WB GROUP AMERICA

WBA PERAD-Mercury Overview

27 October 2021

WB GROUP AMERICA

PERAD 6010 / Mercury Waveform Quad

Background/Motivation

It has become apparent through engagements with Russian forces in Ukraine that their ability to detect, locate and rapidly apply counter fire is a serious ongoing threat.

This necessitates a waveform with high data rates and reliability but low detectability for use in combat environments with an opposition that has the capability of detecting and accurately locating the sources of a transmission.

Approach

The system has three unique components

1) The Mercury Waveform which was developed as COFDM waveform for UHF and L Band frequencies.
2) The PERAD 6010 SDR
3) The UGATE Augmented Reality End User Device

Design Objectives

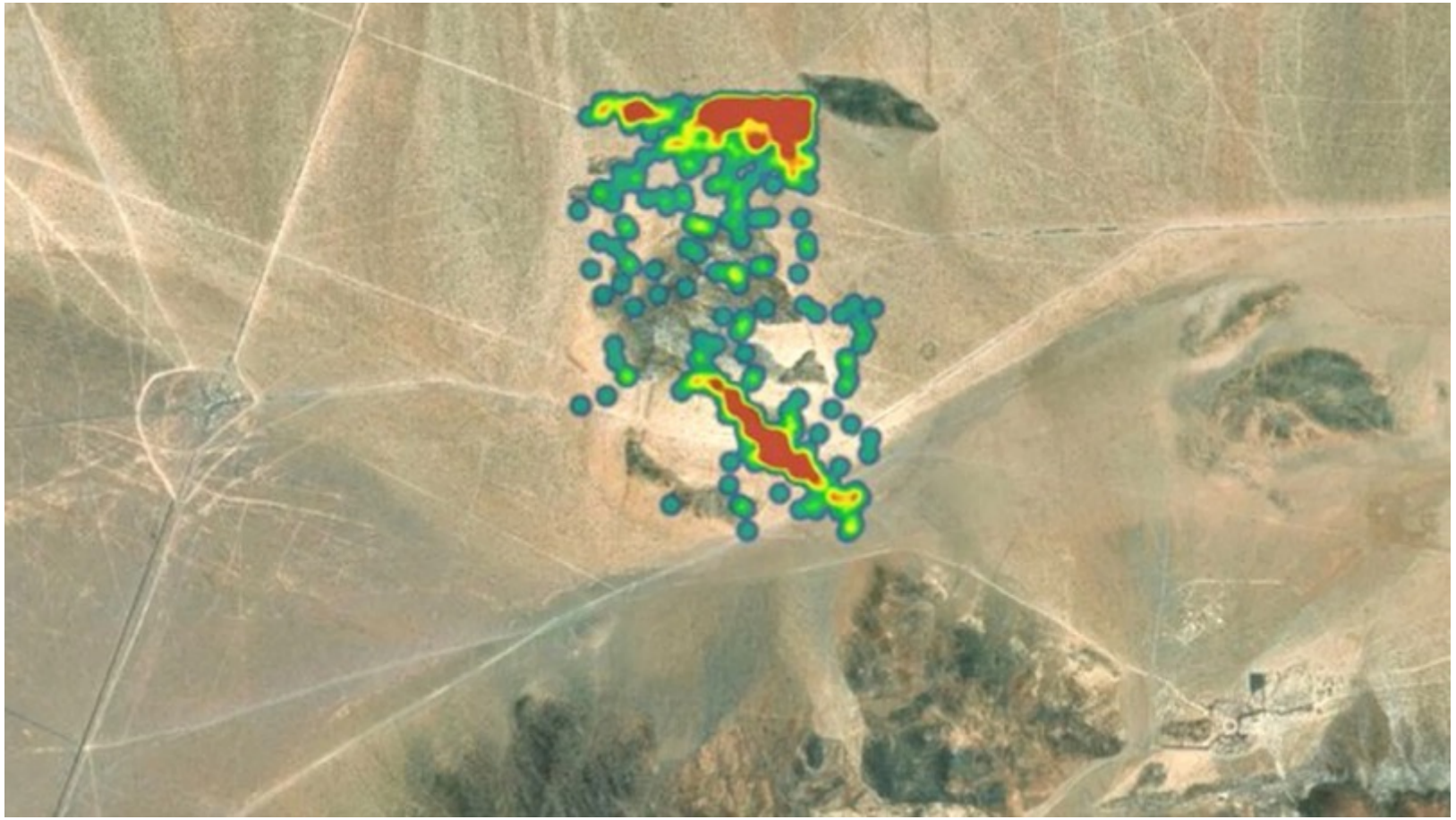
An SDR & Waveformthat can

- Evade detection through low emissions
- Avoid interception/jamming
- Exist on software defined platforms
- Provide increased narrowband, wideband, and MANET throughput.
- Provide enhanced dismount / AR capabilities to warfighters in conjunction with the FONET vehicle integration platform (AKA RF-7800i)

