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Proposed LTE 4G Mobile Network Architecture



Tactical User Requirements

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Unified and dependable access to comms and services in rapidly changing contexts across multiple agencies in a dynamic network topology

- Unified communications across multiple parties, groups, platforms.
- Out of coverage – ‘Bring your own network’ (BYON)
- Search and Rescue – Positioning/detection of victims & search teams
- Pop-up ‘bubbles’ of sterile 4G coverage on demand.
- Access to localized services, e.g. for command & control



Private LTE Network System – Recent Project Scope

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- **Fixed Sites**
 - 700MHz – Band 17 or 28
- **Four (4) Mobile Sites**
 - 700MHz – Band 17 or 28
- **IP Mesh interconnect between Mobile Sites / Fixed Sites**
- **IP Bridge (point to point) interconnect between Fixed Sites**
- **Handsets**
 - Dual Active SIM phones (ASUS/Samsung) Android 5 (Lollipop)
- **Application Support**
 - Push to Talk Radio Bridge
 - Video Streaming
 - SWARM
 - Internet Access (email, browser, social networking)





Tactical - Deployable Public Safety Solutions

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■ Fixed Sites

- Nokia Band 17 or 28 (700MHz) LTE radio
- Three Sector, 2 x 2 MIMO
- High gain sectored panel antennas
- Interconnect – Wireless bridge
- Centralized LTE Network Core – 2000 users with direct connection to application servers/internet



■ ECX Tactical 4G MacroNET

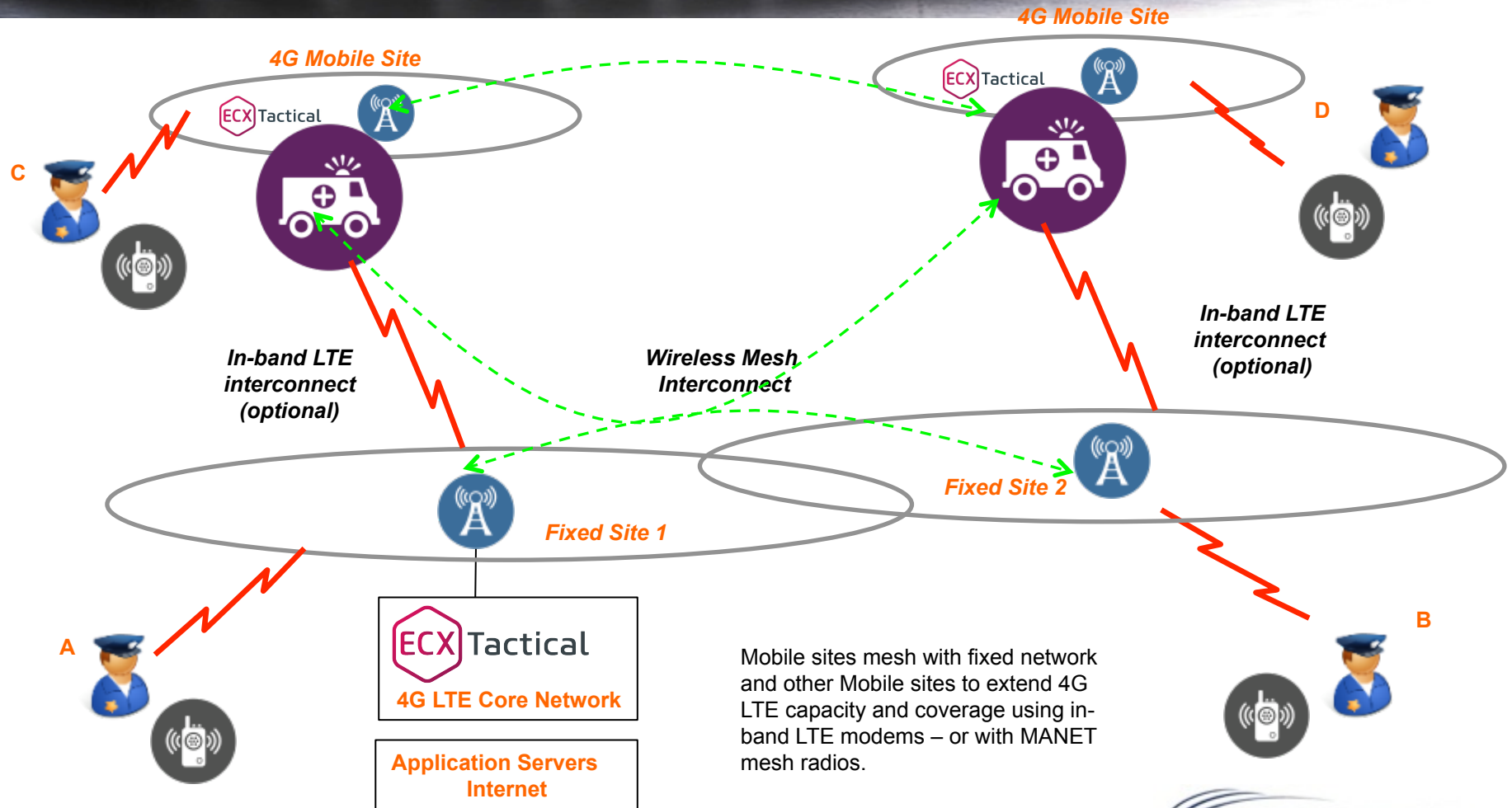
- Nokia Band 17 or 28 (700MHz) LTE radio
- Single sector, 2,x 2 MIMO
- Vehicle mount Omni-directional antennas
- Interconnect – Wireless mesh bridge
- Interconnect – optional in-band LTE modem
- Local LTE Network Core – 64 users – allows standalone operation





