SPECTRUM MANAGEMENT FOR THE 21ST CENTURY

THE PRESIDENT'S SPECTRUM POLICY INITIATIVE
SECOND ANNUAL PROGRESS REPORT

U.S. DEPARTMENT OF COMMERCE

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EXECUTIVE SUMMARY

In this second year of the President's Spectrum Policy Initiative (Presidential Initiative), Executive Branch agencies accelerated the advances necessary for spectrum management policy to keep stride with 21st Century challenges. Their achievements span the breadth of the Federal Government and even reach beyond to embrace private sector and international reform initiatives.

Agencies are charting a path of internal reform and external collaboration. Increasingly, agencies are realigning spectrum management functions to heighten their importance and to link strategic spectrum planning with overall strategic and capital planning in a more efficient way. Across the Executive Branch, federal officials are focusing greater attention on spectrum requirements, streamlining internal processes and collaborating among themselves, with state and local entities, and with the private sector, to meet their needs. All are participating in the "Working Level Groups" that NTIA has created to fulfill the goals of the Presidential Initiative. These advances mark significant milestones in pursuing a unified federal effort to meet the challenges of the *President's Initiative.*

Some agencies report achievements that serve as examples for other agencies. The National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) are automating regulatory processes. The United States Patent and Trademark Office (USPTO) has switched to all-commercial services. As the Department of Defense (DOD) moves toward net-centricity, it will use technological advances to assure dynamic access and communications-on-the-move. Agencies are increasing their use of unlicensed devices. Further examples include:

● Agencies are evolving their management structures to integrate spectrum, information technology, and strategic and capital planning into a comprehensive process that recognizes the importance of spectrum to national defense, homeland security, and other critical missions, as well as to the United States economy as a whole.

● The Executive Branch is taking a fresh look at its use of radio frequencies. Agencies used the strategic spectrum plans formulated under the Presidential Initiative to take an inclusive approach to their current and future spectrum needs. The result is that agencies are factoring alternatives such as the use of commercial systems and partnerships into spectrum requirements planning.

● Agencies are venturing into innovative projects to make their use of spectrum more effective and efficient. The Department of Energy (DOE) is exploring a telecommunications partnership with utility companies that would capitalize on the synergies of the already-interconnected power transmission grid. The Department of Justice (DOJ) is developing a shared network with other agency participants. The Department of Agriculture (USDA), together with other agencies, is leading a federal initiative to optimize the Federal Government's use of commercial wireless services. This project will reduce cost and improve quality of commercial wireless assets through a multiple-agency, blanket purchase agreement.

● DOD is transforming its spectrum management capabilities to support requirements such as communications-on the-move. When validated and mature, these capabilities will permit assured, on-demand access to spectrum anytime, anywhere.

● NTIA and the FCC are partnering to automate and streamline the frequency authorization and coordination process.

● NTIA inaugurated the Commerce Spectrum Management Advisory Committee (CSMAC), giving NTIA the benefit of private-sector innovation and expertise, as well as facilitating understanding between commercial and federal users.

● NTIA selected the Wireless Accelerated Responder Network (WARN) to test the operational and cost-effectiveness of sharing among federal, state and/or local governments and other non-federal users. In addition, USDA and Interior are exploring the formation of an inter-governmental council that would identify ways that these departments and their state partners could achieve technical interoperability for fire, law enforcement, and emergency response networks.

These achievements are considerable given that they represent only the near-term actions of the federal agencies to realize the President's spectrum management vision. Federal agencies will continue their structural and policy improvements as the *President's Initiative* evolves.

BACKGROUND

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This Second Annual Progress Report describes recent steps the Executive Branch has taken to realize the President's vision of a United States spectrum policy for the 21st century. In May 2003, the President launched an initiative to ensure that United States spectrum policy for the 21st century continues to mobilize the radio frequency resource in service of federal missions and national prosperity.[1] This Presidential Initiative serves to foster economic growth; defend and secure our Nation; maintain U.S. global leadership in communications technology and services; and satisfy other vital U.S. needs in public safety, scientific research, federal transportation infrastructure, and law enforcement.

The President has directed that federal agencies report each year on their progress toward these objectives.[2] Accordingly, in October 2006, the Secretary of Commerce requested the heads of 15 departments and agencies to describe their respective progress during the second year of the Presidential Initiative.[3] The Department of Homeland Security (DHS), pursuant to the President's directive, was specifically asked to provide a section for this Report detailing progress made with respect to public safety spectrum issues. The Secretary of Commerce also asked the Office of Management and Budget (OMB) to provide a report on its progress in providing guidance to the agencies for improving spectrum–related capital planning and investment control procedures.

NTIA has proposed an "evolutionary" approach to spectrum policy. The ultimate goal is efficient and effective use of the spectrum and, where appropriate, assured dynamic access to spectrum,

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[1] Presidential Memorandum on Spectrum Policy for the 21st Century, 69 Fed. Reg. 1568 (Jan. 9, 2004), 39 Weekly Comp. Pres. Doc. 726, 727 (May 29, 2003), *available at* http://www.whitehouse.gov/news/releases/2003/06/20030605-4.html. Pursuant to this directive, NTIA issued two reports. *See,* Department of Commerce, *Spectrum Policy for the 21st Century – The President's Spectrum Policy Initiative: Report 1, Recommendations of the Federal Government Spectrum Task Force* (June 2004), *available at* http://www.whitehouse.gov/news/releases/2004/11/20041130-8.html; and Department of Commerce, *Spectrum Policy for the 21st Century – The President's Spectrum Policy: Report 2, Recommendations from State and Local Governments and Private Sector Responders* (June 2004), *available at* *http://www.ntia.doc.gov/reports/specpolini/presspecpolini_report2_06242004.htm* *(collectively "June 2004 Reports").*

[2] *President's Memorandum on Improving Spectrum Management for the 21st Century*, 49 Weekly Comp. Pres. Doc. 2875, § 3(c) (Nov. 29, 2004) (2004 Executive Memorandum).

