

National Spectrum Managers Association: Spectrum Management 2005

**“Wireless Innovation:
Driving U.S. Economic Growth”**

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www.ntia.doc.gov



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The Spectrum Challenge

A Presidential Policy Board examining spectrum management summed up the urgent issues in stating:

"The development of so valuable a resource as the radio spectrum is a matter of paramount importance. Despite technical and operational improvements the demand for frequencies has steadily crowded the supply within the usable spectrum. The use of this resource should have the most careful planning and administration within the United States and in cooperation with other countries. Unfortunately, guidance and administration have often been inadequate."

STOCK ANALYSTS
THE PRESSURE TO SAY 'BUY'
PAGE 54

▶ ASEA'S GLOBAL PUSH ▶ WILL ABC PASS NBC? ▶ XEROX' STRATEGY

BusinessWeek

JULY 23, 1990

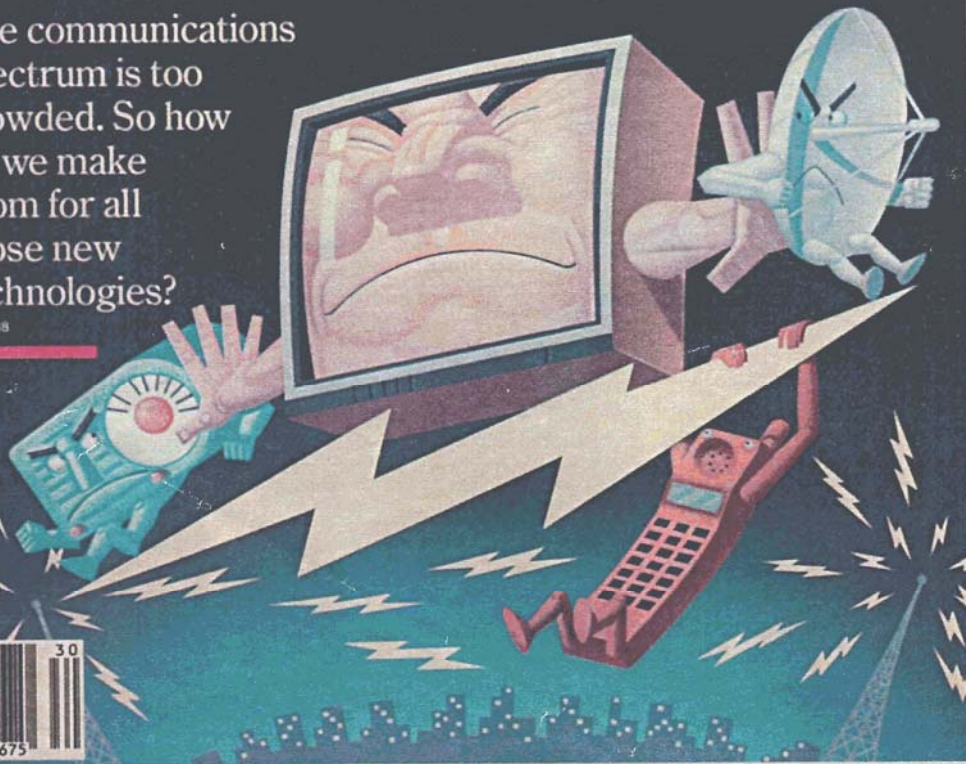
A MCGRAW-HILL PUBLICATION

\$2.00

AIRWAVE WARS

The communications spectrum is too crowded. So how do we make room for all those new technologies?

