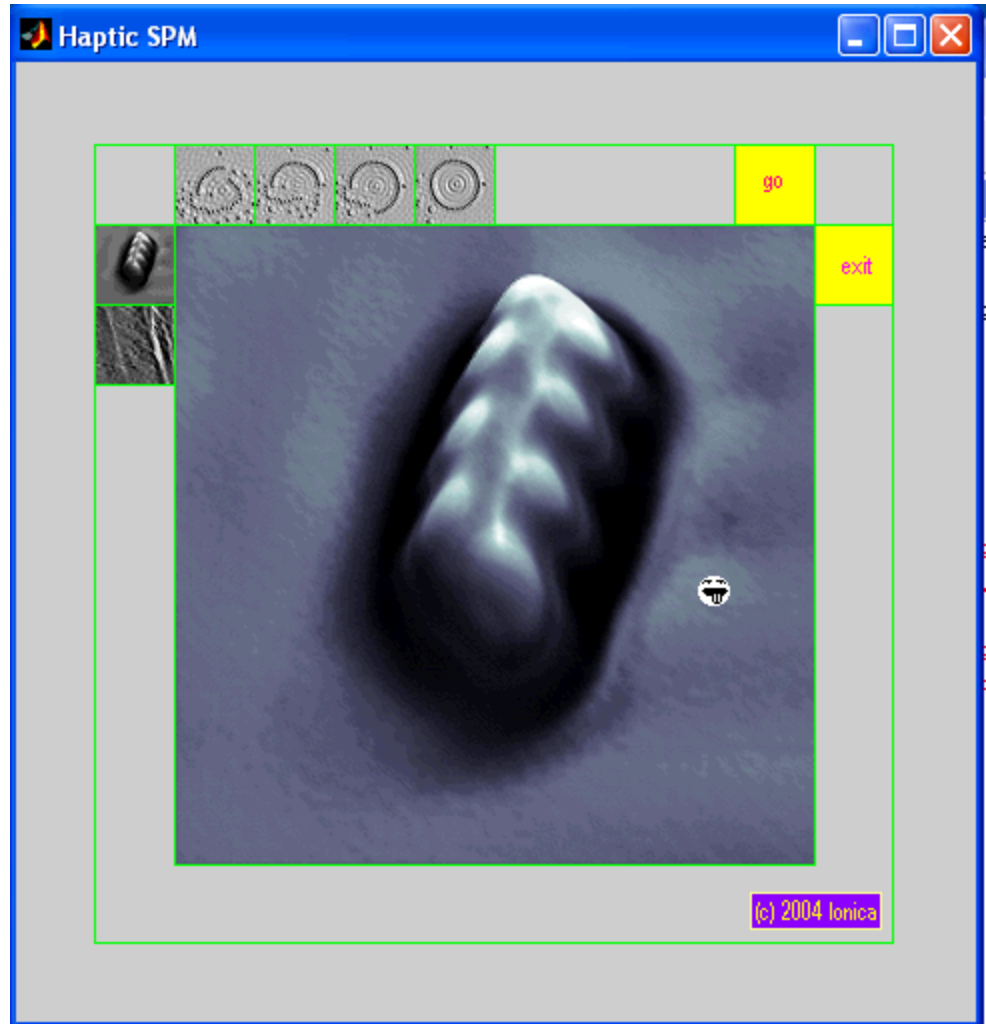
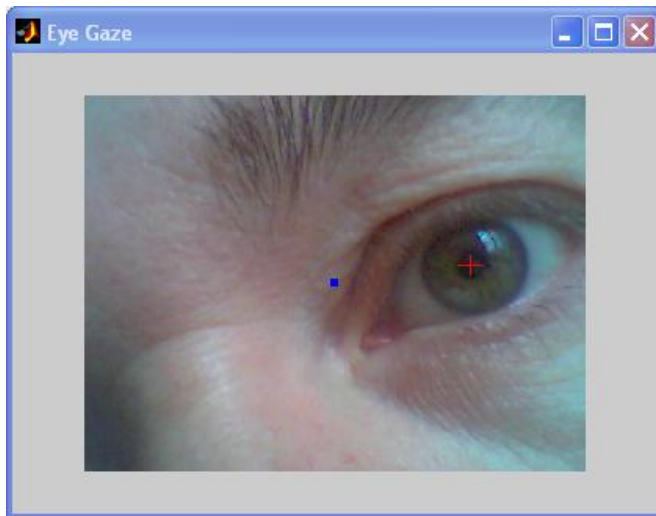
Deflection Detection



