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Homeland
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August 2017

First Responder Technology Operational Field Assessment User Guide

Responder-Driven Technology Development





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First Responder Technology Operational Field Assessment

User Guide

August 2017

AM Lesperance
RM Ozanich
MV Disney



**Homeland
Security**
Science and Technology

Prepared for the U.S. Department of Homeland
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Pacific Northwest National Laboratory
Richland, Washington 99352

Executive Summary

Technology plays a pivotal role in how first responders perform on the job, which is why the Department of Homeland Security (DHS) Science and Technology Directorate's (S&T) First Responders Group (FRG) and its technology developers rely on first responder input throughout the research and development phases and beyond.¹ Developed in partnership with Pacific Northwest National Laboratory (PNNL), the **First Responder Technology Operational Field Assessment (OFA)** proposes a flexible and universal approach that will enable diverse organizations to assess the performance of development in a credible, consistent and verifiable manner.

In designing the OFA process, PNNL conducted a market survey and interviews with first responders, technology developers and subject matter experts (SMEs). The approach was further vetted via a working group of leaders in the field. Lastly, the process was piloted with a DHS S&T EMERGE Accelerator technology to assess and refine the procedures and templates. The outcome is a comprehensive OFA approach, informed by key stakeholders and field-tested on developing technologies supported by the FRG.

This user guide instructs a technical facilitator, designated by an entity requesting an OFA, in how to partner with technology developers, first responders and SMEs to conduct an OFA. This occurs through three key phases:

- **Phase 1 – Technology Profile:** Produce a detailed summary of the technology's technical and operational specifications that establishes a baseline of information to be used throughout the OFA.
- **Phase 2 – Technology Introduction & Feedback:** Vet the technology profile with end users and SMEs to gather feedback and prepare the team to pilot the technology product in the field during Phase 3.
- **Phase 3 – Technology Field Demonstration:** Assess the technology product in real-world operational settings with the intended end users and gather feedback that will drive future technology development.

These phases build on a proven process that is the cornerstone of technology development to ensure products meet client and end-user requirements. This iterative or "spiral" approach ensures mutual benefits—technology developers gain early feedback to optimize their product for better market positioning and usability, while first responders provide feedback that drives product features to better align with their needs and requirements in the field.

The OFA process and resources included in this user guide are designed to assist in assessing and vetting emerging and early-stage technology products to help first responders be protected, connected and better aware, while pursuing their challenging and valuable mission. Organizations seeking to advance beyond this assessment to purchasing technology are encouraged to visit the DHS S&T System Assessment and Validation for Emergency Responders Program, or SAVER, which generates information that can help guide emergency responders in their selection process.

¹ This guide was prepared for the U.S. Department of Homeland Security under a Work-for-Others Agreement with the U.S. Department of Energy, contract DE-AC05-76RL01830, IA Number HSHQPM-14-X-00058 Amendment Number P00005.

Acknowledgements

This user guide was designed by PNNL in partnership with DHS S&T, first responders and SMEs from across public and private industry and academia. This work was funded as part of the DHS S&T Responder Technology Alliance (RTA), led by PNNL, to envision first responder needs 10 years out and to accelerate the development of, and bring to market, integrated technology solutions that will significantly improve the safety and capability of first responders.

We would like to thank the many organizations and individuals who were central to creating this product, including D'Arcy Morgan of DHS S&T, the DHS FRG, RTA, the DHS EMERGE Accelerator partners, the OFA Working Group, and first responders from New York City, New York; Boston, Massachusetts; Seattle and King County, Washington; Everett, Washington; Howard County, Maryland; and Huntingdon, Pennsylvania.

Acronyms and Abbreviations

CONOPS	Concept of Operations
DHS	Department of Homeland Security
EMS	emergency medical services
FRG	First Responders Group
OFA	Operational Field Assessment
PNNL	Pacific Northwest National Laboratory
RTA	Responder Technology Alliance
SAVER	System Assessment and Validation for Emergency Responders
S&T	Science and Technology Directorate
SME	Subject Matter Expert
TD	Technology Developer
TF	Technical Facilitator

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Introduction

Welcome to the **First Responder Technology Operational Field Assessment (OFA)** User Guide. This document outlines a standardized approach developed for the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) First Responders Group to conduct OFAs that will inform development of first responder technologies. In this user guide, “first responder” is a comprehensive term used in line with the DHS S&T definition to include an individual who, in the course of their professional duties of responding to emergencies, and in the early stages of an incident, is responsible for protecting and preserving life, property, evidence and the environment, and for meeting basic human needs.

Purpose

The OFA is designed to gather user feedback to better understand the constraints and technology needs of first responders, and then use that input to drive technology development to benefit DHS S&T and its developers in the mission to transform the future of first response.

Objective

This document guides the user, referred to as a Technical Facilitator (TF), to implement the three phases of the OFA, as outlined in Figure 1.

- **Phase 1 – Technology Profile:** The TF partners with a Technology Developer (TD) to complete a technology profile that captures the detailed technical and operational specifications of the technology product. The profile will be translated into user-friendly information products to create a baseline of information used throughout the OFA process. Outputs of this phase include the technology profile, technology fact sheet and technology overview presentation created by the TD.
- **Phase 2 – Technology Introduction & Feedback:** The TF validates the technology profile with end users and subject matter experts (SMEs) to gather feedback. This will prepare the team to conduct the OFA and pilot the technology product in the field in Phase 3. Outputs of this phase include a vetted and finalized technology profile, feedback to the TD to initiate spiral (or iterative) technology development and selection of use cases for demonstrating the technology.
- **Phase 3 – Technology Field Demonstration:** The TF and TD conduct the OFA and assess the technology product, ideally in multiple progressive, real-world operational settings with the intended end users. Outputs of this phase include a vetted technology, documented user feedback and final OFA reports provided to the entity requesting the OFA and to the TD to guide further development.

Outcomes

To enable responder-driven technology development, this process will:

- Create a baseline of information about a technology product with potential applications for first responders.
- Vet a technology product with first responders and SMEs.
- Document feedback about product usability and applicability to first responder needs in the field.
- Share results to drive future technology investments/developments.

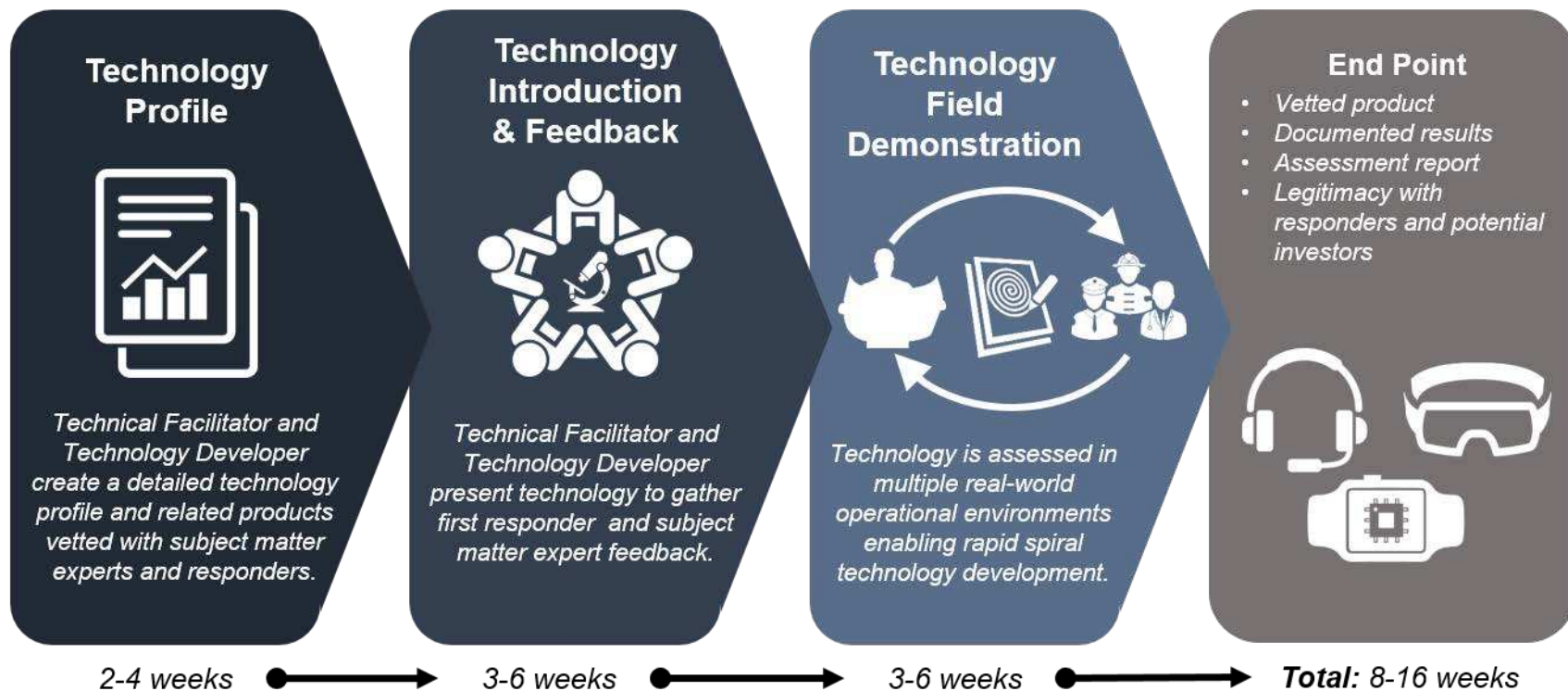


Figure 1. Operational Field Assessment Process

The time required to complete the overall OFA will vary. Timelines shown in Figure 1 depend on the technology complexity, technology readiness level and availability of OFA participants.

Using this Guide

The following section summarizes the roles and responsibilities of each participant (TF, TD, first responders and SMEs) and frequently asked questions. The subsequent chapters in this user guide describe each phase, including a description of what will be accomplished and guidance for implementation. Templates and sample information products for each phase are provided in the appendices. As each assessment may vary based on the technology, the intended end user and the intended environment/application of the device, TFs will need to modify these resources to fit their needs. Participants should avoid proprietary or business sensitive information to ensure information may be openly shared with the entity requesting the OFA and the first responder community. Although generally not needed, if proprietary, business sensitive or For Official Use Only information is required, the TF should consult with their legal department, the entity requesting the OFA and the TD to reach an agreement on any necessary nondisclosure agreements, limited distribution of documents, etc.

Roles, Responsibilities & Attributes

The OFA process is implemented primarily by a **Technical Facilitator**, or **TF**, who: 1) works with the **Technology Developer**, or **TD**, to pilot the technology and gather user feedback in real-world scenarios or use cases; and 2) engages with the **first responders** and other **subject matter experts**, or **SMEs**, to capture their feedback about the technology's usability and applicability to their needs and requirements. See Table 1 for detailed roles and responsibilities of each participant by phase.

Technical Facilitator

A **TF** is a representative selected by the entity requesting the OFA. This could be a project manager or technical lead from the entity requesting the OFA or a member of public or private industry and/or universities. The TF identifies team members and oversees managing, planning and executing the OFA.

Attributes of a Technical Facilitator

- Able to comfortably engage with first responders and TDs.
- Be confident in proactively identifying and pursuing first responders and SMEs.
- Be an active listener and have strong interpersonal communication skills with a broad audience.
- Able to capture key information from interviews and meetings in a timely fashion.
- Able to synthesize complex technical information into simple language for broad audiences.
- Be forward thinking and passionate about the goal of deploying innovative technologies or accelerating technology development.
- Be flexible as needed when working with uncertain outcomes, first responders, SMEs and TDs, while adhering to a defined schedule and budget.
- Able to self-initiate and bring dialogue to logical closure.
- Demonstrate objectivity and sound judgment.
- Possess a broad understanding of first responder disciplines and their operational environments.
- Able to analyze, interpret, prepare and present technical/business reports, professional journal publications or governmental regulations to varied audiences.
- Able to effectively solicit technical and operations information.
- Able to present varied types of information and respond to questions from varied audiences.
- Able to identify appropriate technical support staff.

TECHNICAL FACILITATOR



The **Technical Facilitator** oversees the OFA process, partnering with the TD to implement OFAs and working with the first responders to gather and translate their feedback to initiate spiral technology development.

Technology Developers

The **TD** works alongside the TF to share the technology with first responders and SMEs, demonstrate its use and gather feedback about how it does or does not align to their needs and requirements in the field.

Through the OFA process, the TD gains valuable feedback to enable responder-driven improvements to their products, helping to create a more viable and marketable technology.

Attributes of a Technology Developer

- Be an active member of the OFA team that provides objective information, to the best of their ability, to complete the technology profile.
- Actively participate in the technology introduction and feedback sessions, assessments and post-assessment processes.
- Be willing to commit the necessary time and be flexible to minimize delays for all of the OFA phases.

First Responders

First responders are the intended end user of the technology product being assessed. The role of the first responder in the OFA is to provide open and honest feedback about how a technology does or does not meet operational needs. By participating in the OFA, first responders have the opportunity to influence the features, functions and capabilities of the technology that may ultimately be brought to market.

Attributes of First Responders

- Effectively communicate operational needs and requirements.
- Possess a passion for innovative technology that can improve response and make first responders safer and more effective.
- Be eager to engage in the technology review and assessment process with TDs.
- Provide honest and objective feedback.

Subject Matter Experts

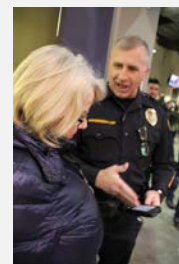
SMEs provide technical and domain expertise in the area of first responder technologies. SMEs participate in validating information in the technology profile, and identifying and understanding similar and competing products. Their role is in support of the TF in understanding what capabilities are feasible.

TECHNOLOGY DEVELOPER



The **Technology Developer** provides data for the technology profile, supports the OFA process and uses the OFA results to refine their product to be more viable and marketable for future first responders.

FIRST RESPONDER



First responders are the end user of the technology. The purpose of the OFA is to gain their feedback about the usability/applicability of the technology to enable responder-driven technology development.

SMEs have a deep understanding of the technical aspects of the technology category and can come from a variety of organizations (e.g., universities, government agencies, national laboratories, DHS and first responders).

Attributes of Subject Matter Expert

- Provide subject matter expertise (first responder or technical domain) to validate claims in the technology profile.
- Provide honest and objective feedback.

SUBJECT MATTER EXPERT



Subject matter experts provide technical and domain expertise in the area of first responder technologies.

Table 1. OFA Participant Roles and Responsibilities by Phase

Role	Responsibilities		
	Phase 1	Phase 2	Phase 3
Technical Facilitator	<ul style="list-style-type: none"> • Understand the technology product to be assessed and similar products on the market • Complete applicable portions of the technology profile with the TD • Conduct technology foraging for similar technologies from a technical, market and operational perspective to help identify unique features of the TD's product • Reach out to SMEs to verify TD's product capability claims and assumptions about product use cases • Develop information products for Phase 2 • Provide an objective perspective and exercise editorial control of the technology profile and other outputs 	<ul style="list-style-type: none"> • Identify first responder disciplines and specialties where the product can have the greatest impact • Plan, coordinate and execute all aspects of the technology introduction and responder feedback meetings • Discuss any potential policy issues related to the responder organization and the developer (e.g., permissions/required processes, intellectual property protection, liability, privacy, security) that could impact demonstration or adoption of the technology • Document all meetings and conversations and highlight technical information important to the TD (functions, features and capabilities) and any policy issues • Provide written meeting summaries to TD • With TD, down-select potential responder organizations to viable candidates for technology field demonstration(s) 	<ul style="list-style-type: none"> • Plan, coordinate and execute all aspects of the technology field demonstration(s) with first responders and the TD at selected location(s) • Coordinate and participate in field demonstration(s) • Gather and collect data, information and feedback from field demonstration participants • Analyze and document findings and provide to TD in a timely manner • Develop a final report after the field demonstration(s) is complete
Technology Developer	<ul style="list-style-type: none"> • Provide detailed information for the technology profile • Assist TF in developing information products • Assist TF to understand technology specifications, product features and applications 	<ul style="list-style-type: none"> • Participate in validating technology claims with first responders and SMEs • Participate (in person or remotely) with technology introduction/responder feedback meetings • Use feedback for spiral development to improve product • Support TF in planning the technology field demonstration(s) 	<ul style="list-style-type: none"> • Participate in the technology field demonstration(s) • Provide training as needed • Provide any necessary hardware or software products • Be available for potential troubleshooting

Role	Responsibilities		
	Phase 1	Phase 2	Phase 3
First Responders	<ul style="list-style-type: none"> • Provide feedback on relevant portions of the technology profile (e.g., operational use, most important product features) 	<ul style="list-style-type: none"> • Provide initial feedback to the TF and TD regarding the need for, usability of and anticipated challenges regarding the technology product • Identify other jurisdictions and disciplines that may have interest in the product 	<ul style="list-style-type: none"> • Participate in the technology field demonstration, using the technology product in relevant operational use cases • Provide honest feedback to the TF and TD
Subject Matter Experts	<ul style="list-style-type: none"> • Participate in validating information in the technology profile, and identifying and understanding similar and competing products • Support the TF in understanding the technology area and verifying the technology profile accuracy 	<ul style="list-style-type: none"> • Assist TF as needed to follow-up on any questions or concerns raised during the technology introduction and feedback meetings 	<ul style="list-style-type: none"> • Provide assistance as needed with unanswered technical issues or questions arising during field demonstrations

Frequently Asked Questions

What do you consider to be a first responder?

