Expeditionary Communications / Communications for the Disadvantaged User

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At a Glance

What is it?

- The Expeditionary Communications/ Communications for the Disadvantaged User initiative explores compact, modular, mobile command centers for lower echelons and compact, low-power consumption command/control and communication (C3) capabilities for dismounted warfighters.

How does it work?

- This effort would lower the cost of low-profile components while maintaining or increasing performance and enabling multi-band operations. Mobile command centers would reduce the size and number of components, especially at very high frequency and ultra high frequency, and would reduce the number of separate antennas needed to support C3 capabilities. Individual capabilities would improve power management, efficiency and security.

What will it accomplish?

- This program will provide naval expeditionary small units with high-throughput reachback to higher echelons and command/control collaboration capabilities while moving toward the objective or on the pause. It will also provide for the exchange of situational awareness and other critical information among distributed warfighters with handheld devices and little to no communications infrastructure.

Point of Contact

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The Office of Naval Research is investing in solutions that provide a high-level of capabilities in small, power-efficient packages to support mobility and flexibility at the tactical edge without any dependence on fixed infrastructure.

Today's naval expeditionary warfighters are geographically dispersed. Distances between echelons and between units of the same echelon are often beyond line of sight. Since expeditionary forces often operate with minimal logistical support and are limited in what they can carry, they require reduced size, weight and power consumption of C3 equipment.

Communications at the tactical edge are typically intermittent with low throughput, which drives requirements for robust C3 services that can continue to operate in and/or adapt to these extreme conditions. Finally, warfighters must sustain communications from the field, including remote locations. Military security protocols must be met without the capability of reaching back to a central authentication authority or sustaining stable point-to-point security associations.

Research Challenges and Opportunities:

- Spread-spectrum modems, low-cost modular link electronics, etc.
- Compact, wideband line-of-sight radio frequency components (i.e., very high frequency to mid-C-band)
- Alternatives for beyond line-of-sight communications (e.g., airborne relays, laser communications, etc.)
- Broadband, low-profile communications antennas
- Adaptable mode antennas for individuals
- Self-adapting radios (i.e., frequency, coding type, coding rate, modulation, diversity, burst rate, power)
- Linear power amplifiers
- Software radio security partitioning
- Ad hoc network security
- Low-overhead, intuitive distributed decision support tools
- Position location without GPS
- High-throughput high frequency communications and compact antennas