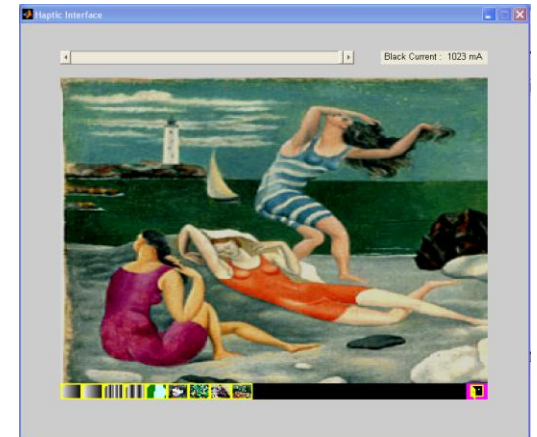
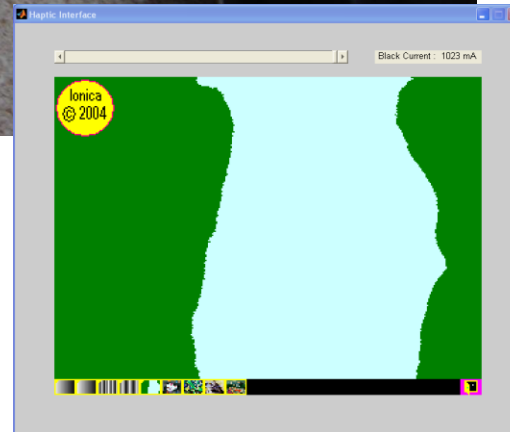
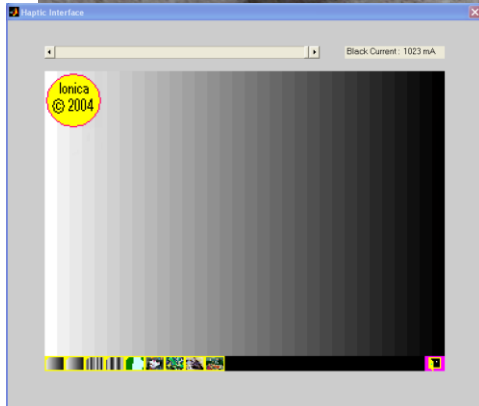
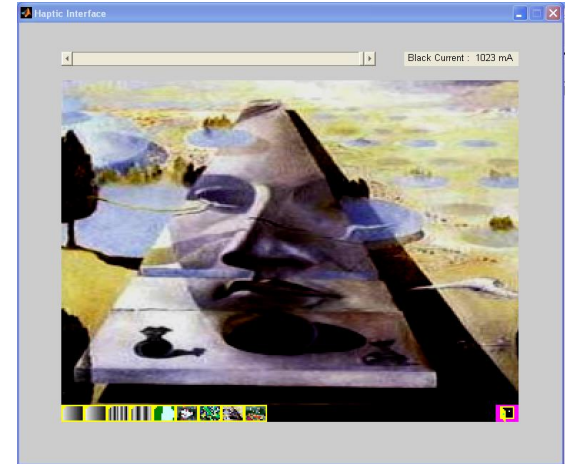
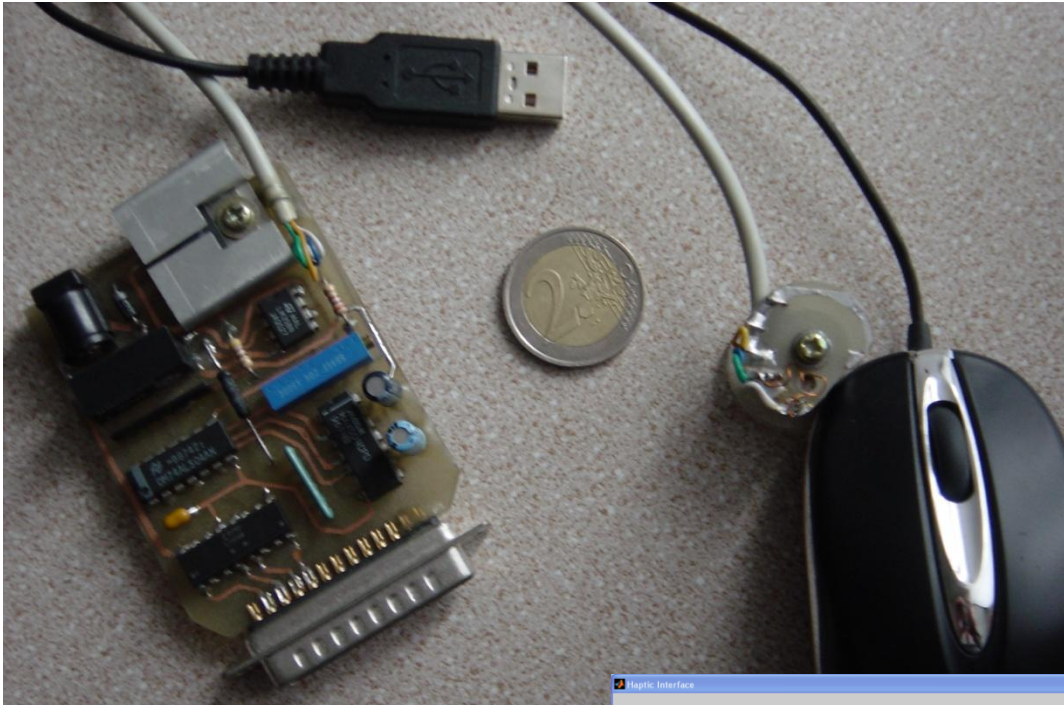
Compact Low Power STM – 2003