- The term “first responder” in this user guide is used as a comprehensive term in line with the DHS S&T definition to include an individual who, in the course of their professional duties of responding to emergencies, and in the early stages of an incident, is responsible for protecting and preserving life, property, evidence, the environment, and for meeting basic human needs. This includes both public (law enforcement, fire, emergency medical services [EMS]) and private industry.

I have been selected to be the TF for an OFA. What is my role?

- As the TF, your role is to gather all pertinent information related to the technology product, including familiarity with similar technologies. In addition, you will take the lead on developing the technology profile in conjunction with the TD, and set up meetings with first responders who can provide initial feedback on the technology and operational input. You will also be responsible for the final OFA documents.

What is the purpose of the technology profile?

- The technology profile will create a baseline of information about the technology product and can be used as a reference throughout the OFA. The TF will use the profile to create user-friendly information products to share essential product information with first responders and SMEs.

How long will it take to complete the OFA process?

- See Figure 1 for suggested timelines for completing the different phases of the OFA process. The amount of time required depends on the technology complexity, technology readiness level and availability of first responders, TD and SMEs.



Phase 1 Technology Profile



Phase 1: Technology Profile

In Phase 1, the TF and TD create a detailed profile about the technology product that will be vetted with first responders and SMEs to validate the technical claims about the product.

Scope

Key steps to this phase are outlined in Figure 2 and include:

- Obtain TD signature on the participant forms (see Appendix A: Participation Forms). If deemed necessary by the entity requesting the OFA, a project management plan or other governing document may also be developed and agreed to by the entity and the TD.
- Complete the technology profile with the TD.
- Conduct technology foraging and market research to understand related technologies, applications and the existing or potential market for the technology product.
- Vet the technology profile with SMEs.
- Together with the TD, revise, finalize and sign the technology profile.
- Use information collected from the technology profile to develop information products (see Appendix B: Templates).

TECHNOLOGY PROFILE



The technology profile creates a baseline of information that will be translated into user-friendly information products used throughout the OFA.

Outputs:

Technology profile
Fact sheet
Presentation

Outputs

The goal of this phase is to complete the technology profile that will create a baseline of information about the technology used throughout the OFA. The TF will use the profile to create information products (e.g., fact sheet) to share essential product information with first responders and SMEs. Templates for and samples of the technology profile, fact sheet and reports are provided in the appendices.

The TF or designated team member should conduct market research to better understand the capability gap being addressed by the technology, similar technologies currently on the market and whether and/or how similar technologies have fared among the first responder community. This can include outreach to technical libraries, trade journals, databases or organizations such as the InterAgency Board and the DHS S&T SAVER program.

Near the end of Phase 1, the TF and TD should sign the technology profile to indicate their concurrence of the information such that it may be used in developing information products to be shared with first responders and SMEs. The team may continue to refine the profile throughout the OFA process as necessary, but significant revisions should be agreed to by both parties and the document re-signed. The need for additional agreements or project management documents will vary by organization and should be determined with the TF and the entity requesting the OFA.

Phase 1 Technology Profile



Figure 2. Phase 1: Completing the Technology Profile



Completing the Technology Profile

The following information is intended to assist the TF in completing the technology profile and to ensure the profile is consistent, complete and accurate.

Audience

The intended audience for the technology profile is the TF and the entity requesting the OFA. The technology profile may be made available in the public domain. Style, therefore, is critical to making the information understandable for broad audiences with varying technical expertise. Some elements may not be applicable to all technologies or audiences.

Content

The profile is intended to capture different attributes of the technology (i.e., challenges and limitations, specifications, performance). Not all questions may be applicable to all technologies.

Purpose

The technology profile will create a baseline of information about the technology product that will be used throughout the OFA. The technology profile will be used to review and validate the technology product with first responders and SMEs who can then provide immediate feedback for the TDs to incorporate into their development process.

Sensitive Information

The technology profile **SHOULD NOT contain proprietary or business sensitive information**. The technology profile and subsequent information products should also be reviewed to remove any subjective ‘marketing’ language regarding the product. The technology profile should focus only on descriptions, technical specifications and operational uses of the product. If it is determined that proprietary or business sensitive information must be included, the TF should consult with their legal department, the entity requesting the OFA and the TD to reach an agreement on any necessary nondisclosure agreements, limited distribution of documents, etc.

Organization of Answers

The answers to the technology profile questions should begin with a clear topic sentence that summarizes the answer for a non-technical audience.

Technical Terms

Technical terms should be limited. A Glossary of Terms may be developed if necessary.

Acronyms

Acronyms should be spelled out within each criterion. An Acronym List may be developed if necessary.

Consistency in Units

Wherever possible (and this is often difficult for new, untested technologies), similar criteria (especially the “Cost” and “Time” sections) should be expressed in consistent units (i.e., metric).



Checklist for Completing the Technology Profile

The following are suggested tasks and tips for conducting Phase 1.

- ☐ TF sends invitation letter and participation forms to TD (see Appendix A: Participation Forms).
- ☐ TD signs and returns participation forms (see Appendix A: Participation Forms).
- ☐ TF sends blank technology profile template to TD (see Appendix B: Technology Profile).
- ☐ TD completes and returns a draft technology profile to the TF.
- ☐ TF and TD review and revise the technology profile as necessary.
- ☐ TF validates technology profile with first responder SMEs and technology SMEs.
- ☐ TF and TD review and make final edits to the technology profile.
- ☐ TF and TD sign the technology profile.
- ☐ TF works with TD using the technology profile to create a fact sheet to be shared with first responders and SMEs in Phase 2 (see Appendix B: Technology Fact Sheet).

Tips

- When identifying technology products that need OFAs, the TF may use categories for prioritization, such as a previously completed technology profile, information on the technology available from other sources or whether limited information exists on the technology.
- The TF does not have to act alone. To assist with this and other phases, the TF may designate a support team including other resources, such as market researchers, a technical reviewer/editor, staff with contacts in the first responder community or staff SMEs.
- Ask a lot of questions. An open conversation about the technology, its potential applications, its unique features and its potential barriers to use can generate important considerations.
- Identify other aspects of the technology needed for first responder use or technology adoption (e.g., availability of key infrastructure the technology needs to effectively operate).
- Draft questions to validate the technology profile in Phase 2. These questions should help guide the discussion to focus on key functionality and features that are of most value to assess during the field demonstration.
- Develop a well-defined schedule for completing the profile and the overall OFA process. Share this schedule with the TD and other participants as applicable. Due to the dynamic nature of the OFA process and participation, schedules may need to be modified.



Frequently Asked Questions

What if the TF does not agree with TD on a response in the technology profile?

- If there is not an agreement on what should be included and how it should be articulated in the profile, note the comment in the profile.

Why do the TF and the TD need to sign the technology profile?

- Various versions of the profile may be shared between the TF and the TD. Signing the profile demonstrates that both parties concur with what is stated in the profile and also signifies a point of closure on one aspect of the OFA process. It does not, however, suggest the TF is an advocate for the technology.

What information will be developed from the technology profile?

- The technology profile can be viewed as the database of all information related to the technology product. Once the profile is signed, fact sheets and presentations to accompany the profile may be developed and used in Phase 2.

What if the TD provides new information or data relevant to the technology profile or the product is updated—when and how should that be incorporated?

- If significant revisions or updates to the technology occur after the technology profile is signed or additional information becomes available, the parties may need to re-sign and date the profile to indicate concurrence on the modifications.

What information should not be included in the technology profile or information products?

- The technology profile **SHOULD NOT** contain proprietary or sensitive information. The technology profile and subsequent information products should also be reviewed to remove any subjective ‘marketing’ language regarding the product. The technology profile should focus only on technical specifications about the product.

Does the entire profile need to be completed?

- No. Some questions may not be applicable to all technologies or may be unanswerable due to proprietary restraints, but the technology profile should be as complete as possible.

Who will have access to the technology profile after it is completed?

- When the OFA is complete, the entity requesting the OFA reserves the right to use the end products at their discretion, depending on any prior agreements that may impact distribution, etc. This could include sharing with public audiences for purposes consistent with this project.

What if the TD does not want to answer certain questions or the question is not applicable?

- Not all of the questions in the technology profile may be relevant because the profile is designed to cover a broad range of technology classes, including both hardware and software. This should be noted in the technology profile: “*A response was not provided by the Technology Developer,*” or “*Not Applicable.*”



Phase 2 Technology Introduction & Feedback

Phase 2 Technology Introduction & Feedback



Phase 2: Technology Introduction and Feedback

In Phase 2, the TF and the TD create and share the information products (e.g., fact sheet) and the technology product with first responders and SMEs to validate the assumptions or technical claims of the TD and technology profile (see Figure 3).

This phase is less of a formal assessment and more of a dialogue in which the first responders and SMEs evaluate the technology in supporting the mission, the advantages of the product over existing tools and the potential return on investment. Participants are encouraged to discuss how they foresee the technology to be of benefit or a challenge in their typical environment.

The goal of Phase 2 is for first responders and SMEs to discuss assumptions, challenges and opportunities for the technology product, and for the TF, and TD as appropriate, to ask questions about things they might not have anticipated when drafting the technology profile. The feedback initiates spiral development in which the developer may make modifications, the team may elicit more user feedback, more modifications may follow and so forth. In addition, operational use cases are explored with different responder organizations/disciplines and potential participant organizations are identified for the Phase 3 technology field demonstration.

Technology Introduction & Feedback



Initial feedback from first responders and SMEs will refine the technology profile and determine the scope for the Phase 3 technology field demonstration.

Outputs:

User feedback
Selection of use case(s)

Scope

Key actions for Phase 2 are summarized below:

- Coordinate communications/meetings between first responders, SMEs and the TD.
- Evaluate the technology to determine if the technology is ready for a field demonstration and the organization's ability to participate:
 - Validate assumptions and capabilities of the technology.
 - Identify barriers to participating in a field demonstration or adopting the technology.
 - Identify potential operational use cases with each organization.
 - Discuss safety/security requirements and regulations specific to the participating organization.
- Gather feedback from a diverse and sufficient number of organizations, geographic areas, jurisdictions, etc., to down-select to a particular operational use case and the participants for the technology field demonstration (Phase 3).

Phase 2 Technology Introduction & Feedback



- Provide feedback to the TD to initiate spiral technology development.
- Identify a technology field demonstration location and operational use cases.

The time required to complete this phase depends on the technology readiness level and complexity of the technology. For example, lower technology readiness level/simpler prototypes could be assessed in less than one day remotely (e.g., video teleconference) by a larger number of evaluators, whereas higher technology readiness level/complex prototypes may need one-day to multi-day assessments with fewer evaluators and more face-to-face discussions.

A key component of evaluating a technology product is whether it is considered safe and compliant, which will vary by product and application. Each organization is unique in its safety requirements and regulations and how these are addressed. For example, different types of products may require review and approval by different departments within an organization (i.e., IT, security, safety, legal). Thus, the TF should work upfront with the TD and the participating users/organization to address these safety, operational, and privacy concerns early in the OFA process. This may require the inclusion of relevant SMEs from the participating organization to ensure there are no compliance issues introduced by the technology product and the associated application in the field demonstration in Phase 3. During this phase and through the remainder of the OFA, the TF should continue to inquire directly and often about technology and user policies, permissions and compliance, particularly in the areas of safety, privacy, public disclosure, security, IT, liability and other departmental/jurisdictional restrictions.

Outputs

Outputs of Phase 2 include feedback that will be delivered to the TD to potentially initiate spiral development and down-selection of organizations, locations and use case(s) for the technology field demonstration(s). In concert with the TD, the TF defines the use case (ideal users, organizations, locations, etc.) with which to demonstrate the technology product. The most important component of this preparation is to select a reliable and communicative team to conduct the technology field demonstration(s) without any use restrictions.



Figure 3. Phase 2: Technology Introduction and Feedback



Selecting Participants & Use Cases

Selecting Subject Matter Experts

The TF determines which SMEs should be included in the review of the technology profile. This could be one SME in a particular domain or several SMEs who represent multiple domains.

The TF should select SMEs who have a deep understanding of the technical aspects of the technology category. These SMEs can come from a variety of organizations (e.g., universities, government agencies, national laboratories, first responders). The key to selecting SMEs is to understand the gap to be addressed by the technology and what domain expertise is needed. Prepared with that understanding, the TF should reach out to relevant organizations and agencies. DHS S&T also may be able to assist in identifying appropriate SMEs. Both first responder and technology domain SMEs should be consulted to validate operational considerations and technical considerations, respectively.

Companies working in relevant technical areas have expertise and possibly similar products. Market research and outreach to these companies and trade organizations may help identify leading experts in key areas of interest. Researchers at universities also can fulfill the role of SME, as well as private and public safety officials.

Selecting First Responders

Selecting first responders to participate in the OFA is important to ensure the feedback provided is timely and relevant. The following is a list of considerations for the selection process. While the TF may have access to and knowledge of the first responder community, it is recommended that the TF contact the DHS S&T Program Manager or other first responder organizations such as the InterAgency Board, international associations of fire chiefs or chiefs of police or the First Responders Resource Group for assistance with identifying and reaching out to first responders to elicit their interest in participating.

Consider a broad base of disciplines

Identify a broad base of potential disciplines and specialties that may use the product/technology and may have the greatest potential for positive impacts. Examples of disciplines and specialties are listed below. Associations such as the International Association of Chiefs of Police, International Association of Fire Chiefs and the National Bomb Squad Commanders Advisory Board may also provide advice on the appropriateness of certain technology products for their respective disciplines and specialties and may be able to refer the TF to specific responder organizations.

Phase 2 Technology Introduction & Feedback



Discipline	Specialty	
Firefighting	<ul style="list-style-type: none"> HAZMAT Water Rescue Marine Firefighting Confined Space Rescue High Angle Rescue Helicopter or Fixed-Wing 	<ul style="list-style-type: none"> EMS Rescue Task Force Fusion Liaison Officer Urban Search and Rescue Logistics (Sustainment of operations during emergencies)
Wildland Firefighting	<ul style="list-style-type: none"> Overhead Team Logistics 	<ul style="list-style-type: none"> Air Operations (Helicopter or Fixed-Wing Water Tankers)
Public Health/Healthcare	<ul style="list-style-type: none"> Surveillance, Detection, Diagnosis (BioWatch, Ebola, other acute emerging diseases) Quarantine and Isolation 	<ul style="list-style-type: none"> Medical Control (distribution of patients throughout healthcare system) Logistics
EMS	<ul style="list-style-type: none"> Mass Casualty Incident Helicopter or Fixed-Wing Medical Examiner/Coroner 	<ul style="list-style-type: none"> Fusion Liaison Officer Logistics
Wildland Search and Rescue	<ul style="list-style-type: none"> Helicopter or Fixed-Wing 4x4 Team (all-terrain vehicles) Foot Team Mounted Team 	<ul style="list-style-type: none"> Canine Search Team Overhead Team Logistics
Dispatch/911	<ul style="list-style-type: none"> Covers all response organizations 	
Law Enforcement	<ul style="list-style-type: none"> SWAT Bomb Squad Arson Investigation Accident Investigation Investigation Real-Time Crime Analysis Law Enforcement Intelligence Fusion Center Mounted Patrol Helicopter or Fixed-Wing Marine Patrol 	<ul style="list-style-type: none"> Dive Team Marine Firefighting Bicycle Patrol Homeland Security Canine Tracking, Drug and Explosive Detection Special Event Planning Logistics Security Crowd Control

Phase 2 Technology Introduction & Feedback



Select the appropriate level of responder in an organization

Identify appropriate end users who can provide the most relevant and valuable input to the TD. While the TF may arrange a discussion with a chief, it will be important to ensure that actual end users of the technology product are also present.

Give preference to active responders

Given the pace of technology advancement and innovation, responders selected to be part of the OFA process should be active in their technical discipline or no more than 1-2 years retired.

Review first responders' eligibility to participate

First responders should confer with their jurisdiction or agency leadership regarding participation in the OFA.

Selecting Use Cases

Mix of small and large jurisdictions and stakeholders (funding, staffing differences, etc.)

It is ideal to obtain feedback from a range of jurisdictions or venues—large vs. small and geographic differences (East, Midwest, South and West). This should be a mix of environmental and geographical locations/differences (e.g., cold, hot, humid, dry). While large cities can sometimes have more procedural and policy issues to address, they may also have resources and departments with high interest in new technology evaluation, as they want to stay on the leading edge of response capabilities. Examples of large jurisdictions include:

- Boston
- Chicago
- Houston
- Los Angeles
- New York City
- Phoenix
- San Francisco
- Seattle
- Washington, DC (Arlington)

In addition, some private venues (e.g., stadiums, concert venues, exhibition halls) and critical infrastructure owners may also be interested in certain DHS-related technologies. It is important to communicate with a combination of large and small venues to gain feedback when determining which use cases will best showcase the technology product's most valuable capabilities.

