

LOCIVA FCC Application **EL271103**

Supporting Documentation

JUICE 2013

JUICE Exercise 2013 June/July 2013

Joint Users Interoperability Communications Exercise 2010 What is it? The Joint Users Interoperability Communications Exercise (JUICE) is an annual event sponsored by the Executive Agent Theater Joint Tactical Network (EA-TJTN) with Joint Forces Command (JFCOM) as the supported and supporting Combatant Command (COCOM). JUICE traditionally focuses on leading edge technologies which provide improvements to existing operational capabilities and fill operational gaps. JUICE attempts to provide the right mix of communication capabilities to leverage the new technologies necessary to maintain and sustain a light agile and lethal fighting force. This year the annual world-wide event will take place June 2013 and will perform over 1,000 test objectives. The key objectives for this year is to validate the Global Information Grid 2.0 Unified Capabilities (UC) Architecture in a Tactical environment and develop the Tactical requirements set for inclusion into the Unified Capabilities Requirement document and validate a new construct for a Joint NETOPS Control Center (JNCC).

What has the Army done? JUICE provides participants the opportunity to leverage numerous training opportunities offered in multiple operational, technical and administrative orientations. Additional benefits that accrue to the Joint Warfighter include team building amongst the many technical, test, operational and acquisition communities.

What continued efforts does the Army have planned? JUICE will continue to be executed in an expanded capacity into the future. The EA-TJTN also has a companion network called the Joint On-demand Interoperability Network (JOIN), which is available on a 24/7 basis at no cost to the TJTN user community. JOIN has two distinct sides, one tactical with a JTF HQ node and multi-service component nodes and another that is geared to the distributed testing area.

Why is it important to the Army? The annual JUICE effort will continue to play a key role for our Warfighters at the leading edge of the Battlespace as they continue to expand a persistent forward presence and engage in joint, multi-national and interagency operations. JUICE and JOIN present to the Army a very unique one of a kind resource that bridges multiple gaps in resource allocation, planning and connectivity while providing the Warfighter and organizations supporting him/her with a capability to stage equipment, troubleshoot problems, train, bring laboratory arguments into an operational network, validate concepts of operation and ascertain realistic tactical requirements for certification.

The **Joint Users Interoperability Communications Exercise**, which takes in June, is an annual exercise run by the US Army's Communications Electronics Command to test new methods and techniques for running and managing joint and coalition networks.

There are three primary themes to this year's event: expeditionary communications, pushing communications to the edge of the battlefield and CECOM's transition from Fort Monmouth, N.J., to the Aberdeen Proving Ground in Maryland. JUICE 2013 takes place in three separate regions — North America, Asia/Hawaii and Europe

Location of LTE Equipment for JUICE exercise

4th Floor CTIE Lab

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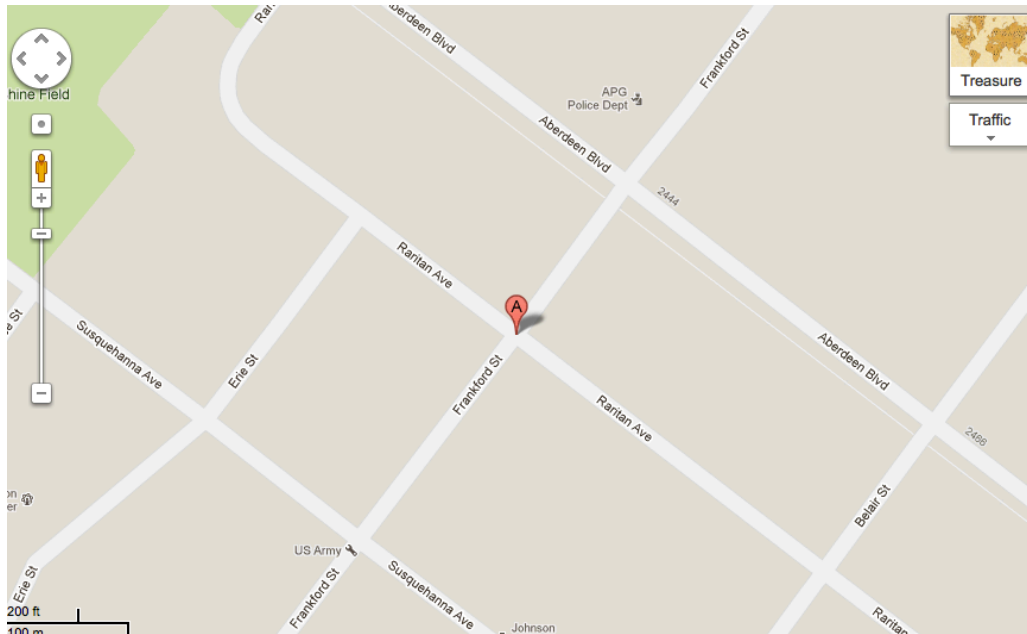
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Installation