PAGE 48



Cover story
July 23, 1990

Spectrum Management

COMMUNICATIONS ACT OF 1934

NTIA

(On behalf of President)

- National Defense
- Law Enforcement & Security
- Transportation
- Resource Mgt Control
- Emergencies
- Other Services

FCC

(Independent Agency)

- Business
- State & Local
- Entertainment
- Commercial
- Private

COORDINATION

ADVISORY

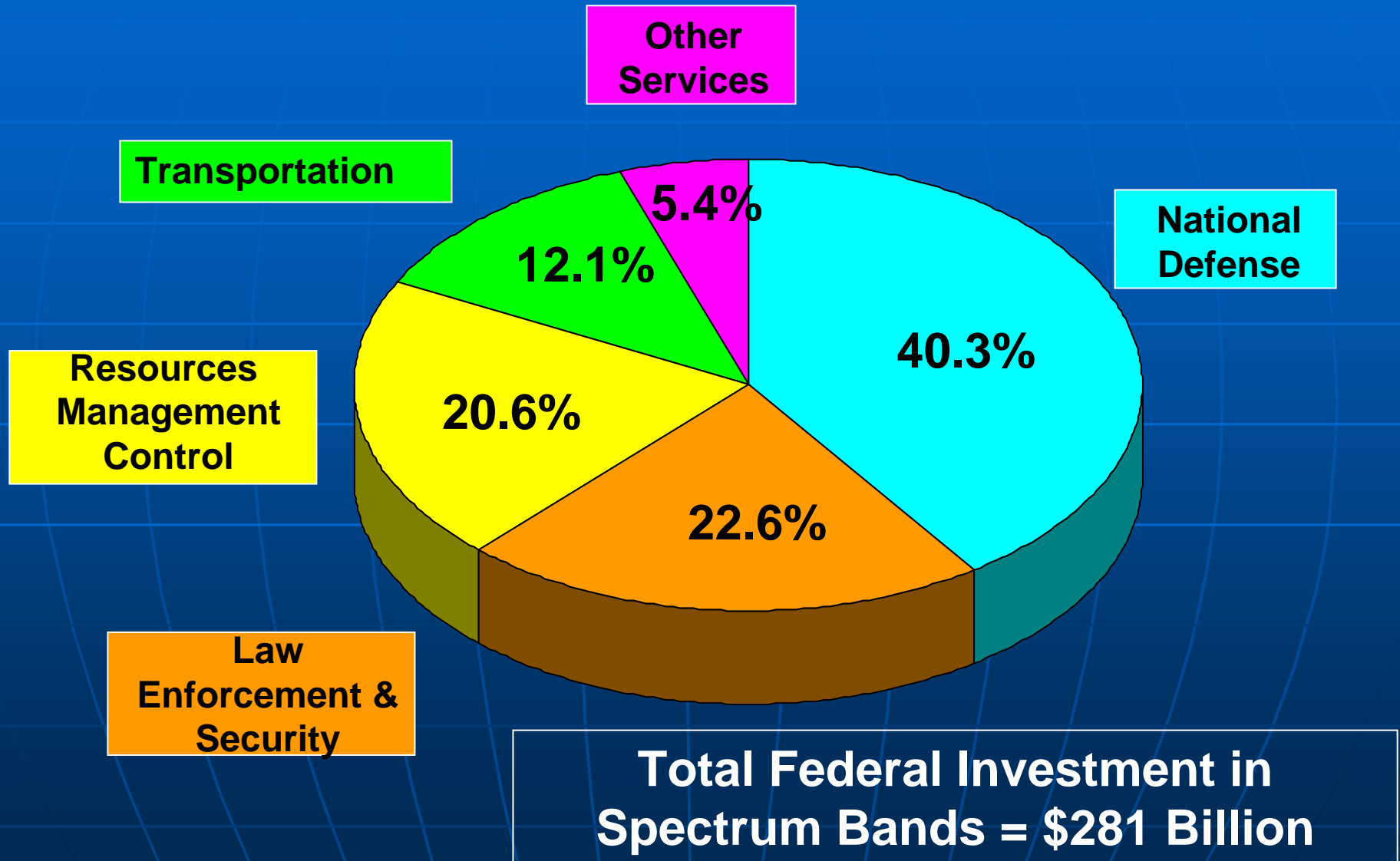
LIAISON

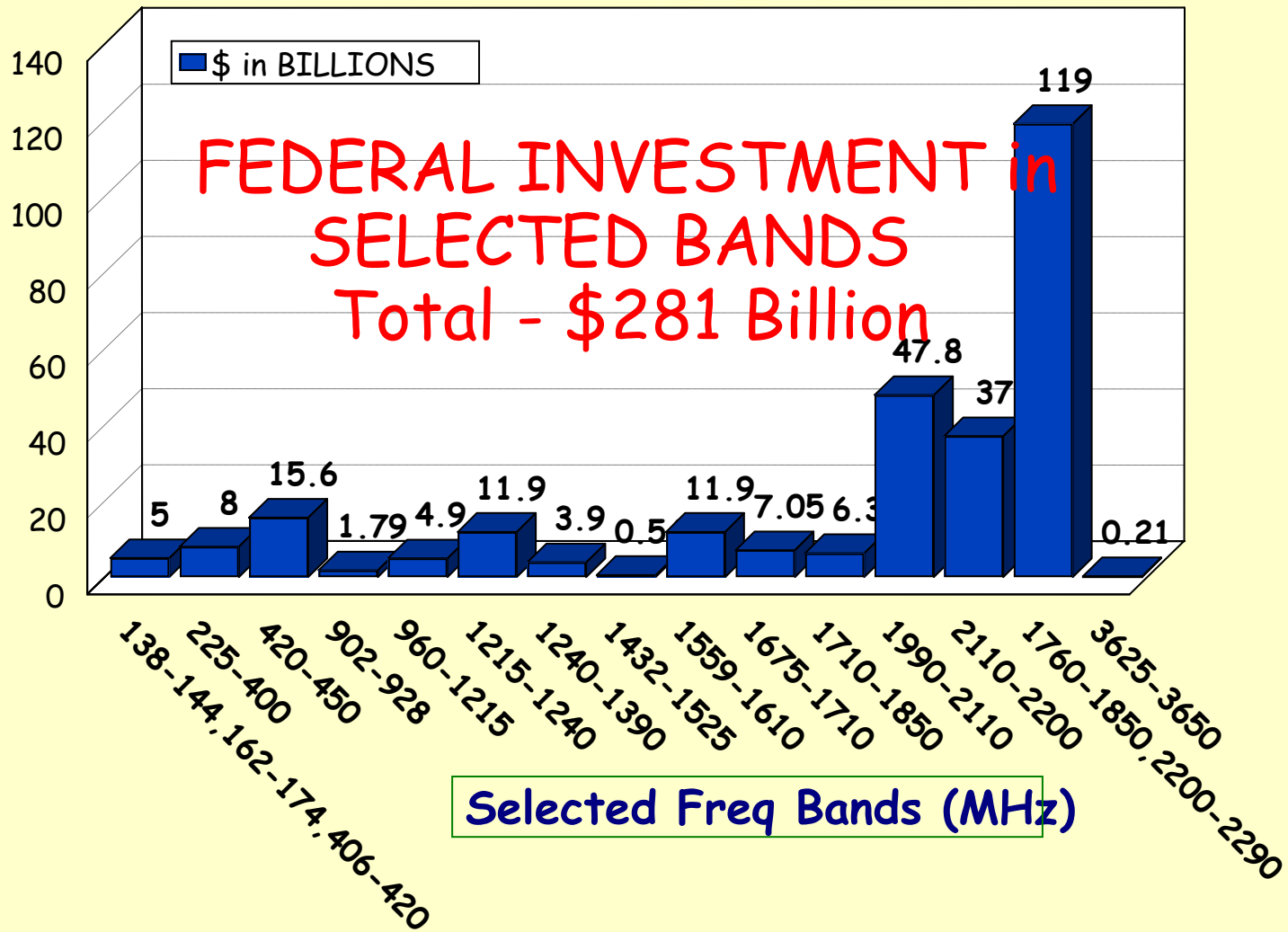
INTERDEPARTMENT RADIO ADVISORY COMMITTEE (IRAC)