Other organizations to consider for advice on selecting use cases include:

- Regional, county-wide or state teams (e.g., Massachusetts HAZMAT is coordinated at the state level)
- Associations (e.g., International Association of Fire Chiefs Hazardous Materials Committee)

Phase 2 Technology Introduction & Feedback



- National Association of State Fire Marshals
- National Volunteer Fire Council
- Urban Search and Rescue
- National Guard

Specifics of demonstrations

When approaching a jurisdiction, venue or critical infrastructure to engage in discussions about their potential participation in the technology field demonstration, certain requirements must be addressed, including:

- Testing requirements – Be specific about how and for what term the technology product should be tested. For example, eight hours per day for four weeks; for three shifts for one day; during a game, concert or parade; etc.
- Training space needs – Be specific with the size of the room, if a table is needed or any other auxiliary needs (e.g., special power).
- Safety regulations/requirements – Discuss with the participating organization safety regulations/requirements and any potential safety issues that could arise during the pilot (e.g., need for fall protection, need for air monitoring if pilot is done in a confined space, potential for personal injury if product misused).
- Other regulations/requirements – Communicate any other requirements for a pilot that may be unique to the participating organization and/or facility (e.g., personal protective equipment needs, environmental requirements such as low light or rain).
- Human subjects review – Technology demonstrations may require the need for Institutional Review or Human Subjects boards to review what data will be gathered and how it will be handled. This information should be described in the technology profile and made available to participants as necessary. The TF should inquire about these needs and potential restrictions as early as possible in Phase 2, and modify the technology profile as new issues are identified.



Hosting a Technology Introduction Session

The introductory meeting should bring together first responders to gather their feedback regarding the usability, applicability and functionality of the device. Meetings can also be held with individual or groups of SMEs. Meetings should last no longer than one hour and content/structure may vary depending on the TD and participant availability. The following is a draft agenda for Technology Introduction and First Responder Feedback session to be led by the TF.

- Introductions
- Objective of Discussion
 - Describe the process and scope.
 - Introduce the technology.
 - Discuss operational challenges.
 - Elicit feedback on the technical aspects of the product and potential policy issues (privacy, etc.).
- Technology Developer
 - Give an overview of the technology product (send the product fact sheet prior to the meeting).
 - Focus on the problems the technology product addresses/benefits.
 - Describe the stage of development of the product.
 - Describe prior demonstrations, pilots or other users.
 - Be clear about potential policy issues (privacy concerns, worker safety and health, etc.).
 - Be prepared to have accurate cost information or price targets.
 - Provide a demonstration of the technology product, if possible.
 - Communicate any other requirements for the Phase 3 technology field demonstration to be representative and of the most value to the TD (e.g., safety, personal protective equipment or environmental/operational requirements).
- First Responders / Subject Matter Experts
 - Highlight challenges for different operational use cases (e.g., need to track individuals at large area events).
 - Describe limitations of technology currently in use (e.g., challenges with voice communication in noisy environments).
- Wrap-Up/Next Steps/Questions and Answers.



Considerations for Planning Phase 3 Field Demonstration(s)

The following are questions to consider when planning for the technology field demonstration(s):

- Does the agency have the infrastructure (available staff, space, limited connectivity, etc.) to support the activities and the testing?
- Has the agency/individual participated in operational testing before? Did they meet the parameters of previous project(s)?
- Does the agency have existing no-fault agreements/documents that protect them against potential damage caused to the device/technology during operational testing?
- Does the agency have the actual mission responsibility for the technology's intended use?
- Does the agency use a similar technology or system already?
- Will the agency designate specific personnel or subcontractors to conduct the testing versus having the technology passed among various personnel not controlled by the TF/TD?
- What are the major use cases that will be evaluated?
- Are there safety requirements or regulations associated with the technology product and/or the intended application and have these been adequately addressed by the participating organization?



Checklist for Technology Introduction & Feedback

The following are suggested tasks and tips for to complete Phase 2.

- ☐ Identify agencies and/or individuals who should be interviewed.
- ☐ Schedule interviews.
- ☐ Prepare information products (see Appendix B for templates and Appendix C for samples).
- ☐ Provide copies of the fact sheet and presentation to the participants before the meeting.
- ☐ Facilitate discussion and take notes.
- ☐ Summarize notes and provide initial feedback summary to TD.
- ☐ Select uses cases for the technology field demonstration(s).
- ☐ Follow-up with organizations not selected for the technology field demonstration and explain selection process.

Tips

- Be respectful of first responders' time. Drive the meeting and be prepared to close-out and summarize the meeting at the agreed-upon time.
- Be aware that questions will vary by end user, technology and intended application/use case.
- Identify responder disciplines and specialties where the product can have the greatest impact.
- Discuss safety, organizational, procedural and policy barriers to the agency being able to participate in technology field demonstration(s).
- Discuss required features, functions and capabilities (i.e., without this feature, would not purchase product) and desired features (may influence selection/purchase or use in certain situations).
- Provide a single point of contact for all participants should they have questions after the meeting.
- Select use cases that represent the end user's typical daily work, will test the product features of most value, align to the unique operational needs of the user and best demonstrate the key or unique features/functionality.



Frequently Asked Questions

As a TF, how do I reach out to first responders?

- While the TF may have access to and knowledge of the first responder community, it is recommended that the TF contact the DHS S&T Program Manager or other first responder organizations such as the InterAgency Board, international associations of fire chiefs or chiefs of police or the First Responders Resource Group for assistance with identifying and reaching out to first responders to elicit their interest in participating in the OFA.

Where do I find technical SMEs?

- SMEs can come from a variety of organizations, such as universities, government agencies, national laboratories and first responders. DHS S&T also may be able to assist in identifying appropriate SMEs. Companies working in relevant technical areas may have expertise and possibly similar products. Researchers at universities can fulfill the role of SME, as well as private and public safety officials.

How do I determine which organizations to contact to participate in the Technology Introduction and Feedback?

- Consideration should be given to matching the key product attributes with those operational use cases and responder disciplines (e.g., fire, law enforcement, EMS) and specialties (e.g., HAZMAT, water rescue, bomb squad) that would benefit the most. Contacting multiple different organizations early in the process typically leads to referrals or suggestions for operational use cases. The TF should also strive to contact organizations that represent: 1) small, medium and large jurisdictions; 2) geographic diversity; and 3) different disciplines and specialties as appropriate for the technology product.

Does the TD need to be part of the responder feedback meeting or discussion?

- In some circumstances, first responders may provide more candid feedback with the TD not in attendance. The TF must decide what is appropriate for each situation. As such, a follow-up briefing with responders and the TF may be useful.

What is “spiral development”?

- Spiral development is an iterative process in which users provide feedback on the technology, the developer may make modifications, the team may elicit more user feedback, more modifications may follow and so forth.



Technology Field Demonstration



Phase 3: Technology Field Demonstration

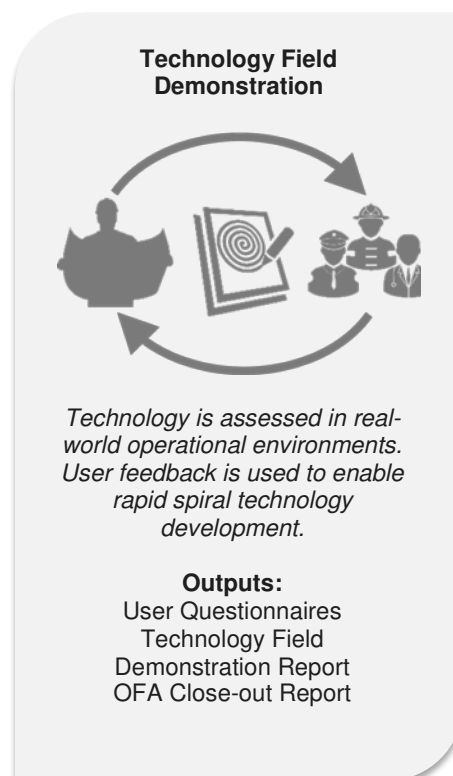
In Phase 3, the TF and TD partner with a group of end users to demonstrate the technology in a real-world use case (depending on the technology readiness level of the product). The goal is to garner operational feedback that will help guide future technology investments and/or developments, and ultimately guide product features and capabilities to better align with first responders' needs and requirements (see Figure 4).

Prior to the technology field demonstration, the TF (and TD if possible) will meet with the organization hosting the demonstration to understand the user/venue/infrastructure needs and capabilities and to define the requirements for a successful demonstration. Together with the TD, the team will develop the plan to execute the demonstration and gather feedback.

Scope

Pre-Demonstration

- Complete the pre-demonstration user questionnaire to better understand the needs and constraints of the organization hosting the demonstration (see Appendix B: Pre-Demonstration User Questionnaire).
- Review with the participating organization that the technology product and its intended application do not infringe on the organization's safety and security requirements and regulations.
- Define the parameters for the demonstration with the TD and the participants. This may include a discussion of loss, damage or injury of participants and/or the technology during the demonstration.
- Identify different classes of users (command center, event leads, marine unit, security, etc.) that will be participating in the demonstration, and clarify their technology needs/constraints and role in the demonstration.
- Conduct a walk-around of the venue, location or infrastructure where the technology will be demonstrated to help identify any potential issues or concerns (e.g., weak cellular signal).
- Install applications and perform updates to systems as necessary.
- Gather pre-demonstration feedback from participants using the feedback form (see Pre-Demonstration questions in Appendix B: Technology Field Demonstration Feedback Form).



Phase 3 Technology Field Demonstration



- Conduct a pre-demonstration briefing with location participants to ensure they understand the goals and purpose of the technology field demonstration, the technology and the feedback requested of them.
- Participants should sign photo release waivers if their pictures may be included in any reports or publications, although they are free to decline (see Appendix A: Photography Release). The TF should confer with the participating organization prior to the demonstration regarding any restrictions on taking photographs of participants and/or facilities.
- Ensure appropriate safety precautions are in place.

During the Demonstration

- Review the logistics, purpose and agenda for the demonstration.
- Demonstrate the technology to the users, train them to an appropriate level and answer questions as necessary.
- During the demonstration, shadow participants and ask questions regarding usability, applicability and the degree to which product capabilities address their challenges.
- At or near the end of the demonstration, the TF should work with participants to complete the post-demonstration questions on the technology field demonstration feedback form (see Post-Demonstration questions in Appendix B: Technology Field Demonstration Feedback Form).
- Conduct a debrief to obtain feedback from the participants as a group.

Post-Demonstration

- Compile and analyze participant feedback.
- Complete a field demonstration report summarizing the user feedback and the overall OFA (see Appendix B: Field Demonstration Report).
- Allow the TD to review the report for completeness and accuracy, but do not allow the TD to change any established findings or results.
- Provide the technology field demonstration and close-out report to the entity requesting the OFA and the TD.

Phase 3 Technology Field Demonstration



Figure 4. Phase 3: Technology Field Demonstration

Outputs

The key output of this phase is feedback gathered via forms, debriefs and TF team participant observations. This feedback is documented in a report (see Appendix B: Templates) that describes how the technology functioned during the demonstration(s), what features participants liked, what they would change and whether they would use it in the future as-is. This feedback provides valuable information to the TD that can help to validate the technology by documenting the performance of the product with actual end users. The summary of the technology field demonstration also helps to establish legitimacy with other potential responder organizations considering adopting the technology and investors.

Documenting Your Results

Through the technology field demonstration, TDs will gain a better understanding of how to optimize products for better market positioning and usability within the first responder community. Following the demonstration, the OFA technology field demonstration report should summarize users' feedback in a way that will help the entity requesting the OFA understand how the technology did or did not align to first responders' needs and what further product developments may be needed.

Final publications and reporting needs may vary by product and end user/evaluators. At a minimum, the report should include the following sections:

- **Scope** – describe the technology that was deployed and how, with whom (e.g., police, event security staff) and where, including environmental factors that may be of interest to a TD or first responder audience (i.e., poor Wi-Fi or cellular signal, limited visual contact, high background noise).
- **Methodology** – describe the activities and information gathering leading up to the demonstration and the methodology of how the technology field demonstration was planned and conducted.
- **Results** – summarize and/or provide raw feedback from the users. The TF will work with the TD and relative SMEs to analyze the data and feedback gathered during the field demonstration. This step

Phase 3 Technology Field Demonstration



may involve analyzing and summarizing the qualitative and quantitative data gathered and will vary by scenario and technology product.

- **Conclusions** – summarize what users’ feedback suggests about how the technology aligns to first responders’ needs, what participants liked, what they would change and whether they would use the product in its current state.

The technology field demonstration report should be shared with the entity requesting the OFA and with the TD to guide future technology development to further improve upon the product and better address first responder and public safety needs.

At the end of Phase 3, the TF should finalize all of the information products created during the OFA and close out the process with a brief summary report. The close-out report should summarize who participated in the OFA, feedback received and outcomes from all of the phases. The report should be accompanied by the technology profile, fact sheet and TD presentation, and provided to the entity requesting the OFA. Reports should not contain proprietary information about the technology or business sensitive information about the facility or activities for which the technology was deployed.

Report templates are provided in Appendix B: Templates, and sample reports are provided in Appendix C: Samples.

Phase 3 Technology Field Demonstration



Checklist for Technology Field Demonstration(s)

The following are suggested tasks and tips to complete Phase 3. Tasks will vary by scenario, the type of technology, operational environment and participants.

- ☐ Determine event agenda/details.
 - ☐ Time (of the event, walk-around, participant training, etc.).
 - ☐ Location of the venue/infrastructure and where participants are expected to be located.
- ☐ Identify participants and lead point of contact.
- ☐ Discuss technology needs of participants, organization or facility.
- ☐ Finalize logistics (parking, Wi-Fi passwords, power outlets, badging, etc.).
- ☐ Determine safety plan/precautions.
- ☐ Participants sign optional photo release waiver and TF/TD check with the organization/facility regarding any limitations on photography (see Appendix A: Photography Release).
- ☐ Conduct a walk-around of the location.
- ☐ Review the “dos and don’ts” (e.g., restricted areas, activity limitations).
- ☐ Demonstrate the technology to the users and conduct adequate training (typically done by the TD).
- ☐ Conduct Q&A with participants.
- ☐ Complete the pre-demonstration questionnaire (see Appendix B: Pre-Demonstration User Questionnaire).
- ☐ Shadow users, asks questions and records responses and other observations.
- ☐ Complete the technology field demonstration feedback form (see Appendix B: Technology Field Demonstration Feedback Form).
- ☐ Conduct a debrief with main point of contact and other participants (e.g., discuss major findings, technology pros/cons and next steps).
- ☐ Compile and review the results.
- ☐ Complete the technology field demonstration and close-out reports (see Appendix B: Templates).

Phase 3 Technology Field Demonstration



Tips

- Determine event parameters that could impact the technology performance (e.g., indoor vs. outdoor, lighting conditions, Wi-Fi availability, distances between participants, policy regarding personal devices or photography, etc.).
- Define and use evaluation criteria relative to the use case(s) and of most importance to the users.
- Identify safety considerations and resources needed to execute the demonstration.
- Review with the participating organization that the technology product and its intended application comply with the organization's safety and security requirements/regulations.
- Visit the venue in advance of the event to better understand the logistics and to anticipate how to gather information effectively during the event where participants may be generally obligated to their primary tasks.
- Ask for as many details as possible (i.e., facility maps, Wi-Fi network IDs/passwords, emergency information).



Frequently Asked Questions

The TD wants to put a nondisclosure agreement in place with the first responders participating in the field demonstration. Is this appropriate?

- If the company believes this is warranted and first responders agree, the option can be pursued. The TF should consult with their legal department and the entity requesting the OFA to assist with any language in a nondisclosure agreement. Typically, nondisclosure will not be required.

How many technology field demonstrations should I conduct?

- A minimum of one demonstration is needed for the OFA process. The need for additional demonstrations will vary based on the feedback from the participants and the need or desire to further evaluate the technology in different operational use cases or with different users/responder disciplines. This will also largely be driven by available budget, schedule and the availability of the technology.

What is the output or intended result of the demonstration?

- TF, TD and participants will provide feedback on the technology product in operational settings. The key output of Phase 3 is documented user feedback regarding how the technology functions during the technology field demonstration, the value of key features and whether additional features are needed. This feedback is critical to the TD to guide future product development and can help other companies developing technologies in similar areas to better understand end-user needs.

Who should receive the technology field demonstration report?

- In addition to the entity requesting the OFA and with their permission, the TD and the main point of contact from the participating organization(s) should receive the technology field demonstration report.

Appendix A

Participation Forms

This section provides forms to complete during the OFA, including:

- Technology Developer Invitation to Participate
- Technology Developer Participation Form
- Photography Release (can be used for TD, first responders, SMEs and TF team members)



First Responder Technology Operational Field Assessment

Invitation to Participate

Click here to enter the name of the Technology Developer
Company
Address
City, State ZIP

Dear Click here to enter text:

SUBJECT: PARTICIPATION IN DHS OPERATIONAL FIELD ASSESSMENT (OFA)

Click here to enter the name of the Technical Facilitator, in support of the Department of Homeland Security (DHS) Science and Technology Directorate (S&T), First Responders Group, is conducting Operational Field Assessments (OFAs) of emerging products for first responders. The OFA is intended to provide technology developers with input to advance their solutions for first responders. These OFAs will be conducted in close collaboration with the technology developer and first responders.

Through a product selection process guided by DHS and the first responder community, Responder Technology Operational Field Assessment User Guide was selected as a candidate for OFA. Therefore, Technical Facilitator would like to act as a Technical Facilitator throughout the OFA process for Responder Technology Operational Field Assessment User Guide in this voluntary OFA. To confirm your acceptance of this invitation, please complete, sign and return the enclosed Participation Form as soon as possible.