Tactical Fixed Site / Vehicle Site Architecture

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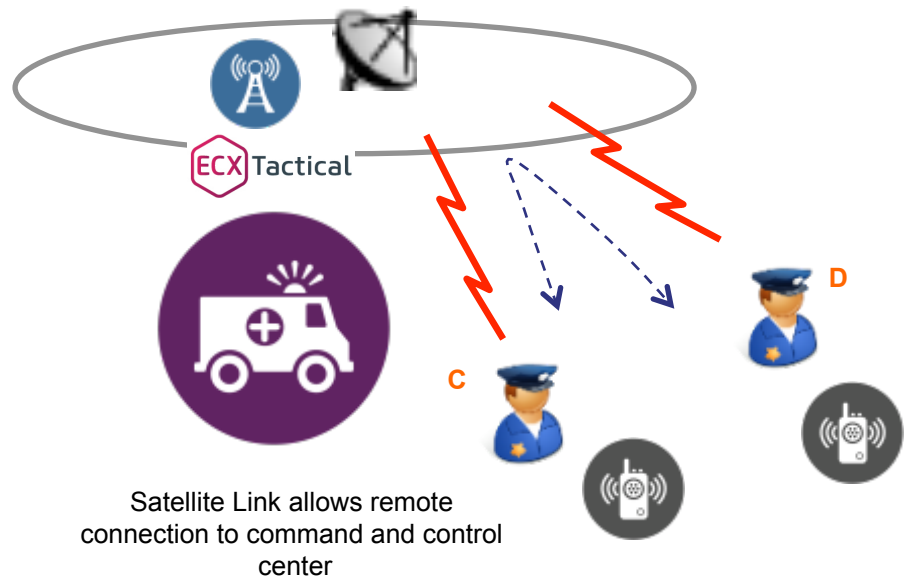
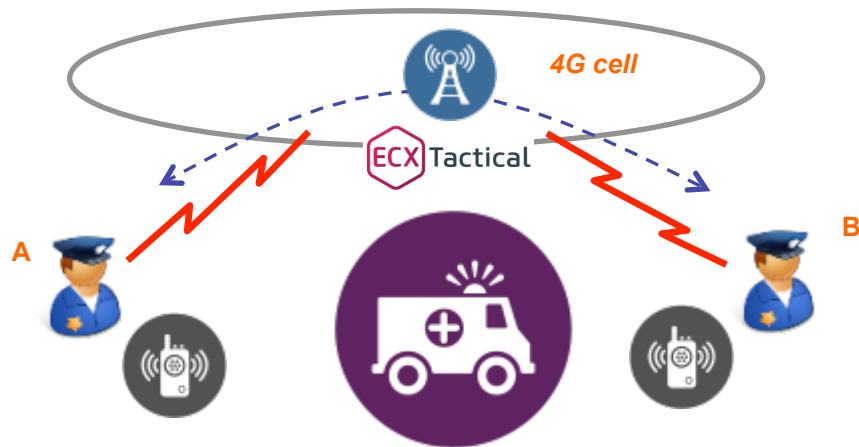




