

3D Audio for Defence & Security MISSION CRITICAL SOLUTIONS



3D POSITIONAL AUDIO

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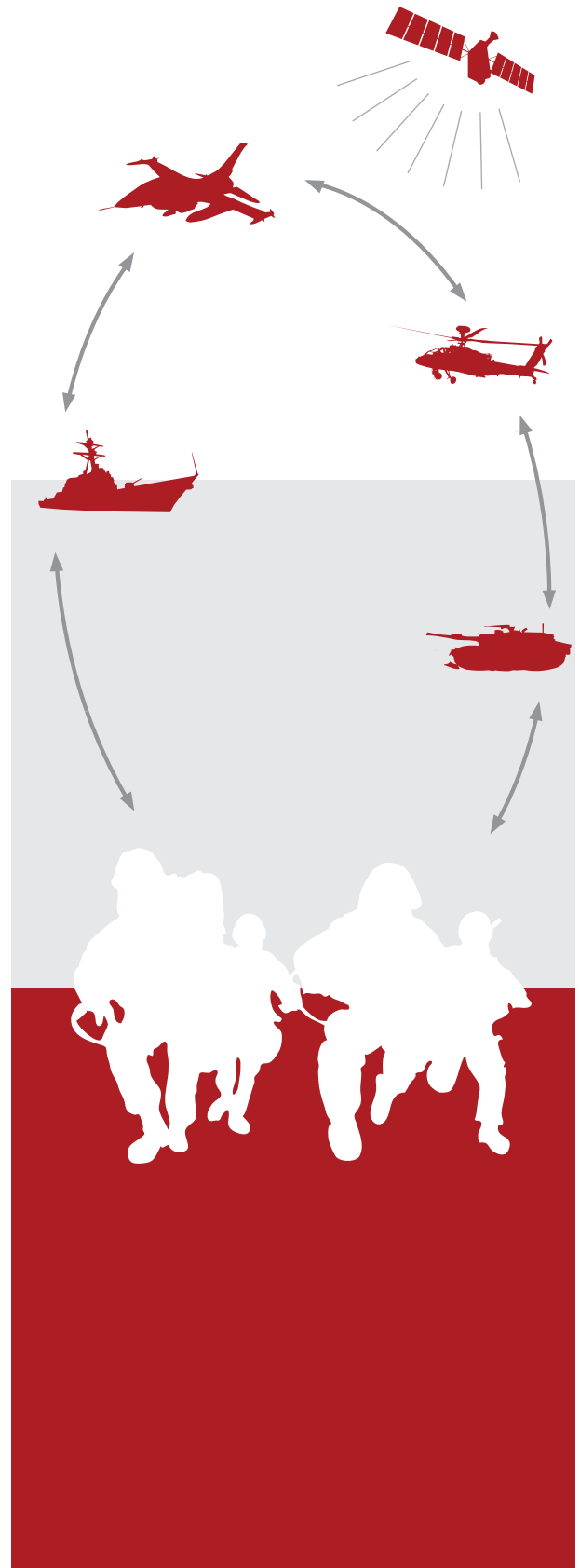
3D Positional Audio plays an important role in giving real life experience to small unit soldiers, infantry, combat vehicles operators and national security forces as an integrated part of electronic warfare solutions and communication equipment.

It is a powerful tool for improving situational awareness, since it allows the soldier to rely on natural instincts and at the same time obtain additional positional information. This makes it possible to listen, to register and to communicate with several people, and most important the soldier can easily perceive what is being said. Correct assessment of information is crucial in Mission Critical Systems and Operations.

The directional sense is a typical unexploited resource. Research and tests show that the true sound separation and positional information received from the audio cue can reduce the response time with 1.5 seconds by allowing a more intuitive directional perception, and give up to 20% lower mental workload, the speech intelligibility will be increased with up to 6dB compared to monaural listening.

AM3D 3D Audio is a highly sophisticated software engine capable of rendering 3D audio with multiple sound sources to enhance situational awareness for the soldier. The 3D Audio System allows the soldier to get spatial perception of the incoming calls and from alerts. It improves the capability to separate and to monitor multiple channels, and it makes it possible to prioritize the received mission critical information. The 3D audio cues can be controlled by sensor information from the soldier's integrated headgear, e.g. from GPS, gyroscopes, accelerometers and compasses. The 3D Audio engine is based on binaural synthesis and has unsurpassed 3D Audio quality based on AM3D's worldwide patented technology.