20 Govt Departments/Agencies as Members

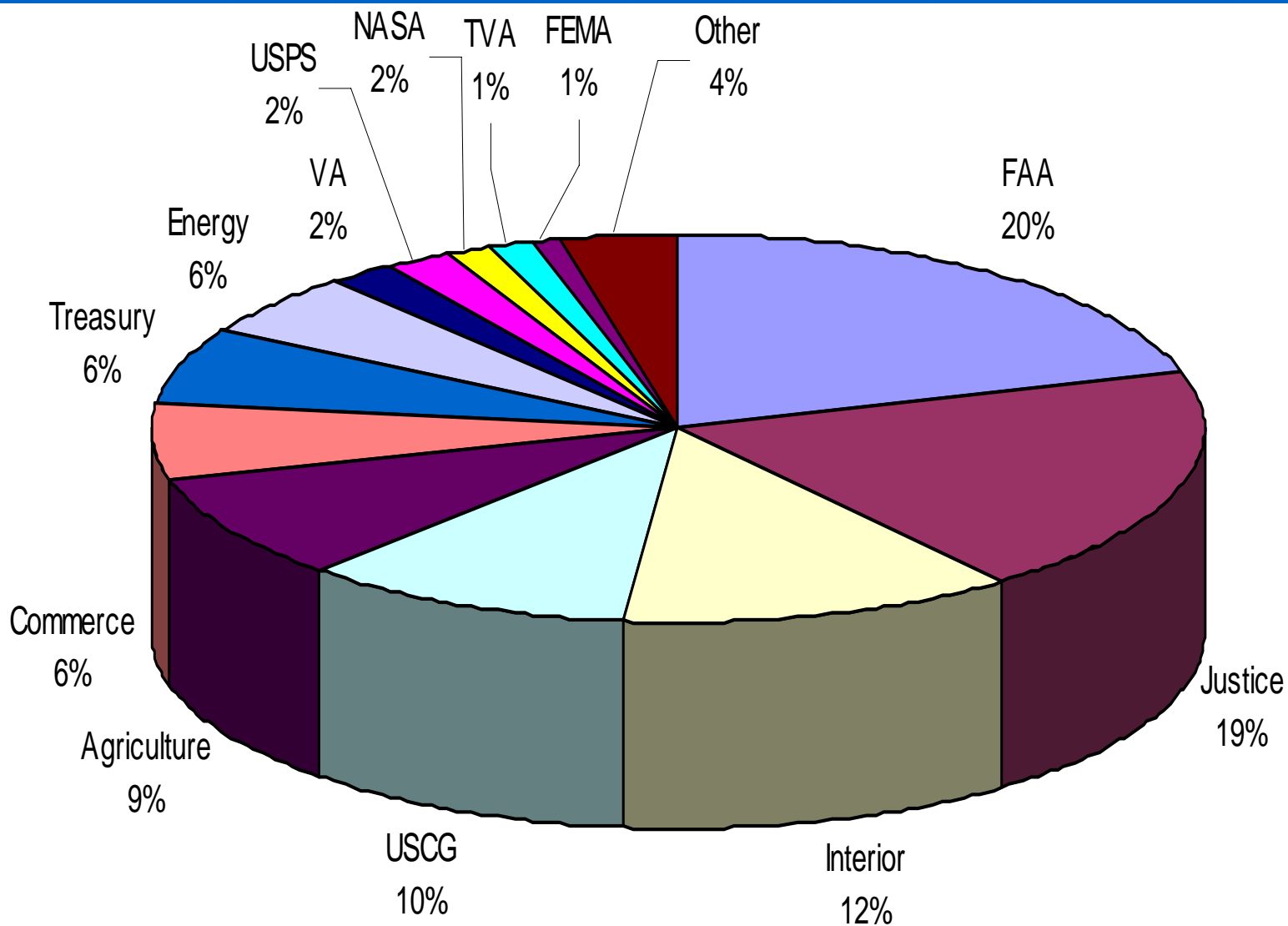
NTIA Chairs IRAC & Subcommittees

Federal Government Spectrum Use





Non-DOD Federal Agency Frequency Assignment Distribution



President's Spectrum Policy Initiative

“The existing legal and policy framework for spectrum management has not kept pace with the dramatic changes in technology and spectrum use.”

