Next Generation First Responder – Birmingham Shaken Fury Operational Experimentation

Playbook

August 2019

Science and Technology Directorate

Homeland Security

Science and Technology

Message from the Operational Experimentation Director

Today's first responders face dangerous, evolving threats, and are often equipped with outdated and proprietary technologies that restrict their ability to communicate between agencies at the incident scene. Responders need access to advanced, interoperable, plug-and-play technologies that can augment their capability to save lives.

To address these gaps, the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) launched the Next Generation First Responder (NGFR) Apex program to develop, adopt and integrate cutting-edge capabilities using a standards-based approach to make responders better protected, connected and fully aware. By leveraging the open standards documented in the NGFR Integration Handbook, first responders can have plug-and-play technologies to help them rapidly adapt to changing environments and evolving threats while sharing mission-critical information between all responding agencies.

DHS S&T will host the NGFR – Birmingham Shaken Fury Operational Experimentation (OpEx) from August 18 – 22, 2019 at Legion Field Stadium in Birmingham, Alabama. The OpEx will integrate first responder technologies using open standards in the NGFR Integration Handbook to enhance the mission capabilities of Birmingham-area responders during a mass casualty and HAZMAT scenario.

DHS S&T chose to work with Birmingham-area partners for the final NGFR Integration Demonstration because the City of Birmingham will host The World Games 2021. By setting the OpEx in a stadium with a sports-related scenario, DHS S&T gets the opportunity to see how NGFR technologies can augment major event public safety coordination, and the local government gets to experience coordinating a large, multi-player public safety response while identifying lessons learned and their own technical and procedural gaps. This will help all participants better understand how cutting-edge technologies can make communities more resilient.

The willingness and dedication of Birmingham-area first responders, as well as DHS partners and performers, has facilitated the development of innovative technology that will help the nation's first responders become better protected, connected and fully aware to maintain the safety of American lives and communities.

Sincerely,

Cuong Luu,
OpEx Director
Science and Technology Directorate
U.S. Department of Homeland Security

Administrative and Handling Instructions

The title of this document is the "Next Generation First Responder – Birmingham Shaken Fury Operational Experimentation Playbook." This document provides players, actors, observers, data collectors and controllers from participating organizations the information necessary to observe or participate in the OpEx. The information in this document is current as of the date of the OpEx, August 21, 2019. All preparation and documentation for the NGFR – Birmingham Shaken Fury OpEx is unclassified. Any control of information is based more on potential public sensitivity regarding scenario-related events, which are fictional, rather than the actual Playbook content. All participants should ensure the proper control of information within their areas of expertise and to protect this material in accordance with current jurisdictional directives.

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If you have any questions about this Playbook, or to request more information about the NGFR – Birmingham Shaken Fury OpEx, please contact NGFR@hq.dhs.gov. Public release of information is at the discretion of DHS S&T.

Accessibility

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Acknowledgements

The DHS S&T NGFR Apex program would first like to thank all our public safety and federal partners, including the Federal Emergency Management Agency (FEMA) Integrated Public Alert and Warning System Office; Birmingham Mayor's Office; Birmingham Fire and Rescue Service Department; Birmingham Police Department; Birmingham Parks and Recreation Board; Birmingham Department of Public Works; Birmingham Information Management Services Department; Jefferson County Emergency Management Agency; University of Alabama at Birmingham (UAB) Emergency Management; UAB Police and Public Safety Department; Birmingham Emergency Communications District; Alabama Emergency Management Agency; and Alabama National Guard for their participation in the OpEx. In particular, DHS S&T would like to thank the agency liaisons for each of these organizations who have dedicated countless hours to working with DHS S&T to plan and execute this event and the preceding activities.

The technological success of the NGFR – Birmingham Shaken Fury OpEx would not be possible without DHS partnerships with technical performers and industry partners, including 5VS LLC; AT&T Corporation; BodyWorn; Easy Aerial, Inc.; FEMA Integration Public Alert and Warning System Office; Field Forensics, Inc.; FireHUD, Inc.; Image Insight, Inc.; Kratos Defense and Security Solutions, Inc.; Metronome Software, LLC; MobileIron Inc.; Modern Technology Solutions, Inc.; N5 Sensors, Inc.; NC4; PAR Government Systems Corporation; Project OWL, LLC; REGAL Decision Systems, Inc.; SensorUp, Inc.; Silvus Technologies, Inc.; SpectraRep; Spectronn; TRX Systems, Inc.; Tyto Athene, LLC; and the University of Alabama in Huntsville Rotorcraft Systems Engineering & Simulation Center.

Lastly, DHS S&T would like to acknowledge the essential program management support provided by General Dynamics Information Technology, Booz Allen Hamilton, Johns Hopkins University Applied Physics Laboratory, FirstLink Analytics, The Cadmus Group, LMI, Carlowe International, Inc., RTI International, and Corner Alliance.

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1 Background

1.1 Next Generation First Responder Overview

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) works with America's first responders to ensure they are more effective and safer—regardless of the hazards they face. DHS S&T develops and adapts innovative technologies that help first responders make communities more secure and resilient, because we know that homeland security truly starts with hometown security.

The Next Generation First Responder (NGFR) program is a five-year program that began in January 2015 and is part of a longer-term DHS S&T commitment to envision and assist the responder of the future. The NGFR program works to make responders better protected, connected and fully aware by developing, adopting and integrating cutting-edge first responder technologies using open standards. This complex, multi-disciplinary program consists of a diverse but related portfolio of projects that span basic research to advanced technology development, and an initiative to define a common set of open standards for technology integration. These open standards enable industry partners to develop standards-based solutions that easily plug-and-play into an interoperable responder ecosystem, including legacy systems. This approach opens doors to industry while lowering costs and increasing choices for public safety organizations, helping them rapidly adapt to changing environments and evolving threats as they secure communities nationwide.

1.1.1 NGFR Integration Demonstrations

DHS S&T has held a series of NGFR Integration Demonstrations to incrementally test and evaluate interoperable technologies currently in development, and to assess how DHS-funded technologies, commercially-developed technologies and existing first responder systems integrate to improve response operations. One key component of the NGFR Apex program is that it is both modular—meaning responders can select different components that will easily integrate via open standards and interfaces—and scalable—meaning responders can build a large and complex system or a small and streamlined system, depending on mission needs and budget. Throughout the course of the NGFR Apex program, it has been essential to test both the modularity and scalability of the system with first responders. In addition, it is critical to gather responder feedback to help improve technologies and the NGFR integration approach. Collecting responder feedback and testing integration, modularity and scalability are core objectives of NGFR Integration Demonstrations.

Since 2016, these demonstrations have evolved from tabletop integrations to field exercises with partner public safety agencies and have matured to include more commercial technologies. Past NGFR Integration Demonstrations include:

- ***NGFR – Harris County Operational Experimentation (OpEx) – December 2018***
  The NGFR – Harris County OpEx was conducted December 4-5, 2018, at the Port of Houston in Houston, Texas. Participants from 13 local public safety agencies and the U.S. Coast Guard used integrated responder technologies to enhance their mission capabilities in a HAZMAT and mass casualty incident scenario. The experiment

scenario included an offshore simulated fuel leak from ships in the Port of Houston, tested technologies that included responder and patient physiological monitoring sensors, indoor location tracking, HAZMAT sensors, smart alerting for responders and incident command, advanced data analytics, and situational awareness and collaboration dashboards. Together, DHS S&T and responders evaluated how selected DHS-developed and commercial technologies integrate with existing public safety systems using open standards, and how those integrated capabilities enhance operational communications, increase operational coordination, improve responder safety and augment situational awareness.

- ***NGFR PlugTest – February 2018***
  The PlugTest was conducted on February 20-22, 2018, at the National Aeronautics and Space Administration (NASA) Jet Propulsion Laboratory (JPL) in Pasadena, California. The NGFR PlugTest tested the architecture and standards documented in the NGFR Integration Handbook, which contains guidance for technology providers in the areas of device design, system architecture, message standards and data formats for on-body and enterprise systems to support first responders. NGFR calls this on-body architecture the SmartHub system. The event was structured to validate interoperability characteristics in three primary functional categories: sensors (e.g., physiological, chemical, location), communication hubs, and situational awareness tools.

- ***Grant County – DHS S&T NGFR Technology Experiment (TechEx) – June 2017***
  The Grant County DHS S&T TechEx was the first partnership with a rural public agency that tested the integration of physiological and location sensors, situational awareness systems, drones, datacasting, and deployable communications into a cohesive public safety solution in an operational environment. The TechEx took place in Grant County, Washington, and assessed both the technology integration as well as how the new technologies improved the mission response of the participating law enforcement, fire rescue and emergency medical agencies.

- ***Boston Communications Experiment – October 2016***
  The Boston Communications Experiment assessed two communications systems—Mutualink and datacasting—to address requirements defined in Section 212 of Public Law 114-120 2015 (U.S. Congress, 2015). This law stipulates the execution of a pilot of three or more DHS components to assess the effectiveness of commercially available systems certified by the U.S. Department of Defense Joint Interoperability Test Center. These systems should allow multiagency collaboration and interoperability, and wide-area, secure, and peer-invitation-and-acceptance-based multimedia communications. The results identify both positive and negative features of the communication systems during the experiment, which have helped determine the next steps for these, or similar, technologies.

- ***NGFR Integration Demonstration – May 2016***
  The NGFR Integration Demonstration highlighted the ways in which various proprietary technologies come together to improve communications and situational awareness of first responders in the field. The demonstration integrated a number of physiological monitoring devices, environmental sensors, live video-streaming from body cameras and small unmanned aerial systems (sUAS), hybrid communications,

wearables, and alerting devices during an emergency scenario requiring a coordinated response from law enforcement, firefighters, search and rescue, HAZMAT, emergency medical services, and emergency management.

- ***Internet of Things (IoT) Pilot – January 2016***
  The IoT Pilot prototyped how open-source standards could allow the integration of various proprietary technologies to improve communications and situational awareness of first responders. This table top demonstration integrated a wide array of sensors, including physiological monitoring devices, environmental sensors and wearables, and investigated sensor catalogs, as well as geospatial displays and alerting.

DHS S&T has incorporated the results and responder feedback from the NGFR Integration Demonstrations into the NGFR Integration Handbook, which outlines a standards-based environment that enables commercially-developed technologies to integrate with existing first responder infrastructure. Using the lessons learned and responder feedback from these integration demonstrations, DHS S&T has also produced materials to help public safety agencies implement new technologies that address their capability gaps and operational priorities. For example, the NGFR Case Study series helps agencies understand how tools like location services, deployable communications, video services, physiological monitoring and situational awareness can improve their mission response and provides guidance on how agencies can best implement them.

1.1.2 NGFR – Birmingham Shaken Fury OpEx

DHS S&T is hosting the NGFR – Birmingham Shaken Fury OpEx on August 21-22, 2019, at Legion Field Stadium in Birmingham, Alabama, in partnership with regional public safety agencies and technology providers. During the OpEx, Birmingham-area first responders and federal partners will use integrated responder technologies to enhance their mission capabilities in a Search and Rescue, Mass Casualty Incident and HAZMAT response resulting from an earthquake scenario. Together, DHS S&T and responders will evaluate how selected DHS-developed and commercial technologies integrate with existing public safety systems using open standards, and how those integrated capabilities enhance operational communications, increase operational coordination, improve responder safety and augment situational awareness.

Responders will employ new technologies to streamline collaboration through response, triage and decontamination. DHS S&T and partners hope to demonstrate how integrated solutions deliver greater operational impact for first responders and communities.

1.2 Birmingham, Jefferson County and the OpEx Venue

The City of Birmingham is the largest city in the state with a population currently estimated at 212,237, and a metro population of 1,136,650. Nestled at the foothills of the Appalachian Mountains at the cross-section of two major railroads, the city was once the primary industrial center of the southern United States. At the height of the nation's manufacturing age, the city grew so fast in population, it was called the "Magic City." Today, Birmingham has transformed itself into a medical research, banking and service-based economy, making it one of the nation's most livable cities with a vibrant downtown, a burgeoning loft community, a world-class culinary scene and more green space per capita than any other city in the nation.

Jefferson County, with an estimated 659,300 residents, is the most populous county in the state of Alabama. The county seat is the City of Birmingham. The county is home to the University of Alabama at Birmingham (UAB), with over 20,000 students.

Jefferson County is located within the New Madrid Seismic Zone, the most active zone west of the Rocky Mountains. The county is also situated within Dixie Alley, a meteorological area distinct from the larger Tornado Alley zone due to its susceptibility to strong, long-track tornados that move at high speeds. In March 2019, 41 tornadoes touched down over the course of six hours across the Southeastern United States, the most severe of which was an EF4 tornado that caused damage near Beauregard, in northwestern Alabama, and left 23 dead.

DHS S&T chose to work with Birmingham-area public safety agencies because the City of Birmingham will host The World Games 2021 in July 2021. Athletes and fans from around the world will unite in Birmingham, Alabama, for 11 days of fierce competition and rich pageantry from July 15-25, 2021. DHS S&T has enjoyed building new stakeholder relationships with the Birmingham-area public safety community, appreciates their willingness to assess and adopt new technologies, and welcomed the opportunity to help improve community resilience as they prepare to host The World Games 2021.

1.2.1 OpEx Venue: Legion Field Stadium

The OpEx will take place in and around Legion Field Stadium, a City of Birmingham-owned football stadium. Legion Field Stadium, also affectionately known as the "The Old Gray Lady," was completed in 1927 as a 21,000-seat venue. The stadium now seats 71,000. The stadium was named Legion Field in honor of the American Legion. Once famously known for playing host to the Iron Bowl and 1996 Olympic soccer, the stadium is now the site for UAB football, the Magic City Classic, Birmingham Bowl, SWAC Championship, and some local high school games, music festivals and more.

Legion Field Stadium has been chosen as the location for the Opening Ceremonies at The World Games 2021, which Birmingham will host in July 2021. Following the Opening Ceremonies, Legion Field Stadium will serve as one of 36 World Games sporting event venues across Jefferson and Shelby Counties.

1.3 OpEx Participants

Although there are many types of OpEx participants, most fall under the categories of DHS, regional public safety agencies and technology providers.

1.3.1 Department of Homeland Security

The Department of Homeland Security has a vital mission: to secure the nation from the many threats we face. This requires the dedication of more than 240,000 employees in jobs that range from aviation and border security to emergency response, from cybersecurity analyst to chemical facility inspector. With honor and integrity, DHS will safeguard the American people, our homeland and our values.

1.3.1.1 Science and Technology Directorate – OpEx Management

Technology and threats evolve rapidly in today's ever-changing environment. The DHS Science and Technology Directorate (S&T) monitors those threats and rapidly capitalizes on technological advancements—developing solutions and bridging capability gaps at a pace that mirrors the speed of life. DHS S&T's mission is to enable effective, efficient and secure operations across all homeland security missions by applying scientific, engineering, analytic and innovative approaches to deliver timely solutions and support departmental acquisitions. Created by Congress in 2003, S&T conducts basic and applied research, development, demonstration, and testing and evaluation activities relevant to DHS. For more information, visit the agency website: scitech.dhs.gov.

DHS S&T's OpEx partnership objectives are to:

- Develop and maintain an active partnership between the Regional Parties and DHS to plan, execute and follow-up from the NGFR – Birmingham Shaken Fury OpEx;
- Fully evaluate technology integration and mission enhancements gained from deploying new technologies;
- Gather feedback from Regional Parties on capability gaps, individual technologies, technology integration, implementation and event lessons-learned; and
- Assess alerts, warnings and notifications for public evacuations.

OpEx management is the support team that is responsible for planning and executing the NGFR – Birmingham Shaken Fury OpEx, including leading coordination between all the different participants. As the OpEx is hosted by DHS S&T, the OpEx management team is comprised of DHS federal and contractor staff providing scenario management, logistics coordination, data collection, technical support and VIP facilitation.

- **DHS S&T Next Generation First Responder Apex Program**

  The Next Generation First Responder (NGFR) Apex program is a five-year program that began in January 2015 as part of a longer-term DHS S&T commitment to envision and assist the responder of the future. NGFR continually collaborates with first responders across the nation on various projects—from developing program requirements to integration testing and evaluating prototypes. These cutting-edge technologies will improve emergency response time and accelerate decision-making to save more lives.

  NGFR is comprised of more than 40 research and development projects geared towards making responders better protected, connected and fully aware. NGFR will incrementally deliver these capabilities over the program cycle and will continue to partner with first responders to test and evaluate technologies before they are available on the market. For more information, visit the program website: www.dhs.gov/NGFR.

- **DHS S&T National Urban Security Technology Laboratory (NUSTL)**

  NUSTL is a federal laboratory within DHS S&T with a mission to test, evaluate and analyze homeland security capabilities while serving as a technical authority to first responder, state and local entities in protecting cities. As part of that mission, NUSTL works with NGFR and other S&T responder technology projects to ensure the durability of new technologies to enhance responder performance and safety. NUSTL supports the development, evaluation and transition of homeland security technologies into field use for

law enforcement, fire and other emergency response agencies. Staff experts work side-by-side with the nation's first responders to effectively plan and execute tests, evaluations and assessments of existing and emerging technologies. The laboratory also works to enhance first responder capabilities by partnering with stakeholders to develop viable solutions to radiological and nuclear response and recovery.

In supporting DHS and first responder projects, NUSTL:

- Conducts test programs, pilots, demonstrations and other evaluations in the lab and in the field alongside responders;
- Provides expert technical assistance to first responders for the development and execution of training and exercises and assessment of equipment performance;
- Applies knowledge of responder environments, operations and mission requirements into the development of more effective technologies; and
- Supports the development and use of homeland security standards.

For more information, visit the laboratory website: https://www.dhs.gov/science-and-technology/national-urban-security-technology-laboratory.

1.3.1.2 Federal Emergency Management Agency, Integrated Public Alert and Warning System Office

The Federal Emergency Management Agency (FEMA) Integrated Public Alert and Warning System (IPAWS) is a modernization and integration of the nation's alert and warning infrastructure and will save time when time matters most—protecting life and property. Local police and fire departments, emergency managers, the National Weather Service, FEMA, and private industry are working together to make sure you can receive alerts and warnings quickly through several different technologies no matter where you are—at home, at school, at work or even on vacation. The IPAWS uses different pathways to simultaneously send alerts through many different channels:

The National Weather Service uses IPAWS to send alerts for: tornadoes, flash floods, hurricanes, extreme wind, blizzards and ice storms, tsunamis, and dust storms. Wireless Emergency Alerts allow public safety officials to send warnings directly to cell phones and other mobile devices in affected areas. These short messages look like text messages, but unlike texts, which are sent directly to your phone number, these warnings will be broadcast to all phones within range of designated cell towers. The alerts will tell you the type of warning, the affected area and the duration. You'll need to turn to other sources, such as television or radio, to get more detailed information about what is happening and what actions you should take. For more information, visit the agency website: https://www.fema.gov/integrated-public-alert-warning-system.

