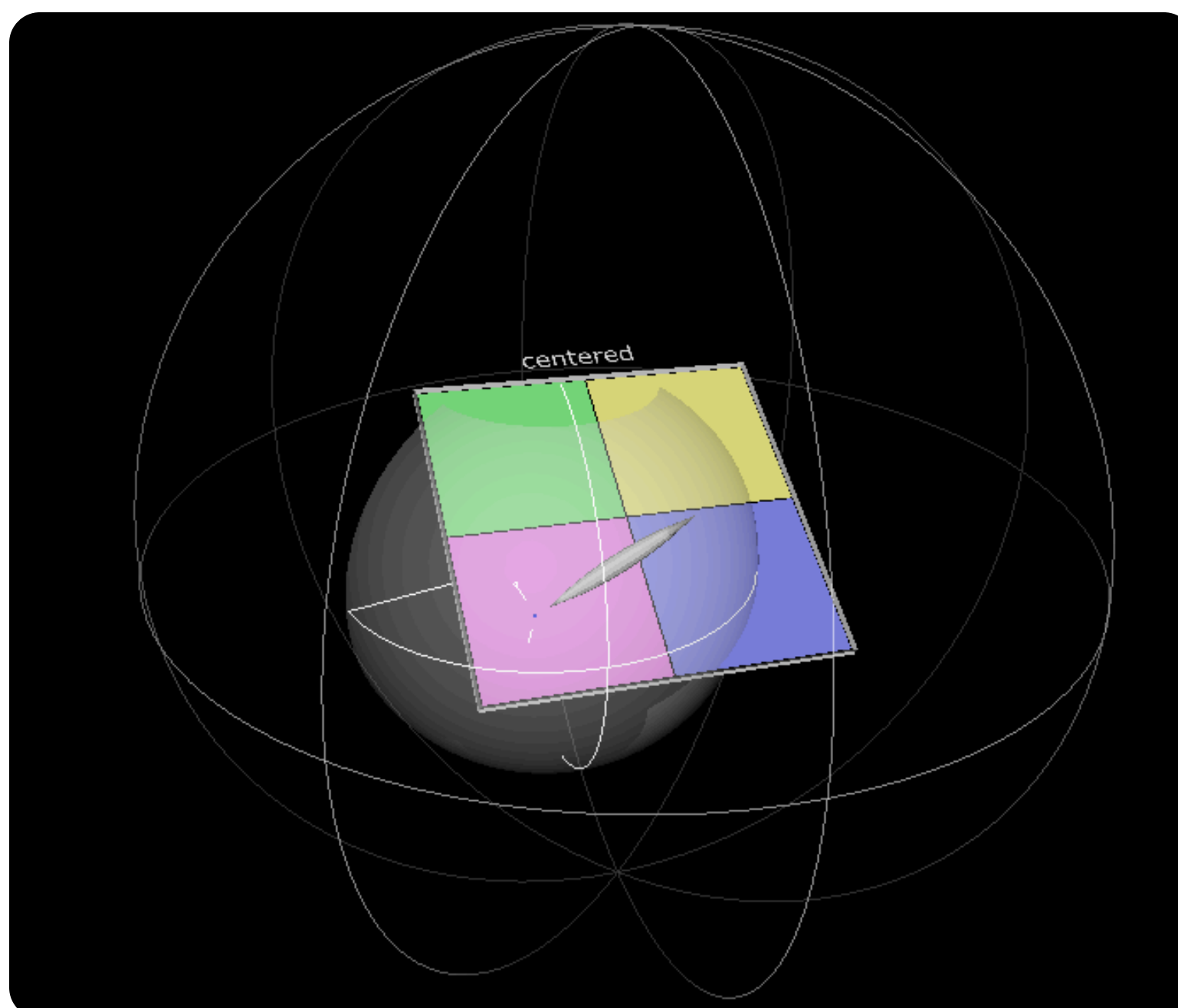


Building an Application Framework for Aural-Visual-Haptic Interaction in VE-SoundSynth