- President George W. Bush, Presidential Memorandum, May 29, 2003

- 1. President's Executive Memorandum (June 2003)**
- 2. Two Reports from the Secretary of Commerce to the President (June 2004)**
- 3. President's Direction (November 2004)**
- 4. Secretary of Commerce Implementation Plan (May 2005)**
- 5. Changing Spectrum Management (May 2005 – November 2011)**

President's Spectrum
Policy Initiative/Direction Jun 03

2 NTIA Reports – Jun 04
24 Recommendations

President's Direction
(Nov 04)

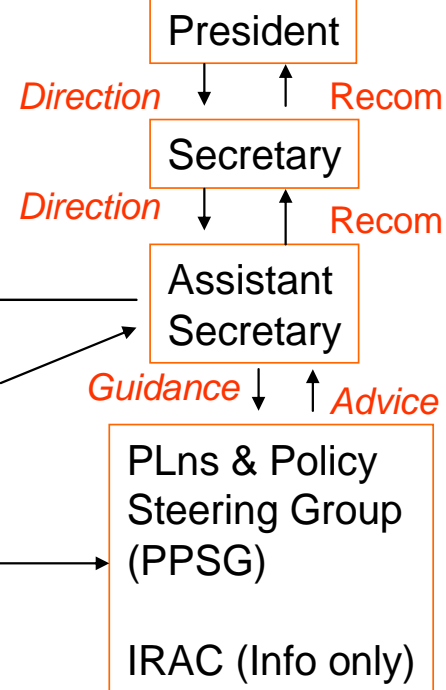
**NTIA/OSM Projects
And
Working Level Groups**

Implementation Plan
(6 months)
Annual Progress
Report (12 months)

PLNs & Policy
Steering Group
(PPSG)

IRAC (Info only)

President's Spectrum Policy Initiative Implementation APPROACH



*Implementation
Direction/Guidance*

Project Descriptions

- **Project A:** Improve Stakeholder Participation and Maintain_High Qualifications of Spectrum Manager
- **Project B:** Reduce International Barriers to United States Technologies and Services
- **Project C:** Modernize Federal Spectrum Management Processes with Advanced Information Technology
- **Project D:** Satisfy Wireless Service Needs of Public Safety and Ensuring Interoperability
- **Project E:** Improve and Develop Engineering Analysis and Technology Assessments
- **Project F:** Expand Federal Use of Commercial Wireless Services and Spectrally Efficient Wireless Systems
- **Project G:** Better Planning and Increased Use of Market-based Economic Mechanisms in Spectrum Management

A. Modernize & Improve Spectrum Management Process

1. Review & improve international management policies

- Improve U.S. WRC process
- Coordinate & review policy and framework

2. Develop & implement analytical tools

- Spectrum efficiency & effectiveness
- Spectrum engineering & procedures
 - Best practices handbook
 - Coordinating new technologies/services
 - Managing interference

3. Develop personnel resources

- Career development
- Spectrum management training

4. Apply information technology

- Frequency assignment
- Spectrum certification
- Satellite coordination
- Policy development – IRAC Automation

B. Create Incentives for Spectrum Efficiency & Beneficial Use & Provide Predictability & Certainty for Incumbent Users

- 1. Improve capital planning process**
- 2. Develop method to evaluate agency efficiency & effectiveness analysis**
- 3. Efficiency incentives**
 - A. Develop & implement a plan to use incentives to encourage use of efficient systems
 - B. Encourage Congress to enact incentive authority
 - C. Establish economic incentives as per authority
 - D. Examine spectrum rights as incentives
- 4. Evaluate efficiency & effectiveness of all federal government spectrum use**

C. Tools to Streamline Deployment of New/Expanded Services/Technologies While Preserving Critical National Radiocommunication Assets

