

# NTIA Spectrum News

Vol. 4, Issue 1

Published Aperiodically

Spring, 2003

Office of Spectrum Management

U.S. Department of Commerce • National Telecommunications and Information Administration • Washington, D.C.

## Spectrum Policy Reform

by Joseph P. Camacho

The management of the spectrum is divided between two separate, independent agencies in the United States. The Department of Commerce's National Telecommunications and Information Administration (NTIA) is responsible for managing the spectrum used by the agencies of the Federal government, while the Federal

Communications Commission (FCC) is responsible for managing the spectrum used by State and Local government agencies, business industry and consumers.

The NTIA and the FCC have embarked on a major spectrum policy and management reformation. The forces

making reform necessary are four fold:

- 1) increasing spectrum demands from the private sector as more and more wireless mobility is becoming a business, social and political necessity;
- 2) continued and increasing requirements for spectrum for important services provided by all levels of government in the United States, such as public safety, national defense and aircraft and maritime radionavigation; and
- 3) the physical characteristics of the spectrum that make certain frequency bands much more desirable than others for some applications. Seldom has such high-level attention been given to spectrum management.



### U.S. 2003 World Radiocommunication Conference Ambassador Appointed by President Bush

Former Assistant Secretary of Commerce and Administrator of the National Telecom-

munications and Information Administration (NTIA) Janice Obuchowski will lead the U.S. delegation to the International Telecommunication Union's (ITU) 2003 World Radiocommunication Conference (WRC 2003).

Before being appointed by President Bush to head the WRC 2003 delegation, Mrs. Obuchowski held several high-level public policy posts in Washington. Mrs. Obuchowski has more than two decades' experience in the wireless spectrum policy arena, both in and out of government. She has been involved in formulating U.S. spectrum management policies, and has been integrally involved in ITU activities since the early 1980s. She has extensive experience leading delegations comprised of both government agencies and private sector representatives to Europe, Asia, Latin America and Africa. In the business arena, she started a successful telecommunications research and consulting firm based in Washington, D.C.

### NTIA Spectrum Summit

Recognizing the need for spectrum management reform, NTIA Administrator and Assistant Secretary of Commerce Nancy J. Victory convened a Spectrum Summit as an important first step in spectrum management reform. NTIA held the two-day spectrum summit in Washington, DC in April 2002. It focused on ways to encourage spectrum efficiency; provide spectrum for new technologies; and improve the effectiveness of the domestic and international spectrum management processes. Senior officials from government, the private sector and academia participated.

When initiating the first-ever Spectrum Summit, Assistant Secretary Victory said,

*continued on page 4*

## Newest Developments: Wireless Access Systems at 5 GHz

By Charles T. Glass

The challenge by Commerce Secretary Don Evans “to promote our country’s economic growth while protecting national security and public safety,” was recently met by NTIA, in cooperation with the Federal Communication Commission, the Department of Defense, and a number of industry representatives, when they completed a robust agreement to promote a new international allocation at 5 GHz.

“I am very pleased that the participants from the federal government and the private sector have reached a consensus that satisfies both of their interests,” said Assistant Secretary of Commerce and NTIA Administrator Nancy J. Victory. “In achieving this, the Bush Administration has continued its goal of stimulating the economy and ensuring the national defense and preserving the leadership of the U.S. high-tech sector. Based on these changes, the United States is now able to formalize its position with respect to earth exploration satellite systems, mobile and radiolocation services at 5 GHz and will now fully support these allocations,” Victory said.

This is one example of the major developments in 5 GHz Wireless Access Systems (WAS) in the United States and Europe during the last year. Wireless access systems are a class of devices that provide broadband communications, including Radio Local Access Networks (RLANS), that can lead to various high speed Internet and other networking applications between fixed and mobile terminals, either indoor or outdoor. Figure 1 presents the WAS concept. While there are similar devices already operating in many bands, such as 2.4 GHz, this article is limited to the proposed new operations in the 5 GHz band. For more information about WAS, see ITU-R Recommendation M.1450, “Characteristics of Broadband Radio Local Area Networks.”

