

# Navigational Sciences, Inc.

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[www.navsci.com](http://www.navsci.com)

# NavSci

- Robust/secure wireless platform technology
- Extending communications capabilities and reliability
- New form of wireless security
- One-stop shop – tracking & com
- Security<sub>[Homeland]</sub> + Efficiency<sub>[Lean]</sub>
- Credentials
  - \$25 M in R&D
  - DOE, Oak Ridge National Laboratory
  - DHS HSARPA SBIR PI and PII
  - National FLC Technology of the Year Award
  - Clients/Partners



# *Imagine a World Where.....*

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- **Sensors:**
  - Intelligent
  - Dynamically plug into the network
  - Auto configure and calibrate
  - Synchronize and report
  - Two wire or wireless solution
  - Long distances through harsh environments
  - Vast numbers of sensors on a single network
  - Cheap, effective, interoperable solution
- **This new network has become the IEEE 1451 standard for sensors**
- **Sensors possess the intelligence to define themselves to a network with the intelligence to understand**
- **Focus on wired and wireless industrial conditions**

# ***DHS Marine Asset Tracking System***

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- **Homeland Security Advanced Research Projects Agency (HSARPA) SBIR PII**
- **RFID Tag System for shipping containers in the marine environment**
  - Being loaded and stacked aboard ship,
  - On board deck of a ship in a stack,
  - Unloaded, Moved and stacked in shipping terminals
  - Shuffled during a stack sort
- **Communications interface for Advanced Container Security Devices – sensors!**
- **3 – 5 year deployment**
- **TCO = \$250 over 5 years!**

# ***Case Study: Marine Trans. System***

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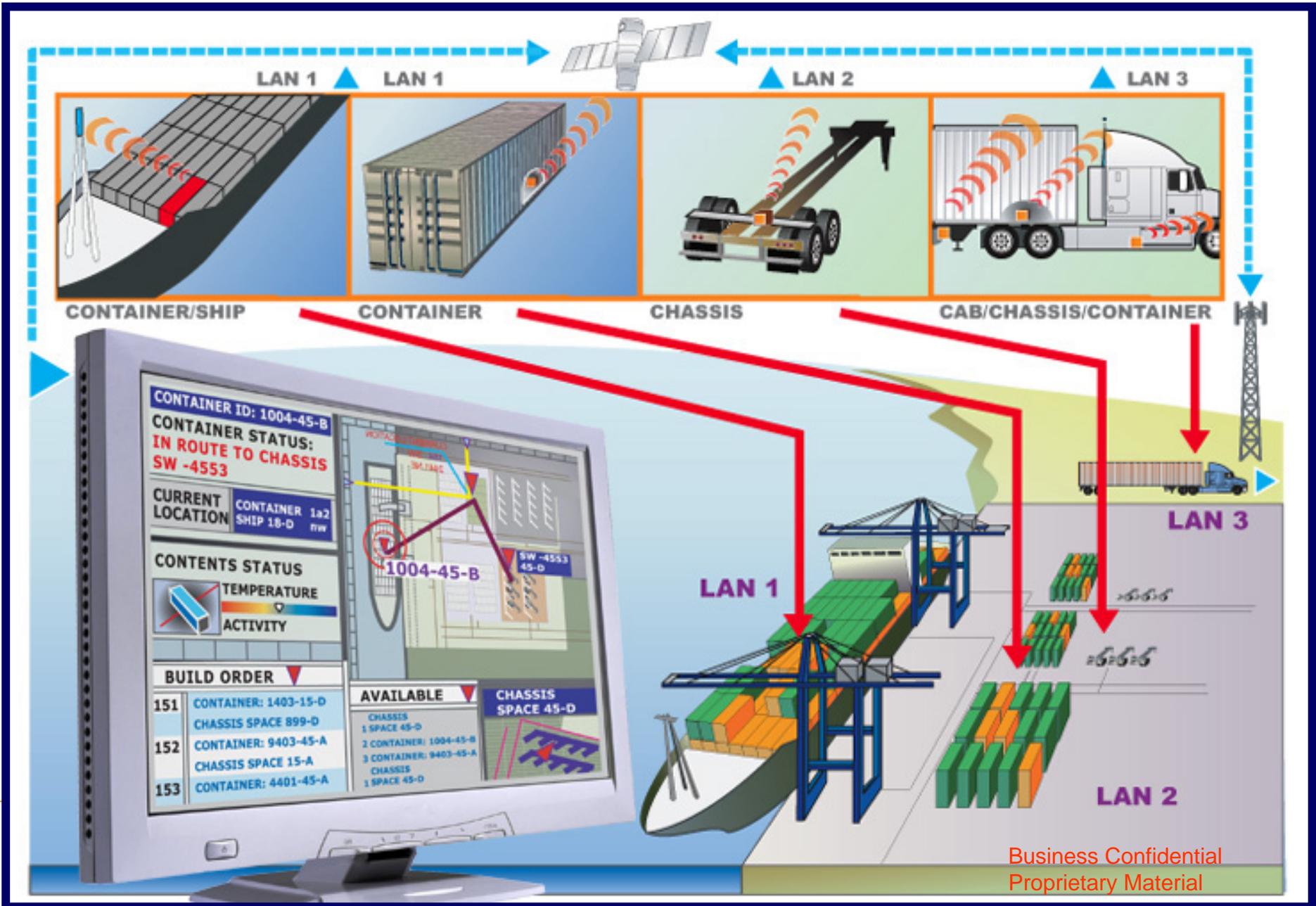
## ➤ **The Problem**

