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An Analysis Of The Public Safety & Homeland Security Benefits Of An Interoperable Nationwide Emergency Communications Network At 700 MHZ Built By A Public-Private Partnership

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AN ANALYSIS OF THE PUBLIC SAFETY & HOMELAND SECURITY BENEFITS OF AN INTEROPERABLE NATIONWIDE EMERGENCY COMMUNICATIONS NETWORK AT 700 MHZ BUILT BY A PUBLIC-PRIVATE PARTNERSHIP

by
Dr. Alan Pearce*

INTRODUCTION

It is generally accepted in business, in economics, and in government, that the market cannot meet all of the needs of society. Among the generally accepted needs, which the market cannot, or should not provide, are national defense and security and public safety. Today, because of new threats to society, along with an apparent increase in the number of so-called natural disasters, there is need for new thinking and new solutions in order to deal with these emergencies. The FCC currently confronts a unique opportunity to resolve some of the nation's communications problems in times of crises with the allocation of a portion of the spectrum at 700 MHz. This article provides an analysis to support reconsideration of the spectrum auction strategy as currently proposed, and instead to consider the allocation of half of the 700 MHz spectrum, namely 30 MHz, for use in a new public-private partnership that will both remedy the widely acknowledged shortfalls of public safety communications, along with those of homeland security and law enforcement, and also provide the benefits of modern broadband wireless communications to commercial customers.

The FCC has an impressive history of using its regulatory and policymaking role to turn the nation's scarce and valuable spectrum resources into assets that have benefited the U.S. population from a public safety, national security and commercial perspective. Most of the innovations have enabled new commercial networks: launching radio and television; transforming traditional landline service that reliably provided dial tone into an advanced suite of network services available to individual consumers and businesses alike; and creating the modern cable, satellite and wireless telecommunications industries. This report describes an approach that extends these innovations to address a public policy problem – how to provide modern, effective, reliable and affordable wireless communications products and services to public safety and homeland defense personnel.

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ANALYSIS OF THE PUBLIC SAFETY & HOMELAND SECURITY BENEFITS

Public safety mobile communications networks in the United States are in dire straits. More than five years after the 9/11 terrorist attacks on New York City and Washington, D.C., the public safety community still lacks the resources to build truly robust and interoperable networks and information services.[1] First responders lack the basic voice and data communications services that they need to confront terrorism, natural disasters, chemical spills, and other emergencies that threaten life and property and cost the nation multiple billions of dollars annually.

The FCC's vision of public safety and homeland security states:

> Communications during emergencies and crises must be available for public safety, health, defense and emergency personnel, as well as all consumers in need. The Nation's critical communications infrastructure must be reliable, interoperable, redundant and rapidly restorable.[2]

The FCC is in the midst of preparing for currently scheduled auctions of portions of the available spectrum at 700 MHz that currently are occupied by incumbent UHF-TV licensees, for purely commercial use. That available spectrum totals 60 MHz, and includes 30 MHz in the upper 700 MHz band (known as the C and D blocks) that are located adjacent to 24 MHz of spectrum previously assigned for public safety usage and currently channelized to support narrowband and wide-band applications. While an additional estimated $12.5 billion, and perhaps even more for the U.S. Treasury is tempting, the actual financial benefits of following a traditional auction approach to allocate the full 60 MHz of this spectrum among competing applicants are much less. As the analysis below demonstrates, facilitating the deployment of a new broadband network using half (or 30 MHz) of the total available 700 MHz spectrum, and forgoing the quick revenues of an auction, is a much wiser medium and long-term investment for the citizens and government of the United States.

By assigning that 30 MHz portion of this spectrum to public safety, the FCC can avail itself of a unique opportunity to establish a new model for dealing with today's critical and urgent public safety and homeland security threats. Rather than "auction-and-forget" as has been done for the past decade, the FCC can license this 30 MHz of spectrum in a creative new arrangement that will effectively and finally address through a new public-private

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[1] Eric Lipton, *The Katrina Year: The Next Emergency: Despite Steps, Disaster Planning Still Shows Gaps,* N.Y.TIMES, Aug. 26, 2006, at A1.

[2] FCC, STRATEGIC PLAN 2006-2011 at 15 (2005) (Strategic Plan) *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-261434A1.pdf.

partnership structure the critical mobile communications issues confronted by the public safety community in the United States. In addition, that same spectrum will be efficiently utilized (to the extent it is not required to meet the needs of public safety) to deliver commercial broadband wireless services through a wide range of commercial entities that could make economically sound arrangements in a secondary spectrum market.

