

# National Science Foundation Symposium

Ed Thomas

Chief, Office of Engineering and Technology  
Federal Communications Commission

# FCC's Mission

Ensure that the American people have available – at reasonable cost and without discrimination – rapid, efficient, nation and world-wide communication services; whether by radio, television, wire, satellite, or cable.

# FCC's Strategic Goals

- Spectrum ★
- Broadband ★
- Competition
- Media
- Homeland Security ★
- Modernize the FCC

# Commission Initiatives

- Broadband Services
- Unlicensed Devices
- BPL
- Cognitive Radio
- Interference Temperature
- Public Safety
- Network Security
- Rural Services

# Current Broadband Deployment

## High Demand for Broadband

- High-speed lines to homes and businesses increased by 55% from 12.8M to 19.9M in 2002
- **Cable Modem Service -- 11.4M lines**
- **Asymmetrical Digital Subscriber Lines (ADSL) -- 6.5M lines**
- **Satellite & fixed wireless & fiber optic -- about 0.8M connections**

# Unlicensed Wireless

## Unlicensed Wireless Devices and Networks

- Unlicensed devices and networks being used to provide Broadband solutions
- Unlicensed Device Explosion
  - Wi-Fi - 25 Million Units Shipped in 2002
  - Bluetooth - 25-28 Million Units Shipped in 2002
- Sales of unlicensed Wireless Local Area Networking equipment expected to increase from \$1.1B in 2001 to \$5.2B in 2005

# Cognitive Radio

- Dynamic New Technology
- Senses RF Environment and modifies frequency, power or modulation
- Allow for Real Time Spectrum Management
- Significantly Increases Spectrum Efficiency

# Interference Temperature

- Sets a maximum “Threshold” for RF energy within a band thereby protecting incumbent operations
- Allows sharing by devices that stay below the “Threshold”
- Creates opportunities for new services and innovative technologies



# Broadband Over Power Line

- Provides broadband services to consumers over existing power lines
- Third "Pipe" into the home providing competition to DSL and Cable Modems
- "In House" BPL allows for networking of electronic devices over existing house wiring

# Advanced Wireless Services (3G)

- New voice, data, and broadband services
- Competitive services with other CMRS
- 1710-1755 MHz/2120-2155 MHz
  - 45 MHz Reallocated from Federal Government
  - Difficult and technical challenging negotiations
- Considering additional spectrum from 2 GHz MSS and other services
  - 1910-1920 MHz, 1990-2000 MHz, 2020-2025 MHz, 2165-2180 MHz

# Unlicensed Technologies

- U-NII (5 GHz WiFi) - 255 MHz new unlicensed spectrum
- Using White Spaces – Unused TV Channels
- Unlicensed Spectrum – 3650-3700 MHz
- Smart Antennas
- Above 90 GHz

# OET Homeland Security Initiatives

- NRIC
  - Commission's post 9/11 Initiative
  - Network Reliability Concerns
  - Best Practices
- 800 MHz Public Safety Interference
  - Interference Analysis
- CALEA
  - Coordinate Agency CALEA Activities
- UWB
  - Ground Penetrating Radar
  - Through Wall Imaging

# Emerging Business Opportunities

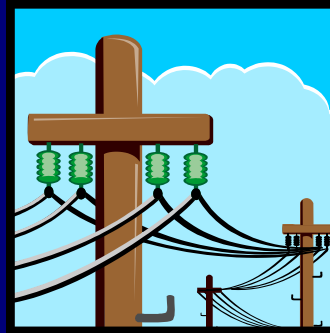
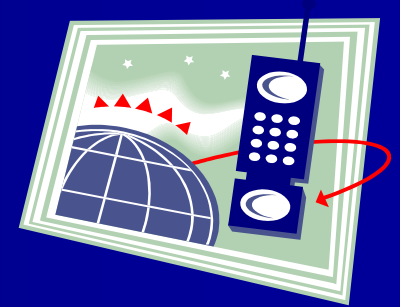
- Hotspot Service Provider
- Wireless ISP
- Carrier Class Equipment Providers
- UWB
- Cognitive Radio

# Potential Regulatory Issues

As unlicensed use spreads, what types of issues will the Commission face while attempting to ensure the continued viability of unlicensed operation?

# Asymmetric Regulation of Licensed and Unlicensed Spectrum

- What happens when unlicensed devices start to provide the same services as license-holders?
  - VoIP
  - BPL
  - Microwave



**Questions??**