[3] Broadcasting Board of Governors (BBG), DHS, DOD, Department of Commerce (through the National Oceanic and Atmospheric Administration, Department of the Interior, National Aeronautics and Space Administration, National Science Foundation, Department of Veterans Affairs, Department of State, Department of Transportation, Department of Energy, United States Postal Service, Treasury, DOJ, and USDA.

to be achieved in judicious and incremental steps. This Report chronicles the near-term successes of the Executive Branch on this course.

PROGRESS SUMMARY

I. Capital Planning and Investment Control Procedures.

Pursuant to the President's directive, OMB instructed federal agencies to consider the economic value of radio spectrum when developing justifications for new systems, beginning with fiscal year 2007 budget requests.[4] The Secretary of Commerce asked each agency to report on implementation of this charge.

A. Valuation.

Federal agencies are working to better integrate planning for spectrum-dependent investments into overall federal agency strategic and capital planning processes. For example, DOD is developing a "spectrum scorecard," i.e., a system-engineering methodology to facilitate trade-off consideration of spectrum efficiency, effectiveness, and supportability as systems are designed.[5]

To develop its economic analysis, DOJ is using cost data from the bids it is receiving to build a shared trunked federal network. DOJ also intends to use data derived from spectrum auctions and other sources.

The Treasury Department also included shared trunked network investment in its OMB submission for integrated information technology (IT) infrastructure. Treasury explains that developing the trunked network business case was a first step in ensuring that spectrum-dependent systems are included in Treasury's IT capital planning.

NSF proposals for new science facilities are peer-reviewed by the scientific community. This process has efficient spectrum use as an evaluation criterion.

B. Evolving Management Approaches.

Agencies are coordinating spectrum management with capital planning and other programs, particularly IT. USDA's new "USDA Guide for Creating an Agency Telecommunications Plan" defines radio and spectrum management as part of Information Technology. The Broadcasting Board of Governors (BBG) has established a Capital and Information Technology Planning Process that ensures that all OMB guidelines are followed. The DOD, DOE, and the Department of Veterans Affairs (VA), are integrating spectrum management, enterprise architecture, and capital planning. DOD's Defense Spectrum Management Architecture will include a robust common set of enterprise architecture products for net-centric spectrum management. DOE is drafting a departmental order that formally requires that spectrum and spectrum-dependent assets be included in all capital planning processes.

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[4] The Office of Management and Budget Circular A-11, § 33.4 (2006), *available at* http://www.whitehouse.gov/omb/circulars/a11/current_year/s33.pdf.

[5] "Supportability" refers to the integration of spectrum planning into DOD's requirements and acquisitions processes. The assessment of "spectrum supportability" requires, at a minimum, receipt of equipment spectrum certification, reasonable assurance of frequency availability from host nations, and a consideration of electromagnetic compatibility. DOD Directive 4650.1, Policy for Management and Use of Electromagnetic Spectrum, at E2.1.10 (June 8, 2004).

Many agencies have reformed their organizational structure to improve spectrum management. Treasury and the U.S. Postal Service (USPS) have both centralized spectrum management into a single office, with a governance committee comprised of representatives from operational units. Treasury explains that its Wireless Programs Office (WPO) Governance Board will facilitate better understanding of the bureaus' needs for spectrum. The VA has developed a Spectrum Management Improvement Plan. This plan is the VA's starting point for accomplishing its long-term goals. The VA hopes to facilitate collaboration between business and technical staff to develop the next generation of spectrum management "best practices." The VA states that it has reorganized many departments, and added spectrum managers. It is pursuing more partnerships with federal, state and local agencies, and with commercial organizations. DOJ now holds quarterly department meetings to review spectrum issues and evaluate more effective ways to apply spectrum management principles.

DOD bases its spectrum management requirements on Presidential Initiative principles. DOD is revising its official policy to incorporate the President's directives.[6] DOD is also finalizing a 2007 Electromagnetic Spectrum Management Strategic Plan. A key goal of this plan is the creation of the Global Electromagnetic Spectrum Information Systems (GEMSIS), a "system of systems" approach providing DOD the overarching framework for future capabilities. While the long-term vision (2020) is still general, in the near and mid-term GEMSIS will begin to build an integrated set of capabilities that will operate across service and functional lines. GEMSIS will enable wireless devices to integrate spectrum and network-centric operations, increasing spectrum efficiency, agility, and sharing.

C. Budget and Investment Control.

Agencies are sharpening the mechanisms that track and control radio system investments. DHS has created multiple internal checks in its investment review process that map to OMB requirements. DOD's efforts to ensure spectrum "supportability" aim to minimize cost, avoid schedule delays, and improve operational effectiveness of spectrum-dependent systems. To this end, DOD has updated its Defense Acquisition Guidebook and added spectrum management modules to the Defense Acquisition University Program Manager curriculum. DOD is also developing a streamlined methodology for quantifying its spectrum requirements. DOJ conducts periodic senior-level reviews of its wireless programs. Treasury states that the procurement process for a new trunked, shared network enables it to determine the best technical and business solutions to balance spectrum efficiency and cost.

