Testing Multi-Services Mobile Adhoc Networks Effectively

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What's At Stake?

Energy | Environment | National Security | Health | Critical Infrastructure

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MANETs are Different…

- **Throughput**
- **Latency**
- **MCR**
- **Security**
- **QoS**

Fixed
wired or wireless
Networks

Cellular wireless
Networks

Mobile Ad Hoc
Wireless
Networks

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MANETs are Different… the users are the network infrastructure

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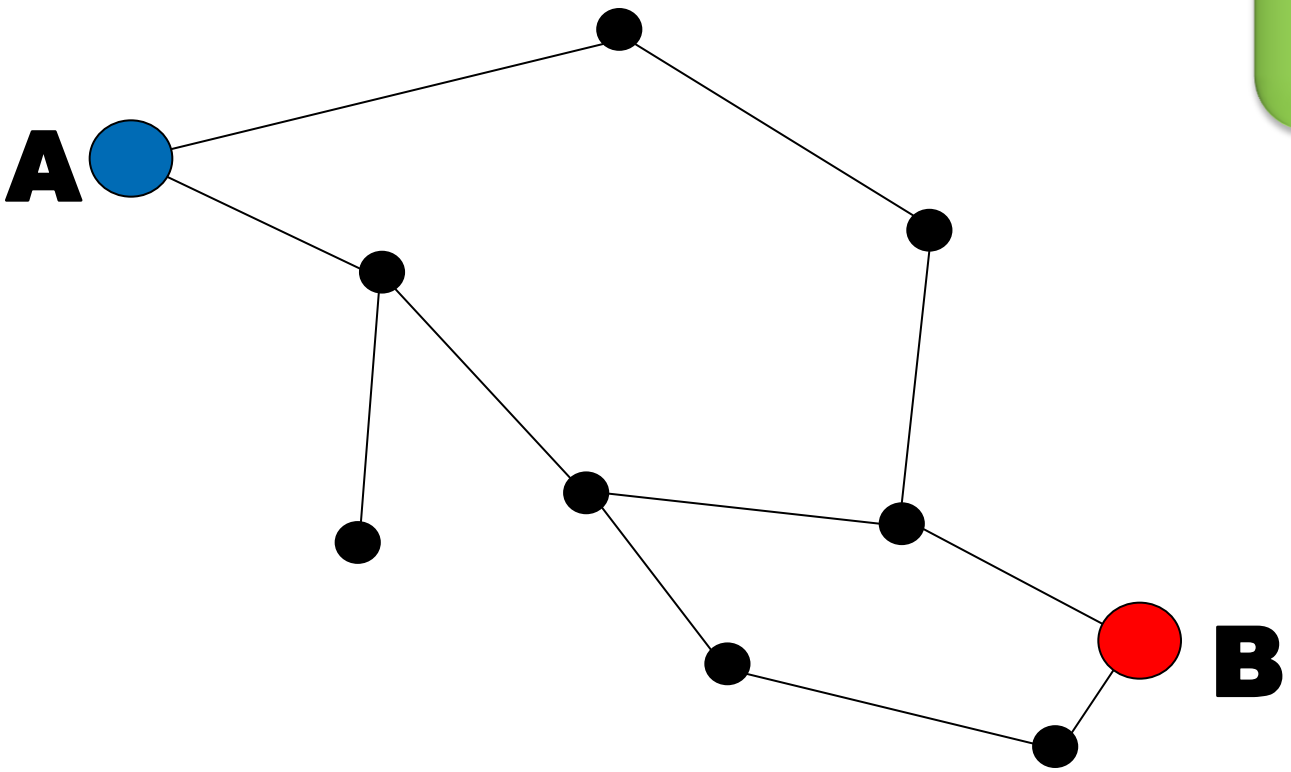

