

Key WNaN Technologies



- **Mobile Ad Hoc Networks (MANET)**

- *WNaN radios improve range and reliability* by forming ad hoc networks to dynamically link sender and receiver

- **Policy Driven ("NETOPS")**

- *Decreases planning and setup time* through policies frequencies, call groups and network established by network manager (S6 staff)

- **DSA (Dynamic Spectrum Access)**

- *Avoids interference; improves spectrum loading* because Dynamic Spectrum Access (DSA) finds and continually evaluates usable spectrum
- Units use policy driven DSA to share frequencies on a non-interference basis

- **DTN (Disruption Tolerant Network)**

- *Prevents messages from being lost*- When a data connection is lost, a message is "held" at the last point in the link and then transmitted to the intended receiver once the link is reconnected
- Delivery despite disruption

WNaN Radio Features

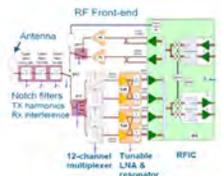


Benefit to the Soldier

- C2 capability enhanced with a four transceiver radio that enables relay capability and message delivery
- Frequencies are not locked to call groups
 - Makes frequency usage more efficient
 - Minimizes disruptions to soldiers operating in a radio dense environment

WNaN Technology

- 4 Channel Handheld Radio
- Freq Band (MHz)/Channels: 900-6000Mhz
- Weight: <3.1 lbs. (battery and antennas included)
- Security: Current- AES 256, Planned- Type II
- Implements many novel front-end filtering designs



- Provides voice, data and PLI

WNaN Support to Command and Control



- **Bandwidth**

- WNaN bandwidth of 1.2 Mbps supports both voice and data

- **Voice Quality**

- High quality (13kbps) coder enhances voice recognition and intelligibility

- **Data**

- Data ports support PDA devices (SA, streaming video, imagery)
 - WNaN experiment supports LW for company; CERDEC C2MINCS software with NOMAD used to send/receive images

- **Scalability**

- Low power handsets (1w) support scalability, frequency reuse and LPI while still achieving range

Disruption Tolerant Network (DTN)