Technical Facilitator is conducting this study with insert name of any other contractor/other support if applicable. Insert one sentence description of facilitator organization/contractor. The OFA team will include members from the first responder community and subject matter experts.

Technical Facilitator will work closely with the technology developer throughout the OFA process. Please see enclosure for reference. ***Information pertaining to this OFA should only be released to the Technical Facilitator or entity requesting the OFA. In addition, the results of this OFA, regardless of how the results were obtained, may not be used in any product literature, promotional materials, advertising, or otherwise without permission from the entity requesting the OFA. Participation in this process is not an endorsement.*** This does not preclude the technology developer from advising clients or investors of participation in the OFA.

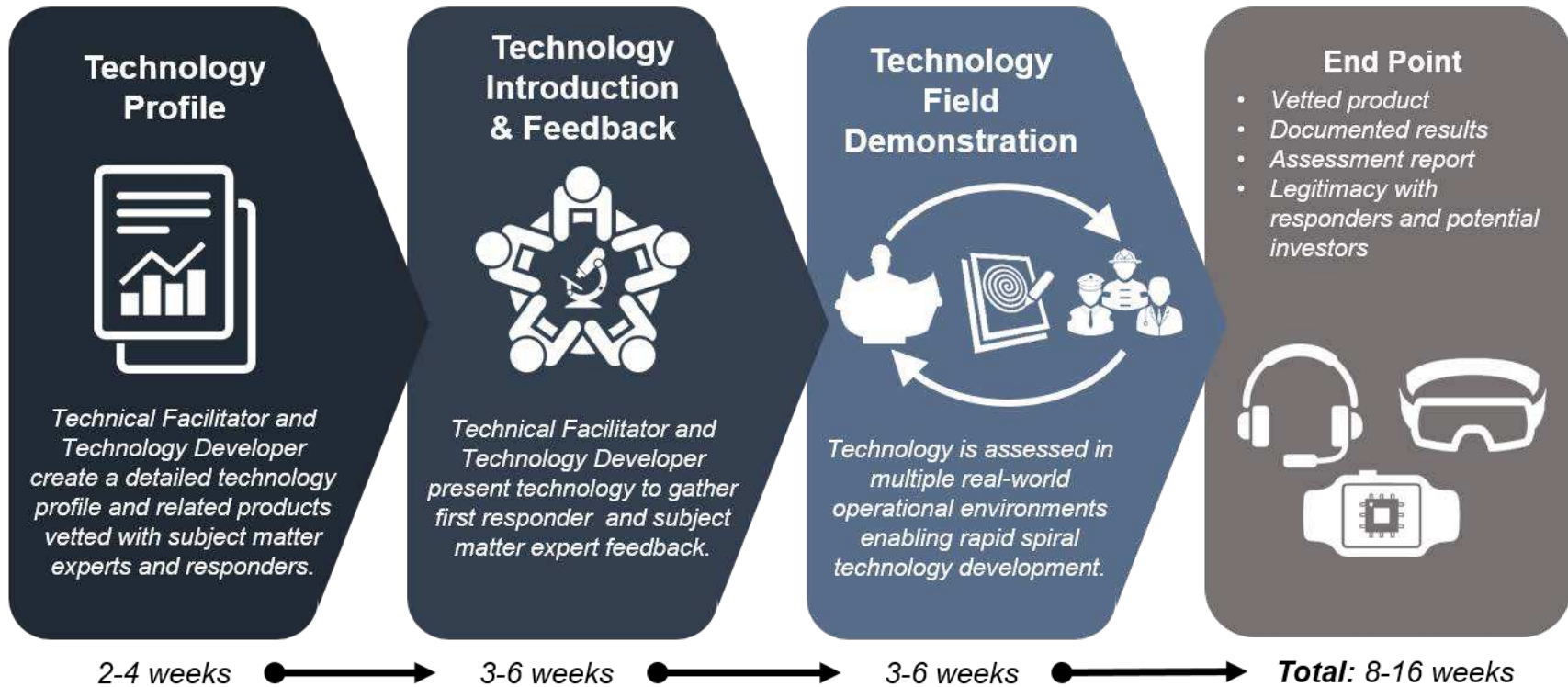
We look forward to your participation in the DHS S&T OFA Program. If you have any questions, please contact Technical Facilitator.

Sincerely,
Technical Facilitator
Contact information

Enclosures:
OFA Overview Graphic
Roles and Responsibilities of OFA Team Members

First Responder Technology Operational Field Assessment

Operational Field Assessment Overview



First Responder Technology Operational Field Assessment

OFA Roles & Responsibilities

Role	Responsibilities		
	Phase 1	Phase 2	Phase 3
Technical Facilitator	<ul style="list-style-type: none"> Understand the technology product to be assessed and similar products on the market Complete applicable portions of the technology profile with the TD Conduct technology foraging for similar technologies from a technical, market and operational perspective to help identify unique features of the TD's product Reach out to SMEs to verify TD's product capability claims and assumptions about product use cases Develop information products for Phase 2 Provide an objective perspective and exercise editorial control of the technology profile and other outputs 	<ul style="list-style-type: none"> Identify first responder disciplines and specialties where the product can have the greatest impact Plan, coordinate and execute all aspects of the technology introduction and responder feedback meetings Discuss any potential policy issues related to the responder organization and the developer (e.g., permissions/required processes, intellectual property protection, liability, privacy, security) that could impact demonstration or adoption of the technology Document all meetings and conversations and highlight technical information important to the TD (functions, features and capabilities) and any policy issues Provide written meeting summaries to TD With TD, down-select potential responder organizations to viable candidates for technology field demonstration(s) 	<ul style="list-style-type: none"> Plan, coordinate and execute all aspects of the technology field demonstration(s) with first responders and the TD at selected location(s) Coordinate and participate in field demonstration(s) Gather and collect data, information and feedback from field demonstration participants Analyze and document findings and provide to TD in a timely manner Develop a final report after the field demonstration(s) is complete
Technology Developer	<ul style="list-style-type: none"> Provide detailed information for the technology profile Assist TF in developing information products Assist TF to understand technology specifications, product features and applications 	<ul style="list-style-type: none"> Participate in validating technology claims with first responders and SMEs Participate (in person or remotely) with technology introduction/responder feedback meetings Use feedback for spiral development to improve product Support TF in planning the technology field demonstration(s) 	<ul style="list-style-type: none"> Participate in the technology field demonstration(s) Provide training as needed Provide any necessary hardware or software products Be available for potential troubleshooting

First Responder Technology Operational Field Assessment

Role	Responsibilities		
	Phase 1	Phase 2	Phase 3
First Responders	<ul style="list-style-type: none"> Provide feedback on relevant portions of the technology profile (e.g., operational use, most important product features) 	<ul style="list-style-type: none"> Provide initial feedback to the TF and TD regarding the need for, usability of and anticipated challenges regarding the technology product Identify other jurisdictions and disciplines that may have interest in the product 	<ul style="list-style-type: none"> Participate in the technology field demonstration, using the technology product in relevant operational use cases Provide honest feedback to the TF and TD
Subject Matter Experts	<ul style="list-style-type: none"> Participate in validating information in the technology profile and identifying and understanding similar and competing products Support the TF in understanding the technology area and verifying the technology profile accuracy 	<ul style="list-style-type: none"> Assist TF as needed to follow-up on any questions or concerns raised during the technology introduction and feedback meetings 	<ul style="list-style-type: none"> Provide assistance as needed with unanswered technical issues or questions arising during field demonstrations



**Homeland
Security**
Science and Technology

First Responder Technology Operational Field Assessment

Participation Form

Operational Field Assessment: *Insert the technology product.*

Technology developers are requested to mail or email the completed form on company letterhead prior to participating in the DHS Operational Field Assessment (OFA) as soon as possible. Please return the completed form to:

Technical Facilitator Name

Contact Information (physical or email address)

If you have any questions please contact:

Technical Facilitator Name

Contact Information (phone or email address)



First Responder Technology Operational Field Assessment

Participation Form

Operational Field Assessment: Insert the technology product

As a participant in the Insert the technology product OFA, we:

YES **NO**

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Agree to the terms stated within the Participation Letter. |
| <input type="checkbox"/> | <input type="checkbox"/> | Agree that information contained in the assessment report or the assessment report results, regardless of how they may be obtained, will not be used in any vendor product literature, promotional materials, advertising or otherwise. This does not preclude the vendor from advising clients or collaborators of participation in the assessment and that the assessment results may be available from DHS S&T or publicly available. |
| <input type="checkbox"/> | <input type="checkbox"/> | Agree that the OFA approach is appropriate and reasonable for our product, given the time limitations. |
| <input type="checkbox"/> | <input type="checkbox"/> | Certify that the following product is being provided for use during the OFA:
Insert the technology product |
| <input type="checkbox"/> | <input type="checkbox"/> | Certify that the following product functions as stated and is ready for the OFA:
Insert the technology product |

Printed Name: _____

Signature: _____

Title: _____

Date: _____

First Responder Technology Operational Field Assessment

Photography Release

I, _____, hereby grant the U.S. Department of Homeland Security (DHS) the right to record my likeness for use in a project that is tentatively titled: Operational Field Assessment.

I grant DHS the full and irrevocable right to produce, copy and distribute my likeness in connection with said project by means of photography or any similar electronic or mechanical method, as well as for any future DHS promotional use, to include on the DHS website, in brochures and in newsletters.

I acknowledge that the picture taken for the project becomes the sole and exclusive property of DHS, and agree to hold DHS harmless from and against any and all claims liabilities, losses or damages that may arise from the use of my image in the project.

Signature		Date	
Print Name			
Work Address			
City			
State		Zip	

Appendix B

Templates

This section includes a series of templates for use during the OFA, including:

Phase 1

- Technology Profile

Phase 2

- Technology Fact Sheet

Phase 3

- Pre-Demonstration User Questionnaire
- Technology Field Demonstration Feedback Form (pre- and post-demonstration feedback questions)
- Technology Field Demonstration Report
- Close-out Report

Phase 1 Templates



Phase 1 Technology Profile

First Responder Technology Operational Field Assessment

Technology Profile

Technology Name: _____

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B. GENERAL TECHNOLOGY DESCRIPTION	B.5
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A. BACKGROUND

1. Full Name of Technology:
2. Common Name(s) of Technology:
3. Project Lead
 - a. Name:
 - b. Role:
 - c. Telephone:
 - d. Email:
4. Affiliation (name/address):
5. Website:
6. Brief description of the organization or company:

B. GENERAL TECHNOLOGY DESCRIPTION

1. Broadly, how would you categorize your technology?

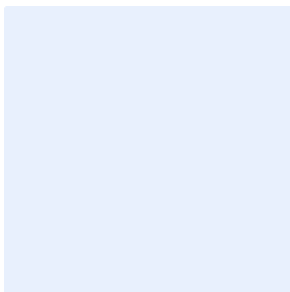
- | | |
|---|--|
| <input type="checkbox"/> Body-Worn Electronic Systems | <input type="checkbox"/> Integrated Voice and Data |
| <input type="checkbox"/> Protective Clothing and Equipment | <input type="checkbox"/> Advanced Sensors |
| <input type="checkbox"/> Data Visualization Systems (e.g., data displays) | <input type="checkbox"/> Robotics (e.g., self-navigating vehicles) |
| <input type="checkbox"/> Other | |



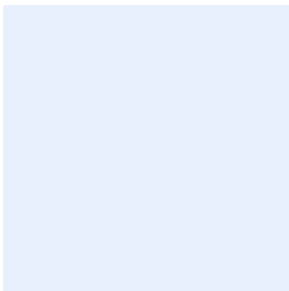
2. **Identify the Technology Category/Sub-category and Approved Equipment List Reference Number (see ATTACHMENT A – DHS FEMA AUTHORIZED EQUIPMENT LIST SECTIONS):**

C. ILLUSTRATION OF TECHNOLOGY

1. **Describe the technology/product in terms that can be easily understood by a non-technical public audience (one paragraph):**
2. **Attach a picture or drawing of the technology (include notable screen shots if a software product).**



3. **Attach a picture or illustration of how the technology fits within a larger system or with other technologies.**



4. **Provide a bulleted list of the key features, functions and/or capabilities:**



5. List the unique advantages of the product when compared to existing technology/products:

D. TECHNOLOGY OBJECTIVES

1. Describe the technology or system (one paragraph):

2. What is the need for the technology? If this technology is part of a system of technologies, describe its role in the system and the need for the system:

3. How does this technology meet the operational requirement of first responders and improve the first responder mission (safety, efficiency, efficacy, etc.)?

4. Is a partner needed to ensure the technology meets those requirements? ☐ Yes ☐ No



**If yes, describe what
type of partner:**

- 5. Describe how the technology is typically used or operated (i.e., Concept of Operations¹ or supporting use cases, if applicable):**

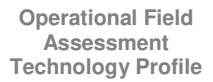
- 6. Where (or for what applications) is the technology commonly used (situations, environments, geographical area)?**

- 7. What other existing and/or similar products are currently used by emergency responders for these applications?**

- 8. Describe the target users:**

- 9. Describe whether this a complete or a partial solution:**

¹ Concept of Operations, or CONOPS, identifies the end users, describes their skill levels and environment, and describes how the proposed product or system will be used in the field to accomplish the intended mission. The CONOPS may also include relationships with other systems or entities, information sources and destinations, and other relationships or constraints.



E. CHALLENGES AND LIMITATIONS

1. What are the major *technical* challenges for the technology (rank by decreasing difficulty)?
2. What major *process* challenges exist for advancing this technology (e.g., funding, regulatory)?
3. What are the major *policy* challenges facing the technology? How is privacy, public disclosure, etc., addressed in the jurisdiction where the technology is going to be deployed (e.g., Canada versus U.S.)?
4. What are the limitations to where/when the technology should be used?
5. What key features or capabilities important to first responders do similar products have that this product does not (and are there plans to add any of these features)?



F. DATA AND INFORMATION

1. What type of information is generated (e.g., images, data) and is it in a useable state (e.g., is user interpretation or additional data processing required)?

2. Who will own the resulting data?

3. Describe information collection and storage options:

4. How long is the information/data stored?

5. How is the information transmitted and at what frequency/time interval?

6. Is the information used or generated by the technology proprietary? ☐ Yes ☐ No

7. Can the data be monetized? ☐ Yes ☐ No

If yes, how is
this addressed?



8. How is the data secured during collection, transmission and storage?

9. Will the information or data contain personally identifiable information?

☐ Yes ☐ No

**If yes, how will
that information
be controlled?**

10. Who is the information collected for and what will they do with it?

11. Can the data can be edited and, if so, by whom?

12. List any end-user storage requirements (e.g., thumb drive, hard drive, server, external computer):

13. List any end-user record-keeping requirements:



14. List potential regulations or policies that may govern the data and the record storage (e.g., privacy or public disclosure issues):

15. List any possible privacy concerns:

G. SPECIFICATIONS

Identify specifications (if applicable), including any MIL-SPEC or other standards, that are met by the technology.

- 1. Weight:**
- 2. Dimensions:**
- 3. Specific requirements of the component parts:**
- 4. User interface:**
- 5. Storage/operating temperature:**
- 6. Ingress protection rating:**
- 7. Shock resistance:**
- 8. Power options (AC/DC):**



- 9. Battery type(s):**
- 10. Charge time:**
- 11. Battery life (hours of operation, hours of standby, recharges):**
- 12. Time for sample-to-result:**
- 13. Electromagnetic pulse or interference protection:**
- 14. Data output formats:**
- 15. Connectivity/communication options (Wi-Fi, Bluetooth, HDMI, RS-232, RF, etc.):**
- 16. Data storage (options/capacity):**
- 17. Decontamination options:**
- 18. Operating system:**
- 19. Consumables (type, cost, shelf-life, storage temperature):**
- 20. Options:**
- 21. Accessories:**



22. Warranty:

23. Backups if the technology fails:

24. Service level agreement:

25. Any additional guarantees:

26. Describe how the product is serviced:

27. Describe any technical support provided (e.g., 24/7 support via phone):

H. TRAINING

1. Describe the types of training offered:

2. Describe training requirements (time, location, facilities) and suggested retraining schedule:

3. Is training/support to use this technology currently included in any organization's standard operating procedures? If so, whose?



- 4. Identify relevant standards/certifications/regulations (e.g., ASTM, NFPA, ANSI, NIST, MIL-SPEC, NRTL, UL, OSHA, NIOSH, ISO):**

- 5. How do users know when the technology is no longer serviceable or is failing?**

I. COSTS

- 1. Estimated life cycle costs
(include assumptions on
which you base your
estimates):**

- 2. Projected cost per unit:**

- 3. Discounts available per unit
for bulk purchasing:**

- 4. Per user cost (e.g., software
license):**

- 5. Training costs:**

- 6. Installation costs:**

- 7. Operations and
maintenance costs:**



8. **Other costs (including facility capital cost, decommissioning/disposal, regulatory or institutional oversight, future liability):**
9. **Export control considerations (e.g., ITAR, Department of Commerce):**
10. **Special storage requirements (e.g., lock and key, shielding):**

J. PERFORMANCE CRITERIA

Define the following performance criteria based on where the technology is today.

