



Superior Engineering Solutions

Welcome!

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## Converging Critical Technologies: Wireless, Sensor and Storage Networking

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## Converging Critical Technologies: Wireless, Sensor and Storage Networking

### **Definitions:**

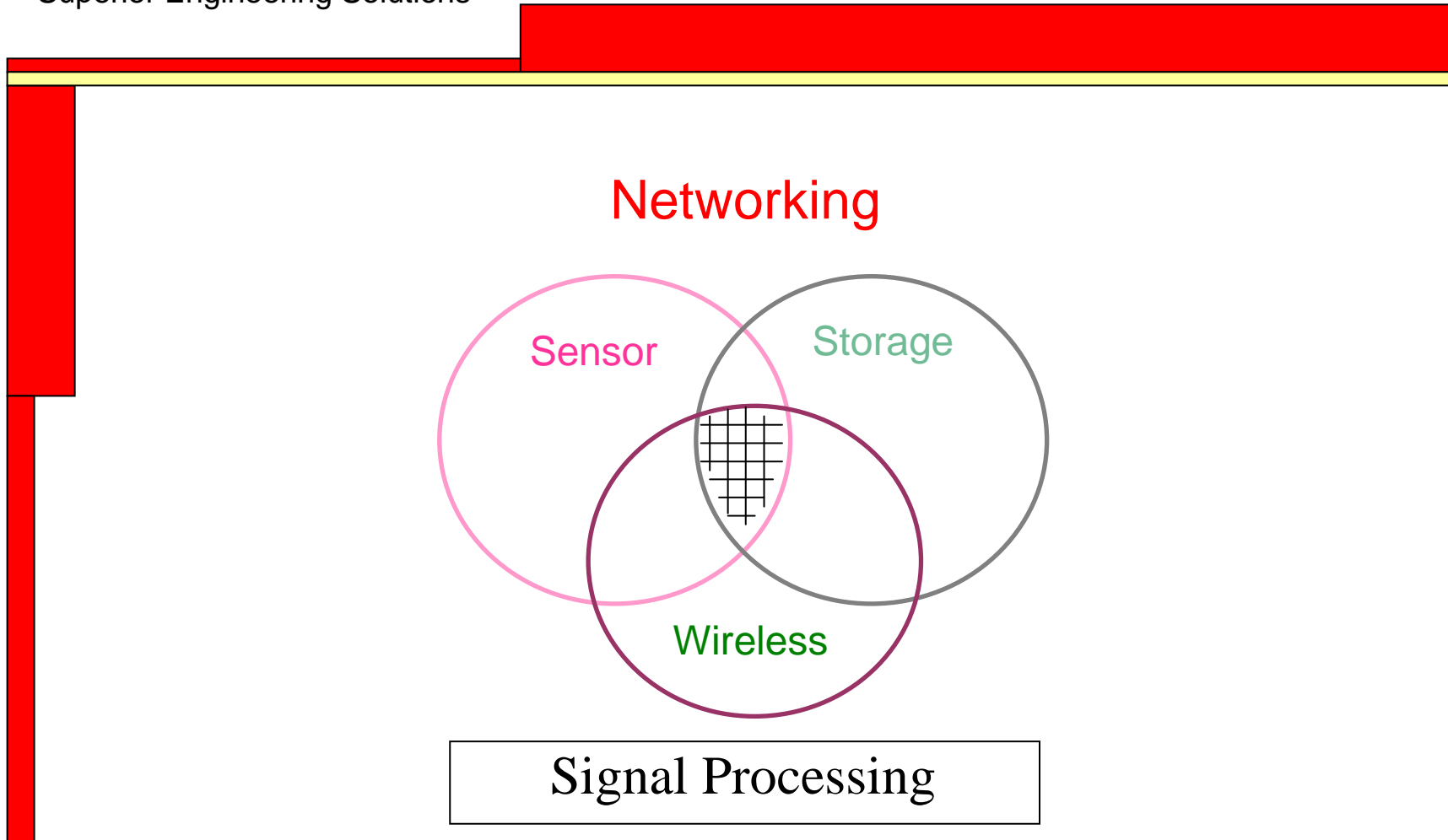
Wikipedia : Dual use = Technology used for peaceful and military aims  
[http://en.wikipedia.org/wiki/Dual-use\\_technology](http://en.wikipedia.org/wiki/Dual-use_technology)

