ENHANCED USER INTERFACE USER EXPERIENCE

Improving the PS technology experience

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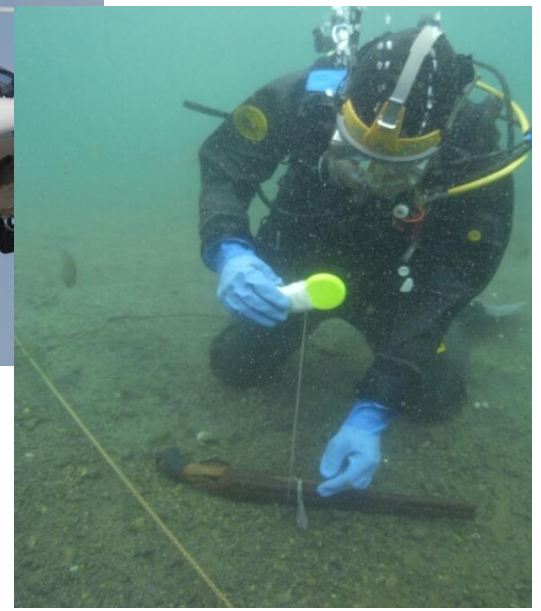
Technology Challenges for Public Safety: The Environment

Public safety personnel are tasked with performing in a variety of challenging environments.

In the heat

and the cold

In the air



and in the water

Technology Challenges for Public Safety: The Environment

Surrounded by noise

and in complete silence

In low-visibility environments…

Technology Challenges for Public Safety: The Environment and the Equipment

…and high above the ground

Equipment is often restrictive

and frequently makes communication difficult.

Technology Challenges for Public Safety: The Environment and the Equipment

Hands are frequently occupied.

Dexterity and ergonomics matter.

User Interface / User Experience

UI/UX was identified as a priority research area for PSCR. Stakeholders from across the United States identified augmented reality (AR) and virtual reality (VR) as the R&D areas.

Internal Research

- User Experience Research and Testing Methodologies
  - Qualitative and Quantitative Surveys
  - Technology Needs and Wants for First Responders
- Virtual Reality and Augmented Reality Scenarios
  - Multiple Environments, Scenarios, and Tasks
    - Highway Scene, Parking Structure, and Office Buildings
    - Mass Causality Incident, Active Shooter, and Fire
    - Patient monitoring, situational awareness, and navigation
  - Instrumented to measure performance of technology/user interface prototypes

User Interface / User Experience

UI/UX was identified as a priority research area for PSCR. Stakeholders from across the United States identified augmented reality (AR) and virtual reality (VR) as the R&D areas.

External Research

- Grants
  - PSIAP-2018–UI – 7 Awardees and Cooperative Agreements, $6.4 Million
  - Awarded May 31, 2018 with 2-3 years period of performance.
- Prize Challenges
  - 2018 - VR NAV HUD Prize challenge – 6 Finalist, $125,000 Prize Purse
  - 2019 - UI/UX Haptic Interfaces Prize Challenge – $425,000 Prize Purse
    - 3 Haptic Providers and 9 Haptic Developers

yet2 Search and Market Feedback

Objective and Metrics

yet2 conducted market feedback on typical R&D cycles for the development of products with significant user interface components (HUDs, wearables, haptics, audio, etc.)

75+
Targets researched and contacted

2019 CES
Informal questionnaires at 2019 Consumer Electronics Show

15+
Targets interviewed

13
Targets presented to NIST

UI/UX Usability Testing - Issue #1

Need frequent, iterative testing

- Once a system is in development, correcting a problem costs **10X** as much as fixing the same problem in design.
- If the system has been released, it costs **100X** as much relative to fixing in design.
- Factoring usability into the early stages of design and testing can yield efficiency improvements of over **700%**.

Expensive Hazardous Testing - Issue #2

$40K - $60K

Testing in hazardous scenarios

$10K - $30K

Consumer testing for single-phase, uncomplex testing

$12K - $20K

Full service testing services from third party firms

~$50K

Rental of controlled burn facilities for fire testing (single day)

Tech Search Conclusions

Based on Market Feedback

Overall estimates of savings ranged from 1 – 4 weeks of time and 20% - 30% of costs.