4th Floor

Map shows Aberdeen Proving Ground Location in MD

Note: Satellite images are not commercially available



In support of the JUICE 13 interoperability exercise in

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Operational Requirements

Integration of the LTE eNodeB and LTE network core with VHF/UHF radio bridge and video streaming systems. Interoperability with Suite B security algorithms and secure applications

LOCIVA SUMMARY

Lociva is a mobile communications technology firm based in Northern Virginia, providing high performance UMTS and LTE mobile networks supporting voice, messaging (SMS and MMS) and high-speed packet data (HSDPA/LTE) services and specialized telecommunications solutions and consulting services:

- Wireless voice and packet data technology, (GSM, MAP/SS7, GPRS/EDGE, CDMA, UMTS, HSDPA, WiMax 802.16d/e, satellite, SIP, T1/E1)
- Wireless data and messaging application integration services
- Security provisioning on wireless networks and devices
- Network design, deployment and optimization
- Customized software and hardware for customer specific functionality/requirements

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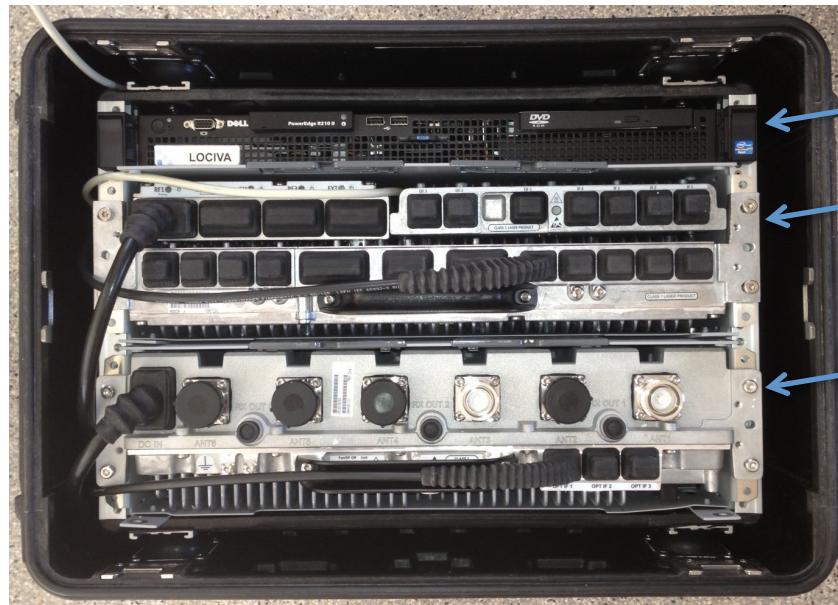
LOCIVA LTE Equipment details

EdgeCentrix LTE Macro Cell System (LMCS)

The EdgeCentrix LMCS is a complete LTE network in a rack mount enclosure that comprises a Nokia Siemens LTE radio with a server based EdgeCentrix LTE packet core (EPC).

The LMCS has the following features

- LTE macro cell (2 x 60W) system
- FDD Band options; 1, 3, 4, 5, 7, 8, 13, 14, 17, 20
- LMCS networking capability (optional)
- 30-60 simultaneous active users per LMCS
- Embedded LTE packet core (EPC)
- Form Factor – 7U rack space needed
- Weight (<75lbs)
- 48V input power
- Output power: up to 2 x 60W (MIMO)
- Temperature range (0 to +45 C ambient)
- UL/DL 4G LTE data rates – 35/20 MBps per handset
- Interfaces: Antenna Connections (2), Power (1), Ethernet (1)