MCTL : Military Critical Technologies List = Permit significant advances in the development, production and use of military capabilities  
<http://www.dtic.mil/mctl/>

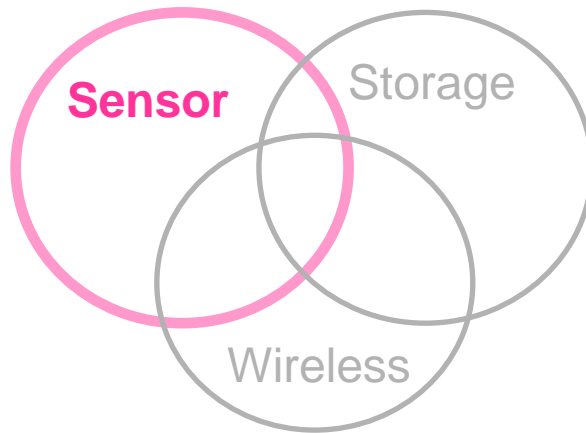
### **CTI Company Mission**

Develop and rapidly commercialize emerging dual-use information technologies, bridging the gap between research and application.

# Converging Critical Technologies: Wireless, Sensor and Storage Networking



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™International Neural Network Society

## Sensor Signal Processing & Networking

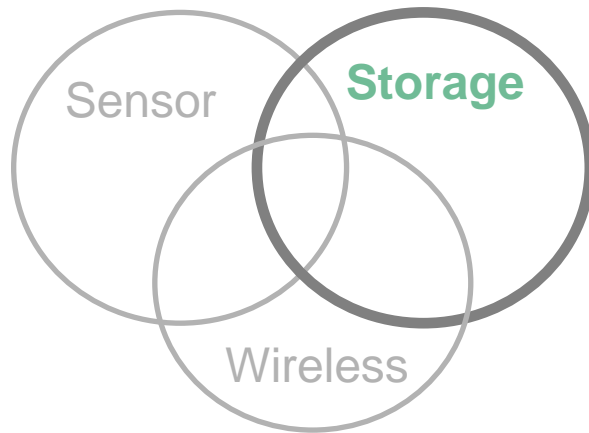
### DARPA SBIR

Massively parallel, real-time hardware neural network for automatic target recognition

### Commercial Contract

Position tracking in massive warehouses:

