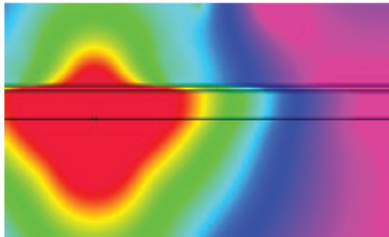


VITALALERT

Digital Very Low Frequency (VLF) Network Connectivity / Positioning Technology DARPA-SN-18-10 – RFI – Subterranean Operations

LEADERS IN VLF TECHNOLOGY RESEARCH

- Partnered with Los Alamos Labs
- Software defined VLF digital radio
- Noise-cancelling inter-harmonic waveform
- Powerful FDTD simulation tools:
 - Modelling complex structures
 - Propagation into man-made structures
- Enhanced range through infrastructure coupling at VLF
- Position determination and vehicle navigation in GPS denied environments with 0.5m accuracy (Japan ITS application – partnered with Toyota).
- Wireless detonation systems (commercial)
- Intrinsically safe VLF radio systems Mine Safety & Health Administration (MSHA approved)
- 6 US patents awarded for VLF technology communications and positioning: US7,043,201, US7,149,472, US 9,231,799, US 9,450,684, US 9,564,977, US 9,866,3333, others pending. 4 papers published in last 2 years (Ralchenko et al): IEEE Antenna and Propagation, Computers and GeoScience, Geophysics.



COMPAC VLF RADIO TERMINAL

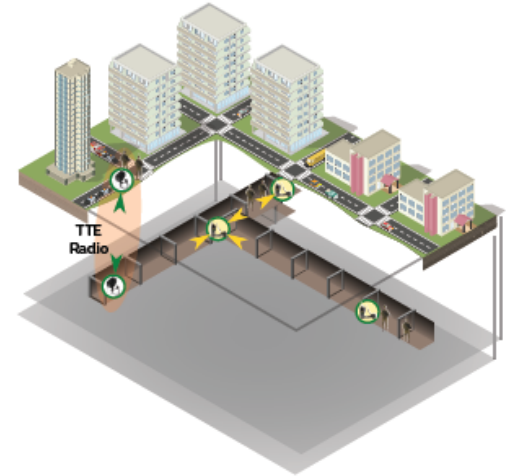
The most advanced VLF Radio Terminal available: TRL 8

- Always on digital link
- Push To Talk (PTT) voice
- Integration with military MESH, MANET and public safety radios
- RS-485 remote sensor backhaul
- MIL standard battery, 10 hours endurance
- Range 100-300ft with 5m loop antenna
- Software Defined Radio with GUI
- Configuration tool
- Multiple antenna options



TARGET APPLICATIONS

- Potential target for DARPA AMEBA technology / project
- Network connectivity (bridge) when other methods are impractical or impossible (Primary or Backup)
- Position determination in GPS denied areas
- Subterranean Operations In support of Military Operations
- Buried sensor / tunnel perimeter breach connectivity
- Rescue operations post kinetic action or remote demolition



VLF TECHNOLOGY CORE FEATURES

- Operates in 1kHz to 9 kHz unlicensed band
- Signals penetrate solid materials up to 1000ft rock, sand, clay, concrete, construction materials
- No infrastructure required
- Data throughput 1700 bps
- No RF power is radiated – magnetic field only
- Not detectable beyond maximum TX range (LPI, LPD)
- No multipath generated enables position measurement through solid materials
- Communication range can be extended 10x by coupling to metallic infrastructure

