System Requirements

Haptic Devices Supported
- SensAble PHANTOM® Omni™
- SensAble PHANTOM® Desktop
- SensAble PHANTOM® Premium 1.5 (3 DOF)
- Quanser Q4 Hardware In The Loop (H.I.L.) Board
- Quanser Q8 Hardware In The Loop (H.I.L.) Board
- Force Dimension Omega

The Handshake proSENSE™ Virtual Touch Toolbox requires the following hardware and software components:

Hardware
- PC with Intel Pentium® IV processor or higher
- Microsoft® Windows® 2000 or XP
- 10/100/1000 Ethernet LAN card
- 30 MB disk space and 128 MB RAM

Software
- The MathWorks MATLAB® 7.0.1 (Release 14 with Service Pack 1 or 2)
- The MathWorks Simulink® v6.1 (Release 14 with Service Pack 1 or 2)
- The MathWorks Real-Time Workshop® v6.1 (Release 14 with Service Pack 1 or 2)
- The MathWorks Virtual Reality Toolbox v4.0.1 (Optional) (Release 14 with Service Pack 1 or 2)
- Microsoft DirectX® v8.1 SDK or later
- Microsoft® Windows® Visual C++ 6.0 or later or Microsoft® Visual Studio™ 2003

Note: In order to create a telehaptic environment another set of the above hardware is required.

For more detailed system requirement specifications visit our website: www.handshakevr.com, and select Products.

The Handshake proSENSE™ Virtual Touch Toolbox is a rapid prototyping, development tool for creating dynamic sense-of-touch and touch-over-network applications. The Handshake proSENSE graphical programming environment is built on top of The MathWorks MATLAB® and Simulink® development platform. The easy-to-use, drag-and-drop environment enables novice users to quickly develop and test designs while being sufficiently sophisticated to provide the expert user with an environment for application development and deployment of new haptic techniques and methodologies.

Handshake proSENSE provides a complete haptic-visual development environment in that it supplies developers with tools to quickly create, intuitively manage, easily modify and readily deploy networked haptic-visual applications. Handshake proSENSE includes integrated haptic-visual capabilities that enable developers to hapticize standard VRML based environments to create multiple scenes that can be graphically and haptically rendered on different networked computers if desired. The creation and management of complex haptic-visual VR environments is performed using an intuitive graphical user interface (GUI) and when prototyping and testing is complete, deployment of the final application only requires the final end user to have the necessary haptic device drivers installed.

The MathWorks Virtual Reality Toolbox, or almost any other 3D modeling application, can be used to build VRML based graphical environments. Handshake proSENSE uses these VRML scenes, along with The MathWorks Real-Time Workshop®, to compile the resulting application into real-time code. As a MATLAB based product, proSENSE applications can also take advantage of the extensive toolboxes and third party solutions offered through MATLAB.

proSENSE™ Advantages
- Integrated sense-of-touch solutions
- Rapid development drag-and-drop environment
- Enables network interactivity
- Powerful productivity tool, reduces development time
- Force data collection and analysis

proSENSE™ Features
- Supports many off-the-shelf and custom built haptic devices
- Fully integrated haptics and graphics
- Improved usability to create and manage complex scenes
- Dual haptic device support
- Provides customizable haptic building blocks in a Matlab®/Simulink® environment
- Works seamlessly with Real-Time Workshop®
- Comprehensive Help system
- Sample models to get started quickly
- Supports integration of custom C/C++ code
- Offers proprietary network latency compensation techniques – TiDeC™

Contact us at sales@handshakevr.com
Handshake proSENSE™ Demos

Handshake proSENSE™ includes demos illustrating the use of the Toolbox. The following is a sample of the Handshake proSENSE demos that are available in the Toolbox or on our website.

Friction Demo

The friction demo is an introductory example to the Handshake proSENSE Toolbox. It shows how basic Handshake proSENSE components can be used to create a hapto-visual application and is the basis of a tutorial that is also included in the Toolbox. The friction demo shows the implementation of haptic friction effects when inside a subset of the Omni™ device workspace.

Haptic Box Demo

Real world physical environments, that can easily be implemented in Simulink®, can also be integrated with Handshake proSENSE to create virtual worlds that users can interact with both visually and haptically. This demonstration shows how a user can interact with a virtual box by pushing it around on a smooth surface. Parameters of the virtual world, such as the mass of the box and friction, can be modified as the application is running.

Multiple Scene Demo

This demo illustrates the new hapto-graphic integration capabilities of Handshake proSENSE. Specifically, it shows how a user can hapticize standard VRML based environments to create multiple scenes and how the complex hapto-visual VR environment can be intuitively managed with the user-friendly GUI.

Air Hockey Demo

This application exhibits how two haptic devices can be daisy chained together and interact independently with a haptic object. This demo also illustrates how sound can be added to an application.

Transmit and Receive Demo

For telehaptic applications, it is necessary to transmit information over a network. This demonstration reveals how the Handshake proSENSE network capabilities can be used to easily accomplish this task.

Integrated Help

Handshake proSENSE is fully integrated with the MATLAB® help browser and provides direct access to a comprehensive library of context sensitive help, including reference pages, manuals, search capabilities and demonstrations.

TiDeC™ Time Delay Compensation

Handshake proSENSE, powered with TiDeC™, provides the critical capability to unleash sense-of-touch applications over networks. The Toolbox helps users implement their telehaptic applications utilizing Handshake’s proprietary TiDeC, which is used to overcome instabilities caused by network latency. TiDeC has been shown to compensate for latencies up to 600ms and 30% packet loss over dedicated network and/or Internet connections using TCP/IP or UDP protocols. Either in an academic lab or in a commercial development environment, the Handshake proSENSE Toolbox allows users to save time, increase productivity and achieve stable haptic and telehaptic solutions.

TiDeC™ Demo

Telehaptic applications that are deployed over networks and suffer from significant latency, require time delay compensation in order to perform adequately. In this demonstration, a virtual spring is placed between two separate haptic devices that are connected together through Handshake’s network simulator. The user can feel the impact of latency on the telehaptic application and can activate TiDeC to improve performance.

S-Function capabilities

MATLAB provides several methods of integrating C/C++ code into Simulink diagrams. For example, S-functions are run-time-loadable extension modules written in C/C++ for adding block-level functionality to Simulink. Also, Simulink provides a mechanism called an S-function wrapper, which allows you to insert your C code algorithms in Simulink and the Real-Time Workshop® with little or no change to your original C code function.