VR testing would be valuable in the early stages of development

However, all respondents believed that it could not completely replace real-world testing in the pre-commercialization and certification stage.

PSIAP-UI Grant Awardees and Cooperative Agreements

NEXTGEN Interactions
Consulting & Contracting Services

HEALTH SCHOLARS

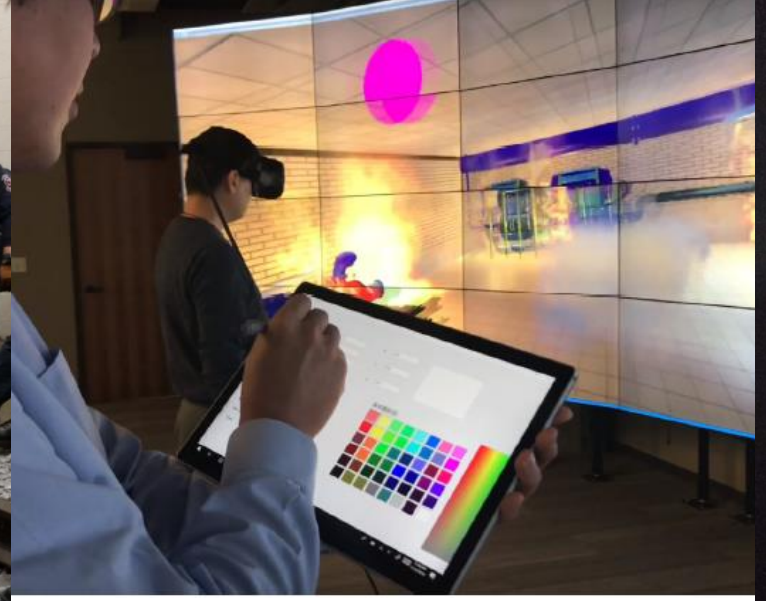
Georgia Tech Research Institute

NC STATE UNIVERSITY

CONSTRUCTION SCIENCE
TEXAS A&M UNIVERSITY

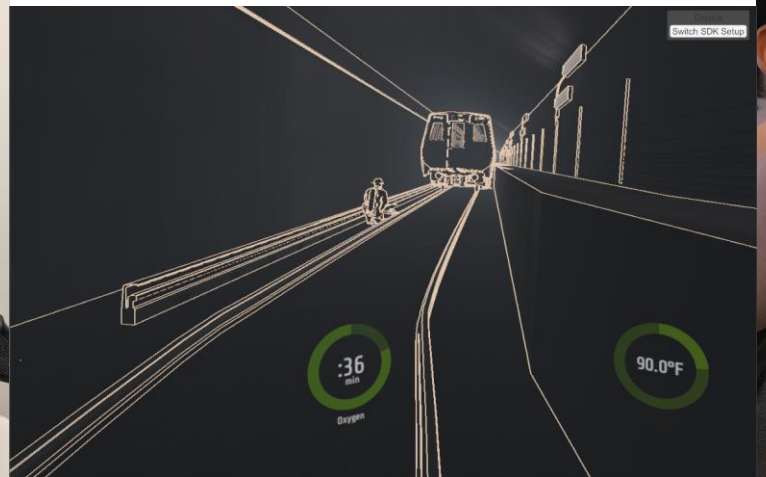
Duke UNIVERSITY

traclabs

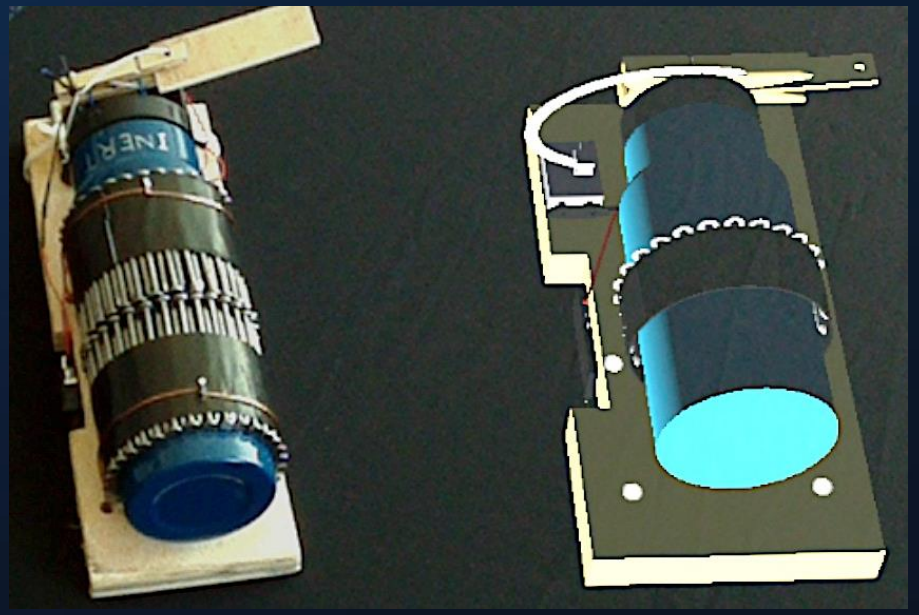


ENHANCED
USER INTERFACE