The ITU, under WRC-2003 Agenda Item 1.5, will consider a breakthrough spectrum-sharing technology, allowing a

mobile allocation for WAS in the 5 GHz band where WAS will share with services that use radars. Currently, the U.S. rules for National Information Infrastructure devices allow WAS use of the 5 GHz band on a non-protected basis at 5150-5350 and 5725-5825 MHz. In Europe, WAS has been authorized as a short range device called High Performance Radio LAN (Hiperlans) at 5150-5350 and 5470-5725 MHz (*see ERC DEC (99)23*). WRC-2003, will allow 5 GHz to be used by WAS devices worldwide.

Most of the 5 GHz band is used on a primary basis by radiodetermination and the earth exploration satellite and space research (active) services; and on a secondary basis, by radiolocation as well as the amateur and amateur-satellite services. The radar operations at 5 GHz are vital. The radars perform a variety of important functions that require the unique spectrum propagation qualities at 5 GHz, including tracking of objects such as the space shuttle and weather rockets, national defense, navigation and ground mapping.

Recent technological developments made successful sharing possible between the existing allocated services and WAS in a large portion of the 5250-5825 MHz band. Spectrum sharing between the radars and WAS at 5 GHz can be accomplished by employing a new breakthrough technology known as dynamic frequency selection (DFS). DFS uses the same principle as listen-before-transmit communications systems, but operates automatically and has a much faster response time. The NTIA was instrumental in developing and validating the DFS technique as a method to allow sharing. This was accomplished through analysis employing rigorous simulation over a two-month period. Without proper specific characteristics for DFS, however, sharing will still not be feasible.

The following values are required for DFS to allow successful spectrum sharing at 5 GHz:

- 1) a DFS detection threshold of -64 dBm for WAS devices operating at a

total effective isotropic radiated power (e.i.r.p.) of 200 milliwatts to 1 watt, and -62 dBm for devices operating at an e.i.r.p. of less than 200 milliwatts, measured over a period not to exceed 1 microsecond, as normalized to a 0 dBi gain antenna. These measurements must be accomplished during quiet periods between or within each WAS frame or packet;

- 2) a channel non-occupancy period of 30 minutes to ensure that fixed radars will be protected for any channel in which the DFS detection threshold has been exceeded;
- 3) a channel availability check time of 60 seconds upon initial startup or monitoring of WAS on any particular channel to ensure all radars present around a WAS are detected prior to it utilizing a channel; and
- 4) a DFS Channel Move Time of no more than 10 seconds. DFS Channel Move Time is the period that WAS systems will have to move off of the channel once the DFS detection threshold has been exceeded. It takes an average of 200 milliseconds for all normal traffic to suspend and then intermittent control signals can continue for up to 10 seconds.

To ensure non-interference, administrations should authorize only those WAS devices meeting the aforementioned parameters to be operated in the 5 GHz band (5250-5350 MHz and 5470-5725 MHz). The ITU-R Draft New Recommendation on this subject is in the approval process (*ITU-R Circular Letter 8/LCCE/120*, *see <http://www.itu.int/md/meetingdoc.asp?lang=e&type=sfolders&parent=R00-SG08-CIR>*).

These critically important spectrum sharing parameters should be given sufficient regulatory status by placing them into a WRC Resolution that is referenced by an allocation table footnote. The issues around this mobile

*continued on page 3*

continued from page 2

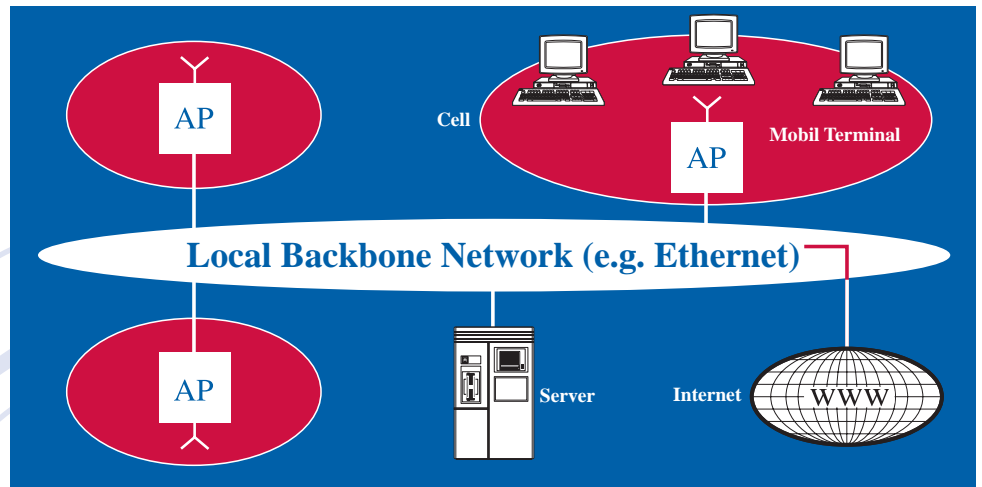
## Newest Developments: Wireless Access Systems at 5 GHz

