



Digital Radio Vocoder Testing

Issue Background

Audio voice communications are essential to the success of emergency response operations. In 2006, firefighters reported that background noise common to these operations—sirens, helicopters, breathing apparatus, alarms—was causing unintelligible audio in portable, two-way digital radios. In response, the Department of Homeland Security's Command, Control and Interoperability (CCI) Division has partnered with the International Association of Fire Chiefs (IAFC), the National Institute of Standards and Technology (NIST), and with manufacturers and fire service leaders to identify the causes of and potential solutions for this critical communications problem.

Digital Radio Vocoder

In 2007, the IAFC Digital Problem Working Group—including emergency responders and industry—unanimously identified the vocoder as the cause of voice audio distortion that some digital radio users have experienced. The vocoder is a hardware/software component in every digital radio. The technology uses a speech analyzer to convert voice into a digital signal, and from a digital signal back to audio. While many emergency response agencies are using digital radio systems with success, field reports indicate that during light to moderate background noise, the vocoder may slightly distort voice communications. In loud background noise scenarios, the vocoder may make voice communications completely unintelligible—potentially compromising mission-critical operations.

Vocoder Testing

CCI, IAFC, and NIST are working to understand how background noise affects voice communications, and to determine what technology improvements are needed to overcome background noise issues. To objectively identify technology-based problems and potential solutions, NIST is working with fire service leaders to develop and implement practical test scenarios. Held in Boulder, Colorado, these tests will focus on digital radio technology's operation in the presence of firefighting noise.

Additionally, project partners also are working to identify immediate behavioral, procedural, and technical steps agencies can take to avoid or minimize emergency response background noise.

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Managed by the Science and Technology Directorate, the Command, Control and Interoperability (CCI) Division is working with Federal partners to strengthen capabilities to communicate, share, visualize, analyze, and protect information. Through a practitioner-driven approach, CCI creates and deploys information resources—standards, frameworks, tools, and technologies—to enable seamless and secure interactions among homeland security stakeholders.