1.3.2 Regional Public Safety Agencies

The operational and observer personnel, more commonly referred to as Players, are representing participating regional public safety agencies from the City of Birmingham, Jefferson County, the University of Alabama at Birmingham, the Birmingham Emergency Communications District, and the State of Alabama.

1.3.2.1 City of Birmingham

The City of Birmingham's mission is to build community through servant leadership. Our strategic theme of "putting people first" is supported through the core values of customer

service, efficiency, effectiveness, transparency and accountability. Learn more about Alabama's largest city. For more information, visit the city website: https://www.birminghamal.gov/.

- **Mayor's Office**: The Mayor's Office, led by Birmingham's 30th Mayor, Randall L. Woodfin, coordinated across the municipal government and City Council. For more information, visit the office website: https://www.birminghamal.gov/about/mayors-office/.
- **Police Department**: It is the mission of the Birmingham Police Department to provide the highest quality of Police Service by partnering with the community to build trust, reduce crime and improve the quality of life. They serve their citizens with respect and protect the lives, property and Constitutional rights of all. The Birmingham Police Department is one of the largest departments in the municipal government. For more information, visit the agency website: https://police.birminghamal.gov/.
- **Fire and Rescue Services**: The Birmingham Fire & Rescue Service is dedicated to providing rapid, reliable and professional emergency services to the citizens and stakeholders of Birmingham. They accomplish their mission through education, risk reduction, fire suppression, emergency medical services and emergency activities. They actively participate in the community, striving to efficiently and effectively utilize all resources at their command to meet the needs of those they serve. For more information, visit the agency website: https://fire.birminghamal.gov/.
- **Parks and Recreation Board**: The Birmingham Park and Recreation Board is responsible for operating all City of Birmingham parks. A five-member board is appointed by the Birmingham City Council. The Board holds more than 100 parcels of property, encompassing more than 2,000 acres. Included among the park amenities offered to the public are Legion Field Stadium, Birmingham Botanical Gardens, recreation centers, golf courses, tennis courts, swimming pools, walking tracks, lakes, athletic fields and picnic pavilions, just to name a few. It is the mission of the Birmingham Park and Recreation Board to offer quality leisure service programs and open park space reflective of the changing community in a clean, courteous, efficient and safe environment. For more information, visit the agency website: https://www.birminghamal.gov/parks-and-recreation/.
- **Public Works**: The mission of the Department of Public Works is to provide an environmentally clean and safe city through the economical, efficient, proficient and courteous delivery of sanitary services, waste disposal, street maintenance, building maintenance, park vegetative maintenance, right-of-way beautification, code enforcement and animal control to the citizens of Birmingham. For more information, visit the agency website: https://www.birminghamal.gov/about/city-directory/public-works/.
- **Information Management Services Department:** Provides service to all City of Birmingham Departments through information technology (IT) for greater efficiency in servicing the citizens of Birmingham. For more information, visit the agency website: https://www.birminghamal.gov/about/city-directory/information-management/.

1.3.2.2 Jefferson County Emergency Management Agency

The mission of the Jefferson County EMA is to save lives and protect property by developing programs and emergency operational capabilities that mitigate, prepare for, respond to and recover from any emergency or disaster. For more information, visit the agency website: https://www.jeffcoema.org/.

1.3.2.3 University of Alabama at Birmingham (UAB)

- **Emergency Management**: UAB Emergency Management is dedicated to protecting and educating the UAB campus and community about emergency situations and severe weather. The university's primary concern during an emergency or severe weather situation is the safety of its students, faculty and staff. The UAB Emergency Management team continually engages in training and exercises. The goal of the training and exercises is to increase awareness, preparedness and response to events that may have a destructive effect on the UAB campus and community. If a negative event were to happen on campus, the Emergency Management team is able to respond and provide support to all supporting agencies. For more information, visit the agency website: http://UAB.edu/emergency.
- **Police and Public Safety Department**: The UAB Police and Public Safety Department's mission is to provide high quality accessible service to the University community that helps foster safety and security on campus by being responsive to the changing needs of their customers. For more information, visit the agency website: https://www.uab.edu/police/.

1.3.2.4 Birmingham Emergency Communications District

The Birmingham Emergency Communications District, a state organization, coordinates Birmingham 9-1-1, dispatch and radio management to ensure resilient emergency communications across the community. Birmingham 9-1-1 takes calls and dispatches for City of Birmingham public safety agencies and works closely with the Jefferson County Emergency Management Agency on major emergencies.

1.3.2.5 State of Alabama

- **Alabama Emergency Management Agency**: The Alabama Emergency Management Agency mission is to support their citizens, strengthen their communities and build a culture of preparedness through a comprehensive Emergency Management (EM) program. For more information, visit the agency website: https://ema.alabama.gov/.
- **Alabama National Guard**: The National Guard is the only organization in the U.S. military charged with both a federal and a state mission. The National Guard's state mission is to provide trained and disciplined forces for natural disasters, domestic emergencies or as otherwise prescribed by law, under the command of the Governor of Alabama. For more information, visit the agency website: https://al.ng.mil/ALABAMA/Pages/Alabama-Home.aspx.

1.3.3 Participating Technology Providers

Technology providers are developers of new, cutting-edge first responder technologies that have worked with DHS S&T to integrate their solutions using open standards. During the OpEx, the responders will use these new technologies in the mission-based environments, which allows DHS S&T opportunities to assess how well the technologies support the mission response and gather feedback directly from the first responders to guide future technology adaption and development. This provides technology providers with critical user information that they can then use to improve and enhance their technology-based solutions.

1.3.3.1 DHS-Funded Technology Providers

DHS S&T has funded the following participating performers (all except FEMA IPAWS) as part of the Next Generation First Responder Apex program to research, develop, adopt, test and evaluate specific technologies that first responders have requested.

- FEMA Integration Public Alert and Warning System Office
- Metronome Software, LLC
- MobileIron, Inc.
- N5 Sensors, Inc.
- Regal Decision Systems
- SensorUp, Inc.
- SpectraRep

1.3.3.2 Industry Technology Providers

Industry technology providers have signed Cooperative Research and Development Agreements with DHS S&T to facilitate their participation in this event. While both DHS and the industry benefit from the event, these participants are not on contract or receiving monetary compensation for attending but are receiving direct first responder feedback to improve their technologies.

- 5VS LLC
- AT&T Corporation
- BodyWorn
- Easy Aerial, Inc.
- Field Forensics, Inc.
- FireHUD, Inc.
- Image Insight, Inc.
- Kratos Defense and Security Solutions, Inc.
- Modern Technology Solutions, Inc.
- NC4 Public Sector, LLC
- PAR Government Systems Corporation
- Project OWL
- Silvus Technologies, Inc.
- Spectronn
- TRX Systems, Inc.
- Tyto Athene, LLC
- University of Alabama in Huntsville

2 Introduction

2.1 Introduction for Players

You are participating in an *operational technology-focused experiment*, which is structured very similarly to a full-scale exercise in that resources and assets will be deployed to respond to a scenario. However, *the focus of this effort is on the performance and integration of new technologies* to support response operations that fall under the following DHS Core Capabilities:

- Environmental Response/Health and Safety
- Situational Assessment
- Operational Coordination
- Operational Communications
- Intelligence and Information Sharing
- Access Control and Identity Verification
- Mass Search and Rescue Operations
- On-Scene Security, Protection and Law Enforcement

The overarching focus of this experiment is the assessment of new technologies to support first response operations directly in their mission space. In order to achieve this, a scenario (earthquake causing partial stadium collapse at Legion Field resulting in a Mass Casualty Incident and HAZMAT spill) will be used to ensure opportunities for responders (players) to use these technologies to support their routine response operations. There will be NO EVALUATION of operations, concepts of operations (CONOPS), policies or operational response.

DHS S&T data collectors will be in the same location as many players to document the performance of the technologies. Data collectors will record information on datasheets.

Players are encouraged to "think out loud" (as/if doable) by verbalizing what they are seeing/hearing, what they are thinking, and what actions they are performing to help the data collection effort and minimize the interruptions needed by the data collectors. Surveys on the technologies will be administered by the data collectors following each use of the technologies. Players are expected to provide appropriate responses based on their experiences with them. Data collectors will also retrieve data from technology files and record pertinent information provided by players during the final hot wash session.

2.2 Purpose and Organization of Playbook

The OpEx Playbook provides participants with the necessary tools to support their roles in the NGFR – Birmingham Shaken Fury OpEx. Some material is intended for the exclusive use of planners, facilitators and data collectors; however, all participants may view and use this Playbook. This Playbook also provides all available, relevant documents used in the planning for this OpEx.

The OpEx will be conducted over two days and is based on a scenario comprised of three vignettes. The OpEx location is Legion Field Stadium and the surrounding parking lot. The experiment focuses on communications and information sharing technologies, and how these technologies support first responder needs during a search and rescue, mass casualty incident and HAZMAT response resulting from an earthquake during a UAB football game at the stadium.

The OpEx will employ new technologies in an operational scenario based on three vignettes, all of which will take place on Wednesday, August 21, 2019. The three vignettes are:

- **Vignette A**: Game Day Set-Up and Communications Check
- **Vignette B**: Mass Casualty Incident Response
- **Vignette C**: HAZMAT Incident Response

On Thursday, August 22 for the VIP Demonstration, responders will conduct a condensed 30-minute VIP vignette that is a mix of vignettes B and C.

2.3 Goals, Objectives and Core Capabilities

DHS S&T is hosting the OpEx to advance the NGFR program as it enters its final year and to support responders. The OpEx plays an essential role in making the NGFR program successful, and local agency and industry contributions are critical to that success. The DHS S&T OpEx objectives defined in Figure 3 will help DHS S&T better measure and communicate OpEx successes and identify the long-term benefits of the event and NGFR program.

Goals	Objectives
Demonstrate success of the NGFR program's research and development through operational test and evaluation	❶ Evaluate how NGFR technologies improve first responder safety and effectiveness in a field environment.
	❷ Demonstrate the successful integration between NGFR-funded technologies, industry solutions and existing first responder systems to exhibit the value of the NGFR Integration Handbook
	❸ Improve regional core capabilities in a multi-agency response
Identify pathways for transitioning NGFR-developed products	❹ Facilitate transition of NGFR-developed technologies, integration approach and knowledge products
	❺ Promote innovation and adoption of public safety technologies to make responders better protected, connected and fully aware

Figure 1. DHS S&T programmatic objectives for the NGFR – Birmingham Shaken Fury OpEx. These tell what impact DHS S&T hopes the OpEx will achieve for the *program*, rather than what DHS S&T hopes will occur at the event.

In the Memorandum of Agreement between DHS S&T and Birmingham-area public safety agencies signed in May 2019, the regional parties identified their objectives as:

- Prepare regional parties to support public safety activities during The World Games 2021;
- Improve coordination, communications and response to all-hazards incidents;
- Build relationships across cities, jurisdictions, agencies and disciplines to improve unified command and operations to planned and no-notice incidents;
- Understand public-private response integration, including activation of private-sector resources;

- Identify barriers to change in technology, procedures and coordination and develop mitigation approaches; and
- Meet exercise and training requirements for participating agencies as required for grant funding.

2.4 Assumptions and Artificialities

The NGFR – Birmingham Shaken Fury OpEx is an experiment, not an exercise. The scenario may look and feel like an exercise, but as a technology experiment the scenario events will be implemented in a more scripted manner to ensure responders/players will have ample opportunity to use new DHS-provided technologies as well as their regular equipment. This more scripted approach also supports the data collection needed to assess how well the technologies support the mission response.

There will be NO EVALUATION of operations, CONOPs, policies or response activities. The OpEx will be conducted in a no-fault learning environment wherein systems and processes associated with technologies, not individuals or their skills, will be evaluated. The following general assumptions apply to the event:

- Simulation associated with the scenario will be realistic and plausible and will contain sufficient detail from which to respond.
- Simulation does not occur in "real time;" assume time stalls and/or jumps in the delivery of injects to ensure technology can be assessed properly.
- Players will react to information and situations as they are presented, in the same manner as if the experiment were a real incident. Actions may be stalled or sped up dependent on the need to assess the technology, or to better understand CONOPs.
- Participating agencies may need to balance experiment play with real-world emergencies. Real-world emergencies take priority.
- Communication and coordination is limited to participating organizations, venues, and the Control Cell and Simulation Cell (SimCell)

2.5 Constructs and Constraints

Constructs are events and/or scenario details that are designed to enhance or improve realism. Constraints are experiment limitations that may detract from scenario realism. Constraints may be the inadvertent result of the experiment construct, or limitations related to time and resources. Although there are constructs and constraints (also known as artificialities), the OpEx planning team recognizes and accepts the following as necessary:

- Communication and coordination will be limited to the participating OpEx venues and the SimCell.
- Only communication methods listed in the Communications Plan in the Player Brief will be available for players to use during the OpEx.
- Participating agencies may need to balance experiment play with real-world emergencies. Real-world emergencies will take priority. The code word or phrase that will be used if a real-world event or an emergency would take place, and the experiment would require to be stopped or stalled, is: **Real World Event—Stop OpEx**.

3 Logistics

3.1 OpEx Schedule

While the OpEx takes place from August 21-22, 2019, the on-the-ground preparations and clean-up will last from August 19-22. The following schedules include the events and preparations for the entire duration. All times provide are local (CT).

3.1.1 Monday, August 19

Participants: DHS OpEx Management, Technology Providers

Location: Legion Field Press Box

Time	Event	Participants
0700 - 0800	DHS Setup	OpEx Management
0730 - 0745	Registration	Technology Providers
0745 - 0815	Introduction & Review of Set-up Plan	OpEx Management
0800 - 1715	Tech Testing	Technology Providers, OpEx Management
1715 - 1800	Clean-up and Release	All

3.1.2 Tuesday, August 20

Participants: DHS OpEx Management, Technology Providers, Controllers, Data Collectors

Locations: Legion Field Press Box

Time	Event	Participants
0700 - 0800	DHS Setup	OpEx Management, Data Collectors, Controllers
0730 - 0745	Registration	Technology Providers
0745 - 0815	Introduction & Review of Set-up	Technology Providers
0815 - 1215	Tech Testing	Technology Providers
0800 - 1100	Data Collector Training and Controller Training	Data Collectors, Controllers
1100 - 1130	Vignette Walkthrough	OpEx Management, Controllers, Data Collectors
1130 - 1300	Lunch	All
1300 - 1330	DHS and Vendor Group Pictures	All
1330 - 1500	SA and Sensor Dashboard Training	Agency Liaisons
1500 - 1630	VIP Tech Rehearsal	OpEx Management
1630 - 1645	Schedule Review	All
1645 - 1715	Tech Showcase Prep	All
1715 - 1800	Clean-up and Release	All

3.1.3 Wednesday, August 21

Participants: DHS OpEx Management, Technology Providers, Controllers, Data Collectors, Players, Actors, Observers

Locations: Legion Field Press Box

Time	Event	Participants
0700 - 0730	DHS Morning Meeting	OpEx Management
0730 - 0830	Tech Provider Check-in and Setup	Tech Providers
0830 - 0900	Player Check-in & Equipment Issuance	Players, Actors
0900 - 0910	Introduction & Program Overview	OpEx Management, Players,
0910 - 0930	Schedule Review, Safety Brief & Players Brief	OpEx Management, Players, Data Collectors, Observers
0915 - 0945	Observer Escort Check-in	OpEx Management, Players, Data Collectors, Observers
0930 - 1015	Equipment Training & Sensor Check	Players, Tech Providers, Data Collectors
1015 - 1030	Transit to Vignette A Staging	All
1030 - 1115	Run Through Vignette A	All
1030 – 1100	Actor and Observer Check-in	OpEx Management, Actors, Observers
1115 - 1130	Vignette A Hotwash	All
1130 - 1145	Group Picture	All
1145 - 1245	Lunch	All
1245 - 1300	Reposition & Tech Check	All
1300 - 1400	Run Through Vignette B	All
1400 - 1430	Vignette B Hotwash/Data Collection	All
1430 - 1530	Run Through Vignette C	All
1530 - 1600	Vignette C Hotwash/Data Collection	All
1600 - 1615	Transit to Press Box	All
1615 - 1630	Equipment Check-in	Players, Tech Providers
1630	Observer Release	Observers
1630 - 1640	Transit to Club Room B	OpEx Management, Players, Actors, Data Collectors
1630 - 1745	Equipment Sorting/Resent for VIP Demonstration	OpEx Management
1640 - 1710	SOPDUSST Remarks and Certificates	OpEx Management, Players, Actors, Data Collectors

Time	Event	Participants
1710 - 1740	Full OpEx Hotwash/Data Collection	OpEx Management, Players, Actors, Data Collectors
1740 - 1755	VIP Demonstration Agenda/Vignette Review	OpEx Management, Players, Actors, Data Collectors
1755 - 1800	Player and Actor Release	Players, Actors
1730 - 1800	Technology Vendor Release	Tech Providers
1800 - 1830	DHS Hotwash and Release	OpEx Management, Data Collectors

3.1.4 Thursday, August 22

Participants: DHS OpEx Management, Technology Providers, Controllers, Data Collectors, Players, Actors, VIPs, Media

Locations: Legion Field Press Box

Time	Event	Participants
0700 - 0730	DHS Morning Meeting	OpEx Management
0730 - 0800	Vendor Check-in	OpEx Management, Technology Providers
0800 - 0830	Player and Actor Check-in	OpEx Management, Players, Actors
0830 - 0845	Equipment Checkout	Players
0830 – 0900	VIP and Media Check-In	OpEx Management, VIPs, Media
0845 – 0915	Schedule Overview, Equipment Training & Comms Check	OpEx Management, Technology Providers, Players, Actors, Data Collectors, Controllers
0900 - 0930	VIP Opening Remarks	OpEx Management, VIPs, Media
0915 - 0930	Staging for StartEx	OpEx Management, Players, Actors, Data Collectors, Controllers
0930 - 1000	Run Through VIP Vignette	OpEx Management, Players, Actors, Data Collectors, Controllers, VIPs, Media
1000 - 1015	Group Picture	OpEx Management, Players, Actors, Data Collectors, Controllers VIPs, Media
1015 - 1030	Transit to Press Box	OpEx Management, Players, Actors
1015 - 1045	VIP Q&A Panel and Press Conference	OpEx Management, VIPs, Media
1030 - 1045	Equipment Check-in	OpEx Management, Players, Actors, Data Collectors, Controllers
1045 - 1100	Responder Closing Remarks	OpEx Management, Players, Actors, Data Collectors, Controllers

Time	Event	Participants
1045 - 1100	Transit to Press Box	OpEx Management, VIPs, Media
1100 - 1130	Responder Technology Showcase	OpEx Management, Technology Providers, Players, Actors
1100 - 1145	VIP Technology Showcase	OpEx Management, Technology Providers, VIPs, Media
1130 - 1200	Open Responder Release	OpEx Management, Players, Actors
1145 - 1200	VIP Closing Remarks	OpEx Management, VIPs, Media
1200	VIP and Media Release	VIPs, Media
1200 - 1600	Stadium Clean-up	OpEx Management, Data Collectors, Controllers, Technology Providers

3.2 Participant Roles and Responsibilities

The term participant encompasses many groups of people. The specific types of participants involved in the OpEx are delineated below and include their respective roles and responsibilities:

3.2.1 Players

Players are personnel (e.g., first responders, emergency managers, public safety personnel) who have an *active* role in performing their regular roles and responsibilities during the scenario response. Players initiate actions in response to the events (both simulated and real).

