



The INCA 6D is a 6 degrees-of-freedom haptic device, specifically designed for work in Virtual Reality environments.

Thanks to its large workspace and its high forces, it enables a scale one interaction with digital models coming from CAD.

Its main applications are:

- ergonomic studies
- accessibility studies
- assembly simulation
- project review



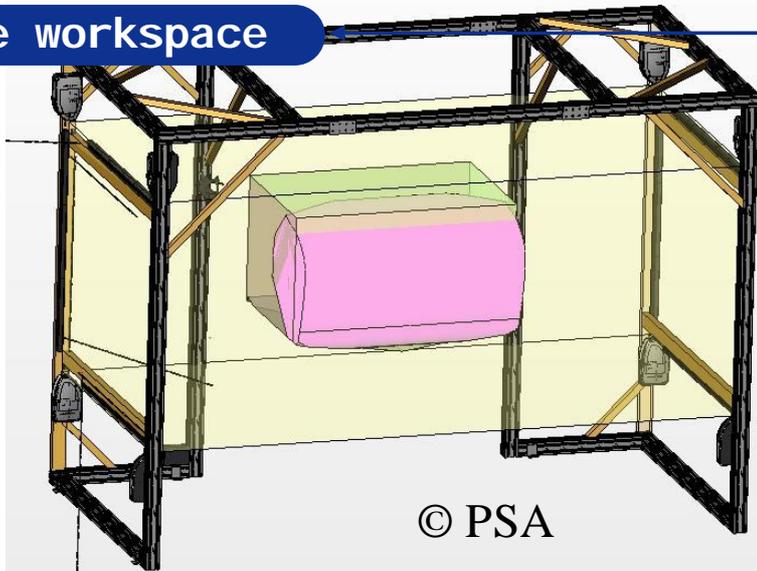
Technical characteristics

The INCA 6D is the only force-feedback system of the market today, which offers the following characteristics:

- ✓ Force-feedback on all 6 degrees-of-freedom (3 translations and 3 rotations)
- ✓ Operational workspace is depending the position of the motor and the cable
- ✓ Maximum force of 40N (15 N continuous), i.e. high enough to simulate the handling of heavy objects
- ✓ Maximum rotation torque of 5 Nm (1,5Nm continuous),
- ✓ Exact static compensation of the device's own weight
- ✓ Modular end-effector equipped with programmable switches
- ✓ Gripping tool equipped with a proximity sensor, connected to a "dead-man" function: as long as the user does not hold the gripping tool in his hand, and as soon as he releases it, the motors are switched off, and no active movement can occur
- ✓ Easy to setup few minutes. Easy to assembly and to disassembly, very important to continue to use the room for other application
- ✓ Development kit (API) available for the major operating systems
- ✓ Demonstrated compatibility with the major software applications on the market today, using dedicated plug-ins: Vortex™, Havok™, ODE, Virtools™, Catia™ V5, OpenMask, etc.
- ✓ Compatibility with tracking device like ART

NB : Inca is based on the SPIDAR™ of Professor Sato

Device workspace



The INCA 6D is composed of height motor module, the workspace is dependent to the position of the motor module. For example in a configuration of a cube : 3m x 3m x 3m, the workspace will be 1.50m x 1.50m x 1.50m with a rotation of +/-40° in all directions independently.

As a consequence, the haptic interface is a 6 degrees-of-freedom device, with force-feedback in all directions.

The resolution in position is 0.2 mm.

Detailed specifications INCA Force-feedback Module



Peak force on transmission cable	37.5 N
Max continuous force on transmission cable	12.5 N
Winding length of transmission cable	2.5 m
Force of tension cable	5 N
Winding length of tension cable	1.0 m
Length measurement resolution	7.10^{-6} m
Dimensions	0.1 x 0.2 x 0.3 m
Weight	2,5 kg

Modularity



The user takes hold of the haptic device using a gripper or handle placed at the tip (called "end-effector"). The end-effector is easy to remove and replace, so that a frequent change of tool is possible, in order to customize the application and reinforce the sensation of immersion. The gripping tool is equipped with three push-buttons. One of the push-buttons is dedicated to the offset function (see the control system functionalities hereafter). The state of the other buttons can be accessed using the VIRTUOSE API.

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