I
FCC'S LEADERSHIP ON THE INTRODUCTION AND DEPLOYMENT OF NEW TECHNOLOGIES AND SERVICES

The position of the FCC in the communications landscape in the United States has consistently been one of positive stewardship. At the core of this positive role is the Communications Act of 1934 (1934 Act),[3] which has served as the foundation for this country's national telecommunications-information-entertainment policy that has enriched the country both culturally and economically.

The key policy directives of the 1934 Act for the FCC include:

- encouraging the larger and more effective use of radio.
- ensuring that the benefits of new inventions and developments are made available to all of the people of the United States.
- encouraging the provision of new technologies and services to the public.
- the sole responsibility for the allocation and assignment of spectrum upon which many of the technologies are based.

Most importantly for the purposes of this study, the 1934 Act was amended in 1937 to add the following language: "For the purpose of obtaining maximum effectiveness from the use of radio and wire communications in connection with safety of life and property, the Commission shall investigate and study all phases of the problem and the best methods of obtaining the cooperation and coordination of these systems."[4] In sum, the FCC is charged by the U.S. Congress to serve the public interest, convenience, and necessity by using spectrum policy in an efficient manner in order to serve those laudable public policy goals.

The 1934 Act represented a giant step forward in bestowing the benefits of communications technologies and services on all Americans in an

[3] 47 U.S.C. §§ 151-614 (1996).
[4] 47 U.S.C. § 154(o) (1996).

equal, non-discriminatory, and non-preferential basis. Not only did the 1934 Act specify that the benefits of new technologies should flow to all, but it added that discrimination and preferences were illegal.

This conceptual approach differentiated the United States from almost every other country in the world where telephone service, for example, was exclusive as opposed to inclusive and focused primarily on service to government, business and the well-to-do. As a result, the 1934 Act contributed enormously to the growth of the U.S. economy from the 1930s onward by promoting policies that resulted in the construction of nationwide and ubiquitous telephone, wireless, radio, TV and satellite networks that are available to almost everyone at affordable prices.

A. Landmark Policies of the FCC

As market conditions have evolved over the past 70 years, the FCC has exhibited extraordinary foresight, leadership and resolve in adapting its regulatory policy framework so as continually to foster the successful deployment of new technologies and services. Although the FCC always has had – and always will have – its critics, its overall success cannot be challenged.

Generally, the FCC's major public policy role is one of encouraging the development of new technologies. From its beginnings, it has successfully promoted the deployment of new technologies and services by framing rules and regulations that have guaranteed that the public interest is better served.

Over the past 70+ years, the FCC has not only improved the level of competition but, in so doing, has encouraged the deployment of new technologies and services in radio, TV, cable TV, satellites, fixed and wireless telecommunications, information services (including the Internet and the World Wide Web), and equipment.

Among the most successful landmark decisions and policies are:

- Spectrum policies developed in the 1920s (when it was still the Federal Radio Commission), the 1930s, 1940s, and 1950s that launched a commercially based nationwide radio and TV system that has become an essential part of the economic fabric of the United States.[5]

[5] *See* Nat'l Broad. Co., Inc. v. United States, 319 U.S. 190, 210-13 (1943) (Describing the early years of radio broadcasting in the United States). Congress passed the Radio Act of 1927 and created the Federal Radio

- The Above *890 MHz* policy of 1959, which drove microwave technology into the market and ultimately led to the emergence of competition in the provision of long distance telecommunications services.[6]

- The *MCI* decision[7] in the late 1960s and the Specialized Common Carrier decision[8] of 1971 that opened the market to long distance and private line competition.

- The cable TV rules of the early 1970s that led to a growth of an increasingly sophisticated cable telecommunications system in the United States. By mandating multi-channel capacity and the provision of public access channels and institutional networks, the FCC paved the way for cable TV to become more than an entertainment distribution.[9] Today, because of FCC policies, cable TV multiple systems operators (MSOs) provide a wide array of broadband telecommunications, information, and entertainment services.

- The domestic satellite decision of 1972, embracing an "open skies" philosophy, which contributed to the development and expansion of pay-TV services for cable TV operators, as well as increasingly sophisticated satellite communications links.[10] Further developments in satellite policy have led to the creation of direct broadcast satellites, as well as low-earth orbit (LEO) and mid-earth-orbit (MEO) satellites.

Commission whose role was to develop the potential of radio. As the Supreme Court stated, "regulation of radio was . . . as vital to its development as traffic control was to the development of the automobile." *Id.* at 213. *See also* Television Assignments, Sixth Report and Order, 41 F.C.C. 148 (1952).