Players should ensure the following:

- Review their appropriate plans, procedures and protocols.
- Attend required training and other briefings.
- Review appropriate materials included in the OpEx Playbook.
- Report to the event check-in location at the designated time to sign in, receive your identification and receive your copy of the OpEx materials.
- Be at your pre-assigned location (e.g., pre-staging) at least 30 minutes before the start of each vignette.
- Obtain all necessary equipment ahead of time from DHS.

3.2.2 Actors

Actors are personnel (e.g., Community Emergency Response Team (CERT) volunteers) who are playing victims during the scenario. Actors should ensure the following:

- Review their cue cards and any other material provided to them prior to the OpEx.
- Attend required training and other briefings.
- Review appropriate materials included in the OpEx Playbook.
- Report to the event check-in location at the designated time to sign in, receive your identification and receive your copy of the OpEx materials.
- Be at your pre-assigned location (e.g., pre-staging) at least 30 minutes before the start of each vignette and check in with the OpEx Controller in that location (Controllers are in orange vests).

3.2.3 Agency Liaisons

Agency liaisons serve as the key point of contact with their agency's participating players and actors and have been the main coordinators with DHS S&T on all OpEx activities and plans. Some agency liaisons may also serve as players during the OpEx.

Agency liaisons should ensure the following:

- Review their appropriate plans, procedures and protocols.
- Attend required training and other briefings.
- Review appropriate materials included in the OpEx Playbook.
- Report to the event check-in location at the designated time to sign in, receive your identification and receive your copy of the OpEx materials.
- Be at your pre-assigned location (e.g., pre-staging) at least 30 minutes before the start of each vignette.
- Obtain all necessary equipment ahead of time.

3.2.4 Observers

Observers from local and nationwide public safety organizations are participating in this OpEx to identify operational and technological lessons learned that can be shared by DHS S&T and themselves to benefit first responders as they adopt new technologies.

Observers should ensure the following:

- Review their appropriate plans, procedures and protocols.
- Attend required training and other briefings.
- Review appropriate materials included in the OpEx Playbook.
- Report to the event check-in location at the designated time to sign in, receive your identification and receive your copy of the OpEx materials.
- Be at your pre-assigned location (e.g., pre-staging) at least 30 minutes before the start of each vignette.
- Share all observations and documented feedback with DHS S&T data collectors at the end of the event.

3.2.5 Data Collectors

Data collectors for this OpEx are assigned to observe, note and document events and actions (e.g., send and receipt of communications, video quality and clarity, timeliness of information received, human performance factors, etc.) associated with the intended use of the technologies. Their primary role is to observe and document actions, discussions, timing, results and end users' comments. **Data collectors wear yellow vests.**

Data collectors should ensure the following:

- Attend required training and other briefings.
- Review appropriate materials included in the OpEx Playbook.
- Report to the event check-in location at the designated time to sign in, receive your identification and receive your copy of the OpEx materials.
- Be at your pre-assigned location (e.g., pre-staging) at least 30 minutes before the start of each vignette.

- Obtain all necessary forms ahead of time.
- Review the data collection forms and fully understand the data collection requirements.
- Report to their assigned locations.
- Participate in all pre-OpEx events (e.g., dry run, training, etc.).
- Participate in all post-OpEx events (e.g., vignette debriefs, final hotwash, AAR review, etc.).

3.2.6 Controllers

For this OpEx, there are three types of Controllers: 1) Master Controllers, 2) Venue Controllers, and 3) Technical Controllers. **Master and Venue Controllers wear orange vests**. All Controllers should have a thorough understanding of the MSEL and have participated in a controller training prior to the event.

Master Controllers:

Master Controllers will be located in the Simulation Cell (SimCell) - a location from which the master controllers can deliver messages representing actions and activities, as well as monitor the overall progression of the event. The Master Controllers will use the Master Scenario Events List (MSEL) to guide or prompt player responses. Accompanying maps and inject scripts will also be available to help guide the injects and the progression of the OpEx. In the event of a real-world event, the Master Controller will communicate a pre-determined code word to stop the event. The code word for this event is **Real World Event—Stop OpEx**.

Venue Controllers:

Venue controllers will be located at each venue or facility participating in the OpEx (e.g., docking locations, staging areas, emergency management entities, firehouse, command centers, information center, etc.). Venue controllers ensure smooth execution of operational play by ensuring MSEL injects and expected player actions occur as intended. Venue controllers will also assist players if needed in understanding injects, the sequence of the events, the technologies being used and the expected actions/outcomes from each inject. The venue controller assigned to incident command may assist command staff with initiating events to prompt players to take action, as well as provide situational updates and ad-hoc injects to prompt a response when/if needed.

Technical Controllers:

Technical controllers will be located at the major venues. Technical controllers focus on the use of the technologies within operational play and ensure that the technology objectives of the OpEx are met through conduct. Technical controllers are technical subject matter experts who understand the participating technologies, how they integrate and how to trouble-shoot issues should any arise during operational play.

Controllers should ensure the following:

- Attend required training and other briefings.
- Review the Master Scenario Events List (MSEL) for each vignette.
- Review the Inject Scripts for each vignette.
- Review appropriate materials included in the OpEx Playbook.

- Report to the event check-in location at the designated time to sign in, receive your identification and receive your copy of the OpEx materials.
- Be at your pre-assigned location (e.g., pre-staging) at least 30 minutes before the start of each vignette.
- Obtain all necessary forms ahead of time.
- Venue-based controllers should communicate any changes or adjustments to the MSEL to the Master Controllers in the SimCell.
- Technical controllers should communicate any significant technology issues to the Master Controllers in the Sim Cell.
- Participate in all pre-OpEx events (e.g., dry run, training, etc.).
- Participate in all post-OpEx events (e.g., vignette debriefs, final hotwash, AAR review, etc.).

3.2.7 OpEx Management

OpEx management are dedicated to ensuring all components of the event run smoothly, with a particular focus on logistics, VIP coordination, communications and outreach. OpEx management produces all OpEx materials and documentation, runs registration, coordinates with the agency liaisons and stadium facility owners, provides overarching technical and evaluation guidance, and facilitates capture of lessons learned.

OpEx management should ensure the following:

- Lead required training and other briefings.
- Review appropriate materials included in the OpEx Playbook.
- Report to the event check-in location at the designated time to sign in, receive your identification and receive your copy of the OpEx materials.
- Be at your pre-assigned location at least 30 minutes before the start of each event.
- Coordinate with all types of participants to ensure they have the information they need and that every event is running smoothly.
- Lead all pre-OpEx events (e.g., dry run, training, etc.).
- Lead all post-OpEx events (e.g., vignette debriefs, final hotwash, AAR review, etc.).

3.2.8 Technology Providers

For this OpEx, there are two types of technology providers: 1) DHS-funded, and 2) industry vendor. All technology providers have been engaged in extensive pre-OpEx technical integration work using the NGFR Integration Handbook.

- **DHS-funded Technology Providers**: DHS-funded technology providers are currently on contract or sub-contract with DHS S&T to develop, adapt, test or evaluate technologies for first responders.
- **Industry Vendor Technology Providers**: Industry vendor technology providers have signed Cooperative Research and Development Agreements with DHS S&T to facilitate their participation in this event. While both DHS and the industry vendors benefit from the event, these participants are not on contract or receiving monetary compensation for attending.

Technology providers should ensure the following:

- Review their appropriate plans, procedures and protocols.
- Bring all necessary equipment and have it ready and charged for player use ahead of time.
- Attend required integration meetings and other briefings.
- Review appropriate materials included in the OpEx Playbook.
- Report to the event check-in location at the designated time to sign in, receive your identification and receive your copy of the OpEx materials.
- Set up, staff and tear-down your technology's presentation table at the OpEx VIP Technology Showcase.
- Record and provide a log of your technology's actions and technical support interventions during the vignettes for post-OpEx data analysis.

3.3 Participant Safety

3.3.1 Safety

OpEx participant safety takes priority over OpEx events. Although the personnel involved in this OpEx come from various response agencies, they share the basic responsibility for ensuring a safe environment for all personnel involved in the event. Professional health and safety ethics should guide all participants to operate in their assigned roles in the safest manner possible. The following general requirements apply to the OpEx:

- All controllers, data collectors and OpEx staff members will serve as safety observers while OpEx activities are underway. OpEx participants must immediately report any safety concerns to the Safety Controller or OpEx Director.
- Participants will be responsible for their own and one another's safety during the OpEx. All persons associated with the OpEx are responsible to stop play if, in their opinion, a real safety problem exists. After the problem is corrected, OpEx play can be resumed.
- All organizations will comply with their respective environmental, health and safety plans and procedures, as well as appropriate Federal, State and local environmental health and safety regulations.

The OpEx Safety Officers (Captain Emanuel Smith and Captain Danny Wright) have the authority to stop and/or modify play as needed to ensure participant safety.

The following are the general rules that govern the OpEx:

- Real-world emergencies and participant safety take priority over OpEx events. The code word that will be used if a real-world event or an emergency would take place and the OpEx would require to be stopped, or stalled, will be **Real World Event—Stop OpEx**.
- OpEx participants will comply with real-world response procedures, unless otherwise directed by control staff.
- All communications (written, radio, telephone, etc.) made during the OpEx will begin and end with the phrase, "Exercise, Exercise, Exercise." (Note – "Exercise" is used here rather than "experiment" or "OpEx" due to the familiarity all participants have with using these term for communications during exercises, drills and training.

In order to facilitate the full implementation of the scenario, simulations are somewhat plausible and will contain sufficient detail from which players can respond, including actors who are demonstrating symptoms as if exposed to the HAZMAT chemical in the scenario. Do not be alarmed.

3.3.2 Accident Reporting and Real Emergencies

Due to the nature of this OpEx, it is not anticipated that any accidents will occur, however, if an accident or real world emergency does occur, the participant is to immediately stop exercise play by using the code word "**Real World Event—Stop OpEx**," attend to the accident or real-world emergency as necessary, and notify the OpEx Director and Master Controller as soon as possible. If a real emergency occurs that affects the entire event, the OpEx may be suspended or terminated at the discretion of the OpEx Director, Mr. Cuong Luu.

3.3.3 Player Communication

Players will use a combination of the routine, in-place agency communication systems, as well as the communications-based technologies that are a part of the event. The need to maintain capability for a real-world response may preclude the use of certain communication channels or systems that would usually be available for an actual emergency incident. In no instance will OpEx communication interfere with real-world emergency communications.

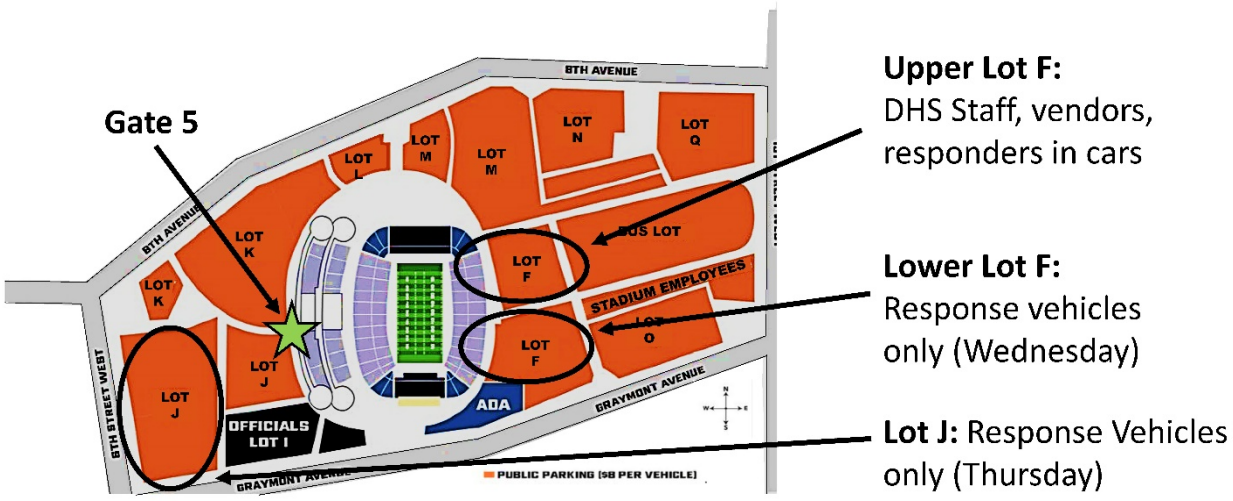
The incident radio communications plan, ICS 205, is included in Appendix F.

3.4 Venue Logistics and Security

3.4.1 Directions and Parking

Address: Legion Field Stadium, 400 Graymont Ave West, Birmingham, AL 35204
Parking:

- **Wednesday, August 21** – Please park **personal vehicles in Upper Lot F** and **response vehicles in Lower Lot F**, then walk around to Gate 5 on the West side of the stadium, then proceed up the elevator to the Press Box (floor 2).
- **Thursday, August 22** – Please park **personal vehicles in Upper Lot F** and **response vehicles in Lot J**, then walk around to Gate 5 on the West side of the stadium, then proceed up the elevator to the Press Box (floor 2).



Location: Meet in the Press Box. The OpEx will take place in and around the west side of the stadium.

3.4.2 Check-in Procedures and Locations

All who are participating in the NGFR OpEx will be required to check in at the registration table each morning, which is located in the Legion Field Press Box, except for VIP and media registration on Thursday, August 22, which will take place in the Legion Field lobby.

If the participant has not already signed a Rules of Behavior or an Informed Consent Form (as applicable), they will be required to sign one at the time of check-in.

3.4.3 Photography, Videography and Outreach

DHS and local partners will be taking photographs and recording video footage during the OpEx. All participants are welcome to take and share their own pictures and videos. Note that all video footage from small Unmanned Aerial Systems (drones) and body-worn cameras will be deleted at the conclusion of the OpEx for privacy purposes.

If you would like to share your photographs or videos with DHS S&T for possible inclusion in a published DHS product, please send them to NGFR@hq.dhs.gov following the event.

If you or your agency is using social media during the OpEx, please share content with the hashtag **#shakenfury** and tag **@dhsscitech** on Facebook, Twitter or LinkedIn.

3.4.4 OpEx Badges and Designations

- **Yellow**: First Responders
- **Grey**: Actors
- **Green**: Observers
- **Black**: Controllers
- **Orange**: Data Collectors
- **Purple**: OpEx Management Team
- **Blue**: Technology Vendors
- **VIPs**: Red
- **Teal**: Tech Management
- **White**: Media

4 Scenario

4.1 Overview

The Scenario is comprised of three vignettes based on a 7.7 magnitude earthquake that causes major structural damage to Legion Field in the middle of a UAB home game with 25,000 fans attending. During the OpEx, players will respond to the effects of the earthquake at Legion Field,

including evacuation, search and rescue, triage, and HAZMAT detection/decontamination. The three vignettes of the scenario are:

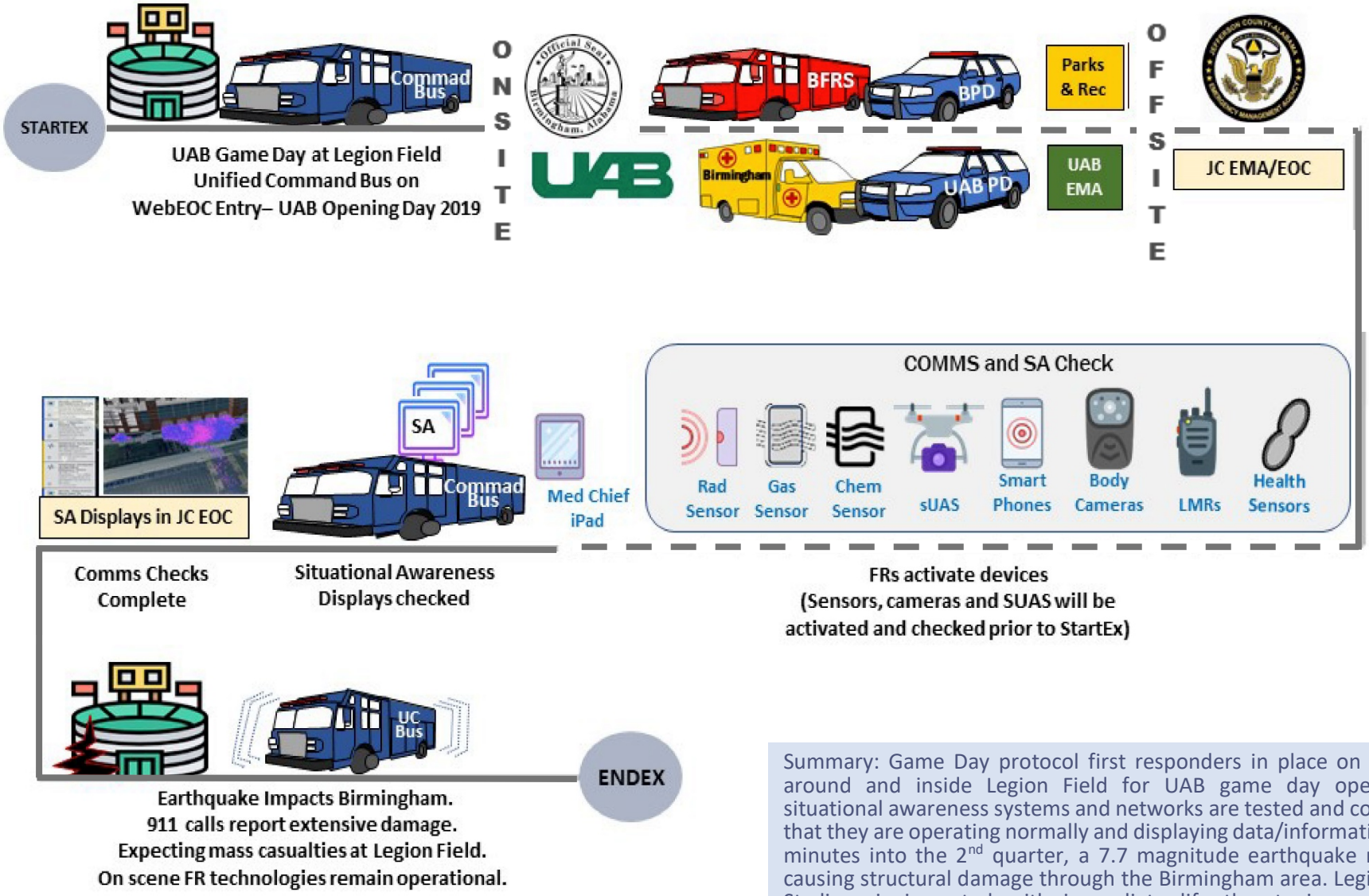
- **Vignette A**: Game Day Set-Up and Communications Check
- **Vignette B**: Mass Casualty Incident Response
- **Vignette C**: HAZMAT Incident Response

4.2 Vignette Descriptions and Storyboards

4.2.1 Vignette A – Game Day Set-Up and Communications

Description: The UAB Blazers are playing their home opener game on a Saturday afternoon at Legion Field. Typical tailgating events are taking place in the parking lots outside the stadium. The Jefferson County EOC is activated and staffed for "Game Day" per protocol. The Birmingham Special Event Command Bus is on location at Legion Field. The Jefferson County EOC has established the "UAB Opening Day 2019" as a WebEOC event. The Birmingham Fire Rescue Services (BFRS) Comms Chief initiates and completes a routine communications check (voice, video, data) with all first responders at the stadium. Two minutes into the 2nd quarter, a 7.7 magnitude earthquake ruptures along the Cottonwood Grove Fault. Birmingham's 9-1-1 Center is quickly overwhelmed with requests for assistance. Incoming reports include power outages, damaged buildings and injuries, to include reports that part of Legion Field Stadium has collapsed.

