PSCR 2020:
THE DIGITAL EXPERIENCE

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CHARIoT Challenge

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Agenda

- Welcome
- Challenge Overview
- IoT Contest
- IoT Discussion – BlueForce Dev
- AR Contest
- Emergency Scenarios
- CHARIoT Data – Scott Turnbull, US Ignite
- Final Event

Speakers

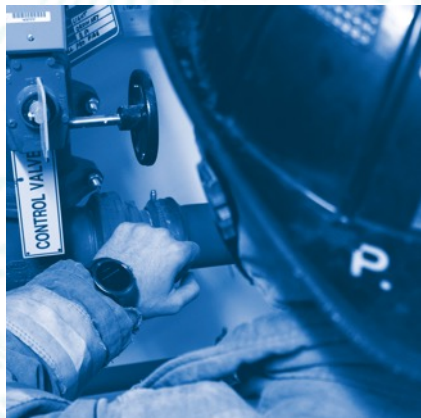Scott Ledgerwood

Don Harriss

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Bill Gellman

Scott Turnbull

Challenge Overview

- **Contestants' objectives:** Build augmented reality interfaces for first responders and develop smart city data streams to simulate disaster scenarios.

- **Emergency Scenarios:**
  - Active Shooter
  - Flood
  - Wildfire
  - Mass Transit Accident

- **Live event**: The final phase will be an interactive test of AR interfaces that utilize the live stream data from the IoT contestants at a public safety training center.

Phases

Build Augmented Reality Interfaces for First Responders

Emulate Smart City Data for Disaster Scenarios

| Phase	Dates	Description	Phase	Dates	Description
1	May	Concepts & AR Interfaces	1	May	Concepts
2	June	Early demonstrations	2	June	Early demonstrations
3	September	AR interfaces with Magic Leap headset	3	August	Data Streams & Transmitters Prototypes
4	November 2-6*	Prototypes at Live Event	4	November 2-6*	Data Integration at Live Event

Challenge Partners

AR Contestants
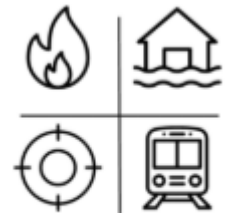
Public Safety Collaborations

Don Harriss, PSCR IoT

IoT Contest

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Emulate Smart City Data for Emergency Scenarios Contest Problem Definition

- Today, first responders do not have convenient access to the critical information that they need to make informed decisions during emergency disasters.

- Researchers can build solutions that provide first responders access to IoT devices', smart buildings' and smart cities' data streams.

- These systems would allow our public safety community to optimize resource deployment and decrease the time it takes for incident command and boots-on-the ground first responders to make life-saving decisions.

"Everyone has something to say"