Tactical Standalone 4G LTE Footprint

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- Vehicles in 'Standalone' mode
- Out of range of Fixed Network
- Local communications only

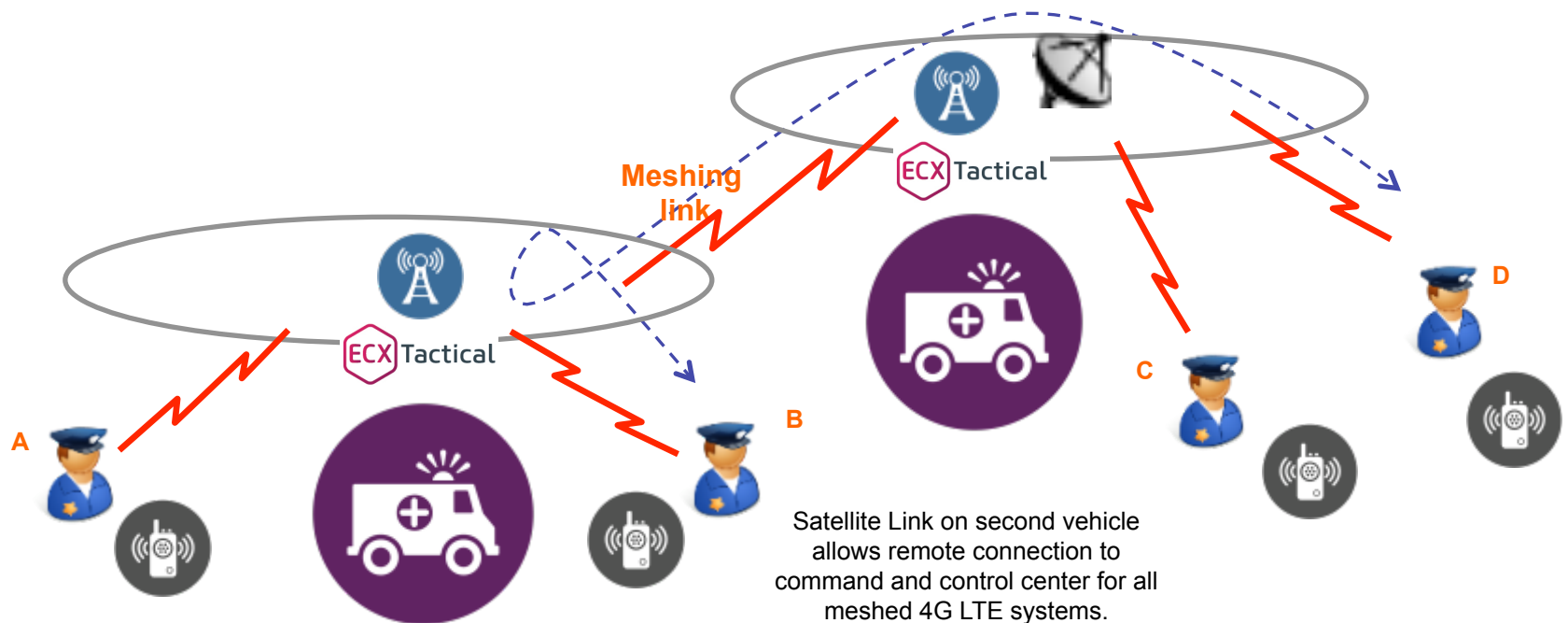




Tactical Automatic Meshing

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- Vehicles approach & mesh together
- Communications between all users



Satellite Link on second vehicle allows remote connection to command and control center for all meshed 4G LTE systems.

