

Headsets

In the ear takes center stage.

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Silynx Communications' C40PS. [Photo courtesy of Silynx]



Earplugs are not enough. Simple hearing protection systems that forces began operations with in 2001 have been found to be inadequate for the needs of sustained combat in Iraq and Afghanistan. The result has been increased fatigue at best and at worst, temporary and permanent hearing loss leading to both an individual's immediate loss of situational awareness (SA) on the battlefield and permanent damage. In response the Army and Marines are beginning to field fully automated hearing and communication systems that provide protection, and improving communications intelligibility for soldiers as they transition between mounted and dismounted roles.

The U.S. is pursuing a number of efforts in this area. The SOF community is pursuing the second generation of its Modular Integrated Communications Headset (MICH) program, for which a sources sought notice was recently issued. After a series of industry trials with the relevant platforms, intercoms and radios this year, industry is expecting a solicitation to be issued in August.

More numerically significant is the Tactical Communication and Protective Systems (TCAPS) initiative; a DoD-wide, Army-led attempt to establish a series of qualified products to meet a range of tactical communications headsets with integrated hearing protection and "talk through" functionality.

TEA

The incumbent in one element of the current MICH program is Television Equipment Associates (TEA), selected as the prime vendor for MICH Maritime and that has supplied a range of headsets to meet that requirement of the naval special warfare community, SEALs, special boat teams and other associated personnel over the past 10 years.

In undertaking this role, the company reprised its approach to tactical headsets that it has pursued over the past 25 years, acting as a systems integrator and value added distributor, customizing designs for customers that include SOCOM, police SWAT teams and a number of other military, homeland security and law enforcement bodies across the country.

Steve Toci dlowski, vice president and director of business development for TEA, explained that process: "It's a mutual developmental effort. We are very much involved in the design effort and also the tweaking and customization. We would for example specify the design parameters and then manufacture some of the smaller items for the headset. For example, we make push to talk [PTT] systems that are used with various brands of headsets and customers will often purchase our PTT switches that they intend to use on one of our competitors' headsets."

Toci dlowski outlined what the firm is providing on MICH Maritime today. "The kit includes a choice of three types of headset—an MSA Sordin brand, over-ear high noise headset rated at approximately 19 dB NRR and designed to allow communications in high-noise environments, protecting the user against gunfire [noise] and the high noise environments but still allowing him

situational awareness with an electronic talk through circuit that allows all sound under 85 dB to come through electronically. The second headset selected for the program is the low noise headset, an SOS-branded, single-sided headset that clips onto the side of the head. The third headset chosen is an in-ear, Invisio headset with a bone microphone. All the headsets are submersible, each has a plug into a PTT system, and there are then various cables that will allow them to hook up to all the different radios or intercoms that they might need to talk on."

Toci dlowski added that while the next iteration of MICH is being mulled, the current program is still very much alive and fielding continues.

Addressing the next generation requirements for MICH, Toci dlowski commented, "We are planning to bid on the upcoming requirements, and we have been working to improve our products to meet the new specifications. There is one particular product that we have been focusing on, and that is the new digital Invisio headset with hearing protection and whatever we offer; that will be a main component."

TEA is also working with Invisio to offer the X50, also known as the Digital Ears, which is also beginning to be sold.

As a system integrator for headsets, TEA is well-placed to identify trends in headset design, and Toci dlowski addressed the current proliferation of in-ear solutions, which are becoming the dominant solution in the market as opposed to other technologies such as bone mics or throat mics.

"The Invisio is a bone mic, but it's an in-ear bone mic as opposed to a skull mic or similar. It picks up sound directly from the jaw bone to the ear canal. Bone mics in that form are very viable and work well. Other types of bone mics, like the skull microphones, have been out of favor in the last few years because of poor voice quality and comfort issues. There are, however, still advantages to bone and throat mics such as in rejecting ambient noise and working with a breathing apparatus, but boom mics are still highly desired as well. There is certainly a role for bone mics; they are very popular and work very well, but only certain ones. Throat mikes are still popular, too, but not as popular as either in-ear bone mics or boom mics."