- 95% of all freight moves via the MTS
- Intelligence indicates major terrorist attack will be targeted at the MTS
- Crisis is the supply chain
- Security vs. efficiency

## ➤ **The Solution**

- Wireless technologies for tracking and sensing
- Fuel intelligence engines that protect homeland
- Congressional mandates

➤ Globally Available | Intermodal | Asset Management | Web Interface



# ***IEEE 1451 Smart Sensor Network***

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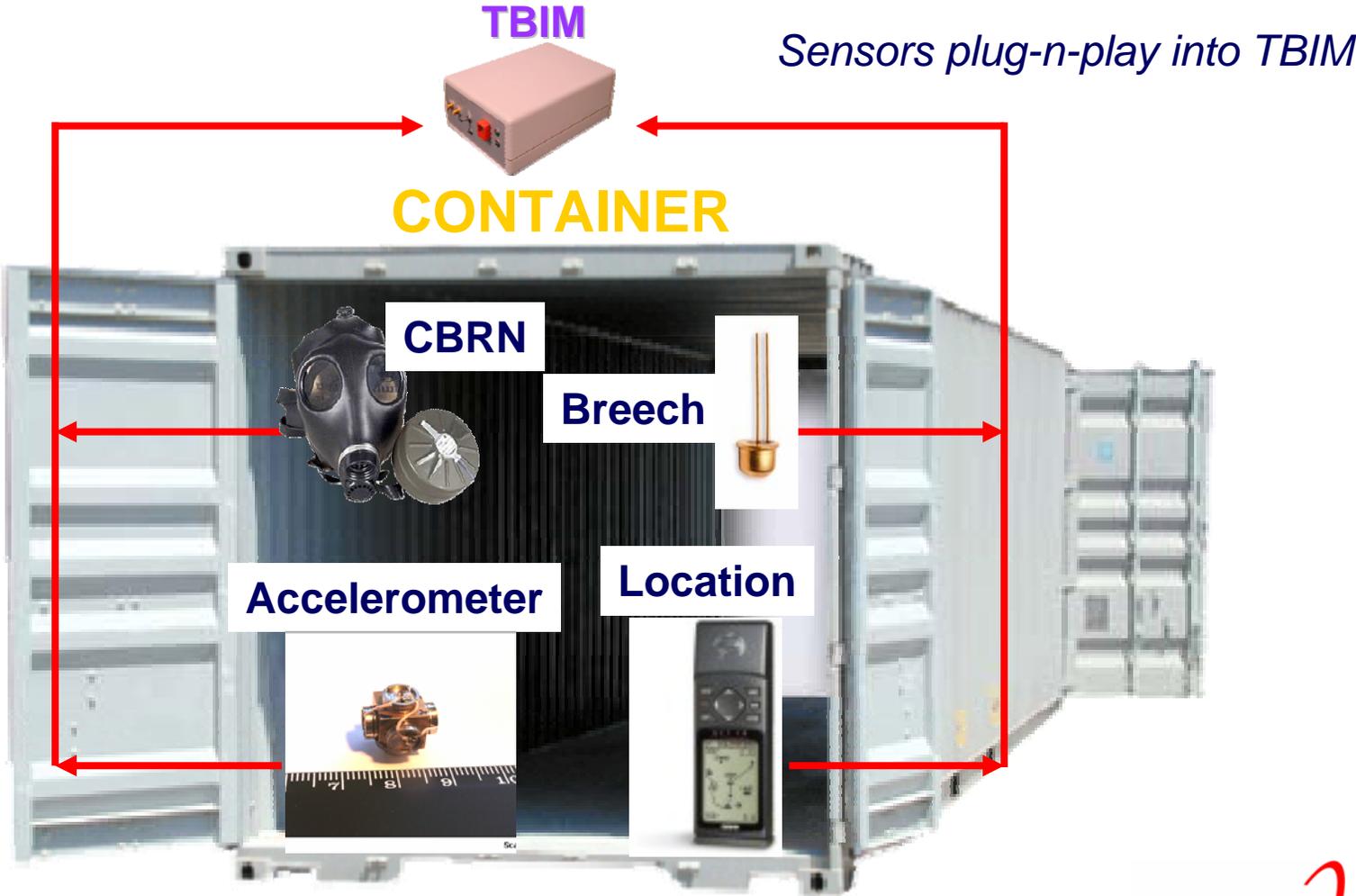
- **Network and vendor independent sensor interfaces supporting analog and digital sensors**
- **High data rates**
- **“Plug & Play” sensor interface to the network**
- **Automatic sensor calibration, configuration, data transmission, and synchronization**
- **Transducer Electronic Data Sheets (TEDS) that remains with the sensor**
- **Supports wired, wireless, or hybrid transmission – media apathetic network**
- **Scalable sensor networks**