allocation will be decided at the World Radiocommunication Conference in Geneva, Switzerland which meets June 9 to July 4, 2003.

**Figure 1:**  
**Wireless Access System Concept**

**Access Points (AP)** – access points provide coverage of an area (cell). The operations to maintain proper sharing conditions is done at the cell level. The e.i.r.p. of the AP is dynamically variable depending on where the mobile terminal is located.

**Backbone Network** – the network that ties the Wireless Access System components together and connection to the internet.



**Mobile Terminal** – user devices, normally a wireless network card or imbedded wireless network chip,

most operating at less than 50 milliwatts.

## Additional 3G Wireless Spectrum in the United States

By Darlene A. Drazenovich and Del Morrison

The search for additional U.S. spectrum that could be used by advanced mobile wireless communications systems, such as the third generation (3G) cellphones, resulted in the identification of 90 MHz of additional spectrum.

Commerce Secretary Don Evans, in announcing this major spectrum decision, said “By making additional spectrum available to consumers, the Bush Administration is moving forward decisively on its commitment to promote the technology needs of all Americans and to ensure the nation’s economic prosperity.” The additional 90 MHz is made up of 45 MHz from the 1710-1755 MHz band, now used exclusively by federal government agencies, and 45 MHz from the 2110-2170 MHz band, used by non-federal government entities. “This plan promotes our country’s economic growth while protecting national security and public safety,” Secretary Evans added.

The United States recognized the increased demand for advanced commercial wireless services, and it

initiated studies in 1999 with the public and private entities participating, to identify additional spectrum for advanced mobile wireless systems such as 3G. The studies resulted in a Viability Assessment, which culminated three years of research and analysis conducted by the National Telecommunications and Information Administration (NTIA), the Federal Communication Commission (FCC), the Department of Defense and other Executive Branch Agencies. The 3G Viability Assessment, press releases and other related information can be found at: [www.ntia.doc.gov/osmhome/osmhome.html](http://www.ntia.doc.gov/osmhome/osmhome.html)

A key step in the search for additional advanced wireless spectrum in the United States included the identification of likely frequency bands - a difficult process because of the extensive incumbent usage in the preferred spectrum areas. For example, it was concluded that the 1755-1770 MHz band could not be made available for commercial wireless use due to difficulties in sharing with or relocating the incumbent Department of Defense users with national security applications. Numerous technical sharing studies were

conducted, and re-accommodation studies identified the preferred new bands for the displaced users.

The ITU was first involved in the advanced wireless process 10 years ago at WARC-92. WARC-92 and WRC-2000 identified a total of 749 MHz of spectrum for IMT-2000, the ITU terminology for the 3rd generation of commercial mobile wireless personal communication systems (3G). The bands identified in the Radio Regulations are: 806-906 MHz, 1710-2025 MHz, 2110-2200 MHz and 2500-2690 MHz. In the United States, commercial operators use parts of the 800 MHz band (824-849 MHz and 869-894 MHz) for cellular operations, and the 1900 MHz band (1850-1990 MHz) for cellular-like personal communications systems or PCS. U.S. commercial operators are already offering a variety of 3G services, such as text messaging, high speed data communications and video, on their existing networks.