Each of these different headset technologies is designed to offer an alternative to traditional boom mics, whose enduring capabilities ensure that they remain a feature in any current and future headset inventory. Toci dlowski said, "Boom mics are still very popular as they will pick up very clear voice quality in high noise environments. However, users do seem to be migrating toward in-ear headsets hearing protection products."



Steve Toci dlowski

SILYNX C40PS

C40PS is the latest generation of the in-ear headset by Silynx Communications Inc., offering hearing

protection of 22 dB NRR attenuation in the second deviation, as well as hearing enhancement systems facilities. Reflecting the firm's traditional target audience, C4OPS was launched at the 2008 SOCOM Tampa show. Following successful evaluation by the U.S. SOF community and other government agencies, in addition to the militaries of Australia, Canada, the United Kingdom and other close allies, it entered full-rate production earlier this year.

"C4OPS is way more than just a headset; it is a mini SOF soldier system," explained Gil Limonchik, CEO, Silynx. "C4OPS is a software-defined, tactical hearing protection/hearing enhancement system with dual wireless PTT [DWPTT], which uses a PC programmer for customization. If, for example, you want to provide a certain configuration for a sniper, you download that from the PC programmer as a flash upgrade, disabling certain menus if they are unnecessary."

Features and functionality are invaluable, especially when the environment conspires against them. Silynx has developed C4OPS from the start to meet exacting specifications. Limonchik described C4OPS as the first 20-meter immersible hearing protection/hearing enhancement headset system, which includes quick disconnect connectors and Molle clips for enhanced securing and fit on the operator's vest. "Instead of having mixed infrastructure of urban, maritime and covert headsets, the C4OPS does it all in one. The design goal was to create a 'SOPMOD'-like modular headset system. We also designed a new control box that utilizes



Gil Limonchik

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state-of-the-art materials and which can withstand the harshest military environments."

In establishing these rugged features, Silynx merged the most demanding specifications and requirements from its main SOF customers in Australia, New Zealand, Canada, United Kingdom, Israel and the United States, and implemented many operational lessons learned about the product. Quirky examples were brought up, such as the fact that bug repellent does not harm human skin, although it significantly degrades plastic. These were all factored in along the design process. Limonchik said, "We thoroughly reviewed end-user feedback on the previous generation of headsets and

brainstormed with the end-user community and our engineers in order to come up with a more advanced and user-friendly MMI with voice prompts. We also researched new materials and technologies and enhanced the processing power of the system to allow for future upgrades and enhancements."

C4OPS has a built-in GPS, something absent in most of the radios in U.S. Army service today. Consequently, using C4OPS, users would no longer need to carry an additional GPS device for Blue Force Tracking (BFT).

C4OPS is powered from the radio itself via the side connector, which is also used to remote-control the radio from both the C4OPS control unit and wireless PTT unit. Limonchik explained, "Because we are already connected anyway, we can transfer the GPS information from the C4OPS

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to a battle management system [BMS] over the radio's encrypted channel." In many cases, the BMS in question would be a version of C2PC, designed specifically for operation with MBITR and 117F. When the C4OPS PTT is pressed, the Combat ID and user location are automatically sent via the radio-encrypted link to the BMS. He continued, "For SOF, this is a great benefit because no one wants to carry an additional BFT device."

Additional navigation capabilities are built into C4OPS, including voice prompts for coordinates and speed with additional features planned as software upgrades.

C4OPS can remote-control up to three devices, via three smart leads, including radios, intercoms and computers using the C4OPS control box as the man-machine interface to activate functions of the computer or the radio. Much less complex capabilities can be enabled via the system's tone signaling in covert missions or in an emergency. Similarly, C4OPS monitors the voice level of the user, and when it detects a whisper it automatically switches to C4OPS discrete whisper mode, saving the user from physically switching to this mode using the rotary knob.

The system's DWPTT with Picatinny rail adaptor is also 20-meter immersible with dual functionality controlling channels and volume remotely via two rocker switches. These are also programmable so that, if required, they could control alternative functionality, such as mute channel, or control hear-thru noise levels. These are modified via a drop-down menu in the PC programmer.