USER EXPERIENCE

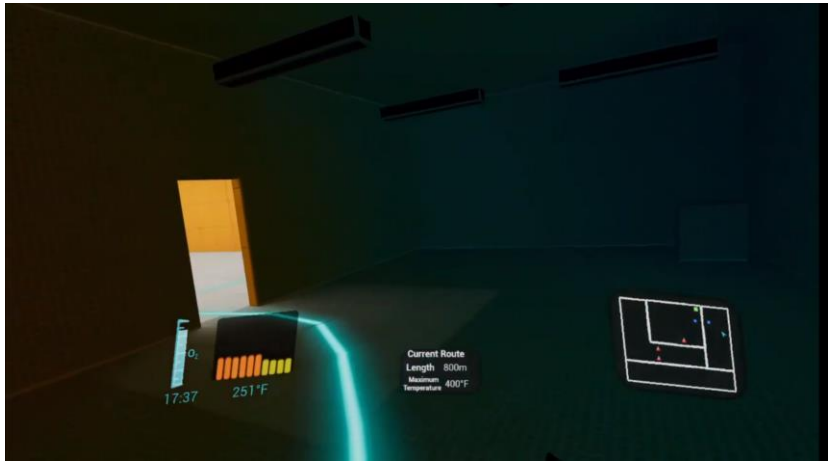
HOSE NOZZLE CONTROLLER PROTOTYPE

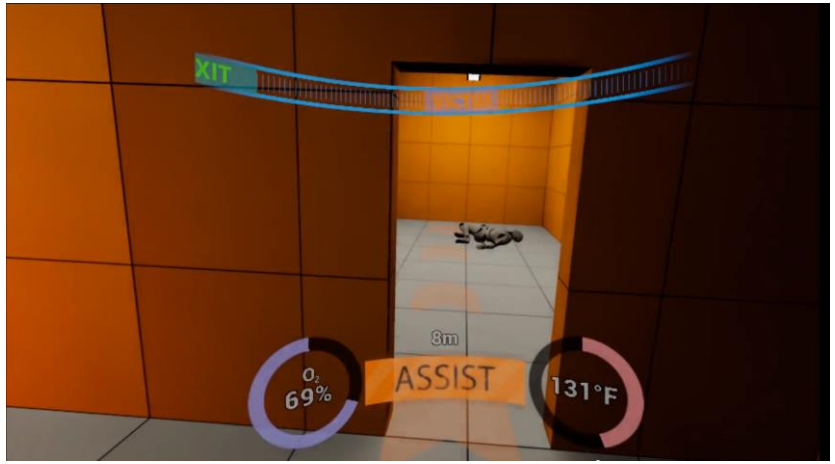


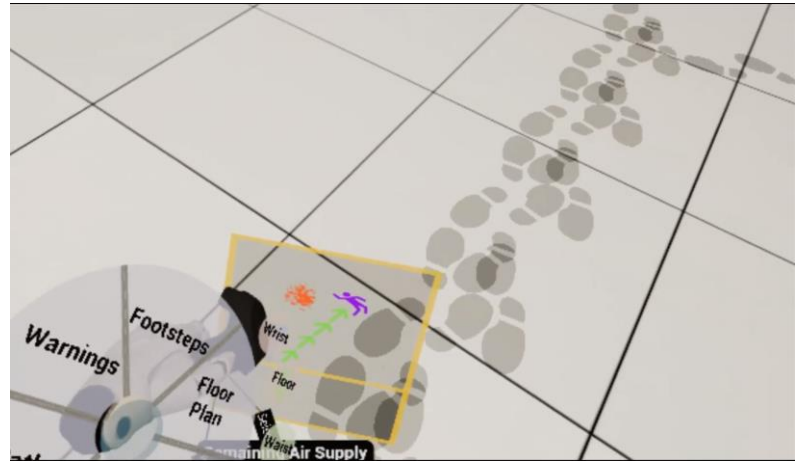
… and in Augmented Reality



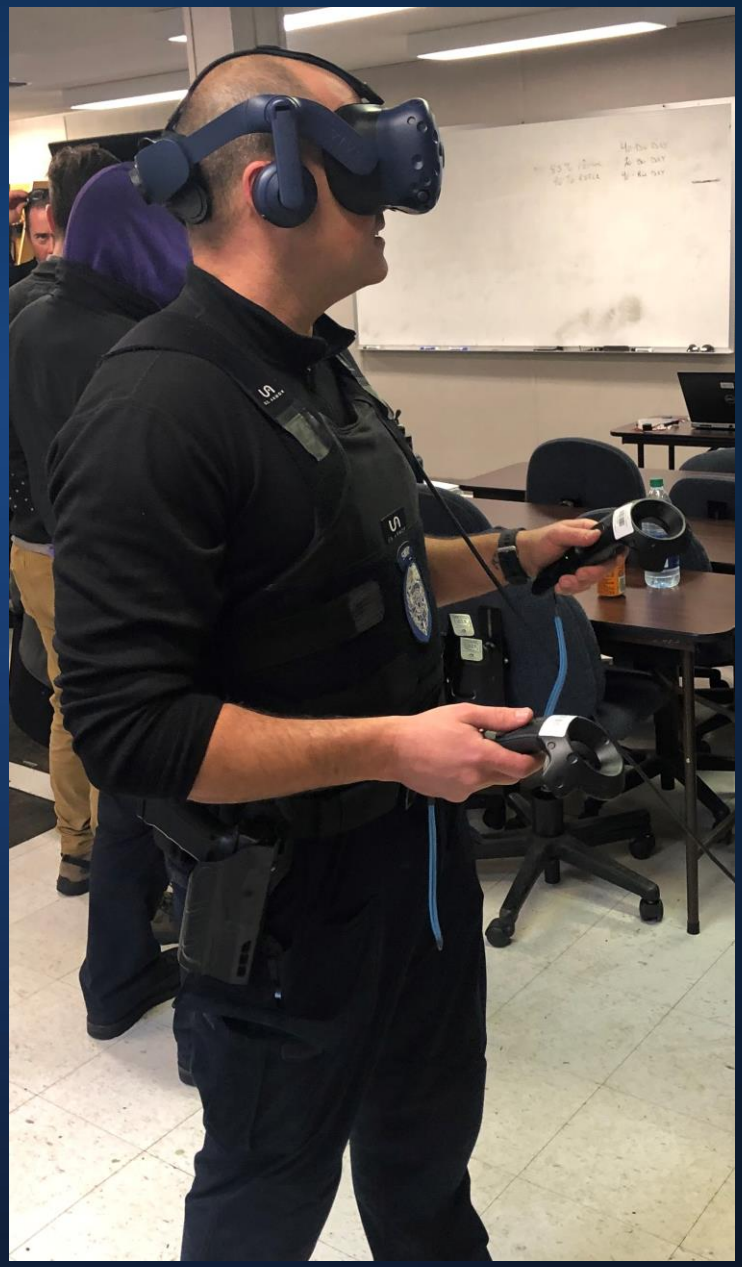
2018 - Heads-up Display Navigation Challenge Finalists