Vignette A Storyboard

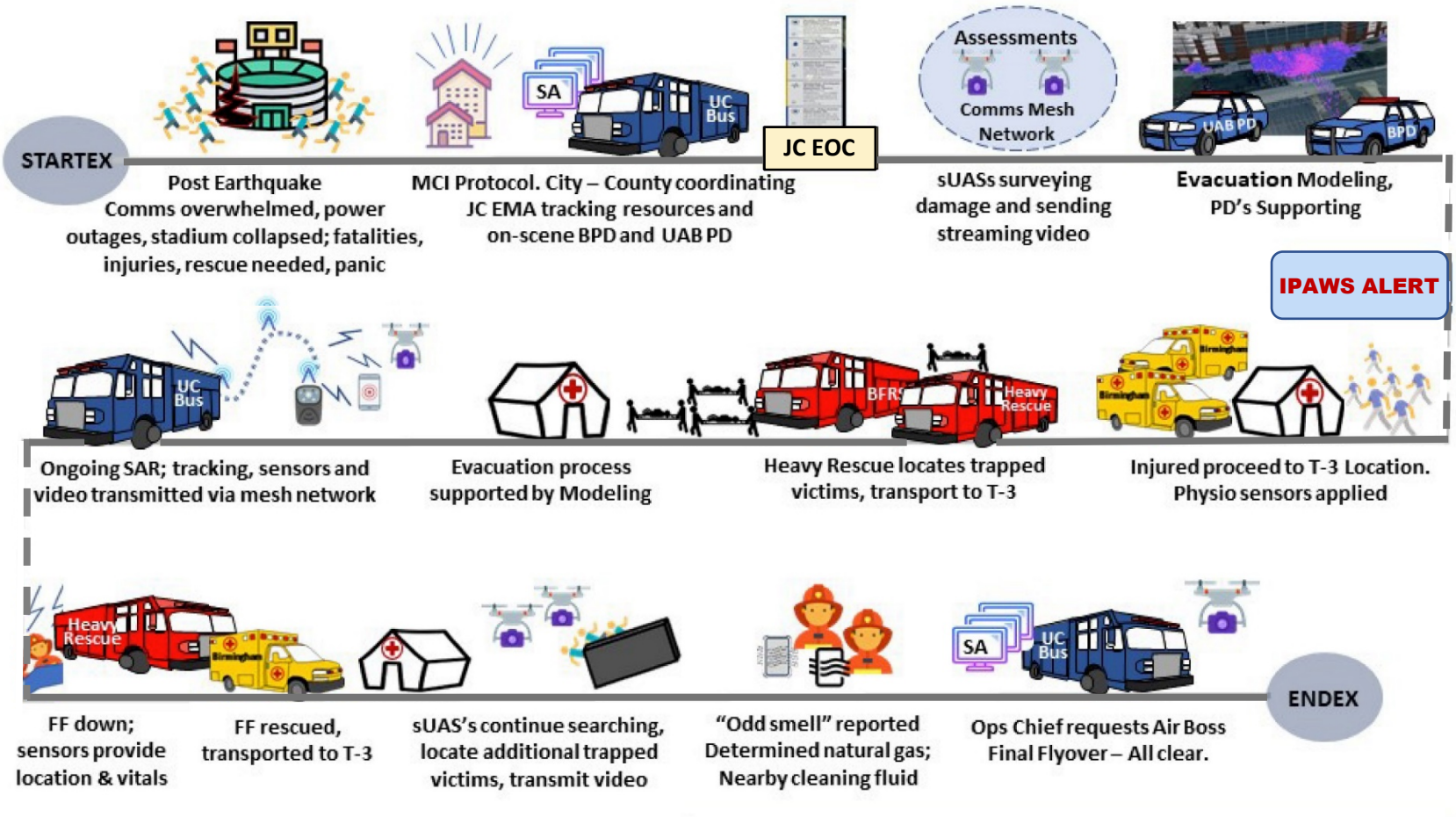


Summary: Game Day protocol first responders in place on grounds around and inside Legion Field for UAB game day opener. All situational awareness systems and networks are tested and confirmed that they are operating normally and displaying data/information. Two minutes into the 2nd quarter, a 7.7 magnitude earthquake ruptures causing structural damage through the Birmingham area. Legion Field Stadium is impacted with immediate life threatening and mass causality incidents. On-scene FR technologies remain operational.

4.2.2 Vignette B – Mass Casualty Incident Response

Description: The BFRS Operations Chief receives damage assessment reports, which indicate a partial stadium collapse with trapped and injured fans on the east side of the stadium. Staff on scene are assessing damage and streaming live video to the command bus for situational awareness. The Ops Chief follows protocols for responding to a Mass Causality Incident. Arriving response units include BFRS Heavy Rescue, HAZMAT, Rescue and EMS. Triage, Treatment and Transport (T-3) area is established just outside the west side of the stadium. Jefferson County EOC is supporting on-scene response needs and the Alabama State EOC has activated. Heavy Rescue locates and rescues several trapped and injured fans, and transports to T-3 where physiological monitors are attached to monitor victims' medical status. Birmingham Police Department (BPD), UAB Police, Parks and Recreation staff, and private security assist with evacuation. sUASs are used to stream live video to the Command Bus for enhanced situational awareness. First responder locations are tracked via geo-locator devices and advanced smart apps support assessment and decision-making. Eventually, the area is cleared and confirmation that all victims have been removed is made via a final sUAS flyover.

Vignette B Storyboard



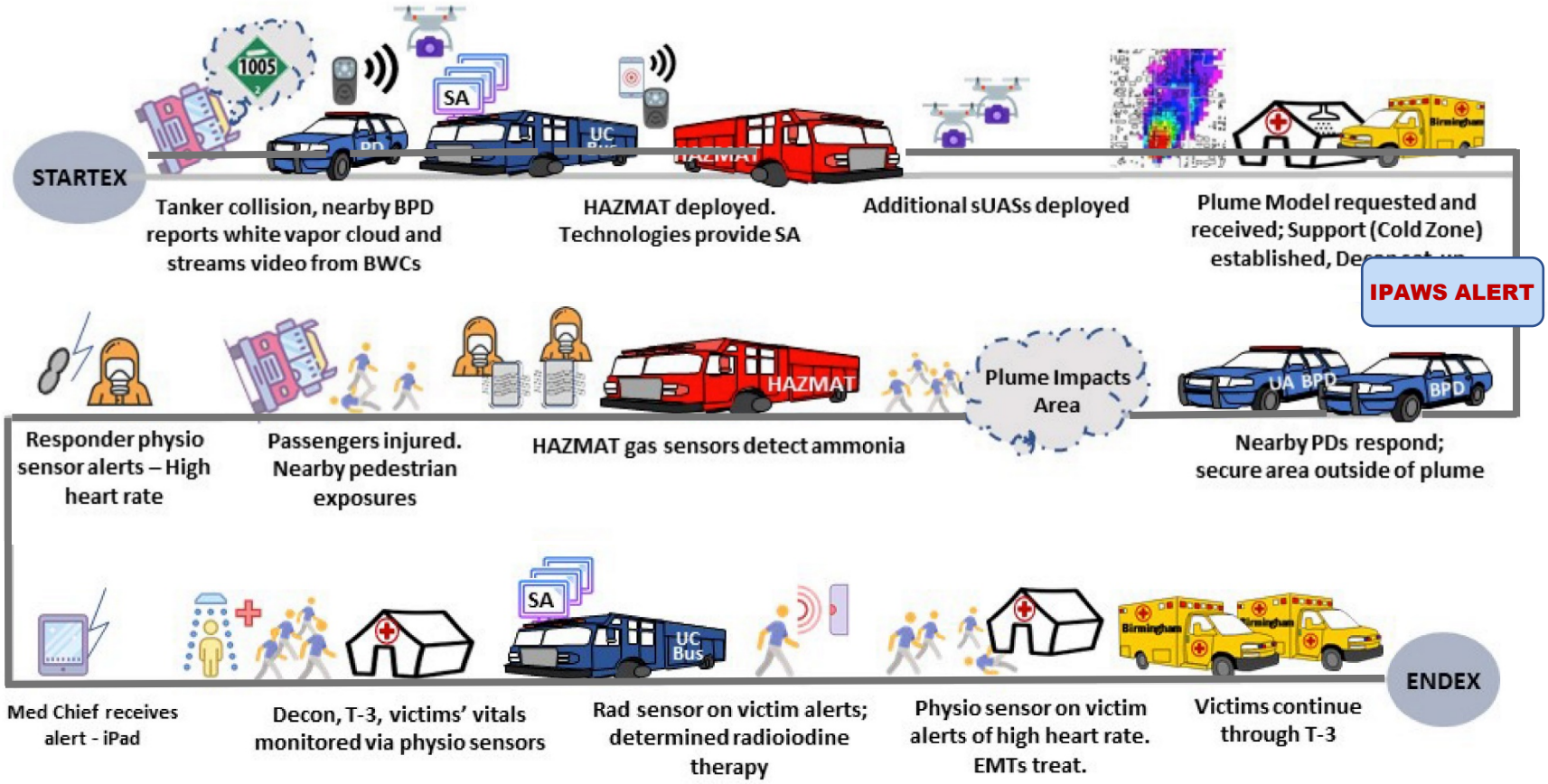
Summary: Post-earthquake: Comms overwhelmed and power outages. On-scene sUASs used to locate victims, provide SA & comms mesh networks. MCI declared, additional resources requested. sUAS and camera providing SA. Sensors monitoring responder locations & patient vitals. Comms repeaters transmit sensor and video data from stadium. Firefighters and victims rescued and directed to T-3. Gas/chem sensors alert of potential hazards in stadium.

Updated 14 Aug 2019

4.2.3 Vignette C – HAZMAT Incident Response

Description: As response staff members are preparing to leave the stadium area, a tanker traveling east on 8th Avenue is involved in a collision and overturns into the Legion Field Stadium grounds and a white vapor is coming from the damaged tanker. PD officers directing traffic on 8th Ave and the EMS unit near Gate 4 (Location B) hear the collision and witness the after-effects, and have shut down traffic on 8th Ave, directing pedestrians evacuating from stadium to stay clear of wreckage. On-scene BPD Officers near the tanker indicate they can see green hazardous placard with "1005" in white letters, which indicates the tanker contains anhydrous ammonia. Live-stream video from BPD's body worn cameras is used to help assess the incident. BPD controls vehicle and pedestrian traffic to isolate the area per protocol. The Ops Chief and HAZMAT Group Supervisor uses a plume model to help guide HAZMAT's approach and to determine hot, warm and cold zones. The Ops Chief contacts the Jefferson County EOC and requests an IPAWS alert be issued for shelter in place. HAZMAT sets up Decon in a cold zone, which is near where the T-3 was already set up. HAZMAT responders don Class A suits with gas and health sensors and enter spill area to rescue victims. Gross decon takes place on-location, before victims are moved to technical decon and T-3, where health sensors are applied to victims. A radiation sensor alerts on a victim, who is undergoing radiation treatment; EMS determines it is not a threat. A responder's health sensor alerts indicating a potential cardiac arrest. EMS treat the responder and arrange transport.

Vignette C Storyboard

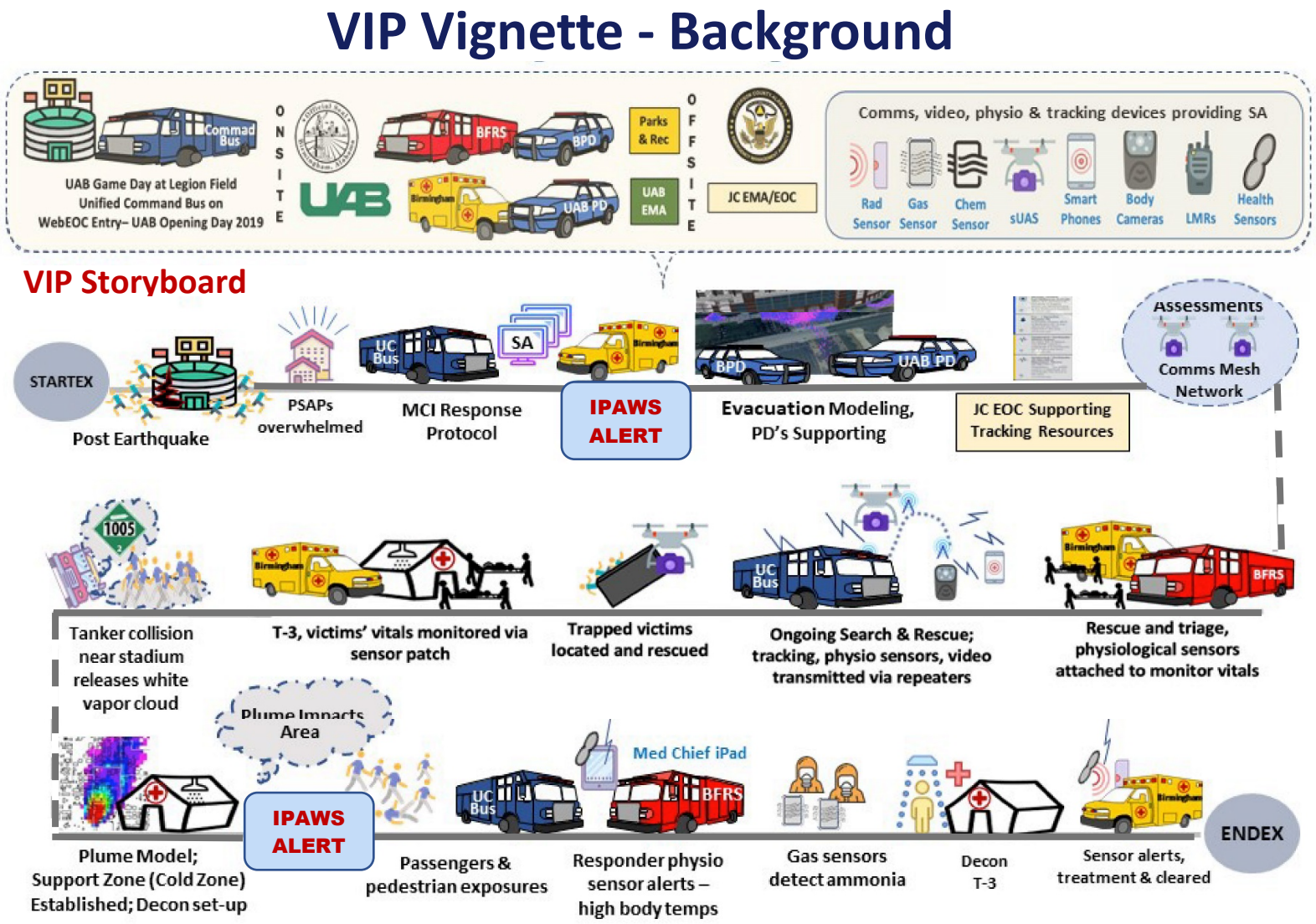


Summary: Collision causes HAZMAT incident on stadium grounds. Various video systems provide situational awareness. Vapor cloud impacts area. HAZMAT arrives, plume model received, zones established, decon set-up. HAZMAT detects ammonia when approaching the tanker,. Pedestrians proceed through decon. Radiation detected on one victim. Physio sensors applied and alerts of high heart rate on victim. Victims proceed through T-3.

Updated 14 Aug 2019

4.2.4 VIP Vignette

Description: The VIP Vignette is a condensed scenario with components of vignettes B and C combined into a 30-minute demonstration to showcase OpEx technologies.

