3 DOF fMRI compatible hapic robot

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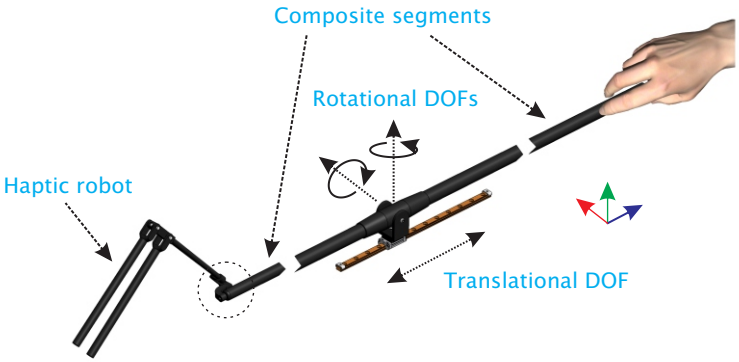
Overview:

A fMRI-compatible haptic robot is an ideal tool for experiments where we need to observe human brain activation during execution of a haptic virtual environment task. It is much more than just a measuring system. Besides being capable of measuring trajectories and velocities during upper limb movements, its main advantage is the ability to exert forces, all this in 3D space.

The haptic system is comprised of: Phantom Premium 1.5 haptic robot, mechanical extension with a 3-DOF central joint and a frame on which the Phantom and the extension are mounted. The entire system is constructed of non ferromagnetic materials: aluminium, composites, ceramics, stainless steel, brass and titanium.

Benefits:

- 3-DOF haptic robot for fMRI experiments,
- Quick setup in a fMRI examination room (less than 10 min),
- Easy to adapt to different subject sizes,
- Includes the Robotica Matlab/Simulink xPC Target-based haptic library for rapid development of haptic applications,
- No need for a new haptic robot if you already have one (the system was designed for a Phantom haptic robot, but can be used with other types of haptic robots such as Force Dimension Omega, Delta),
- The same software can be used for behavioral and fMRI experiments.



Evaluation and testing:

The haptic system has been throughly tested and evaluated. No interferences between fMRI scanners and the haptic robot were observed. The system has been tested with both Siemens Trio and Verio 3 T fMRI scanners. Independent evaluation has been carried out at the ATR institute, Kyoto, Japan. Over 30 human subjects have participated in two neuromotor control studies.

Technical specifications:

- Number of degrees of freedom: 3,
- Available workspace: 380x260x190 mm,
- Tested with fMRI scanners up to 3 T,
- Total weight of the system: 21 kg,
- System includes: extension, frame, Robotica library.

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