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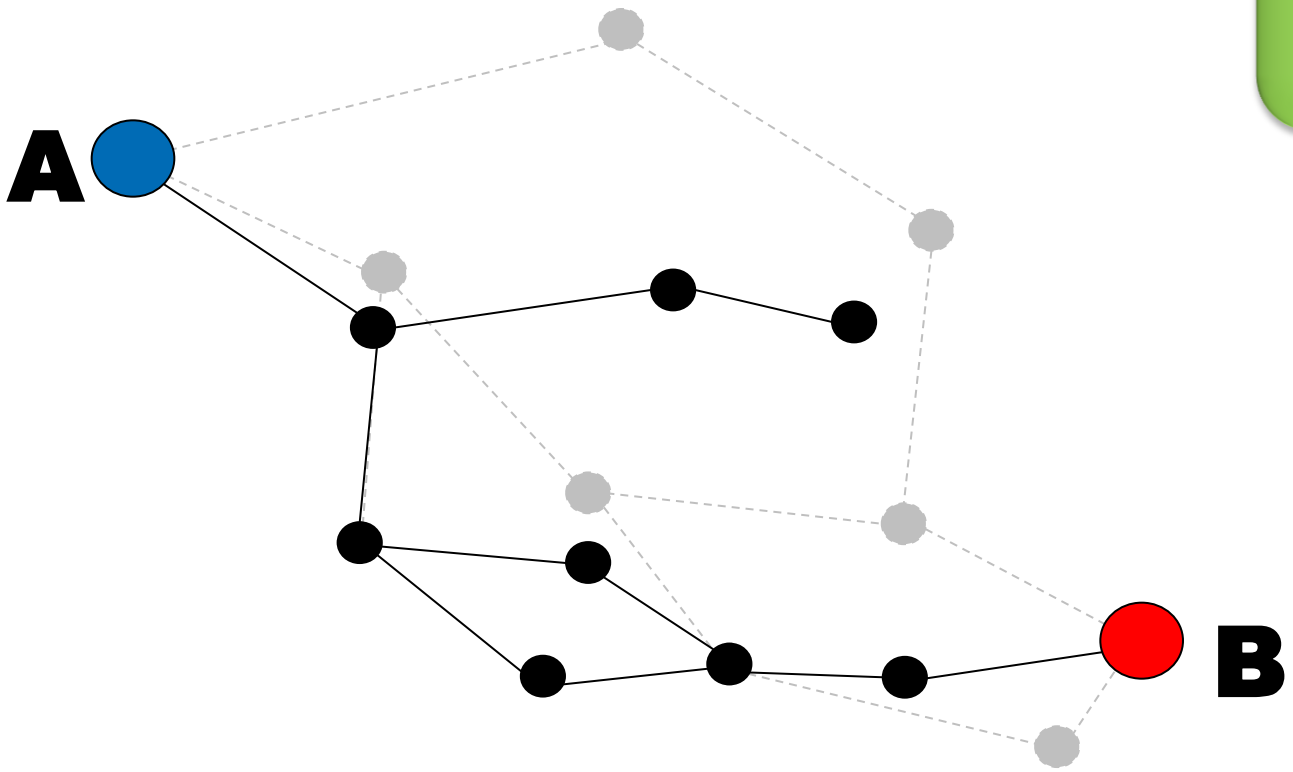

Deconstructing the MANET for Test

- **Throughput**
- **Latency**
- **MCR**
- **QoS**

- How much traffic?
- How much traffic…
  … is going where?
- What "mix" of traffic?

