Semester project: World of Passive Haptic Interaction.

Figure 2-From The Void

Figure 1-From Artanim Foundation

Main Objective:
Integrate passive haptic feedback in games through tangible objects/structures

Background:
Lighthouse system is an effective low cost tracking system. It is an optical tracking system, e.g. the system uses several emitters that send a laser signal received by photo sensors. Thus, these sensors send their position in the tracking space. This system was specifically created by Valve for the HMD (Head Mounted Display) in partner with HTC, which is now wireless thanks to a new module called TPCast. However, they have opened the system and expanded their system with the new Vive Trackers [1] bringing new possibilities. This system is very flexible and allows us to track several objects as well as the entire body.

Project Idea:
We want to develop a game in virtual reality, which exploits passive haptic feedback with tangible objects and structures (e.g. existing walls). First, the user has to master the use of the Vive Tracker to track tangible objects and locate permanent structures such as walls. They are also used for tracking body parts. Then, an efficient method should be proposed to register the virtual environment according to the position of the tangible objects/structures. In a second stage, the user needs to use the leap motion or a glove to interact with the tangible objects/structures. The game has to encourage the user to interact naturally with the virtual world.

The theme of the game is free but has to be validated by T. Porssut and R. Boulic.

Goal:
- Master the Vive Tracker technology and the full body-tracking project.
- Implement an efficient registration of the game (adapted to different environments of demonstration).
- Exploit natural interactions with the tangible objects/structures.
- Produce an easy to set-up demo.

Requirements:
- Unity (scripting in C#/DLL in C++)
- 3D geometry and quaternions (Vectors, cross products, rotations)

Information, materials and resource:
Untiy3D game engine: http://unity3d.com/learn
Final IK: http://root-motion.com/
Vive Tracker Project Example : https://github.com/JamesBear/vive_ik_demo

Contact:
Thibault.PORSSUT@epfl.ch ,INJ 139
Ronan.BOULIC@epfl.ch , INJ 141