LTE EPC server

Nokia Siemens
eNodeB BB Module

Nokia Semens
eNodeB RF Module
(band specific)

EdgeCentrix LMCS Functionality

The EdgeCentrix LMCS will provide high-speed 4G LTE data services to standard COTS subscriber devices supporting LTE services. Demonstrable functionality

- LTE 4G data services
- Video distribution capability between multiple subscriber devices supporting simultaneous video streaming from and to multiple video sources anywhere on the routable network
- Handset/ PC Application interoperability – band specific smart phones, tablets or LTE dongles allow connection to the internet or local application servers
- Integration with LTE MiFi routers to create WiFi access areas

EdgeCentrix LMCS Options (not included in quotation)

- PTT Voice Services – supported via handset based PTT clients to a local or centralized SIP meet-me gateway
- On the fly networking between multiple EdgeCentrix LMCS
- Satellite fallback option – integration of Globastar/Iridium modem – for voice services

EdgeCentrix LMCS System Hierarchical Communications Capabilities

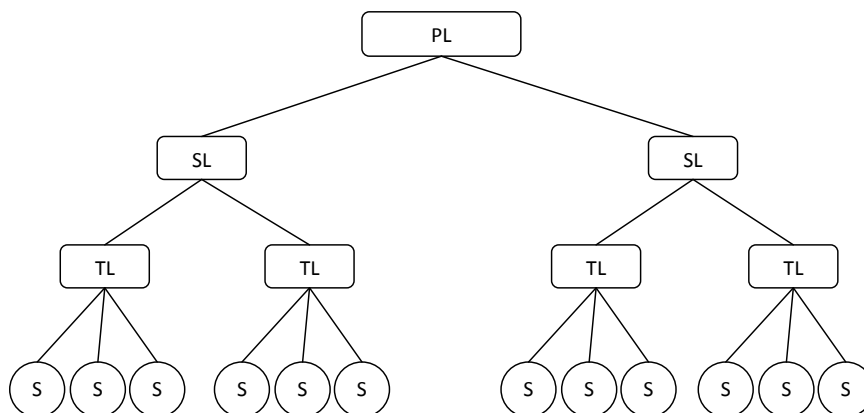
LTE Mesh Network

Each EdgeCentrix LMCS incorporates an LTE modem that allows it to automatically set up a high speed network link to another LMCS system. The configuration of the LTE network, network codes, ipaddresses and HLR entries are define in such a way as to allow automatic configuration of the system.

The meshing concept for the Lociva EdgeCentrix LMCS was originally designed as part of a hierarchical push-to-talk PTT communications system between a Platoon Leader and Squad Leaders, Squad Leaders and Team Leaders, Team Leaders and their allocated soldiers. This is explained in more detail below and is available as an option on the recommended system.

The original concept – as detailed below - can be modified as needed for this DHS program where the communication profiles may be different

Hierarchial Communications configuration using SIP and PTT Android applications



The high level functional capabilities are as follows (the original design hierarchical concepts are retained)