Human Computer Interface and Nanotechnologies – 2003

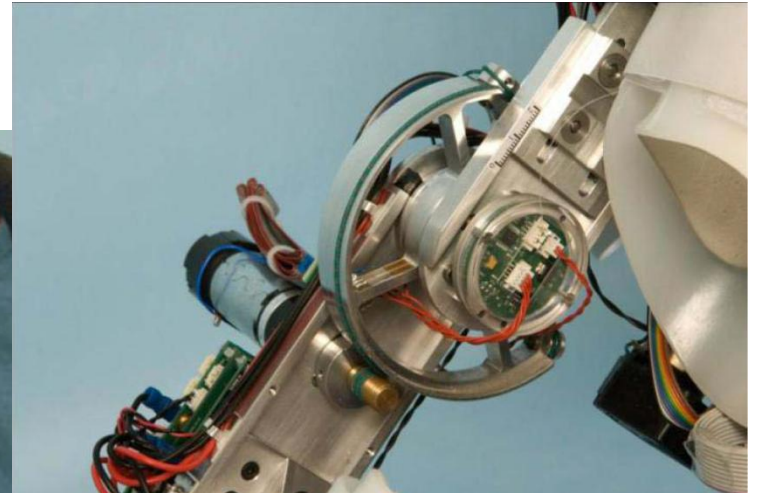
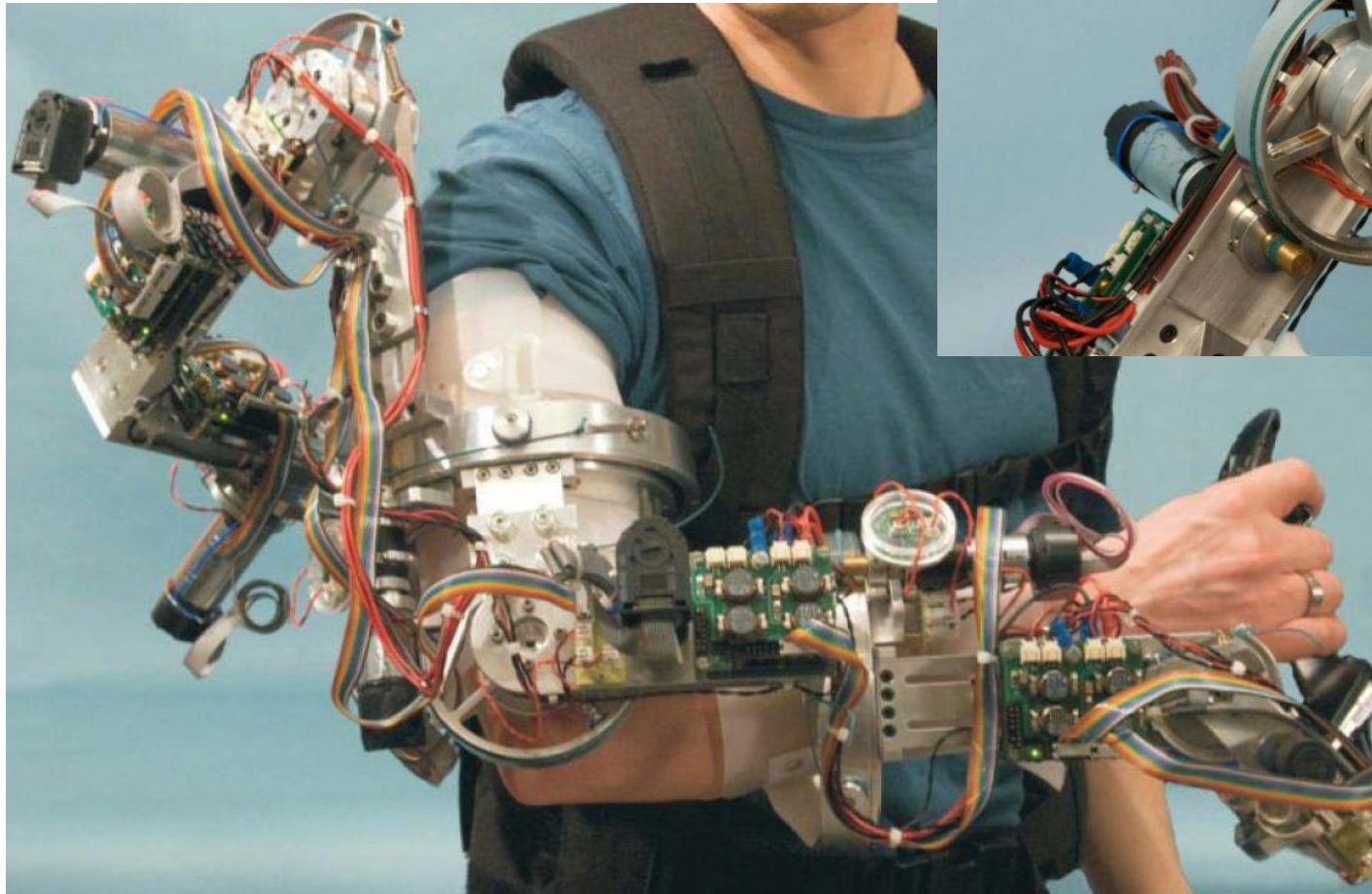


