

Post Doctoral Proposal 2006 Campaign

- **Research Project-Team : I3D**
- **Title : Haptic Interaction for Scientific Visualization Applications**
- **Description :**

Scientific visualization consists in visual presentation and interaction with experimental or simulated data from various physical phenomena, such as flow, medical data, results from scientific computing,... to facilitate their rapid assimilation and understanding. Limited to pure visualization for a long time, this field is extended today to immersives, interactive and multi-sensory solutions.

INRIA Rhône-Alpes has installed a workbench. The workbench is an immersive visualization system allowing direct interaction and manipulation within the virtual environment. INRIA's workbench has two-screens, an horizontal and a vertical one (see attached photo). A stereoscopic image is displayed on each one. The user is wearing shutter glasses and head tracking is provided. Several input/output devices

(stylus, gloves,...) allow the user to interact with the virtual model.

The workbench allows direct manipulation, thanks to co-location. However, no force feedback is provided. The i3D research group installed an haptic device, the Spidar (haptic device conceived and developed at the Tokyo Institut of Technology [2]) on the workbench. The Spidar is a string-based haptic device.

This configuration (workbench + Spidar) is very promising for scientific visualization applications where complex data have to be explored interactively. The RNTL project Geobench permits to set up a complete Scientific Visualization platform based on the Stringed Haptic Workbench. Based on this platform, the objective of the work proposed is the study of new haptic (or pseudo-haptic) interaction techniques for scientific visualization applications (scalar, vector fields,... data analysis). These researches will be conducted in collaboration with CEA-DAM and BRGM which will furnish data and bring the user experience. The i3D group is also in contact with University of Utah, Chuck Hansen [1] pioneer in haptic interaction for scientific visualization.

References

[1] "The Visual Haptic Workbench", J. Brederson, M. Ikits, C. Johnson, C. Hansen and J. Hollerbach, Proceedings of the Fifth PHANTOM Users Group Workshop, 2000.

[2] "A 3d spatial interface device using tensed strings", M. Ishii and M. Sato, Presence, 1994.

- **Requirements (educational and technical background, knowledge of specific material) :**

Good Computer Science background. Experience in one or more of the following domains : VR, 3D interaction, IHM, computer graphics, image, robotics, or Scientific Visualization is welcome.

- **Person to contact :**

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- **Project Home Page :** http://www.inria.fr/recherche/equipes_ur/i3d.fr.html