1. **Reliability of the technology (address potential breakdowns, effectiveness and sensitivity to operating conditions):**
2. **Technology ease-of-use (include skill level and training required to use the technology):**
3. **Required infrastructure (buildings, power sources, personnel) to support the technology:**
4. **Versatility of the technology (suitability for a variety of applications/scenarios):**



- 5. Integration with existing technologies/systems:**
- 6. Describe the technology's compatibility with other elements of the system, if applicable (include a description of the system that includes the technology):**
- 7. Describe calibration and maintenance needs and requirements (include frequency, ease of maintenance, skill level or training required):**

K. DEVELOPMENT TIMELINE

- 1. Estimate the cost to achieve a desired end point (insert month/year), assuming funding is available:**
- 2. Provide a date when the technology will be available for initial assessment by first responders:**
- 3. State the TRL at the time it is ready for assessment:**



4. To assist planning of OFAs, how many devices/products could be made available at one time?
5. Estimate the cost of advancing the technology to the next TRL after the assessment:
6. Describe the specific operational environment or application desired during the assessment (if applicable):

L. INPUT FROM FIRST RESPONDERS

Describe first responder input that will be of use to your technology. Complete as much as possible; this section will tailor the technology review and assessment with responders.

1. List the most important features, functions and capabilities of your technology to have first responders assess:
2. How can relevant operational environments be simulated/replicated during the assessment?
3. What type of support is needed to assess the product?
4. Describe any needs for third-party testing:



- 5. How does the technology fit into Incident Command?**
- 6. How will first responders be trained to use the technology?**
- 7. List specific questions you have for potential first responder end users about your technology:**
- 8. List specific questions you have for first responders about operational environments/applications/scenarios where the technology would be used:**
- 9. Discuss whether staged assessments would be valuable (e.g., initial broader audience tele- or video-conferencing to validate assumptions and product concept viability, followed by down-selected organizations for interviews/further feedback, and finally hands-on OFA from final selected organizations):**
- 10. List any other questions you have for first responders or other subject matter experts:**



- 11. Do you anticipate any responder organizations having issues with policies or procedures related to privacy, public disclosure, security, IT, safety, liability or institutional review board requirements? If so, please describe.**

M. SAFETY AND HEALTH

- 1. How is insurance liability addressed?**

- 2. Is the technology safe? List potential hazards involved in operating the technology:**

- 3. Is there a potential for end users to be exposed to hazardous materials and/or other hazards? Describe those materials and hazards:**

- 4. What are the physical requirements for users?**

- 5. Does an Occupational Safety and Health Administration standard exist for this technology?** ☐ Yes ☐ No

- 6. Will the technology be used in a hazardous environment?** ☐ Yes ☐ No



7. Are hazardous materials part of the technology/process? ☐ Yes ☐ No
8. Does the equipment have exposure limits? ☐ Yes ☐ No
9. How are the baseline technologies evaluated?
10. How is the technology vulnerable to disruption (e.g., lack of communications signal, hacking)?

N. PUBLIC PERCEPTION

1. How familiar is the technology to the general consumer?
2. How easy is the technology to explain to the public?
3. What are the privacy concerns and impediments, if any?
4. What are the legal implications, if any?



5. Would the use of the technology cause public concern or alarm? ☐ Yes ☐ No

If yes, list what those might be.

O. PARTNERSHIPS

1. List any Memorandum of Understandings you have with other companies relative to this product:
2. Name of the industrial/other partner(s):
3. Rationale for partnership:
4. Contract mechanism:
5. Other potential partners:
6. Potential international partners:

P. MARKET RESEARCH

1. Are you currently selling this technology into the first responder market? ☐ Yes ☐ No
2. Describe any market research or technology foraging that has been conducted by you or others and provide those reports:



3. **List intellectual property (if applicable):**

4. **List relevant patents for this technology (application or patent #, assignee(s)):**

5. **List intellectual property licenses (from or to other entities) associated with this technology:**

Q. REFERENCES

16. **List references or other supporting material, videos, brochures, specification sheets, etc.:**



R. SIGNATURE

Date Completed: _____

Signature of Company Representative: _____

Signature of Technical Facilitator: _____



ATTACHMENT A – DHS FEMA AUTHORIZED EQUIPMENT LIST SECTIONS

See <https://www.fema.gov/authorized-equipment-list> for Categories, Sub-categories and Authorized Equipment List Reference Number.

- 1. Personal Protective Equipment**
- 2. Explosive Device Mitigation and Remediation Equipment**
- 3. Operational and Search and Rescue Equipment**
- 4. Information Technology**
- 5. Cyber Security Enhancement Equipment**
- 6. Interoperable Communications Equipment**
- 7. Detection Equipment**
- 8. Decontamination**
- 9. Medical**
- 10. Power**
- 11. CBRNE Reference Materials**
- 12. CBRNE Incident Response Vehicles**
- 13. Terrorism Incident Prevention Equipment**
- 14. Physical Security Enhancement Equipment**
- 15. Inspection and Screening Systems**
- 16. Animal and Plants**
- 17. CBRNE Prevention and Response Watercraft**
- 18. CBRNE Aviation Equipment**
- 19. CBRNE Logistical Support Equipment**
- 20. Intervention Equipment**
- 21. Other Authorized Equipment**



ATTACHMENT B – TECHNOLOGY READINESS LEVEL DEFINITIONS

	Level	TRL Definitions	TRL Descriptions
<i>Research and Development</i>	1	Basic principles observed and reported	Scientific research begins the first steps toward applied research and development. Examples include paper studies of a technology's basic properties, exploring a technical phenomenon and defining a technical concept. This level represents the origin of technology readiness.
	2	Technology concept and/or application formulated	Once basic principles are observed and proven repeatable, practical applications can be formulated. Applications are speculative and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies, device phenomenology and experimentation.
	3	Analytical and experimental critical function and/or characteristic proof-of-concept	Active research and development is initiated. This includes analytical and laboratory studies to physically validate analytical predications of separate elements of the technology. Examples include components that are not yet integrated.
<i>Testing and Demonstration</i>	4	Component and/or breadboard validation in laboratory environment	Basic technological components are integrated to establish that they will work together. Examples include integration of modules and components in the laboratory.
	5	Component and/or breadboard validation in relevant environment	The basic technological components are integrated with reasonably realistic supporting elements so they can be tested in simulated environment. Examples include "high-fidelity" laboratory integration of components and software.
	6	System/subsystem model or prototype demonstration in a relevant environment	Representative model or prototype system is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high-fidelity laboratory environment or in a simulated operational environment.
	7	System prototype demonstration in an operational environment	Prototype near, or at, planned operational system level. Represents a major step up from TRL 6, requiring demonstration of an actual system prototype in an operational environment.
<i>Production and Deployment</i>	8	Actual system completed and qualified through test and demonstration	Technology is proven to work in its final form and under expected operational deployment conditions. In almost all cases, this TRL represents completion of system development. Examples include test and evaluation of the system in its intended system configuration and operational requirement.
	9	Actual system proven through successful mission operations	Actual application of the technology in its final form and under mission conditions, in accordance with the user's CONOPS.

Phase 2 Templates



Phase 2 Technology Introduction & Feedback



Operational Field Assessment Technology Fact Sheet

Technology Name

This fact sheet should provide a high-level overview of the technology and its potential application for first responders. Limit this document to two pages front and back.

Technology Name

[Click here to enter text.](#)

Description

[Click here to enter text.](#)

Need/Gap Analysis

[Click here to enter text.](#)

Benefits

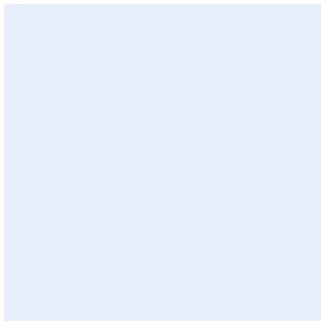
[Click here to enter text.](#)

Challenges

[Click here to enter text.](#)

Current Status

[Click here to enter text.](#)



For more information:
[Click here to enter text.](#)



**Homeland
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Phase 3 Templates



Technology Field Demonstration

First Responder Technology Operational Field Assessment

Pre-Demonstration User Questionnaire

Date Completed: _____

Participant Name/Title: _____

Technology Name: _____

Work Phone Number: _____

Work Email: _____

As part of the First Responder Technology Operational Field Assessment, this document will help us to better understand technology needs and constraints of the planned use case.

1. Describe how you anticipate the technology being used?
2. What features do you anticipate being of most use to yourself and/or your organization?
3. How many users will participate in the demonstration?
4. What types of users will participate? (command center staff, security personnel, EMTs, etc.)
5. What other platforms, devices or systems will this device need to interface with during the demonstration?
6. Is there a need to discuss and/or formally document the potential for loss, damage or injury of participants and/or the technology during the demonstration?
7. What infrastructure is available for the technology field demonstration? (i.e., Wi-Fi, power supplies, cellular service)
8. Are there any constraints or requirements on the demonstration? (i.e., time of day/season, facility access, public notification/signage, photography/video, restricted areas)
9. Does your organization have policies that might impact use of this technology? (e.g., use of personal smartphones, uploading information to the cloud, secure communications, public disclosure requirements, privacy issues)
10. Are permissions required from any other departments within your organization? (e.g., legal, IT, senior leadership)
11. Do you have other questions or suggestions:

First Responder Technology Operational Field Assessment

Technology Field Demonstration Feedback Form

Technology Developer:

Your Function/Job Assignment:

Device Piloted (list all that apply) :

Pre-Demonstration

1. What are your expectations of piloting this technology?
2. What issues do you hope it will address?

Post-Demonstration

1. Were your expectations met? Why or why not?
2. What did you like about the technology? What would you change?
3. What were the technology's most useful features?
4. Would you use the technology as-is or with modifications?

Device	As-is	With Modifications	Would Not Use
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments or suggestions:



**Homeland
Security**
Science and Technology

First Responder Technology Operational Field Assessment

First Responder Technology Field Demonstration Report

Technology Name: {technology name}

Location: {location}

Event Date: {Date}

Overview

Summarize the purpose of the technology field demonstration.

Scope

Describe the details of the event, including technology, location, participants and intended applications/features of the technology demonstrated during the pilot demonstration.

Methodology

Describe activities and outcomes before, during and after the demonstration.

Pre-Demonstration

Summarize activities.

Demonstration

Summarize activities.

Post-Demonstration

Summarize activities.

Results

Summarize the feedback received during the demonstration. Detailed feedback can be listed in the table below.

Conclusion

Describe the overall outcomes of the demonstration and the next steps for the operational field assessment process.

Feedback Forms

Feedback forms were filled out by {list participants and their roles/responsibilities during the demonstration}. Notes from the pre- and post-demonstration checklists are provided below.

User	Pre-Pilot: What are your expectations of piloting this technology?	Pre-Pilot: What issues do you hope it will address?	Were your expectations met? Why or why not?	What did you like about the technology? What would you change?	What were the technology's most useful features?	Would you use the technology as-is or with modifications?	Comments or suggestions:



Operational Field Assessment Technology Fact Sheet

Technology Name

Overview

Provide a brief summary of the operational field assessment (OFA), including an overview of the technology and its intended benefit to the first responder community.

Phase 1 Summary

What technology/company did you select to complete the technology profile?

Phase 2 Summary

Who participated in the technology introduction and feedback session? Do not list individual names or name of organizations; use the generic type and location only (e.g., fire department in Washington State). How were participants selected? What feedback did participants provide and how did that impact plans to proceed to the next phase?

Phase 3 Summary

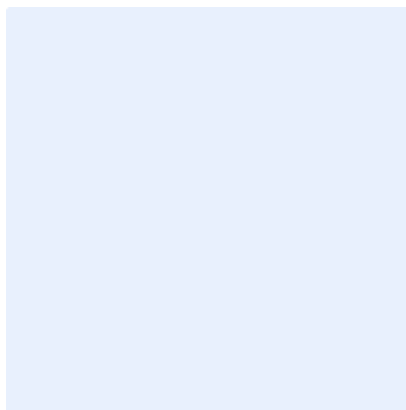
Summarize the technology field demonstration including location, participants and results.

Results

Summarize the overall feedback received from Phases 1-3. Was the technology deemed viable? Why or why not?

Recommendations

How will the results of this OFA be used? What are the recommended next steps for advancing this technology to the first responder market?



For more information:
Click here to enter text.

Appendix C

Samples

This section includes sample materials developed during an initial pilot of the OFA process, including:

- Technology Profile
- Technology Fact Sheet
- Technology Presentation
- Technology Field Demonstration Report
- OFA Close-Out Report



First Responder Technology Operational Field Assessment

Technology Profile

Technology Name: CommandWear

- A. BACKGROUND
- B. GENERAL TECHNOLOGY DESCRIPTION
- C. ILLUSTRATION OF TECHNOLOGY
- D. TECHNOLOGY OBJECTIVES
- E. CHALLENGES AND LIMITATIONS
- F. DATA AND INFORMATION
- G. SPECIFICATIONS
- H. TRAINING
- I. COSTS
- J. PERFORMANCE CRITERIA
- K. DEVELOPMENT TIMELINE
- L. INPUT FROM FIRST RESPONDERS
- M. SAFETY AND HEALTH
- N. PUBLIC PERCEPTION
- O. PARTNERSHIPS
- P. MARKET RESEARCH
- Q. REFERENCES
- R. SIGNATURE



A. BACKGROUND

1. **Full Name of Technology:** CommandWear
2. **Common Name(s) of Technology:** CommandWear Commander, CommandWear Communicator
3. **Project Lead:**
 - a. **Name:** Mike Morrow
 - b. **Role:** Founder & CEO
 - c. **Telephone:** +1.604.761.3647
 - d. **Email:** mike@commandwear.com
4. **Affiliation (name/address):** CommandWear Systems Inc., 1400-1055 West Hastings St, Vancouver, BC, V6E 2E9
5. **Website:** <http://commandwear.com>
6. **Brief description of the organization or company:** Headquartered in Vancouver, Canada, CommandWear Systems, Inc. is a software development company leveraging mobile and wearable technology, such as smartwatches. The CommandWear software platform integrates data from wearables and sensors through its mobile and wearable apps. The solution gives responders real-time situational awareness. Specifically, the software provides real-time personnel location tracking (blueforce tracking), two-way assured text-based communications, real-time picture and video sharing, and event replay capabilities.

B. GENERAL TECHNOLOGY DESCRIPTION

1. **Broadly, how would you categorize your technology?**

<input checked="" type="checkbox"/> Body-Worn Electronic Systems	<input type="checkbox"/> Integrated Voice and Data
<input type="checkbox"/> Protective Clothing and Equipment	<input type="checkbox"/> Advanced Sensors
<input type="checkbox"/> Other	
2. **Identify the Technology Category/Sub-category and Approved Equipment List Reference Number (see ATTACHMENT A DHS FEMA AUTHORIZED EQUIPMENT LIST SECTIONS):**

[04AP-02-OAPT] System, Operations Area Personnel Tracking and Accountability



C. ILLUSTRATION OF TECHNOLOGY

1. Describe the technology/product in terms that can be easily understood by a non-technical public audience (one paragraph): CommandWear is a web and smartphone/smartwatch app that gives first responders an ability to track their teams in real-time, communicate more effectively when radios are congested or hard to hear, and gives those in charge of running the operation (Commanders) new insights into what is happening on the frontlines to help them make critical, potentially life-saving decisions.
2. Attach a picture or drawing of the technology (include notable screen shots if a software product).



3. Attach a picture or illustration of how the technology fits within a larger system or with other technologies.



Integrates with Customers' Systems



4. Provide a bulleted list of the key features, functions and/or capabilities:





A Superior Tactical Platform

www.commandwear.com
mmomow@commandwear.com | +1 604 761 3647

- **Essential Features without the Clutter**
Real-time Personnel Location Tracking | Secure and Assured Group Communications | Photo/Video Sharing | Instant Replay
- **Integrated Wearable Technology**
Smart Watch App | Bio-Metric and Environmental Monitoring | Body-worn Cameras | GPS Trackers
- **Cross Platform, Open and Standards-based**
Multi-Browser | IOS and Android | Web Services API | Secure End-to-End AES-256 Encryption
- **Sonim Ready**



PERSONAL AREA NETWORK

API / Dispatch Interface
Google, ESRI, Open Street Maps
Instant Playback/Archiving

*Easiest to Navigate
Tactical User-Interface
Fastest Setup*



TRACKING | MAP OVERLAY | 2 WAY MESSAGING

REPLAY | PICTURE/VIDEO SHARING | GROUPS



MAINTAIN VISUAL CONTACT

5. List the unique advantages of the product when compared to existing technology/products:

CommandWear's integration of wearables, specifically the smartwatch and its sensor data, is a differentiating capability. The 'panic button' feature, like that found on public safety radios, via the CommandWear smartwatch application (on Pebble Watch) is not offered in competing solutions. Another unique feature is the REPLAY capability that provides real-time playback of all position (GPS) tracks, encrypted text communications and pictures/video sharing and export of this data to MS Excel files for analysis/reporting or archive. An additional unique feature is the UX design has focused on rapid deployment, scaling and simplicity of use (minimum need to manually interact – thus distract) to minimize or eliminate need for training (a very important aspect given responders ad-hoc use of this technology and use during high stress situations).

D. TECHNOLOGY OBJECTIVES

6. Describe the technology or system (one paragraph):

CommandWear has launched a proprietary cloud-based mobile situational awareness platform that securely connects all responders in real-time.