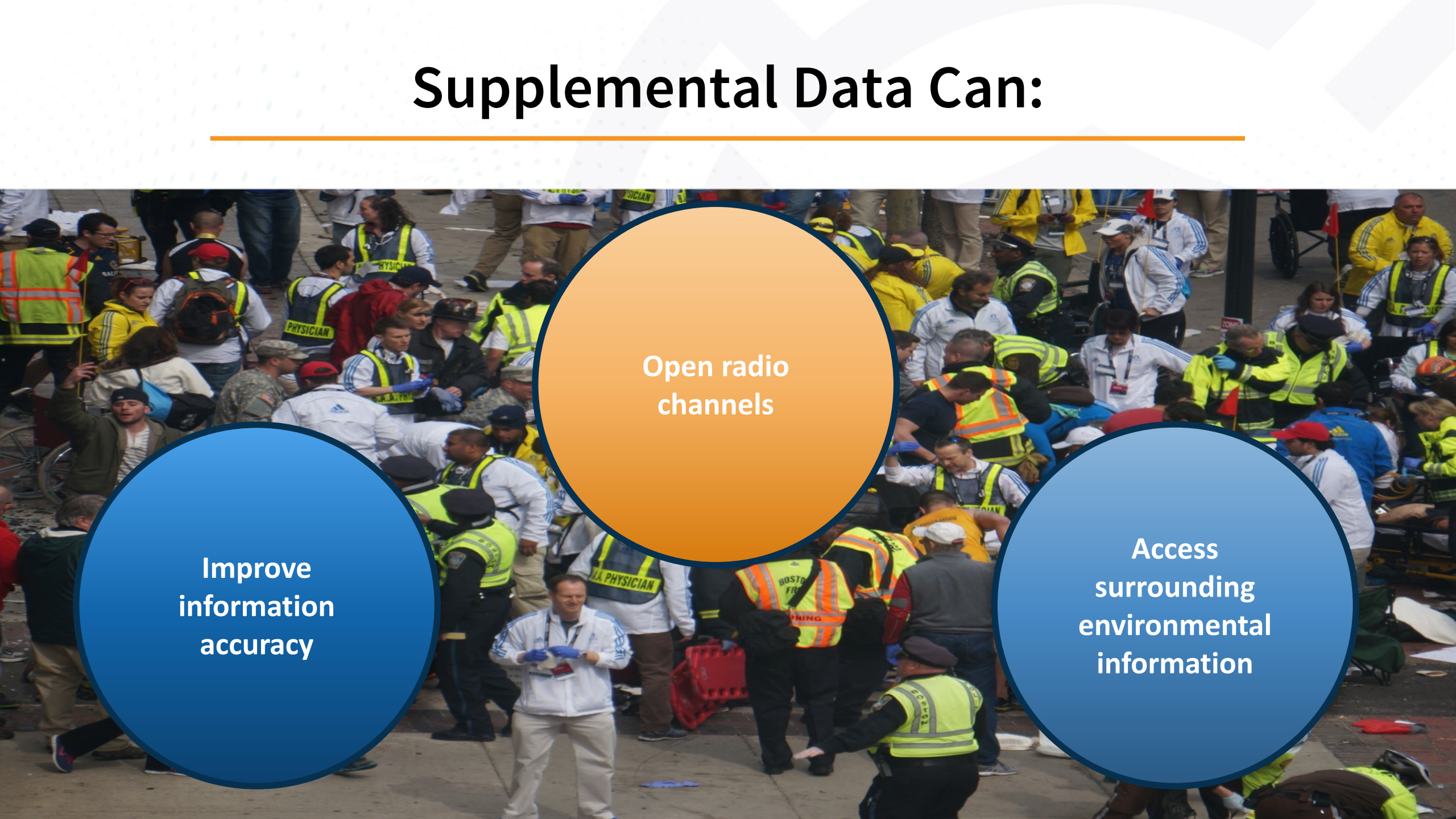Common Issues with Today's First Responder Communications
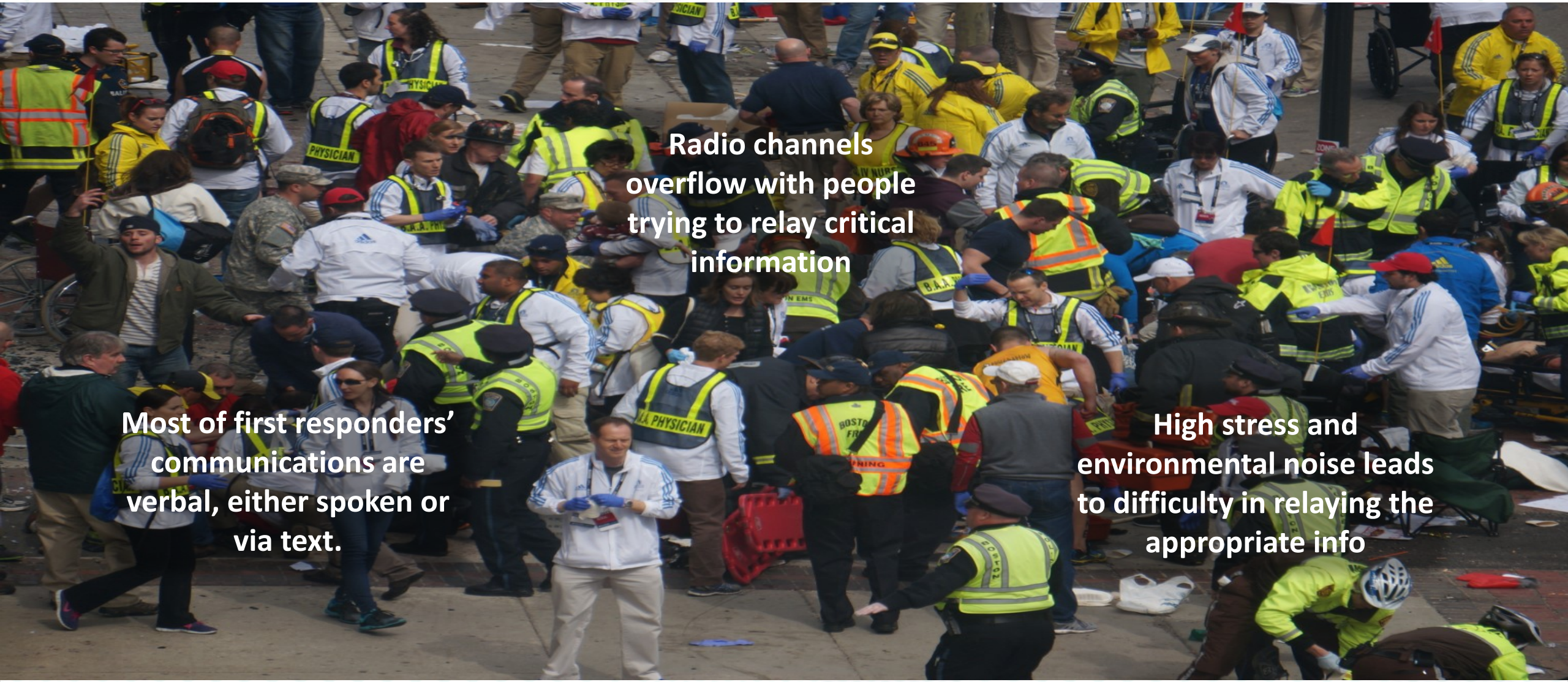
Radio channels overflow with people trying to relay critical information