USDA states that its internal controls exceed the detail that OMB requires.[7] Its new agency telecommunications guide provides additional data that complement existing procedures. The new USDA "Guide for Creating an Agency Telecommunications Plan" requires reporting of commercial wireless expenditures, such as for cellular and satellite. USDA now requires that vendors offer automated tracking tools and specialized personnel qualified to perform rate plan optimization analyses, inventory control, and billing reconciliation for commercial wireless equipment and rate plans. USDA has joined a new federal initiative to improve the tracking and economic performance of federal use of commercial wireless services.[8] This effort will culminate in a blanket purchase agreement that can serve multiple federal agencies, improving quality and decreasing cost.

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[6] *Id.*

[7] OMB Circular A-11, Exhibit 300.

[8] The Federal Strategic Sourcing Initiative (FSSI), Wireless Handheld Devices and Services Commodity Team (Wireless Team) was launched in January 2006 to improve the tracking of commercial wireless assets and rate plans. The FSSI is based on an OMB 2004 directive, and jointly run by the General Services Administration (GSA) and the Department of the

D. Ongoing Collaboration.

NTIA is working with key agencies to identify various agency practices with respect to capital planning for spectrum-dependent systems. NTIA is also working to revise its system certification rules to reinforce improved capital planning methods as directed by OMB.

II. Formal Assessment of Spectrum Needs: The Technical Planning Process.

The President directed that agency heads implement a formal process to evaluate proposed needs for spectrum.[9] The 2004 Executive Memorandum requires federal agencies to make this evaluation before seeking certification from NTIA for new or upgraded radio systems.[10] Accordingly, NTIA, in collaboration with a number of federal agencies, is reviewing existing agency processes. Initial efforts are focused upon recent Department of Defense reforms, as the majority of requests for certification of spectrum support are submitted by the military services.[11]

Agencies across the government are improving spectrum planning as a result of formal assessments. The Coast Guard has improved its spectrum certification process in connection with the Integrated Deepwater Program.[12] It has updated its Major Systems Acquisition Manual to include spectrum certification. DOJ now holds quarterly department meetings to review spectrum issues and evaluate more effective ways to apply spectrum management principles. DHS has installed spectrum tracking and engineering analysis tools to streamline spectrum processing and control. New DHS software analyzes the effectiveness of communications equipment for current and future proposed projects. The VA developed a spectrum evaluation process that includes best practices to avoid spectrum interference or congestion, determination of facility requirements, formulation of a communications plan, and evaluation of devices and spectrum used. DOT uses existing senior-level management and technical processes to evaluate new spectrum requirements. Treasury, Commerce, and USPS are formalizing their agency spectrum policies. Treasury is updating its spectrum policy directive to require that spectrum needs be considered and NTIA certification obtained before obligating funds for spectrum-dependent systems. Commerce is finalizing a Department Administrative Order on spectrum management policies.

Treasury. Wireless Team participants are partnering with tier-one wireless carriers to baseline agency inventories, update old plans, and negotiate lower prices for cellular service renewals.

[9] 2004 Executive Memorandum, 49 Weekly Comp. Pres. Doc. 2875, § 2(a).

[10] *Id.*

[11] *See, e.g.*, DOD Directive 4650.1, at 4.6 (June 8, 2004), *available at* http://www.dtic.mil/whs/directives/corres/pdf/d46501_060804/d46501p.pdf. This directive provides, among other things, that DOD shall consider sharing spectrum with other federal agencies and with commercial users.

[12] The Coast Guard's Integrated Deepwater System is a multi-year program to modernize and replace aging ships and aircraft, and to improve command and control and logistics systems. *See generally* Integrated Coast Guard Systems- Deepwater, http://www.icgsdeepwater.com/overview/

III. Strategic Spectrum Planning.

The 2004 Executive Memorandum directed federal agencies to formulate agency-specific strategic spectrum plans which would detail (1) future spectrum requirements, (2) planned uses of new technologies, and (3) suggested spectrum efficient approaches to meeting identified requirements. The 2004 Executive Memorandum also required that DHS, through consultation with other federal, state, and local agencies, develop a Spectrum Needs Plan to address public safety spectrum needs, as well as the continuity of Government operations."[13]

All 15 agencies responded to the President's directive with agency-specific plans in November 2005. NTIA integrated the 15 agency plans into a comprehensive Federal Strategic Spectrum Plan (Federal Plan). This Federal Plan forms the core of the national strategic vision for meeting critical future spectrum needs. NTIA now plans to work with the FCC to create a National Strategic Spectrum Plan.[14] In the meantime, federal agencies have begun updating their agency-specific plans for the next biennial submission in November 2007.

A number of agencies, such as BBG, are using their agency-specific strategic spectrum plans as the baseline for further achievements under the Presidential Initiative. Several agencies, such as USDA, Treasury, and DHS, plan to continue implementing the goals and strategies outlined in their plans. USDA has developed a draft Program Management Plan to formalize the execution of the USDA Strategic Spectrum Plan as a continuous improvement process. DOE created a "lessons learned" document based on the development of the agency's 2005 plan. As noted above, DOD is finalizing a 2007 Electromagnetic Spectrum Management Strategic Plan, a plan establishing extensive goals and objectives to guide the DOD toward realizing its net-centric vision for management of the electromagnetic spectrum.

