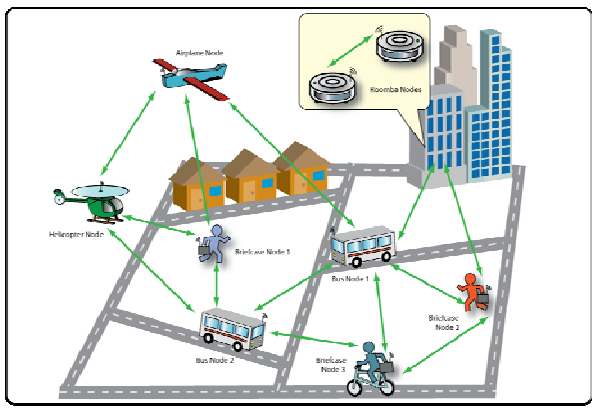
SCORPION: A Heterogeneous Wireless Networking Testbed

Sean Bromage
seanbromage@umail.ucsb.edu
SURF-IT 2008, University of California Santa Cruz
Advisor: Katia Obraczka, Grad Students: Matt Bromage, Vladislav Petkov, Bruno Nunes

Network



- Unique array of nodes allows for thorough testing of innovative wireless protocols
- Differs from other testbeds due to its node heterogeneity
- Wide range of mobility scenarios allows for modeling real-world applications that are prone to frequent, long-lived connectivity disruptions

Nodes

Aerial: 4 autonomous airplanes and 4 self-stabilizing helicopters provide aerial coverage

iRobot: 20 terrestrial nodes roam the ground in an unpredictable way, making the testbed's behavior unspecified

Bus: 40 buses are equipped wireless radios in order to blanket the campus effectively

Briefcase: 20 nodes are carried by students via foot or bicycle while constantly transmitting data to other nodes they come into contact with

Projects

Autonomous Airplane

- 4 RC Airplanes equipped with Paparazzi autopilot navigate according to GPS waypoints
- Able to bridge disconnected sections of the testbed
- Traverse treacherous terrain, providing network connectivity to otherwise disconnected nodes

Epidemic Protocol

- Nodes spread data throughout the network as if it were a virus to ensure adequate coverage
- A node transmits a list of its data to other nodes in the area via datagram sockets
- Nodes within range then respond with packets containing any missing data