

# *Mesh Networking for Logistics Applications*

*A new form of Automatic Identification Technology*

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# Paradigm Shifts

- Overused and Overhyped
- But they DO Happen
- The Cell Phone
- The “Smart” Phone



# NGWC Mesh – Army Developed

- Objective is a new form of “Automatic Identification Technology” (AIT) for DoD logistics:
  - Monitoring and tracking high-value assets (CBM+, CLOE)
  - Tracking sustainment shipments through shifting supply lines
- Apply the concept of Wireless Sensor Mesh Networks
  - Continuous visibility – not nodal like RFID (interferes with processes, low accuracy)
  - Fully Ad Hoc
  - Secure (all data encrypted at rest and in motion)
  - Battery powered for many years without changing batteries
- Pattern the architecture and business model after TCP/IP

# Wide Area Mesh with NGWC



# NGWC Mesh – Technical Features

- Focus on a Full Network Protocol
  - Full protocol stack supports future capabilities without wholesale upgrades
  - Full protocol stack can better leverage Moore's law
- Continuous visibility using COTS chips
- Use ubiquitous RF – IEEE 802.15.4 @ 2.4 GHz
- Requirements driven – includes “BIG” mesh
- Satisfy DoD “Information Assurance” requirements (Cyber Security)

# NGWC Status

- It Works!
  - Actually exceeding expectations
- About to go large in Kuwait (10,000 tags in 4 locations)
- Just completed HERO/HERF/HERP testing
  - Initial report soon (Dahlgren/Mike Slocum)
  - Expecting zero standoff
  - Appears to be very low aggregate power (as expected)
- Selected for 2012 JCTD by OSD, COCOMs, and the Services
- Railroads see significant commercial potential
  - They have several business cases with strong ROI
  - Already understand potential to offer as service to customers

# NGWC Capabilities

- Features of Interest to Container Users:
  - Tags can be permanently installed – the NGWC Mesh is bi-directional – can write data to tags over the mesh – no need to cradle to “burn” the tag
  - GPS position reporting opens up many possibilities
  - Support for motion sensing, interior light detection, door state sensors, temperature, humidity
  - NGWC mesh tags include an on-board encrypted file system (currently 512kbyte) – data files readily loaded, queried, and read
  - Ability to upgrade/revise data formats, data elements without changes to the mesh network
  - Single IA solution across a broad spectrum of mesh tags

# NGWC Opportunities

- Capabilities for Container Owners:
  - Continuous location reporting wherever DoD deploys the mesh
  - E-log book for condition and maintenance history
  - Sensors for condition (light intrusion with doors “closed”, humidity)
- Capabilities for Customers:
  - Near-real-time ITV when under DoD control
  - Location plotting for yard management
  - Near-real-time intrusion detection wherever mesh is deployed
  - Content detail and other data files
  - If NGWC is commercially accepted, potential for gap-free ITV

# NGWC Wrap-up

- Hardware show and tell
- Final paradigm question – what is it that makes a “Smart Phone” smart?