NACRE

The U.S. is Nacre's—now part of Sperian—biggest market following the introduction into service of its QuietPro in-ear headset, first by the Marine Corps under the aegis of the Marine Expeditionary Rifle Squad (MERS) program office. Brian Burns, vice president for U.S. Operations, Nacre AS, said, "We were responding to an immediate requirement from the USMC for hearing protection and communication on the battlefield in Iraq in the first part of OIF. MERS had done a lot of studies on the fact that Marines were losing their SA, mostly due to combat-induced noise



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and the lack of an ability to communicate. After field user evaluations, QuietPro was chosen, and that was the first major contract for Nacre in the U.S."

In parallel to this, the Army undertook a series of additional studies into hearing protection and enhancement looking at over-ear and in-ear headsets from around the world. Burns said, "The bottom line to that story was that we were chosen for the rapid equipping of infantry for Land Warrior [LW]. QuietPro is still the only in-ear headset for LW and the new Ground Soldier Ensemble [GSE] program."

Burns explained that Nacre is currently working with the three teams down selected for GSE: General Dynamics C4 Systems, Raytheon and Rockwell Collins, as government furnished equipment on that program. QuietPro was the only in-ear headset that was approved. A Peltor over-ear solution was also mandated for GSE by PEO Soldier. An additional result of the testing is that PEO Soldier selected QuietPro to be added to the Army's approved product list.

Since the initial contracts for the USMC, Nacre AS has developed and released the QuietPro. Burns addressed the advantages of the new QuietPro: "Because our platform is software-based and digital, we have flexibility in the capabilities the system offers. This next generation of our system takes into account feedback from user communities on what they are looking for, above and beyond baseline hearing protection and communication headsets. When you talk to the operators, they don't necessarily appreciate the hearing protection as they are much more focused on the communication aspect of it. That is why we always strive toward the clearest communication possible. As we adapt new digital radio systems, our platform is also well-equipped to seamlessly fit with those devices. We are listening to the customers, looking at the adaptive capability of the system to not only meet the current equipment requirements but also to focus on threshold and objective requirements for the future."

Hearing loss on the battlefield is the "bloodless injury" that continues to be the number-two casualty. Hearing loss contributes to loss of SA and is a factor in post-traumatic stress disorder (PTSD). Besides the high-quality communications aspect of the QuietPro the users get the added benefit of industry leading hearing protection.

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This allows operators to be better equipped to perform and accomplish their missions.

Working with the customer community means working with SOF. Burns said, "We have a strong working relationship with the requirements and development team at Natick and the SOF Warrior program, and we get constant feedback from those customer bases within the special operations community."

He continued, "We are looking at [the SOF community] not only from the standpoint of current requirement but tailoring and listening to the customer to work toward their objective requirement."

RACAL ACOUSTICS

Racal Acoustics, acquired by U.S. giant Esterline earlier this year, now has roughly 50 percent of its sales in the United States. Terry Buckley, director of sales and marketing at Racal Acoustics, explained, "We are one of the biggest players in the world of military acoustics."

The majority of the firm's U.S. business has been related to vehicle intercom systems: first the VIC-3 and now the VIS-X program. Buckley explained that roughly 30 percent of VIS-X's potential 10-year, \$2.4 billion value, has been set aside for future buys of headsets.

Racal's initial sales to the U.S. military were based around the Slimgard 2 headset, but since 2005 this has switched to the Raptor 25. Buckley said, "[Slimgard] is now a replacement through attrition purchase for the market of Abrams and Bradley AFVs, with the predominant volume of headsets being provided through the Raptor 25 product, which has been positioned as a product to meet the MRAP and HMMWV mission profile requirements."

A major focus for the firm is now the dismounted soldier, being led by a team based in Manchester, N.H. Buckley explained, "MICH is a big part of that, but there are also 790,000 infantry soldiers in the U.S., and that is clearly a key market for us, too. We have several specific product developments planned based on particular radio styles and have already launched a bespoke product for the personal role known as the Frontier 1000. At AUSA in October, we will launch about six new products, two of which will be in-ear products based around a dual radio capability, working with two radio inputs as opposed to a single radio input."

