

## Robomote: Sensor Actuator Platform

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[www-robotics.usc.edu/~robomote](http://www-robotics.usc.edu/~robomote)

### Introduction: Network friendly robot architecture

#### Sensor Networks with Static Deployment

- Limited Energy (Lifetime)
- Limited Capacity
- Limited Coverage and Connectivity
- Limited use of Geography of network

#### Mobility Assisted Sensor Networks

- Balance the energy distribution
- Increase the capacity of network
- Adaptive coverage and connectivity

Robomote



Test Bed



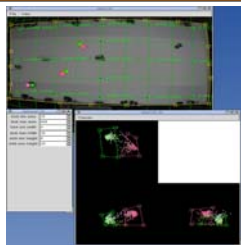
### Infrastructure and Applications

#### Infrastructure

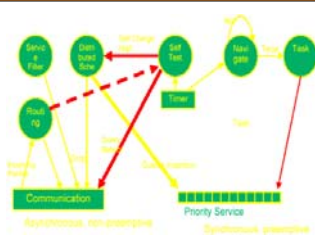
- RF Localization
- Vision based Localization
- Obstacle Avoidance
- Precise Odometry
- Compass based navigation
- Rechargeable battery

#### Applications

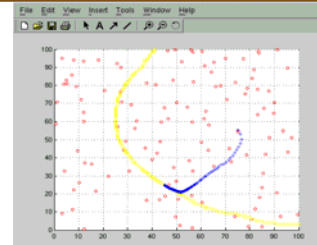
- Energy harvesting
- Actuated Boundary detection
- Network repair / Load Balancing



Vision based Ground Truth



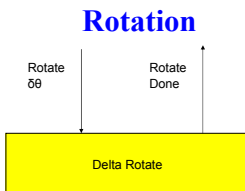
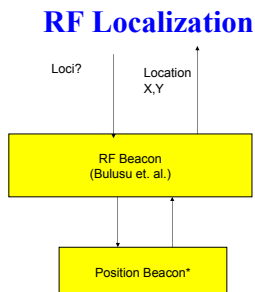
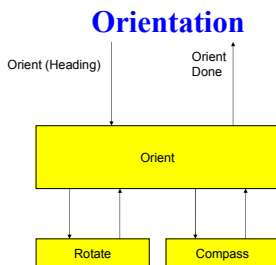
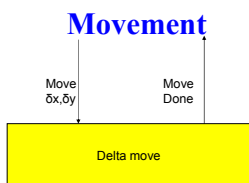
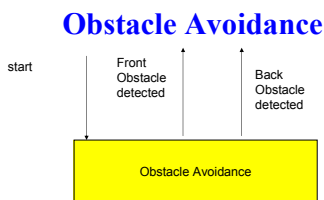
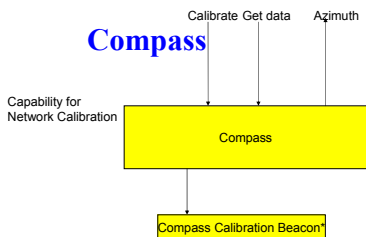
Energy Harvesting State Machine



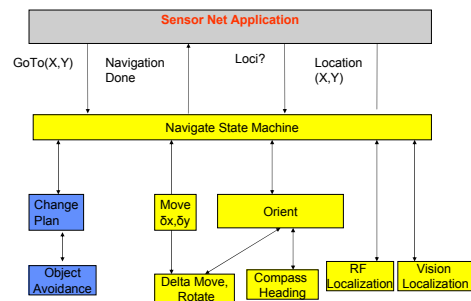
Boundary Detection

### Component based software architecture

#### BASIC COMPONENTS



#### Sensor Network Application Interface



#### • Hardware Details

- AVR 8 bit RISC microcontroller ( Atmega 32L)
- 32 K Flash, 2 K Byte Ram , 1024 byte EEPROM
- Max speed 15 -20 cm/Sec
- Odometry 36 Pulses per cm
- IR object avoidance system on front and back
- Compass better than 5° precision
- Max payload 300 grams
- Power 345mAh
- Charging Time 15-20mins wall

\* Beacon range calibrated with auto calibration mechanism