VRAC TACTILE VEST

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Problem

The Virtual Reality Applications Center (VRAC) is currently receiving funding from the United States Army for a virtual reality training simulator called the MIRAGE. The MIRAGE a mixed-reality research lab fitted with IR sensors and a fully functional game engine. Users are in need of a tactile way to indicate when they have been “shot.”

Design Details

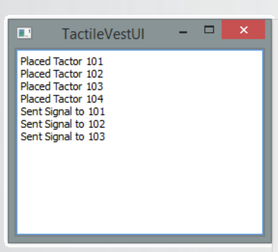
We must develop an API for serial communication to cheap, off-the-shelf pagers. These pagers will be placed in numerous locations on a military vest and will vibrate when signaled. The API will follow the c++11 standard and must include pager patterns for signaling the pagers. A SimplePattern is made up of a single pager that can be signaled to respond in various ways. For instance a pager may be signaled to beep for 2 seconds then vibrate for 1 second.
A ComplexPattern is made up of one to many simple patterns, These complex patterns will execute each simple pattern in sequential order with a minimum delay of 1 second to account for handshaking between the transmitter and the pager. A user interface configuration tool is needed to act as a mobile command post that is able to signal pagers on the fly if need be and also to create a 1-1 mapping between the virtual vest and the physical vest. The user interface will be written using Qt and OpenSceneGraph libraries.

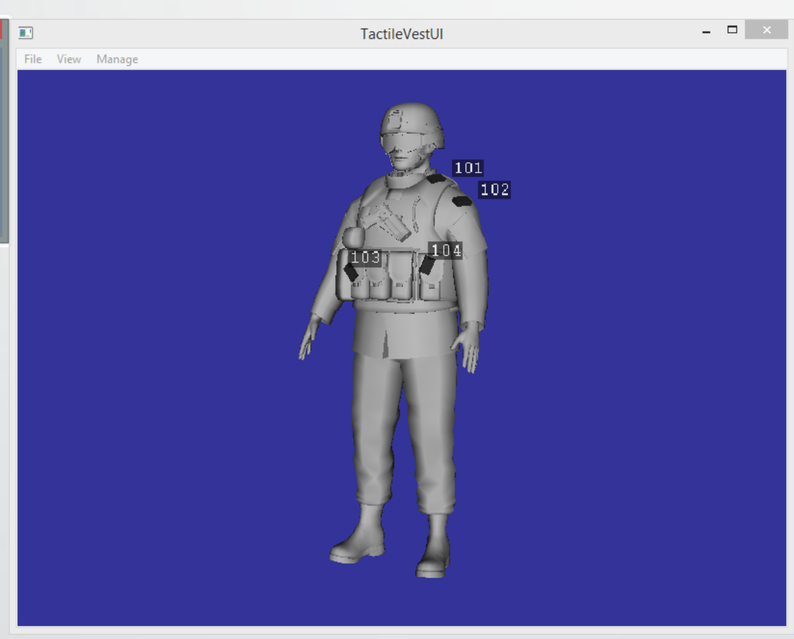
System Structure

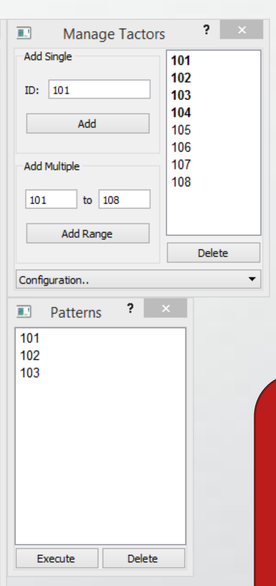
- User interface communicates with the API to signal a pager
- The API sends the command via serial connection to the Long Range Systems (LRS) transmitter.
- The transmitter and the signaled pager commence a handshaking process and the pager is buzzed.
- The pager sends a signal back to the transmitter that it is finished.

User Interface

Log View
Shows every action that has been taken during this session







Tactor Manager
This window controls the current tactors within the configuration, pagers are a subclass of tactors in this instance

Main Window
Displays a 3-D model that can be rotated for placement of tactors to the model

Pattern Manager
Users can decide what tactors will be signaled in a sequential order

Requirements

Functional

- Create custom pager patterns
- Save/Load pager patterns
- Ability to place pagers to any appropriate location
- Ability to create other tactile attire
- API must be able to be “plugged” into any platform or system

Non-Functional

- Detailed documentation
- Cross platform
- Basic soldier 3D model
- Fewest possible transmitters

Deliverables

- Functional tactile vest.
- Reusable API for serial communication to the tactors (pagers).
- User Interface for tactile vest configurations.

Testing

- System testing done on multiple environments to ensure cross platform support.
- Stress testing on the hardware before API design.
- Weekly meetings held with team and client to meet acceptance criteria.