TRAFFIC PROFILE

MOBILITY PROFILE

- How the devices move
- How the devices move…
  … wrt each other

- Clustering of nodes
- Sparseness of nodes

NODE DENSITY

RF CHANNEL

- Terrain
- Intentional jamming
- Unintentional interference

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1. The MOBILITY Profile

- **Throughput**
- **Latency**
- **MCR**
- **QoS**

0-60mph

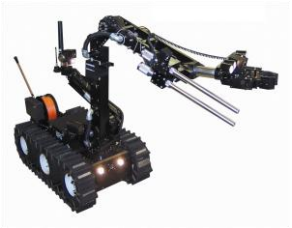
< 2300 mph

0-7mph

500 mph

0 mph

100-130 mph



0-15mph

100 mph

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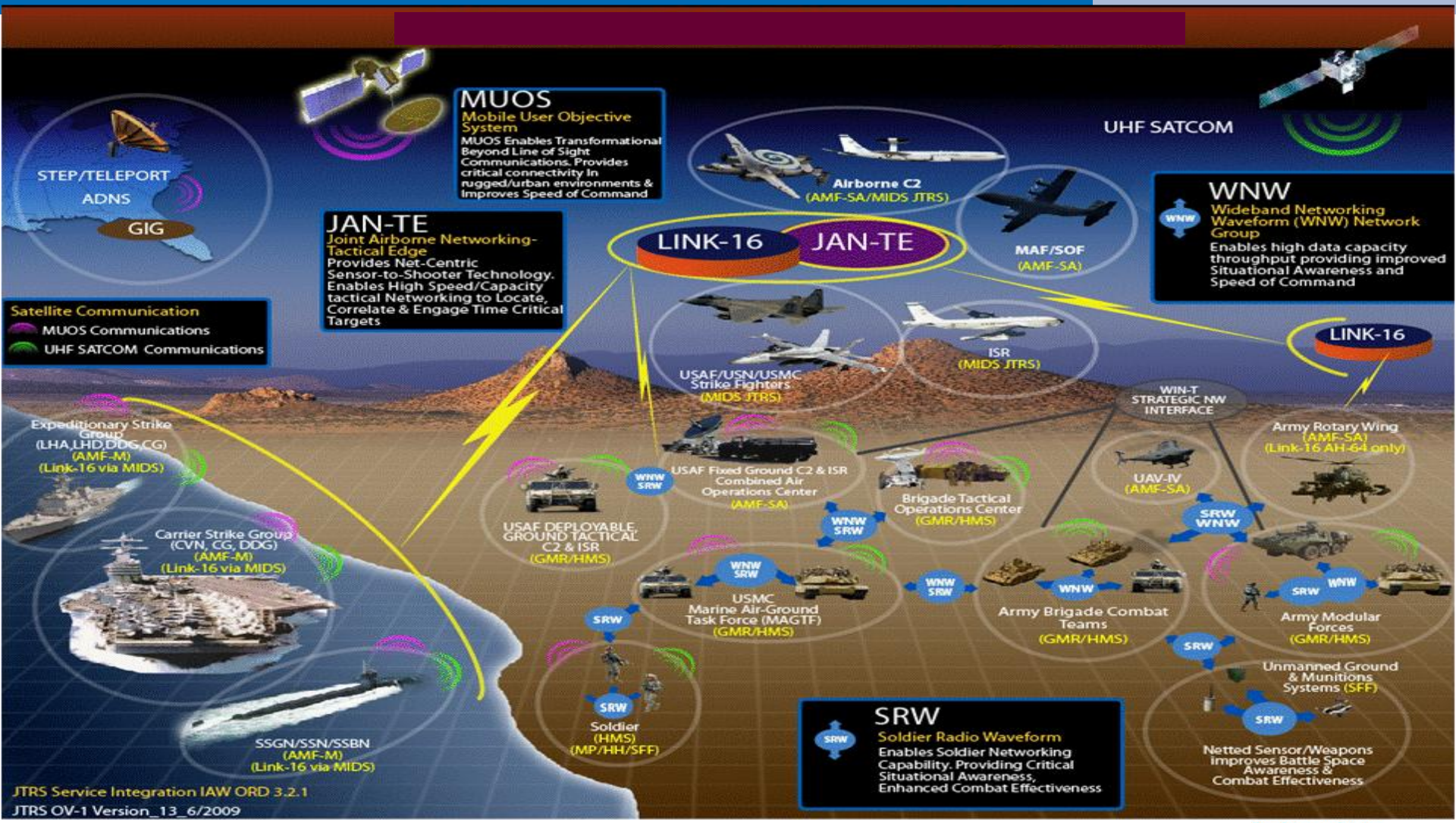
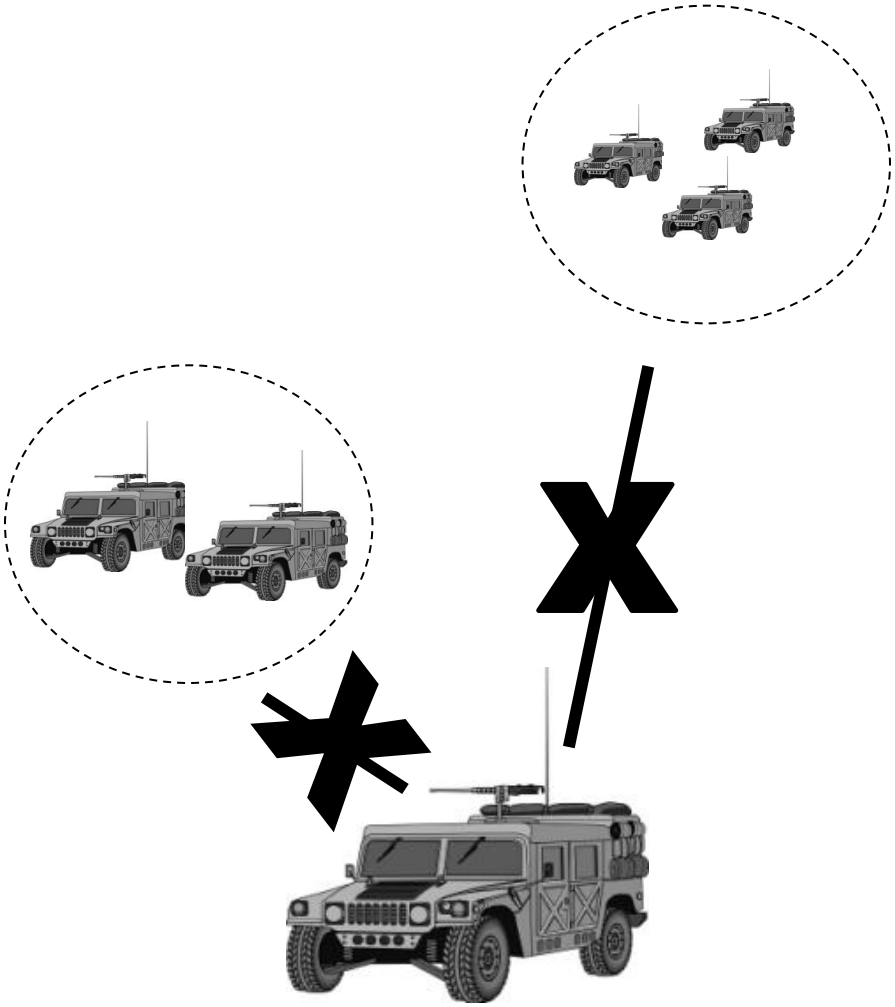
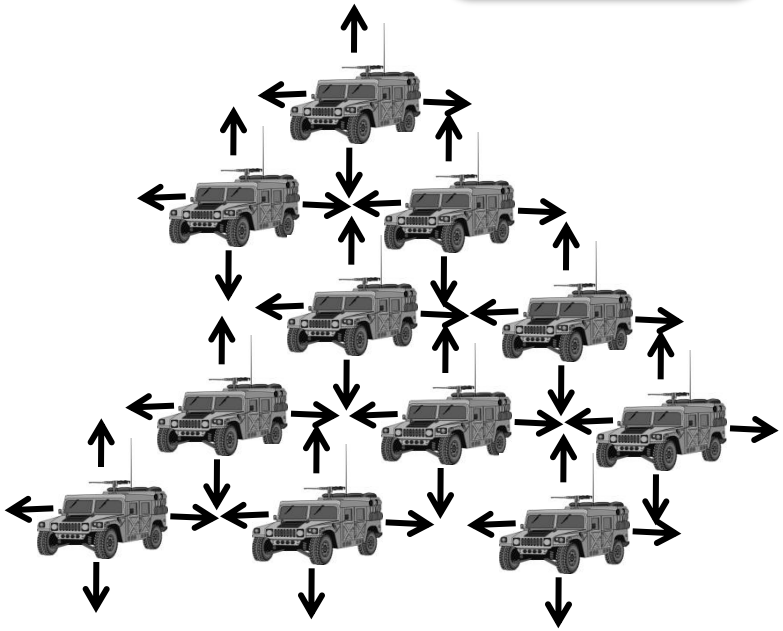
1. The MOBILITY Profile – the "mix"