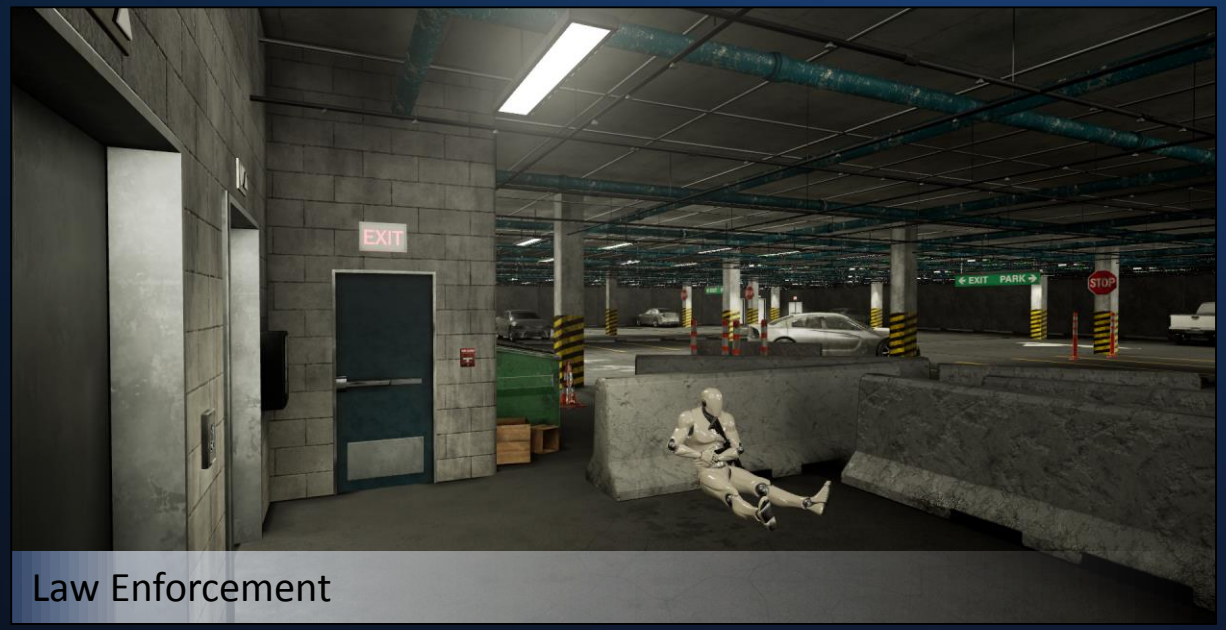



PSCR
CHUNG
SCEMS

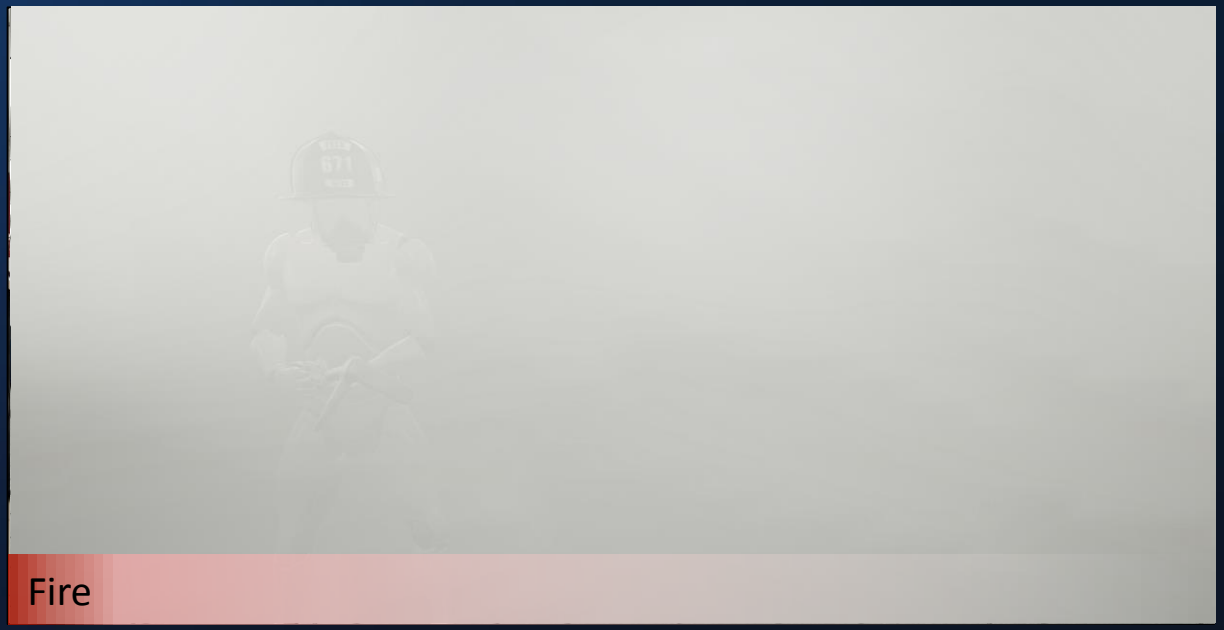


Our plan for what's next:

Emergency Medical Services



Law Enforcement


Fire

The Challenge - Relevancy of Haptic Interfaces for Public Safety Tasks

