

Constantly listening, Constantly protected

Steve Rist, Product Manager, Racal Acoustics, reviews the company's integrated approach to hearing protection

Insufficient hearing protection is a problem. Militaries know this and are addressing this in partnership with industry. Steve Rist, Product Manager, Racal Acoustics explained, "There are large numbers of soldiers, returning from battlefield situations with varying degrees of hearing loss. That is partly because of blasts from Improved Explosive Devices (IED) but it also partly due to the noise from friendly heavy machine gun and rifle fire, adjacent to the head. That could mean that they are unfit for further military service in the Army but it could also mean that they are no longer fit for work." Outside the human cost, the operational penalties are significant. So too, are the financial consequences, figures show that in 2007 alone, military related hearing loss claims in the US exceeded \$1billion.

"If you are in theatre and your hearing is temporarily impaired, by a blast or gunshot, it then restricts your ability to hear things going on around you and may put you in a greater amount of danger, for example, if you are nearby a roadside bomb and it goes off, and then don't hear the truck coming, you can't respond," explained Rist.

It's not just protection; communication and clear communications are an important contribution to increasing operational tempo in theatre. Clear communication needs not only to be resistant to being interrupted by impulse noise but to also give the dismounted soldier the ability to get on and off lower noise platforms such as Armoured Fighting Vehicles (AFV) and not have to keep on putting on multiple layers of hearing protection.

Rist explained, "The ideal solution is to be able to utilise the same device being used in the field to also protect against noise from within the AFV or similar low

noise platform. If your commander can tell you where to go, what to do and when to do it, you are going to be a lot more effective. That is an important factor."

As usual with hearing protection, Rist explained that soldiers' main demand is always to, 'give me my ears back'. Rist continued, "On the one hand you need to 'restrict' hearing but on the other hand you need to provide him with enough situational awareness (SA) so that if he needs to listen to the ambient sounds around him, such as someone sneaking up behind him and stepping on a twig, he is able to do that too."

RACAL'S APPROACH

One of Racal Acoustics' approaches to hearing protection is to use an in-ear device with a choice of

either foam tips or a custom moulded type ear insert. Different customers have different preferences.

"A custom moulded design has to be fitted to the soldier, so there is the logistics issue," explained Rist. "A custom moulded solution and foam tip solution can offer passive protection stand-alone, with suitable occlusion of the communications path, or can be the platform to which you attach a communications headset. Our Frontier1000 would screw into either kind of product to give you that communications capability. What it effectively does is provide hearing protection and boomless communications. It eliminates the boom mike and instead picks his voice up from one of his ears and gives him a talk through circuit for SA. The Frontier1000 currently connects into a PRR-type radio."



Racal Acoustics has recently been awarded a contract to supply its Frontier1000 system to the UK MoD for the Personal Interfaced Hearing Protection System (PIHP) project © Racal Acoustics

► Racal is also looking at expanding the use of that unit to all of the other commonly available PRR style radios including the ITT SpearNet and the Harris Secure Personal Radio. Rist explained, "We have a connector in the down lead between the box and the radio, which enables a different pigtail to be used to interface to alternative radio types. Most of the newly developed radios today are clever enough so that whatever headset you put on them they can adjust to suit."

Racal Acoustics has recently been awarded a contract to supply its Frontier1000 system to the UK MoD for the Personal Interfaced Hearing Protection System (PIHP) project. This is a new system consisting of two parts - custom-moulded ear plugs for each soldier and a small interface box housing a device that reduces the sound level of the firing and explosions to the soldier, whilst still being able to talk and listen to their colleagues on the ground. The proposed new system will connect to the soldier's personal radio which in turn interfaces to BOWMAN, replacing the existing boom-mic and head-set. This provides protection from impulse noise, hearing protection on wheeled vehicle platforms and delivers clear radio communications. It is currently in the pre-

deployment training and testing phase which will lead to manufactured products being deployed in April 2009.

Passive protection levels for any device are frequency dependent. IEDs are at the higher end of the frequency range. Rist said, "If you look at the protection profile our headsets provide against IEDs, the sort of protection you are getting is roughly 40dB. The other factor to take into account is that if you have SA switched on - microphones translating the outside information into your ear - you also need to cap that noise to a similar level. Interestingly, we had off field comments from users regarding devices that provide enhanced hearing; what happens if the rounding of off your noise peak protection doesn't work? If there were a failure in the cut-off then that could potentially be a problem. There is a fairly small likelihood of that occurring, but it is something we have to be absolutely certain about."

PROTECTION UPGRADES

In July 2010, things change. Until that point the UK MoD and many other militaries had had the goal of reducing noise down to 85dB, purely as an advisory measure. In roughly eighteen months time, it becomes mandatory.

"Not only will they need to protect soldiers hearing to that level, but they will probably need to demonstrate protection levels. That potentially gets us into the need to record or capture noise levels in soldiers' ear canals after."

Growth in the subsystem will be enabled by the company's work on the Digital Communications Platform (DCP). Optimising the system is in part a function of understanding the problem. The DCP will have the capability to able to monitor and store, the sorts of noise levels that are being experienced inside the ear cup that and could be downloadable for analysis on a regular basis. Rist explained, "At the moment, analogue Active Noise Reduction senses noise in the ear cup to feed back anti-phase noise to reduce noise in the ear channel but we are not measuring and capturing that data. That needs to change before we can get a true picture of operational exposure. DCP gets us part of the way towards it. We are currently developing the software to be able to do that type of application." DCP is scheduled to be completed by the second quarter of 2009, with software applications to follow. Racal Acoustics are currently testing and qualifying pre-production prototypes. ■



The difference between the mounted and dismounted user impacts how any system deals with noise, or at least should © DoD