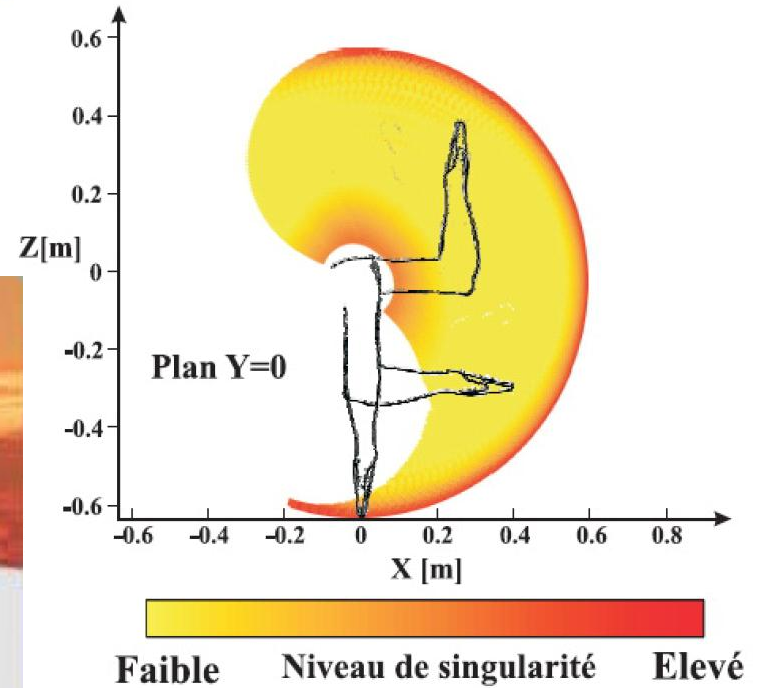
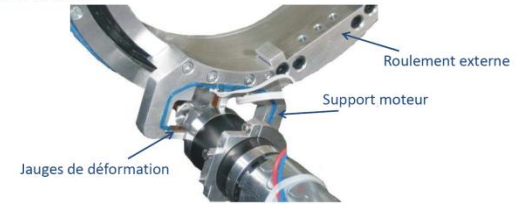
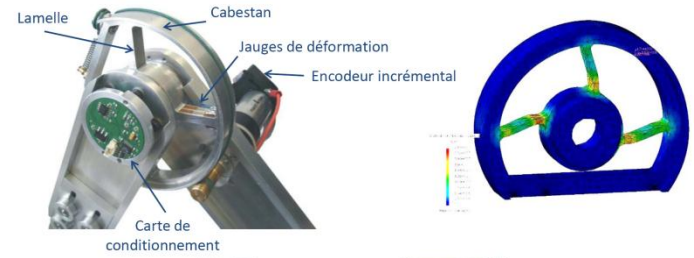
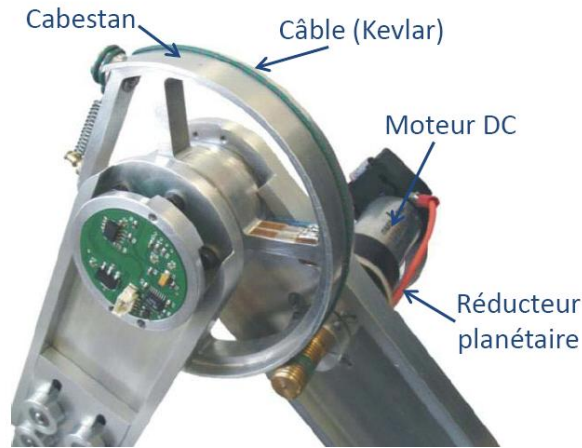
Passive Haptic Interface – 2004, UBB Romania



