

- Definitions:

- Sensing range $[r_s]$
- Transmission range $[r_t]$

- Relationship between coverage and connectivity

- If transmission range $\geq 2 \times$ sensing range,
- coverage implies connectivity
- Most sensors satisfy the condition!
 - Coverage is the main issue



COVERAGE

- Determine how well the sensing field is monitored or tracked by sensors
- To determine, with respect to application-specific performance criteria,
 - In case of static sensors, where to deploy and /or activate them
 - In case of mobile sensors, how to plan the trajectory of the mobile sensors
- These two cases are collectively termed as the coverage problem in wireless sensor networks.

Coverage

- The purpose of deploying a WSN is to collect relevant data for processing or reporting
- Two types of reporting
 - Event driven
 - E.g. forest fire monitoring
 - On demand
 - E.g. inventory control system

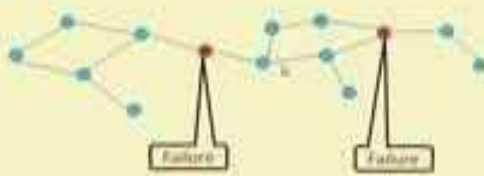
- Objective is to use a minimum number of sensors and maximize the network lifetime

SATIONARY WIRELESS SENSOR NETWORKS

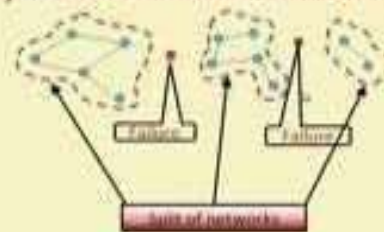
- Sensor nodes are static
- Advantages
 - Easy deployment
 - Node can be placed in an optimized distance- Reduce the total number of nodes
 - Easy topology maintenance
- Disadvantages
 - Node failure may result in partition of networks

- Topology cannot be changed automatically

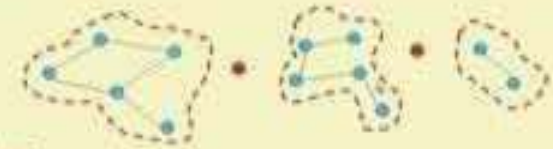
Stationary Wireless Sensor Networks (Contd.)



Stationary Wireless Sensor Networks (Contd.)



Stationary Wireless Sensor Networks (Contd.)



Solution?

To mobilize the sensor nodes
Mobile Wireless Sensor Networks (MWSN)

MOBILE WIRELESS SENSOR NETWORKS

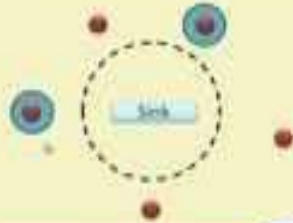
- MWSN is Mobile Ad hoc Network (MANET)
- MANET- infrastructure less network of mobile devices connected wirelessly which follow the Self- CHOP properties
- Self-Configure
- Self-Heal
- Self-Optimize

- Self-Protect

Components of MWSN

- **Mobile Sensor Nodes**

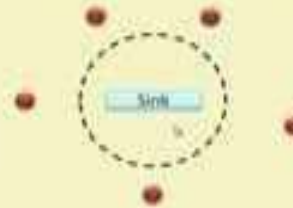
- Sense physical parameters from the environment



Components of MWSN

- **Mobile Sensor Nodes**

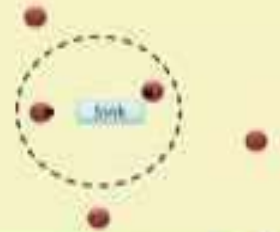
- Sense physical parameters from the environment
- When these nodes come in close proximity of sink, deliver data



Components of MWSN

- **Mobile Sensor Nodes**

- Sense physical parameters from the environment
- When these nodes come in close proximity of sink, deliver data



Components of MWSN

- **Mobile Sink**

- Moves in order to collect data from sensor nodes
- Based on some algorithm sink moves to different nodes in the networks



Components of MWSN

- **Data Mules**

- A mobile entity
- Collects the data from sensor nodes
- Goes to the sink and delivers the collected data from different sensor nodes



Underwater MWSNs

- ✓ Senses different parameters under the sea or water levels
- ✓ Can be linked with Autonomous Underwater Vehicles (AUVs)
- ✓ Applications: Monitoring-marine life, water quality etc.

Terrestrial MWSNs

- ✓ Sensor nodes typically deployed over land surface
- ✓ Can be linked with Unmanned Aerial Vehicles (UAVs)
- ✓ Applications: Wildlife monitoring, surveillance, object tracking

Aerial MWSNs

- ✓ Nodes fly on the air and sense data (physical phenomena or multimedia data)
- ✓ Typical example is Unmanned Aerial Vehicles (UAVs)
- ✓ Applications: Surveillance, Multimedia data gathering