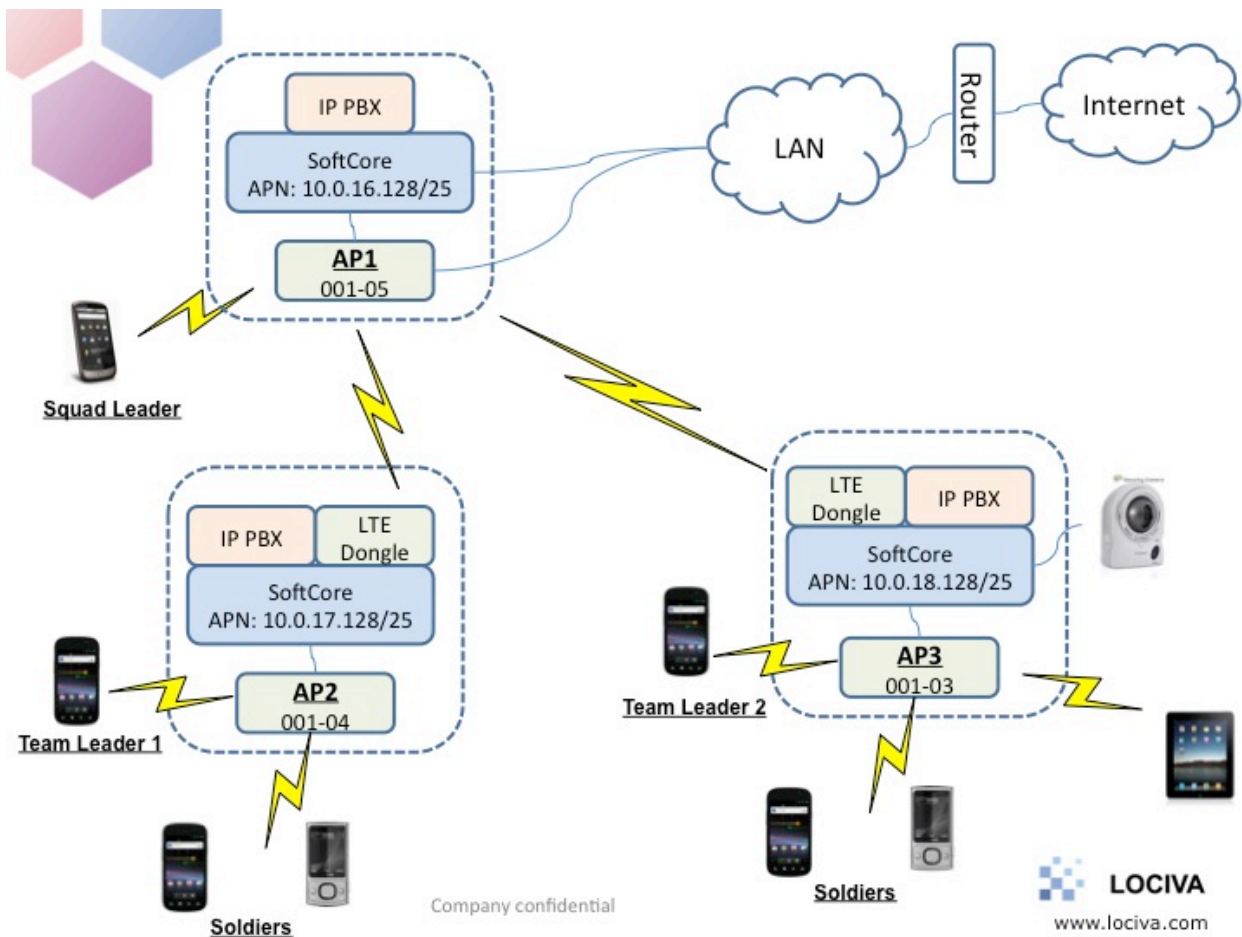
- Every Soldier shall be able to communicate with his Team Leader and the other soldiers under that team leader.
- If the TL is either unavailable or out of range, a soldier's communication system shall be able to connect with
 - either his own TL using a satellite fallback connection
 - or he can communicate with another TL via the mobile network or the satellite fallback
- Each Team Leader shall provide a communications node for his team
- Each TL shall be able to communicate with members of his team and with his Squad leader.
- If the SL is either unavailable or out of range, a TL's communication system shall be able to connect with
 - either his own SL using a satellite fallback connection
 - or he can communicate with another SL via the mobile network or the satellite fallback.
- Each Squad leader shall provide a communication node for his Team leaders
- Each SL shall be able to communicate with his TLs or with the Platoon Leader or Platoon sergeant.
- If the PL/PS is either unavailable or out of range, an SL's communication system shall be able to connect with
 - either his own PL/PS using a satellite fallback connection
 - or he can communicate with another PL/PS via the mobile network or the satellite fallback.
- Each PL/PS shall provide a communication node for his Squad leaders and other users

In the example above – the 'satellite fallback' connection is a GlobalStar or Iridium modem supporting voice only.

