Presentation Outline

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

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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

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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,
      ≥1 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

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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

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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
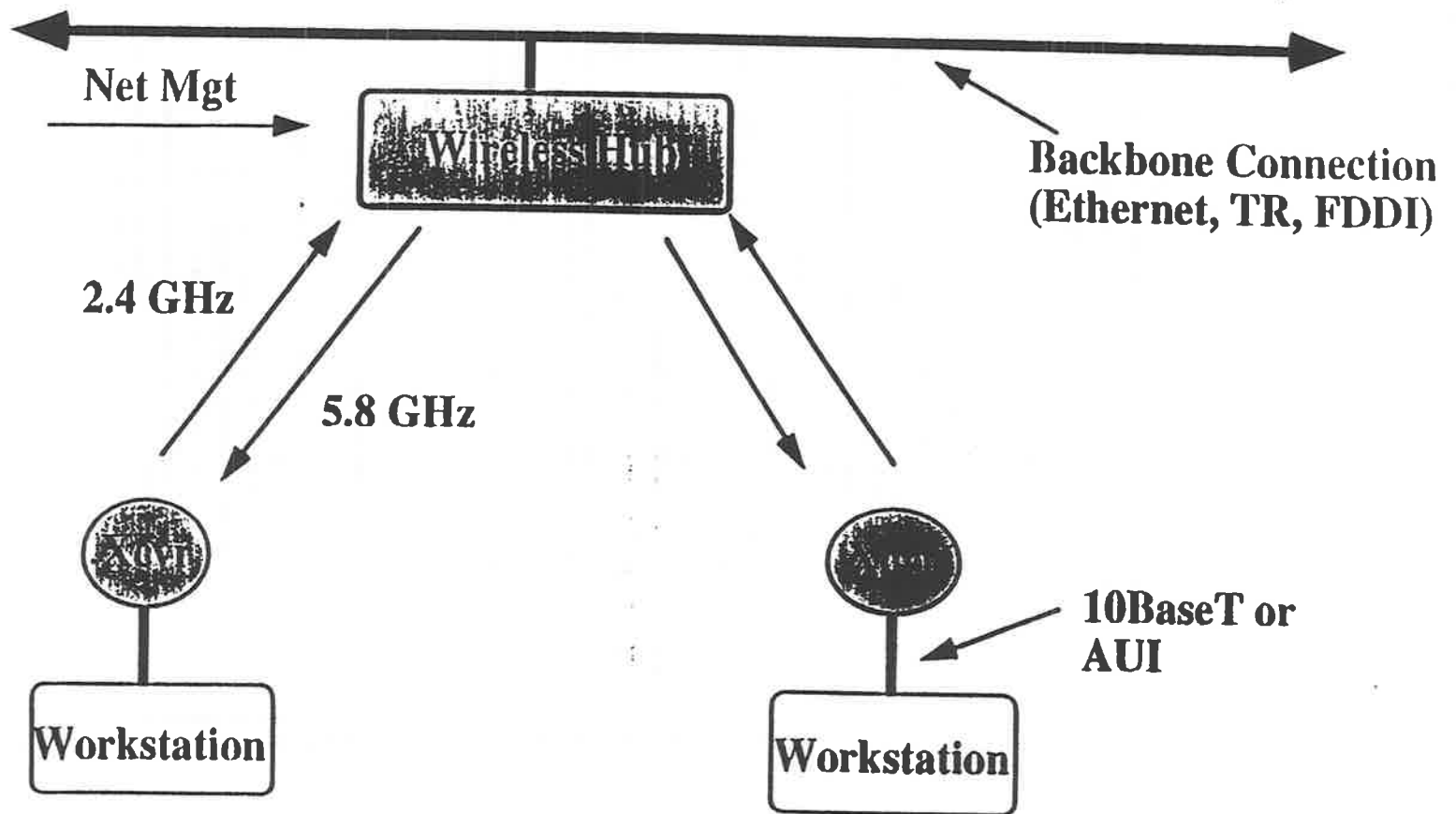 - Potential packet delay

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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)

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System Architecture

Net Mgt

Wireless Hub

Backbone Connection
(Ethernet, TR, FDDI)

2.4 GHz

5.8 GHz

10BaseT or
AUI

Workstation

Workstation

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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

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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

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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

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Wireless LAN Requirements

- 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

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