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Publisher
Scott Spencer
scott@highfrequencyelectronics.com
Tel: 603-472-8261

Associate Publisher/Managing Editor
Tim Burkhard
tim@highfrequencyelectronics.com
Tel: 707-544-9977

Senior Technical Editor
Tom Perkins
tom@highfrequencyelectronics.com
Tel: 603-472-8261

Vice President, Sales
Gary Rhodes
grhodes@highfrequencyelectronics.com
Tel: 631-274-9530

Business Office
Summit Technical Media, LLC
One Hardy Road, Ste. 203
PO Box 10621
Bedford, NH 03110

Also Published Online at
www.highfrequencyelectronics.com

Subscription Services
Sue Ackerman
Tel: 651-292-0629
circulation@highfrequencyelectronics.com

Send subscription inquiries and address changes to the above contact person. You can send them by mail to the Business Office address above.

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Focus on Military Communications

Scott L. Spencer
Publisher

Last month I attended Milcom2013 in San Diego. It was the first time in two years that I, or anyone else for that matter, was able to attend. Last year we were in Belgium, en route to Amsterdam for the European Microwave Conference when word came through that Milcom2012, set to open in Orlando, had been cancelled due to Hurricane Sandy, a powerful storm that eventually wreaked havoc on the Northeast.

Now in its 32nd year, the 3-day conference and exposition is co-sponsored by AFCEA International and the IEEE Communications Society. With about 2500 attendees and some 200 exhibitors, the event connects top military and industry leaders with the latest in defense and IT technology.

Even with federal budget experts and military brass predicting more cuts and greater uncertainty as the fiscal 2014 budget and appropriations process materializes, there are areas that are targeted for investment. There is a need in the military and even a directive from the President *"to invest in advanced capabilities to defend its networks, operational capability, and resiliency in cyberspace and space."*

C4ISR

Ever since the Department of Navy's publication, *"Copernicus: C4ISR for the 21st Century,"* the concept of Network-Centric-Warfare has played a key role in the advancement of defense electronics. Driven by the knowledge that future military environments may be far too complex for any one individual, command, or even an entire branch of the military to comprehend, the ability to network together sensors, commanders, firepower and other assets to improve precision and boost speed of command has grown increasingly desirable.

Future threats will likely involve a dizzying array of weapons, far beyond bullets and bombs. Electronic warfare (EW), cyber, chemical, directed-energy, nuclear, and biological weapons could all be in play. This will translate into an emergent need for investment in programs such as unmanned systems, cyber security, and ISR (intelligence, surveillance, and reconnaissance). These will remain high on the list of defense priorities going forward.

The theme of this year's Milcom technical program was *"Balancing Commercial and Defense Technologies."* Conference topics for the Waveforms & Signal Processing track alone covered a wide range of subject matter including Antennas and RF technology, Anti-jamming Techniques, Cognitive Radios, Coding and Modulation techniques, Radar Systems Detection and Localization, Undersea Communications, and more. But, there was also

some interesting discussion concerning readily available commercial communications equipment finding an increasing role within the military.

One Milcom-sponsored tutorial revealed how Tactical Command and Control during combat and surveillance operations are examples of where LTE and Femtocell technologies can now be deployed. With their flexibility and self-management capabilities these systems are suitable for many harsh environments and rapid deployment scenarios.

Collaboration

Opportunities exist for equipment suppliers and application developers to collaborate with commercial, military and government organizations to develop made-to-order solutions in areas such as Private Networks; Intelligence Gathering; Nomadic Networks; Personnel and Asset-monitoring systems—all of which will play a significant part in the future of military communications.

Satellite communications on-the-move (SOTM) is a new communications capability that will also have a role in the future of military communication systems. It will enable two-way, high-speed communications over Fixed Satellite Service satellites operating in Ku and Ka Bands.

A tutorial examined the general characteristics of SOTM systems including spectral efficiency, performance of SOTM systems, modeling and impacts of motion-induced antenna pointing errors, and interference assessment techniques for SOTM networks. Regulations and Standards will need to be developed since satellite spectrum is a shared resource.

Consistent with the military's need to update existing systems is the importance of reducing SWaP (size, weight and power consumption). Demand for "soldier systems" which equip soldiers with much more vigorous intelligence-gathering capabilities through the use computing devices, sensors, secure communication equipment, and digital imaging capabilities will increase.

Next year Milcom's Baltimore venue should further help by bringing it a bit closer to Washington, where the final decisions and appropriations are made.

With an ever-evolving array of electronic threats before us, a new type of combat has emerged dubbed by some as "Spectrum Warfare." Solutions involving Cyber warfare, EW, Navigational warfare, and other new threats will be needed if we are to counter these dangers. At a time when defense spending is being curtailed there still are many opportunities for our industry to benefit from the modernizing of our military communications capabilities.