Presentation Outline

- Wireless LAN Requirements
- Proposed System Architecture
- System Features
- Wireless Portable Computing
- Conclusions & Next Steps

Wireless LAN Requirements

- Maximum possible wireless data rate and packet throughput
- Service area consistent with wired LANs
- Support for standard workstation interfaces
- Unlicensed operation
- Augment wired LANs
- Communications reliability consistent with wired LANs
Wireless LAN Requirements

- Maximum possible wireless data rate and packet throughput
  - Increasing user speed requirements:
    - 4 Mbps < 10 Mbps < 16 Mbps < 100 Mbps
  - Increasing capabilities of workstations and portables, 21 Mbps transfer rate typical today
  - More demanding network applications coming
    - More networked applications
    - More communication between networked applications
    - More graphical communication, less keyboard I/O
    - Multimedia
- Design goal should be 10 Mbps with minimum packet delay

Wireless LAN Requirements

- Service area characteristics consistent with wired LANs
  - 100 meter radius would be ideal
  - > 50 meters would require additional wiring infrastructure
  - Overlapping service areas must be permissible
- Design goal should be 80 meters with overlapping service areas with minimum reduction in throughput and no system interference
System Architecture

- Why is a controller or hub necessary?
  - Wiring hubs were selected over peer level wiring systems because
    - Reliability
    - Segmentation
    - Net management
    - Ease of wiring
  - Theoretically doubles service area
  - Allows simplification of transceiver and more robust operation
  - Supports initialization, access control, and error control
  - Good access point for wired systems
  - Net management engine
  - Allows power control for spread spectrum operation

- Why not?
  - Entry level cost
  - Potential packet daisy

Wireless Portable Computing

- Communications power consumption is the dominant issue
  - 5.8 GHz and Spread Spectrum at reasonable data rates very questionable
  - 2.4 GHz at reasonable data rates possible
  - Again, a Hub(controller, access point, etc.) can help
  - Easy attachment point to wired LAN
  - Wake-up technique for wireless transceivers
  - Best way to reduce wireless transceiver complexity (i.e., cost and power consumption)
System Architecture

Net Mgt

Backbone Connection (Ethernet, TR, FDDI)

2.4 GHz

5.8 GHz

Workstation

10BaseT or AUI

Workstation
Wireless LAN Requirements

- Support for standard workstation interfaces
  - The world is dominated by IEEE-802.3 and IEEE-802.5 workstation interfaces
  - Proliferating more hardware interfaces causes significant software compatibility problems
  - Should new interfaces be required (or forced)?
- Design goals should be IEEE-802.3 and IEEE-802.5

Wireless LAN Requirements

- Unlicensed operation
  - Licensing and computing mobility are antithetical
  - WINDATA supports all attempts to allocate more bandwidth for unlicensed data communications...
  - but, pragmatically, the ISM bands and low power operation are our only options at this time
  - In the ISM bands our design goals were 2.4 GHz and 5.8 GHz
    - more bandwidth available
    - some commonality with Europe and Japan
Wireless LAN Requirements

- Augment wired LANs
  - Twisted pair LANs are ubiquitous and most initial wireless applications will be connected to wired LANs
  - therefore ...
    - Connect to devices that are equipped to connect to wired LANs
    - Provide easy connection between wired LANs and wireless LANs
    - Support net management services so that wireless devices can be managed just as well as wired devices

- Communications reliability consistent with wired LANs
  - Raw bit error rate consistent with wired systems
  - Adjust system operation due to changes in environment
  - Strong initialization procedures
  - Ability disallow or disable marginal stations from the network
  - Isolation and control points between wired and wireless LANs