Interconnect between vehicles is either MANET or LTE modems

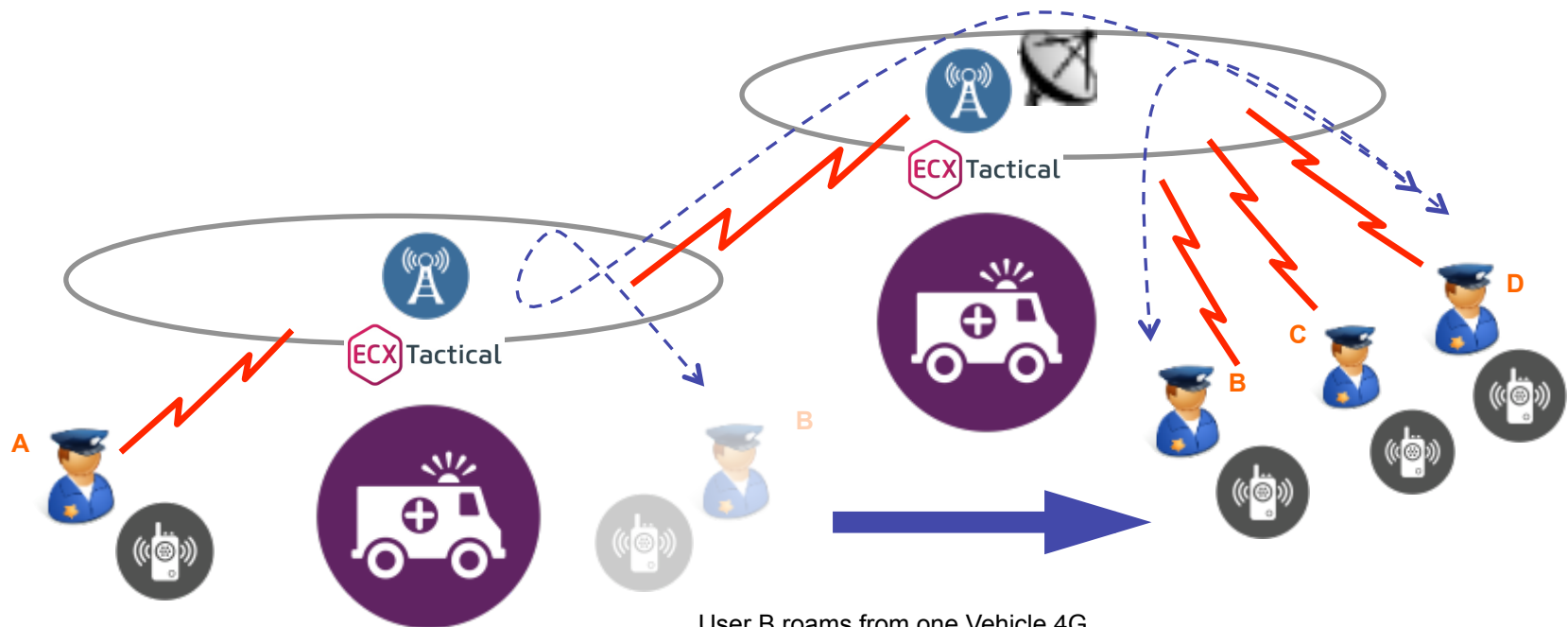




Tactical Mobility between Vehicle Networks

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- User B changes host vehicle
- Data session remains active



User B roams from one Vehicle 4G network to the other without dropping the ongoing secure data session

