Nationwide survey aims to improve communications devices for fire, police, EMT and 911 crews

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Credit: B. Hayes/NIST

Our first responders have spoken. An extensive research project conducted by experts at the National Institute of Standards and Technology (NIST) reveals what our country's police, fire, emergency medical and 911 dispatch responders think about the communications

technology they use on a regular basis and how they would like developers to improve it in the future.

More than five years in the making, the Voices of First Responders project reflects the input of 7,182 respondents to a survey NIST conducted of first responders hailing from across the country, from large cities and suburbs to small towns and rural areas. The results of the study, the largest of its kind ever to investigate public safety personnel user experiences, provide a wealth of data intended to help developers of communications technology create more useful devices for the field.

"First responders are people who go to the scene with the goals of saving lives and protecting the public," said Yee-Yin Choong, an industrial engineer at NIST. "We set out to understand this technology from their perspective, to find out what is working for them and what isn't."

While the results fill more than a dozen publications, some overarching messages stand out, including three interrelated requests that first responders made: Public safety communications technology should be trustworthy, be controllable and reduce user frustration.

"Our findings are aimed at the research and development community, but we are also trying to reach administrators who make purchases," she said. "Technology needs to be trustworthy, and the users need autonomy over it. Our results indicate that if you focus on those things, the users will be happier."

The team also distilled the study data into six guidelines for future technology development:

- Improve current technology—more important than developing new technology is improving what first responders currently have.

- Reduce unintended consequences—develop technology that does not interfere with or distract from first responders' attention to their primary tasks.
- Recognize that "one size does not fit all"—technology must accommodate public safety's wide variety of needs, across disciplines, districts and contexts of use.
- Minimize "technology for technology's sake"—develop technology with and for first responders driven by their user characteristics, needs and contexts of use.
- Lower product and service costs—develop technology at price points that departments find affordable and also scalable for widespread distribution.
- Require usable technology—technology should make it easy for the user to do the right thing, hard to do the wrong thing, and easy to recover when the wrong thing happens.

The team began its investigation by interviewing about 200 first responders from across the country to gain a general understanding of how they used communications devices. From this information, the team developed a more detailed survey about particular pieces of technology—from radios and phones to laptops to the headsets and earpieces that call center dispatchers use—and details about them, such as frequency of use and the problems they presented.

After obtaining the raw survey results, the team spent three years analyzing the interview and survey data and developed a total of 14 publications detailing the findings. Four are NIST Special Publications (SPs), each of which concerns the technology needs of one of the four first responder communities. The remaining 10 are NIST Interagency Reports (NISTIRs), which focus on the interview and survey data across all four communities.

The data are freely available online, and the team has made it possible to

enter specific queries and create charts that allow for more effective analysis.

"For a developer, the data might help you design a better radio, but it also might give you information you never thought of," Choong said. "One police officer said his body camera needs to show the court exactly what he saw. It should indicate that he was upside down and in the dark, but it shouldn't change the video contrast, which can make it appear that something in that dark room was plainly visible."

The study fills a gap in public safety communications technology research. Previous research efforts by other organizations have focused on the technology itself, not users' interactions with it in real-world situations, Choong said.

"Before our project there was no systematic method for looking at the users' needs and the problems they have faced," she said. "We did not have any preconceived ideas of what we would learn, but we were rigorous in our methodology for obtaining the data. We include the details so that it can be useful in domains beyond public safety communications research."

Provided by National Institute of Standards and Technology

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