Cellular Services and Infrastructure
Introduction

• Jeff Carpenter, Manager of Planning and Engineering
  • Lead role in all cellular-related projects since 2001
  • Negotiate agreements for service contracts and infrastructure improvements
  • Project manage public/private partnerships
  • Advocate for MSU with carriers
IPF-Telecom Wireless Scope

• We are **NOT** MSUnet Wireless WiFi, but we handle portions of the install
• We are **NOT** Broadcasting Services, but we provide consulting services
• We are **NOT** pagers
• We **ARE** all remaining wireless including cellular, two-way and related systems
Session Overview

• History of cellular services at MSU
• End user plans, products and payments
• Carrier funded projects
• Department funded projects
• A glimpse of the future
• Questions and discussion
A Brief History of Services...

• Is there central control of cellular services?
  • In the past – highly decentralized
  • Now – highly decentralized, with a twist
    • Some contract changes require IPF-Telecom sign-off as the carrier’s “single point of contact”
      – Especially for switch between university-liable and personal-liable plans
      – This can delay processing of orders
      – This cannot be avoided (e.g. Verizon Wireless)
  • Select staff well versed in the process
Plans and Products

• Contracts with discounts?
  • MSU-specific contracts dominated in the 1990s and early 2000s
  • Now tied to state, federal or national group purchasing agreements
  • MSU Purchasing website (contracts and services)
    • Verizon
    • AT&T
    • Sprint
  • Service, device and accessory discounts apply
Contracts and Services

Strategic Contracts
In a university setting, it is common to negotiate contracts with select suppliers to provide the most commonly used goods and services. This practice greatly improves our buying power as the negotiator and results in improved pricing, improved delivery schedules, and enhanced relationships with suppliers. Most contracted items are available through University Stores via the Shop at State catalog. Buying from contracts is the first of three preferred purchasing methods at MSU; next is the Pcard, and then purchase orders.

Open Orders
Another way to buy from contracts is the Open Orders process. These are supplier relationships that are open for the entire campus to utilize. There can be more than one contracted supplier for the commodities or services and users may have a choice in suppliers.

Internal Service Providers
Many goods and services can be bought from MSU internal sources. To make shopping easier for you, the most commonly used service providers are included below in the contracts list. Look for the names with an asterisk. We also provide a list of links to other internal service providers. If
Payment Methods

• University-liable Vs. Personal-liable?
  • P-Card still the recommended payment method for shrinking number of university-liable accounts
  • Pendulum has swung dramatically to personal-liable
    • Driven by:
      – IRS accounting rules (since changed)
      – Trend towards telecommuting/teleworking/mobile workers
  • Taxable stipend model dominates (see MBP)
    • Business use: Section 78
    • Mixed use: Section 79
Carrier Funded Projects

• We define service quality as...
  • **Coverage:** The ability for your mobile device to communicate with the network in a specific geographic location (e.g. bars!)
  • **Capacity:** The ability for your mobile device to communicate with the network in dense population environments (e.g. don’t drop my call, lose my text or slow my Internet data session!)
Carrier Funded Projects

• Regardless of the solution, these projects are very expensive
  • Capital intense
  • Rigorous installation and operational standards
  • 911 and life/safety requirements
    • 70% of 911 calls from mobile devices (FCC recent estimate)
    • Stricter rules for location accuracy
Carrier Funded Projects

• IPF-Telecom has championed public/private partnerships with all major carriers (since 2004)
  • Verizon
  • AT&T
  • Sprint
  • Nextel (no longer on air)
  • T-Mobile
  • MetroPCS (now part of T-Mobile)

• Serve as contract negotiator, project manager and long-term site contact
Carrier Funded Projects

• What do we provide?
  • MSU functions as landlord, carriers as tenants
  • MSU hosts a carrier compound on south campus
  • MSU leases underground fiber optic capacity
  • MSU leases rooftop space

• What does this cost us?
  • No capital or operational costs
  • Parts and labor costs recovered from carriers
Carrier Funded Projects

• How is this accomplished?
  • Outdoor Distributed Antenna System nodes (oDAS)
  • Outside-in signal approach
    • Carrier’s network is closer to the users
  • Frequency re-use through low power, low height
    • Helps meet insatiable demand for mobile Internet data
Carrier Funded Projects

• Fun facts
  • 57 outdoor sites across main East Lansing campus
    • Locations vary by carrier as they operate per unique engineering requirements
    • 4 more sites in negotiation (AT&T)
  • Major upgrades in progress or negotiation
    • AT&T @ Stadium
    • Verizon at Stadium, Breslin and Munn
    • Sprint at Stadium
  • High density sites are very challenging
Department Funded Projects

- Options range from an individual office up to entire building
- IPF-Telecom facilitates estimate, design, installation and operation
- No free solution, vary widely in complexity and cost
- Each situation unique, requires consultation
Department Funded Projects

• Three solutions
  • Indoor Distributed Antenna System (iDAS)
  • Bi-directional amplifier/repeater (BDA)
  • Femtocell (personal hot spot)
Department Funded Projects

- iDAS
  - Indoor solution, can be multi-carrier
  - Requires carrier permission and consultation
  - $50K, $100K and even more depending on design
  - Only one such system at MSU
    - Breslin and Munn, funded by Athletics
    - Verizon, AT&T, Sprint and T-Mobile on the system
    - Operational issues because carrier technology has moved from 3G to 4G services
    - Burden is on the iDAS owner to invest in any upgrades
Department Funded Projects

• BDA
  • Indoor solution, typically single-carrier
  • Requires carrier permission and consultation
  • Typically a smaller coverage area due to technology used, depends on building size
  • $10K, $25K and even more depending on design
  • Only a handful at MSU
    • Radiology (Verizon 3G)
    • IPF (formerly Physical Plant) (Verizon 3G/4G)
Department Funded Projects

• Femtocell
  • Each carrier has different marketing name
    • Verizon = Network Extender
    • AT&T = Microcell
    • Sprint = Airave
    • T-Mobile = Cel-Fi
  • Internet (MSUnet) connection
    • May require discussion with IT Services to enable service
• Fast-growing technology
  • MSU does not restrict, however offers little
The Future Holds...

- Advancement of so called “small cell” technology
  - Femtocells for the enterprise space
  - Central administration
  - IP/Internet backhaul to carrier networks
- Tighter integration between carrier and enterprise networks
  - WiFi (MSUnet Wireless)
  - Clean handoffs between disparate coverage systems
- More investment at MSU by carriers to meet Internet data demands (double digit annual growth rates)
Questions/Comments?

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