In support of advanced mobile networks, the FCC recently allocated the fixed and mobile services to the 1710-1755 MHz

continued on page 5

continued from page 4

## Spectrum Policy Reform

“we are going to continue to be a leader in technology, and if our citizens are going to be able to enjoy all the benefits such technological advancement can bring, we need to find spectrum to deploy all these wonderful new wireless products and services. And just so there is no misunderstanding - we need to find spectrum for commercial and governmental uses because Americans benefit greatly from them both.”

A wide variety of participants provided many observations and great ideas that resulted in identifying a number of areas for further investigations and analyses. “This will not be a short-term project, but one we must accept as a challenge thoroughly and thoughtfully. We intend to turn what we learn into action items to affect the changes needed to better manage this essential resource,” said Assistant Secretary Victory.

The four important themes that came out of the summit were:

- 1) One spectrum team. The U.S. government agencies responsible for spectrum management, namely the NTIA, the FCC, and the Department of State (DOS)— must work together to serve the nation’s interests as “one spectrum team.”
- 2) Forward-looking spectrum policies. There is the need to modernize our spectrum policies so that they are forward-looking. A concerted effort needs to be made to eliminate unnecessary government micromanagement of spectrum uses. This means taking a fresh look at legacy policies, rules and restrictions to assess their ability to accommodate emerging technologies or spectrum needs.
- 3) Spectrum efficiency. The United States must pursue policies that encourage spectrum efficiency and discourage spectrum waste.
- 4) Flexible spectrum policies. The United States must develop spectrum policies that ensure the deployment of robust wireless

networks that are prepared for the worst of crises and that are able to deliver the best of services to the government, defense and public safety communities as well as to the American people. The wireless networks of today and tomorrow must be robust and capable of functioning well, especially under the stress and strain of an emergency situation.

### Future Spectrum Initiatives

While the U.S. telecommunications industry has made some great strides over the last year, there is still much work to be done. The NTIA intends to focus on a number of major spectrum issues designed to improve overall spectrum management.

Among other things, NTIA plans to address and enhance spectrum efficiency among government users. The first part of this initiative is to review just how government agencies are using their spectrum today. In this regard, NTIA will be conducting a study of the current and future use of the federal land mobile spectrum in the Washington/Baltimore area. Based on this use, the NTIA will identify the technical improvements or changes via technology, spectrum management practices, and/or standards to increase effectiveness of spectrum use and spectral efficiency. If this approach works, NTIA’s efforts would be expanded to the remainder of the land mobile radio services and other radio services as well.

The NTIA also will be examining whether certain market-based spectrum policies successful on the private sector side can be applied to the federal government to encourage efficient spectrum use. For example, could secondary leasing options be made available to government licensees to permit them to lease out a portion of their spectrum in non-emergency situations and recover it in the event an emergency?

The NTIA also hopes to address spectrum rights relative to interference protection. Right now there is no standard formula or methodology for determining levels of acceptable interference. That’s one of the reasons why negotiating new sharing situations takes so long and is so contentious. This year, the NTIA plans to begin identifying the interference protection criteria for various radio services. If this effort is successful, the NTIA will consider adopting the derived interference protection criteria standards into its rules and regulations. In that case, the NTIA also may encourage the FCC to adopt these new standards where applicable.

Receiver standards is another area that the NTIA hopes to investigate. To the extent that a receiver is more robust, it has the potential to reduce interference and increase sharing. The NTIA also will be considering inclusion of these standards in NTIA’s rules and regulations if doing so will mitigate interference, be practical and be cost effective.

The Bush Administration has and will continue to advance policies that promote efficiency of spectrum use. The NTIA’s recent achievements in new technology areas demonstrate what can be done when those competing for spectrum are given the opportunity to work together to develop innovative solutions to complex spectrum management issues and responsibilities. This type of honest coordination, coupled with the spectrum management initiatives proposed by NTIA, will go a long way in helping to bring new and advanced wireless technologies to market.

### FCC Reform: The Spectrum Policy Task Force

In June 2002, FCC Chairman Michael K. Powell established the Spectrum Policy Task Force to assist the Commission in identifying and evaluating changes in spectrum policy that will increase the public benefits derived from the use of radio spectrum. The creation of the

continued on page 5

continued from page 4

## Spectrum Policy Reform

task force initiated the first-ever comprehensive and systematic review of 90 years of spectrum policy at the FCC. The November 2002 Spectrum Policy Task Force Report culminated FCC efforts in its Public Notice, information meetings and four public workshops. The report's findings and recommendations for improving the way that the electromagnetic radio spectrum is managed is expected to serve as a catalyst for further advancement of spectrum policy at the FCC.

