Tactical Scalable MANET (TSM)

Use Cases

November, 2014
Simultaneous Voice, Data, Video, PLI

Tested Across Wide Range of Harsh Environments

TSM Meets Wide Range of Missions

- Tunnels
- Sparse Urban
- Mid Size City
- Long Range
- Heavy Foliated
- UAV Relay
- Large Scale
- In-Ships
TrellisWare Tactical MANET Product Family

Exportable SDR Products

<table>
<thead>
<tr>
<th>TW-400</th>
<th>TW-225</th>
<th>TW-600</th>
<th>TW-130</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUB</td>
<td>CheetahNet Mini</td>
<td>Ocelot Module</td>
<td>WildCat II</td>
</tr>
<tr>
<td>Small, Versatile Gen 2</td>
<td>Modernized Original</td>
<td>Embeddable Gen 2</td>
<td>High Power, Dual Channel Gen 2</td>
</tr>
<tr>
<td>9.5 in³ • 10 oz</td>
<td>9.5 in³ • 10 oz</td>
<td>1.75 in³ • 2.9 oz</td>
<td>33 in³ • 55 oz</td>
</tr>
</tbody>
</table>

Family of products provides the same MANET capability in a range of form factors

- Self Forming, Self Healing Networking
- Robust in Harsh RF Environments
- Simple to use and operate
- Scalable – 2 to 20 to 200+ Networks
- Robust in high mobility
- NO FIXED INFRASTRUCTURE NEEDED

- 0, 2, 4, or 8 PTT Voice channels
- 8-hop MANET covers up to 100+ miles
- Demonstrated 2 6 miles per hop
- Data connections via standard interfaces
- USB/Ethernet, WiFi
Tactical Scalable MANET (TSM)

Supported Events
Recent National Guard / First Responder Support

2014 Pro Bowl - DTRA and 93rd CST
- TW assets deployed as capabilities enhancement to MFK-CBRN Packages
- Served as backbone to nodes and detectors
- Provided stable and robust coverage including beneath the stadium
- Increased operational availability of all SA, sensor monitoring, collaboration and mission planning tools beyond any previous operational testing

Staples Center / LA City Hall – 9th CST and LAPD
- Provided full network coverage of Staples Center from HVAC access tunnel to inside concourses and outside street blocks away with just 5 radios
- Provided streaming video and voice from street level to 5 levels below ground with just three radios

2014 Boston Marathon supporting 1st CST and TF CBRNE
- 5 TW personnel and 150+ radios in support
- Established 150+ radio network covering 26 miles and 8 jurisdictions
- Challenging RF characteristics; hills, dense trees, deep urban
- Enabling voice, PLI, real-time (CBRNE monitoring) data, chat and file sharing
• **Challenging Coverage Area**
  – Large geographic area: entire race route
  – Diverse terrain: rural hilly, suburban, urban canyon
  – 9 cities / municipalities
  – 100+ nodes
  – Fixed and mobile nodes
  – Voice, PLI, SA apps

• **Robust performance for different applications**
  – Cell quality voice from start to finish
  – IP data supporting chat, location, picture/file transfer
  – Network Management / Mapping of PLI
Point-to-Point Phy Test
2 nodes placed on ground voice, streaming video, PLI through Angels Stadium 1000M with no video degradation
• USS North Carolina supporting SOF K9 Teams

  • Ship walls average 6 – 16 inches of steel plus the superstructure is a significant RF impediment

  • Provided voice and video throughout the ship with 3 radios

  • Coverage included lower and mid level decks, engine room, topside and nearby land position

  • Integrated with APASS running on Samsung Note 3 Android devices
2014 FIFA World Cup

• 3 x TW Rep and 26+ Cub radio systems in support of Brazilian Federal Police

• No preplanning or rehearsals

• Provided robust communications in and around the Maracanã Stadium in Rio de Janeiro during the 2014 World Cup

• Challenging RF characteristics; mountainous, deep urban, concrete and steel stadium

• TSM worked in areas of the stadium where no other comms would
Range Example – 10+ mile links

MANET Demo
Voice, streaming video, PLI
12 miles – only one relay necessary
Additional car at HWY speeds tracked
USMC exercise deploying of 200 CheetahNet units - Voice, Data and PLI Tracking

Eval Team: USMC

Scenario: Deploy and PLI track large number of CheetahNet units + voice + IP Chat

Description: Units first tested in ‘parking lot’ test; Units handed out to MEF Company and deployed for week exercise.

Approach: Monitor PLI tracking with Google Earth; system also supports export of PLI data via JSON or KML from any unit

Units Evaluated: 200 Units

Summary: Voice, PLI and IP Data all scaled successfully
**Border Support – Arizona**

- Extremely small and tight tunnels
- TW provided comms below surface and ability for leader to monitor from above ground
- One tunnel was known by agents as a “no comms” zone. TW radios showed considerable improvement in this tunnel
  - Current capability provides about 30’ separation between agents in this tunnel
  - TW provided 400’ of separation between two agents and a single radio used as a relay. This would free up 11 agents

Canal Entrance - .25 miles single hop achieved in this canal
For Information on TrellisWare MANET Technologies and Capabilities Call:

Reid Kinder
TrellisWare Technologies Inc

16516 Via Esprillo Suite 300 San Diego, CA 92127
(919) 819-6394
rkinder@trellisware.com