indoor GPS



## Storage Networking

No\*Stop Network

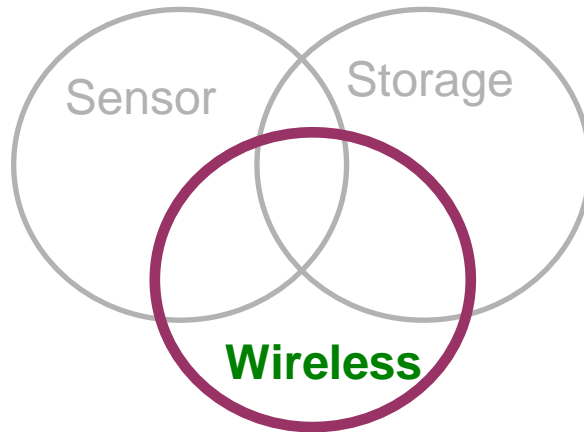
Local server mirroring

Miralink Principia™

Remote disk mirroring for  
high availability systems

PeerStor

Transparent remote  
mirroring for Windows



Joint STARS

## Wireless Networking

Information for the Warrior

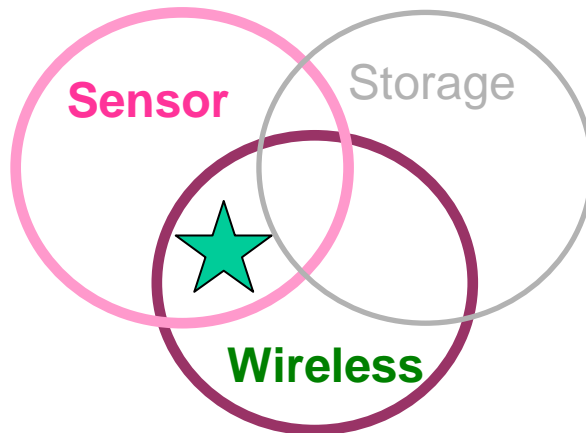
Information for Global Reach

Information for the Mobile Warrior

Interim Capability for Airborne Networking

Joint Capability for Airborne Networking

***\*\*ICAN currently deployed in 2  
active theatres of war***



Concurrent Multipath Routing (CMR)  
exploit ALL available links

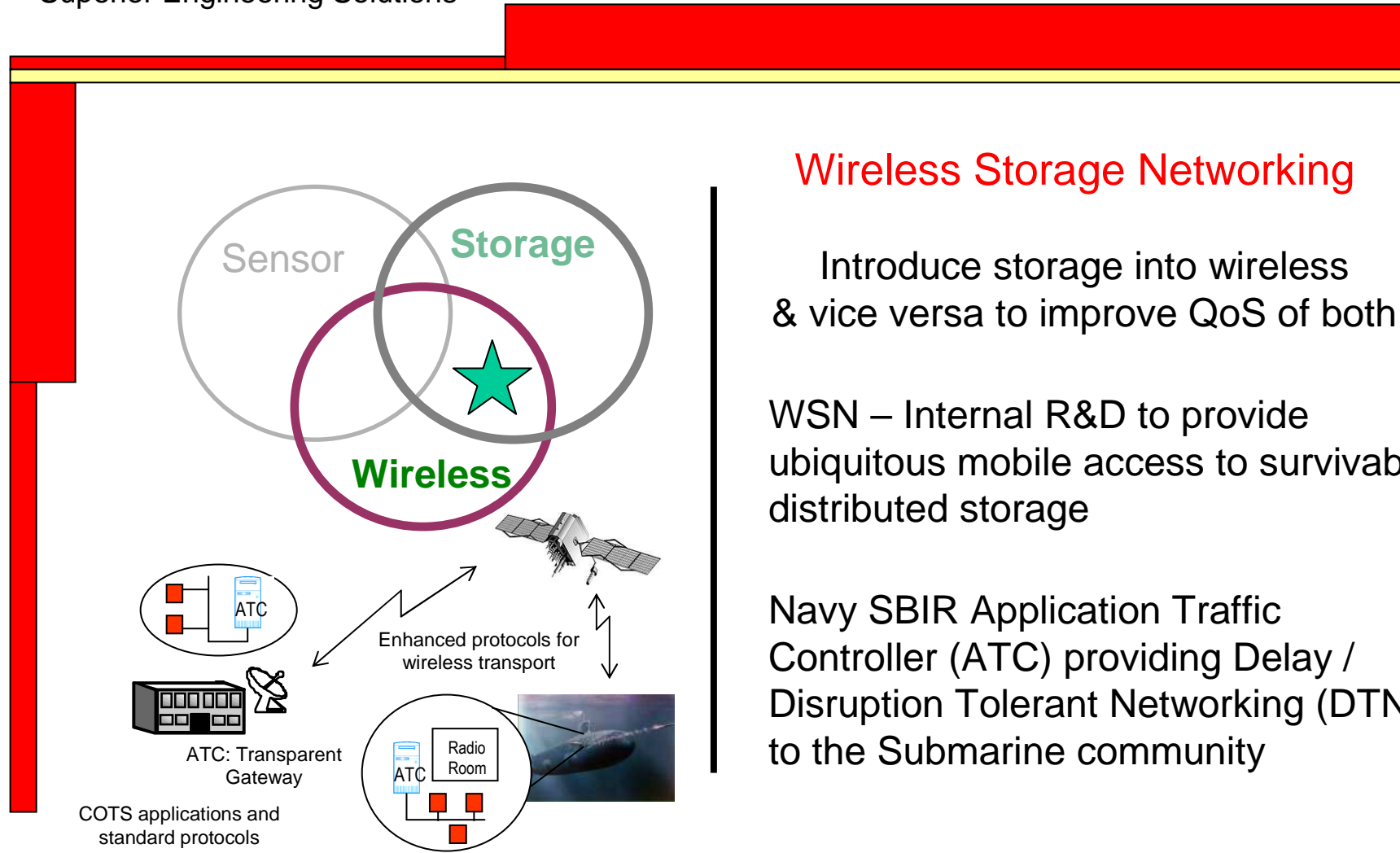
- highly divergent characteristics
- balkanized network control