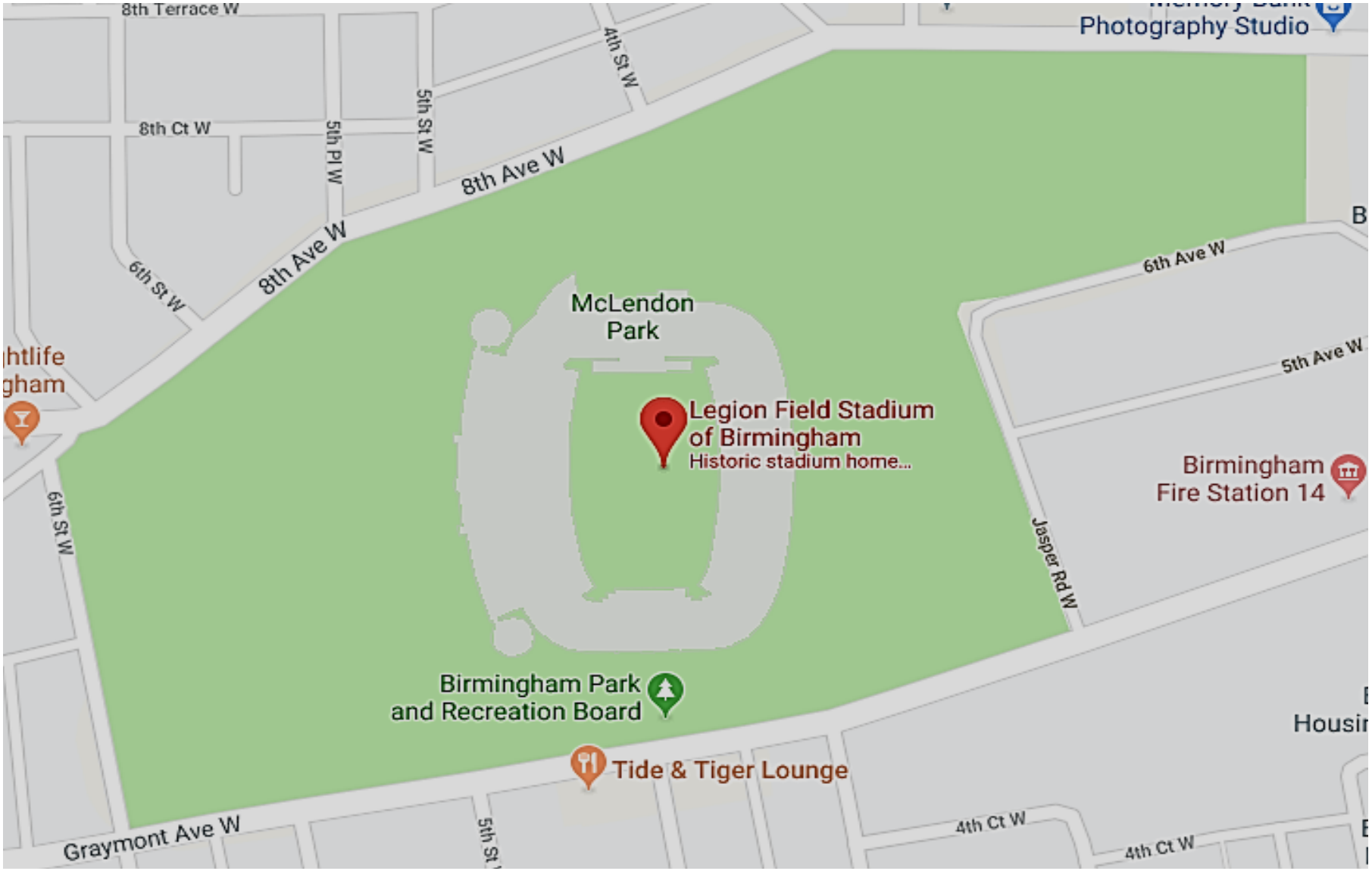


4.3 Master Scenario Events List

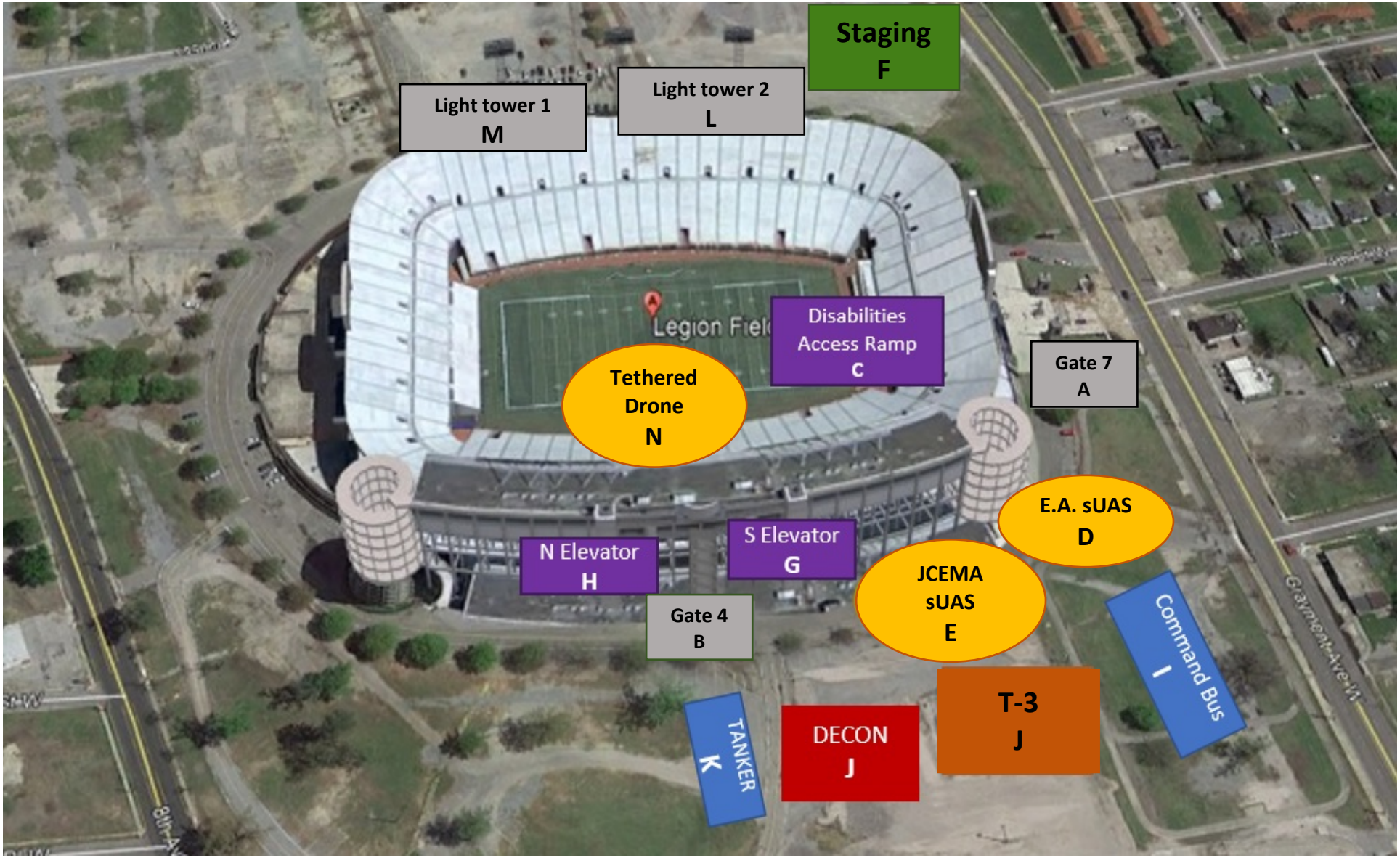
The Master Scenario Events List (MSEL) is a separate document that is available upon request from NGFR@hq.dhs.gov.

5 Appendix A: Maps

5.1 City of Birmingham – Legion Field Stadium



5.2 Legion Field Stadium – OpEx Site Overview



6 Appendix B: Technology Descriptions

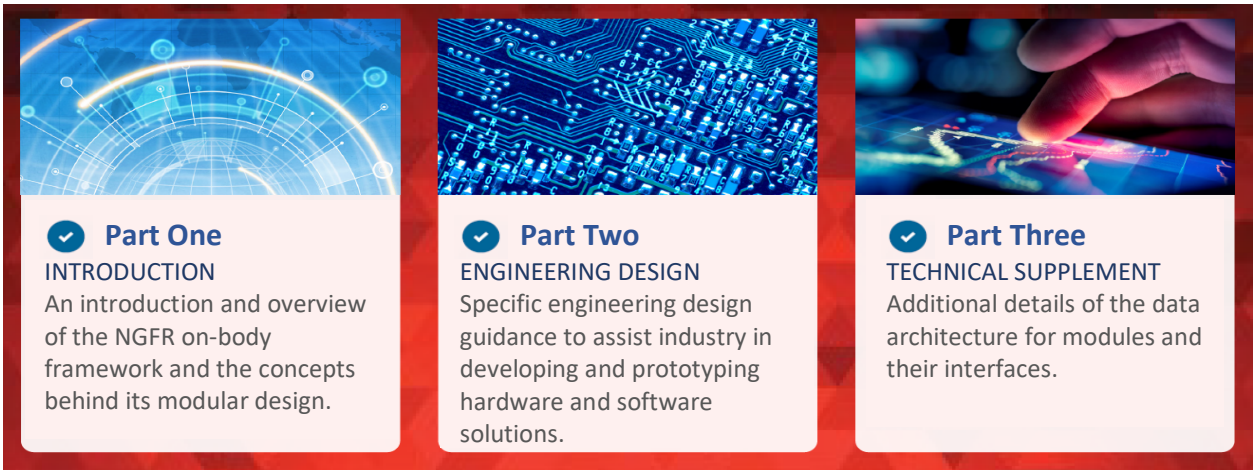
6.1 DHS S&T's Next Generation First Responder Technology Integration

Today's first responders save lives every day, using yesterday's technology. Both responders and the communities they serve deserve public safety services enabled with all the capabilities technology makes possible. To avoid overwhelming responders with too many devices or excessive amounts of data, responders need smarter, integrated technologies that increase their ability to focus on the mission, rather than distract from it. With the advent of public safety broadband and initial deployment of FirstNet, it is critical to examine how technology supports public safety and how we can help responders get the right information at the right time to save lives. The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) initiated the Next Generation First Responder (NGFR) Apex program to address these gaps.

The NGFR Apex program works with first responders across the country to ensure they are protected, connected and fully aware, regardless of the hazards they face. The program is developing and integrating technologies that are modular (have the ability to integrate via open standards and interfaces) and scalable (have the ability to build a large and complex system or a small and streamlined system). Beyond developing individual technologies that can integrate into existing first responder technologies, the program also aims to define the open-source standards that enable commercially developed technologies to integrate. This approach opens doors to industry while lowering costs and increasing choices for public safety organizations, helping them rapidly adapt to changing environments and evolving threats as they secure communities nationwide.

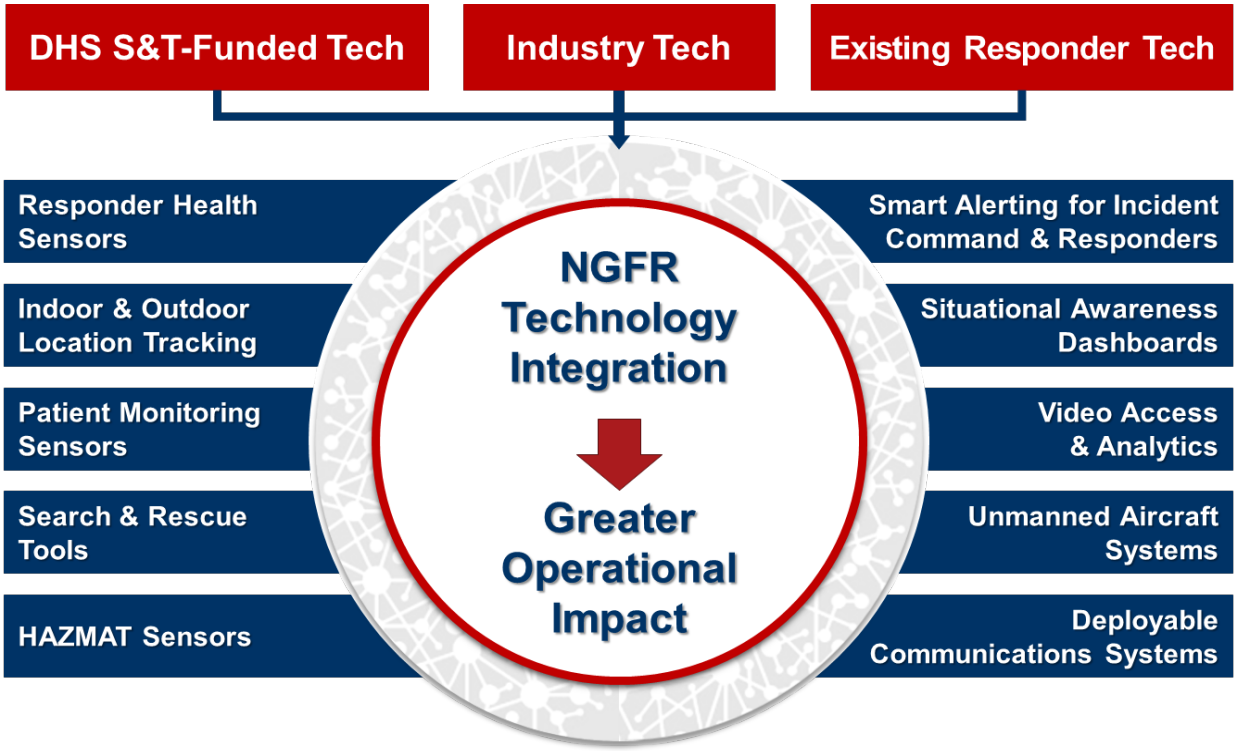
6.2 NGFR Integration Handbook

DHS S&T published the initial NGFR Integration Handbook in February 2018 with a refresh in August 2018 to guide industry to develop technologies using open standards. This allows for easier system and device integration through a "plug-and-play" standards-based environment. The goal of the handbook is to make it easier for developers to make interoperable technologies, and easier for public safety organizations to buy new technologies that they know will work with what they already have. The NGFR Integration Handbook identifies standards, interfaces and data flows that allow public safety organizations to integrate hardware, software and data of different technology solutions, building their own public safety system.



NGFR – Birmingham Shaken Fury OpEx

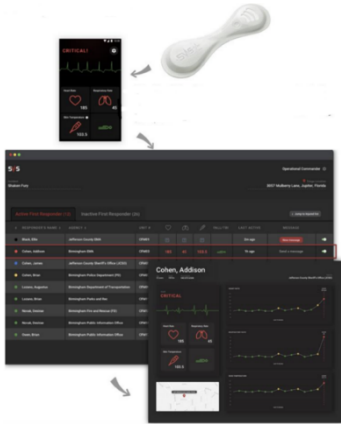
The OpEx will evaluate how NGFR-developed and commercially-available technologies integrate with existing public safety systems using standards recommended by the NGFR Integration Handbook to enhance mission capabilities during a multi-agency response to an earthquake at Legion Field Stadium during a football game. The scenario requires evacuation, search and rescue, and HAZMAT operations. The OpEx will employ new technologies to streamline collaboration through response, decontamination and triage, including capabilities to improve responder safety, enhance operational communications, increase operational coordination and augment situational awareness. The majority of participating technologies will be integrated into a single system.



6.3 Participating Technologies

5VS LLC

TOD (Triage-On-Demand) Biosensor



5VS is committed to providing lifesaving triage and medical awareness at a glance and in real-time. TOD is the size of a band-aid, weighs 11 grams and adheres to the chest. Vital signs are captured and relayed reliably and accurately to the Incident Command dashboard. Any critical (red) or non-critical (yellow) change is instantaneously flagged on the first responder's smartphone display and flagged and prioritized on the Incident Command dashboard. Responders and Incident Commanders can tap on any first responder or patient and their real-time vital signs appear with their precise location. TOD captures and relays a single lead ECG, heart rate, respiratory rate and body temperature, and detects falls with a high degree of probability and may diagnose traumatic brain

injuries. TOD can make responders safer through consistent monitoring, both during and after an incident response, when most firefighter heart attacks occur. TOD can be applied to patients at the incident scene within 60 seconds, helping to identify and prioritize the care of critically injured individuals in a mass casualty incident.

TOD Biosensor is currently commercially available.

AT&T Corporation

FirstNet Solutions

AT&T is honored to work with the First Responder Network Authority (FirstNet) to build, deploy and maintain the first-ever nationwide public safety broadband network for America's first responders. The FirstNet network will help ensure first responders and the public safety community have access to the interoperable communications and technologies they need, when they need them. This will let first responders focus on what matters most: protecting communities and saving lives.

FirstNet Solutions by AT&T is currently commercially available.

BodyWorn

BodyWorn

Generation 2 BodyWorn video camera with automatic recording, Gunshot Detection, Holster trigger, Officer Down reporting and live video streaming.

AVail Web

Web browser map-based real-time situational awareness for BodyWorn and in-car video, audio and metadata. Live video streaming, officer down alerts, video redaction and full chain of custody audit trail reporting.

Vehicle Wireless Router and Video Server

Hardened IP-67 cellular, FirstNet, Wi-Fi and Bluetooth access point and video storage server supporting up to four video cameras and unlimited BodyWorn cameras.

BodyWorn, Avail Web, and the Vehicle Wireless Router and Video Server are all currently commercially available.

Easy Aerial Inc.

SAMS-T (Smart Aerial Monitoring System – Tethered)

The SAMS-T is a unique product that allows remote deployment of a tethered unmanned aircraft system (UAS), or drone, with a continuous aerial video monitoring system. It includes an "Alpine Swift Drone," a customized Falcon drone capable of carrying a variety of payloads. SAMS-T transmits all data directly to the RMS via the tether, allowing for highly secure data transmission. The system can be deployed in either a stationary location, or on an emergency vehicle and easily deployed within seconds. By providing continuous

video surveillance for up to 24 hours, first responders will be able to view real time video feeds to make the most informed decisions.

SAMS-T is currently commercially available.

Federal Emergency Management Agency

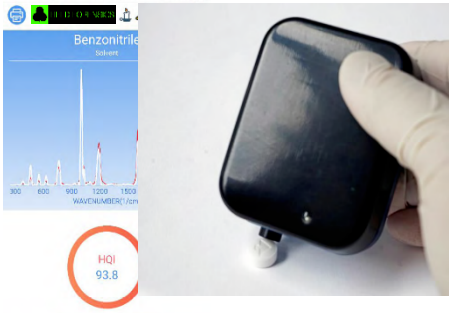
Integrated Public Alert and Warning System

The Integrated Public Alert and Warning System (IPAWS) modernizes the nation's emergency communication capabilities. Based on the Common Alerting Protocol (CAP) and aggregated through FEMA's Open Platform for Emergency Networks, a single emergency notification can be disseminated to many media outlets. This allows Federal, state, local, tribal and territorial alerting authorities the ability to notify and warn their respective communities through multiple communication pathways, thereby reaching more of the public. Communication pathways include broadcast to cellphones via the Wireless Emergency Alerts (WEA), radio and television by the Emergency Alert System (EAS), and various integrated IP-based systems such as desktop alerting, signage, siren systems, etc.

IPAWS is an open platform available to approved alerting authorities.

Field Forensics, Inc

HandyRam XS ™



HandyRam XS™ miniaturizes hand-held Raman spectroscopy to a key-fob/belt-wearable device. Identifies explosives, narcotics, toxic chemicals, precursor compounds and many other organic chemicals quickly (~1 minute) and with minimal sample preparation or handling. Mobile device-based processing allows HAZMAT, bomb squad and drug interdiction teams to rapidly identify chemical substances, ensuring they have time to take appropriate protective measures.

HandyRam XS™ is currently commercially available.

FireHUD, Inc.

BioTrac Platform

FireHUD's BioTrac Platform provides passive biometric monitoring and accountability for firefighters via arm-worn wearable devices. The data can be viewed in real-time and post-incident by authorized officials to allow for more informed decisions and prevent injuries and deaths due to overexertion. FireHUD provides text alerts to prevent overexertion, which is the number one cause of injury in firefighting and responsible for nearly 60% of firefighter line-of-duty deaths.

BioTrac Platform is currently commercially available.