Results

- Current Frequency Hopping Rate = 700/s on all waveforms
- Power Emissions less than 1w
- Throughput
  - MANET 1mbit/s
  - Wideband 4mbit/s
  - Narrowband 75kbit/s
- Longest single hop transmission: 199km
- Typical Forest Range approximately 1km

Silent Network is The solution to The real problem…



US. Army's 11th Armored Cavalry Regiment comms electromagnetic signature localized on the satellite map

PERAD 6010 Security & Useability

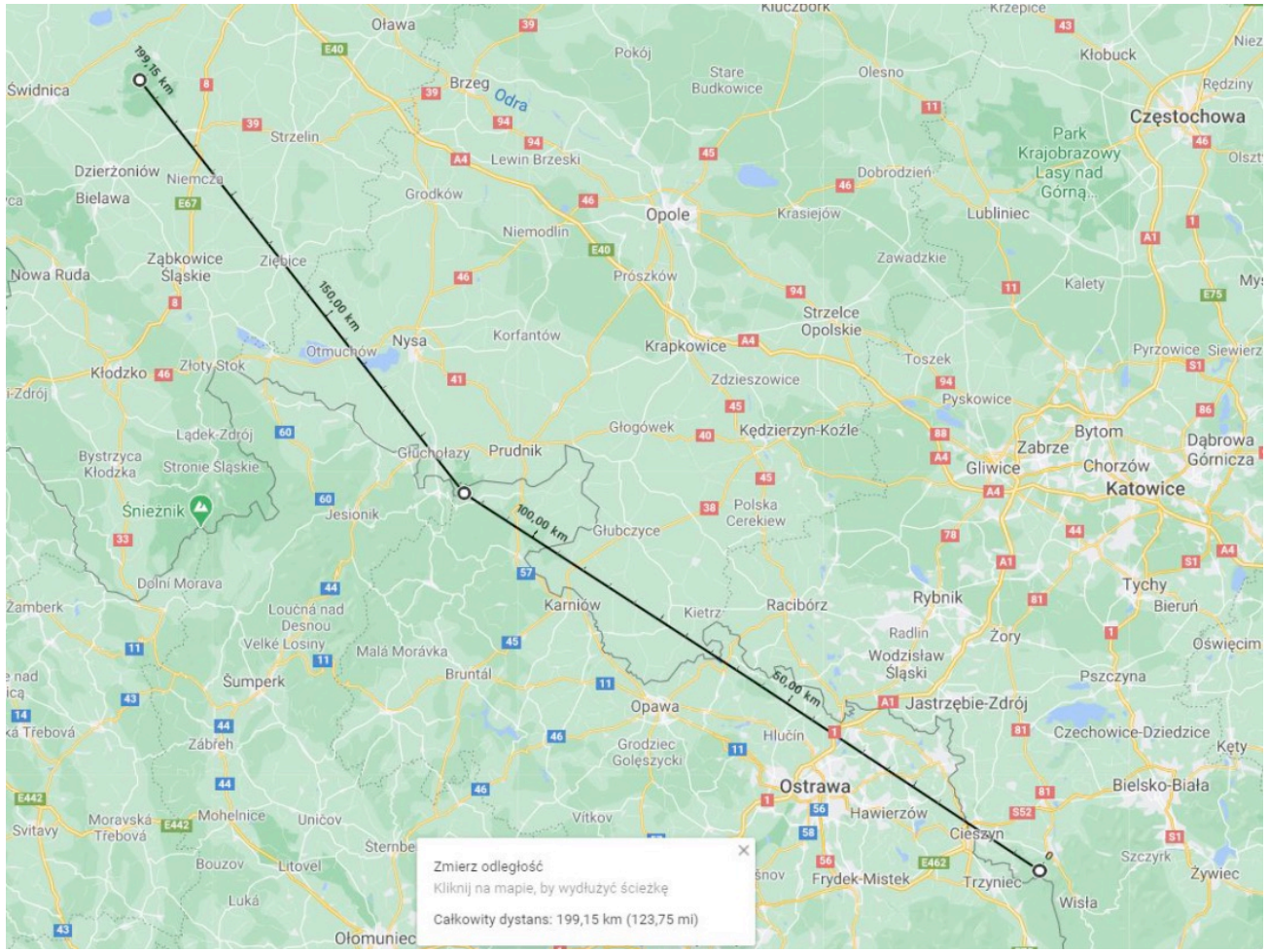
- OFDM – UHF/L Band 1W, 1,25 MHz/75 KHz channel
- Embedded AES encryption.
- Customer Crypto Module integration kit
- Frequency Hopping - 700 hops/sec.
- No GPS reliance. GPS built-in.
- Anti-Tamper protection.
- Over-The-Air zeroing.
- Radio silence / network entry < 6 secs
- Embedded spectrum scanner
- Waveforms: MANET 1 Mb/s, 80 Kb/s
- Point-to-point 4 Mb/s
- Weight – 1 Kg (with battery)