Most of first responders' communications are verbal, either spoken or via text.

High stress and environmental noise leads to difficulty in relaying the appropriate info

Supplemental Data Can:

Open radio channels

Improve information accuracy

Access surrounding environmental information

Issues that Remain for IoT

- Integrating devices so that First Responders have access to necessary data
- Obtaining access from data owners
- Hardware that can withstand operating conditions
- A unified interface that can display information without impeding mission

Emulate Smart City Data for Emergency Scenarios Contest
Timeline

May 18th — **Challenge Kickoff & Congratulations!**

$5,000: Awarded to each selected team for prototype development

June 17th &18th — **Phase 2 – Demonstration of Data Streams**

Contestants participated in a video conference demonstrating their solution for a minimum of 2 of the 4 emergency scenarios for a pass/fail evaluation on June 17th & June 18th. Selected contestants advanced to Phase 3.

June 24th — **Phase 2 – Judging:**

$4,000: Awarded to each selected team for prototype development. Awardees advanced to Phase 3.

Emulate Smart City Data for Emergency Scenarios Contest
Phase 3 Timeline

June 25th — **Phase 3 – Evaluation Data Streams**

Contestants finalized their emulated data for the four emergency scenarios and demo their emulated data. On August 27th, Contestants will submit a wireless network and their data transmitters pre-configured for the four emergency scenarios for evaluation by the Judging panel.

