

# Protecting soldiers against extreme noise across dismounted and mounted environments

**N**oise Induced Hearing Loss (NIHL) is a concern across defense sectors globally. Protecting troops from extreme noise levels in combat situations – either dismounted soldiers needing protection from gunfire and other noise or mounted soldiers enduring continuous vehicle noise is a key priority. The issue is the backdrop to INVISIO's work in providing a flexible, practical solution for dismounted and mounted soldiers in the field – dual layer hearing protection.

"Noise levels are on a logarithmic scale," explains Seth Williams, Sales Director Europe at INVISIO. "Increase the noise level by three dB and you half the amount of time that you can be in that continuous noise environment before you are deemed to have potential hearing damage." That means even a few decibels of extra noise significantly

reduces the amount of time a soldier can spend in a specific environment without any hearing protection – taking it right down to seconds in high-noise settings such as tanks and armored vehicles. Such extreme environments require more than traditional headsets and hearing protection, says Williams, yet still need to allow effective communication, which is where dual layer protection comes in.

INVISIO offers two solutions for such environments, often based around tracked personnel carriers: Where protection either has to cover dismounted soldiers who switch from non-continuous noise environments, to environments of continuous high-level noise inside the vehicle or where it has to cover mounted crew who occasionally has to be dismounted. "The two solutions can be different, which is where we have two separate product solutions that will work in that environment."

## Protecting dismounted soldiers inside high-noise vehicles

As the name suggests, dual layer protection essentially layers INVISIO's tried and tested headsets on top of one another, explains Jonathan Wassberg, Product Manager at INVISIO. While dismounted soldiers will often wear a combination of the company's control units and either X5 in-ear headset or T7 over-the-ear headset, in extreme continuous noise settings they can be combined to provide added protection of up to 42dB Single Number Rating (SNR) – the EU standard used to determine hearing protection. The X5's state-of-the-art external microphones that provide natural hear-thru and auditory situational awareness switch themselves off when needed, allowing the input to come instead from the T7 headset – ensuring that both situational awareness and communication remains effective whilst also providing added protection. Such integrated systems allow dismounted soldiers to switch as they change environments from one with non-continuous noise to continuous noise.

"In this setup, they will already be wearing the X5 in-ear headset and the T7 over-the-ear headset would be available inside the vehicle, for example," adds Wassberg. "There would be an adapter cable on the end of the T7 headset so

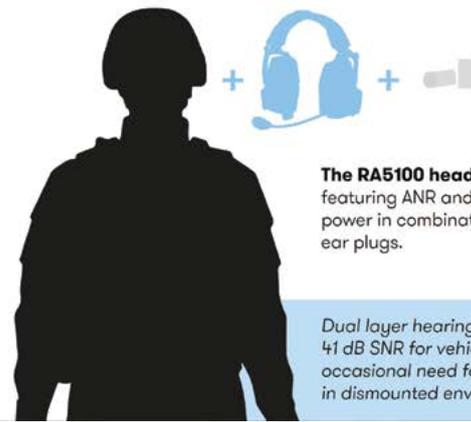


## INVISIO Dual layer hearing protection solutions



**The INVISIO System:** X5 in-ear headset in combination with T7 headset and INVISIO control units featuring continuous auditory situational awareness and comms.

*Dual layer hearing protection of 42 dB SNR for dismounted soldiers with occasional need for transportation in high-noise tracked vehicles.*



**The RA5100 headset** featuring ANR and built-in power in combination with ear plugs.

*Dual layer hearing protection of 41 dB SNR for vehicle crew with occasional need for operations in dismounted environments.*

they can just plug into their control unit. And then they can wear the T7 on top of their X5 and will automatically have the 42dB SNR certified ear protection."

This first solution allows dismounted soldiers to enter higher-noise platforms whilst maintaining full situational awareness at all times. In addition, both headsets are extremely lightweight compared to traditional crew headset and tactical comms headsets in general – yet rugged and MIL STD compliant.

### Protecting vehicle crews when dismounted

A second solution, aimed at vehicle crews who need higher protection but also need to be dismounted at certain times, combines the versatile RA5100 hearing protection headset with yellow plugs, providing 41dB SNR. This solution also addresses the issue of size compared to traditional vehicle crew headsets, explains Rob Harrison, High Noise Product Manager at INVISIO. "One way to get more protection is to have a much bigger headset but then that becomes a practical problem for a dismounted soldier. Dismounts need a smaller headset because it has to work with all of their other kit and ballistic helmet. The crew, for example, have much bigger headsets. And it's fine if you never leave the vehicle because you can wear that all the time but for the vehicle crew occasionally dismounted – or dismounts that are being transported, they need something smaller. So, there's a lot of preference to go for something small and streamlined, and the only way to get the performance up is to go with dual layer protection."

The need for flexibility in size and ease is where the solution, using the RA5100, comes in. "One of the differences between the INVISIO system and the Racal RA5100 headset is the RA5100 can be used as a standalone," says Harrison. "You can put a foam plug in the ear, put a headset over the top and claim a much bigger performance without having anything else to plug in. So, if you've already got a soldier radio, you've got a source of power, then it makes perfect sense for the INVISIO solution. If you don't have all of that, the RA5100 solution could be a better choice. But the end result is the same – you're going to end up with 41 or 42dB of protection, which is 10dB more than you can get with a single device." On top of that, Active Noise Reduction (ANR) in the RA5100

helps protect mounted soldiers. "Active Noise Reduction takes a lot of the low frequency out," adds Harrison. "If you're in a vehicle, you've got the rumble, rattle, the low frequency noise and vibration you get from whatever surface you're driving on, axles, gearboxes, engine and that droning that can cause noise induced fatigue and tiredness."

### Scalable and flexible solutions

In simple terms, the Racal RA5100 has more of a vehicle-based role, while the INVISIO system is aimed at dismounted soldiers. "But there are missions where you actually have both, so then we solve the problem, but from a different approach," adds Harrison. The use cases for dual layer hearing protection are wide-ranging, including around certain weapons systems such as mortars and 50 caliber guns, as well as vehicle-based high-noise environments. A key advantage of the dual layer protection systems is its flexibility and modularity – increasing its appeal for the defense sector, adds Williams. "The ability to scale it without having to change your equipment is key. Because so often when you change your environment, you need to change the equipment. It's not as simple as Lego but it's like a building block of hearing protection and flexibility to connect to different sources. When you're in extreme high noise in a vehicle, you may have one solution. When you're in extreme high noise as a dismounted soldier, you have another. But then a soldier needs to travel to the field of operations in a vehicle. Not only do you need to have the scalable high noise protection – you need the modularity of the system to connect to different radio sources or vehicle communication systems. So there is a dual layer capability but underneath it all is a functionality that allows you to connect to different radio and intercom sources."

The appeal of dual layer hearing protection is clear, proven by the fact INVISIO has already received two orders from the UK's Ministry of Defence via its partner Marlborough Communications Ltd (MCL) for its branded solutions for use in armoured fighting vehicles and in dismounted close combat, totaling SEK 118 million (£9.6 million), with deliveries due to start in late 2022. ■

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