Introduction

We seek to explore ways in which dynamic, interactive audio can be used to enhance Virtual Reality applications. Research goals include:

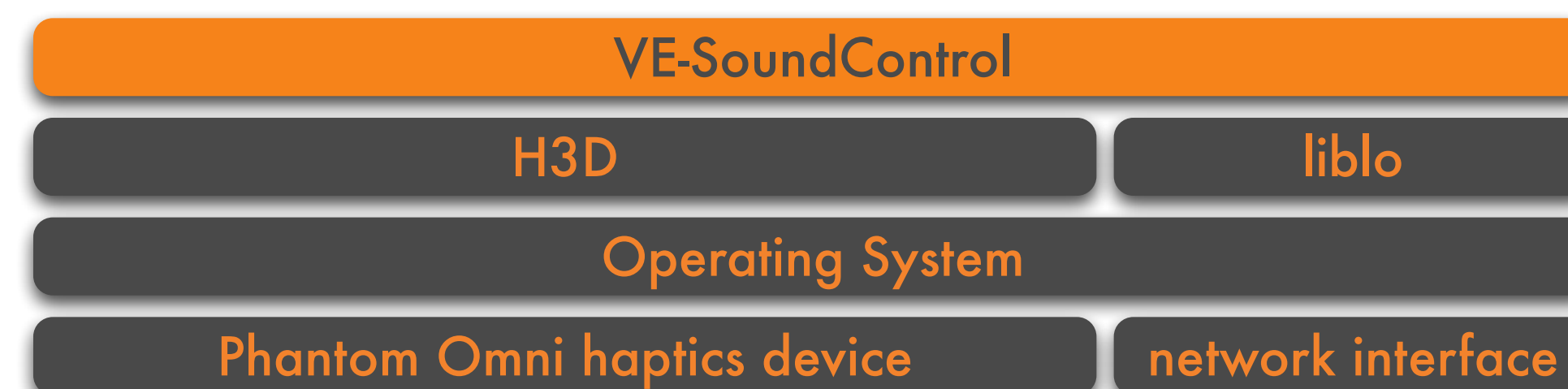
- providing a platform for the sonification of models and processes in a Virtual Engineering (VE) environment.
- providing a haptically-enabled interface for the transformation of sound in musical performance.



VE-SoundControl provides interfaces for adjusting the haptics device's working volume, as well as for normalizing coordinates.

Current Work

Current work revolves around the development of a prototype application, called VE-SoundControl, using SenseGraphics' open-source H3D haptic application development framework and Nokia's open-source Qt UI framework. This application serves as a testbed for the haptics-device-as-musical-controller concept. The application uses H3D's event system to capture data about a user's interactions with scene geometry and send this information over the local network as Open Sound Control (OSC) messages using Steve Harris' open-source liblo library. These messages can then be received and interpreted by a sound synthesis package such as Cycling 74's Max/MSP and used to drive a synthesis process. VE-SoundControl can also receive OSC messages to allow manipulation of the scene graph in real time. The application uses a SensAble Phantom Omni haptics device and a Space Navigator 3D mouse from 3DConnexion for viewpoint control and other interaction modes.



VE-SoundControl's software/hardware stack.

Future Work

osgHaptics

Extend Umeå University's osgHaptics toolkit, which incorporates haptic rendering into OpenSceneGraph via SensAble's OpenHaptics framework, to support HAPI, the haptic rendering component of H3D. This allows access to H3D's broad device support and rich set of haptic force effects from within any OSG-based application.

osgAudio

Extend the osgAudio project to support real-time sound synthesis with ZenGarden, a library for running DSP "patches" built with Pure Data, a visual dataflow programming environment for working with audio, video, and graphics.

VE-Suite integration

Expose haptic rendering and sound synthesis functionality to VE-Suite.