IV. Commerce Spectrum Management Advisory Committee (CSMAC).

The Department of Commerce in November, 2006 appointed 18 private-sector experts to serve on a spectrum management advisory committee.[15] The committee will advise the Assistant Secretary of Commerce for Communications and Information on domestic spectrum policy and management to enable the introduction of new spectrum-dependent technologies and services, including policy reforms for expediting the American public's access to broadband services, public safety, digital television, and long-range spectrum planning. This committee provides an opportunity for NTIA to gain information on technology trends and to benefit from the insights and experiences of the commercial sector.

V. Incentives Plan.

NTIA developed a project plan in February 2006 that intends to develop and address both market and non-market based incentives to promote more efficient and effective government spectrum use, while protecting national and homeland security, critical infrastructure, and government services.[16]

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[13] 2004 Executive Memorandum, 49 Weekly Comp. Pres. Doc 2875, § 3(a).

[14] *Id.*

[15] The 2004 Executive Memorandum ordered the Department of Commerce to implement of all of the recommendations contained in the June 2004 reports issued pursuant to the President's 2003 directives and not specifically addressed elsewhere in the 2004 Memorandum. 2004 Executive Memorandum, 49 Weekly Comp. Pres. Doc. 2875, § 3(c). Recommendation 1 of Report 2 called for the creation of a federal advisory committee on spectrum matters. Report 2, *supra* note 1, at 4.

[16] The President directed the Secretary of Commerce, in coordination with other federal agencies, to develop a plan for identifying and implementing incentives to promote more efficient and effective spectrum use, while protecting national and

NTIA's plan includes two major tasks. The first task addresses incentives to improve spectrum efficiency by federal agencies; the second task addresses incentives to improve spectrum efficiency in both the federal and non-federal sectors.

NTIA completed two projects related to implementation of federal incentives. In early 2006, NTIA conducted a two-day policy reform workshop at the National Academy of Sciences on the use of economic or other incentives that could increase the efficiency of federal and non-federal spectrum use. Experts from government and the private sector addressed spectrum valuation, rights and secondary markets, sharing, and fees. The workshop brought together experts from government, industry, and academia to examine the advantages and disadvantages of particular incentive mechanisms and best practices for both the private sector and government agencies. In 2006, NTIA reviewed the spectrum management approaches of 33 countries to identify international practices for incorporating market mechanisms into spectrum management. The results will be compiled in a report due to be released in 2007.

In support of the NTIA spectrum incentives program, Treasury is assisting with efforts to identify opportunities for federal agencies to make their spectrum available to other federal and non-federal users. These opportunities could encourage efficiencies and alternative approaches to satisfying mission needs.

VI. Public Safety.

A. Spectrum Needs Plan.

DHS submitted to the President a "Spectrum Needs Plan," which describes the requirements of the public safety community. The plan includes an annex on continuity of government operations.

B. Federal/Non-Federal Public Safety Demonstration Program.

NTIA selected the Washington, D.C., Wireless Accelerated Responder Network (WARN) to test the operational and cost effectiveness of sharing spectrum and communications infrastructure among federal, state and/or local governments, and other non-federal users.[17] This program operates on a dedicated public safety network in the 700 MHz band under an experimental FCC license. WARN provides real-time video for city-wide remote surveillance, chemical and biological detection, and other emergency-related services.

C. Interoperability.

DOJ upgraded inter-agency connectivity in 21 of 25 targeted metropolitan areas. The High Risk Metropolitan Areas Interoperability Assistance Program (25 cities) implemented interoperability channels in 11 cities, improving federal-to-federal and federal-to-local/state communications.[18] These multi-agency projects create a foundation for more interagency and intergovernmental collaboration and better spectrum use.

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homeland security, critical infrastructure and government services. 2004 Executive Memorandum, 49 Weekly Comp. Pres. Doc. 2875, § 3(b).

[17] Report 2, Recommendation 9(b). *supra* note 1, at 4.

[18] In part as a response to a request from Congress, DOJ has been leading the 25 cities project to provide targeted cities with basic and immediate interagency communications capabilities among local, state, and federal agencies during emergency response. Twenty-five cities were selected using criteria that included perceived risk and population size.

Agencies are exploring creative ways to maximize the reliability and availability of emergency communications. DOE field sites at the Argonne, Oak Ridge, and Idaho National Laboratories are enhancing interoperability with local public safety agencies. The Idaho Lab is considering connecting to a new state 700 MHz radio system. The Oak Ridge Lab plans to join an 800 MHz area-wide federal, state and local homeland security mutual aid network.

DOJ developed a matrix of federal law enforcement and incident response interoperability channels that federal agencies and their non-federal partners in major metropolitan areas can use. This matrix identifies the channels that continue to be available as land mobile systems transition from wideband to narrowband.

DHS established an interoperability scorecard for more than 70 urban areas. The scorecard rates interoperability levels of these areas so that interoperable communications can be improved where needed.

D. Port Security.

The Coast Guard identified critical spectrum needs for port security.

VII. Efficiency Measures.

A. Sharing.

Federal agencies are cooperating across inter-agency, intra-agency, and jurisdictional boundaries to pool and maximize radio frequency resources. DOJ is expanding a pilot interoperability program in Washington and Oregon. DOJ also partnered with these states to share microwave backbone systems, reducing the need for use of additional federal frequencies.

