



## *Trends in Military Communication Systems*

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Military communications is no different than the rest of the world's communications; they want it smaller, lighter, covering more bands and carrying more voice and data than the last generation of products. But there are other changes that are potentially much more profound that will eventually change the way that battlefield communications is carried out.

Traditional tactical communications has been via specialized individuals or locations that were the hubs for information exchange using terrestrial links or, more recently, a combination of ground and UHF SatCom uplinks. AR Modular RF has been making man-pack 20 Watt KMW 1030 and man portable/vehicle KMW2030 & KMW2050 125/200 Watt units for a number of years to address the traditional hub and spoke kind of communications. These kinds of systems are still the backbone of military communications, but the wind of change is already blowing and vendors like AR Modular RF are constantly looking into the future for product enhancements and new product developments.

### **New and Improved Multiband Tactical Communication Amplifiers**

A recent product improvement to reduce operator intervention has been to make these units auto-tuning, such as our recently upgraded man pack, the KMW1031. This unit provides a minimum of 20 Watt output for only 1 Watt input, making it operable with just about any single or multiband "handie-talkie" transceiver. This high gain unit (minimum of 13dB) will therefore give potentially up to 4 times the operational reach of a 1 Watt handheld unit used under the same terrain conditions. Recent improvements include a new power supply module that allows the unit to operate from both 12 and 24 Vdc supplies. It also has vehicle power spike suppression circuits included so that the unit can be run from vehicle supplies without fear of damage from power surges. The unit is smaller and lighter than the old one and consumes only about half the current, which allows it to be operated from a single tactical battery such as the UBI-2590 or similar item. Battery use management software maximizes operational life when operated on batteries. In line with its predecessors, this unit is fully submersible to 66ft.

There is also a new vehicle mount amplifier, the KMW1040, which provides at least 50 Watt output with an input of between 1 and 5 Watts. The unit is designed to be mounted directly to vehicle structures without the need for shock mounting; it is also waterproof, making it a great choice for waterborne or weather exposed vehicle applications and, like its sibling, the KMW1031, it can be used on both 12 and 24Vdc vehicles without any additional hardware. In addition to making both of these units automatic band switching and capable of filtered operation in the SINCGARS 30 to 88MHz band, they have been designed using the latest generation semiconductor devices, making them significantly more efficient and therefore, they use less vehicle power or need fewer batteries per mission. The latter of which is a vital consideration as more "electronic gadgets" are carried by frontline troops.

### **Legacy Systems Still Need Support**

Old HF and low band VHF equipment for voice have been augmented or replaced by multi-band voice and data VHF/UHF systems with frequencies up to 512MHz using both old legacy modulation as well as modern complex modulations. However, legacy communication products are not dead yet and AR Modular RF has supported a number of programs to provide modern power amplifier designs to support older legacy government communication systems. Amplifier systems such as our 100 Watt KMW2025

covering 30 to 512MHz, and the 100 Watt KMW2040M14 covering 225 to 450MHz, and the custom designed rack mounted 500 Watt KAW4040M13, offer the high performance necessary for modern modulation formats and give years of new life to older legacy systems for a relatively low investment. Custom configured designs like our 50 Watt KMW2040M13 covering the 200 to 400 MHz band include RF sensing transmit/receive switching and the ability to survive +80C case temperatures.

### **Ever Higher Frequencies and Secure Modulation Formats**

Frequencies are climbing up the spectrum and in the near future designs will have to go up to 3GHz and be able to handle a multitude of secure modulation formats in order to be “multinational” in nature. It’s now becoming essential that our military groups communicate with other “friendly forces” as well as our own Homeland Security groups in times of war or national emergency. All of which means more modes of operation, new frequency bands and/or spectrum for our new systems to handle.

### **Next Generation IP Systems are Needed**

Next generation highly mobile front line communications are tending to move away from the high power single line of contact methods, toward a low power “mesh” system where more operators are linked together by means of a multi-node mesh system. These systems will be less susceptible to single points of failure and will be self healing such that the communications packets find the best route to the destination based on traffic levels and available system bandwidth. Additionally, these new systems will need to be IP compliant and have a network port into the “IP pipe in the sky”, thus being able to carry encrypted voice and data information instantly to and from locations all over the planet. PDA devices, laptops, head-up displays, surveillance radars, scopes and other frontline systems will all connect seamlessly into the communications pathway, allowing individuals to be better informed of the big picture as well as allowing the big picture guys to see/hear the details at the source of the action.

### **Satellite Links are a Vital Part of Communications for a Highly Mobile Force**

UHF SatCom “on the move” systems are a vital part of modern highly mobile forces. So, in addition to the multimode systems discussed above, dedicated UHF communication amplifiers like the legacy KMW2050 can provide up to 200 Watt uplink power, thus allowing relatively “minimal gain” antenna systems. Plus, a variety of custom configured “embeddable” SATCOM modules such as the KMW2040M17 can provide up to 100 Watt with VSWR and automatic level control ALC built right into the unit, allowing it to be neatly integrated into a larger and multi-functional communications package. Designed to be rugged, these systems meet applicable sections of the MIL STD 810F environmental specifications.

### **Converged Communications and Countermeasures**

The need for converged communications and electronic war systems such as jammers exists, too. The use of a combination of software defined radio (SDR) and broadband amplifiers like AR Modular RF’s KMS1033 20 to 2500MHz, or one of our KMW1090 series 10 to 1000MHz amplifiers allow multi-carrier communication and jamming to be carried out simultaneously by a single operator in the band 30 to 2500MHz. New high efficiency amplifier designs use the latest generation GaN devices offering high efficiency and tolerance to high temperature without threatening the system reliability. Our future soldiers will be better informed and better protected than at any time in history due to the high tech systems that they carry in their backpacks or on the dashboards of their vehicles and AR Modular RF will be there to support them.