Exoskeleton Haptic - 2004



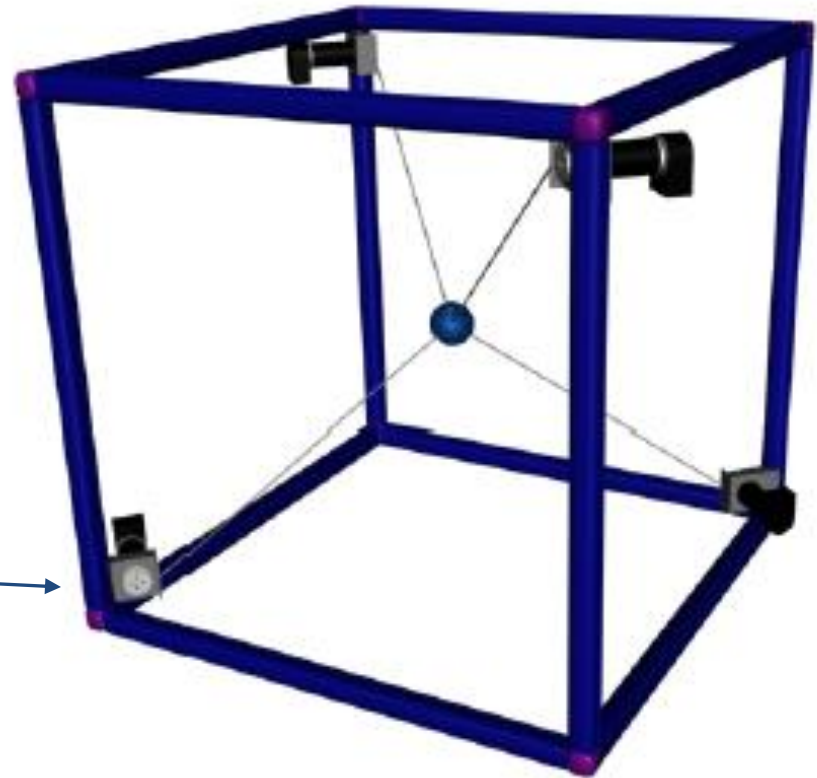




(b) Niveau de singularité



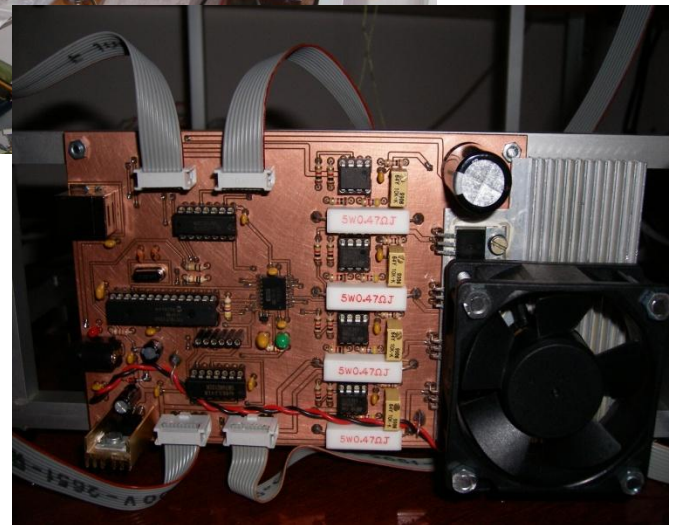
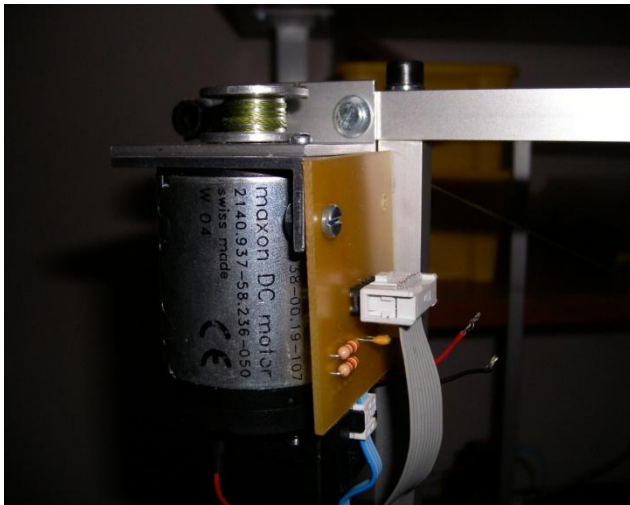
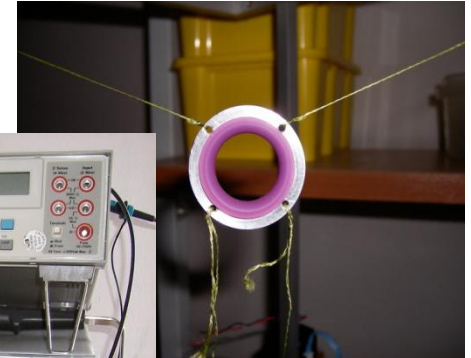
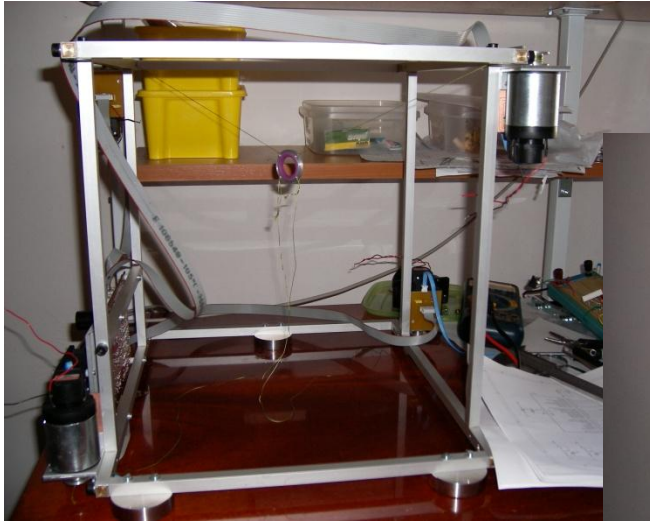
Makoto Sato's group Precision and Intelligence Lab.Tokyo
Institute of Technology