DOE's Argonne National Laboratory partnered with the Illinois State Police in a new statewide 800 MHz system. This new system replaces the laboratory's legacy land mobile system with a shared interoperable system. DOE is considering whether to partner with power utilities in sharing telecommunications infrastructure.

DOJ is constructing a shared narrowband land-mobile system along the Gulf Coast. The new system will consolidate into a single infrastructure land-mobile communications for its public safety and law enforcement agencies.

The Bureau of Industry and Security cancelled all frequencies reserved for its use and is in the process of coordinating a Memorandum of Agreement with the Department of Homeland Security to use DHS's National Law Enforcement Communications Center for its land mobile radio requirements.

B. New Technologies.

DOD is pioneering ways to share spectrum more effectively. In August 2006, the Defense Advanced Research Projects Agency (DARPA) successfully demonstrated neXt Generation (XG) technologies for DOD and other representatives from the Federal Government and industry regulatory community. The XG program aims to develop "policy-defined" smart radios that can dynamically access available spectrum. A "policy" refers to a regulatory, military, or technical rule that dictates how to avoid interference.

The VA is deploying IPv6 technology to permit voice over IP on land mobile radio.[19] BBG continues to increase the use of Internet services long-term, alleviating some spectrum demand, particularly for congested shortwave spectrum.

NOAA's National Weather Service is deploying the Radiosonde Replacement System (RRS).[20] The RRS will use the Global Positioning System (GPS) to track radiosondes.[21] RRS reduces the amount of spectrum needed for radiosondes by half.

C. Commercial Services and Unlicensed Devices.

Use of commercial services, where appropriate for an agency's mission, can conserve valuable spectrum and also save other federal resources. Several agencies have expanded their use of non-federal spectrum services.

The USPTO cancelled all its frequency assignments, switching from dedicated federal spectrum use to commercial service.

USDA has instituted a method for substituting the most cost-effective commercial satellite services for federally owned radio systems in remote locations. USDA conducts a cost-trade off analysis and applies various procurement procedures to find the best overall value.

The VA is using commercial systems and many unlicensed and Part 90 radio frequency devices.[22] The VA participates in many state and county 800 and 900 MHz systems. This includes a recent initiative in Oregon where emergency frequencies are shared by emergency medical technicians, police, fire and rescue, and trucking. The VA is installing new 900 MHz systems in its hospitals. It is also implementing a VSAT (very small aperture terminal) satellite network, which can be used for emergency response, the government's Continuity of Operations Program (COOP) and tele-health. The VA is using 802.11 wireless devices for Bar Code Medication Administration (BCMA), and plans to expand its use of 802.11 technology.[23] The USPS states that it is rechanneling some licensed frequency applications to use Part 15 unlicensed devices.

D. Spectrum Engineering and Analytical Tools.

NTIA's engineers, in cooperation with the federal agencies, are focused on finding answers and aids to improve federal spectrum management. In assessing spectrum efficiency in the land mobile radio (LMR) frequency bands, a three-phase study is being performed.[24] In conjunction with the three-

[19] "IPv6" refers to "Internet Protocol version 6" or "next-generation Internet."
[20] A radiosonde or "radio-sounding device" is a balloon-borne device that measures upper-air pressure, temperature and humidity, important components of weather prediction. *See generally* NWS Radiosonde Observations- Factsheet, http://www.ua.nws.noaa.gov/factsheet.htm.
[21] *See generally* The Radiosonde, http://www.nws.noaa.gov/rrs/radioson.htm.
[22] 47 C.F.R. Part 90, Private Land Mobile Radio Services.
[23] 802.11 or "Wireless Fidelity" (WiFi) refers to a suite of IEEE standards pertaining to wireless communications, often used for unlicensed wireless computer applications.
[24] The first phase study created a database of frequency assignments from the Government Master File in the 162-174 MHz band, in the Washington, D.C., area National Telecommunications and Information Administration, U.S. Department of Commerce, *Federal Land Mobile Operations in the 162-174 MHz Band in the Washington, D.C., Area, Phase 1: Study of Agency Operations*, NTIA Report 06-440 (August 2006). As part of this study, a metric referred to as average signal capacity was developed to assess the geographical coverage capabilities of base stations operating in the 162-174 MHz band. The second phase study used field measurements to characterize the federal LMR channel usage in the 162-174 MHz band.

phase study, a report assessing the current frequency assignment process in the LMR frequency bands has been completed. These reports will be used as the technical basis for establishing policies to improve spectrum efficiency in the federal LMR frequency bands.

Both NTIA and the FCC are developing proposals for a joint Spectrum Sharing Innovation Test Bed.[25] The test bed will explore innovative ways to make more intensive use of the Nation's airwaves and explore the feasibility of sharing between federal and non-federal users. NTIA and the FCC will each identify approximately 10 MHz of spectrum to be used in the test bed. Both agencies solicited public comment on this pilot program in 2006.

NTIA is developing a Best Practices Handbook with the support of the federal agencies, particularly DOD. In this connection, DOD proposed a channel plan for the 4400-4940 MHz band, a federal fixed microwave band. The channel plan provides a structure for more efficient spectrum use.

