

Zeroing in on the 'science of sound propagation' in burning buildings

October 23 2012

An acoustic navigation system being developed by a team of University of Texas at Austin researchers studying the science of sound propagation inside burning buildings may one day become a life-saving addition to firefighters' arsenal of tools.

The team will provide details about their multi-faceted research at the Acoustical Society of America's 164th Meeting, October 22-26, 2012, in Kansas City, Missouri.

"Our study is focusing on locating open doors inside burning buildings to gain a better understanding of how acoustic propagation is affected when flames are between the device and a doorway," explains Mustafa Abbasi, a graduate research assistant.

Inside buildings engulfed in flames and smoke, firefighters currently rely on tools such as thermal imaging cameras to help them not only detect obstacles and passageways, but also to judge distances to them. But unfortunately, heat and open flames can significantly degrade the performance of these cameras.

To address this, the team decided to create a complementary sonar-based imaging technique to supplement TIC technology.

They initially selected an ultrasonic device similar to the ones used in cars' reverse parking sensors to build their acoustic navigation device, but quickly discovered that fire strongly distorts ultrasonic [acoustic](#)

[waves](#).

The team then turned to a more advanced acoustic source, called a "parametric array," which is capable of creating audible sound that remains focused.

"Using a parametric array enables us to effectively see through moderate-sized flames," says Abbasi. "Now, we're investigating the effect of smoke on acoustic propagation. [Flames](#) and smoke are interrelated, but TIC images are degraded less by smoke. We believe that combining [acoustic](#) sensing with other technologies will improve the capabilities of these imaging devices."

Yet another facet of this project involves working to improve personal alert safety system (PASS) devices used to locate incapacitated firefighters. The team is collaborating with the National Fire Protection Association's Fire Protection Research Foundation and the Federal Emergency Management Agency (FEMA) to study how the signal emitted by the PASS device propagates inside burning buildings.

Provided by American Institute of Physics

Citation: Zeroing in on the 'science of sound propagation' in burning buildings (2012, October 23) retrieved 27 April 2024 from <https://phys.org/news/2012-10-zeroing-science-propagation.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--