IPSI

Interactive Physics Simulation Interface

IPSI (Interactive Physics Simulation Interface) is a software library for physical simulation with force-feedback developed by Haption in collaboration with CEA-List. IPSI is used in the implementation of:

- IFC Core for Catia
- IPP for Virtools

Key Features

⇒ Distributed architecture
⇒ Easy implementation of an interactive simulation with collision, weight, constraints
⇒ Support of 64bits for large data sets

Technical Requirements

⇒ Server: Windows XP, Linux. 32bits or 64bits Bi-processeur PC, minimum of 2Gb of RAM, and 2 Ethernet cards.
⇒ Client: Windows XP, Linux

IPSI is a physics engine and a comprehensive solution to stability problems, model complexity and precision issues in case of industrial applications.

- Distributed architecture (client/server) based on the ONC RPC (open standard)
- Multi operating system for the client and the server: Microsoft Windows™, Linux
- Scenes composed of rigid bodies
- Simulation of simple kinematics chains (no closed-loop kinematics)
- Static integration (no inertial forces)
- 6-dof force-feedback output
- Compatibility with all the product line Virtuose™
- Degraded operation without force feedback for 6D mouse (product line 3DConnexion©)
- Compatibility with optical tracking systems from ART©

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Level of performances (example)
⇒ Dual-Xeon 4 GHz
⇒ 300 static objects
⇒ 5 moving objects
⇒ 3 million polygons
⇒ 1 mm precision
⇒ 500 Hz frame rate
⇒ 4 GByte memory footprint

Reference customers
⇒ The IPSI-enabled product **IFC Core** is used by PSA Peugeot Citroën, Renault, and Dassault Aviation
⇒ The IPSI-enabled product **IPPS for Virtuools** is used by PSA Peugeot Citroën and ENIT

**IPSI Server:**
The IPSI server integrates software modules for collision detection (LMD++) and for simulation of movement (GVM) developed by the CEA/List. It also integrates the software library for collision detection VPSTM (Voxmap PointShell) developed by BOEING/Phantom Works.

**IPSI API:** C++ library of functions for
- Connecting to the IPSI server locally or over the network
- Loading 3D objects into the scene
- Selecting interaction-enabled objects
- Creating simple kinematics constraints (prismatic, plane, pivot, etc …) and connecting those to objects in the scene
- Associating interaction devices to objects in the scene
- Starting/stopping an interactive simulation
- Updating the position of objects in the scene for visualization

**IPSI Architecture**

Note: In case of a simple scene, the IPSI server and client can be run on the same PC.