TACTICAL 3D AUDIO SYSTEM (T3DAS)

GOALS

- Implement and demonstrate an audio communication system capable of reproducing directional cues

- Assess the usefulness of system for combat troops and emergency first responders

REQUIREMENTS

- Interface with existing radios and communication devices
- Parse audio and location from input data stream

- Use COTS or GOTS stereo headsets that will not adversely affect ambient sound and awareness

- Calculate in real-time the artificial direction of sound using locations and head position tracking

OUTCOME

- Be able to recognize the relative direction from which a transmission originates using the artificial audio cues

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SUMMARY

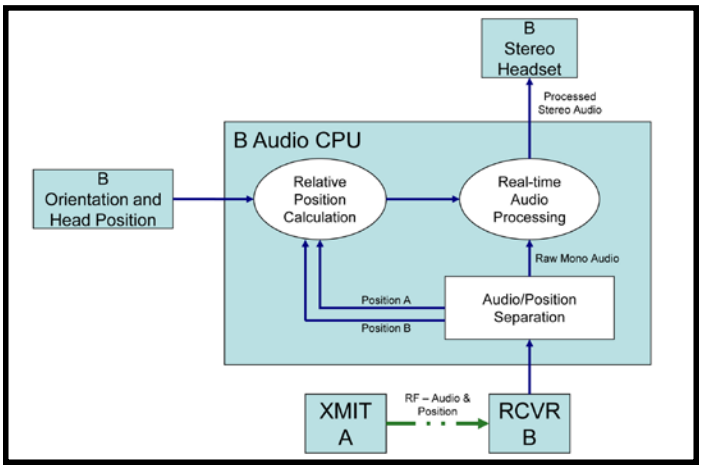
The Tactical 3D Audio System (T3DAS) enables users to "hear" the location of others through directional voice communications. The sense of hearing is one of the most powerful yet unexploited senses for first responders and military personnel. Distinguishing position information from an audio stream permits greater situational awareness and reduced operational load—all while working in difficult environments such as low-visibility and lights-out. Additionally, spatial separation between audio channels enhances the ability to distinguish key information by utilizing the brain's tendency to block out extraneous information. T3DAS capitalizes on these facts to make an operator more efficient and effective.

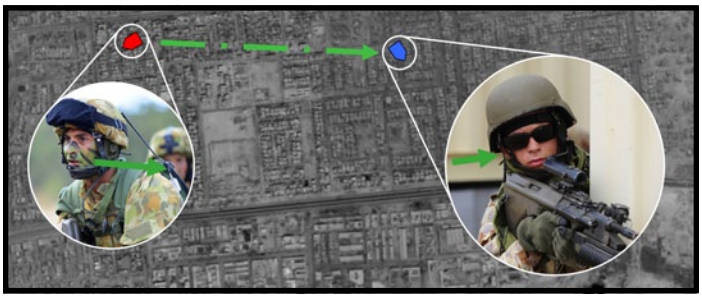
TECHNOLOGY

Presently, RF communication amongst personnel and command centers is monaural ("mono") with a single audio channel. Using this transmission scheme, the direction of the sound source cannot be perceived. However, position information (such as a set of GPS coordinates) is commonly transmitted in the RF data stream along with audio; this non-audio information is currently only used within a visual system or operational/tactical map. Combining the position and audio along with mathematical algorithms allows for the perception of natural three-dimensional audio. T3DAS provides greater clarity of location and sight-agnostic information for heightened situational awareness.

CAPABILITIES AND FEATURES

- Consists of a headset and processing unit
- Enables users to "hear" the location of others through directional voice communications
- Reproduces the "Cocktail Party Effect" allowing users to focus on a single talker amongst background noise and other voices
- Calculates sound directions in real-time using locations and head position tracking
- Reduces operational load and reliance on visual systems to provide location information and situational awareness
- US Patent Application 13/135,973 filed July 19, 2011





DEVELOPMENTAL FOUNDATIONS

T3DAS satisfies a number of DoD and DHS science and technology objectives: ONR C2 STO-4 seeks to "improve situational awareness for warfighters at all echelons" by enabling "near-real time distribution of tailored information." Navy S&T Focus Area for Distributed Operations seeks to "enable dispersed small units to dominate an extended battlespace through…enhanced situational awareness…" DHS Strategic Plan Goal 3 seeks to "strengthen the Homeland Security Enterprise…" by creating "high-impact technologies…that facilitate the safety, effectiveness, and ease with which First Responders do their work."

IRREGULAR WARFARE TESTBED (IWT)

T3DAS is being developed as part of the Irregular Warfare Testbed (IWT). This testbed provide tools, resources and capabilities to integrate, collaborate, test, and present Irregular Warfare information and solutions across the appropriate security level of dissemination.

IWT APPROACH

The IWT navigates the gap between national command directives, component S&T objectives, and NSWC PCD strategic thrusts while leveraging cross department efforts and systems in order to provide timely solutions to IW needs.

The NSWC PCD IWT consists of hardware, software, and personnel with a focus on providing an "operationally relevant" environment for studying IW capability gaps and developing and evaluating solutions. Ultimately, an expeditionary component will be available for deployed experiments, exercises, and operations. In order for this testbed to be effective, special emphasis is placed on sharing resources and expertise to reduce the total ownership cost. This testbed will be the core for IW workforce development and implementation of NSWC PCD Irregular Warfare initiatives.

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NSWC PCD 10/14/11
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