(See <http://www.fcc.gov/sptf/>.)

### FCC and NTIA Memorandum of Understanding

FCC Chairman Powell and Assistant Secretary of Commerce Victory have both emphasized the need for enhanced cooperation and coordination of spectrum issues throughout the government to promote efficient use of the radio spectrum in the public interest. On January 31, 2003, the FCC and the Commerce Department's NTIA executed a new Memorandum of Understanding (MOU) on spectrum coordination. The MOU, signed by FCC Chairman Powell and Assistant Secretary of Commerce Victory, will apply to coordination of spectrum issues involving both federal and non-federal users. (See <http://www.fcc.gov/ntiahome/press/2003/MOUJan31.htm>)

[hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-230835A2.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-230835A2.pdf))

The FCC and NTIA had been operating under an MOU dating back to October 1940. The new agreement establishes procedures relating to frequency coordination, as well as spectrum planning provisions contained in the Communications Act. This MOU establishes a framework for compliance with the statutory requirements and stipulates that the Chairman of the FCC and Assistant Secretary for Communications and Information shall meet biannually to conduct joint spectrum planning. The MOU further stipulates that the FCC and NTIA spectrum staffs shall meet regularly on spectrum planning issues. The MOU also is consistent with a recent Congressional General Accounting Office report that focused on the need for greater cooperation between the two spectrum policy organizations.

Upon signing, Chairman Powell stated, "This marks a historical step forward in spectrum policy reform. Much has changed in the sixty plus years since the original MOU was adopted. As the task force recently found, spectrum policy is simply too important to be locked in such a policy time warp. The Commission and NTIA will now be more responsive,

cooperative and effective. Ultimately, this partnership will mean more efficient regulatory processes that will speed the deployment of new innovative spectrum-based services to consumers. I look forward to working with Assistant Secretary Victory and her team on additional ways to improve spectrum management." Chairman Powell has identified spectrum policy reform as one of the key strategic goals of his job.

"To deal effectively with critical spectrum management issues, it is essential that the U.S. government works together as 'One Spectrum Team'," said Assistant Secretary Victory. "Chairman Powell and I and our staffs have worked hard to achieve a close and productive working relationship that operates effectively and delivers results. The MOU we signed today memorializes that relationship to ensure that this heightened level of cooperation between our agencies will continue for years to come. Through better coordination, we can manage the spectrum more effectively, facilitating the introduction of new technologies, the satisfaction of critical user needs and, ultimately, the enhancement of our nation's economic and homeland security." (See <http://www.ntia.doc.gov/ntiahome/press/2003/MOUJan31.htm>)

continued from page 3

## Additional 3G Wireless Spectrum in the United States

and the 2150-2155 MHz bands. This new allocation resulted in the entire 2110-2155 MHz band being allocated to the fixed and mobile services in the United States. For the mobile service, the mobiles were authorized in 1710-1755 MHz, and their associated base stations in 2110-2155 MHz. The fixed service is also authorized in 2110-2155 MHz. The bands were allocated to both the fixed and mobile services to provide prospective licensees the maximum flexibility in the services to respond to the needs of their customers. One important result of this action was the decision to make the spectrum contiguous, especially in the

2110-2155 MHz band. Currently, the 2150-2155 MHz band is allocated to the Multipoint Distribution Service (MDS), a fixed point-to-multipoint service. The MDS licensees will need to move to another part of the spectrum, an action that the FCC will consider in a future proceeding.

The FCC service rules for advanced wireless services are currently being developed. At this time, there is no date set for the auction of licenses. Subsequent to the auction, federal entities will be reimbursed for the costs incurred to relocate their radiocommunications

systems from the 1710-1755 MHz band or to modify their systems. Funds for relocating federal systems from the band will be made available either directly by the private sector entities winning the auction, or via a relocation fund created from auction receipts. Legislation to authorize the use of a relocation fund mechanism is currently being considered in the House and Senate.