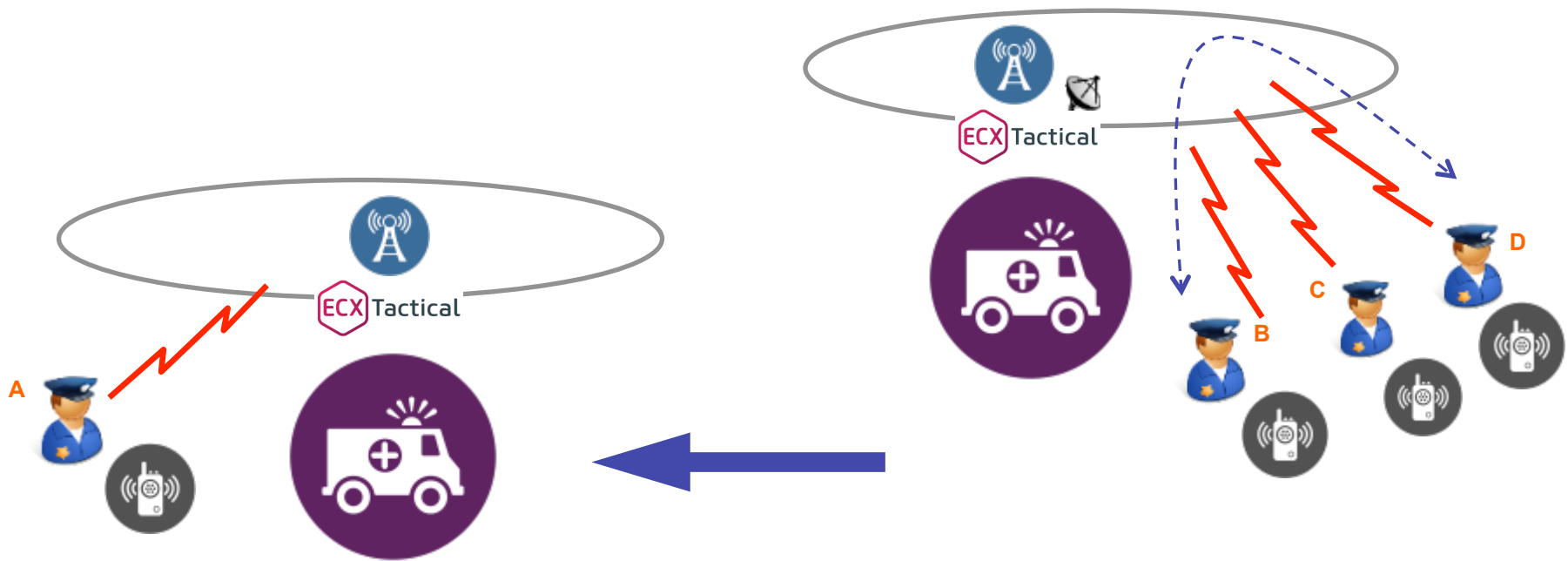




Tactical Flexible Deployment

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- Vehicles separate again
- User B maintains active session

