Wireless and Internet Research Laboratory (WIRLab)

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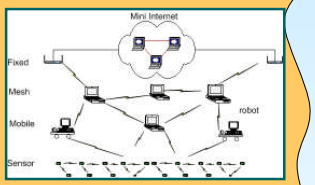
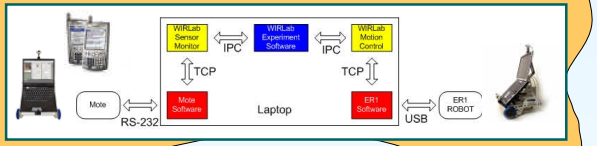
WIRLab is a quarter million dollar facility built by a funding support from Canadian Foundation for Innovation (CFI) and Ontario Innovation Trust (OIT) and numerous industrial partners.

WIRLab Architecture

- The equipment is organized into multiple layers to emulate various networking architectures:
  - Core network with high-end L2/L3 switches and soft routers;
  - Several access points with capability for multiple standard support;
  - Numerous wireless devices such as notebooks, PDAs, wireless cameras, etc, for mesh or multi-hop communications;
  - Wireless robots for mobility management;
  - Sensors equipped with localization devices for environmental monitoring and location estimation;
  - DSRC/WAVE devices for fast MAC and rapid network acquisition used in mobile communications at vehicular speeds.
- The lab can simulate almost all network configurations and various topologies.





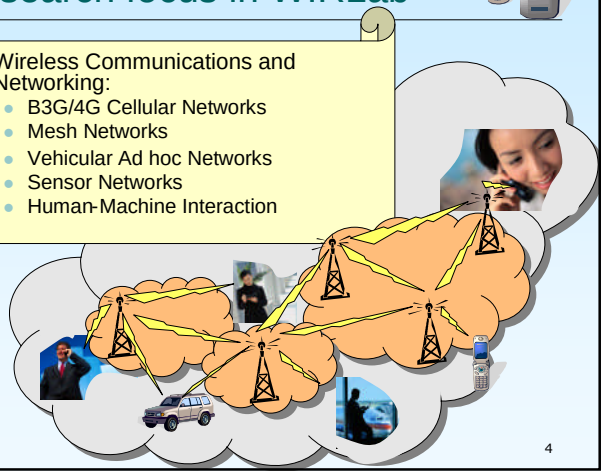
Projects (last three years):

- 4G Cellular Networks
- Mesh Networks
- Vehicle-to-vehicle Communication
- Mobile Hotspots for Transportation
- Localization of Wireless Terminals
- IEEE 802.16 Wireless Broadband Access
- Patient Pocket Care
- Call Admission Control in Wireless Ad Hoc Networks
- Multipath Routing in Wireless Ad Hoc and Sensor Networks
- Virtual Network Partitioning
- Channel Order Estimation for Multiuser Detectors
- Video Streaming over Wireless Networks
- ….

WIRLab

Research focus in WIRLab

- Wireless Communications and Networking:
  - B3G/4G Cellular Networks
  - Mesh Networks
  - Vehicular Ad hoc Networks
  - Sensor Networks
  - Human-Machine Interaction



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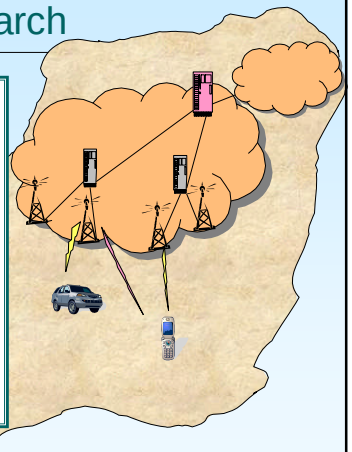
4G Cellular Research

- Effective solutions for 4G networks
- Supported by LG Electronics in Korea
- Long term evolution of cellular networks
- 50-100 Mbps
- ….



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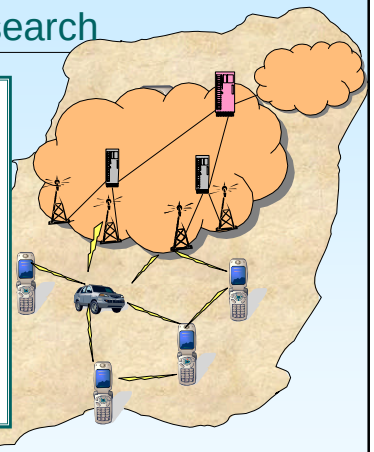
Mesh Network Research

- IEEE 802.11s Standard
- Hydro Ontario Mesh Network
- Nortel Networks mesh nodes
- Supported by LG Electronics
- Effective scheduling techniques
- ….



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Vehicular Ad Hoc Networks

- Low latency communications for vehicular environment
- IEEE 802.11p
- More than 40 companies (auto makers, telecom, government) involved
- Collaborator: Mark IV Industries
- Applications role out: near term (2008-2011), mid-term (2012-2016), long-term (2016+)

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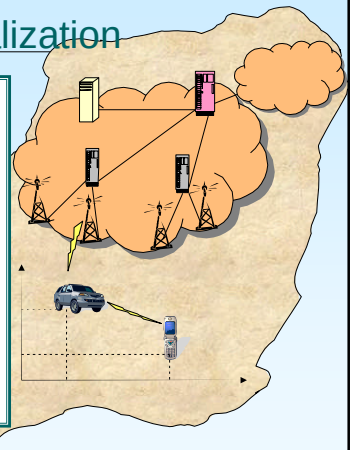
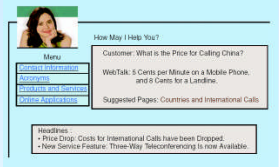
Wireless Node Localization

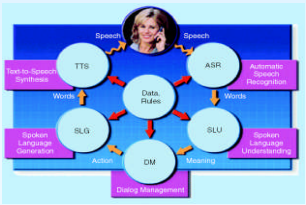
- Localization of wireless nodes
- E911 application
- Location-based Services
- Indoor localization for emergency
- …



Human-machine Interaction

- Bell Canada Emily Persona (310-BELL)
- Interactive Voice/Response system
- Multimodal/multimedia Services
- Supporter:
  Bell Canada





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Sensor Networks

- Wireless in-car communications
- Sensors connected through high-speed reliable wireless links
- Reduced wiring cost