

SAFE, SOUND

An Air Force CRADA facilitates the development of protective headsets for the military

Surrounded by insurgents in Afghanistan's Herat province in 2009, a team of 30 U.S. Special Forces, in pursuit of a Taliban commander, were caught in sniper fire. Staff Sgt. Robert Gutierrez, Jr., an Air Force Special Operations Command combat controller, was the only Joint Terminal Attack Controller (JTAC) on the ground. His job was to call in air support and provide real-time battlefield surveillance, both tasks critical for the success of the mission and the ability to evacuate wounded troops.

During the ambush, Gutierrez was shot in the left shoulder, breaking two ribs and a scapula and leaving a softball-sized hole in his back. Gutierrez returned fire and killed the insurgent before collapsing with a sucking chest wound that rapidly filled his lungs with blood. A medic jammed a needle and decompression tube into his chest to relieve the pressure. As soon as Gutierrez could breathe and talk again, he got back on his radio to advise the ground force commander and request close air support of F-16 Fighting Falcons and A-10 Thunderbolts. Both his eardrums had ruptured due to the Thunderbolts' strafing runs. Despite losing five pints of blood and walking over a mile to the medical evacuation landing zone, Gutierrez stayed on the radio coordinating his own evacuation while ensuring surveillance coverage and air support for the safe return of the ground force team. Gutierrez was awarded the Air Force Cross for his extraordinary heroism.

Since then, the development and introduction of

new technologies offer support to JTACs in the fulfillment of their duties, even when incapacitated by injuries or disoriented by blasts that impact their hearing or vision. For example, since JTACs simultaneously communicate with ground commanders and aircraft pilots to coordinate battle support, temporary hearing loss due to blasts or aircraft noise—as experienced by Staff Sgt. Gutierrez—significantly complicate JTAC missions.

Galvion Ltd, formerly Revision Military, Inc., founded in 2001 and located in Portsmouth, New Hampshire, works with JTACs and other special operations forces to develop and deliver purpose-built protective equipment for military use worldwide. The company provides face, head, and torso protection solutions, including wireless power sources and wireless power transmission to head-worn systems and tactical vests.

Long accustomed to demonstrating new product innovations to the military (including JTACs at Nellis AFB near Las Vegas, Nevada), in 2016 Revision Military entered into a Collaborative Research And Development Agreement (CRADA) with the Air Force Research Laboratory's 711th Human Performance Wing (711 HPW).

The CRADA focused on several areas, including communications and hearing protection, smart head-mounted systems, and wireless power access and distribution. According to 1st Lt. Patrick Assef, a special warfare mechanical engineer with 711 HPW, the CRADA was essential in addressing “one of the most



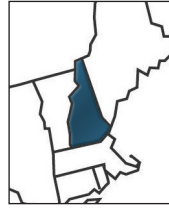
Galvion's ComCentr2 Tactical Headset System

important issues for JTACs, which is designing agnostic power and communication systems that integrate seamlessly with any other tactical gear, vest, or head system JTACs were already using, as well as operate as stand alone and modular components.” The goal was to streamline the data transfer between systems, reduce the amount of cabling, and design a quick disconnect for operators to recharge systems easily with a variety of power sources. Galvion’s SoloPack and SharePack battery systems store power, deliver it to one or more devices simultaneously, share and redistribute power as needed, and harvest power from a range of sources (such as vehicles, wall outlets, portable chargers, kinetic energy harvesters, or solar panels) without an intermediary device.

The existing working relationship with JTACs became a critical feedback loop for Galvion in designing new products for the warfighter. Steve Jarvis, Trials and Development Manager at Galvion, and a JTAC himself, understood that JTACs were “early adopters of breakthrough technologies. We’ve never received a bad piece of feedback from JTACs, thanks to their top-notch technical expertise paired with direct operational experience.”

Standard headsets are traditionally analog and allow operators to communicate through their mic, speakers, and radio with multiple people at the same time. But they fail to provide advanced capabilities and functions such as situational awareness to localize these competing voices in space, which confuses the brain and causes cognitive strain. Imagine you are in a noisy bar having a one-on-one conversation with someone across from you. Your mind can focus on your communication while tuning out the background noise, partially because your brain can process which direction the other voices are coming from and where these other people are in relation to you.

Galvion’s ComCentr2 Tactical Headset System provides an entirely digital



architecture and leverages advanced technology such as applying filters to the microphones that allow audio inputs to be perceived by the operator as if situated in 3D space. A JTAC will hear one audio track as if located at 3 o’clock and 20 feet away, while another appears to be only ten feet away at 8 o’clock, allowing the brain to more easily differentiate between audio signals and thus reducing mental overwhelm. Especially in high-stress battlefield situations where operators have to respond rapidly to changing circumstances, the system provides clear, actionable intelligence.

With both USB and traditional analog connectivity functions, the headset integrates with a variety of helmets, hubs, and devices, and can improve team communication and situational awareness, especially in hostile, noise-cluttered settings. The headset also incorporates digital Active Noise Reduction (ANR) technology, which protects operators from low-frequency noise generated by military vehicles like helicopters, Strykers, Humvees, and tanks that might otherwise cause long-term hearing damage.

After the success of their CRADA, Galvion is building on their work by fine-tuning the headset and improving overall systems integration. And Steve Jarvis continues to rely on actionable intelligence from the battlefield: “JTACs deal with immense physical and cognitive loads during their missions,” he said. “Their operational need for cutting through complex and often

contradictory data streams allows them to provide invaluable feedback to us for streamlining our systems and making them more intuitive and efficient.” JTACs like Staff Sgt. Gutierrez continue to display courage and grit on the battlefield, even under immense stress or when physically incapacitated. These technologies make it easier, faster, and safer for them to fulfill their duties while preventing injuries and fatalities. 🌟

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1st Lt. Patrick Assef