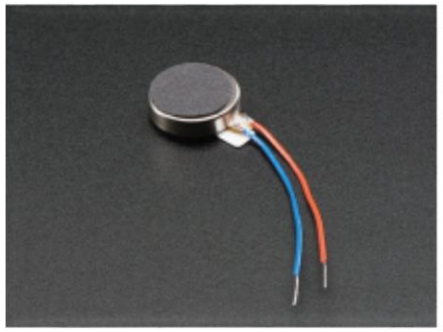
Can Haptic Interfaces assist First Responders?

3 Virtual Scenarios
1 Live Test

Prize Purse of $425,000

Two Different Contestant Types

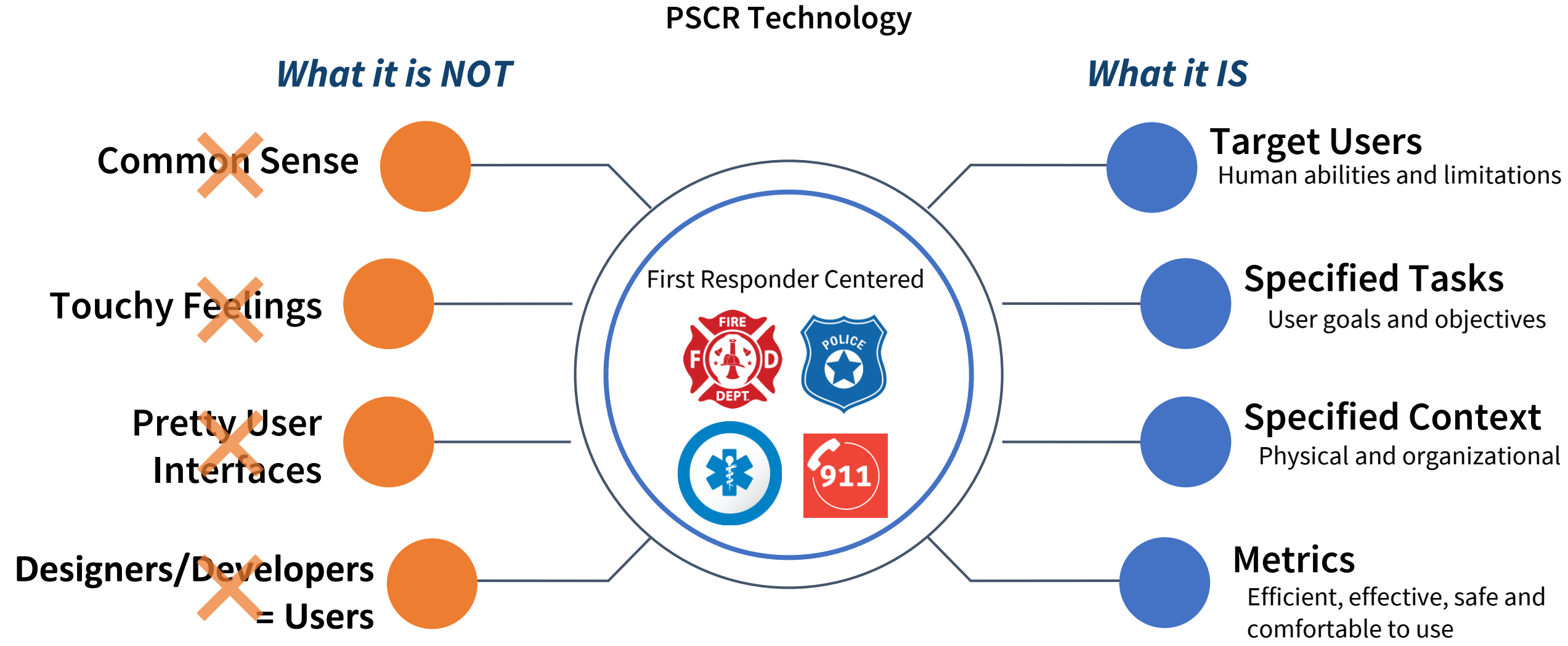
- **Haptic Providers**
- **Haptic Development Teams**