Late July — **Anticipated Webinar about Phase 3 Demonstration & Phase 4 Live Event**

Sept 9th — **Phase 3 – Judging:**

Up to 4 Contestants, the best per emergency scenario, will be invited to advance to Phase 4.

$7,500: Awarded to each selected team for prototype development

$5,000: Awarded to fund travel for the final live event

Emulate Smart City Data for Emergency Scenarios Contest
Phase 4 Timeline

Sept 10th — **Phase 4 – Commences**

Sept 16th — **Anticipated Webinar with AR Contestants**

Up to Four Contestants will set-up their data transmitter and ensure compliance before the final competition; their data transmitter and the appliance would be available to the AR contestants for the live stream phase, currently scheduled for **Nov. 2-6, 2020.**

Nov. 2nd - 6th — **The Final Event**

Nov 18th — **Phase 4 – Judging**

$25,000: First Place

$12,500: Second Place

$2,000 will be awarded to teams who open-source their solution

$4,500 Most flexible design for public safety use case

$4,000 Most creative sensor utilization

DISCLAIMER

The slides presented by the guest speaker, Bill Gellmen, contained vendor proprietary information and are not presented in this PDF document. The views and content of his presentation do not necessarily reflect the views or policies of the National Institute of Standards and Technology or the U.S. Government.

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Bill Gellman, BlueForce Development