The Commander web-based situational awareness display and the Communicator messaging and GPS tracking application for smartphones and wearable device (e.g., smart watches) provides:

- Real-time remote monitoring, tracking and analysis (via examination of replay) of the mission progress and positioning of individual responders and resources (e.g., people travelling in or out of vehicles), providing personnel accountability, safety and more effective resource management;
- Increased tactical situational awareness and deconfliction in the field, specifically responder-to-commander information sharing to maximize field responder effectiveness; and,
- Reduced time and cost of preparing an accurate account of past events through an “Event Replay” feature (e.g., playback a historical log of positions, messages and pictures/video from the last shift or an archived event).

7. What is the need for the technology? If this technology is part of a system of technologies, describe its role in the system and the need for the system:

Major incidents and pre-planned events require the involvement of multiple disciplines, jurisdictions and agencies. Incident command communications, particularly voice communications, depend upon two characteristics: the ability to transmit, and the ability to receive and clearly hear and understand the message. In most routine operating conditions, radio communications systems are effective. However, dynamic situations requiring coordination of multiple response teams, such as riots or shootings, often require communicating urgent information immediately to prevent damage, serious injury or save a life. The Parliament Hill and Moncton shootings in Canada clearly revealed a lack of situational awareness that resulted in unnecessary loss of life of first responders. The RCMP’s After Action Review of the October 22, 2014 Parliament Hill Shooting (ref: <http://www.rcmp-grc.gc.ca/en/external-engagement-and-coordination-parliament-hill-incident-october-22nd-2014-after-action-review>) defined the problem as “Delays in providing all key partners (and potential responders) in the National Capital Region with situational awareness surrounding the critical incident of October 22nd, 2014.” During CommandWear’s direct conversations four weeks after the incident with the Ottawa Police member involved in the response operation, he stated they “had no clue where their police members were, couldn’t communicate across responding agencies nor could they access the CCTV cameras to know where the shooter was and what was going on.” Regarding the Moncton Shooting incident, an independent review, known as the “MacNeil Report (ref: <http://www.rcmp-grc.gc.ca/en/independent-review-moncton-shooting-june-4-2014#sec3> ... pages 12, 22, 24, 31) describe issues with lack of Situational Awareness and personnel location tracking and communications.

Police, fire, paramedic and security organizations rely almost entirely on voice communication between command and responders. Valuable radio bandwidth is used to locate personnel and can hamper getting critical messages communicated. When messages do get through, frontline responders often cannot hear the radio and tend to talk over one another and speak in inaudible tones in challenging environments. Furthermore, some situations require covert communications and radio (audio) can put responders at risk of being heard or identified.

An over-reliance on voice communication often compromises the overall mission success and, ultimately, puts responders’ and citizens’ lives at risk.

8. How does this technology meet the operational requirement of the first responder and improve the first responder mission (safety, efficiency, efficacy, etc.)?



- **Location:** Knowing where responders are in conjunction with hazards/threats, and (responders and commanders) knowing who is closest to help or respond, increases responder safety. Command and frontline responders can now see the near real-time location of team members for increasing speed and accuracy of any emergency response.
- **Situationally Aware:** Knowing who is closest to respond without time delays associated with radio communications, speeds response (reports of 30 seconds per call for service has been communicated to CommandWear by one of its paramedic clients). Knowing where responders are, whether they are dismounted or not, what their current status is (and, in future, vital signs) and being able to share real-time photos/videos from the frontlines increases responder safety and decision-making effectiveness.
- **Communication:** Improving speed and accuracy of response, while enhancing officer safety, and ability to visualize what is happening real-time from the frontlines, increases probability of desired results. The software complements radio communications with a secure, text-based, two-way messaging capability that has the added benefits of reducing radio congestion, adding picture/video sharing, assuring messages were received and understood, and providing a covert communication channel.
- **Accountability:** The system by default gives an agency increased visibility into what happened, where, when and by whom, through the REPLAY feature; thereby, increasing accountability internally and in support of public inquiry. An added feature provided by CommandWear is REPLAY – an ability to instantly replay any event graphically to have instant and accurate account of resource deployments, text comms and visuals (pics/video) of what happened, when and where responders were located. This is a potentially significant time (cost) saver for investigation/inquiry and supports personnel accountability programs.

9. Is a partner needed to ensure the technology meets those requirements? ☐ Yes ☒ No

CommandWear runs as a stand-alone, turnkey solution (just download an app and “go”), and can be extended through an application program interface, or API, to push data to customers’ dispatch, crisis management, fleet management, analytics or other systems.

If yes, describe what type of partner: N/A



- 10. Describe how the technology is typically used or operated (i.e., Concept of Operations¹ or supporting use cases, if applicable):** CommandWear is typically deployed by tactical teams in support of special ops, including major event security (marathons, sporting events, festivals) and critical incident response (natural disasters, hostage taking, terrorist events, etc.). Commanders in the field and their support organization (Ops Centers) use the web app to monitor and maintain a Common Operating Picture, while responders use the smartphone/smartwatch app to send/receive messages or requests, share pics/video, etc.
- 11. Where (or for what applications) is the technology commonly used (situations, environments, geographical area)?** Critical Incident Response (Emergency Response Teams/SWAT), Major Public Events, Close Protection Operations, Search, Surveillance.
- 12. What other existing and/or similar products are currently used by emergency responders for these applications?**

Most public safety agencies will rely on computer aided dispatch (CAD) and land mobile radio systems to carry out major incident response operations and day-to-day operations. CAD systems also often provide Automated Vehicle Tracking (AVL) to track locations of responder vehicles. New radio systems offer a GPS location capability, but it is not real-time tracking (GPS signal sent when radio button pushed; dispatch having to query locations on ad-hoc basis).

When incidents become too large or are beyond the capabilities of a department to manage, an emergency operation center (EOC) may be activated. Crisis management software systems, such as WebEOC or DisasterLAN, may be used to help EOC staff support the Commander and their responders in the field (site support) through obtaining additional resources and assisting with coordination of the response operation across multiple departments or agencies. These crisis management systems typically make extensive use of GIS Mapping software, such as ESRI ArcGIS, to support decision-making (e.g., utilizing predictive hazard models, such as ALOHA or USGS Earthquake Shake Models, to analyze potential impact on people and infrastructure). Often, EOCs also utilize notification systems, such as MiR3 or SendNow, to notify internal staff and/or the public of the situation. Social media is now used extensively for public communication and intelligence gathering by responding agencies.

13. Describe the target users:

- Police Teams (special ops/tactical, close protection, surveillance, site and operations center commanders)
- Emergency Medical Response Teams (special ops, major events)

¹ Concept of Operations or CONOPS, identifies the end users, describes their skill levels and environment, and describes how the proposed product or system will be used in the field to accomplish the intended mission. The CONOPS may also include relationships with other systems or entities, information sources and destinations, and other relationships or constraints.



- Security Teams (Municipal or Private Security)

14. Describe whether this a complete or a partial solution: Complete solution not requiring other external sub-systems yet able to become integrated with customers' existing systems.

CHALLENGES AND LIMITATIONS

1. What are the major *technical* challenges for the technology (rank by decreasing difficulty):

Business sensitive.

2. What major *process* challenges exist for advancing this technology (e.g., funding, regulatory)?

- Ongoing funding until we get to profitability continues to be #1 challenge.

3. What are the major *policy* challenges facing the technology? How is privacy, public disclosure, etc. addressed in the jurisdiction where the technology is going to be deployed (e.g., Canada versus U.S.)?

- First responder organization policies relating to security, privacy, data storage and disclosure.

4. What are the limitations to where/when the technology should be used?

Some indoor environments that are GPS-challenged can limit the effectiveness of the system (although our app indicates last known position and displays any connectivity problems). This limits applicability for structural firefighting.

Responders off-shift tend to not want the app on personal devices (however, CommandWear does allow an agency, based on its policies, to allow users to turn off tracking through the app). In some jurisdictions, smartphones (and wearables) will be issued to responders when they are assigned to a pre-planned event or when they come on shift. The equipment is then either returned to the office at the end of a shift or powered off and kept in their "emergency response kit" (e.g., duffle bag with helmet, non-lethal weapons, protective clothing, etc.). Therefore, the devices become part of a deployable "emergency response kit" that many responders carry with them. In other jurisdictions, smartphones are not allowed on the job to ensure sensitive information, such as photos of a crime site, is not inappropriately shared. In those cases, a smartwatch may be a better option.

5. What key features or capabilities important to first responders do similar products have that this product does not (and are there plans to add any of these features)? –
Business sensitive. ...



DATA AND INFORMATION

1. **What type of information is generated (e.g., images, data) and is it in a useable state (e.g., is user interpretation or additional data processing required)?** All information generated and displayed to users is intended to be easily understood and, when possible, actionable. We use GIS maps, overlay pictures and video to maximize ‘at a glance’ understanding augmented by visual and audible alerts when certain conditions are met (e.g., when a responder hits a ‘panic button’ on the smartwatch).
2. **Who will own the resulting data?** The licensed organization owns their own data (a separate Organization is created on the cloud server for each customer (multi-tenant) and they can manage their own data, users, configs, etc).
3. **Describe information collection and storage options:** Information is collected primarily through data entry (or voice-to-text input where possible) and automated means (location coordinates from smartphones’ GPS). Data storage is in a central, cloud-based and customer-accessible database. CommandWear gives customers the option of exporting the data via an integrated utility (exports to Excel format).
4. **How long is the information/data stored?** Currently, CommandWear stores the data for an unlimited amount of time during the license period and for a fixed period after termination or expiration of this license period.
5. **How is the information transmitted and at what frequency/time interval?** Data from smartphones and tablets/PCs is transmitted through 3G/4G LTE or Wi-Fi networks (private or public). CommandWear has also successfully tested over FirstNet spectrum (700 MHz Band 14). Data comms between smartwatch and smartphone apps is typically via Bluetooth Low-Energy (BLE) or, if supported, 3G/4G/Wi-Fi from the watch with a SIM installed.

Frequency of GPS updates is user-configurable and often set to 10-30 seconds for operations. Frequency of messages sent/received is based on users hitting the ‘send’ button and is immediate, if there is a network connection. The user will be notified if the message is not sent during intermittent network outages and the software has a device status monitor that gives Command real-time status of network connections.

6. **Is the information used or generated by the technology proprietary?** ☐ Yes ☒ No

The data generated and stored belongs to the licensed customer.

7. **Can the data be monetized?** ☒ Yes ☐ No

If yes, how is this addressed? Data could be monetized, but this is highly unlikely for this product given customer ownership and data protection requirements.



- 8. How is the data secured during collection, transmission and storage?** All data is encrypted 'end-to-end' based on AES-256 encryption. Customers can choose to add additional levels of security through VPNs or Mobile Data Management software.
- 9. Will the information or data contain personally identifiable information?** ☐ Yes ☒ No

Data stored and transmitted to/from the smartphone/smartwatch app do NOT contain any personally identifiable information nor any indication that the transmission is from a public safety agency.

If yes, how will that information be controlled? N/A

- 10. Who is the information collected for and what will they do with it?** Information is primarily collected and shared for/with Commanders in the field. Often it is also shared with dispatch and or Emergency Management Agency staff as needed. Commanders use the info to carry out and monitor progress of mission(s), obtain real-time location and status of resources (responders), and identify possible 'gaps' in the service area, send and receive visuals (pics/video) to support development of tactics and strategies, and to send commands or requests and ensure critical communications were understood and acted upon through acknowledgements/replies.
- 11. Can the data can be edited and if so, by whom?** No, data cannot be edited as it is considered legal record; however, agencies can download the data to Excel and then edit it and incorporate into report format as needed.
- 12. List any end-user storage requirements (e.g., thumb drive, hard drive, server, external computer):** All data is stored either on the smartphone (temporarily) or in the server database.
- 13. List any end-user record-keeping requirements:** User profiles/permissions, configuration settings and data backups are the responsibility of the customer's Administrator. During the license period, users with Admin access are permitted to create REPLAY's of past event data.
- 14. List potential regulations or policies that may govern the data and the record storage:**
- Agencies that utilize the picture/video sharing feature may be subject to privacy laws and data retention/management policies.
 - Agencies may need to review/establish policies related to tracking locations of personnel (e.g., not for performance reviews and no tracking when off duty).
 - Some jurisdictions do not allow use of private cell phones. Also, since no personal records are typically captured or maintained in the system, HIPPA compliance does not apply (assumes user does not enter personal details into a message managed by the CommandWear system).
- 15. List any possible privacy concerns:** Stated above.



SPECIFICATIONS

Identify specifications (if applicable), including any MIL-SPEC or other standards, that are met by the technology.

Most of these are not applicable to CommandWear software, but would apply to the devices our app runs on (tablets, smartphones, smartwatches). Our approach is to give customers a “choice” by providing an open, interoperable software design (e.g., web service API available) and designing to standard platforms (e.g., iOS, Android, Android Wear).

- 1. Weight:**
- 2. Dimensions:**
- 3. Specific requirements of the component parts:**
- 4. User interface:**
- 5. Storage/operating temperature:**
- 6. Ingress protection rating:**
- 7. Shock resistance:**
- 8. Power options (AC/DC):**
- 9. Battery Type(s):**
- 10. Charge Time:**
- 11. Battery life:**
- 12. Time for Sample-to-Result:**
- 13. Electromagnetic pulse or electromagnetic interference protection:**
- 14. Data output formats:**
- 15. Connectivity/communication options (Wi-Fi, Bluetooth, HDMI, RS-232, RF, etc.):**
- 16. Data storage (options/capacity):**
- 17. Decontamination options:**
- 18. Operating system:**
- 19. Consumables (type, cost, shelf-life, storage temperature):**



20. Options:

21. Accessories:

22. Warranty:

23. Backups if the technology fails:

24. Service level agreement:

25. Any additional guarantees:

26. Describe how the product is serviced:

27. Describe any technical support provided (e.g., 24/7 support via phone):

Detailed support level agreements (SLAs) are available on request. The following summarizes our current Support Program.

Annual Support, Maintenance & Software Upgrades

CommandWear offers two levels of support agreements: Standard and Enhanced.

TRAINING

- 1. Describe the types of training offered:** Because of the simplicity of operating and Administering the cloud edition software, we offer free (annual) 2-hour web-based ‘train-the-trainer’ orientation training (typically, responders receive a 2-minute brief from their trained Command or support staff prior to operational deployment). Online User Guides (‘Help’) are available at no charge. Onsite training and onsite support services can be contracted in advance and on a fee basis.
- 2. Describe training requirements (time, location, facilities) and suggested retraining schedule:** Described above. Occasionally, we are contracted to provide onsite support during initial deployments prior to an exercise or planned (major) event. In these cases, our staff are present to provide commanders and responders with the quick 5-minute brief and, if needed, we can ‘shadow’ them during the exercise/event to observe (learn) and support as needed.
- 3. Is training/support to use this technology currently included in any organization’s standard operating procedures? If so, whose?** Yes, the software is pre-configured with customers’ naming conventions, planning maps, preset commands/message responses to ensure it ‘fits’ customers’ CONOPS and organization standards (e.g., ICS). There are no fixed/pre-configured workflow capabilities so the system requires minimal setup and maintenance to start using it productively.



4. **Identify relevant standards/certifications/regulations (e.g., ASTM, NFPA, ANSI, NIST, MIL-SPEC, NRTL, UL, OSHA, NIOSH, ISO):** Business sensitive. ...
5. **How do users know when the technology is no longer serviceable or is failing? If so, how?** The software clearly displays if the user has lost connection to the server. Commanders also can see visually when last GPS update was on each tracked resource (so an indicator for lost GPS).

COSTS

1. **Estimated life cycle costs (include assumptions on which you base your estimates):** Business sensitive.
2. **Projected cost per unit:** ...
3. **Discounts available per unit for bulk purchasing:** ...
4. **Per user cost (e.g., software license):**...
5. **Training costs:** ...
6. **Installation costs:** ...
7. **Operations and maintenance costs:**...
8. **Other costs (including facility capital cost, decommissioning/disposal, regulatory or institutional oversight, future liability):** ...
9. **Export control considerations (e.g., ITAR, Department of Commerce):** N/A
10. **Special storage requirements (e.g., lock and key, shielding):** N/A

PERFORMANCE CRITERIA

Define the following performance criteria based on where the technology is today.

1. **Reliability of the technology (address potential breakdowns, effectiveness and sensitivity to operating conditions):** The software app is only as good as the devices and network it runs on so there may be environmental constraints from using the app on devices that are not ruggedized (minimum IP-67 is expected from customers we deal with) and in (remote) areas where there is no cellular coverage or GPS signal.
2. **Technology ease-of-use (include skill level and training required to use the technology):** The software has been designed with heavy emphasis on UX to ensure it can be used by non-technical officers in austere and stressful environments. Typically, users are given a 2-5



minute brief on the system (or none) and are able to start using it productively. Google maps are used and most users are comfortable navigating with no training.