### Wireless Sensor Networking

Air Force program: COSMIC  
Communications and Sensor  
Management Integrated Capability

Goal: Joint optimization of sensor &  
communications resource usage

Interoperable TCP/IP transparently  
proxied via Space Communications  
Protocol Standards (SCPS) over CMR

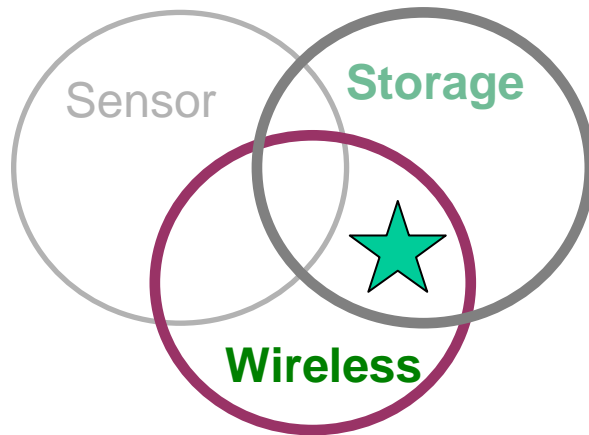


### Wireless Storage Networking

Introduce storage into wireless & vice versa to improve QoS of both

WSN – Internal R&D to provide ubiquitous mobile access to survivable distributed storage

Navy SBIR Application Traffic Controller (ATC) providing Delay / Disruption Tolerant Networking (DTN) to the Submarine community



When connected: *accelerate!*

When disconnected: **preserve**  
access to data & network services

### More ATC.....

#### Application Proxy

- Cache
- Queue
- Compress

#### Transport Proxy

- Bundle
- Stream

## Benefits of ATC

### De-couple:

*when* users have access to data & network services  
*when* the LAN has wireless WAN connectivity

### **New Capabilities** - When disconnected, preserve access to:

Internet Protocol suite network services (e-mail, web)

Data (old in cache, queue request for new)