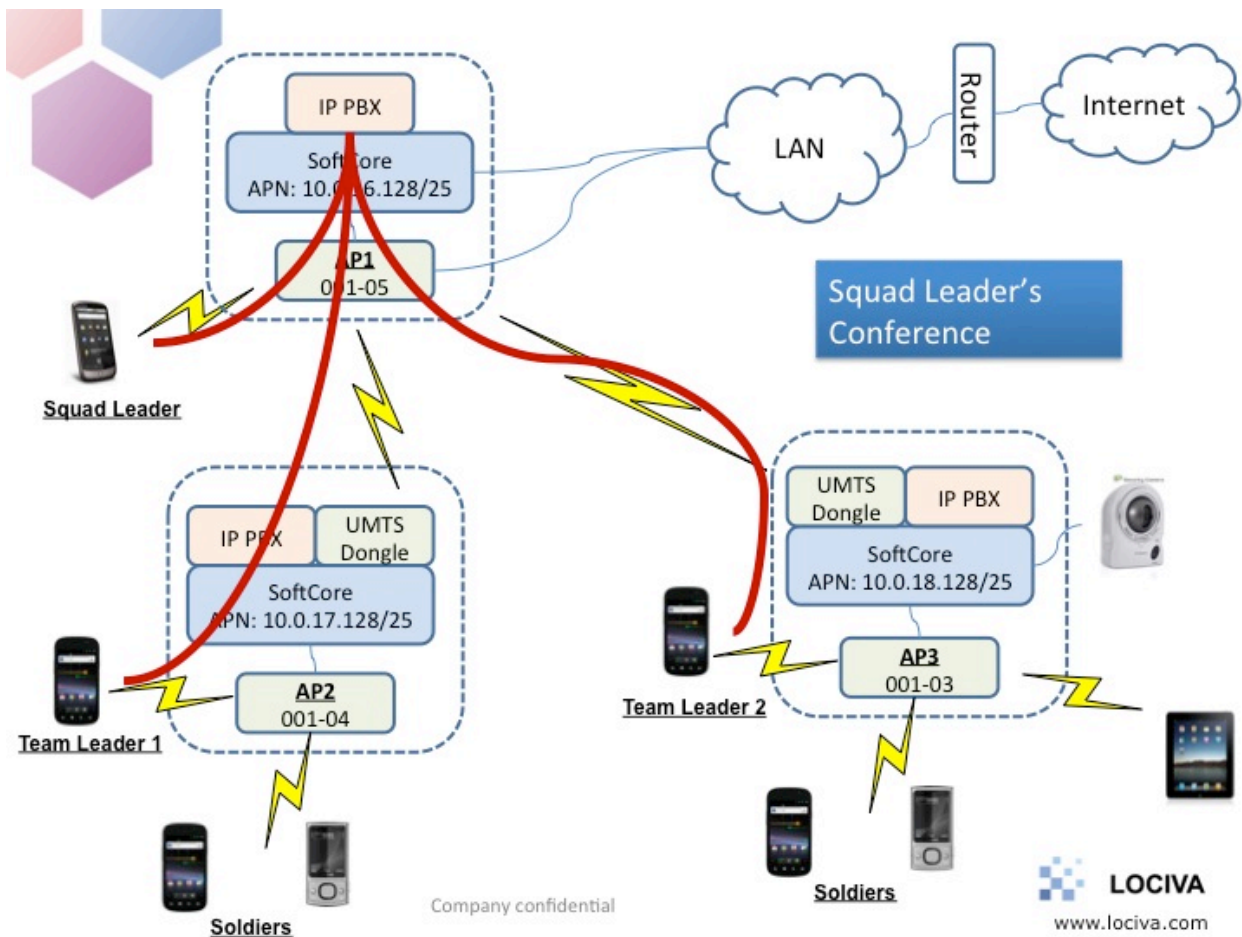
EdgeCentrix LMCS System configuration

The system is designed to be configurable directly from one of the handsets connected to the system. By entering a code on the Android handset via an Android application, which represents the PTT channel used by a specific PL/SL/TL combination – each level in the hierarchy will be allocated a unique set of PLMN codes, RF Frequencies, IP Addresses and MSISDNs / SIP IDs