3. **Required infrastructure (buildings, power sources, personnel) to support the technology:** The software runs on smartwatches and smartphones plus tablets/laptops/PCs; therefore, sufficient battery for a minimum 12-hour shift is typically required (and battery charger or backup recommended in some cases where a shift may be extended). Real-time tracking through the application using a 10-second GPS update/transmit is a heavy load for existing wearables and this currently adds significant constraints on battery life. The system typically does not require any dedicated technical support personnel to operate or maintain the system (they would maintain the smartphones/smartwatches in a “business as usual” manner).
4. **Versatility of the technology (suitability for a variety of applications/scenarios):** The software can be configured by customers to be useful for a wide range of use cases as described earlier. Beyond emergency response, given the software’s tracking, messaging and data recording capabilities, the software is also useful to support lone/remote workers across many industries (oil & gas, utilities, municipalities, etc).
5. **Integration with existing technologies/systems:** N/A
6. **Describe the technology’s compatibility with other elements of the system, if applicable (include a description of the system that includes the technology):** N/A
7. **Describe calibration and maintenance needs and requirements (include frequency, ease of maintenance, skill level or training required to maintain the technology):** As mentioned, there is virtually no maintenance required by the customer other than as mentioned above and perhaps some annual update training (which can be delivered through a web conference).

DEVELOPMENT TIMELINE

1. **Estimate the cost to achieve a desired end point (insert month/year), assuming funding is available:** Business sensitive.
2. **Provide a date when the technology will be available for initial assessment by first responders:** Available now.
3. **State the TRL at the time it is ready for assessment:** TRL 8-9, depending on operational scenario.
4. **To assist planning of OFAs, how many devices/products could be made available at one time?** CommandWear suggests a minimum of 5 smartphone/smartwatch pairs to be deployed/tested with first responders. A minimum of one license of the Commander web app is required for each field assessment. Note, CommandWear has offered the use of 1 of its “6-Pack Pilot Kits” that contains 6 rugged Sonim (Android) smartphones plus 6 smartwatches,



all pre-configured with the CommandWear software and login credentials so customer doesn't need to involve IT in any setup and there is no equipment acquisition required for the field trial.

5. Estimate the cost of advancing the technology to the next TRL after the assessment:
N/A

6. Describe the specific operational environment or application desired during the assessment (if applicable):

- Outdoor environment (for GPS signal) within a cellular coverage area(s)
- Cloud server to be used so requires internet connectivity via Wi-Fi or 3G/4G LTE networks.

INPUT FROM FIRST RESPONDERS

Describe first responder input that will be of use to your technology. Complete as much as possible; this section will tailor the technology review and assessment with responders.

1. List the most important features, functions and capabilities of your technology to have first responders assess:

- Tracking – How accurate is the GPS used to track personnel. How beneficial was the personnel tracking feature?
- Messaging – Did all text messages get transmitted successfully? Did all messages get acknowledged by responders? Did the use of text messaging help to reduce radio traffic?
- Smartwatch – How beneficial was the use of a smartwatch by responders for messaging? How easy was it to use?
- Picture/Video Sharing – Did all pictures and/or video get transmitted successfully between Command and Field Teams? How beneficial was this feature?
- REPLAY –How beneficial is the ability to replay incidents/events (for exercise and live operations)? How would this feature be used and by whom (e.g., investigation? analysis?)?

2. How can relevant operational environments be simulated/replicated during the assessment? The system should be tested during an exercise or planned (major) event with responders equipped with smartphones and smartwatches and Command with tablet or laptop. Operational environments should be outdoor areas or venues with good cellular and GPS signal. Responders could test the system in some indoor environments such as stadiums or buildings (note, if connectivity is lost for any period of time, the smartphone app continues to log GPS tracks and Command will have a 'last GPS update' timer for each tracked resource. This is done to ensure no data loss during event Replay and to give Command an idea of how current/accurate the GPS location is based on last update time). If there is no GPS in an area, then CommandWear cannot collect it, but will when it becomes available



again. Note, when replaying you will clearly see when this happened because GPS update clock will show how long the GPS was lost. There is also GPS tracking log record for each user that Admins can review.

3. **What type of support is needed to assess the product?** The system typically requires no support; however, we recommend that a CommandWear representative assist in delivering a quick briefing prior to the start of the test to orient users to the system (usually 3-5 minutes). Also, a CommandWear rep (or two) typically would observe and document user experience and problems of the software by both responders and Command. Customers may also want to assign one or two staff to observe and document user experience, but this is not essential since a survey should be done shortly after testing to capture all participants' feedback on the system.
4. **Describe any needs for third-party testing:** None
5. **How does the technology fit into Incident Command?** The system can be configured to support groups (which could be ICS Sections) and ICS-based color-coded map icons representing each Section. Common terminology is supported through customer-configurable pre-set commands and message responses. The software can be operated within, and connect, each level of the incident command organizational structure: site, site support, regional, etc.
6. **How will first responders be trained to use the technology?** Typically, a train-the-trainer approach is used whereby CommandWear delivers a web (or onsite) briefing to representatives from Command, Field Team (responders) and, optionally, IT or systems support. This should be done within 1 week prior to the test and typically includes hands-on testing of the equipment to check that everything is working prior to the test.
7. **List specific questions you have for potential first responder end users about your technology:**
 - Do you typically carry a smartphone during operations? If so, where and is it easily accessible during operations?
 - Are you familiar with using a smartphone (Android or iPhone)?
 - Are you familiar with using mapping programs such as Google Maps (basic operations such as zoom and pan)?
 - Are you familiar with using a smartwatch?
8. **List specific questions you have for first responders about operational environments/applications/scenarios where the technology would be used:**
 - Will the testing be done outdoors? If indoors, will there be GPS and Wi-Fi or cellular signal? Will there be good cellular coverage throughout the testing environment?
 - How long will the exercise last (consideration for battery life and whether to supply chargers)?
 - Will gloves be worn by responders or Command? If so, will they work with touchscreens?



- How many concurrent/active users will there be? (responders vs. commanders)
 - Will you be running the app on your existing smartphones? If so, what make/model of phone? (older smartphones can have less battery capacity and, thus, may have to be charged depending on duration of the field test).
- 9. Discuss whether staged assessments would be valuable (e.g., initial broader audience tele- or video-conferencing to validate assumptions and product concept viability; followed by down-selected organizations for interviews/further feedback; and finally hands-on OFA from final selected organizations):**
- Pre-training survey, sent by email, of customer's configuration requirements (e.g., users/roles/callsigns), CONOPS, device standards, technical environment/infrastructure, priorities placed on key functionality to be tested and measurement criteria (with key success factors noted).
 - Video recording of the initial hands-on training to capture any UX or technical issues or functionality missing/required. Video/audio is recorded by the web conference tool and, if onsite OFA observers are available, also in person.
 - Pictures/video and observations recorded on paper during the field test.
 - Post-test survey of findings for each key success factor. This is a document (PowerPoint) presented to customer's project lead(s) in person or via web conference.
- 10. List any other questions you have for first responders or other subject matter experts:**
Questions about budget, purchase process, decision-maker(s) and timings should the system pass evaluation and pilot converted to a purchased software license.

SAFETY AND HEALTH

- 1. How is insurance liability addressed?** Insurance liability and disclaimers are incorporated into the software license agreements.
- 2. Is the technology safe? List potential hazards involved in operating the technology: Yes.**
There are no safety issues (other than obvious recommendations that equipment not be operated while driving, if applicable).
- 3. Is there a potential for end users to be exposed to hazardous materials and/or other hazards? Describe those materials and hazards:** No
- 4. What are the physical requirements for users?**
 - May need a pocket to put phone in or provide a belt clip.
 - Phones may need to have protective case if being used in outdoor environments and have potential to be dropped/bumped and/or become wet.



- If wearing gloves, can they operate touchscreens (if used)? If not, voice inputs or buttons may have to be used.

5. **Is an Institutional Review Board review required?** ☐ Yes ☒ No

6. **Does an Occupational Safety and Health Administration standard exist for this technology?** ☐ Yes ☒ No

7. **Will the technology be used in a hazardous environment?** ☐ Yes ☐ No

Possibly – customer decides. May affect the types of devices used (e.g., with necessary IP rating and ruggedization).

8. **Are hazardous materials part of the technology or process?** ☐ Yes ☒ No

9. **Does the equipment have exposure limits?** ☐ Yes ☒ No

10. **How are the baseline technologies evaluated?** UX and any issues or missing capabilities captured through direct interview (a debrief) and/or survey.

11. **How is the technology vulnerable to disruption (e.g., lack of communications signal, hacking)?** Possibly, although all data and communications are encrypted (AES-256). Additional security measures, such as using VPN and Mobile Data Management software, can be implemented by customer.

Cellular communication outages or ‘dead spots.’ This will cause communication of messages and responder GPS locations updates to be delayed until the connectivity is re-established. Note, Command will see any delays in GPS updates, whether messages reached the device and/or were acknowledged. Also, the smartphone app continues to log GPS tracks when connectivity is interrupted and will send this logged data to the server when connectivity is re-established so there is no missing data when an event REPLAY is run (synchronization of data is managed automatically by the system).

PUBLIC PERCEPTION

1. **How familiar is the technology to the general consumer?** Smartphones, tablets, laptops/desktops are very familiar to public as is the mapping program (using Google Maps and other map data). Smartwatches are somewhat familiar to the public.
2. **How easy is the technology to explain to the public?** Very easy since people tracking and text messaging is used broadly.
3. **What are the privacy concerns and impediments, if any?** Possible privacy concerns related to pictures/videos taken by field personnel and stored in the system (Freedom of Information Legislation issues).



Tracking location of personnel may require support from unions and employees; however, typically they accept the capability as long as tracking is done only while personnel are on duty and used for operational efficiencies and officer safety reasons – not for employee performance evaluation. Note that CommandWear can be configured by departments to permit smartphone users to turn off GPS tracking by the app or that option can be hidden from the user and GPS tracking turned on/off from the central Admin console.

4. **What are the legal implications, if any?** If the data will be used for inquiries, and considered legal record, appropriate data storage/access (retention policies) needs to be planned out.
5. **Would the use of the technology cause public concern or alarm?** ☐ Yes ☒ No

Not likely, but some possibility of public concern if personal pictures/video taken by responders.

If yes, list what those might be.

PARTNERSHIPS

1. **List any Memorandum of Understandings you have with other companies relative to this product:** N/A
2. **Name of the industrial/other partner(s):** N/A
3. **Rationale for partnership:** N/A
4. **Contract mechanism:** N/A
5. **Other potential partners:**
 - Large global systems integrators that work with public safety and/or security agencies.
 - Device manufacturers of smartwatches and other wearable and/or sensor devices to be integrated into the system.
 - Dispatch and Crisis Management software vendors.
6. **Potential international partners:** Large public safety integrators within our target geographic markets.

MARKET RESEARCH

1. **Are you currently selling this technology into the first responder market?** ☒ Yes ☐ No
2. **Describe any market research or technology foraging that has been conducted by you or others and provide those reports:** Extensive research has been done on market size, needs, competitors, etc. This data is considered sensitive and only shared under an NDA.



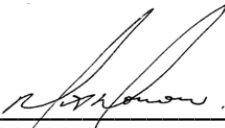
3. List intellectual property (if applicable): N/A
4. List relevant patents for this technology (application or patent #, assignee(s)): N/A
5. List intellectual property licenses (from or to other entities) associated with this technology: N/A

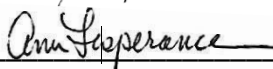
REFERENCES

1. List references or other supporting material, videos, brochures, specification sheets, etc.: N/A

SIGNATURE

Date Completed: March 28, 2017

Signature of Company Representative: 

Signature of Technical Facilitator: 



Operational Field Assessment Technology Fact Sheet

CommandWear

Technology Name

CommandWear (includes Commander and Communicator)

Description

The CommandWear software platform integrates data from wearables through its mobile and wearable apps, giving responders real-time situational awareness.

The Commander web-based situational awareness display and the Communicator messaging and GPS tracking application for smartphones and wearable device (e.g., smart watches) provides:

- Real-time remote monitoring, tracking and analysis of mission progress and positioning of individual responders and resources, providing personnel accountability, safety and more effective resource management.
- Increased tactical situational awareness and deconfliction in the field, specifically responder-to-commander information sharing to maximize field responder effectiveness.
- Reduced time and cost of preparing an accurate account of past events through an “Event Replay” feature (e.g., playback a historical log of positions, messages and pictures/video from the last shift or an archived event).

Need/Gap Analysis

An over-reliance on voice communication often compromises mission success and, ultimately, puts responders’ and citizens’ lives at risk. CommandWear’s cloud-based mobile situational awareness platform securely connects responders in real-time.

Benefits

CommandWear provides real-time personnel location tracking (blueforce tracking), two-way assured text-based communications, real-time picture/video sharing and event replay capabilities.

- **Locate:** Command and frontline responders can see the near real-time location of team members for increasing speed and accuracy of any emergency response.
- **Communicate:** The software complements radio communications with a secure text-based two-way messaging capability that has the added benefits of reducing radio congestion, adding picture/video

Integrates with Customers’ Systems



sharing, assuring messages were received and understood, and providing a covert communication channel.

- **Situationally Aware:** Knowing where responders are, whether they are dismounted, what their current status (and, in the future, vital signs), and being able to share real-time photos/videos from the frontlines increases officer safety and decision-making effectiveness.

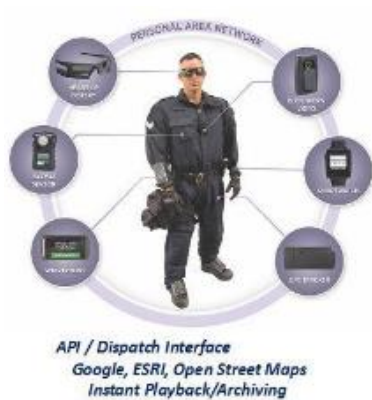
An added feature provided by CommandWear is REPLAY, the ability to instantly replay any event graphically to have an instant and accurate account of resource deployments, text communications and visuals of what happened, where and when, as well as where responders were located.

Challenges

- Customers requiring a self-host Enterprise deployment.
- Indoor tracking.
- Durability - Lack of battery life and sufficient ruggedness on wearable devices.
- Reliance on cellular or Wi-Fi in remote or connectivity-challenged environments.
- Small form factor of wearables requiring innovative means of data input and display.

Current Status

CommandWear has been deployed operationally, and successfully, on more than 12 field exercises and major events with police, paramedics and private security teams (in Canada, USA, Singapore).



For more information:
Mike Morrow
CommandWear
(604) 761-3647
mike@commandwear.com



**Homeland
Security**
Science and Technology

First Responder Technology Operational Field Assessment

Technology Overview Presentation



Situational Awareness Software Platform



January 2017 | www.commandwear.com



Responders' Challenges

"We **don't know where** our responders' are."

"The teams on the front lines often **can't hear** the radio and **comms not acknowledged**."

"We have to make decisions **without a real-time visual** of what is happening."

"We are **not interoperable** with other agencies we work with."



Features - Overview

Communicator (field personnel)



Commander (Commanders, Dispatchers, EOC)



Features - Smartwatch

- ✓   **Personnel Tracking**
- ✓   **Secure and Assured Text Messaging**
- ✓ **Panic Alarm**
- ✓ **Heart Rate Monitoring/Alerting (Q2 2017)**



Police

- Major Events
- K9
- SWAT
- Surveillance
- VIP Protection



Paramedics/Fire

- Special Operations
- Bike Teams
- Marine Teams
- Rescue



Security

- Guarding
- Close Protection
- Surveillance
- Facility/Campus Alerting

Works with Customers' Systems



Proven in Live Operations Since 2014



Field Exercises

- Riots (Vancouver Police)
- Terrorist (RCMP)
- Earthquake (City of Vancouver)

Full Scale Deployments

- Celebration of Light (Vancouver Police)
- Canada Day (Ottawa Paramedics)
- Floods (City of San Diego)

Multi-Agency

- Grey Cup (BC Place Security)
- GranFondo Cycling (BC Ambulance)
- Marathons (Ottawa and San Diego)
- PanAm Games (Toronto Police + Ontario Police)
- Music Festivals (HUKA Entertainment)
- Formula1 (Singapore Police Force)

CommandWear - Summary

Key Findings from Pilot Studies:

1. Reduced dispatch times and radio congestion
(reduces need for 10-20's so frees up radio channel).
2. Quick deployment and minimal training required.
3. Supports heads-up operation (smartwatch).
4. Speeds re-integration of assets to original tasking.
5. Identifies units moving outside of assigned zones or into dangerous areas, in real-time.
6. Works well with existing devices and interfaces to existing systems.

Next Steps

- **Value to your organization?**
 - What do you like?
 - What don't you like?
- **Additional meeting/demo with others desired?**
- **Interest in committing time to Operational Field Assessments (Pilots) in Feb/Early March?**
 - Any staff with other SA tool experience?
 - Upcoming events/exercises/operations?
- **Recommend other organizations with possible interest?**

“6-Pack” Pilot Kit

Available Free of Charge for OFA





First Responder Technology Field Demonstration Report

Technology Name: CommandWear

Location: Xfinity Arena, Everett, WA

Event Date: February 24, 2017

Overview

On February 24, 2017, Pacific Northwest National Laboratory (PNNL), as the technical facilitator, partnered with staff at the Xfinity Arena in Everett, Washington to demonstrate communications technology that may have applications for the first responder community. The demonstration was part of a first responder technology operational field assessment being developed by PNNL for the Department of Homeland Security Science & Technology Directorate (DHS S&T) First Responders Group.



Figure 1. The pilot was conducted at Xfinity Arena, a 10,000-seat venue in Everett, WA.

Scope

The scope of this technology demonstration was to deploy the CommandWear communications technology (app, smartwatch, cellphone, tablet) with venue staff during a hockey game at the Xfinity Arena, a 10,000-seat venue. CommandWear integrates data from wearables through its mobile and wearable (smartwatch) applications, giving responders real-time situational awareness. The selected users included a Command Center Lead, four Team Leads, a law enforcement representative and an Emergency Medical Technician (EMT).