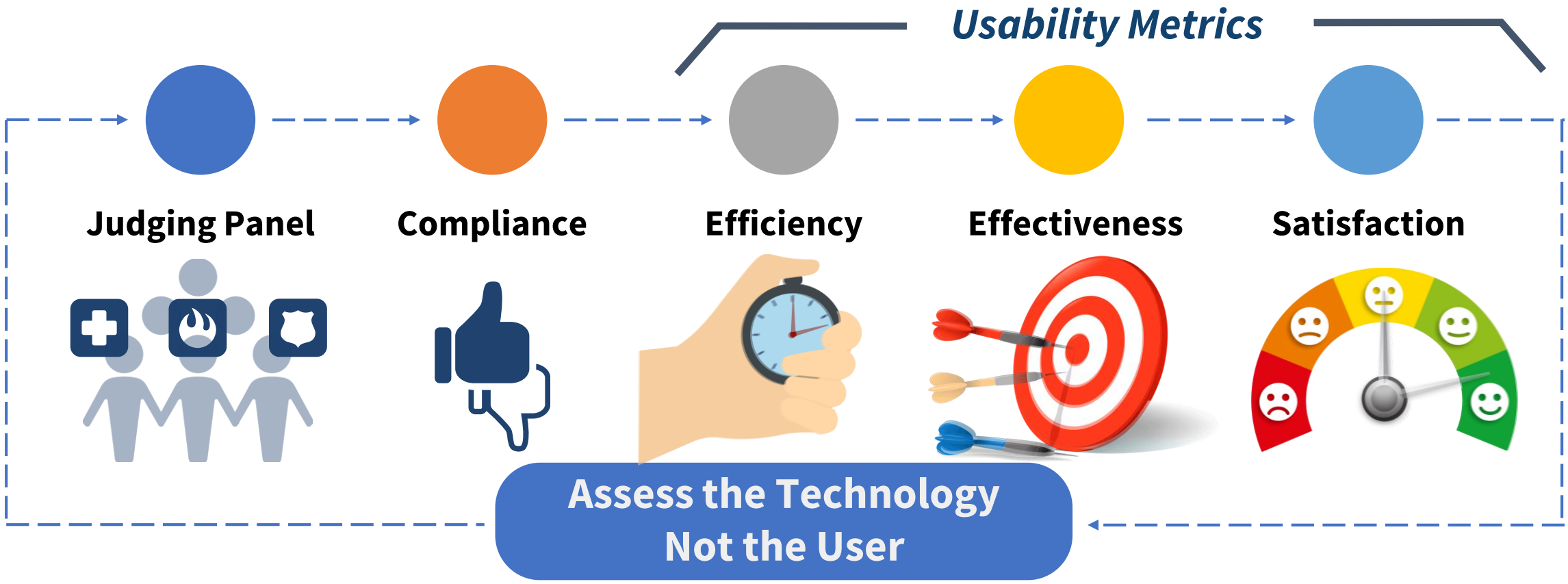
The Challenge -Relevancy of Haptic Interfaces for Public Safety Tasks

	Phase 1 Concept Paper	Phase 2 Teaming	Phase 3 Prototyping	Phase 4 VR Evaluation	Phase 5 Fire Nav. Course
Start:	March 18	May 13	May 24	July 9	September 10
End:	May 10	May 23	July 9 -11	September 10	November 15