### **Optimization** – When connected, effectively utilize bandwidth

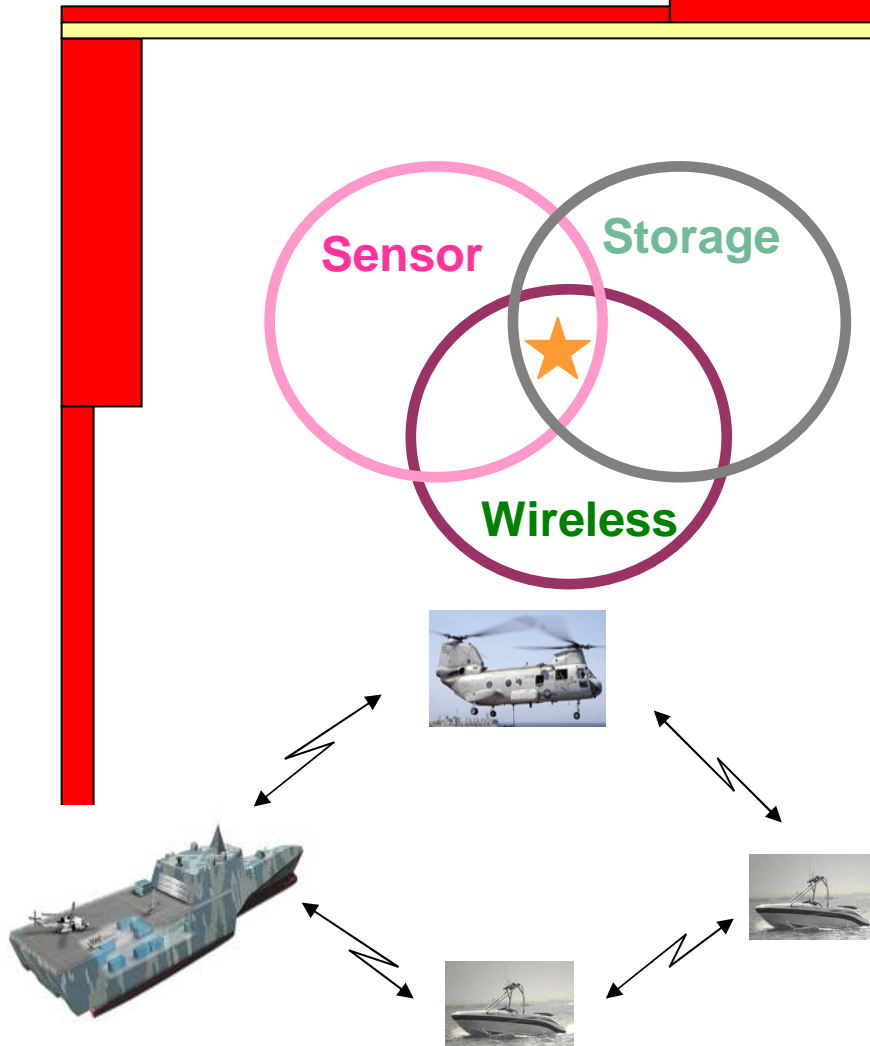
Prioritization – most critical traffic first