There was considerable Region 2 activity in the search for new advanced wireless bands. The U.S. decision on the advanced wireless bands is consistent with recent

continued on page 6

## Spotlight on: Slovenia

by Fredrick Matos

The Republic of Slovenia lies at the heart of Europe where the Alps and the Mediterranean meet. It is south of Austria and has a coastline on the Adriatic Sea. The population is approximately two million, and its area is about half the size of Switzerland.

Slovenia declared its independence on June 25, 1991, having previously been part of Yugoslavia. Prior to its independence, Slovenia's telecommunications and spectrum regulatory functions were administered by the Yugoslav government in Belgrade, the capitol of Yugoslavia. For the sake of continuity, Slovenia continued to follow the Yugoslav telecommunications law until 1997, when it passed its first telecommunications law. The 1997 law defined the commercial use of the spectrum and contained the first Slovenian frequency allocation table. The allocations followed the CEPT.

The transition period was very challenging for Slovenia because at independence, it had no official frequency assignment license records or other spectrum usage data. These records had been kept in Belgrade. The Slovenian spectrum managers had to begin from a point of essentially zero information to develop the frequency assignment license records database and other data.

Slovenia enacted a modern new telecommunications law in 2001. It

defined and established the Agency for Telecommunications, Broadcasting and Post (ATRP) as an independent national regulatory agency. The ATRP director and two deputy directors are appointed to five-year terms by the Executive Branch, which is composed of the Prime Minister and the other ministers. The ATRP manages all of the civil spectrum, including international coordination, licensing, and legislation, and it regulates all of the telecommunications and postal activities.

The Slovenian state-use frequencies, such as those used by the military, are managed by the Ministry of Defense. The Ministry of Defense uses the Spectrum XXI spectrum management software developed in the United States by the IIT Research Institute.

Slovenia established a Telecommunications Council and a Broadcasting Council. The Telecommunications Council provides advice to the ATRP on telecommunications affairs. The council has 11 members who are experts in telecommunications. The seven-member Broadcasting Council decides on program matters.

Within the ATRP, the non-government or civil spectrum management regulatory functions are the responsibility of the Frequency Management and Licensing Department. The Department has a staff of 10 experts, six who work with fixed

and mobile assignments, and five who work on broadcasting matters. Slovenia has approximately 7,500 frequency assignments, not counting government usage. The frequency assignment database is maintained with ORACLE software, and there are plans to make it available online by the end of 2003. Slovenian experts have developed their own propagation path loss models to determine coverage areas. The current Slovenian allocation table is close to the table contained in CEPT/ERC/REP 25.

Slovenia also has a small spectrum monitoring department. The department can monitor all of the spectrum from fixed, mobile and remote controlled monitoring stations, as necessary.

Slovenia is an active participant in the ITU, and plans to send a delegation to WRC-2003. The Head of Delegation will be Dr. Bojan Bostjancic, State Secretary on Ministry of Information Society; and the delegates from the ATRP will be ATRP Director Nikolaj Simic; Deputy Director of Telecommunications Management Tomo Zbontar; and the Frequency Management and Licensing Department Director, Marjan Trdin.

Slovenian spectrum management has come a long way from its 1991 independence day to today's modern and efficient regulatory office. The results are evident in a modern telecommunications infrastructure.

*continued from page 5*

### Additional 3G Wireless Spectrum in the United States

decisions taken by the ITU-R and the Organization of American States (OAS) Inter-American Telecommunications Commission (CITEL). ITU-R Working Party 8F (WP8F) and subsequently Study Group 8 adopted a new recommendation on frequency arrangements for implementation of the terrestrial

component of IMT-2000 in the bands 806-960 MHz, 1710-2025 MHz, 2110-2200 MHz and 2500-2690 MHz. This recommendation is on the agenda for approval by the Radio Assembly. CITEL's Permanent Consultative Committee II (PCC II) on radiocommunications issues, also recently

approved a recommendation on the frequency arrangements for IMT-2000 in the bands 806 to 960 MHz, 1710 to 2025 MHz and 2110 to 2200 MHz. Each of these includes frequency arrangements for advanced wireless in the bands the United States has made available.