Backpacking Adventure

By **Dr. Thomas Withington**

Manpack SIGINT systems provide a highly versatile capability to allow the dismounted collection of signals intelligence to support conventional and special forces.

Manpack SIGINT systems capable of collecting communications intelligence are increasingly sought after by dismounted troops.

Such equipment is highly versatile. It can be used when troops are dismounted and on the move. Manpack SIGINT equipment can be used in a vehicle, using the latter's power supplies and organic antennas to serve as a mobile Communications Intelligence (COMINT) gathering system. They can even be left unattended at a particular location to clandestinely collect signals of interest.

In the dismounted configuration SIGINT manpacks can be used in the vanguard of the manoeuvre force to gather detailed COMINT on hostile communications traffic at the forward edge of the battle area: It may be impractical or too dangerous for vehicles to operate in such locations. In the special forces domain, this apparatus can provide local COMINT during counter-insurgency missions, or during operations targeting high value individuals.

Jim Kilgallen, the president and chief executive officer of COMINT Consulting states that manpack SIGINT systems should ideally cover a waveband of three megahertz/MHz to three gigahertz. This is essential for collecting COMINT regarding High Frequency (HF: three megahertz to 30MHz), Very High Frequency (VHF: 30MHz to 300MHz) and Ultra High Frequency (UHF: 300MHz to three gigahertz/GHz) transmissions.

SIGINT manpacks should be capable of accurate direction-finding and/or the ability to network several systems together to ascertain emitter locations. Other technical requirements stressed by Mr. Kilgallen include at a minimum a 16-bit Analogue-to-Digital (ADC) converter embedded in the Software Defined Radios (SDR) integral to COMINT collection systems to provide as accurate information on the incoming signal as possible.

"An SDR whose ADC is less than 16-bits simply lacks the bit depth necessary to process complex, modern waveforms … None of these essential target signals can be collected with adequate enough fidelity to have a reasonable expectation of full demodulation and decoding and thus, maximum content extraction for subsequent decision-making." Kevin Davis, vice president of product and channel at TCI International, adds that other manpack SIGINT system requirements include low Size, Weight and Power (SWAP) penalties, a rugged construction and ease of use.

COMINT Consulting's Krypto500 and Krypto1000 software suites are used extensively in SIGINT manpacks in service with US and allied nations. Mr. Kilgallen says that the company worked hard to ensure that this software provides "extremely deep, matched, adaptive and heuristic filters capable of identifying even a single incorrect bit due to atmospherics or the vagaries of propagation," adding that "A system using our software should be able to inform decision-makers of a target radio's make and model, give a precision classification of the actual modem make and model as well as decode target communications and derive a network diagram, all in real-time or very near real-time … This gives a SIGINT or EW officer a complete, detailed picture with which to take action."

New products

TCI International, meanwhile, will be launching new products towards the end of 2020: "We will be rolling out a new hardware platform in late-2020 that provides higher performance and lower SWAP to support fixed, mobile, transportable and manpack solutions." Beyond this, the firm sees manpack SIGINT technology evolving particularly with regards to the deepening connectivity of such systems with "other elements in the electronic warfare kill chain."

In addition, there will be an imperative to ensure that emerging SIGINT products are "5G ready," Mr. Davis explains, referring to the fifth generation wireless and cellular communications protocols which will proliferate during this decade. 5G will use frequencies of 450MHz to six gigahertz, and could eventually expand into and beyond the 24.25GHz to 52.6GHz waveband in the near future.

Mr. Davis adds that the imperative to reduce SWAP will continue possibly towards soldier-wearable devices which can be used to collect SIGINT. From the software perspective, COMINT Consulting expects to add more artificial intelligence capabilities to its products in the future "to provide even more autonomous assistance to an often busy or overloaded tactical operator," Mr. Kilgallen notes. This will be alongside "more precision classifiers and decoders … The company will also continue to release more of its unique-in-the-market precision classifiers for even more modulation types."

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