Smart Cities, Smart Buildings, and Personal Area Networks

Paul Merritt, PSCR UI/UX
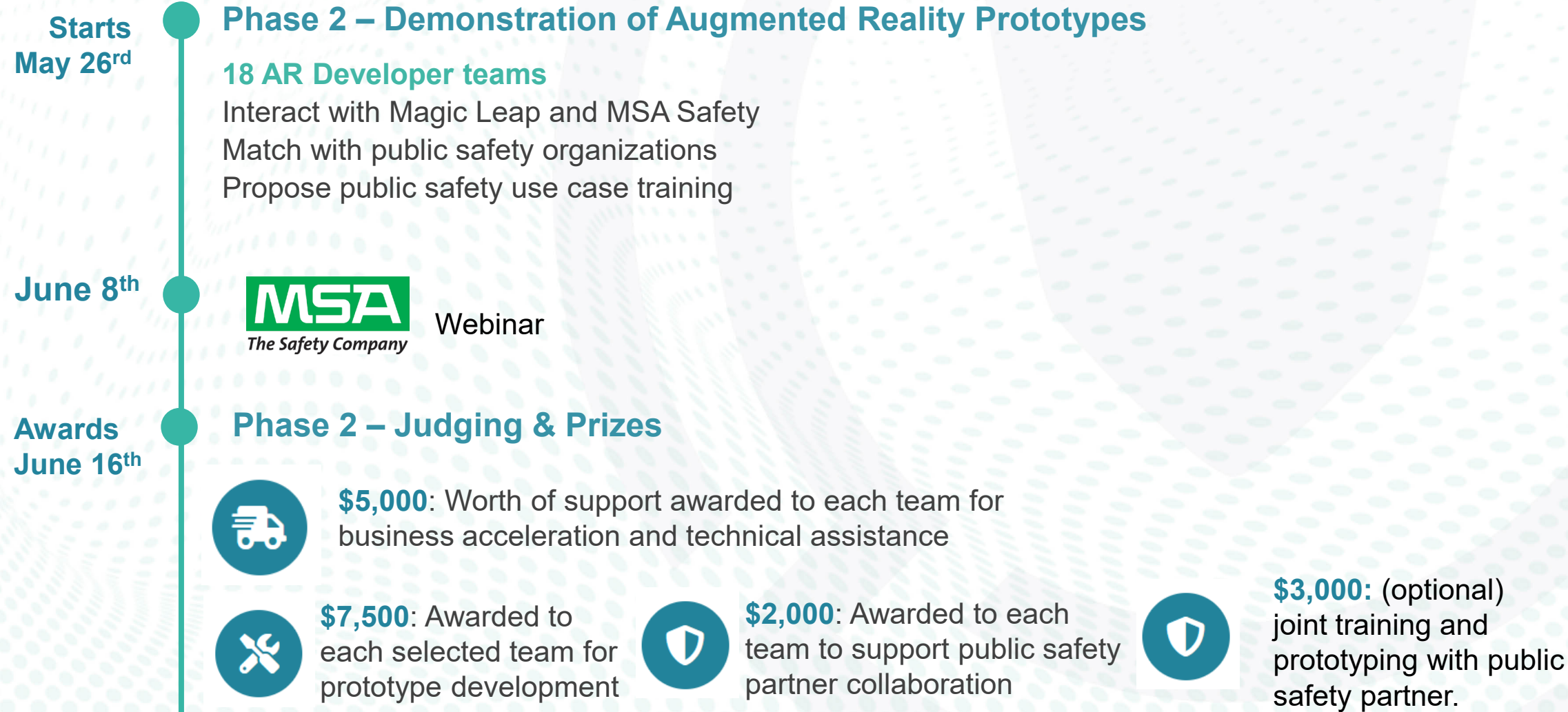
AR Contest

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Build Augmented Reality Interfaces for Public Safety Problem Definition

- Developers have the opportunity to leverage augmented reality (AR) technology, such as heads-up display and holographic interfaces, to convey actionable information to first responders without distractions or cognitive overload.

- These solutions can significantly improve a first responder's situational awareness allowing them to more effectively plan and respond during incidents. Today, however, current advancements in AR technology have been largely unavailable to first responders.

Build Augmented Reality Interfaces for Public Safety Contest
Timeline

Starts May 26rd

Phase 2 – Demonstration of Augmented Reality Prototypes

18 AR Developer teams
Interact with Magic Leap and MSA Safety
Match with public safety organizations
Propose public safety use case training

June 8th

MSA *The Safety Company* Webinar

Awards June 16th

Phase 2 – Judging & Prizes

$5,000: Worth of support awarded to each team for business acceleration and technical assistance

$7,500: Awarded to each selected team for prototype development

$2,000: Awarded to each team to support public safety partner collaboration

$3,000: (optional) joint training and prototyping with public safety partner.

Build Augmented Reality Interfaces for Public Safety Contest
Timeline

Starts June 17th

Phase 3 – AR Heads-Up Displays & Holograms

18 Contestants

Develop AR interfaces for use by public safety
Design incident command and first responder perspectives
Leverage Challenge IoT Disaster Scenario Dataset.

June 24th

magic leap   Training Webinar

Awards Sept 15th

Phase 3 – Judging & Prizes

$7,500: Awarded to each selected team for prototype development

$2,000: Awarded to support public safety participation

$5,000: Awarded to fund travel for the final live event

$8,750: (optional) Awarded to Best Visual Interface

Build Augmented Reality Interfaces for Public Safety Contest
Timeline

Starts Sept 16th

Phase 4 – Live Event

Interactive test of up to 15 teams' augmented reality interfaces
Live public safety training course
Utilize AR interfaces and IoT data to complete first responder tasks

Nov 2-6th — **Live Event**

Awards Nov 18th — ### Phase 4 – Prizes

- **1st: $25,000**
- **2nd: $20,000**
- **3rd: $15,000**
- **4th: $10,000**
- **5th: $7,500**

Most Creative Interaction with AR
$5,000

Business and Technical Assistance
$10,000

Best Demonstration of Public Safety Use Case
$4,000

Top Hologram per Scenario
$2,500
(4 prizes)

Top Heads-up Display per Scenario
$2,500
(4 prizes)