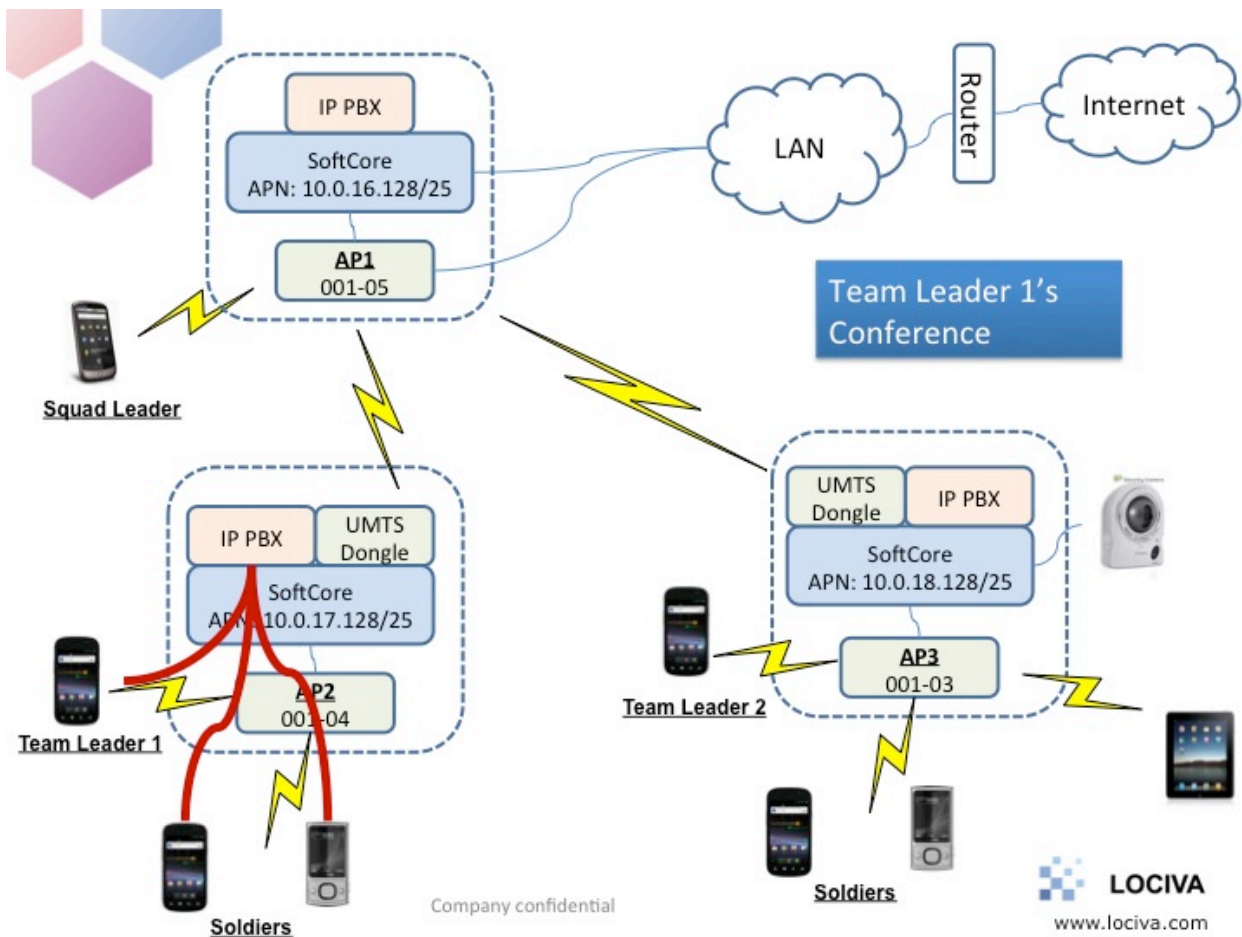
Scenario 1



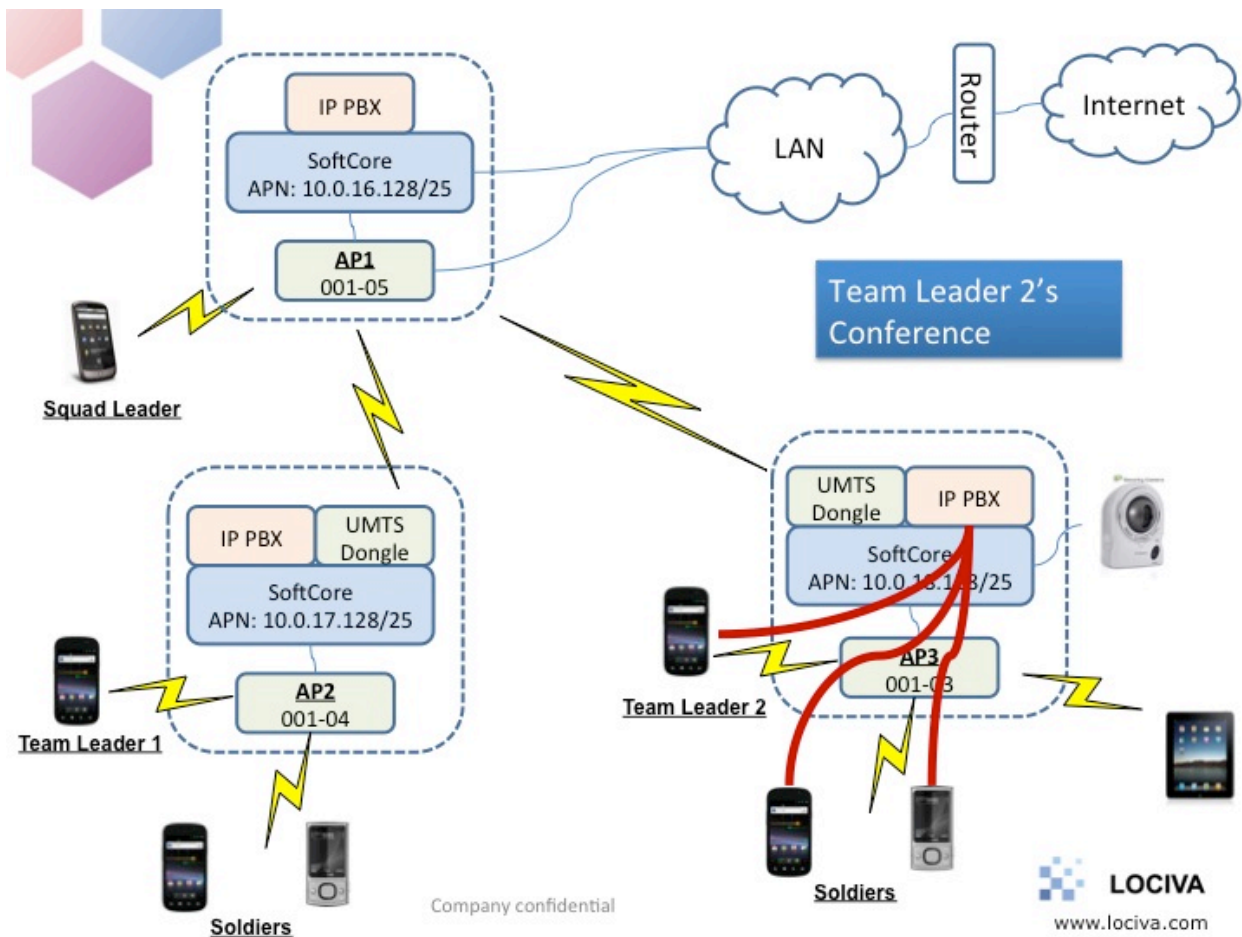
In this scenario three LTE LMCS systems are interconnected because they are in range of one another. A fully routable network exists between the different LMCS systems and data can be transferred from one node to another. In this example a video feed from AP3 can be shared with users on AP1 and AP2 and anywhere on the LAN and beyond. The hierarchical nature of the system configuration allows the TL to use PTT to communicate with his TL's. Similarly the TL's can do group polling of the soldiers in their group.