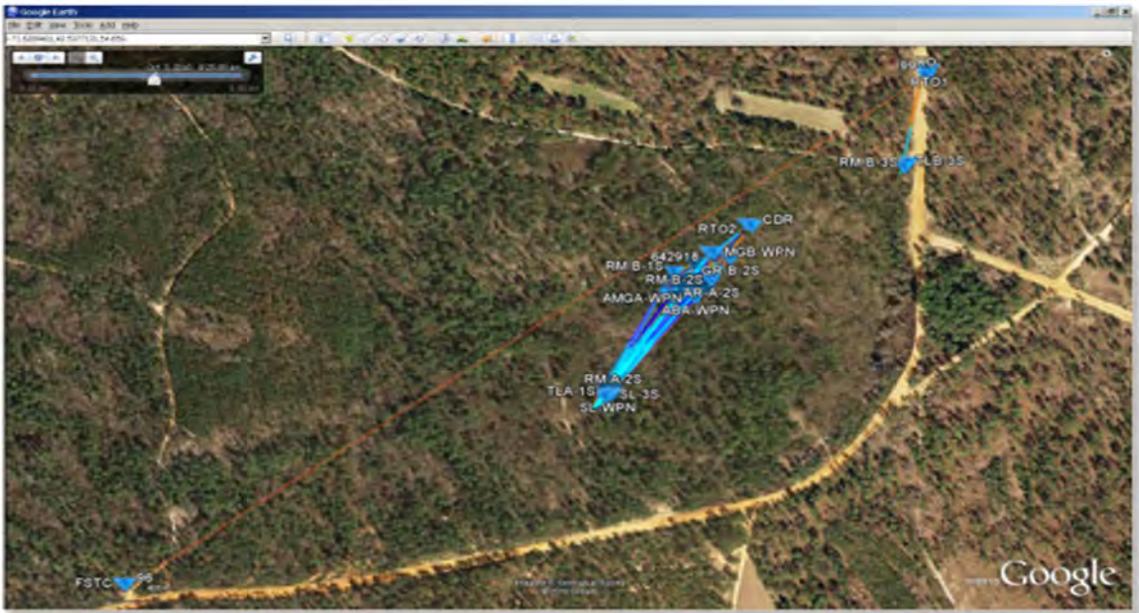
Benefit to the Soldier

- Data messages sent during breaks in communication are held for a pre-determined amount of time and sent when contact is re-established
 - This ensures Leaders do not have to spend valuable time repeatedly sending data when there is a break in communications

WNaN Technology

- When a data connection is lost:
 - A message is “held” at the last point in the link until the link is re-established
 - Then transmitted to the intended receiver once the link is reconnected
- Delivery despite disruption

Dynamic Spectrum Access (DSA)



Benefit to the Soldier

- Reduces soldier task load
 - Soldiers do not have the added task of having to adjust frequencies
- Allows seamless operations in a Joint or Coalition environment
- Minimal impact to Command and control from civilian, hostile or other emitters

WNaN Technology

- Dynamic Spectrum Access (DSA)
 - Finds and continually evaluates usable spectrum
 - Avoids interference; improves spectrum loading/utilization

Mobile Ad Hoc Networks (MANET)



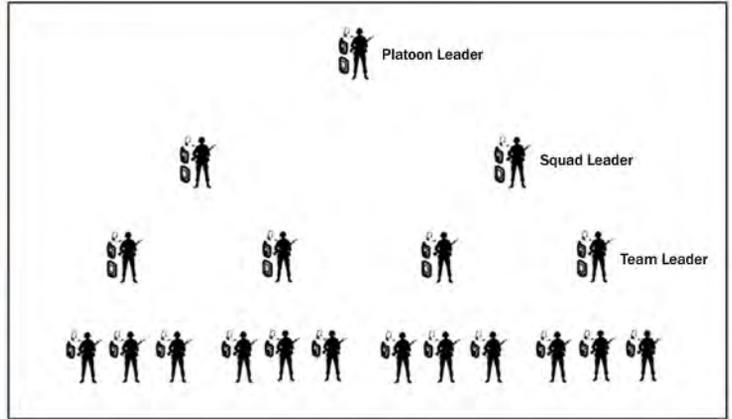
Benefit to the Soldier

- Network formation and reformation is transparent to soldier, allowing him to focus on executing the mission verses maintaining communications
- Range is enhanced rather than limited by a larger network allowing the soldier to operate over extended distances and still maintain communications

WNaN Technology

- WNaN radios form an ad hoc network to dynamically link sender and receiver
- Each radio functions as a relay for other radios
- Improves range and reliability

Policy Driven ("NETOPS")



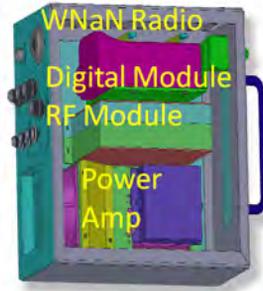
Benefit to the Soldier

- Automatic frequency changes by time or geographic location allows soldiers to focus on mission execution rather than maintaining communications
- Leaders can adjust task organization to support the mission with minimal impact on the communications plan/network

WNaN Technology

- Network manager pre-configures radios
 - Frequencies
 - Call groups
 - Network topology
- Decreases planning time
- Eliminates task load from individual soldiers

WNaN Radio Vehicle Adapter (WRVA)



Benefit to the Soldier

- Allows soldier to combine mounted and dismounted operations while extending the WNaN dismount/WRVA squad network

WNaN Technology

- Proof of concept of WNaN vehicle based capability
- WNaN dismounted radio cloud (network) connects with WRVA
- WRVA extends range to another WNaN/WRVA equipped unit
- Integrates WNaN radio with 10w amplifier; frequency modified to 450 MHz band
- Used in experiment as link between company and simulated TOC