This will include the Frontier 1400 designed for use with the Harris Secure Personal Radio. The Frontier range is based on common-software-defined architecture, allowing future upgrades and applications. The next generation Frontier 3000, now at the capability demonstrator level, is now being circulated to garner feedback for on-board features such as inbuilt gunfire detection and noise dosimetry. Buckley believes that once requirements are firmed up, production can proceed very rapidly.

SELEX ITE

Selex Communications is another trans-Atlantic firm bidding for MICH and other businesses in the U.S. The company has recently launched its In The Ear (ITE) range of headsets, with an initial offering closely tied to the firm's PRR range of radios while also working on an intelligent radio interface system (CTX) for use with Selex and other personal and combat net radios.

Claire King, international sales manager, Selex, outlined the ITE's two initial variants. "We started by providing hearing protection for the soldier that was integrated into the PRR. This system runs on the PRR batteries without affecting its standard operating time of 24 hours [using two AA batteries]. It has absolutely no effect on that whatsoever." The highly power-efficient digital signal processing,

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explained King, “literally takes a few milli-volts of the PRR power source.”

The design concept was to reduce the burden and power consumption on the soldier; the PRR ITE system saves 30–40 grams but also increases the soldier’s capability.

This capability can be offered as standard on new PRR or by a field replacement of the PRR’s Switchpack—a standard line replaceable unit, which can be undertaken in the field if required. Adding the capability to the successor SRR is also being reviewed.

The PRR variant is an electronic passive hearing protection system. When impulse noise is detected, PRR ITE reduces the noise to a maximum of 85 dB, within the limitations of passive protection. This ensures full SA during the heat of battle.

The SA feature is set at zero gain, so that hearing with the plugs is exactly the same as it would be without them. Operation of the PRR when fitted with ITE is not effected.

The PRR ITE is not designed to have active noise reduction; however, in a continuous noise environment, the ITE’s SA can be switched off to provide a measure of protection.

The next step was the development of CTX. This interface system is adaptable to environmental change through the use of different headsets and senses new radios and intercoms via the automatic sensing software, which ensures optimum quality of communications at all times. CTX is for use on Selex and non-proprietary radios and intercom systems. Additional features and functionality not seen on the PRR variants are installed on a compact unit that is a tri-input system enabling up to two radios and an intercom system to be connected simultaneously. It is simple to fit and operate, with no requirement for classroom-based training. One of the near-term objectives for CTX is the MICH program.

King explained, “In addition to what you have on the PRR variant, the CTX allows you to gradually reduce and increase the talk through and situational awareness functionality so that as the noise increases you can gradually reduce the talk through/situational awareness. When the noise becomes intense the talk



Claire King

through/situational awareness can be shut down. For amplified or ‘super hearing’ the user can adjust the mode switch on CTX. Amplified sound is useful on observation posts or when entering enemy buildings.”

The CTX is a chest-mounted interface system that can plug into two radios and an intercom system simultaneously. It has dual tones, dual PTT functions, front-mounted buttons for adjusting the SA, and dual wireless PTT. On the top of the box is what King calls a unique feature, namely two headset sockets. One is specifically for an ITE headset; the other is for all Selex

proprietary headsets such as the Daylight, Light Patrol, Ultra Light and WACH-900. The feature provides the user with headset options dependent on the mission and for temporary relief from ITE.

Unlike the PRR variant, the unit runs on its own AAA cell, and inside is a rechargeable lithium ion battery that provides three hours of backup power. King explained, “If you were in a situation where your AAA expired and you had no spares, with the integrated backup battery to replace it you would never lose communications. The same would be the case if you have to change the AAA: the system will continue to run on the lithium ion, until you put a new battery in, so you never lose communications when you put a new battery in.”

CTX earpieces are designed to provide enhanced side impact protection by the design shape of the earpiece being shaped to fit against the inner meatus of the pinna to enable any side impact to be displaced across a larger area and to stop the earpiece from being forced by the impact deep into the ear canal.

King concluded, “CTX has been designed for environments as diverse as tropic to arctic and from arid desert to open ocean environments. The interface provides the user with all required communication interface capabilities no matter what the mission.” ★

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