Image Insight, Inc.

GammaPix™

The patented GammaPix™ technology provides a low-cost, pervasive detector network to monitor for ionizing radiation. It turns any smartphone into a radiation detector for early warning and personal protection without requiring additional equipment. The companion Training Simulator provides Live-Virtual training with realistic source sizes. Data can be viewed over the internet, allowing Incident Commanders to monitor events without disturbing personnel in the field. Use of the GammaPix system provides early warning against radiation emergencies and emergency dosimetry in case of accidental exposure to first responders.

GammaPix™ is currently commercially available.

Kratos Defense and Security Solutions, Inc.

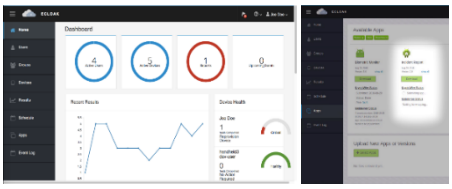
Aethon Mk. 1

Aethon Mk. 1 is a tethered UAS system consisting of a Kratos-built UAS, Kratos's proprietary tether system and a high mobility ATV. The system is capable of lifting payloads up to 20lbs to 500ft AGL on tether and reaches 1 Gbps data speeds over GigE fiber optic inside the tether. This system gives first responders persistent and secure ISR, communications, and sensors on a highly mobile and rapidly deployable airborne platform. Aethon Mk.1 delivers the total situational awareness and communication reliability necessary to keep first responders working effectively to save lives.

Aethon Mk. 1 is not yet commercially available.

Metronome Software, LLC

SENSEI – Sensor Secure Enterprise Infrastructure



Currently partnered with MobileIron and Kryptowire, SENSEI integrates Enterprise Mobility Management (EMM) and Mobile App Vetting technology to provide a comprehensive system of mobile security for Internet of Things and mobile endpoints. SENSEI ensures that mobile apps are risk-analyzed prior to deployment and provides users confidence that their mobile devices are not compromised. REST API is available for DevOps integration.

Metronome Software is currently funded by DHS S&T for this project. SENSEI is currently available for pre-order.

MobileIron, Inc.

Unified Endpoint Management

Provides visibility and IT controls needed to secure, manage and monitor any corporate or employee-owned mobile device or desktop computer that accesses business-critical

data. Secures all endpoint devices and their identity and information, providing the assurance that lifesaving operational decisions can be made reliably.

MobileIron, Inc. is currently funded by DHS S&T for this project. Unified Endpoint Management is currently commercially available.

Modern Technology Solutions, Inc.

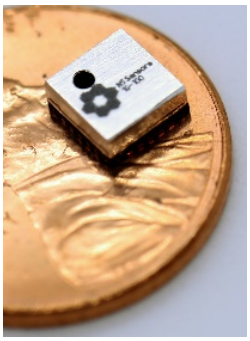
Artificial Intelligence Augmented UAS Search and Rescue

MTSI offers a real-time detecting and geo-locating UAS payload solution for object detection at the network edge. The UAS performs operator out-of-the-loop recognition of various object types, geolocates their positions and sends down only the information needed, minimizing the need for large network bandwidth. For operators, this means information available directly to situational awareness platforms (such as ATAK) without having to view a UAS video feed.

Artificial Intelligence Augmented UAS Search and Rescue is not yet commercially available.

N5 Sensors, Inc.

Compact Multi-Gas and Particulate Matter Detector

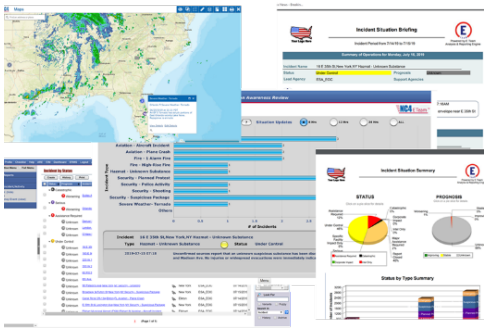


A compact, low-cost gas and particulate detector leveraging N5's patented chip-scale nanoengineered gas sensor technology. It provides real-time detection of multiple toxic and fire gases along with particulate matter counts in a wide range of environmental conditions. The breakthrough sensor technology enables gas detector miniaturization while providing improved resistance to contaminants – providing awareness of both immediate and long-term chemical threats.

N5 Sensors, Inc. is currently funded by DHS S&T under the Small Business Innovation Research program for this project. The Compact Multi-Gas and Particulate Matter Detector is not yet commercially available.

NC4

NC4 E Team



An enterprise application that provides real-time collaboration within and between organizations and jurisdictions, NC4 E Team provides situational awareness through tracking events/incidents, enabling all concerned parties to provide simultaneous input. E Team is integrated with NC4 Risk Center, which provides real-time, location-based alerts and notifications. E Team has a complete Resource Management piece which integrates Requesting, Asset Tracking and Vendor Tracking. The ESRI HTML 5 Mapping client enables the consumption of all ESRI services and OGC compliant data. Together this creates a comprehensive common operating picture. E Team also includes an embedded reporting solution based on SAP Crystal Reports Business Intelligence, included dashboards, embedded notification, geolocation of all data, embedded ICS/HICS with one

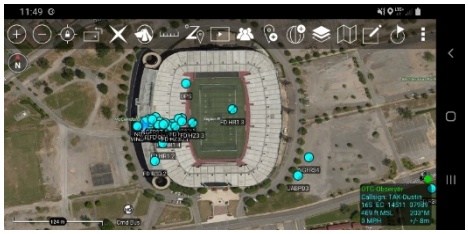
button IAP, working IPAWS Integration and interface, and embedded custom form capability with ability to create advance workflows.

PAR Government Systems Corporation

Team Connect

Team Connect is a highly-advantaged, elastic, cloud-based situational awareness (SA) server that provides a next-generation, Enterprise-level TAK Server capability. When used with TAK applications, Team Connect provides users with a secure SA solution that provides immediate information of what is happening in their area of operation while gathering additional intelligence from both TAK and non-TAK sources. The Team Beacon feature of Team Connect can also be enabled for use on embedded sensors including those on UAS platforms and robots to share position location information even without the use of TAK applications.

Team Awareness Kit

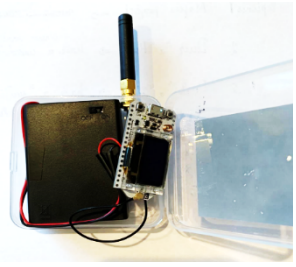


Team Awareness Kit (TAK) is a geospatial mapping engine, originally developed for the Android Operating System, which allows for advanced SA, navigation and data sharing. TAK serves as a common user interface for sharing basic position location information and provides a basis for hosting various user enabling tools that provide an enhanced end-user experience. TAK can function as a standalone situational awareness tool or be incorporated through various tactical and commercial networks.

Team Connect is currently commercially available and Team Awareness Kit is available as a government-off-the-shelf product.

Project OWL, LLC

DuckLink



Project OWL builds wireless DuckLink internet-of-things devices that can communicate with consumer electronics (smartphones) as well as other DuckLinks to form a mobile ad-hoc sensor and communications network. This network can be used to establish communications in locations without it, or to monitor geographies and accumulate data.

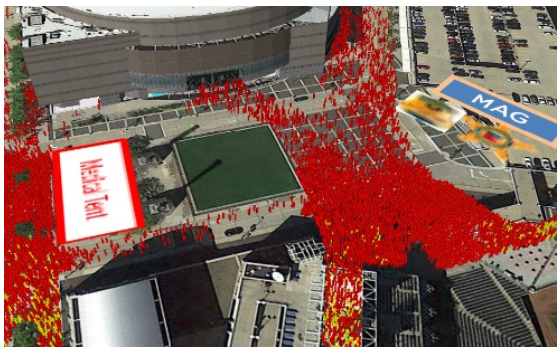
OWL Incident Management Software

Project OWL also builds the OWL Incident Management Software. This cloud software system supports DuckLink network operation and offers a simple interface to monitor network activity and communications. This software system may be accessed via web browser.

DuckLink devices and OWL Incident Management Software are both currently commercially available.

REGAL Decision Systems, Inc.

Pedestrian Flow Simulation Modeling

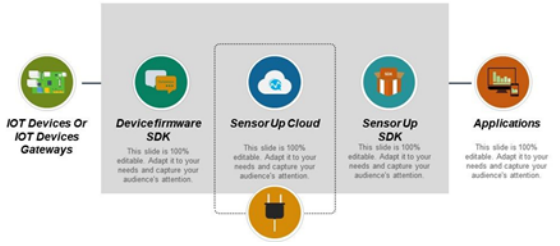


The Pedestrian Flow Simulation Modeling develops a baseline egress model and emergency evacuation model under a threat scenario (e.g., earthquake). The developed model reflects Legion Field-specific information such as physical infrastructure and restraints, stadium population, and pedestrian flow routes. The product includes video files of simulation visualizations to help identify chokepoints and areas of concern, statistical outputs indicating evacuation time requirements and population distribution recommendations, and a written report with graphics providing useful information such as optimal resource placement locations and gathering area requirements. These deliverables help facilitate interagency discussions about appropriate coordinated response.

Pedestrian Flow Simulation Modeling is currently commercially available.

SensorUp, Inc.

SensorThings Cloud



SensorUp is a leading Internet of Things cloud service platform for customers who rely on geospatial in their IoT Implementations. Our Cloud-based API allows our customers to rapidly aggregate and coordinate multiple IoT systems, and then transform them into actionable insights. SensorUp provides the sensor integration layer for NGFR by providing the API that connects the various position, biometric and hazardous materials sensors and enables their data for use in Situational Awareness and Common Operating Picture tools.

SensorUp, Inc. is currently funded by DHS S&T through a subcontract for this project. SensorThings Cloud is currently commercially available.

Silvus Technologies, Inc.

StreamCaster MN-MIMO Mesh Radio

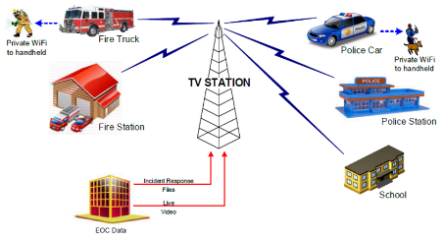
Built on more than $70M in Government-funded R&D, StreamCaster radios create a self-forming, self-healing mobile ad-hoc network (MANET) capable of distributing audio, video and other IP data in an infrastructure-less and RF-harsh environment. Networks built on Silvus radios have been used in environments ranging from subterranean to airborne and desert to dense urban—and at ranges from hundreds of feet to hundreds of miles. Radios can be hand or pack carried or infrastructure mounted, and have been integrated onto more than 100 unmanned systems. Carrying HD video, PTT audio, situational awareness data such as TAK, and relaying VHF audio signals, Silvus networks are a powerful blend of robust RF, high throughput, long range capability, and simple operation.

StreamCaster MN-MIMO Mesh Radios are currently commercially available.

SpectraRep

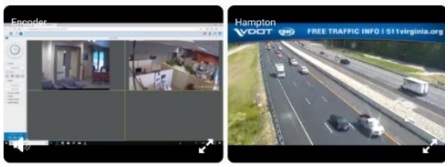
Datacasting

Datacasting leverages existing broadcast television signals to deliver encrypted and targetable public safety video, files, alerts and other data to first responders.



IncidentOne Dashboard

The IncidentOne Dashboard presents an aggregated view of multiple video systems in one dashboard. Sources can be VMS, cell phone, helicopter, drone, etc.



SpectraRep is currently funded by DHS S&T through a subcontract for this project. Datacasting and IncidentOne Dashboard are both currently commercially available.

Spectronn

Unified Multi-network Mobile Router and Video Management System

The mobile router provides (a) high-speed and resilient connectivity by aggregating bandwidth from multiple available backhaul networks (wireless and wired) and transparently offloading connections between networks with session persistence, and (b) advanced video management, enabling local storage, local and cloud video streaming, and artificial intelligence-based video analytics. This technology significantly enhances mobile network capacity and coverage for mission critical applications as well as for daily operations, while decreasing the information overload on first responders.

Unified Multi-network Mobile Router and Video Management System is currently commercially available.

TRX Systems, Inc.

NEON Personnel Tracker and NEON Location Service

NEON Personnel Tracker delivers 3D mapping and GPS-denied personnel tracking for warfighters, first responders, security and industrial personnel that operate indoors, underground and in areas without GPS. NEON Personnel Tracker uses inertial measurements from the Tracking Unit and any available constraints such as ranges to beacons to compute the user's location. NEON Personnel Tracker is an Android application tightly integrated with the NEON Location Solution where a suite of patented algorithms fuse inertial sensor data, Wi-Fi readings and inferred building data to

deliver reliable 3D location. Personnel wearing a NEON Tracking Unit and carrying an Android device running the NEON Location Service can be seamlessly located both indoors and out.

TRX Systems, Inc. was previously funded by DHS S&T for indoor tracking solutions under the Firefighter Accountability and Proximity Systems project. The NEON Personnel Tracker is currently commercially available.

Tyto Athene, LLC

Acuity® Micro Data Center

Tyto Athene's Acuity® Micro Data Center for communication and engineering teams focused on the rapid deployment of mission-critical information technology capabilities. Built to deliver essential communication and processing power to emergency or tactical edge locations anywhere in the world, the Acuity solution weighs only 30 pounds, provides 10 servers and wireless communication, and can easily be carried into any environment.

Acuity® Micro Data Center is currently commercially available.

University of Alabama in Huntsville

sUAS Monitoring and Damage Assessment Mapping

University of Alabama in Huntsville's Rotorcraft Systems Engineering and Simulation Center can provide near real-time location information of small UAS (sUAS) to show flight paths and data collected at various locations. This solution will also be used to compile geographically accurate mosaics and geospatial data products for damage assessment mapping and comparison to satellite imagery or other sUAS imagery.

sUAS Monitoring and Damage Assessment Mapping is currently commercially available.

7 Appendix C: Rules of Behavior

RULES OF BEHAVIOR FOR THE DHS NEXT GENERATION FIRST RESPONDER – BIRMINGHAM SHAKEN FURY OPERATIONAL EXPERIMENTATION

I. Background.

(a) The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) is hosting the Next Generation First Responder (NGFR) – Birmingham Shaken Fury Operational Experimentation (OpEx) in August 2019 at Legion Field Stadium, Birmingham, Alabama, to promote first responder technology integration and support innovation and adoption of public safety technologies to make responders better protected, connected, and fully aware. For more information on the NGFR Apex program, visit www.dhs.gov/NGFR.

Today's first responders face dangerous, evolving threats, and are often equipped with outdated and proprietary technologies that restrict their ability to communicate between agencies at the incident scene. Responders need access to advanced, interoperable, plug-and-play technologies that can augment their existing capabilities while increasing their ability to share information. DHS S&T is partnering with Birmingham-area public safety agencies to conduct the NGFR – Birmingham Shaken Fury OpEx to assess how advanced, integrated technologies can help better prepare responders and emergency managers for planned and no-notice events.

During the OpEx, Birmingham-area first responders and federal partners will use integrated responder technologies to enhance their mission capabilities in a HAZMAT and Search and Rescue incident response resulting from an earthquake scenario. Together, DHS S&T and responders will evaluate how selected DHS-developed and commercial technologies integrate with existing public safety systems using open standards, and how those integrated capabilities enhance operational communications, increase operational coordination, improve responder safety and augment situational awareness.

(b) The NGFR – Birmingham Shaken Fury OpEx will take place during the week of August 18-22, 2019, in Birmingham, Alabama, and will integrate first responder technologies to enhance the mission-response capabilities of federal, state and local entities. During the NGFR – Birmingham Shaken Fury OpEx, DHS S&T will evaluate how DHS-developed technologies, commercial technologies and legacy public safety systems integrate using open standards, and how those integrated capabilities increase responder safety and efficiency.

(c) The data collected from this operational experimentation will be analyzed and used to:

1) Test and evaluate NGFR technology's and industry technology's ability to support Birmingham's need to establish and maintain interoperability during a multi-jurisdictional emergency response,

2) Improve regional core capabilities in a multi-agency response;

3) Facilitate transition of NGFR-developed technologies, integration approach and

knowledge products; and

4) Promote innovation and adoption of public safety technologies to make responders better protected, connected and fully aware.

II. Voluntary Participation and Responsibility.

(a) Individuals participating in this OpEx acknowledge that they do so voluntarily at the request of DHS.

(b) Participants acknowledge that they have not been coerced into participating as a condition of maintaining employment and may withdraw from participating in this experiment.

(c) Participation in this OpEx is not and nor should it be considered as an interview for future employment with DHS or any other branch of the Federal Government.

(d) Participation in this OpEx may include using DHS and industry-provided technology during an operational response scenario, connecting DHS-provided and industry-provided technology to technology that a participant's organization provides to them, and providing feedback on the technologies' form, fit, function and impact to operational communications, responder health and safety, situational awareness, and operational coordination.

(e) Individuals participating in this OpEx acknowledge that they agree to all of the provisions set forth herein.

III. Privacy Act Notice.

(a) **Authority:** The Homeland Security Act of 2002 [Public Law 1007-296, §301] authorizes the collection of this information.

(b) **Purpose:** DHS will use this information to plan and coordinate assessment activities for the NGFR – Birmingham Shaken Fury OpEx.

(c) **Routine Uses:** The information will be used by and disclosed to DHS personnel and contractors who need the information to assist in activities related to the planning and coordination of the assessment and may also be disclosed under one or more of the routine uses specified in system of records notice DHS/S&T-001 Research, Development, Test, and Evaluation Records, January 15, 2013, 78 FR 3019 and DHS/ALL-002 DHS Mailing and Other Lists System, November 25, 2008, 73 FR 71656.

(d) **Disclosure:** Furnishing this information is voluntary; however, failure to furnish the requested information may prevent you from participating in the assessment.

The following personally identifiable information (PII) will be collected:

1) Full name
2) E-mail address
3) Organization name
4) Facial images

(e) **Security and Disposal:** DHS S&T will maintain PII on secure DHS Systems including Homeland Security Information Network (HSIN), Cvent (registration portal) and DHS

SharePoint, accessible by personnel working on the OpEx on a need-to-know basis. PII will be retained to plan, execute and follow-up from the OpEx and OpEx activities, and will be disposed of in accordance with DHS S&T Records and Disposition schedules as approved by the National Archives and Records Administration U.S. DHS Records Schedules. S&T. Administration Correspondence Files – File Plan: 405-000-01: 2 years. Visitor Control Files – File Plan: 401-121-18: 2 years. Video Recordings – File Plan: 403-256-10: 2 years.

As a condition of your participation in the NGFR – Birmingham Shaken Fury OpEx, you agree that you:

(a) Acknowledge that your facial image and anonymized feedback may be included in DHS-produced products, which may be made publicly available on platforms including but not limited to the DHS website, public safety agency partners' websites and social media platforms; and

(b) Acknowledge that your contact information (full name, organization and e-mail address) will be used to plan, execute and follow up from the OpEx and OpEx activities, but will not be included in DHS-produced products, nor shall it be made publicly available on any website or other publications.