[6] Allocation of Frequencies in the Bands Above 890 Mc., Report and Order, 27 F.C.C. 359 (1959), *recon.* 29 F.C.C. 825 (1960).

[7] Microwave Commc'ns Inc., 18 F.C.C.2d 953 (1969); MCI Telecomms. Corp., 60 F.C.C.2d 25 (1976).

[8] Specialized Common Carrier Services, First Report and Order, 29 F.C.C.2d 870 (1971), *recon. denied*, 31 F.C.C.2d 1106 (1971).

[9] Cable Television Report and Order, 36 F.C.C.2d 143, 262 (1972); *see also* STAFF OF SUBCOMM. ON COMMC'NS OF THE H. COMM. ON INTERSTATE AND FOREIGN COMMERCE, 94TH CONG., CABLE TELEVISION: PROMISE VERSUS REGULATORY PERFORMANCE (Comm. Print 1976).

[10] Domestic Comm. Satellite Facilities, Second Report and Order, 35 F.C.C.2d 844 (1972), *modified in part*, 38 F.C.C.2d 665 (1972).

- The value-added network decision of 1973, which resulted in the creation of an increasing array of "packet" services.[11] This decision, like those concerning the convergence of communications and computers, contributed to the development of the Internet and the World Wide Web based primarily on packet switched as opposed to circuit switched technology.

- In 1971, the FCC was the world's first government agency to enunciate a policy regulating the convergence of computers and communications with its *Computer I* decision.[12] This was followed by the *Computer II* and *III* decisions promulgated in the 1980s, further promoting the convergence of computers and communications by enabling the growth of the Internet and the World Wide Web. This effort paved the way for Internet Service Providers (ISPs), which the FCC insisted should be interconnected with the public switched telecommunications network via open network architecture (ONA).[13]

- The competitive equipment decisions dating back to the late-1950s and extending throughout the 1960s and 1970s, culminated with the investigation of Western Electric Company, which was then vertically integrated with AT&T and the Bell System.[14] These decisions created not only a competitive equipment industry in the United States, stimulating the deployment of new communications, computers and information technologies and services, but also, with the assistance of the Department of Justice Antitrust Division and a federal district court presided over by Judge Harold Greene, resulted in the break up

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[11] *See* Packet Comm. Inc., 43 F.C.C.2d 922 (1973); Graphnet Sys., Inc., 44 F.C.C.2d 800 (1974); Telenet Comm. Corp., 46 F.C.C.2d 680 (1974).

[12] First Computer Inquiry, *tentative decision*, 28 F.C.C.2d 291 (1970), *final decision*, 28 F.C.C.2d 267 (1971), *aff'd in part sub nom.* GTE Serv. Corp. v. FCC, 474 F.2d 724 (2nd Cir. 1973), and Second Computer Inquiry, *final decision*, 77 F.C.C.2d 384, 461 (1980), *recon.* 84 F.C.C.2d 50, 74-75 (1980) *further recon.* 88 F.C.C.2d 512 (1981), *aff'd sub nom.* Computer and Commc'ns Indus. Ass'n v. FCC, 693 F.2d 198 (D.C. Cir. 1982).

[13] For a complete history of the FCC's policy role in the convergence of computers and communications, *see* Alan Pearce, Ph.D., *Chapter on Computers & Communications Convergence*, *in* THE ENCYCLOPEDIA OF TELECOMMUNICATIONS (Marcel Dekker, Inc. 1992).

[14] *See* Hush-a-Phone Corp. v. United States., 238 F.2d. 266 (1956); Hush-a-Phone Corp. v. AT&T, 22 F.C.C. 112 (1957); Carter Elec. Corp., 13 F.C.C.2d 420 (1968); *See also* United States v. AT&T, 552 F.Supp. 131 (D.C. Cir. 1982), *aff'd sub nom.* Maryland v. United States, 460 U.S. 1001 (1983).

of AT&T, the Bell Operating Companies, Bell Laboratories and Western Electric.

- The policies of the early 1980s, stemming from a rulemaking known as FCC Docket 18262, launched nationwide, universal cellular service with the allocation of spectrum in 1981 and the start of service in October, 1983.[15] Concurrently specialized mobile radio (SMR), which was first licensed by the FCC in 1977 and was restricted to public safety, special emergency services, industrial users, and land transportation, was allowed to interconnect with the public switched telecommunications network thanks to a favorable decision by the FCC in Docket 20846 in March 1982.[16] This decision also governed the interconnection of all private radio systems with the emerging cellular wireless systems.