VIII. Advanced Information Technology.

The Presidential Initiative underscores the role that information technology plays in accelerating assignment and coordination of frequencies. To this end, NTIA is developing the Federal Spectrum Management System, a suite of software programs that will streamline the frequency assignment and system certification processes. NTIA established a working partnership with the FCC to create an automated frequency coordination system. These agencies have taken the first step toward a streamlined authorization process.[26]

In the near and mid-term, IT improvements will support federal spectrum management evolution, reducing paperwork, duplication of effort, and the time for application processing. These advances will evolve over time to support the long-term objective of assured and dynamic spectrum access.

IX. Reducing International Barriers to United States Technology.

A. Improved World Radio Communication Conference Preparation and Implementation.

NTIA completed a status summary of recommended improvements to U.S. preparations for World Radio Communication Conferences (WRC). NTIA, and the other two lead agencies, the Department of State and the FCC, have increased the engagement of senior-level management in WRC-related activities. The U.S. Government Principals Group has expanded to encompass WRC activities.[27] This body provides oversight and policy guidance on WRC issues.

While the federal and non-federal WRC preparatory processes remain independent, NTIA and FCC staff meet regularly to develop consensus positions and proposals. The two agencies work closely with State on outreach to other countries in order to build coalitions and define strategic approaches.

This report is in the inter-agency review process. The third phase study uses the results of the two previous studies to derive the geographical coverage and traffic level specifications needed to design alternative LMR systems that would provide the same level of performance and coverage as the current conventional LMR systems but in a more spectrally efficient manner. This report is in the inter-agency review process.

[25] *See* Report 1, Recommendation 11; Report 2, Recommendation 6(b), *supra* note 1, at 4.

[26] This partnership will implement the June 2004 recommendation that NTIA and FCC certification and licensing databases be coordinated. *See* Report 2, Recommendation 7. and Report 1, Recommendation 3, *supra* note 1, at 4.

[27] The U.S. Government Principals Group is coordinated by the Department of State. It consists of agency leaders who focus on telecommunications policy.

NTIA and the FCC quickly adopted a plan to implement the WRC Final Acts of 2003. This swift action provides certainty, facilitates planning, stimulates investment and jobs, and provides a model for future WRC implementations.

B. Advancing International Spectrum Management Policy.

NTIA, in collaboration with the federal agencies, studied the international spectrum policy framework. This project reviewed (1) barriers to implementation of new technologies and services; (2) U.S. technical, administrative and financial contributions to international spectrum-policy organizations; (3) cross-border coordination processes; and (4) global and regional spectrum harmonization and technical interoperability. The results of the study will be compiled into a report to be released in 2007.

X. Unified Federal Response.

A. Implementation Plan and Working Level Groups.

The President directed the Secretary of Commerce to establish a plan to implement all the recommendations made in the June 2004 Reports that were not specifically addressed in the 2004 Executive Memorandum. In March 2006, the Department of Commerce published this report.[28] NTIA was supported by the federal agencies in the implementation of recommendations from the June 2004 Reports through participation in seven advisory working level groups. These groups are accomplishing the tasks outlined in the Implementation Plan and their achievements are detailed in Appendix A.

B. Policy and Plans Steering Group.

The Policy and Plans Steering Group (PPSG) met twice during the period covered by this report. The PPSG is an advisory group of senior, political-level officials advising NTIA on spectrum policy and strategic plans. The PPSG provided input on the development of the Implementation Plan for the *President's Initiative*, the formulation of the Federal Strategic Spectrum Plan, the role of the FCC Defense Commissioner and other issues. All of the federal agencies involved in the Presidential Initiative participated in the PPSG.

CONCLUSION

The *Presidential Spectrum Policy Initiative* made substantial progress in its second year, inspiring innovations and improvements. The federal agencies improved internal processes, made more efficient use of spectrum, and considered alternatives for meeting future spectrum requirements. With the continued development of the Spectrum Sharing Innovation Test Bed, the publication of the Federal Strategic Spectrum Plan, the development of the National Strategic Spectrum Plan, and the creation of the Commerce Spectrum Management Advisory Committee, these efforts will intensify in the coming year.

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[28] Department of Commerce, *Spectrum Management for the 21st Century: Plan to Implement Recommendations of the President's Spectrum Policy Initiative* (Mar. 2006), *available at* http://www.ntia.doc.gov/osmhome/reports/ImplementationPlan2006.htm.

APPENDIX A
OVERVIEW OF KEY NTIA DELIVERABLES AND TARGET DATES

Project A: Improve Stakeholder Participation and Maintain High Qualifications of Spectrum Managers

	A.1. Establish a Commerce Spectrum Management Advisory Committee	**Chartered in May 2005**
	Accomplishments: Secretary of Commerce appointed diverse group of private sector representatives to the Commerce advisory committee.	**Appointed November 2006**
	A.2. Establish a High Level Interagency Advisory Group -- Policy and Plans Steering Group (PPSG)	**Established January 2005**
	Accomplishments: Meetings held March 2005, March 2006 and October 2006 to review implementation of the *President's Initiative*, the status of the Federal Strategic Spectrum Plan and the reallocation of the 1710-1850 MHz band, among other matters.	**PPSG is ongoing**
	A.3. Resolve Inter-governmental Spectrum Disputes Through the Existing White House Policy Coordinating Committee (PCC) Process and Revise the NTIA/FCC MOU to Provide an Additional Minimum 15 Business Days to Accommodate the PCC Process	**White House PCC process is ongoing**
	Accomplishments: NTIA has shared the draft MOU revisions with the FCC. This draft was discussed at the PPSG meeting in October 2006.	**Draft MOU under discussion**
	A.4. Expand the Role of the FCC Defense Commissioner.	
	Accomplishments: NTIA has shared a draft of a proposed rulemaking on this topic with the FCC. PPSG discussed this item at its October	**Draft rulemaking under discussion**

	2006 meeting.	
	A.5. Promote a Career Development Program and Spectrum Management Training	**To be completed by September 2007**
	Accomplishments: Two workshops for federal and state radio frequency managers have been held this year. Issues involved in initiating training and career development programs will be discussed in the third or fourth quarter of fiscal year 2007.	