Emergency Scenarios

Active Shooter

Wildfire

Mass Transit Accident

Flood

Emergency Scenario: Active Shooter

Narrative: https://www.chariotchallenge.com/active-shooter/

Incident Command Tasks

- Track shooter
- Deploy SWAT personnel
- Track people evacuating
- Monitor evacuation routes and traffic
- Coordinate with CAD system data
- Detect injured individuals
- Detect suspicious objects

Incident Command Perspective

- Enhanced resource deployment using local maps and CCTV security cameras to determine ingress/egress points
- Building-level disarmament, using power grid, to shut off power to building to support responding assets

First Responder Tasks

- Engaging shooter via ingress/egress location points
- Identifying IED
- Preparing for treatment/staging/transport/triage of victims
- Helping people evacuate
- Locating/treating injured victims

First Responder Perspective

- Identifying number and location of victims
- Ingress/egress points to identify appropriate entry points
- Tactical response decision-making
- Real-Time IED Assessment
- Notification of location of victims

Emergency Scenario: Flood

Narrative: https://www.chariotchallenge.com/flood/

Incident Command Tasks

- Establishment of first responder flood rescue teams
- Identification of victims and rescue assistance
- Notification of residents in harm's way
- Identification and assessment of infrastructure assets at risk

Incident Command Perspective

- Enhancing city-level decision-making
- Deploying resources and personnel with geographic precision and real-time data flows

First Responder Tasks

- Notifying and evacuating residential and business areas located in potential flooding areas
- Rescuing of those that have been caught in existing flooding
- Creating clearance for driving through water, withstanding force of water
- Forecasting water speed/direction/quality levels
- Mapping hazardous materials

First Responder Perspective

- Intelligent location and mapping ability
- Advise on depth of water on roadways
- Notification of incoming rising water
- Alerts of water speed using water speed sensors

Emergency Scenario: Mass Transit Accident

Narrative: https://www.chariotchallenge.com/mass-transit-accident/

Incident Command Tasks

- Identifying location of metro cars, number of passengers in cars
- Identifying and leveraging CCTV streams
- Tracking first responders in the field
- Assessing infrastructure integrity
- Viewing live situations and direct first responders

Incident Command Perspective

- Visualizing underground pathways for pre-incident planning
- Collecting and analyzing real-time environmental data
- Mapping optimal navigation routes

First Responder Tasks

- Identifying if 3rd Rail is safe
- Identifying and mitigating risks such as smoke or fire
- Locating and evacuating victims
- Triaging victims
- Identifying damage to critical infrastructure

First Responder Perspective

- Tracking air quality and smoke levels
- Collecting and showcasing real-time information on status of victims
- Receiving navigation guidance and information to traverse through dark tunnels

Emergency Scenario: Wildfire

Narrative: https://www.chariotchallenge.com/wildfire/

Incident Command Tasks

- Identify victims or assets at risk
- Identify water resources/foam resources
- Track resources
- Receive updated temperature scans
- Establish geographic knowledge of area

Incident Command Perspective

- Visualizing & forecasting speed, intensity & direction of fire
- Visualizing and forecasting areas to evacuate based on wildfire models
- Deploying wildfire personnel to target areas

First Responder Tasks

- Establishing trench lines
- Evacuating victims
- Maintaining safety of other fire personnel and team members
- Identifying safe locations

First Responder Perspective

- Assessing dry/dangerous conditions
- Conducting thermal mapping of environment
- Tracking windspeed and wind direction
- Tracking movement of people
- Evaluating dangerous air conditions
- Overlaying infrastructure maps

DISCLAIMER

Scott Turnbull was a guest speaker and spoke on the CHARIOT challenge data streams but did not present slides. The views he shared did not necessarily reflect the views or policies of the National Institute of Standards and Technology or the U.S. Government.

Scott Turnbull, US Ignite

CHARIOT Data Streams

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Final Event
Nov 2 - 6

Stay tuned at
chariotchallenge.com

THANK YOU

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