Sensor Networks and Mobility

Professor Jack Stankovic
Department of Computer Science
University of Virginia
Assisted Living and Residential Monitoring - AlarmNet
Smart Living Space

- Uplink
- Trip Sensor
- RFID Reader
- Pressure Sensor
- Environmental Sensor
- Camera
- Wearable Sensors
- PDA
- RFID Reader
- Object Tag
- Medication Sensor
- Proximity Sensor
- Floor Sensors
- Data Storage
Real-Time Display
Sensors Everywhere

- Cell phones with sensors
- PDAs with sensors
- Laptops with sensors
- Workstations with sensors
Requirements (1)

- Real-time
- Location based
- Discontinuous operation
- In network aggregation
- 2 mobile end points
- Spectrum coordination
- Energy aware
Requirements (2)

- Security
- Privacy
- Multi-cast and anycast
- Ad hoc formation
- Reliable and available
Fundamental Principles

- Asymmetric Placement
- Adaptation via Reflection
- Spatial-Temporal
- Overlays
- Self-Healing
Creating This Today

- New architectures based on fundamental principles
  - IP for Internet
  - SP for sensor network
  - MP for mobile network
  - Maybe an ISMP

- Allow for “sensing”
1. An unmanned plane (UAV) deploys motes

2. Motes establish a sensor network with power management

3. Sensor network detects vehicles and wakes up the sensor nodes