Perad 6010 – key features

- Ad Hoc Mesh Network
- UHF or L Band, SDR radio
- WB 1,25 MHZ (4 or 1Mb/s) / NB 75 KHz, 80 Kb/s
- Frequency Hopping up to 700 hops/s
- Full Duplex Conferencing with 10 users
- Burst mode
- Flexible interconnectivity (ETH, USB)
- IP Network Oriented - SNMP v.3 controlled
- Embedded SIP, RIP & OSPF
- Battery Operation up to 48h *
- MELP 2400
- Voice activated, PTT or video/voice streaming
- Dongle to wireless eairbuds (optional)
- High selectivity, co-site operation ready
- Sensitivity: -103 dB (WB), -116 dB (NB)

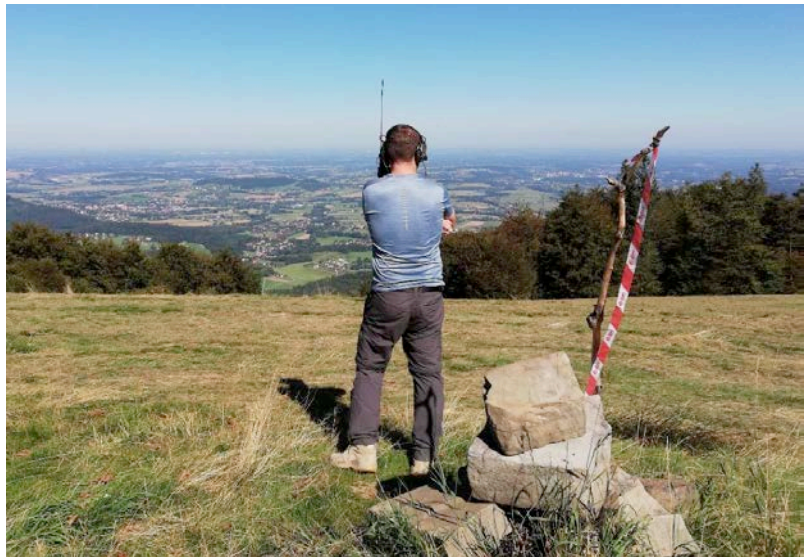
* RF autosense with max 7 sec network entry