AM3D 3D Audio is the result of many years of research in how ears perceive sound sources in three dimensions. This has resulted in the most advanced non-individual Head Related Transfer Functions databases with a spherical resolution on 2° yielding an unbeaten localization performance. The HRTFs are measured with advanced high-precision methods and are documented in several reports. The 3D Audio software is capable of positioning both static and dynamic sound sources in any direction.



SITUATIONAL AWARENESS

Imagine a squad of soldiers on a night mission coming under thunderous fire. Or imagine a team of firemen on a search-and-rescue mission in a noise- and smoke-filled building.

Common to both scenarios is a significant reduced situational awareness: You are not quite sure where you and your teammates are, because your headset cannot reproduce directional audio. This means you are likely to lose mission critical information when you need it at the most and you are unable to do your best.

With AM3D's 3D Audio solution it is possible to overcome the surrounding obstacles and enhance situational awareness.

Our 3D Audio solution enables the user to accurately locate voices of teammates, the position of threats and the spatial location of other mission-critical sounds. And this is possible even in high noise combat environment. The user maintains overview of the situation; he can react faster and more accurately which in the end reduces the total mental and physical risk for the individual.

CASE: F-16 FIGHTING FALCON

Fighter pilots benefit from a significant reduction in workload and response time from a 360 degree audio threat warning system.

When a hostile radar station locates a fighter, and the missile is on its way, the pilot has approximately five seconds to react correctly. Within these seconds the pilot must perceive the alarm in the headset, look down on his instrument board and interpret the content of a symbol giving the missile type, and its direction. But even with intense training the pilots are not able to reach a safe response time. One or two seconds might be enough to save a pilots life.

This desirable reduction of the response time is precisely, what 3D Audio is able to deliver. When the pilot hears the warning signal in his headset: Missile! The attack position is measured by the computer of the fighter, transformed and presented as 3D Audio. In other words, the pilot is able to react immediately on the danger due to the 3D Audio sound positioning of the signal. A head tracker placed on the headset measures the pilots' head movements and keeps the correct position of the incoming radio channel or threat no matter how the pilot turns his head. Seconds are saved and the pilots' succes rate is improved.

The 3D Audio system positions sound sources in the headset in any direction: both vertical and horizontal, the system can present a friend or a threat in its actual position in the audio cue, e.g. above, below, to the left etc. The 3D Audio system therefore makes it possible to localize a wingman or hostile fighter in its actual position, before he is seen or noticed on the radar.

The AM3D 3D Audio software is today integrated into the Electronic Warfare solution manufactured by Terma A/S, which today is in use by The RDAF fleet of F-16 fighters. The 3D Audio technology contain business perspectives in large scale both in military and civil environments, e.g. combat vehicles, soldiers, helicopters, submarines, ships, civil airplanes, firemen and national security forces.

KEY FEATURES

- Supports playback for both headphones and stereo loudspeakers
- Real time 3D Positioning
- Simulation of Acoustical Environments through reverb
- Smooth position and parameter transitions
- No platform/OS dependencies
- Input Sample Rate: minimum 6kHz
- Input Sample Format: 8/16-bit, Mono
- Output Sample Rate: 6-48 kHz
- Output Sample Format: 2 channel PCM stream
- Supports playback for both headphones and stereo loudspeakers
- Highly scalable rendering engine



The Royal Danish
Air Force is utilizing the
AM3D Audio Solution for their F16s

ABOUT AM3D

AM3D is a provider of world-class audio technology providing software solutions for 3D audio and audio enhancement for mission-critical solutions, mobile phones and portable devices, in-car and home entertainment systems. AM3D holds several patents on audio technologies.

AM3D has offices in Denmark (Aalborg), Japan (Tokyo) and South Korea (Seoul). AM3D's principal owner is Nordjyske Holding A/S which has more than 2,000 employees and a history that dates back to 1767.