Compression – dispatch per data type

### **Installation & Interface** – Non-intrusive but can drill down

End nodes untouched – Transparent network insertion

User policies – Define, monitor & override w/GUI



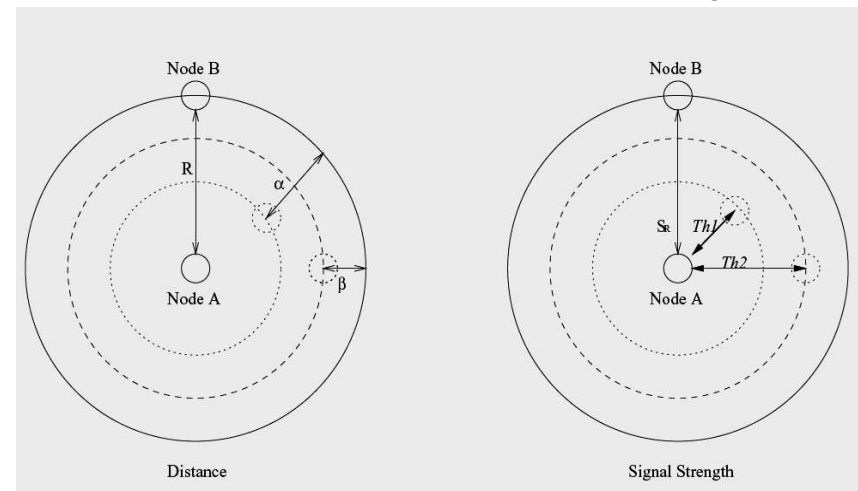
### Wireless Storage Sensor Networking

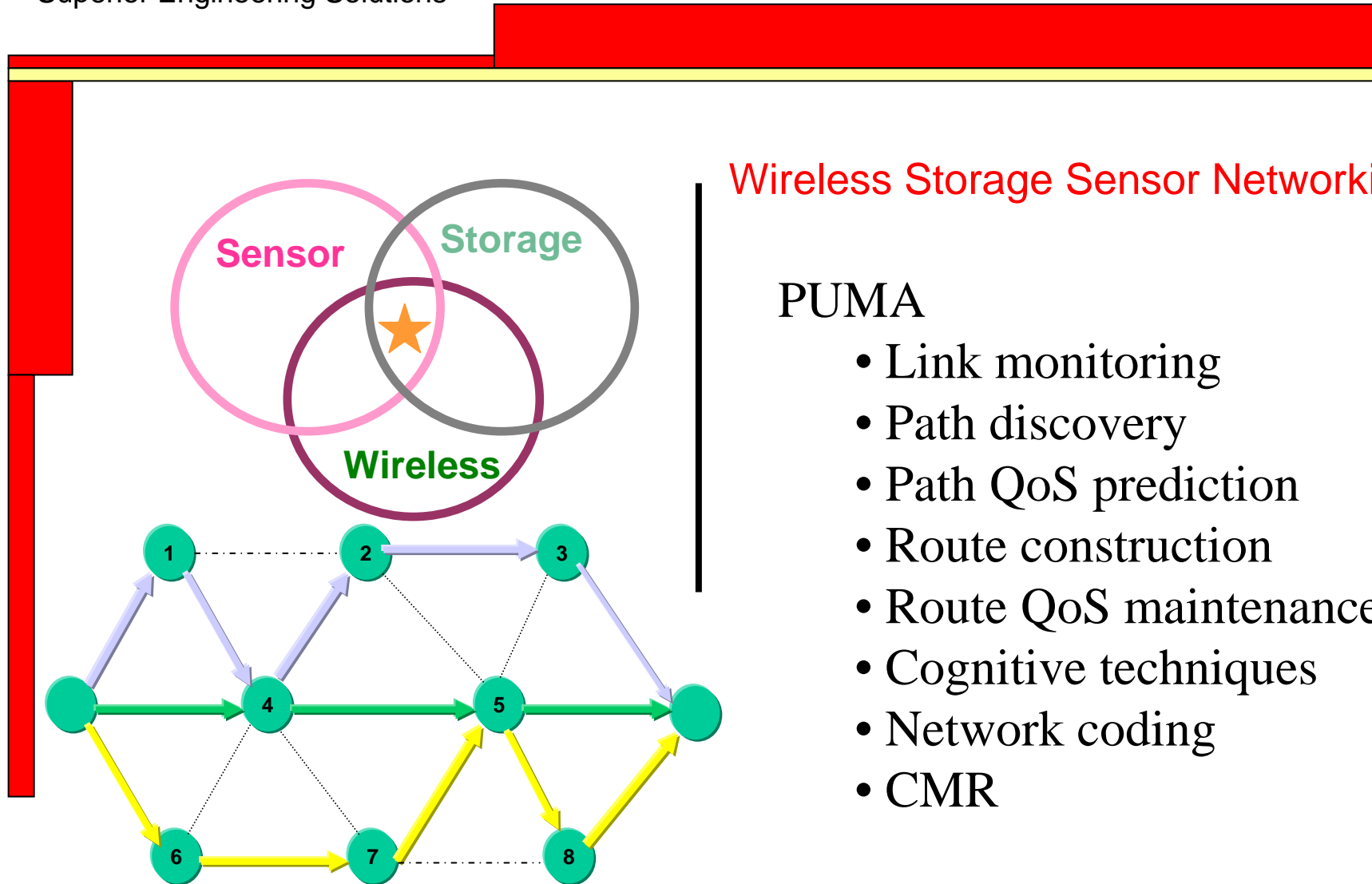
#### Adaptive Remote Sensor Communication

- Double communications range
- Quadruple search area

#### Using

- Delay / Disruption Tolerant Networking
- Predictive Unicast Multipath Algorithm





### Wireless Storage Sensor Networking

#### PUMA

- Link monitoring
- Path discovery
- Path QoS prediction
- Route construction
- Route QoS maintenance
- Cognitive techniques
- Network coding
- CMR

What's next?

Cognitive communications!

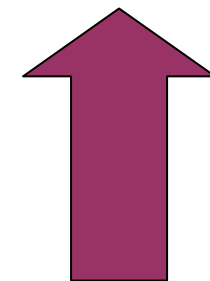
- a foundation for cognitive networking

Predictive & cognitive wireless networking

Predictive disruption & delay tolerance

Genetic algorithms in complex environments

QoS





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Thank you!

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