2. The NODE DENSITY

- Throughput
- Latency
- MCR
- QoS





Proximity has its pros…and cons

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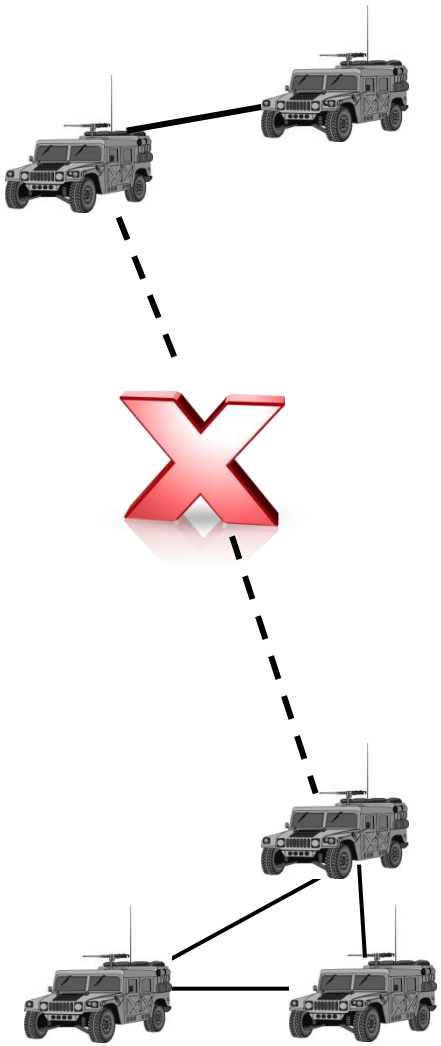
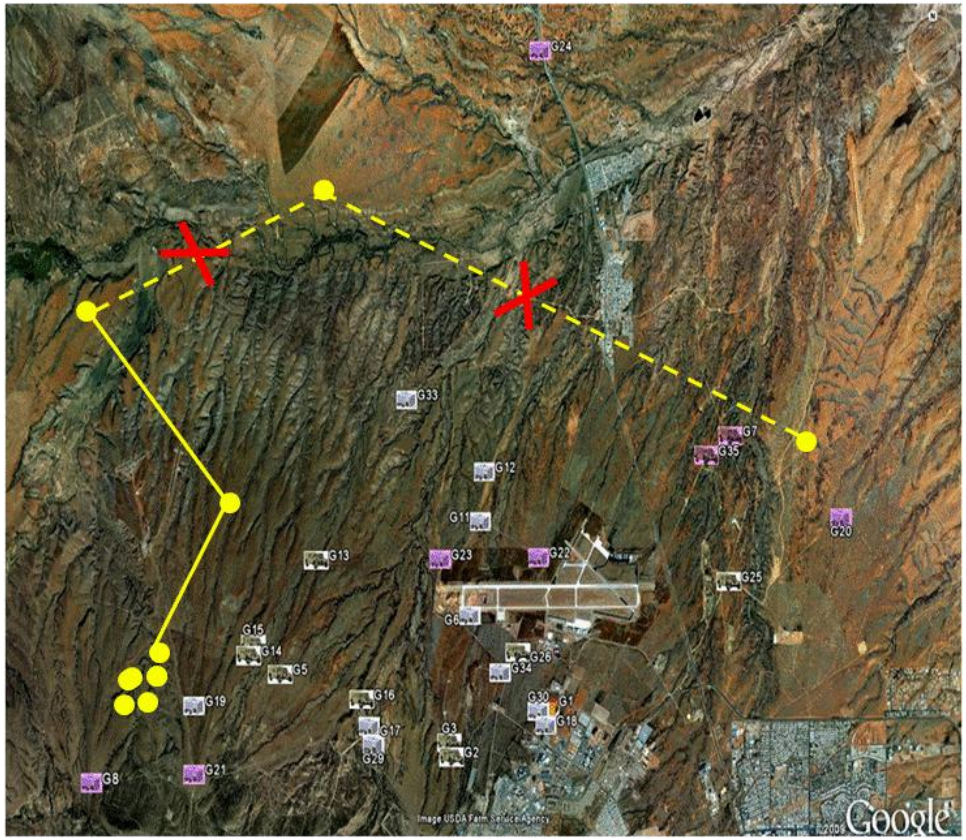
2. The NODE DENSITY: CONOPS

