An Approach to Designing Next Generation User Interfaces for Public-Safety Organizations

Jeronimo G. Grandi[1], Mark Ogren[2], Regis Kopper[1]

[1]Mechanical Engineering and Materials Science - Duke University, USA
[2]Pratt School of Engineering - Duke University, USA

Motivation

In the near future, high-speed broadband networks will enable public safety first responders to:

- Learn the precise location of indoor and outdoor points of interest;
- Receive real-time data analytics that is relevant to the mission;
- Have precise and reliable mission-critical communication.

All this technological advancement demands user interfaces that are effective and efficient, as they are operated in critical situations.

Objectives

Design **novel user interfaces for public-safety organizations** based on their needs and expectations.

Evaluate the prototypes **in virtual reality**.

Use the **first responders' expertise and feedback** to maximize the acceptance of the interfaces created.

Methodology

Requirement Analysis

Prototyping and evaluation of interaction techniques for PSOs

Prototyping and evaluation of comprehensive PSUIs

Prototyping cross-discipline PSUIs

1 - 1 interviews
Group discussions
Training observation
Shadow operations

Interaction metaphors in VR
Simulation of locomotion

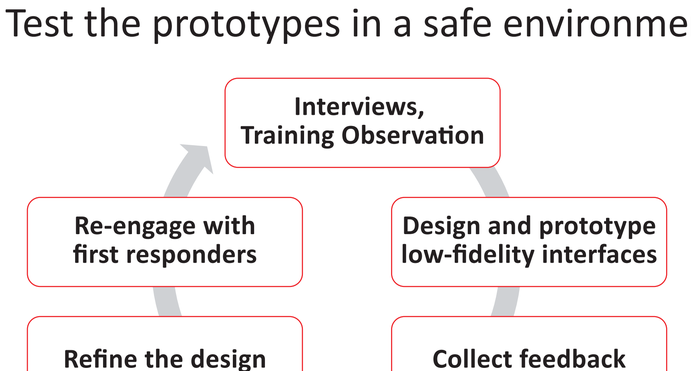
Development of user interfaces
Enhance the situational awareness
Evaluation of cognitive demands

Cross-discipline critical situations

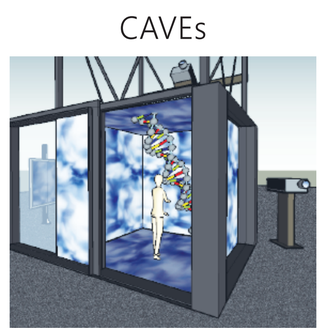
Technical Approach

We will simulate the interface designs in virtual reality. Within the virtual environment, it is possible to:

- Prototype several concepts before committing to a definitive interface;
- Repeat and tweak simulated interfaces with little effort;
- Test the prototypes in a safe environment.



Virtual Reality HMDs



HTC Vive

CAVEs

Duke DiVE

First Insights and Achievements

- Our initial interviews and training observations revealed that first responders are enthusiastic about the benefits that next generation UIs can bring to their work environments.
- The interviews also exposed first responder' major problems with the current technology and what are the desired tools would make their work more effective, efficient and safer.
- Since this approach aspires to offer validated user interfaces with a potential for implementation in the real world, all materials derived from the project are being provided in the "Public Safety User Interface Resource Library (PSUI-RL)".

Acknowledgements

This work is being performed under award #60NANB18D151 from the U.S. Department of Commerce, National Institute of Standards and Technology, Public Safety Communications Research Division.

IEEE VR 2019 OSAKA

{jeronimo.grandi, mark.ogren, regis.kopper}@duke.edu

DiVE Lab. - Duke University

Duke University