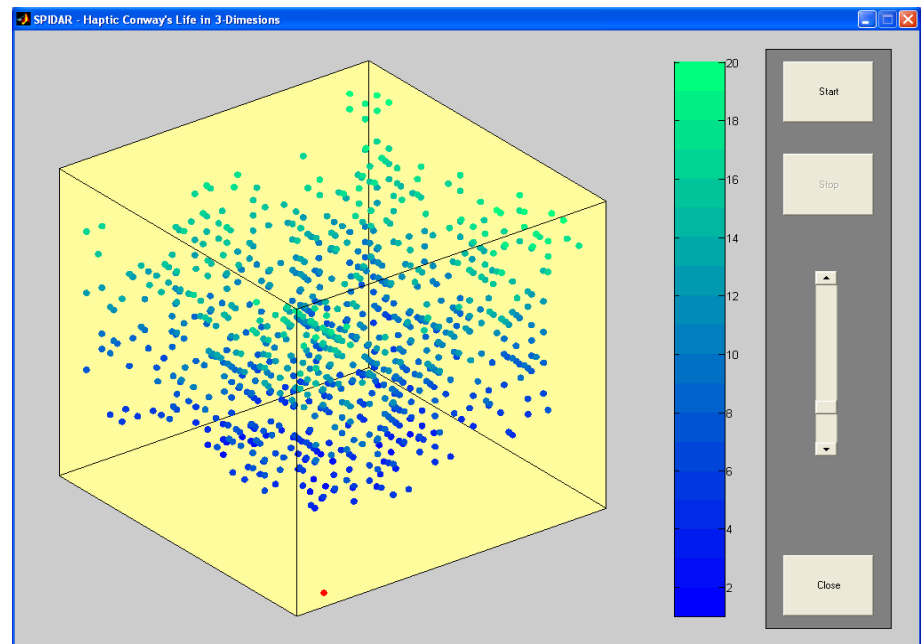
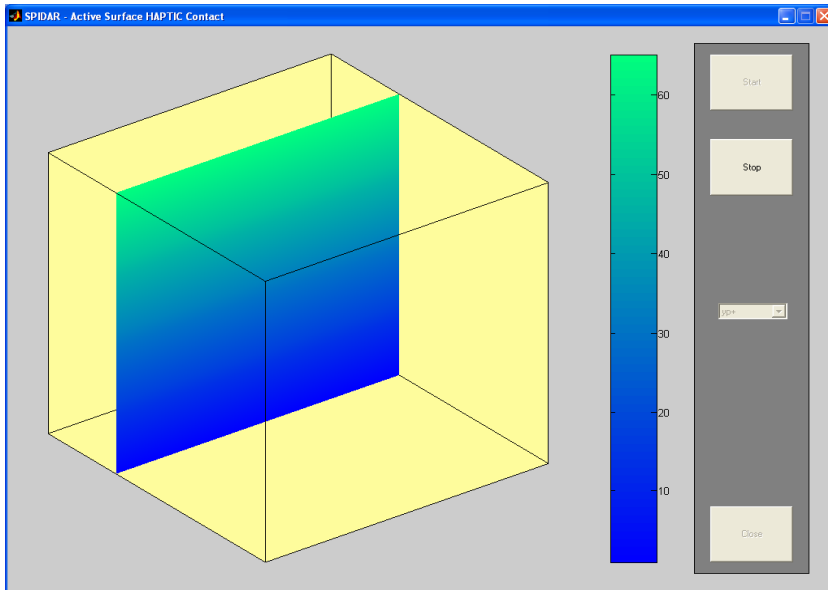
Motor and Encoder