IV. Participation and Intellectual Property Rights.

As a condition of your participation in the NGFR – Birmingham Shaken Fury OpEx, you agree that you:

(a) Will refrain from pursuing any patent, trademark, copyright or other intellectual property rights associated with any of the technologies used during this OpEx.

(b) Will agree to relinquish and assign to DHS any intellectual property rights in any subsequent iterations of the systems, technologies, garments or instruments used throughout this OpEx that may result from your direct participation during the course of this OpEx.

(c) You have sufficient rights in any first responder equipment (radios, vehicles, LTE systems) that you bring for the specific purpose of its use in the OpEx.

(d) Will refrain in engaging in any activity that infringes upon the patent, trademark, trade secret, copyright or other proprietary rights of any party.

V. Non-Disclosure of Information Regarding the NGFR – Birmingham Shaken Fury OpEx.

As a condition of your participation in the NGFR – Birmingham Shaken Fury OpEx, you agree that you:

(a) Will refrain from disclosing any information regarding the purpose, subject matter or location of this OpEx with any individual or entity that is not a participant **prior to the OpEx**, unless DHS S&T authorizes the disclosure of specific information in writing. This includes the disclosure of any information related to the OpEx via social media, internet or any other viable means of communication.

(b) Are permitted to disclose information regarding the purpose, subject matter or location of this OpEx with any individual or entity **during or after the OpEx**, provided that no

disclosure uses any defamatory language against any organizations, individuals or technologies that are participating in the OpEx. This includes the disclosure of any information related to the OpEx via social media, internet or any other viable means of communication.

(c) Will not disclose any non-publicly available technical information about any of the systems, technologies or instruments discussed in the OpEx.

(d) Will refrain from disclosing any information regarding the evaluation criteria or product selection criteria developed as part of the OpEx with any individual or entity that is not a participant. This includes the disclosure of any information related to the assessment via social media, internet or any other viable means of communication, unless DHS S&T authorizes you in writing to retweet or repost information that DHS S&T itself disseminates publicly.

(e) Will not disclose any information regarding the vulnerabilities of specific systems, technologies, or instruments that you obtain by virtue of your participation in this OpEx.

(f) Understand your responsibilities and will comply with these Rules of Behavior for participation in the NGFR – Birmingham Shaken Fury OpEx. You understand that your failure to agree to or comply with these Rules of Behavior will result in the end of your participation and your removal from the OpEx location.

DHS S&T reserves the right to review and approve in writing all disclosures of information related to the NGFR – Birmingham Shaken Fury OpEx via the press, social media, internet or any other viable means of communication before they are released, with the exception that participants have unrestricted rights to share or repost information that DHS S&T itself disseminates publicly first. DHS S&T reserves the right to request that participants delete or recant disclosures of information after they have been shared if those disclosures violate these Rules of Behavior.

VI. DHS Seal, Insignia and Other Visual Identities.

(a) By participating in the NGFR – Birmingham Shaken Fury OpEx you do not gain authorization to use the official seal, insignia or other visual identities of the Department of Homeland Security.

(b) Use of the DHS seal without proper authorization violates federal law (e.g., 18 U.S.C. §§ 506, 701, 1017) and is against DHS's policies governing usage of the seal.

(c) Any use of the DHS seal, insignia or other visual identities requires the advance written approval of the Department of Homeland Security.

VII. Your Responsibilities Regarding Export Controls.

(a) Participants have the responsibility to comply with all applicable laws and regulations regarding the export of controlled information. These laws and regulations include those set forth in the Export Administration Regulations (EAR) and the International Traffic in Arms Regulations (ITAR) and with embargoes and sanctions programs administered by the Office of Foreign Assets Control (OFAC). These regulations and programs apply to ANY PERSON OR ENTITY, whether DHS personnel, Federal personnel, or ANY OTHER PERSON OR ENTITY.

(b) Under the EAR and ITAR, "export" includes the act of disclosing certain technical information to foreign nationals, whether from or within the United States, in chat rooms, electronic bulletin boards, emails, links and other communications mechanisms.

VIII. Video/Photo Release.

(a) You hereby grant DHS S&T full and unrestricted permission to use your likeness in any and all of its official videos, publications, websites, press releases, articles and other media, without payment or any other consideration.

(b) You understand and agree that the video and/or photographs of you will become the property of DHS S&T.

(c) You hereby irrevocably authorize DHS S&T to edit, copy, exhibit, publish and distribute this video footage/photographic imagery for purposes of publicizing DHS S&T's programs and activities, or for any other lawful purposes.

(d) You waive the right to inspect or approve the finished product(s), including written copy and electronic media, in which your likeness appears.

(e) You also waive any right to royalties or other compensation arising from or related to the use of said video or photographs.

(f) You hereby hold harmless and release and forever discharge DHS S&T from all claims, demands and causes of action which you, your heirs, representatives, executors, administrators or any other persons acting on your behalf or on behalf of your estate have or may have by reason of this authorization.

IX. Disclaimer of Compensation.

You hereby acknowledge your voluntary participation in the NGFR – Birmingham Shaken Fury OpEx:

(a) I understand and agree that DHS may accept my gratuitous services pursuant to 6 U.S.C. § 453 and section 507 of Public Law 108-90, the DHS Appropriation Act of 2004.

(b) I understand and agree that in providing my gratuitous services to the federal government, I am not displacing a federal employee.

(c) I understand and agree that I am providing my services without remuneration from the United States government, DHS, or any instrumentality thereof ("the government"), that I am not entitled to, nor do I expect, any present or future pay, compensation, benefit, or *quid pro quo* from the government for providing my gratuitous services, and that I will not be considered an employee of the government. I agree that I will participate fully in whatever training DHS may require of me to perform the gratuitous services I am offering and I will strictly follow all directions that I am given by authorized federal officials in the course of my participation and service.

X. **Disclaimer of Liability.**

You hereby acknowledge your voluntary participation in the NGFR – Birmingham Shaken Fury OpEx:

(a) I have been informed and understand that my participation in this OpEx may expose my property and me to certain foreseeable and unforeseeable risks of damage and/or bodily

injury, including serious bodily injury, where I may need to be hospitalized.

(b) Having been informed of the risks, I voluntarily assume all risks as a consequence of my participation in this OpEx.

(c) In no event shall the Department of Homeland Security or its contractors or subcontractors be liable for any damages, including but not limited to direct, indirect, special or consequential damage arising out of, resulting from, or in any way connected with your involvement with the OpEx, whether or not based upon warranty, contract, tort or otherwise, whether or not injury was sustained by was sustained by persons or property or otherwise and whether or not loss was sustained from, or arose out of participation in the NGFR – Birmingham Shaken Fury OpEx.

XI. Signature of Participant. By signing below, I agree to the provisions set forth above and I understand that my failure to agree to or comply with any of the provisions may result in my removal from the OpEx.

Signature: _____

Printed Name: _____

Title: _____

Organization: _____

Date: _____

8 Appendix D: Informed Consent Form

Informed Consent Form

Study Title: Next Generation First Responder – Birmingham Shaken Fury Operational Experimentation (OpEx)
Principal Investigator (OpEx Lead): Matthew Monetti Department of Homeland Security (DHS), Science and Technology Directorate (S&T), National Urban Security Technology Laboratory (NUSTL)

RESEARCH CONSENT SUMMARY

Protocol Title: Next Generation First Responder – Birmingham Shaken Fury OpEx.
You are being asked for your consent to take part in a research study. This document provides a concise summary of this research. It describes the key information that we believe most people need to decide whether to take part in this research. A complete consent document will provide all relevant details.

WHAT SHOULD I KNOW ABOUT THIS RESEARCH?

Someone will explain this research to you.
Taking part in this research is voluntary. Whether you take part is up to you.
If you don't take part, it won't be held against you.
You can take part now and later drop out, and it won't be held against you.
If you don't understand, ask questions.
Ask all the questions you want before you decide.

HOW LONG WILL I BE IN THIS RESEARCH?

We expect that your taking part in this research will last 13 hours over a two-day period, August 21 and 22, 2019.

WHY IS THIS RESEARCH BEING DONE?

The purpose of this research is to gather feedback from first responders on technologies such as physiological, location and environmental monitoring sensors on body worn platforms, video from small unmanned aerial systems (sUAS), enhanced communications networks, and situational awareness platforms.

WHAT HAPPENS TO ME IF I AGREE TO TAKE PART IN THIS RESEARCH?

If you decide to take part in this research study, the general procedures include participating in mock operational scenarios while using the various technologies listed above. You will be asked questions regarding your feedback on the various pieces of technologies used in the experimentation.

COULD BEING IN THIS RESEARCH HURT ME? (WHAT ARE THE POTENTIAL RISKS OF THIS STUDY)

Participants will not be asked or expected to perform any tasks or utilize any equipment or gear or prototype equipment beyond the scope of their abilities or regular use. The risks associated with this OpEx are less than those encountered in response to an emergency since all activities shall be simulated.

Since the experimentation is scheduled to take place during the summer in August in Birmingham, Alabama, there is a potential for high temperature weather. Evaluators will take breaks as necessary throughout the OpEx to prevent any safety and health risks. Additionally,

while working outdoors, there will be a dedicated hydration station and covered area to provide shade, which will be accessible by all participants.

Ensuring the safety of participants is the highest priority for NUSTL. In this OpEx, there is a low risk of injury. Team members conducting this test will be required to review the test plan prior to the event, providing them with an opportunity to address any safety and health risks or environmental impact concerns and to identify and mitigate any unforeseen risks. Evaluators will not be asked to perform tasks beyond the scope of their abilities or regular use.

During the experiment, some substances are used to trigger alerts on chemical sensors (see Test Protocol Field Forensics and N5 sections in the System Description). One material is 25% LEL Hydrogen in air gas. It is a product manufactured by Gasco Affiliates, LLC. The gas is 32 liters under 500 psi at 70 ºF (when purchased) in a handheld steel cylinder with a regulator attached to control the flow rate. The DHS team members will handle this and ensure it is safely stored, transported and used when at the venue. At times during the experiment, the gas is released at the intake of sensors. This release takes place in open air conditions and the gas itself poses no health risks. The other materials are liquid solutions of Windex (commercial available household cleaning product which contains Ammonium hydroxide, ethoxylated alcohol, Sodium lauryl sulfate, Sodium lareth sulfate, Benzisothiazolinone, Liquitint® Sky Blue dye, Citric acid, and fragrances) and a 99% solution of Methyl salicylate (a common ingredient in over the counter topical analgesics and the primary component of wintergreen oil). The Windex is to be purchased at a retail store and the Methyl salicylate is obtained from a commercial supplier, Sigma-Aldrich Inc. About 1 liter of each in plastic bottles will be available for the experiment. The DHS team will be the handling these materials during the experiment. No one will be permitted to eat or drink in the location where open solutions are placed. Nitrile gloves and eye protection will be worn by the handler during the use of these solutions to prevent any exposure, although the risk of harm associated with either is low. At the end of each use, the solutions are to be covered and returned to the original container at a sink. The empty petri dishes are then rinsed and flushed with water down the drain. The handler will then wash their hands after use. The substances are not particularly dangerous, but should a release occur, the spill will be handled in a manner consistent with safety data sheets (SDS), which will be on site. The SDSs of all three materials and other information will be reviewed by the handlers in advance of the experiment.

During the experimentation, anyone onsite that notices unsafe work practices or conditions, or has any concerns regarding their safety or the safety of any participant, is empowered with the authority to stop the OpEx until the issues have been addressed and mitigated. These concerns can be addressed to the NUSTL Test Director – Matthew Monetti. See the Rules of Behavior form for Disclaimers of Liability and Compensation.

WILL BEING IN THIS RESEARCH BENEFIT ME?

This study provides no direct benefit to participants. Provided benefits are to the community as a whole and may include improved technologies for first responders.

WHAT OTHER CHOICES DO I HAVE BESIDES TAKING PART IN THIS RESEARCH?

Your participation in this study is voluntary. Your refusal to participate or your withdrawal from the study will involve no penalty or loss of benefits to which you are entitled. You may stop your participation at any time. Your participation in this study may be ended for administrative

reasons. Participation in this study requires you to sign a Department of Homeland Security Rules of Behavior. See attachment titled "DHS Rules of Behavior."

WHAT ELSE SHOULD I KNOW ABOUT THIS RESEARCH?

The results of the evaluation will be used to create a report. The report may be published on the DHS S&T Microsite: https://www.dhs.gov/science-and-technology/. Your name will not be used in any reports generated as a result of this study. If photos of the exercises are used, your name will not be used in the picture caption. Your name will not be used as part of the data collection. Since the report may be made available to the public on the DHS S&T Microsite, data presented in the report could be used for future research by other investigators for future research without your consent.

Detailed Research Consent Form

Study Background and Purpose: DHS S&T's Next Generation First Responder (NGFR) Apex program aims to make first responders better protected, connected and fully aware. This is accomplished by equipping first responder agencies with technologies that bring new operational capabilities or enhance existing ones.

The NGFR will be conducting an operational experimentation on first responder technologies called the NGFR – Birmingham Shaken Fury OpEx. This event will be held in Birmingham, AL, at Legion Field Stadium on August 21 – 22, 2019. The OpEx will simulate an earthquake centered in Memphis, TN, and felt in Birmingham. The earthquake will prompt a multi-agency urban search and rescue operation and a HAZMAT response at Legion Field Stadium. An integrated suite of NGFR technologies will be evaluated at the OpEx. The system of technologies includes physiological, location and environmental monitoring sensors on body worn platforms, video from small unmanned aerial systems (sUAS), enhanced communications networks and situational awareness platforms.

In the OpEx, approximately 55 first responders will be assigned technologies, comprised of representatives from Birmingham-area agencies including Jefferson County EMA (JCEMA), Birmingham Police Department (BPD), Birmingham Fire and Rescue Services (BFRS), Alabama EMA, University of Alabama at Birmingham Police Department (UABPD), and the Birmingham Community Emergency Response Team (CERT). The National Urban Security Technology Laboratory (NUSTL) will lead test and evaluation activities for the OpEx. This includes developing test procedures designed to evaluate operational requirements for each technology and coordinating data collection efforts throughout the OpEx.

OpEx Activities:

The OpEx will consist of three "vignettes" representing a different stage of the full scenario. Vignette A will be a communications and equipment check of the units positioned throughout the venue, Legion Field. Vignette B will be an urban search and rescue exercise following a stadium collapse as a result of an earthquake. Vignette C will be a HAZMAT response operation, which occurs beside the stadium following a tanker truck accident. The vignettes are designed to provide opportunities to use the NGFR-provided technologies to help facilitate response operations. While the Master Scenario Events List (MSEL) will list hazardous chemicals, the usage of these chemicals will be simulated throughout the event.

Vignette A

A Game Day protocol has a Unified Command (UC) Bus and first responders in place on grounds around and inside Legion Field for UAB game day opener. The participating first responders are expected to be in fixed locations. The locations will be dependent upon the role they fill. First responders that would typically be present at a game day will be assigned to the locations where they would be during such an event. All other first responders are in designated staging areas awaiting being called to action in subsequent vignettes. All situational awareness systems, sensors and networks are tested and verified they are operating normally and appearing on respective dashboards. This will be accomplished by radio communications with the first responders to ensure that all the technologies they are equipped with are on and performing the expected functions. Vignette A ends with the script stating they are two minutes into the 2nd quarter of the game when a 7.7 magnitude earthquake ruptures along Cottonwood Grove Fault causing structural damage throughout the area. Legion Field Stadium is impacted creating an immediate life-threating mass causality incident (MCI).

Vignette A will be the least intensive Vignette in terms of responder activities. Participating responders will remain at their respective staging areas and respond to radio checks and technology verifications when appropriate.

Vignette B

Vignette B begins with the response to the simulated earthquake impact at Legion Field. Post-earthquake, the native communications are overwhelmed and power outages are widespread. An MCI is declared and additional resources are requested. On-scene sUAS technologies are tasked to fly to locate victims, provide situational awareness and support communications mesh networks.

The operation of the sUASs is by the technology providers with proper training and certifications. All video streams and sensor data are to be accessible on situational awareness applications displayed within the unified command bus where the Command team will view them to stay informed of the status and help make decisions as the event unfolds. Most responders will wear TRX sensors that track their locations, and many will wear the 5VS TODs that monitor their vitals. 20 law enforcement responders are tasked to aid in the evacuation of the stadium and assist in the assessment of structural damage and situational awareness through the use of Utility body cam vests worn by 10 of them. Two Heavy Rescue teams (4 members each) will enter the stadium with their usual gear for incidents involving a building collapse to extricate the victims. One member of each Heavy Rescue team will be assigned to apply 5VS TODs to the chest of actors (10 Birmingham Community Emergency Response Team (CERT) members) playing the injured as they are identified. The victims are moved to a triage area, staffed by 4 Emergency Medical Technicians (EMTs), outside of the stadium.

During the response, one of the Heavy Rescue members is asked to perform some light exercise (jumping jacks or such), which will raise their heart rate. The increased heart rate (simulating responder in distress) is then identified within the command and a request is made to have that responder brought to medical triage for evaluation. Two HAZMAT teams (4 members each) are asked to respond with the N5 gas and the Field Forensics sensors to locations in the stadium where two unknown chemical spills and foul odors. The sensors are used to identify simulants provided as vignette B ends.

Vignette C

Vignette C is the response to a simulated collision of a tanker truck carrying anhydrous ammonium onto the stadium grounds from an adjacent highway that results in a HAZMAT incident. Several individuals from Birmingham CERT are staged in the area to play victims of the release. Various video systems (sUASs, Utility body cams and other available cameras) provide unified command with situational awareness, including the identification of the placard on the tanker truck.

Command will use both the videos and sensor data displayed on the monitors at the command post to maintain situational awareness of the incident and support the response. Most responders will wear TRX sensors that track their locations, and many will wear the 5VS TODs that monitor their vitals throughout the vignette.

20 law enforcement responders are tasked to provide traffic control for the incident. Those positioned nearby will assist in the assessment of the scene through the transmission of video from Utility body cam vests worn by 10 of the officers.

HAZMAT arrives with two teams of four responders who don Level A suits to enter the area of the release and remove victims from the designated contamination zone. Some HAZMAT members are wearing the N5 sensor, which detects the simulated ammonia gas while extracting the truck driver. The sensor alerts the team and command of the presence of the chemical hazard. The HAZMAT teams bring the victims to the decontamination station, which two teams of four Decon members have established during the HAZMAT response. The victims are moved through the decontamination process and then moved to a triage location for assessment and care by four EMTs. The EMTs will apply 5VS TOD sensors to the incoming patients' chests such that their vital signs are monitored for the duration of the event.