Project B: Reduce International Barriers to U.S. Innovations in Technologies and Services

	B.1. Improve U.S. Preparations for World Radio Communication Conferences (WRC)	**Issued report recommendations May 2005**
	Accomplishments: NTIA completed a status summary regarding implementing WRC recommended improvements on September 30, 2006. The report detailed the status of all recommendations contained in the May 2005 report.	**Status summary completed September 2006**
	B.2. Improve International Spectrum Management Policies and Regulatory Environment	**Recommendations to be provided by June 2006**
	Accomplishments: NTIA completed the final report, including recommendations, and is finalizing the report through the review process.	**Presentation of recommendations December 2006**

Project C: Modernize Federal Spectrum Management Processes with Advanced Information Technology

	C.1. Implement Advanced Information Management Systems	**Ongoing**

	Accomplishments: Implemented the following classified online systems via the SIPRNet and/or dial-up remote access: Spectrum XXI, FREQNet, IRAC Documents Database, Retrieve, EL-CID, and Data Capture and Forwarding System. Developed technical computer hardware requirements and specifications for spectrum management processes. Developed high-level transition plan from the current spectrum management computer system to the proposed new system. Developed and demonstrated a cross-security domain prototype system. Provided electronic access to the daily Frequency Assignment Subcommittee agenda, which resulted in the discontinuation of paper and CD-ROM distributions. Procured enterprise content management system pursuant to the President's "paperless initiative" and implemented a pilot project for the electronic processing of IRAC policy documents. Established working partnership with the FCC for implementation of an automated frequency coordination system. Continued support of the DOD in development of a common data standard for use within the NATO community. Developed a system to stabilize the existing DataWare CD-ROM product used for monthly Government Master File distributions resulting in a $500K savings in development of a replacement system. Established an Information Security Operations Center that allows for automated monitoring of the security and performance of	

	NTIA networks, workstations, and systems. Continued detailed use case analysis for spectrum management business processes, identifying 14 "use cases" or types of activities that OSM performs, over 60 business work flows and 1,500 specific requirements of these activities. These requirements have been captured in the newly implemented requirements management repository. Evaluated and procured OSM's enterprise portal (a web-based front end accessible to all applications), service oriented architecture framework, business process management and monitoring software. Further refined the OSM data dictionary for increased accuracy and efficiency of OSM systems and processes.	

Project D: Satisfy Public Safety Communication Needs and Ensure Interoperability

	D.1. Spectrum Sharing between Federal and Non-Federal Public Safety Agencies	**To be completed by December 2006**
	Accomplishments: NTIA selected the WARN project in Washington, D.C., to test the operational and cost effectiveness of sharing spectrum and communications infrastructure among federal, state and/or local governments and private users. NTIA expects to publish a report on the results of the demonstration.	**Pilot selected April 2006**

During this period, NTIA continued to lead Working Level Group D (WLG-D) in addressing the feasibility of spectrum sharing with public safety entities at all levels of government and with the private sector. Agency representatives supported these meetings, providing direction and consultation.	

Project E: Enhance Spectrum Engineering and Analytical Tools

E.1. Develop Analytic Approaches, Software Tools, and Engineering Techniques for Evaluating and Improving the Efficiency and Effectiveness of Federal Spectrum Use	**To be completed by September 2007**
Accomplishments: Land Mobile Radio Service NTIA Report 06-440, "Federal Land Mobile Operations in the 162-174 MHz Band in the Washington, D.C., Area, Phase 1: Study of Agency Operations" was published. NTIA is completing internal coordination of a draft report, "Assessment of Federal and Non-Federal Land Mobile Radio Frequency Assignment Methodologies." Publication is expected shortly. NTIA staff has drafted and submitted for inter-agency comment two reports, "Assessment of Alternative Future Federal Land Mobile Radio Systems" and "Measurements to Characterize Land Mobile Channel Occupancy for Federal Bands 162-174 MHz and 406-420 MHz in the Washington, D.C., Area." Associated ongoing research tasks at the Institute for Telecommunication Sciences include: - Proposed Approach to Analyze Radar Spectrum Efficiency - Measurements to Characterize Land Mobile Channel Occupancy for Federal Bands 162-174 MHz and 406-420 MHz in the Denver, Colorado,	**Land mobile radio service studies to be completed by November 2007**