- measure length of string
- present force to user

SPIDAR Clone – 2007, UBB Romania



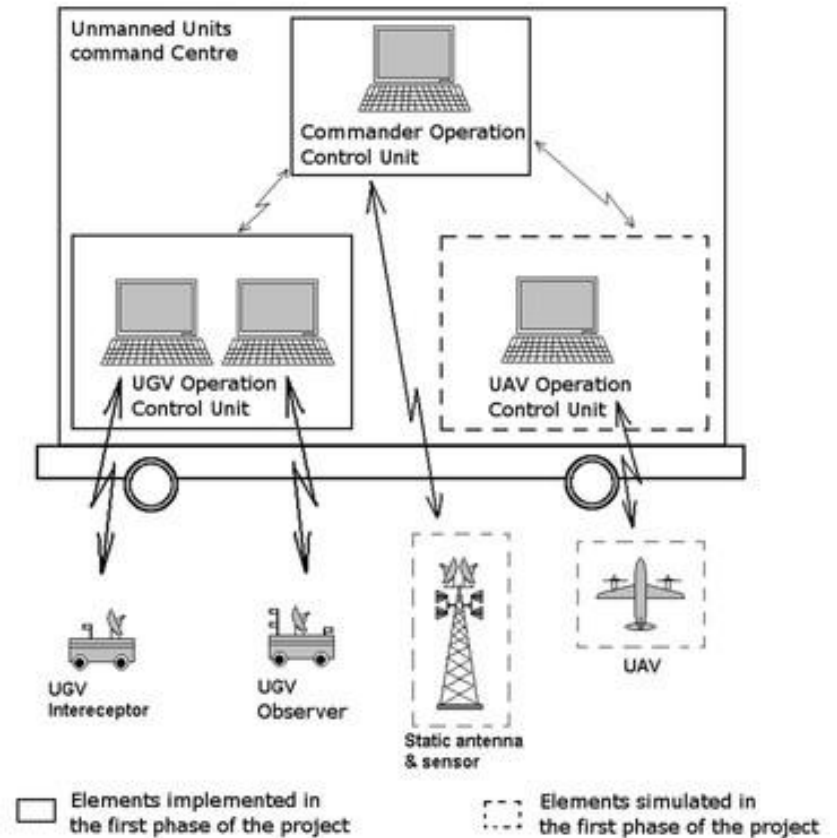
SPIDAR Clone – 2007, UBB Romania



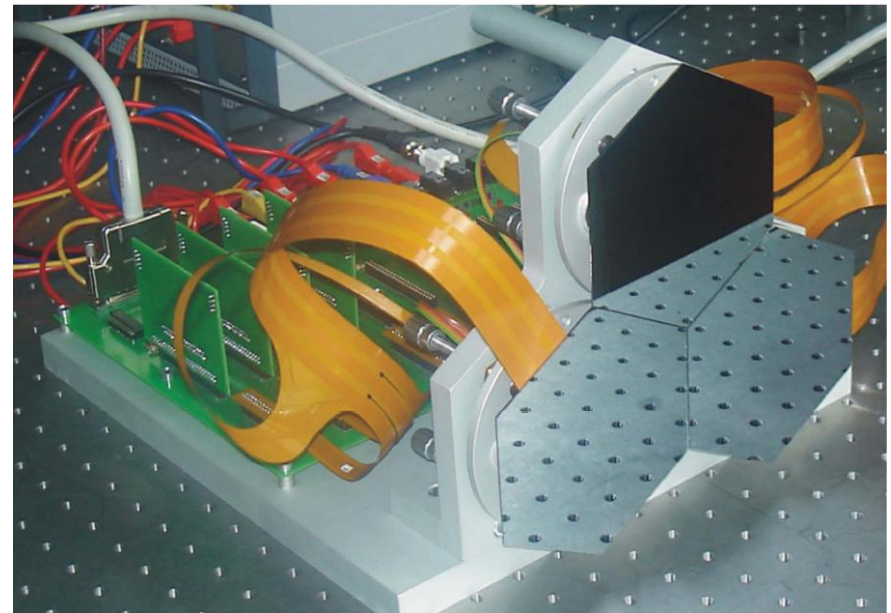
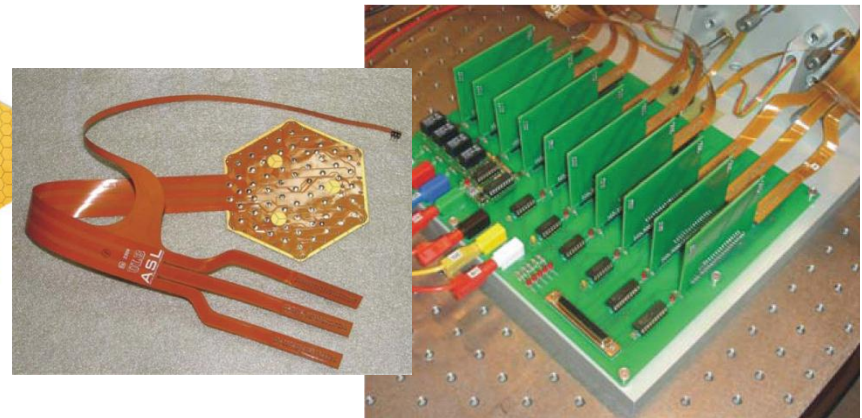
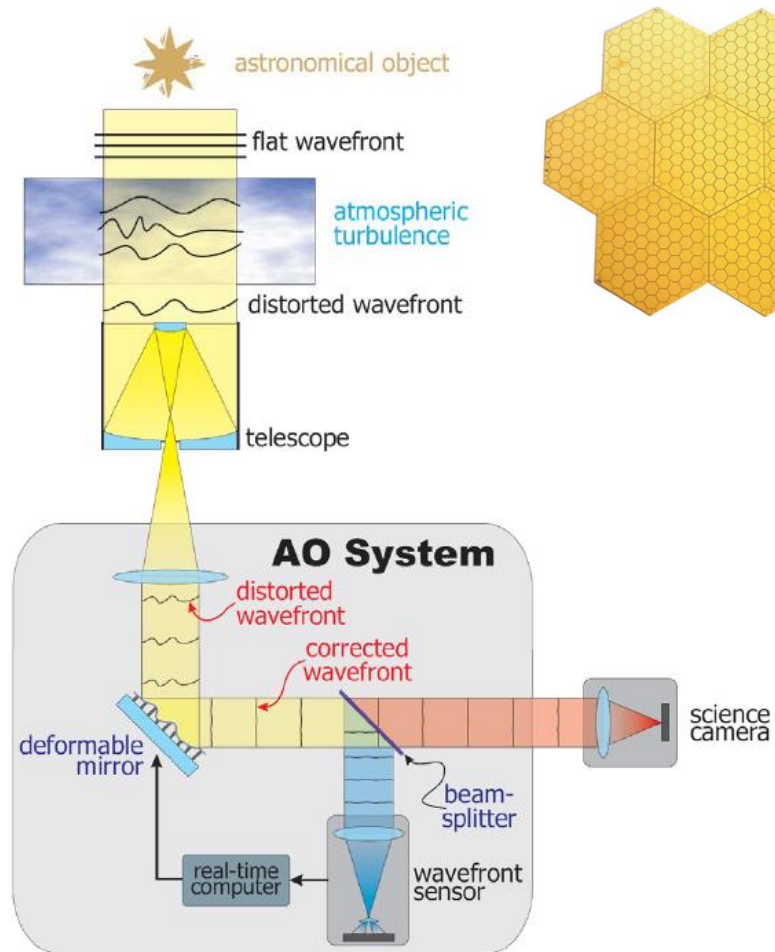
TALOS – 2008, EBIC Romania



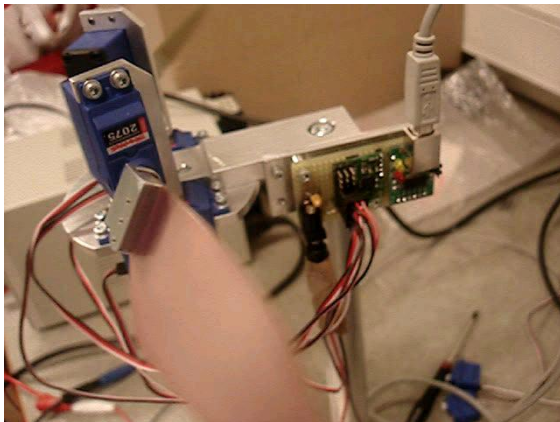
- Development of Commander OCU Software and UGV OCU Software.
- Cooperation with Romanian Border Guards.