Methodology

Pre-Pilot

Prior to the technology demonstration, PNNL and the technology developer elicited information from the venue regarding technology needs, event logistics and general facility situational awareness (i.e., event safety, availability of Wi-Fi, planned staffing locations). The venue staff completed a Client Requirements Document outlining tactical actions and goals, technology needs, previous experiences, expectations and the planned approach for implementation. The technology developer requested from Xfinity staff and loaded CommandWear with a map overlay of the arena that would let the venue lead track other CommandWear users.

The technical facilitator and developer met with the Xfinity Arena management to review pilot objectives, placement of their personnel and questions that would be asked during the assessment. Participants were also asked to sign a photo release waiver. The team toured the Xfinity Arena with event staff to connect all of the devices to the facility's multiple Wi-Fi networks to ensure comprehensive coverage during the event.

Pilot

Staff at the Xfinity Arena were given devices using the CommandWear software platform. Venue Security Team Leads and representatives from emergency medical services (EMS) and law enforcement were given a cellphone and smartwatch equipped with the CommandWear application. The Command Center Lead was given a tablet and desktop web application that allowed them to communicate with the team and

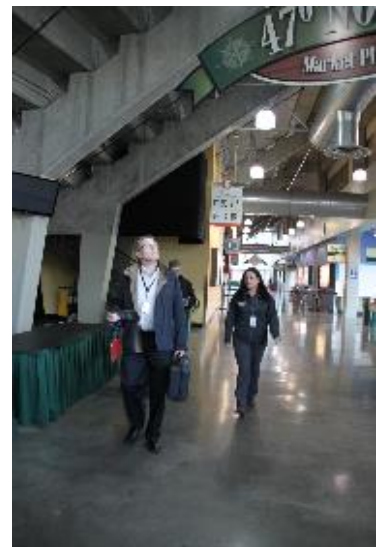


Figure 2. The team toured the facility in preparation for the pilot.

monitor their whereabouts in the arena. Each group of users was given a 2-minute demonstration of their device prior to use.

Participants were asked to perform their job duties as usual, but incorporate the new technology where possible and practical. PNNL team members shadowed the participants, asking questions about operations, usability and applicability. Participants were also invited to complete questionnaires regarding their experience and suggestions for improvement.

Post-Pilot

Following the event, the technical facilitator and technology developer gathered the venue team for a final debriefing and final comments regarding the use of the technology.

Results

Notes taken by the PNNL team based on feedback in the control room and from Team Leads periodically visiting the control room or sending/radioing are provided below. Results from the feedback forms are provided at the end of this document.

Compared to their existing technology (radios and cell phones), participants noted a few key advantages to the technology, despite Wi-Fi connectivity challenges:

- Texting was most helpful to overcome typical environmental challenges (i.e., background noise).
- Vibration and lighting provided necessary alerts in loud environments (the vibration of the watch was noted as especially beneficial).
- Location tracking is a critical application for the Team Leads, whereas communications (texting) was cited as the most important for Command.
- The ability to take photos can assist in documentation and situational awareness, such as sharing a photo of someone removed from the venue.

The participants also suggested a series of modifications, including the addition of the following features:

- Silent/Do Not Disturb (although phone and watch settings could be used to enable this);
- Acknowledge message capability for Command;
- Push-to-talk;
- Camera button (which was a feature enabled on the latest CommandWear app used by a Team Leader); and
- Ability to identify on which floor users were located.

Environmental Challenges

- Housekeeping would be helped a lot by this software (radios do not reach well and this causes big problems when there are multiple drink spills reported and housekeeping does not know where they are reported from).
- Operations would be helped (e.g., cannot hear radio while on Zamboni).



Figure 3. Venue staff were given a demonstration of how to operate the technology.



Figure 4. Users provided feedback about the technology's ease of use.

- Now the control center has phone numbers of EMTs and law enforcement officers because radios are unreliable.
- Pre-pilot site visit (reconnaissance) is critical to identify potential issues such connectivity (Wi-Fi and cellular) or security issues.
- Team Lead Supervisor wants a silence button/feature so as not to be interrupted when giving a briefing (although users could set phones and watches on silence through devices settings).
- A situation occurred where radio sensitive dialogue could not happen (vulgarity by guests), so being able to communicate with text in this case would be ideal.



Figure 5. The technical facilitator captured user feedback.

Group Communications

- Inter-department communications are critical between and among each entity: Command, Operations, Catering, Guest Services (Team Leads), Housekeeping.
- Xfinity radios are not compatible with EMT and law enforcement radios, so interoperability is a problem. CommandWear can solve the problem by getting users onto its common operating picture and messaging system.
- Command likes the feature that allows them to form groups (e.g., one message to all EMTs, different message to all Team Leads).

Location

- In the arena when multiple people are on different levels in same x,y location, it looks like they are together (CommandWear software can cluster icons when people are located next to each other, but does not yet indicate on which floor number they are located).
- Team Lead Supervisor noted the #1 importance is to manage Team Leads and know where they are, so tracking is #1 value. They would be able to make sure they are roaming enough, not clumping together or are where they need to be at some point in time (e.g., at a door).
- Need better actual floor plan of venue on phone (CommandWear's web application used by Command allows floor plans and other data to be layered over maps, but the maps on the phone application currently do not).

On-screen Display

- Team Lead Supervisor likes being able to see the location of all team members (this new CommandWear phone app feature was installed on one phone for the test).
- Displaying a person's name on the map would be better than a call sign (in this case because of familiarity). The software allows Administrators to change this and other configurations easily.
- Some users had to be shown how to scroll through a long message on the smartwatch. Once shown, use was easy.
- Command: in the send message dialogue screen, would like a

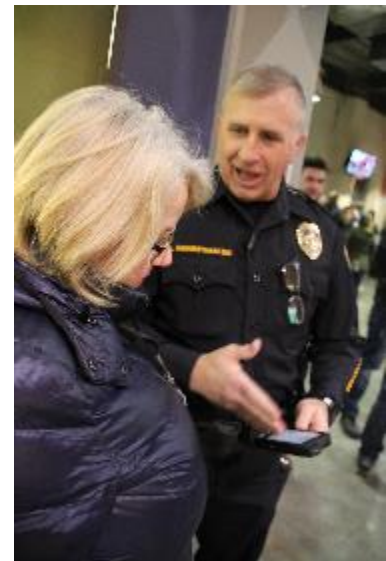


Figure 6. A range of responders, including law enforcement and EMTs participated in the demonstration.

list of everyone connected and be able to select who to send a particular message to (a CommandWear planned feature).

Acknowledge Function

- Command noted that the message acknowledgement function is useful. Many critical messages require an acknowledgement from everyone to ensure they read and understood the message (e.g., “box office is closing,” “doors are closing”).



Figure 7. The users noted the technology's most and least useful features.

Message Logging

- The new smartphone application with a historical message log was preferred to an older version of the software version tested, in which the user gets a message and acknowledges and then gets another message, losing access to the previous message.

Alerts (vibrating, audible, visual)

- The smartwatch vibration may not be strong enough, especially at a concert or if a smartwatch is worn over clothing.
- Other Team Leads stated that the watch is required in conjunction with the smartphone, as the vibrating watch more reliably alerted them when a new message was received.
- Command would like an option to turn on an audible (ping, etc.) when a message arrives since doing so many things at once can miss messages displayed on screen (the software has a Panic alarm message type with an audible notification).
- Another Team Lead would like the watch to light up or flash a very distinctive light, in addition to the vibration (more than just screen lighting up).

Texting

- Ability to text users on floor was useful.
- Texting was most helpful to overcome common challenges (background noise, talk over problems, radio dying).

Photo

- Pictures would be valuable for reports they have to generate. Approximately 1-1 ½ hours at the end of a long night is needed to fill out reports associated with the Command call log/incidents. Ability to auto-fill report forms with information, pictures and communications would be valuable (the software does allow export of all data which participants indicated to be beneficial).
- The ability to take a picture of an ejected person and send to other door guards to deny re-entry is important. It would be ideal if the picture could be sent directly from user to user (from door to door), but sending picture to Command and then Command sending to all the other doors is nearly as good.
- Users sending photo/video (or messages) need an acknowledgement that Command received photo.
- Law enforcement could not (but would like to) see the picture on the smartwatch (a planned feature).

Connectivity

- When Wi-Fi drops often, may have to show users how to try to reconnect or connect to a different Wi-Fi, as if phones are not configured to do so automatically (the CommandWear system automatically switches between cellular and Wi-Fi networks; issue was lack of Wi-Fi and cell signal in some parts of the arena).

Other

- Radios will not go away anytime soon, but CommandWear Systems, Inc. is looking into adding a push-to-talk feature on phone, which could replace costly radios (the venue showed several broken radios, noting most do not work well and need a major upgrade).
- Would be nice to record an “incident,” which might include multiple pictures and messages (need some way to tie incident data together, such as with an incident ID#).
- One evaluator thought there were too many features on the phone and it was a little hard to navigate (although the user was exploring various features that were not part of the test) – but all others indicated it was very simple and were able to use with a 2-minute briefing.
- Command and Team Leader indicated the Event Replay feature will be a time saver since the data can be exported to Excel®, based on a time period, so much of the 1.5-hour reporting task would be automated.



Figure 8. Users discussed environmental challenges such as low-light and noisy environments.

Conclusion

At the conclusion of the event, the Xfinity staff determined that 18-20 CommandWear phones (optional watches) would be ideal to cover all the Team Leads (up to 9), housekeeping, EMT, Law Enforcement, Operations, Guest Services and Alcohol Enforcement. In the questionnaires and interviews, majority of the users responded that they would be interested in using the smartphone and/or smartwatch with modifications.

Feedback Forms

Feedback forms were filled out by Venue Security Team Leads, Command Center Lead, EMS and Law Enforcement. All users had a smartwatch and smartphone. One Team Lead had a smartphone with updated software. Notes from their forms are provided below.

User	Pre-Pilot: What are your expectations of piloting this technology?	Pre-Pilot: What issues do you hope it will address?	Were your expectations met? Why or why not?	What did you like about the technology? What would you change?	What were the technology's most useful features?	Would you use the technology as-is or with modifications?	Comments or suggestions:
Command Center Lead			Locations not accurate especially for different levels. Texting service was awesome.	Texting A+ Group chat option would be nice	Texting	With modifications	
Team Lead 1	That it would be an easy solution to our communication issues	Connectivity, quick accurate info to the applicable person	Yes, the smartphone was easy to use and functioned as expected	Vibrating watch, large text on smartphone, photo with text capability.	Vibrating watch	Smartwatch: with mods Smartphone: as-is	Need both watch and smartphone. Even if the watch only vibrates, that is enough added value. But prefer the smartphone for functionality.
Team Lead 2		Easier communication in a busy, noisy environment	Yes	Not having to listen for radio traffic during busy times. Would change building Wi-Fi.	Text ability.	Smartwatch: with modifications Smartphone: with modifications	
Team Lead 3		Better communication during events	Yes	I think it would work. I like the idea, just need a little more training.	Being able to react to important announcements. Not affected by noise.	With better training Smartwatch: as-is Smartphone: as-is	Venue Wi-Fi needs upgrading. I really like the idea it could be a great addition.
Team Lead 4	Secondary line of communication			That the command software kept a historical log of the pictures and messages.		Smartwatch: with modifications Smartphone: as-is	Would be good to know if command receives a photo. Had to call on radio to verify. Quick button to take a pic would be nice.
Law Enforcement				Instantaneous. I won't miss a text message, but I will miss a radio call.		Smartwatch: with modifications Smartphone: as-is	Need historical record of received texts. Didn't know how to get pic on smartwatch. Didn't have much problem with connectivity.
EMS						Smartwatch: with modifications Smartphone: as-is	Ability to send a photo along with complaint/symptoms would help to assess potential medical needs quickly.



Operational Field Assessment Close-Out Report

CommandWear

Overview

Pacific Northwest National Laboratory (PNNL), acting as a Technical Facilitator, conducted an operational field assessment (OFA) with the company CommandWear to assess its potential for use by first responders.

CommandWear integrates data from wearable devices through its mobile and wearable (smartwatch) apps, giving responders real-time situational awareness.

The goal of the OFA was to evaluate the technology for its applicability, usability and functionality by first responders, gathering feedback that will ultimately drive future product development to better align with first responders' needs and requirements in the field.



CommandWear technology

Phase 1 Summary

PNNL and the Technology Developer, a representative from CommandWear, completed the technology profile. During this process, the partners iterated on the technical specifications, anticipated applications of and general first responder technology needs to be met by the technology.

The PNNL and Technology Developer team conducted market research on similar products and consulted with subject matter experts (SMEs) to validate the accuracy and completeness of the technology profile. The final draft of the technology profile captured a broad range of information about the product and its potential benefits to end users and formed the knowledge basis for proceeding with subsequent phases in the OFA process.

Following the completion of the profile, PNNL prepared an overview fact sheet and the Technology Developer prepared a briefing presentation to be shared with first responders and large event venues.

Phase 2 Summary

To validate the technology and validate claims in the technology profile, PNNL met or held teleconferences with more than two dozen first responders from multiple geographically dispersed jurisdictions, including fire, emergency medical services and special events staff from Seattle, New York City and Boston, as well as two technical SMEs specialized in related technologies at PNNL.

In interviews with the first responders, participants generally concurred with the field challenges and technology gaps outlined in the Technology Developer's presentation. Participants praised the following features as being advantageous:

- Video/photo sharing provides essential sharing of visuals;
- Real-time situational awareness;

- Communications features, such as text messages free up radios from non-critical communications and are highly beneficial in very noisy environments;
- Tactile and visual indicators/alarms are useful, particularly for noisy environments; and
- Resource management could reduce the load on dispatch/command centers.

Questions and concerns raised by participants included:

- Cost for the number of devices required. One participant suggested the ability to rent devices as a way to lower costs, which is an option actually offered by the company.
- Some jurisdictions limit the use of cell phones or personal devices and/or installation of software/apps, which would impede the technology's adoption.
- Many locations or large venues can have intermittent wireless and/or cellular connectivity, which can impact the ability to track and/or communicate in real-time.
- GPS tracking, while advantageous from a safety and logistics standpoint, raises privacy concerns for some (e.g., union rules), which may not permit tracking individuals.



Technical Facilitator shadows the Command Center lead using the technology.

Following each interview, PNNL compiled the notes and shared with the Technology Developer. After all of the interviews were complete, PNNL conferred with the Technology Developer and down-selected potential organizations, locations and use cases for a field demonstration. Numerous considerations impacted the selection of participant organization for the field demonstration, including organizational restrictive policies and requirements and the selection of use cases that demonstrate the unique features of the product (in this case, a very noisy environment).

Phase 3 Summary

On February 24, 2017, the PNNL Technical Facilitator team partnered with staff at the Xfinity Arena in Everett, Washington to deploy the CommandWear communications technology (app, smartwatch, cellphone, tablet) with venue staff during a 10,000-seat venue hockey game. The selected users included a Command Center Lead, four Team Leads, a law enforcement representative and an Emergency Medical Technician (EMT). Detailed results are presented in a field demonstration report.

The PNNL team gathered feedback in the control room and from Team Leads periodically visiting the control room or sending/radioing. Compared to their existing technology (radios and cell phones), participants noted a few key advantages to the technology, despite Wi-Fi and connectivity challenges:

- Texting was helpful to overcome environmental challenges (i.e., high background noise).
- Vibration and lighting provided necessary alerts that a message had been received in loud environments (the vibration of the watch was noted as beneficial).

- Location tracking was most important for the Team Lead supervisor to know where each team was in the venue, whereas Command cited communications (texting and photo sharing) as the most important.
- The ability to take photos and share with Command (who can then share with other teams) was noted to be valuable, for example, to ensure ejected patrons that attempt to re-enter the venue at different entrance locations are recognized and denied.



A Technical Facilitator interviews participants about their experience using the technology.

The participants also suggested possible modifications to the product, including the following:

- Silent/Do Not Disturb option;
- Acknowledgement to field personnel that Command received their communication;
- Push-to-talk capability; and
- Quick capture camera button (which was a feature on the latest CommandWear app used by a Team Leader, whereas field personnel/Team Leads used an older software versions)

The Xfinity staff determined 18-20 CommandWear phones (with optional watches) would be ideal to cover all the Team Leads (up to nine), housekeeping, EMT, law enforcement, Operations, Guest Services and alcohol enforcement.

Results

At the conclusion of the technology field demonstration, in the questionnaires and interviews, the users generally responded that they would be interested in using the smartphone and/or smartwatch with minor noted modifications.

Recommendations

Based on the feedback gathered through this OFA process, the Technology Developer intends to continue to improve software and product capabilities to include many of the modifications suggested above. Significant interest in this product was also expressed by several cities that host large outdoor events where crowds and responders are in constant flux (both crowd size and location). This represents another opportunity to conduct a field demonstration that will allow additional end users to experience first-hand the performance of the product and its impact to responder efficiency and safety, as well as improved public safety.

For more information:

Ann Lesperance
Pacific Northwest National Laboratory
(206) 886-6100
Ann.Lesperance@pnnl.gov

Mike Morrow
CommandWear
(604) 761-3647
mike@commandwear.com



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