- **Throughput**
- **Latency**
- **MCR**
- **QoS**





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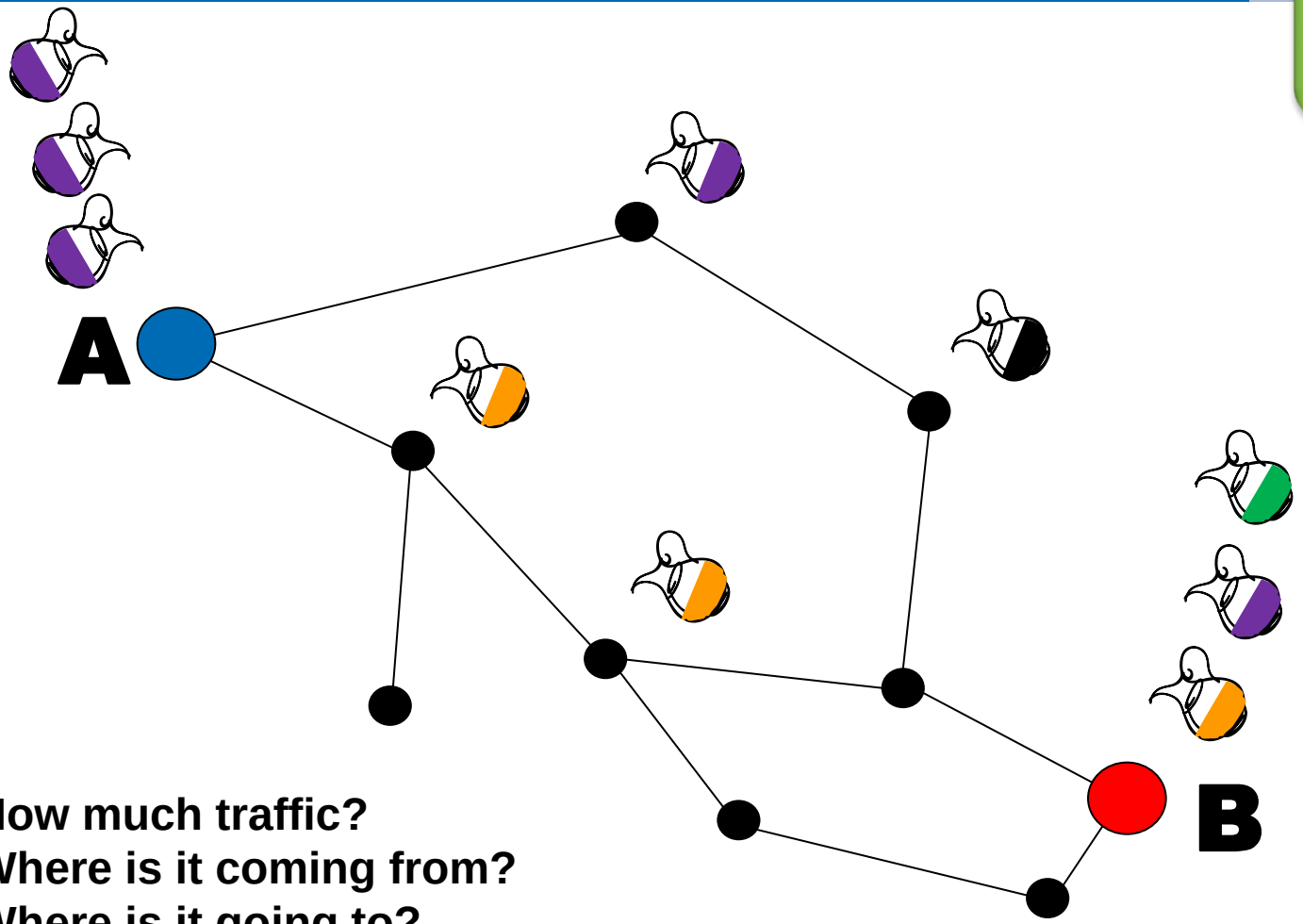
3. The TRAFFIC Profile