During the response, the Image Insights GammaPix app alerts that radiation is detected. The source is isolated to one of the victims and determined to be an innocent medical source. The 5VS TOD on one of the patients in triage alerts the EMTs to a patient in possible cardiac distress. The EMTs provide care for that patient as the vignette C ends.

Will you be informed of new information relating to the study?

All new findings discovered during the course of this research study that may reasonably influence your decision to continue to participate in this study will be provided to you as such information becomes available.

What happens if you have a research related injury?

If you suffer a physical injury as a result of your participation in this study, you will not be reimbursed for your medical expenses to treat the injury, to the extent not paid by your own insurance. No funds have been set aside or provisions made for payments or other forms of compensation (such as for lost wages, lost time or discomfort). However, you do not give up any of your legal rights by signing this consent form.

Will you be paid for being in this study?

You will not be paid to participate in this study.

Do you have to participate in this study?

Your participation in this study is voluntary. Your refusal to participate or your withdrawal from the study will involve no penalty or loss of benefits to which you are entitled. You may stop your participation at any time. Your participation in this study may be ended for administrative reasons. Participation in this study requires you to sign a Department of Homeland Security Rules of Behavior. See attachment titled "DHS Rules of Behavior."

Who will have access to your study information?

The results of the evaluation will be used to create a report. The report may be published on the DHS S&T Microsite - https://www.dhs.gov/science-and-technology/. Your name will not be used in any reports generated as a result of this study. If photos of the exercises are used, your name will not be used in the picture caption. Any comments or suggestions you make about the device may also be used in the report but if used you will only be identified by rank and function. Your name will not be used as part of the data collection.

Who do you contact if you have questions about the study?

If you have questions, concerns or complaints about the study or would like to see the test data or results, or you think you have been hurt by the research you may contact the Principal Investigator, Mr. Matthew Monetti at NUSTL@hq.dhs.gov.

If you have questions about your rights as a research subject, or other questions, concerns or complaints about the research, you can contact NEIRB at 1-800-232-9570 or info@neirb.com.

Privacy Act Notice

(a) **Authority:** The Homeland Security Act of 2002 [Public Law 1007-296, §301] authorizes the collection of this information.

(b) **Purpose:** DHS will use this information to plan and coordinate assessment activities for the NGFR – Birmingham Shaken Fury OpEx.

(c) **Routine Uses:** The information will be used by and disclosed to DHS personnel and contractors who need the information to assist in activities related to the planning and coordination of the assessment and may also be disclosed under one or more of the routine uses specified in system of records notice DHS/S&T-001 Research, Development, Test, and Evaluation Records, January 15, 2013, 78 FR 3019 and DHS/ALL-002 DHS Mailing and Other Lists System, November 25, 2008, 73 FR 71656.

(d) **Disclosure:** Furnishing this information is voluntary; however, failure to furnish the requested information may prevent you from participating in the assessment.

The following personally identifiable information (PII) will be collected:

1) Full name
2) E-mail address
3) Organization name
4) Facial images
5) Physiological measurements: heart electrical activity (electrocardiogram), heart rate, respiratory rate, blood pressure, and body temperature will be collected from participants utilizing 5VS, FireHud or CommandWear (see Test Protocol System Description, page 4).

(e) **Security and Disposal:** DHS S&T will maintain PII on secure DHS Systems including Homeland Security Information Network (HSIN), Cvent (registration portal) and DHS SharePoint, accessible by personnel working on the OpEx on a need-to-know basis. PII will be retained to plan, execute and follow-up from the OpEx and OpEx activities, and will be disposed of in accordance with DHS S&T Records and Disposition schedules as approved by the National Archives and Records Administration U.S. DHS Records Schedules. S&T. Administration Correspondence Files – File Plan: 405-000-01: 2 years. Visitor Control Files – File Plan: 401-121-18: 2 years. Video Recordings – File Plan: 403-256-10: 2 years.

As a condition of your participation in the NGFR – Birmingham Shaken Fury OpEx, you agree that you:

(a) Acknowledge that your facial image and anonymized feedback may be included in DHS-produced products, which may be made publicly available on platforms including but not limited to the DHS website, public safety agency partners' websites and social media platforms;

(b) Acknowledge that your contact information (full name, organization and e-mail address) will be used to plan, execute and follow up from the OpEx and OpEx activities, but will not be included in DHS-produced products, nor shall it be made publicly available on any website or other publications; and

(c) Acknowledge you have the ability to opt-out of this OpEx by contacting the Principal Investigator Mr. Matthew Monetti at NUSTL@hq.dhs.gov if you have any concerns about data security and storage. In the case that you opt-out, you will not be able to participate in the OpEx.

Video/Photo Release

(a) You hereby grant DHS S&T full and unrestricted permission to use your likeness in any and all of its official videos, publications, websites, press releases, articles and other media, without payment or any other consideration.

(b) You understand and agree that the video and/or photographs of you will become the property of DHS S&T.

(c) You hereby authorize DHS S&T to edit, copy, exhibit, publish and distribute this video footage/photographic imagery for purposes of publicizing DHS S&T's programs and activities, or for any other lawful purposes.

(d) You understand that you will not be able to inspect or approve the finished product(s), including written copy and electronic media, in which your likeness appears.

(e) You understand that you will not receive any right to royalties or other compensation arising from or related to the use of said video or photographs.

(f) You can opt-out from having any video or photos taken of you by DHS S&T in which case the Video/Photo Release section of this form will not apply to you. If you wish to not have video or photos take of you check the box below and sign:

☐ DO NOT photograph or videotape and/or audio tape me during the OpEx.

a. Name_____

b. Signature_____

c. Date_____

Volunteer's Statement

I have been given a chance to ask questions about this study. These questions have been answered to my satisfaction. I may contact Mr. Monetti if I have any more questions about taking part in this study.

I understand that my participation in this research project is voluntary. I know that I may quit the study at any time without harming my future medical care or losing any benefits to which I might be entitled. I also understand that the investigator in charge of this study may decide at any time that I should no longer participate in this study.

By signing this form, I have not waived any of my legal rights.

I have read and understand the above information. I agree to participate in this study. I understand that I will be given a copy of this signed and dated form for my own records. I understand my responsibilities and agree to comply with the Informed Consent Form for participation in the OpEx. I understand that my failure to agree to or comply with the Informed Consent Form will result in the end of my participation and my removal from the OpEx location.

Participant

SIGNATURE: _____DATE: _____

PRINTED NAME: _____

ORGANIZATION: _____

9 Appendix E: Public Information

9.1 News Release: DHS S&T Partners with Industry and Alabama Emergency Responders to Evaluate Technology Integration

Available at: https://www.dhs.gov/science-and-technology/news/2019/06/10/news-release-st-industry-responders-partner-evaluate-tech

Release Date: June 10, 2019

For Immediate Release

DHS S&T Press Office, (202) 254-2385

Washington, DC – The U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) has partnered with public safety agencies in Jefferson County and the city of Birmingham, Alabama, and industry partners for the Next Generation First Responder (NGFR) – Birmingham Shaken Fury Operational Experimentation (OpEx) set for August 19-23, 2019.

"At the end of the day, S&T strives to ensure that in the chaos of a disaster, our communities are prepared, and our emergency responders are protected, connected and fully aware of the situation on the ground," said William N. Bryan, DHS Senior Official Performing the Duties of the Under Secretary for Science and Technology. "We achieve this by bringing together the right partners and evaluating a range of technology solutions so when the time comes, responders can take swift, decisive action to mitigate loss of lives and property."

This integration demonstration for the NGFR Program will help local emergency responders augment their public safety capabilities before hosting the World Games in July 2021. The OpEx will depict a scenario depicting an earthquake causing partial structural collapse and a HAZMAT leak at the Legion Field stadium. Such an incident would require significant public safety coordination for search and rescue, stadium evacuation, HAZMAT decontamination and mass medical care. The experiment also serves as the last in the series of FEMA Shaken Fury exercises.

S&T and industry partners will evaluate how selected DHS-developed and commercial technologies integrate with existing public safety systems using open standards, and how those integrated capabilities enhance operational communications, increase operational coordination, improve responder safety and augment situational awareness. These interoperable technology solutions will use recommended guidelines found in the Next Generation First Responder Integration Handbook. The handbook, which provides guidance for public safety agencies and industry on standards-based interoperable technologies, will help to ensure DHS-funded and commercial technology solutions can share information with existing regional public safety systems, applications, processes and procedures.

DHS S&T recently signed a Memorandum of Understanding with the local agencies, as well as 26 Cooperative Research and Development Agreements with industry partners to establish a collaborative relationship for planning and executing the OpEx. Public safety partnerships include the City of Birmingham, Jefferson County and the Birmingham Emergency Communications District, the University of Alabama at Birmingham, Alabama Emergency Management Agency, Alabama Law Enforcement Agency, Alabama Department of

Transportation, and Alabama National Guard, along with the Federal Emergency Management Agency. These partnerships will provide the opportunity to evaluate and demonstrate mission impact of first responder communication, situational awareness, Internet of Things (IoT) and on-body technologies in an operational environment.

Some of the technologies and capabilities used in the OpEx will include: public safety IoT, Unmanned Aerial Systems, deployable communications, stadium evacuation simulation tools, sensors that assess hazardous gases, responder physiological condition and patient status; and responder and incident commander situational awareness tools. Industry partners include:

- AT&T Corporation
- BodyWorn
- CommandWear Systems, Inc,
- Easy Aerial, Inc.
- Field Forensics, Inc.
- FireHUD, Inc.
- 5VS LLC (Five Vital Signs)
- Image Insight, Inc.
- Kratos Defense and Security Solutions, Inc
- Metronome Software, LLC.
- MobileIron, Inc.
- Modern Technology Solutions, Inc.
- N5 Sensors, Inc.
- NC4 Public Sector, LLC
- PAR Government Systems Corporation
- Project OWL
- Regal Decision Systems
- Robotic Research, LLC
- SensorUp, Inc.
- Silvus Technologies, Inc.
- Sonim Technologies, Inc.
- SpectraRep
- Spectronn
- TRX Systems, Inc.
- Tyto Athene, LLC
- University of Alabama in Huntsville

DHS S&T is also coordinating with the First Responder Network Authority (FirstNet) and AT&T Corporation to run many of these cutting-edge networked devices on the newly-available FirstNet public safety broadband network.

“Real-time information helps first responders make real-time decisions,” said DHS S&T Program Manager and Birmingham Shaken Fury OpEx Director Cuong Luu.

“This exercise provides the opportunity for first responders to provide real-time feedback so that we may develop smarter, seamless and state-of-the-art technologies that increase their ability to focus on the mission, rather than distract from it.”

The OpEx aims to fulfill DHS S&T and regional first responder objectives including supporting responder technology innovation, evaluating how integrated technologies make responders safer and more effective, fulfilling responders' annual training requirements, and receiving responder feedback on existing and emerging technologies to identify areas for improvement and continued DHS S&T focus.

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Credentialed media interested in attending the NGFR – Birmingham Shaken Fury OpEx should register by emailing NGFR@hq.dhs.gov by August 16, 2019.

9.2 Media Advisory: DHS S&T to Demonstrate Emergency Response Tech Integration in Birmingham

Available at: https://www.dhs.gov/science-and-technology/news/2019/08/09/media-advisory-dhs-st-demonstrate-emergency-response-tech

Release Date: August 9, 2019

For Immediate Release
Contact: DHS S&T Press Office, (202) 254-2385

BIRMINGHAM, Ala. – The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) will facilitate a demonstration of integrated emergency response technologies during a simulated earthquake and HAZMAT scenario at Legion Field Stadium in Birmingham, Alabama. S&T's Next Generation First Responder (NGFR) – Birmingham Shaken Fury Operational Experimentation (OpEx) will involve a coordinated emergency response by the Jefferson County, City of Birmingham, and University of Alabama at Birmingham public safety agencies, and industry partners.

Over the past year, DHS S&T partnered with the City of Birmingham to identify their mission-critical technology needs, pair them with DHS-funded and industry technologies, and integrate those technologies to enhance their response capabilities. During the OpEx, DHS S&T and responders will evaluate how selected DHS-developed and commercial technologies integrate using open standards, and how those integrated capabilities enhance operational communications, increase operational coordination, improve responder safety, and augment situational awareness. This OpEx will help Birmingham-area public safety agencies prepare to host the 2021 World Games by giving them an opportunity to field test new technologies, improve regional coordination and emergency communications, and build relationships across the public safety enterprise.

Thursday, August 22, 2019

- 8:30 a.m. CDT – DHS S&T Next Generation First Responder Program will host a media availability and OpEx technology demonstration, including a technology showcase providing the opportunity to examine and discuss the various technologies.
- 9:00 a.m. – Remarks by Mayor Randall Woodfin
- 9:10 a.m. – Remarks by DHS Senior Official Performing the Duties of Under Secretary of Science and Technology William N. Bryan
- 9:30 a.m. – Technology Demonstration

- 10:15 a.m. – Panel Discussion and Press Conference
- 11:00 a.m. – Responder Technology Showcase

Legion Field Stadium
400 Graymont Ave W
Birmingham, AL 35204

Public Safety Partners

- Birmingham Fire & Rescue Services Department
- Birmingham Police Department
- Birmingham 9-1-1
- Birmingham Mayor's Office
- Birmingham Parks & Recreation
- Birmingham Public Works
- Birmingham Information Management Services
- Jefferson County Emergency Management Agency
- University of Alabama at Birmingham Emergency Management
- University of Alabama at Birmingham Police Department
- Alabama Emergency Management Agency
- Alabama National Guard

Technology Partners

- AT&T Corporation (New York, NY)
- BodyWorn (Decatur, GA)
- Easy Aerial, Inc. (Edison, NJ)
- Field Forensics, Inc. (St. Petersburg, FL)
- FireHUD, Inc. (Norcross, GA)
- 5VS LLC (Five Vital Signs) (Arlington, VA)
- Image Insight, Inc. (East Hartford, CT)
- Kratos Defense and Security Solutions, Inc. (San Diego, CA)
- Metronome Software, LLC (Laguna Hills, CA)
- MobileIron, Inc. (Mountainview, CA)
- Modern Technology Solutions, Inc. (Alexandria, VA)
- N5 Sensors, Inc. (Rockville, MD)
- NC4 Public Sector, LLC (Arlington, VA)
- PAR Government Systems Corporation (Rome, NY)
- Project OWL (Brooklyn, NY)
- Regal Decision Systems (Severna Park, MD)
- SensorUp, Inc. (Calgary, Canada)
- Silvus Technologies, Inc. (Los Angeles, CA)
- Spectronn (Holmdel, NJ)
- SpectraRep, LLC (Chantilly, VA)
- TRX Systems, Inc. (Greenbelt, MD)
- Tyto Athene, LLC (Herndon, VA)
- University of Alabama in Huntsville (Huntsville, AL)

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To attend the press availability and demonstration, credentialed media must ***RSVP to*** NGFR@hq.dhs.gov ***by Friday, August 16, 2019*** *to register and receive a media packet and additional logistical information for the experiment at Legion Field Stadium.*

9.3 Fact Sheet

Available at:
https://www.dhs.gov/sites/default/files/publications/4425_ngfr_birmingham_opex_onepager_201904_updated-508.pdf

Next Generation First Responder – Birmingham Shaken Fury Operational Experimentation

Homeland Security
Science and Technology

BRINGING NEW SOLUTIONS TO BIRMINGHAM, ALABAMA

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) is hosting the Next Generation First Responder (NGFR) – Birmingham Shaken Fury Operational Experimentation (OpEx) in August 2019 to promote first responder technology integration and support innovation and adoption of public safety technologies to make responders better protected, connected, and fully aware.

MISSION-CRITICAL TECHNOLOGY INTEGRATION

Today's first responders face dangerous, evolving threats, and are often equipped with outdated and proprietary technologies that restrict their ability to communicate between agencies at the incident scene. Responders need access to advanced, interoperable, plug-and-play technologies that can augment their existing capabilities while increasing their ability to share information.

DHS S&T is partnering with public safety agencies in the city of Birmingham and Jefferson County, Alabama, for the NGFR – Birmingham Shaken Fury OpEx. As hosts of the World Games 2021, a major international multi-sport competition, Birmingham is looking to augment their public safety capabilities. The NGFR – Birmingham Shaken Fury OpEx will help assess how advanced, integrated technologies can help better prepare responders and emergency managers for planned events, like the World Games, and no-notice events, like natural disasters.

PROTECTED, CONNECTED AND FULLY AWARE

DHS S&T launched the NGFR Apex program in 2015 to develop, adopt and integrate cutting-edge capabilities using a standards-based approach to make responders better protected, connected and fully aware. By leveraging the open standards documented in the NGFR

DHS S&T partners in Birmingham include the Fire and Rescue Service Department, who will be instrumental in evaluating HAZMAT and Search and Rescue technologies.

Integration Handbook, first responders can have plug-and-play technologies to help them rapidly adapt to changing environments and evolving threats while sharing mission-critical information between all responding agencies.

During the OpEx, Birmingham-area first responders and federal partners will use integrated responder technologies to enhance their mission capabilities in a HAZMAT and Search and Rescue incident response resulting from an earthquake scenario. Together, DHS S&T and responders will evaluate how selected DHS-developed and commercial technologies integrate with existing public safety systems using open standards, and how those integrated capabilities enhance operational communications, increase operational coordination, improve responder safety and augment situational awareness.

PROVING IMPACT WITH INTEGRATION DEMONSTRATIONS

DHS S&T has held a series of NGFR Integration Demonstrations to incrementally test and evaluate interoperable technologies currently in development, and to assess how DHS-funded tech-nologies, commercially-

Contact Us: NGFR@hq.dhs.gov | scitech.dhs.gov | dhsscitech

10 Appendix F: Incident Radio Communications Plan

INCIDENT RADIO COMMUNICATIONS PLAN (ICS 205)

1. Incident Name:	2. Date/Time Prepared:	3. Operational Period:
SHAKEN FURY	Date: AUG 9, 2019 Time:	Date From: AUG 19 Date To: AUG 22 Time From: Time To:

4. Basic Radio Channel Use:

Zone Grp.	Ch #	Function	Channel Name/Trunked Radio System Talkgroup	Assignment	RX Freq N or W	RX Tone/NAC	TX Freq N or W	TX Tone/NAC	Mode (A, D, or M)	Remarks
1	2		HS1	TECH TEAM						
1	3		HS2	CONTROLLERS						
1	4		HS3	DATA COLLECTO						
1	5		HS4	SUAS						
1	6		HS5	LOGISTICS						
1	7		HS6	OPERATIONS						

5. Special Instructions:

6. Prepared by (Communications Unit Leader): Name: Greg Silas Signature:

ICS 205 | IAP Page ____ | Date/Time: 8/12/19 1500HRS