	Area Other Radio Services Work has started on the fixed and radiodetermination services	**Fixed service studies to be completed by December 2007; radiodetermination service studies to be completed by December 2007**
	E.2. Develop and Promote Recognition in the Spectrum Management Community for Best Practices in Spectrum Engineering	**To be completed by November 2007**
	Accomplishments: The following reports were published: NTIA Report 05-432 Interference Protection Criteria Phase 1 Compilation from Existing Sources NTIA Report TR-06 Effects of RF Interference on Radar Receiver Performance Technical memorandums on the following technical areas related to spectrum management	**Section 3 of the Best Practices Handbook to be completed by Nove**

	are in-progress: Propagation Models Antenna Models Interference Protection Criteria Phase II Equipment Characteristics Building Attenuation Interference Scenarios Communications Receiver Performance Degradation Handbook Associated ongoing research tasks at the Institute for Telecommunication Sciences include: Short range propagation modeling Investigation of the effects receiver signal processing on interference rejection Characterization of low noise amplifiers Examination of antenna polarization mismatch Extent of frequency range to be considered in electromagnetic compatibility analysis	**mber 2007**
	E.3. Conduct a Pilot Program to Evaluate Approaches and Techniques to Increase Spectrum Sharing Between Federal and Non-Federal Spectrum Users	**Pilot Program to be completed by March 2008. Results and recommendations of Pilot Program are to be completed**

	by December 2008
Accomplishments: In June 2006 NTIA published a Notice of Inquiry (NOI) in the *Federal Register* seeking public comments on the creation of the Spectrum Sharing Innovation Test-Bed (Test-Bed). In conjunction with the NTIA NOI, the Federal Communications Commission issued a public notice soliciting public comments on issues related to the Test-Bed. The public comments provided proposals on the frequency bands and technologies to be implemented in the Test-Bed, authorization of Test-Bed operations, protection of incumbent spectrum users from Test-Bed operations, duration of the Test-Bed, number of test-Bed participants, and evaluation of the Test-Bed results. The proposals made by the public in response to the NTIA NOI and the FCC Public Notice will be used by the federal agencies and the FCC to develop proposals for the Test-Bed.	**Spectrum Sharing Innovation Test-Bed will be operational by October 2007**
E.4. Develop and Promote the Use of Modern Analytic Tools for Spectrum Engineering	**Ongoing**
Accomplishments: A questionnaire was developed to identify the current capabilities of the federal agencies and their contractors. One-on-one meetings were held with many of the federal agencies to discuss in further detail their responses to the questionnaire. Based on the questionnaire responses and the meetings, a status report of the first phase consolidated the information identifying current capabilities and any new requirements for spectrum management tools. This information will be used in the first phase of the Spectrum Tools Catalog.	**Phase 1 status report on current model capabilities completed January 2007** **First version of the Spectr**

	um Tools Catalog completed by September 2007

Project F: Promote Efficient and Effective Use of Spectrum

F.1. Improve the Technical Planning Process	**To be completed by December 2007**
Accomplishments: The President's Spectrum Policy Initiative directs agencies to implement policies and procedures to evaluate their proposed needs for use of the spectrum before seeking spectrum certification from NTIA for new or improved radio systems. NTIA convened several meetings of Working Level Group F (WLG-F). The majority of requests for certification of spectrum support are submitted by the military agencies, so WLG-F is initially focusing upon DOD processes. DOD is currently developing a system engineering methodology that can be used to perform spectrum efficiency and effectiveness trade-off analyses and promote consideration of spectrum efficiency in its planning and procurement processes. The military services are also preparing a companion new instruction to implement procedures for management and use of the electromagnetic spectrum that is intended to establish a unified DOD approach to achieving assured spectrum access within national and	

international regulations.	

Project G: Improve Long-term Planning and Promote Use of Market-Based Economic Mechanisms in Spectrum Management

G.1. Improve the Processes for Federal Agencies' Spectrum Planning and Produce a National Spectrum Plan	**Federal Strategic Spectrum Plan due to be completed by May 2006; National Spectrum Plan due to be completed by December 2007**
Accomplishments: Federal Strategic Spectrum Plan circulated for agency input September 2006. PPSG provided additional input in October 2006.	
G.2. Improve Federal Agencies' Processes and Procedures to Better Consider the Economic Value of Spectrum When Investing in Spectrum-Dependent Systems.	**OMB portion completed at the end of November 2004; NTIA and interagency completion due by September 2007**
Accomplishments: Review of internal processes of several	

	agencies with respect to integrating spectrum strategic and capital planning with agency strategic and capital planning process. Input to OPAD with respect to developing methodologies for determining spectrum value. Dialogue with OMB with respect to possible revisions of Circular A-11 to clarify obligations of agencies, especially with respect to consideration of the economic value of spectrum. Input to WLG-F with respect to revisions to the NTIA Manual regarding compliance with OMB Circular A-11. NTIA continued to lead Working Level Group G with respect to Capital Planning issues and consideration of spectrum value.	
	G.3. Develop a Plan to Identify and Implement Incentives for Improving Efficiency in Federal Agencies' Spectrum Use.	**Completed in April 2006**
	Accomplishments:	
	Plan to implement incentives submitted to White House in February 2006. Two of the seven deliverables relevant to this task were completed in FY 2006.	**February 2006**
	NTIA and the National Academy of Sciences cosponsored a workshop on the use of economic or other incentives in order to increase the efficiency of federal and non-federal spectrum use.	**February–March 2006**
	NTIA completed a study of international practices that incorporate market mechanisms into more efficient spectrum management.	**FY 2006**
	G.4. Promote the Implementation of a Wide Range of Incentives to Improve the Efficiencies of Both Government and Private Sector Spectrum Use.	**Ongoing**

Accomplishments: Submitted Incentives Plan to the White House in February 2006.	