Smart Materials (Adaptive Optics) – 2009



The Hummingbirds Project - 2009



- Robotic Psychology - compatibility between humans and robots
- Robotherapy - interactive robots as therapeutic companions
- CyberAnthropology - reciprocal relations with the computer-generated world

The Ultimate Display

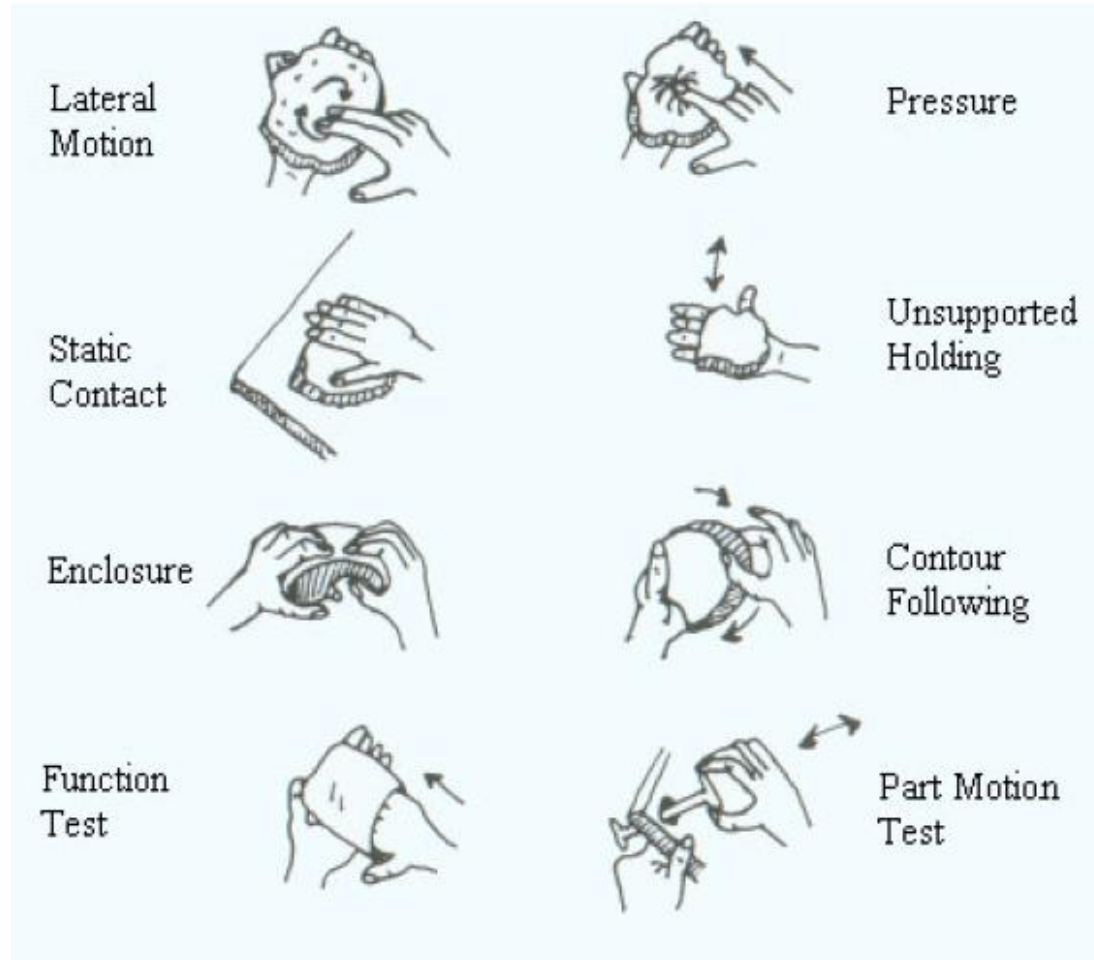


“The ultimate display would, of course, be a room within which the computer can control the existence of matter. A chair displayed in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal. With appropriate programming such a display could literally be the Wonderland into which Alice walked.” Ivan E. Sutherland (1965)

- general and unified model of *haptic perception* and its interaction with other modalities (multimodal integration) – ideal input to design haptic interfacing technology
- *investigation of haptic illusions*
- *cross-modal effects*
- *influence of haptic feedback on immersion*
- *pseudo-haptics, simplification of devices and haptic rendering*

Haptic Virtual Reality And Rehabilitation

Typical exploratory procedures described by Lederman and Klatzky for determining object properties through touch.



Marionette



- A **marionette** is a puppet controlled from above using wires or strings.
- A marionette's puppeteer is called a **manipulator**.
- Wire controlled, articulated puppets made of clay and ivory have been found in Egyptian tombs.

Marionette

