



Tracking Systems for High End Visualisation and HPC

Today's engineering and design environments are virtual and complex, incorporating features such as multi-disciplinary optimisation (MDO), advanced visualisation, parametric modelling, automation and integration and decision support. While these virtual design environments have the potential to dramatically enhance the productivity and sustainability of the engineering process, their complex nature can make interacting with such an environment difficult or confusing.



<<< NaviSphere – A Navigation Tool for Complex Design Environments

To address the complex useability issues inherent in Virtual Integrated Design Environments and fulfil VPAC's aim to ensure the smooth uptake of Advanced Computing technology in the Australian Research and Development sector, VPAC developed the NaviSphere, a unique peripheral device with the specific ability to allow for intuitive navigation through complex design environments. The NaviSphere works within VPAC's real-time visualisation platform, called Information Engagement Environment (IEE), and allows a user intuitive 6-dimensional control (3 translational dimensions and 3 rotational dimensions) within an information-rich 3D Virtual Integrated Design Environment (VIDE).

Essentially, the NaviSphere allows navigation through a complex Virtual Design environment to become a reflex action, giving designers and engineers the opportunity to concentrate fully on the information confronting them. The device is also designed to 'feel' natural to an engineer accustomed to dealing with physical 3-dimensional models. The NaviSphere allows for this powerful freedom of navigation without a steep learning curve, meaning that it is useful for many applications involving Virtual Engineering.

The NaviSphere has three buttons that function as mouse buttons, and can be tracked in up to 6 dimensions simultaneously. The driver is supported by calibration programs that automatically adjust parameters within the driver program to allow for the most accurate video tracking possible. The NaviSphere has been demonstrated within a 3D VIDE using the Vortools engine. The environment has been set up to allow the NaviSphere to operate in multiple modes. The device can either directly control the camera position and orientation, or can similarly control a meshed object (CAD mesh). The NaviSphere also incorporates an orbit mode to allow for engineering CAD-style visualisation, which allows an anchor point to be chosen. Furthermore, a mouse mode exists allowing the device to be used as a fully operational three- button 2D mouse.

The NaviSphere is a device utilising simple video tracking, in conjunction with the complex rotational tracking of a commercial device and can be used as an effective control mechanism as a peripheral to a PC. Through the introduction of the tracking code into a 3D engine, VPAC has used this basic peripheral to fully control a demonstrator program designed to simplify a complex optimisation process.

For further information regarding the NaviSphere, please contact Chris Seeling at chs@vpac.org or phone +61 3 9647 5432.