- More recently, the Commission has encouraged the rapid deployment of high definition digital television, broadband technologies, and is promoting a new age of IP-based video and data services based on packet switching as opposed to circuit switching.[17]

- In December 2005, FCC Chairman Kevin J. Martin submitted a Report to Congress on the Study to Assess Short-Term and Long-Term Needs for the Allocations of Additional Portions of the Electromagnetic Spectrum for the Federal, State, and Local Emergency Response Providers.[18] This report was followed in March 2006, with the creation of a Public Safety Homeland Security Bureau described as a major step toward the Commission's goal of a secure

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[15] Rules Relative to Operations in the Land Mobile Service Between 806 and 960 MHz, Second Report and Order, 46 F.C.C.2d 752 (1974).

[16] Rules to Prescribe Policies and Regulations to Govern the Interconnection of Private Land Mobile Radio Systems with the Public Switched Telephone Network, Memorandum Opinion and Order, 98 F.C.C.2d 46 (1984).

[17] *See* 47 U.S.C. § 157 (2006); Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television, 19 F.C.C.R. 18279 (2004); Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, Policy Statement, 20 F.C.C.R. 14986, 14988 (2005); IP-Enabled Services, Notice of Proposed Rulemaking, 19 F.C.C.R. 4863 (2004).

[18] FCC REPORT TO CONGRESS SUBMITTED PURSUANT TO PUBLIC LAW NO. 108-458 (2005), *available at* http://hraunfoss.fcc.gov/edocs_public-/attachmatch/DOC-262865A1.pdf.

national telecommunications system that can meet critical needs in the event of a disaster.[19]

The public policymaking scene now presents the FCC with an opportunity to make the next great leap forward in the development of a mechanism combining the strengths of the government and the private sectors so that they can deal with today's emergencies in an effective, efficient and timely way that will result in huge benefits to society as a whole. National and international tragedies and natural disasters are not only costly in terms of lives lost and disrupted, enormous property damage accompanied by economic, business, educational, social and political disruption, but also demand new, more effective and immediate response mechanisms for dealing with them.

Today's FCC has a major role in developing a policy to establish a secure, reliable, and interoperable communications system that can be used by the nation's public safety, federal law enforcement, and homeland defense organizations. Historically, the FCC has repeatedly demonstrated its courage in politely resisting the efforts of entrenched forces that have attempted to protect the status quo. Time after time, the Commission, in the name of pursuing its mandate from the U.S. Congress, has prevailed in ways that have resulted in enormous economic, business, social, cultural, and educational benefits accruing to the nation as a whole. History suggests that it will rise again to this challenge too, after carefully listening to, and then disregarding, the voices of outrage, protectionism and retrenchment, take the steps necessary to resolve the public safety and homeland security Communications crisis.

II
PUBLIC SAFETY COMMUNICATIONS CRISIS AND THE 700 MHZ OPPORTUNITY

Public safety communications have suffered from decades of benign neglect. While 9/11 should have served as a wake-up call to modernize and revamp public safety communications, four years later, Hurricane Katrina exposed glaring weaknesses in public safety systems. Traditional wired and wireless networks, upon which we rely in national, regional and local emergencies, are optimized to meet the day-to-day needs of their customers and are eager to offer more value-added, i.e., revenue producing, services, as opposed to reliable, recoverable, and re-routable systems that can survive and

[19] Press Release, FCC, FCC Adopts Plan to Establish a Public Safety and Security Bureau (Mar. 17, 2006), *available at* http://hraunfoss.fcc.gov/-edocs_public/attachmatch/DOC-264395A1.pdf.

recover from natural and other disasters.

Of course, improving public safety communications cannot, and will not, prevent disasters. However, unlike many other measures that can be taken to address catastrophes, ranging from hurricanes and earthquakes to terrorist incidents and attacks, improved communications can support improved preparation and speed response to these crises, resulting in the saving of lives, the restoration of public health and welfare, and added protection to property. The benefits to society as a whole are self-evident and are not challenged by any responsible person or institution.

As with many infrastructure systems, it is difficult to accurately quantify the benefits of improved public safety communications. However, even a modest improvement will result in substantial financial benefit, and there will be immeasurable – and continuing – benefits stemming from human lives saved due to, for instance the faster response and more effective evacuation procedures that an assured and effective network for providing enhanced public safety communications services would make possible.