Demo of range testing for PERAD 6010 radios

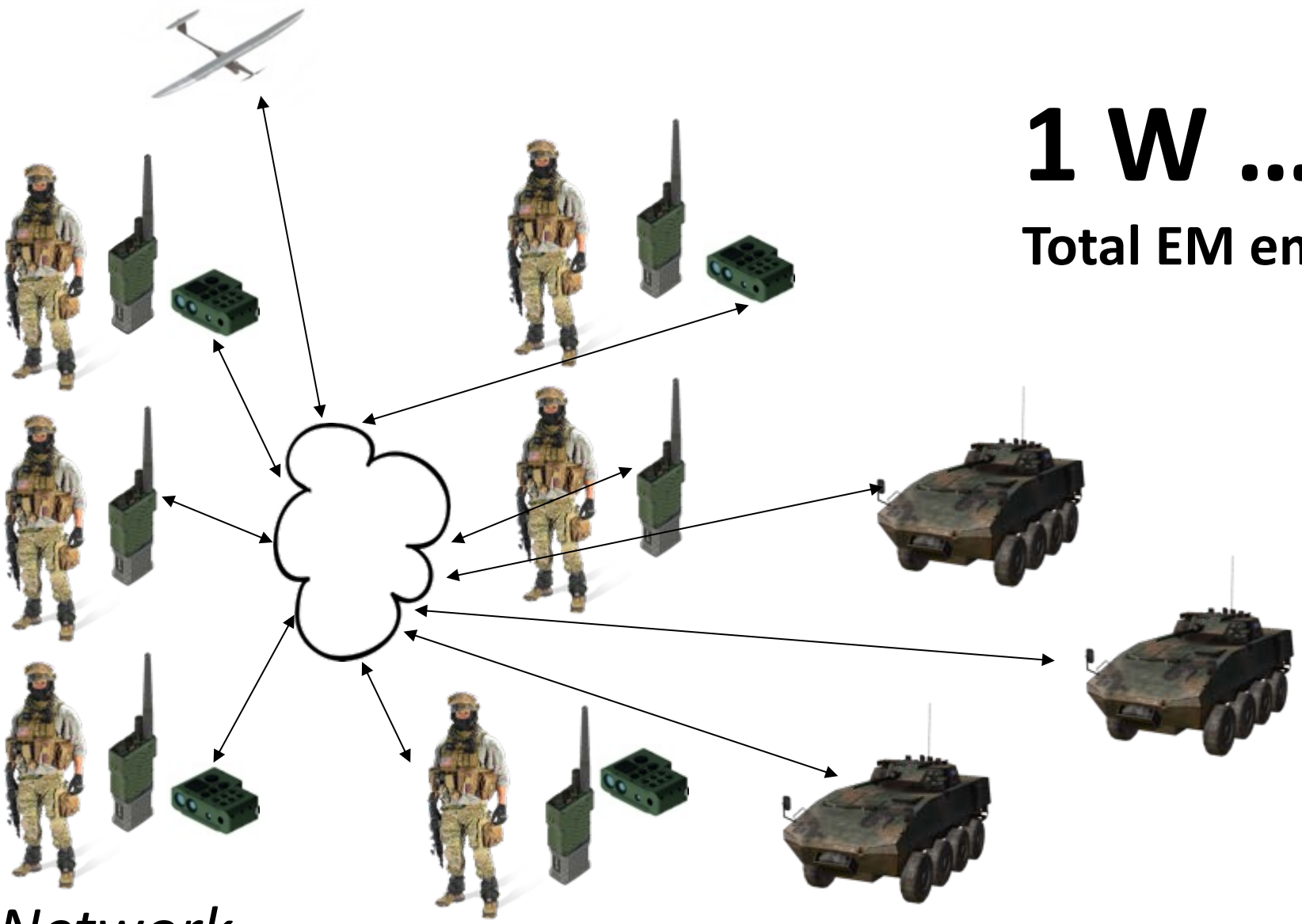


NB,1 W (30dB) RF power
Standard omnidirectional antennas
One relay point (one hop end to end)
85,7km + 113,4km

