VRAC Tactile Vest

May14-23

About the team

Garrett Phelps - Software Engineer

Ben Andry - Software Engineer

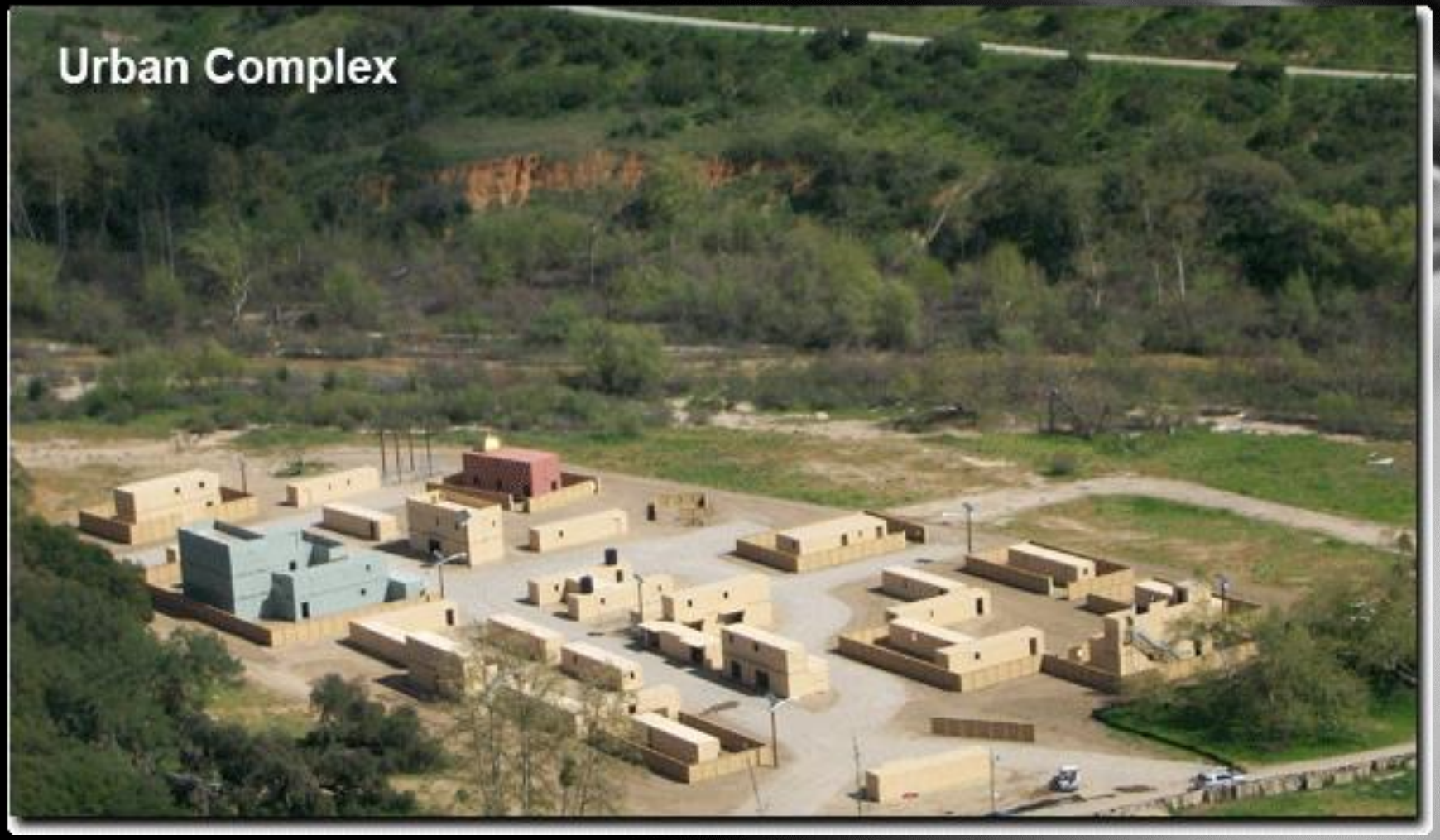
Jacob Cramer - Software Engineer

Cyle Dawson - Software Engineer

Ryan Haack - Computer Engineer

Stephen Gilbert - Associate Director of VRAC

Military Practices



http://www.peostri.army.mil/PRODUCTS/MMOUT/

Virtual Reality

http://www.vrac.iastate.edu/mirage/

VRAC Tactile Vest

- VRAC
- MIRAGE
- Tactile Vest
- Pagers

Project Breakdown

User Interface

API for multiple applications

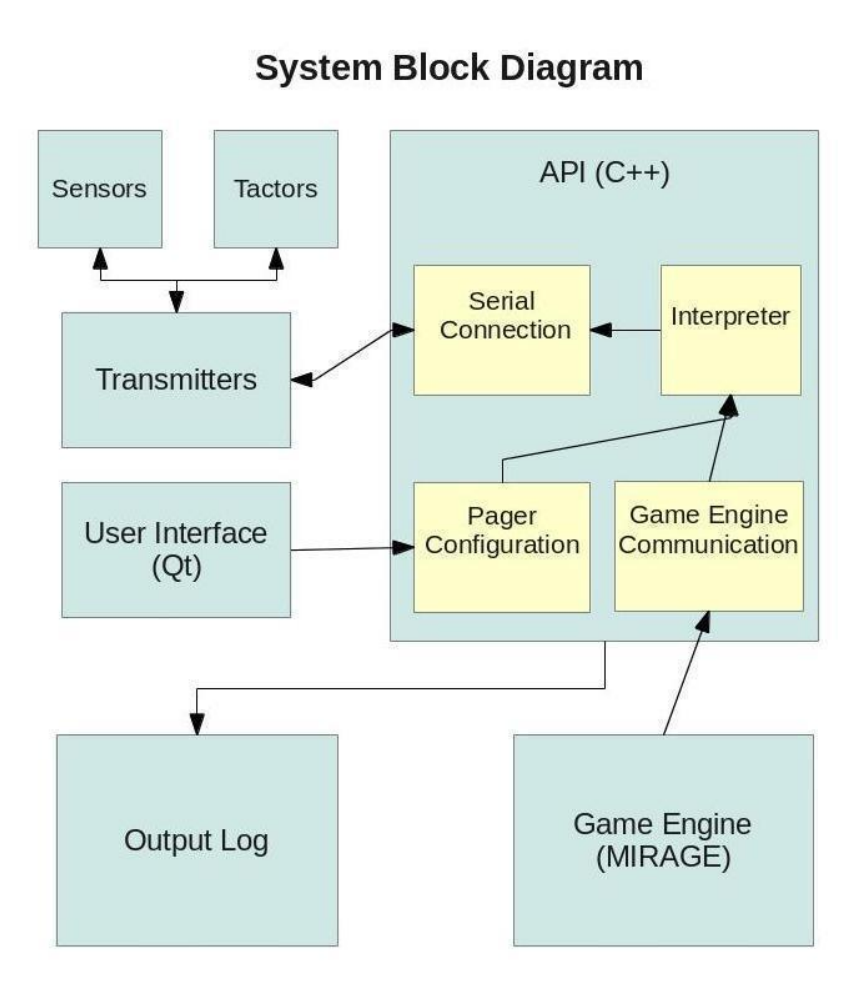
Cross-platform

Predefined patterns

Market/Product Study

- Solenoid to the chest
  - Dangerous
  - Recharge delay
- Pagers
  - Safe and cheap
  - Vibration strength
- Simultaneous signals
  - Major problem

Block Diagram



Functional Requirements (V1)

Version 1 (December 2013)

- User will be able to choose from predetermined locations for the pagers on the vest/body through the UI
- User will be able to send commands to pagers with predefined buttons
- User can change the intensity of the vibration for each pager
- User can test pagers currently assigned to body to ensure functionality

Functional Requirements (V2)

Version 2 (May 2014)

- User can run predetermined patterns
- User can make custom patterns with UI
- User can make custom pager layout and save custom pager layout
- User can user other tactile attire (belt, wrist)
- Interface must be able to be “plugged” into any platform or system

