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Cubic spearheads effort to create DirecNet, the military information highway and skyway of the future

Today's warfare pushes the envelope of military communications. Marines operate radios from a Humvee in the desert. Soldiers use laptops at Forward Operating Bases in Iraq. Satellites orbit high above the earth. Aircraft carriers cruise the Persian Gulf. Strike aircraft fly over Afghanistan. All possess pieces of situational awareness that may make a big difference to someone else, whether in the combat zone or the Pentagon.

But how to get information to each interested party quickly enough to achieve tactical advantage has been a long-standing challenge.

For several years, the military has been studying creation of a new communications infrastructure that would replace stovepiped, proprietary communications systems and would support network-centric warfare. Current legacy and commercial systems used by the military are often incompatible, only allow point-to-point communications, and do not support full Internet Protocol (IP) networking.

Cubic Defense Applications is part of a major new industry initiative to create DirecNet, a Radio Fre-

quency/IP-compatible network for routing data to give U.S. forces a common operational picture. Cubic is spearheading an effort to create a DirecNet Task Force, and met recently with representatives from ITT Industries, BAe Systems, Boeing, Harris, Innocon, L-3, Northrop Grumman, Nova Engineering, The Open Group and Raytheon in Washington, D.C., to discuss the path forward.

According to a vision statement, the DirecNet Task Force's goal is to "standardize directional, IP-enabled, highly mobile ad hoc mesh networks through a validated open specification." Organizers envision a complex network of routing stations through which both RF and Internet communications can flow to allow data containing video, imagery and audio to travel freely from one user to another, whether the user is in the air or on the ground. All future tactical communications systems would have to be interoperable with this electronic infrastructure.

Here's how it works: The military has chosen the Common Data Link (CDL) as the waveform to provide the

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Cubic Defense Applications (CDA) and Harris Corporation held a small demonstration at Cubic's Balboa campus in San Diego to showcase initial DirecNet-enabling technology. Pictured in photo at left are Eric Campbell of the U.S. Space and Naval Warfare Systems Command (SPAWAR), CDA President and CEO Gerald Dinkel, CDA Senior Vice President Rick Lober and U.S. Navy Capt. John Pope. At right, demonstration participants examine Cubic Radio Frequency Equipment (RFE) modules atop the Cubic test tower.

bridge between satellite, air and ground network-centric operations. Under the DirecNet concept, manned, unmanned, fixed wing and rotary aircraft would operate on an air-ground network called DirecNet that would extend the CDL capability to enable a 1 Gbps data rate across hundreds of miles. The aircraft would be equipped with directional antennas that would interface with a control LAN to bolster link power and range, and to permit efficient use of limited RF spectrum. This link would allow narrowband data links to join the network, schedule a connection and assign bandwidth, thus resolving spectrum allocation problems. LAN users on the ground would send their messages via wideband communications to a DirecNet terminal, which would provide routing to another user. If spectrum was saturated on one route, the system would automatically find another routing path.

The DirecNet Task Force envisions a future infrastructure that would allow secure wideband IP communications up to 1 Gbps — up from the current 274 Mbps — for air and surface platforms of all types. This would make streaming video much easier than now.

With its recent successes in the CDL field — including contracts to manufacture CDLs for use aboard ships, aircraft and UAVs — Cubic is in an excellent position to help shape the military's future communications infrastructure.

"The military has mandated CDL for airborne platforms, so we're coming up with the next standard for those systems, mobile ad hoc networks," said Rick Lober, senior vice president in charge of Cubic's Communications & Electronics Business Unit. "The next-generation CDL specification will replace the stovepiped proprietary link waveforms that now exist."