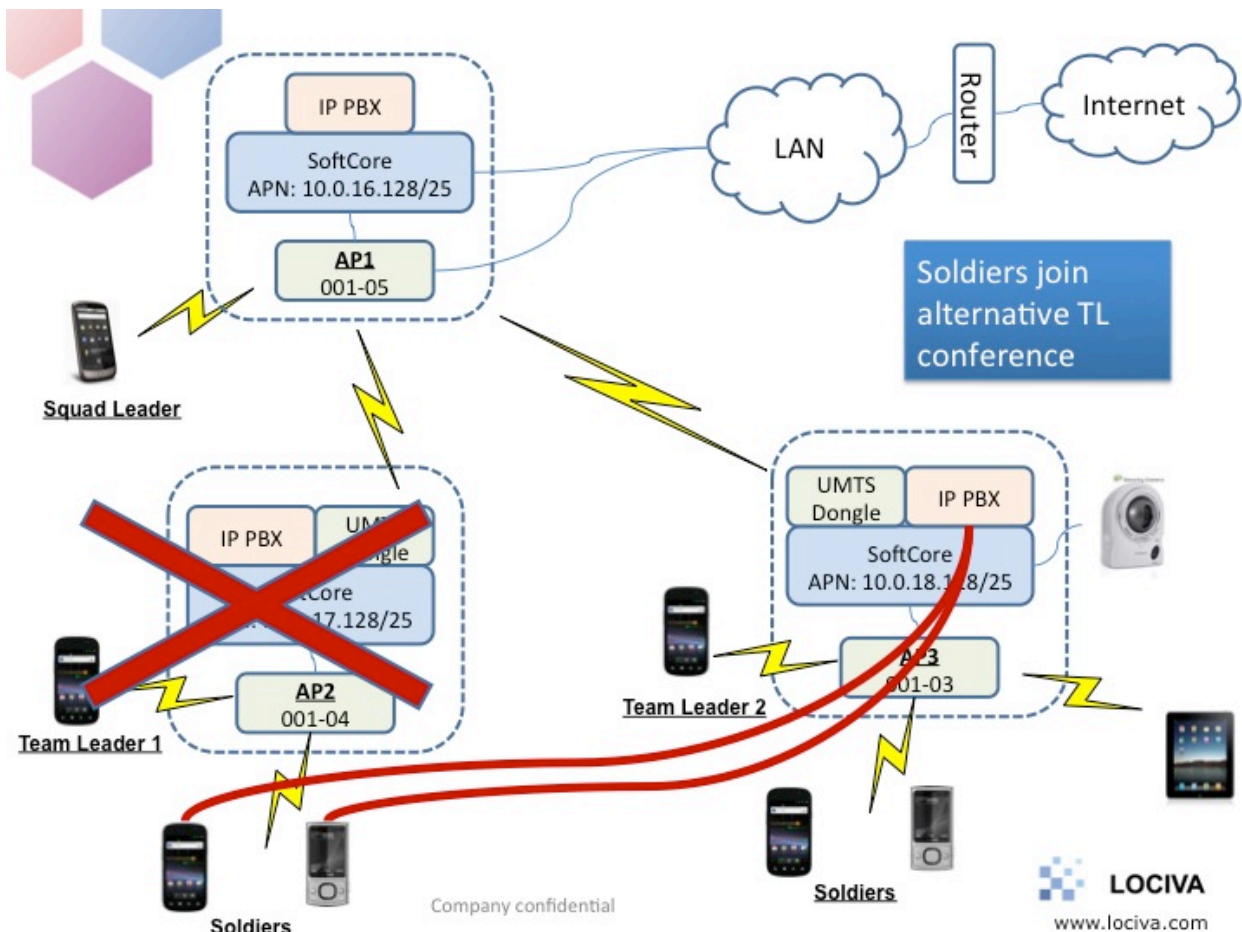
In this scenario the SL can broadcast voice services to the TL's. In the case that the LMCS systems are not within range of one another – the satellite fallback mechanism can be used to broadcast the SL's broadcast over Globalstar or Iridium



In this example the TL (on AP2) is using PTT to send a broadcast voice message to his group of soldiers



In this example the TL (on AP3) is using PTT to send a broadcast voice message to his group of soldiers



In the event that the AP2 LMCS system is removed from the scene – subscribers on AP2 and automatically join the AP3 LMCS system and continue to receive broadcasts.

Proposal Summary

We have presented our summary of the EdgeCentrix LTE Macro Cell System (LMCS). The LMCS will support the following demonstrable EdgeCentrix LMCS functionality

- Realistic 4G LTE data speeds
- Video distribution capability between multiple subscriber devices supporting simultaneous video streaming from and to multiple video sources anywhere on the routable network
- Handset/ PC Application interoperability – band specific smart phones, tablets or LTE dongles allow connection to the internet or local application servers
- Integration with LTE MiFi routers to create WiFi access areas

Optional EdgeCentrix LMCS demonstration functionality

The following capabilities may be available to demonstrate. A prototype of the Android PTT client is available to show this capability – however it is not currently productized.

- PTT Voice Services – supported via handset based PTT clients to a local or centralized SIP meet-me gateway
- Mesh networking
- Satellite fall-back option – integration of Globastar/Iridium modem – for voice services