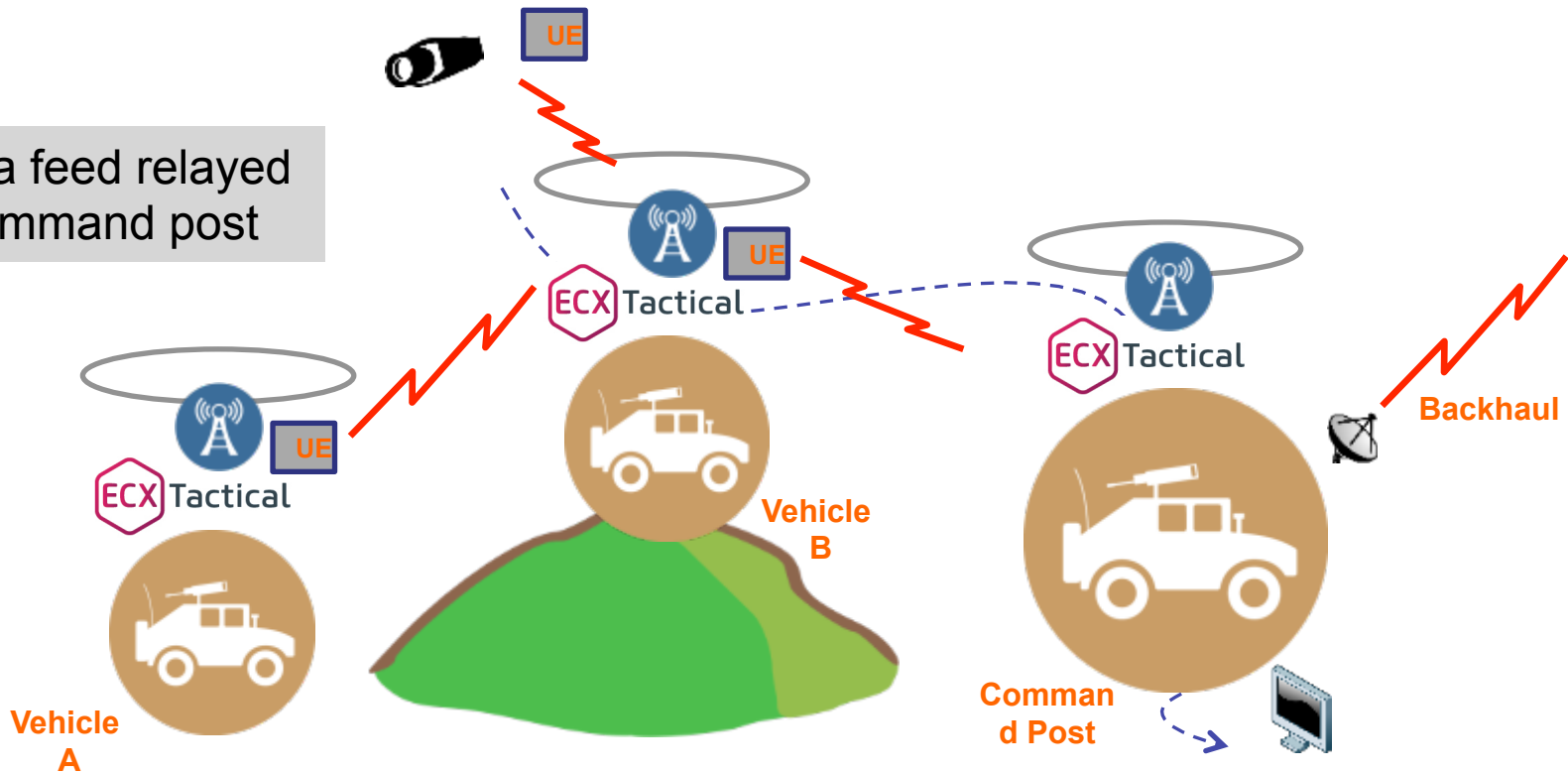




Tactical Convoy Example – Remote Sensors

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Camera feed relayed to command post