Non-Functional Requirements

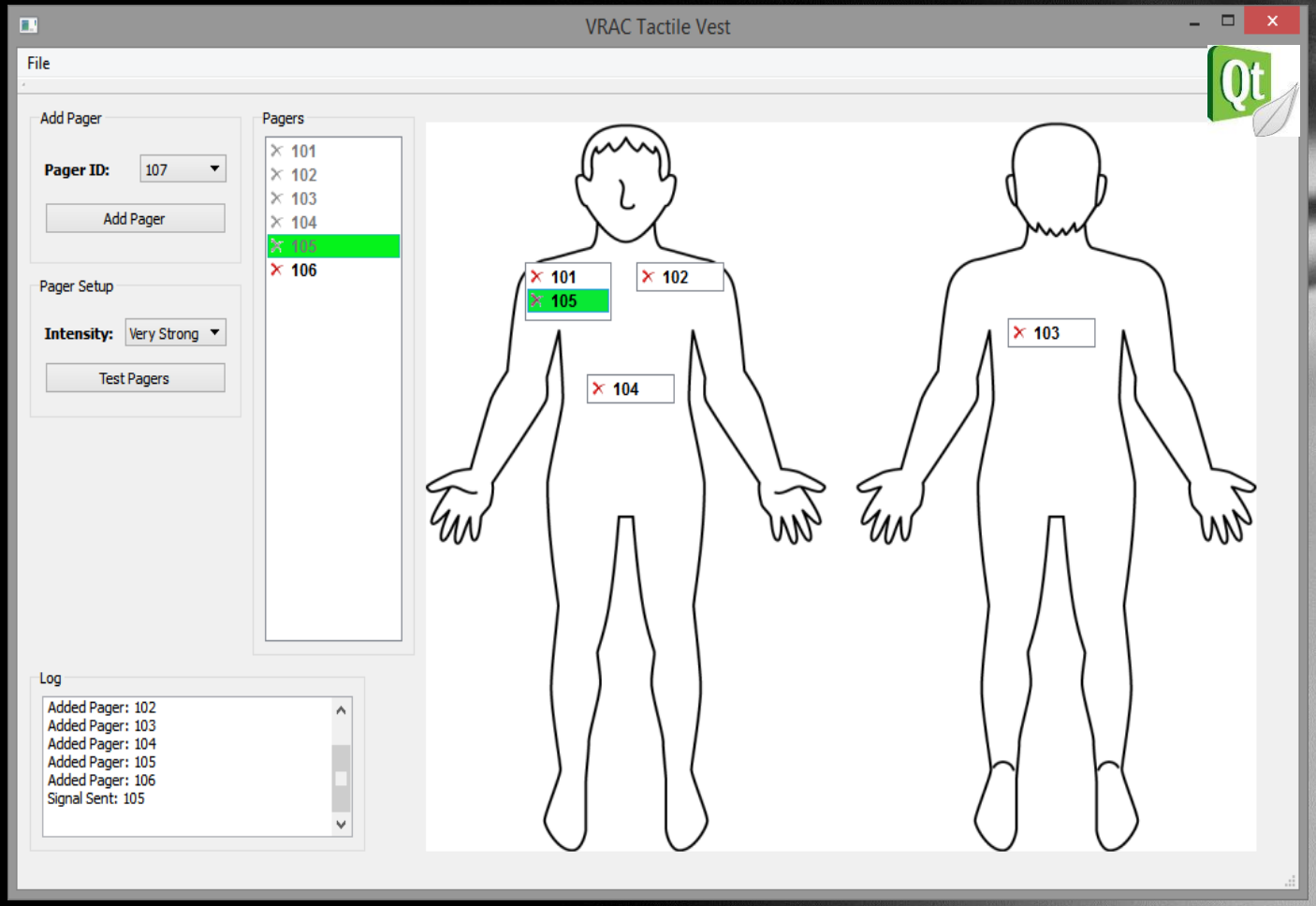
Detailed documentation, every method declaration and class

Quick response time of signals sent to pagers

Use the fewest possible transmitters to keep price low

UI is simple enough to use without any knowledge of the code

User Interface Description



API Description

Tactor

- Contains hardware handle
- Easy Tactor commands

SimplePattern

- A collection of Tactors with a specific command to execute

ComplexPattern

- A collection of SimplePatterns to be executed in sequence

Attire

- Contains Tactors and associates them with a name
- Executes Simple and Complex Patterns

Assumptions and Limitations

Assumptions

- VRAC has set up a git repo
- Pagers, transmitter, and military vest will be provided
- Simultaneous signals can be sent with better hardware
- Pagers must be configured before use

Limitations

- Vibration strength of pagers
- Hardware restrictions for simultaneous signals
- Operating range of pager approximately ¼ mile
- Battery life of pager approximately 48 hours
- Export control regulations

Test Plan

Agile Testing Process

Tested by the team, client, and third-party

Verify the UI functionality is cross-platform (Windows and Unix)

Verify the API is cross-platform (Windows and Unix)

Milestones

Version 1

October

- 10/11- Project Plan V.1
- 10/21 - Simultaneous Signals Tests
- 10/24 - Design Document V.1

November

- 11/4 - Skeleton API, Skeleton User Interface
- 11/15 - Project Plan V.2
- 11/18 - Communication between UI and API to send a signal (Functioning prototype)

December

- 12/2 - Fully functioning prototype of one Tactile Vest
- 12/6 - Final Design Document and Project Plan
- 12/10 - Group Presentation

Milestones cont.

Version 2

January
1/27 - Fully Working API where user can run predetermined patterns

February
2/10 - Functioning ability to create custom patterns with UI
2/24 - Draggable Custom Pager Banks in the UI

March
3/3 - User can use other tactile attire (belt, wrist, etc.)
3/17 - Finalize API and UI

Responsibilities

Garrett Phelps - UI design and implementation

Ryan Haack - UI design and implementation

Ben Andry - API implementation (linux)

Jacob Cramer - API implementation (windows)

Cyle Dawson - API design and implementation

Project Status/ Prototype

What we have completed:

A functioning UI that allows the user to assign/remove/signal pagers to locations on the body

A tactile vest that can be signaled by the UI or a program that uses the API

THANK YOU