Range confirmed: 199 km/124 miles



Airborn node – extends range to 10 Km WB, 40 Km NB



1 W …

Total EM emission

Silent Network

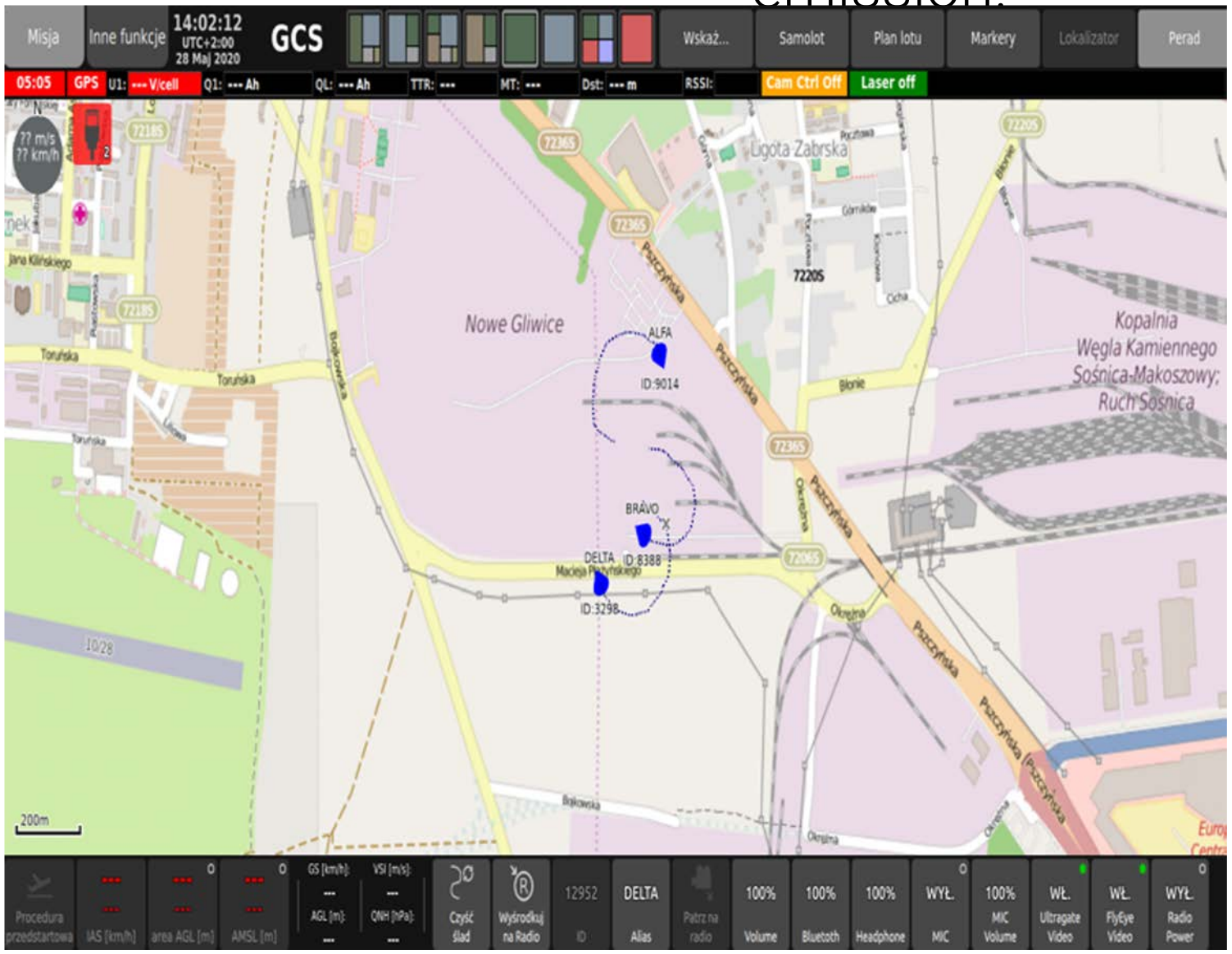
Semi-satellite, mini UAV based large area network coverage.

- ✓ Any terrain;
- ✓ Tactical ranges;
- ✓ IP based;
- ✓ Semi-satellite connectivity-on-demand;
- ✓ Video, voice, PLI, pictures, maps, chat, AR, and more ;
- ✓ Low EM signature;
- ✓ UAV datalink supports voice/data projection from the battle network to remote HQ;
- ✓ On-the-fly spectrum availability analysis;
- ✓ GPS jamming avoidance;

Silent Network & Soldier-centric philosophy, explained.

- Extend connectivity reach by use of flying robots;
- Provide information advantage at the battlefield while limiting forces network EM signature,
- Communicate over wide area, covering any terrain (buildings, forests, mountains) using affordable UAV carrying network node;
- Integrate an entire motorised battallion (100+ nodes) with a scallable network that evades enemy EW;
- Provide frontline soldiers with airborne reconnaisance, communication & access to „joint fires”that can be scallable between a loitering munition, AFV guns, artillery & airpower;
- Remove excessive load that soldiers currently „deliver” to the battleground on their backs.

Secure & Silent connectivity for an AFV battalion under 1 W of total EM emission.



MANET	✓
Conference call	✓
Multiple talkgroups	✓
Selective Call	✓
Video & pictures	✓
PLI	✓
WB/NB Waveform	✓
Cognitive Radio	✓
Radio Silence	✓
Network entry	***5sec***

SILENT NETWORK FAMILY

Vehicular Silent Network Node
SWAP – 15 x 18 x 11 cm , 3 KG, - <7 W

Airborn Silent Network node.

Personal Silent Network node.

Thank You.

WB GROUP AMERICA

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