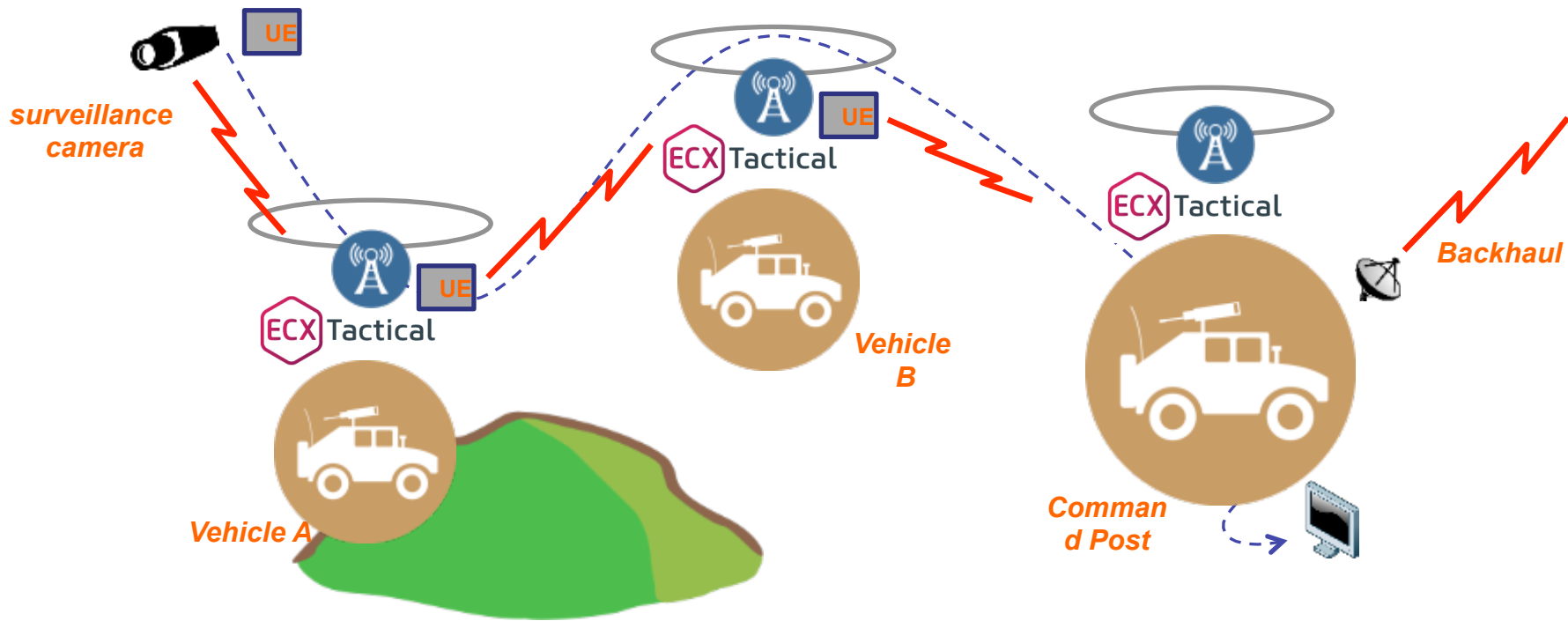




Tactical Convoy Example – Remote Sensors

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Camera feed transparently maintained



Tactical - Capabilities

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- Suitable for vehicle fit, technically and economically
- Scalability: Up and Down
- Solution for macro network interference mitigation
- Minimal changes to macro network
- Hand in/out between GW and macro, maintaining secure session
- Allow standalone use
- Secure, locally and end-to-end
- QoS managed voice & data, even in secure tunnels



MACRONET 4G LTE System

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Q2/2014

- Now 5U case
- 40lb lighter
- 60Mbps/20Mbps (REF-US Army)
- Optional LTE-Advanced
- Carrier Aggregation

- High Capacity – up to 600 simultaneous RABs
- Large Coverage FootPrint (48 miles @ 250ft)*
- 2 x 2 MIMO Radio - 150Mbps shared data per sector
- Carrier Grade – reliable and dependable
- Integrated ECX LTE Network Core
- Voice over LTE, LTE SMS, MultiCast (IGMP), LTE Mobility and Meshing options
- Optimized for Satellite Backhaul
- Upgradeable to LTE Advanced >300Mbps shared data per sector

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MICRONET 4G LTE System

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- High Capacity up to 400 RABs
- Small Size – portable– Rugged Packaging
- Nokia FlexiZone - MicroCell
- 2 x 2 MIMO Radio – 2 x 5W per TRX
- Carrier Grade – reliable and dependable
- Integrated ECX Tactical Network Core
- Voice over LTE, LTE SMS, MultiCast (IGMP), LTE, IP Mobility and Meshing options
- Optimized for Satellite Backhaul

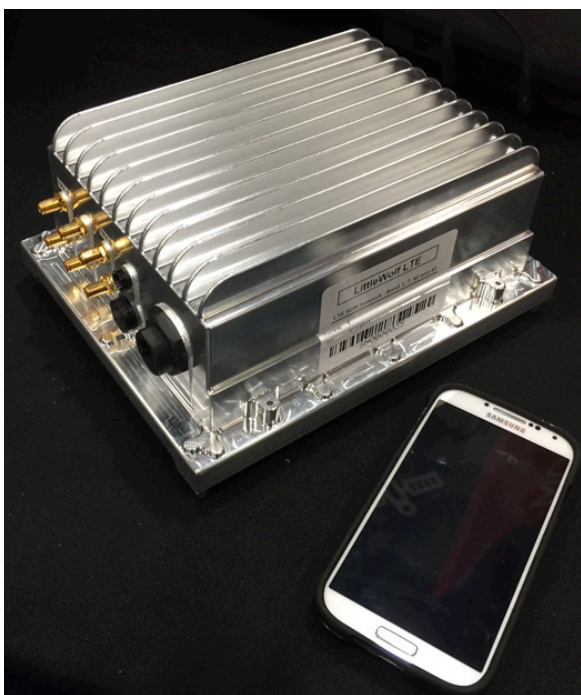


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LittleWolf 4G LTE System

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- High Capacity up to 32 RABs
- Small Size –Rugged Packaging
- LittleWolf eNodeB
- Quad Band – FDD/TDD – Band 3, 7, 40, 42
- 2 x 2 MIMO Radio – 2 x 1/2W per TRX
- Optional Frequency Agile Output
- Integrated ECX Tactical Network Core
- 12VDC or PoE+ power input
- SWAP: 12" x 6" c 6", 5lbs, 20W
- Voice over LTE, LTE SMS, MultiCast (IGMP), IP Mobility and Meshing options
- Embedded backhaul modems