Human Factors & Usability Engineering



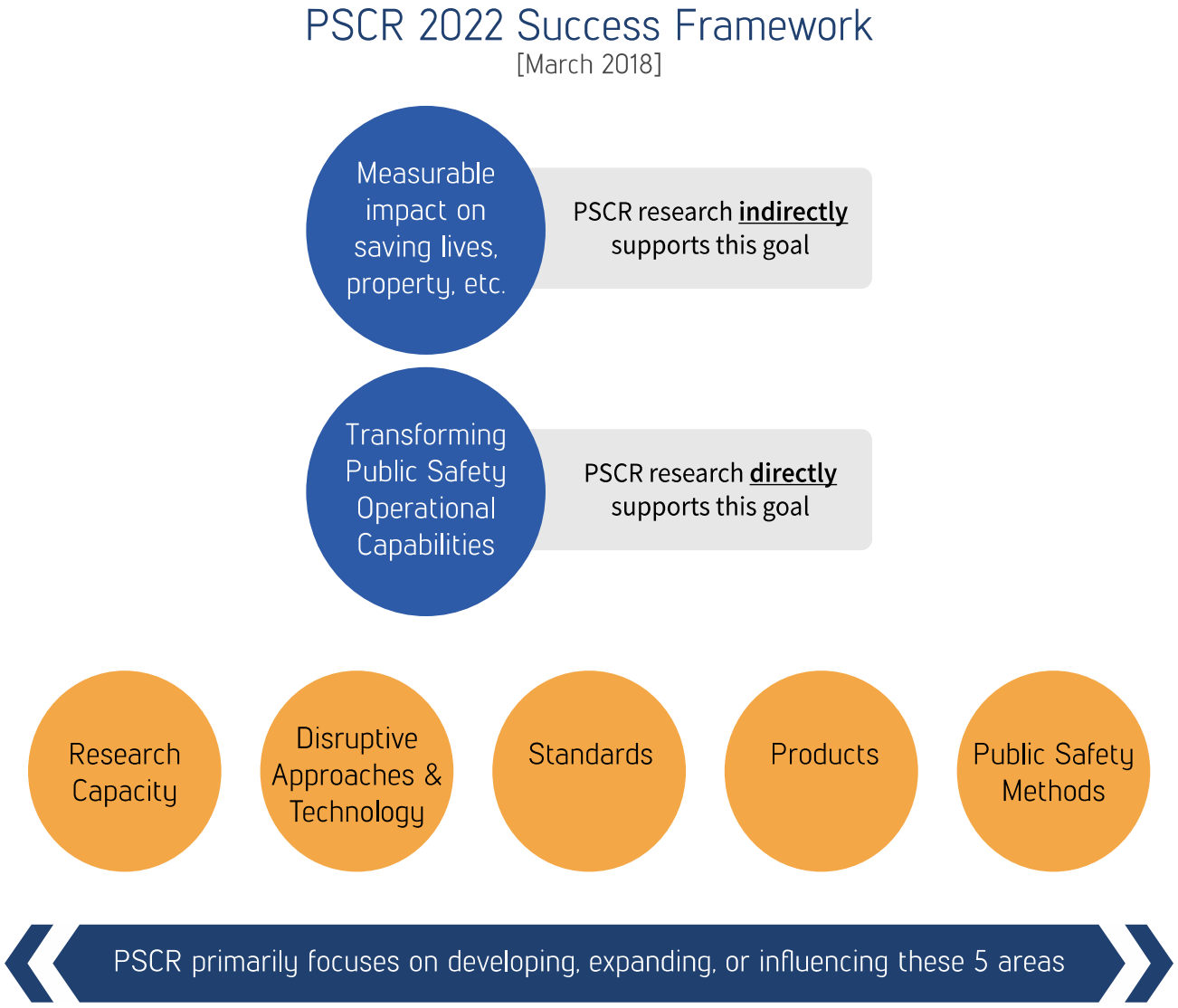
Evaluation – Haptic Interfaces Challenge



Evaluation – Haptic Interfaces Challenge

Two rounds of evaluation

PSCR 2022 Success Framework



QUESTIONS?