# *IEEE 1451 System Components*

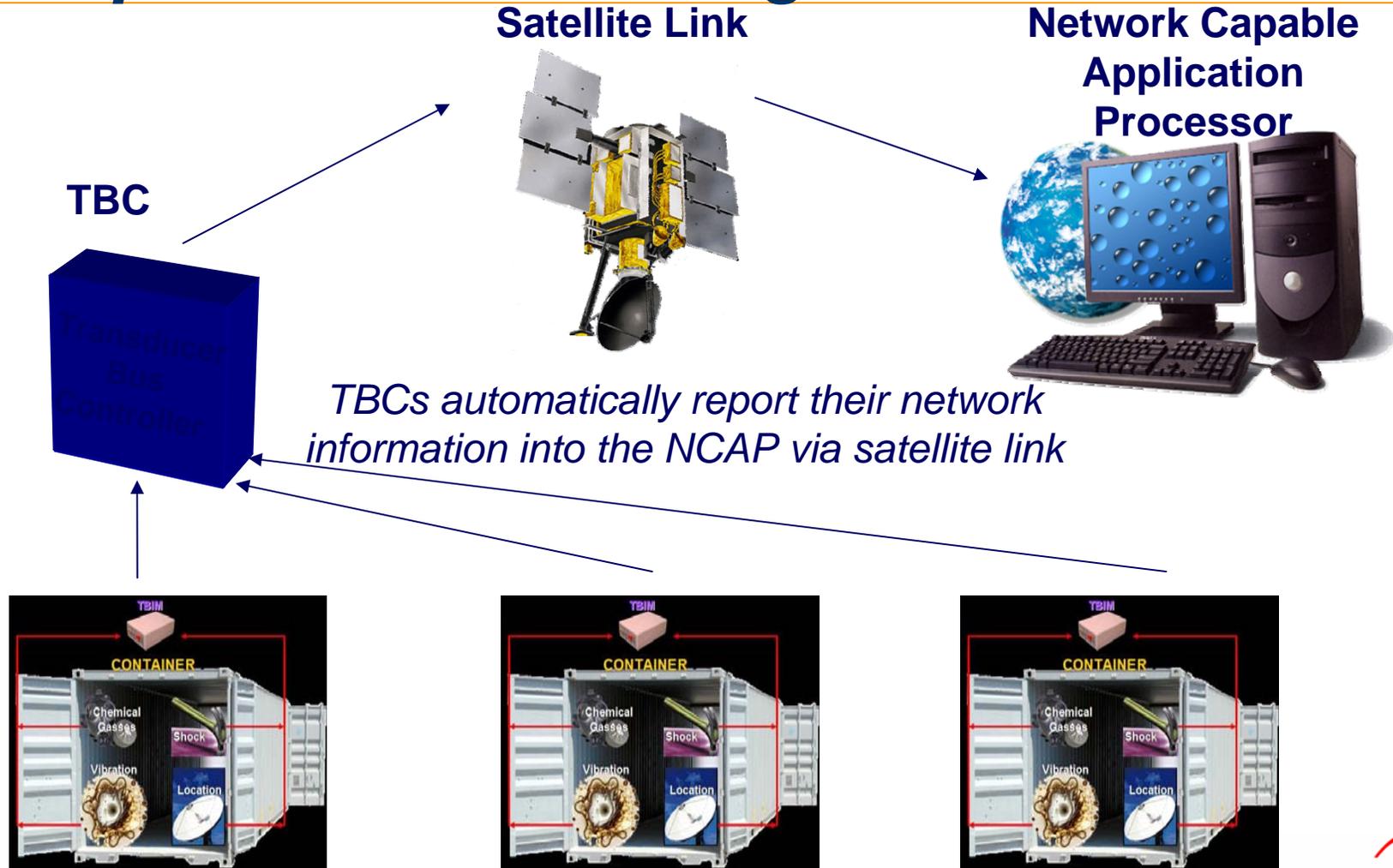
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- **IEEE1451 Compliant Sensors** 
- **Transducer Bus Interface Module (TBIM)** 
- **Transducer Bus Controller (TBC)** 
- **Network Capable Application Processor (NCAP)** 
- **Network timing requirements**
- **Network control requirements**
- **Response Algorithms**

# Container Network Diagram



# Ship/Port Network Diagram



# Port Problem

- Voluminous sensors
- Potential for staggering data volumes
- Harsh wireless conditions
- Need for increased security
- Need for increased efficiency
- Must link from local to global