- **Throughput**
- **Latency**
- **MCR**
- **QoS**



- **How much traffic?**
- **Where is it coming from?**
- **Where is it going to?**
- **What is happening in between?... Movement? Congestion? Failure?**

4. The RF CHANNEL

- **Throughput**
- **Latency**
- **MCR**
- **QoS**

The Nearly Infinite Variations in a MANET

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- **Latency**
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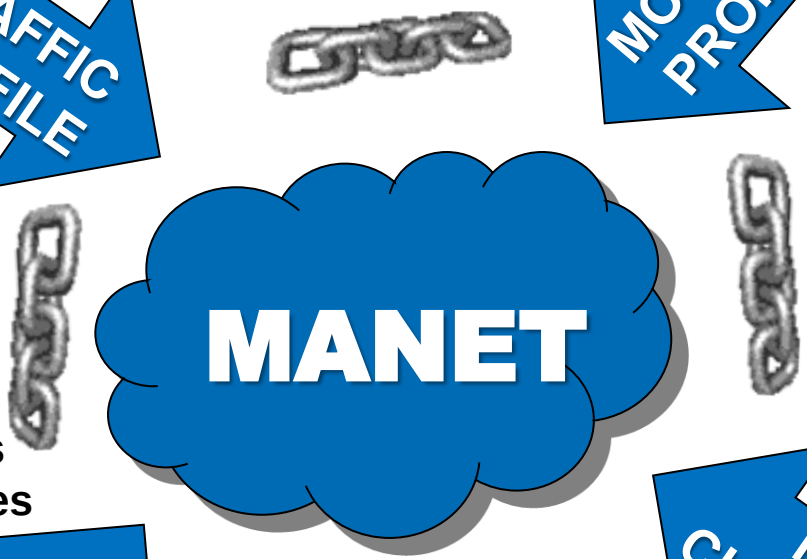

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PROPOSED TEST METHODOLOGY

1. Define the REQUIREMENTS carefully

2. Develop BMs and SCMs early → → V&V

3. Test-fix-Test-fix → → in lab and field

4. Insist on BITs & BIDs

5. Set up your program to verify performance
   a) Simultaneity of performance
   b) Use your models
   c) FATs should prove scalability and also define performance boundaries. Where does a network using these devices break?
   d) Don't test a network without its Net Manager(s)

OUTSIDE the DEFENSE SECTOR







- **Dept. of Homeland Security**
- **Firefighting**
- **Law Enforcement**
- **Emergency Search-and-Rescue**
- **Emergency Response/ Natural Disasters**
- **Emergency Medical Response**

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