



Advatech Pacific




Changing The Way Engineering Is Conducted

Interoperable Communications and Beyond Line of Sight Capabilities for the Military

Universal Gateway to Telecommunications Equipment (uGATE)

Background: Advatech Pacific, Inc. has worked for several years for the Office of Naval Research and SPAWAR SSC San Diego on an R&D program called the Highly Mobile Tactical Communications (HMTC) system. This successful program was to develop a means for small, tactical USMC units to communicate over extended distances with line-of-sight communications. Under HMTC, Advatech Pacific developed a product to do exactly that and more. Not only does the product developed by the company extend rf radio links to beyond-line-of-sight, but it also provides the capability for multiple radio systems to intercommunicate via a “micro-gateway,” which is called the Universal Global Access to Telecommunications Equipment, or uGATE.

Product Description: The uGATE has been developed in four configurations:

- uGATE-B Unit is a standard 19-inch rack mountable unit with two internal General Dynamics Sectera Crypto, either commercial or Type-1, and two L-band transceivers (LBT) for communicating via the Iridium satellite constellation. It operates on vehicle or commercial power and supports both data and voice communications. (Note: Sectera is a registered trademark of General Dynamics). It provides for interoperable communications between EPLRS, SINCGARS, Personal Role Radios, and a commercial radio system such as the Motorola walkie-talkie. 
- uGATE-C Unit is a “lunch box size,” man-portable unit in a Pelican case with a single LBT Iridium satellite transceiver without the Sectera crypto and is limited at this time to voice communications. It also provides for interoperable communications between SINCGARS and the commercial radio system. 
- uGATE-J3 Unit is a smaller, man-pack configuration that fits in a Land Warrior vest and provides interoperability between two disparate radio systems, such as the Microlight, SINCGARS, JEM, MBITR, and others. It does not contain either an encryption unit or a satellite transceiver due to its small size. 

- uGATE-C Plus Unit is packaged the same as the uGATE-C, and is designed with the First Responder to Civil Disaster in mind, providing interoperability for up to eight different radio networks. Those eight networks can be arranged into 1 to 4 sub-networks for ease of communications management. The uGATE-C Plus does not contain either a satellite transceiver or an encryption unit, though satellite communications can be provided via external means, such as connection to a satellite phone or to a standard uGATE-C Unit.



The uGATE-B and uGATE-C Units can use either standard Daytona-type (9522a) Iridium LBTs, or a smaller, lighter, and more rugged version of the LBT, which is being developed by Advatech Pacific's subcontractor, Global Information Technologies, Inc. (GIT). Both units can quickly interface with the users' existing radios to provide direct line-of-sight (LOS) communications across disparate networks. When LOS communications are unavailable, the uGATE's internal LBTs use the Iridium satellite network as a backup communications path, providing world-wide voice and data connectivity to any phone on the planet. Because of its capabilities to interconnect multiple radio systems and the Iridium satellites, along with the variety of power sources, communications continue even when all ground infrastructures are unavailable.

Operations Concept: The uGATE equipment handles the interoperability issues between radio systems through the connection of a user-supplied radio from each net type. When the internal "switchboard" detects incoming voice signals from one of the connected radios, it transmits (broadcasts) that signal to all other connected radios. Also, the uGATE keeps track of current members of the local area network of data transmitters so that it treats data in the same manner as voice, except that data is transmitted to the intended receiver, while voice is broadcast.

Local area of coverage can also be increased by the addition of multiple uGATEs throughout the area. These uGATEs do not require line-of-sight among each other since they each have a connection to the Iridium Constellation of satellites, permitting world-wide interconnectivity of voice and data communications.

Typical Operations: Today's military forces operate in a variety of roles ranging from direct combat to peace-keeping to other-than-combat missions. They are involved in everything from small unit operations to full-scale invasions. Recent actions have seen a rapid transition from combat to quasi-police operations and then to peace-keeping activities, including patrolling hostile communities with small teams. They also have to deal with the political pressure to maintain as small a force as possible while conducting their missions. Frequently, these small teams are widely dispersed and out of communications with one another and with higher echelons of command.

As an example, consider two organizations, each equipped with SINCGARS radios, out of line of sight of each other due to mountains, buildings, or just geographical distances, but with a need to coordinate their operations. The insertion of a uGATE unit with each organization would ensure that communications were reliably maintained due to the uGATE's ability to connect the two networks via satellite. In this case, radio communications would be maintained as though the nets were close by and within line of sight.

Consider, also, tactical military operations that have a combination of the SINCGARS voice and data radio at some echelons, EPLRS data communications at others, UHF radios for some organizations, Personal Role Radios, and Motorola walkie-talkies, none of which intercommunicate with the other systems. That these operations are generally successful is a testament to the training and professionalism of the military units, but controlling these operations can be enhanced by enabling the various systems to intercommunicate.

The military also has a need for the small man portable unit. A security or reconnaissance patrol, or supply convoy, out of line-of-sight contact with combat support, could rapidly establish satellite communications with supporting units and higher headquarters should the need arise for air cover or extraction (search and rescue) or even vehicle recovery from a breakdown enroute.

EPLRS communities can likewise be interconnected via the uGATE system. When there are multiple EPLRS communities and associated uGATEs, one uGATE unit assumes the role of Primary Controller and the others as Secondary Switchboard Controllers. The Primary Controller becomes the "traffic cop" for the control of the communications among the various communities.

The EPLRS system also has a voice capability via voice over internet protocol (VoIP). Through the application of a uGATE system, that voice capability can be easily routed to standard military voice radio systems, such as SINCGARS, JEM, MBITR, and others.

Typically, in a relatively small military operation, there are only two disparate systems in use. The uGATE-J3 Unit, a small man-pack device, can provide interoperability between those two systems while being carried in or on the vest of a radio operator.

The uGATE devices created from the Highly Mobile Tactical Communications (HMTIC) program provide a versatile, low-cost solution to many otherwise difficult communications problems. They permit non-compatible, disparate communications systems to interoperate and extend line-of-sight radio communications to not only beyond-line-of-sight but to world-wide capabilities.

For additional information, please contact:

Jay Murphy

ojmurphy@advatechpacific.com

(951) 340-9024 or Cell (909) 997-0996

Advatech Pacific, Inc.

www.AdvatechPacific.com