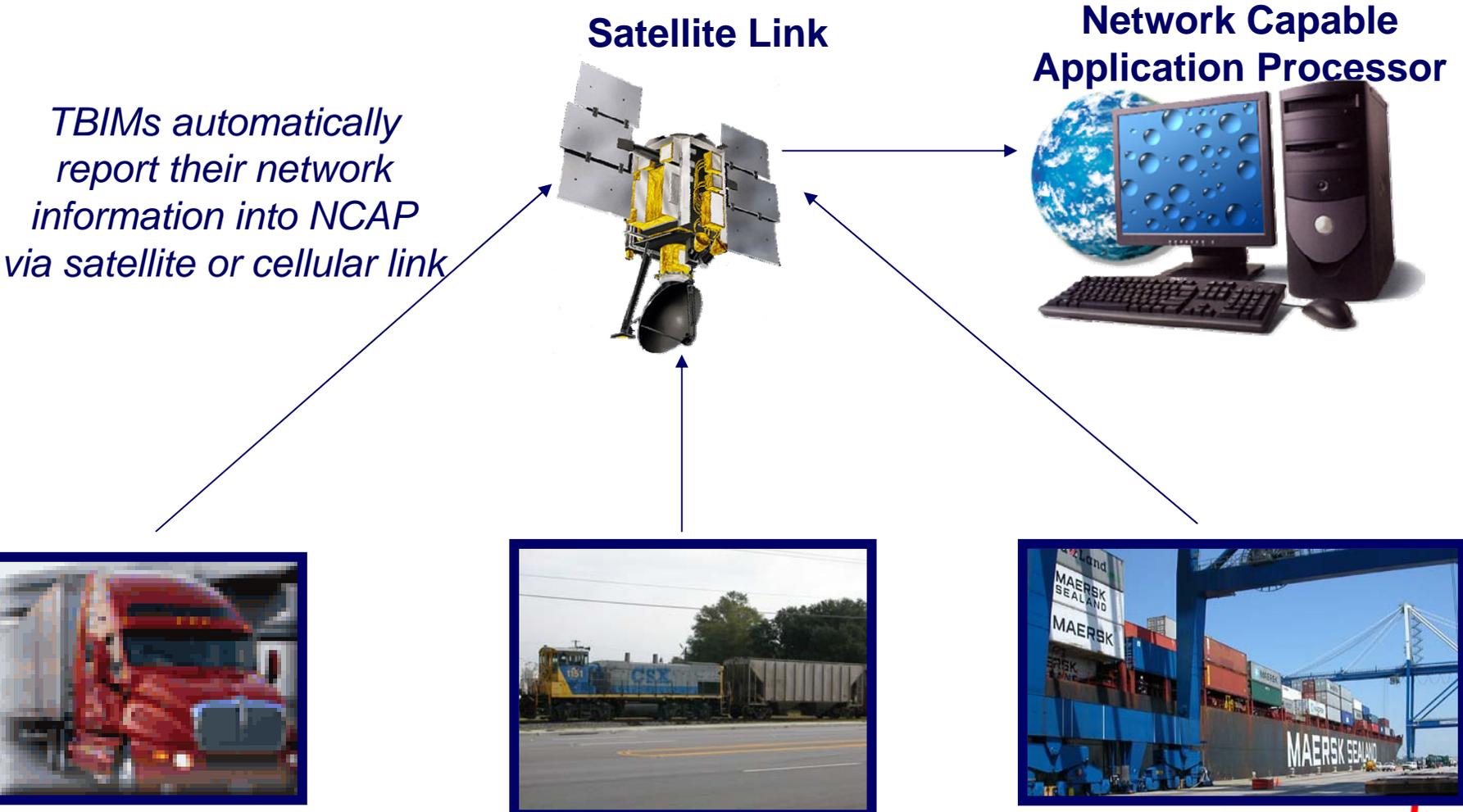
# Radiological/Nuclear Detection

- Gamma radiation detection
- Ship becomes the portal
- Self normalizing measure
- 3-D perspective of Rad/Nuc
- 3 to 21 days to watch for D R/N
- Identify threats before they reach a port/population center
  - Manifest/Origin/Destination
  - Audit Trail



2-A	3-A	4-A	5-A	6-A	7-A	8-A	9-A	10-A	
2-B	3-B	4-B	5-B	6-B	7-B	8-B	9-B	10-B	
2-C	3-C	4-C	5-C	6-C	7-C	8-C	9-C	10-C	
2-D	3-D	4-D	5-D	6-D	7-D	8-D	9-D	10-D	
2-E	3-E	4-E	5-E	6-E	7-E	8-E	9-E	10-E	
2-F	3-F	4-F	5-F	6-F	7-F	8-F	9-F	10-F	
2-G	3-G	4-G	5-G	6-G	7-G	8-G	9-G	10-G	
2-H	3-H	4-H	5-H	6-H	7-H	8-H	9-H	10-H	
2-I	3-I	4-I	5-I	6-I	7-I	8-I	9-I	10-I	
1-J	2-J	3-J	4-J	5-J	6-J	7-J	8-J	9-J	10-J

# Overland Network Diagram



# ***Plug & Play Advantages***

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- **User acceptability/demand**
- **Increased, critical functionality**
- **Greater reliability – self diagnostic, self calibration**
- **Lower cost per unit**
- **Improvements in measurement**

# Summary

- Global problem with local application
- Need for IEEE 1451 sensor standard
- 2-way communication anywhere
- 24x7 monitoring and control
- Auto response algorithms
- Monitor & control via browser interface
- Cost-effective network configuration
- Power efficient network deployment
- Homeland Security mandates



# Thank You!

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From anywhere in the world to your street: Global Asset Tracking and Control