- 1. Strategic spectrum plans (agency, federal, and national)**
- 2. Facilitation of interoperability & continuity of government operations**
- 3. Sharing Innovation**
 - Develop a test-bed
 - Identify, characterize, & analyze new technologies/expanded services & their impact

D. Address Critical Spectrum Needs

1. Leadership & Issue Resolution

- PPSG (government)
- PCC (White House)
- SMAC (Private Sector)
- FCC Defense Commissioner

2. Public safety

- Identify unsatisfied spectrum requirements
- Develop Federal/non-Federal demonstration program
- Address shortage, interference, new technology & security issues
- Inventory spectrum, determine use efficiency & ways to use spectrum more effectively

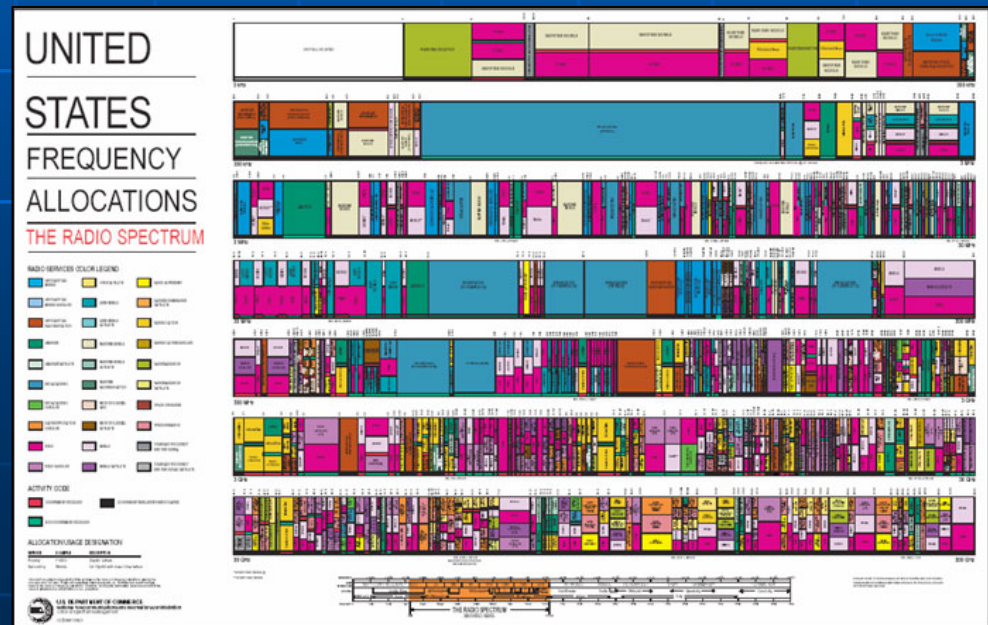
Expanding Competition: Wireless Broadband and New Technologies

“The other promising new broadband technology is wireless. The spectrum that allows for wireless technology is a limited resource . . . [a]nd a wise use of that spectrum is to help our economy grow, and help with the quality of life of our people.”

-- President George W. Bush, June 24, 2004

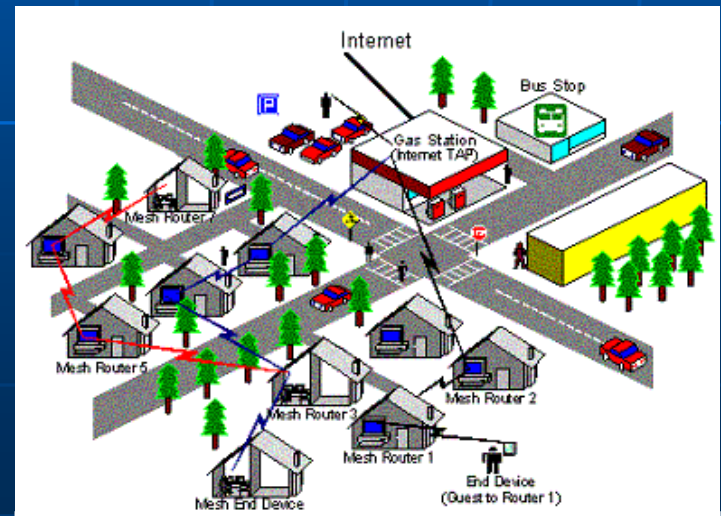
The Administration has made more radio spectrum available for wireless broadband technologies:

- Broadband over Power Line (BPL)
- Advanced Wireless Services (“3G”)
- Ultra-wideband
- 5 GHz Spectrum
- 70/80/90 GHz



Moore meets Marconi: Wireless Applications

- **Wi-Fi:** Until recently, the utility of Wi-Fi phones was limited to businesses and colleges. Companies such as Nokia, Flarion, IDT, Motorola, Cisco, and SpectraLink are beginning to develop hardware and software to facilitate Wi-Fi telephony.
- **WiMax:** Intel plans to build WiMax into its Centrino chip platforms, which power 80% of all PCs, by 2006. InStat/MDR estimates that a company could reach 97.2% of the U.S. population with a \$3.7 billion investment in Wi-Fi.
- **Unlicensed Mesh Networks:** By linking nodes on an ad hoc basis, mesh technology promises to deliver high bandwidth wireless coverage to areas that lack wired infrastructure, and can link diverse devices or networks.



Self-Organizing Neighborhood Wireless Mesh Networks (Source: Microsoft Research)

Moore meets Marconi: Wireless Applications (cont'd)

- **Software Defined Radio** (SDR) holds promise to provide efficient and comparatively inexpensive solutions to several constraints posed in current systems and is uniquely suited to address the common requirements for communications in the military, civil, public safety, and commercial sectors.
- **Cognitive radio technology** will be able to sense its surroundings and the presence of other signals and then adapt – changing its radio parameters such as modulation, operating frequency, and output power in cooperation with other CRs around it.
- **Smart antennas** provide numerous benefits:
 - 1) The effect of multipath fading in wireless communications environments can be significantly reduced which enhances system performance.
 - 2) Handsets of a smart antenna system have longer battery life because the power required to transmit to the base station is lower than that of a conventional system.
 - 3) Base stations using smart antennas have a longer range than systems employing conventional.

Spectrum Relocation Fund Legislation

- President Bush signed the Commercial Spectrum Enhancement Act (CSEA) into law in December 23, 2004.
- Previously, the winners of spectrum auctions were required to reimburse a federal entity for the costs incurred in the process of relocating the agencies' spectrum operations to a different spectrum band.
- Now, instead of requiring auction winners to pay twice, as required under old law -- once at the auction and then again after negotiating uncertain relocation costs -- the spectrum relocation fund allows relocating government users to recoup their costs out of auction proceeds.
- The relocation fund will substantially speed and facilitate the relocation of federal government spectrum users to new frequencies to permit the introduction of new commercial services for consumers.

Spectrum Auctions

- Under the CSEA, the FCC is required to notify NTIA within 18 months of the auction of the 216-220 MHz, 1432-1435 MHz, 1710-1755 MHz, and 2385-2390 MHz bands, and any other bands of frequencies reallocated from federal to non-federal use after January 1, 2003 that are assigned through competitive bidding.
- On December 29, 2004, the FCC notified NTIA that the auction of the 1710-1755 MHz band could commence as early as June 2006.
- At least six months prior to the auction, NTIA (on behalf of the agencies and after review by OMB) must provide the FCC with the federal agencies' cost estimates and timelines for relocating the agencies from the affected agencies -- in this case the information must be to the FCC by December 2005.
- In early January 2005, NTIA contacted the federal agencies to seek their cooperation in ensuring the new relocation procedures are timely and effectively implemented.

Conclusion

- Spectrum dependent services are essential to the United States' national security and economic security.
- Spectrum is a critical engine for economic growth and job creation.
- The Bush Administration is committed to spectrum policies that create a domestic and international environment for economic growth by removing barriers to the implementation of U.S. technologies and services.
- NTIA's spectrum reform program will result in policies that satisfy the United States' requirements for domestic and worldwide spectrum use.