The total costs of catastrophic incidents in the United States has exceeded $10 billion per year.[20] Projections for future catastrophes are predicted to continue to escalate at a rapid rate. The continued expansion of development in coastal areas, combined with the expansion of urban areas, is dramatically increasing costs associated with disasters. Major catastrophe loss projections range from $25 billion to nearly $85 billion a year (see Figure 1).

Furthermore, the losses are not restricted to major disasters. Even minor hurricanes can cause substantial damage. Average total losses for all hurricanes are over $122 million a year and these events (Categories 0 to 2) are 37 times more likely than a major (Category 3, 4 or 5) hurricane, making the aggregate losses virtually equivalent to a one major hurricane.[21] Losses from fire and other minor, non-catastrophic incidents were more than $27 billion in 2004. Many of these losses could also be reduced by improved

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[20] *See* Insurance Information Institute, Facts & Statistics, *INFLATION-ADJUSTED U.S. CATASTROPHE LOSSES BY CAUSE OF LOSS, 1986-2005, available at* http://www.iii.org/media/facts/statsbyissue/catastrophes/. This estimate is consistent with the Congressional Budget Office Cost Estimate. *See* H.R. 230 - NATURAL DISASTER PROTECTION AND INSURANCE ACT OF 1997 (Oct. 8, 1997), *available at* http://www.cbo.gov/showdoc.cfm?index=157&sequence=0.

[21] Robert T. Burrus Jr., Christopher F. Dumas, Claude H. Farrell & William W. Hall Jr., *Impact of Low-Intensity Hurricanes on Regional Economic Activity*, 3 NAT. HAZARDS REV. 118, 118, 122, 124 (2002).

public safety communications losses from fire and bodily injury represent about one quarter of this total or $6.75 billion,[22] yielding between $67 million and over $337 million in potential additional savings per year, if one were to assign a 1 percent to 5 percent loss reduction effect to improvements in public safety communications.

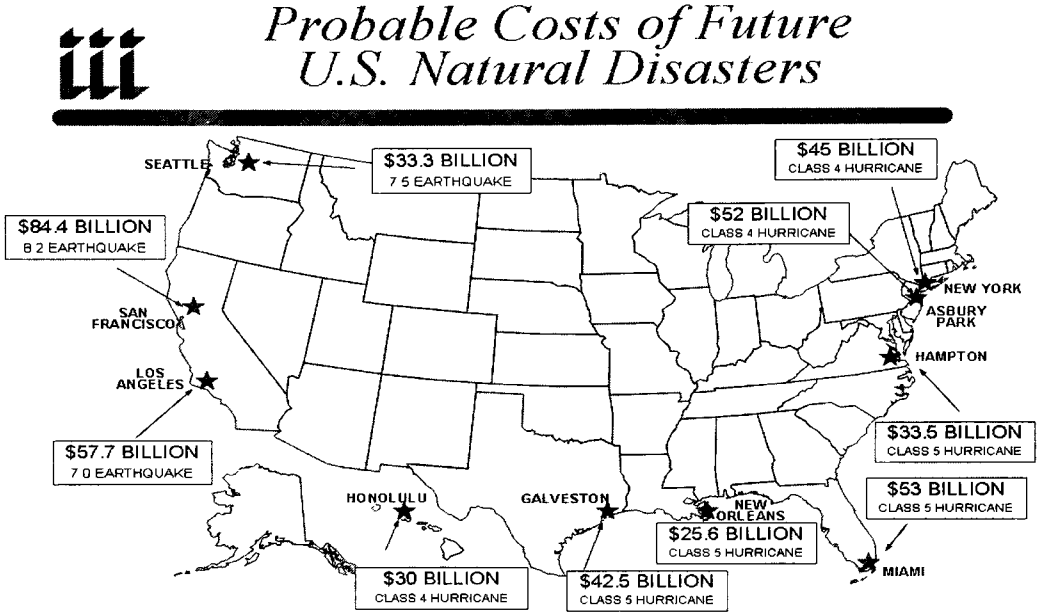

Figure 1 - Projected Future U.S. Catastrophe Losses[23]

Improved public safety communications cannot prevent these incidents, but they can reduce loss of life with effective early warnings prior to the catastrophes, restore public health and welfare more quickly by enabling the rapid and reliable transfer of information to service those ends, and reduce secondary damage (for example from fire, flooding or looting) and speed the evacuation and recovery process. If the cost savings assumed to be associated with significant improvements in the coverage, functionality, reliability, redundancy and capacity of public safety mobile communications could be expected to result in even a modest reduction in the dollar cost of damages and losses caused by all catastrophic events – for instance 1 - 5 percent of these total costs – the annual savings would be astronomical, ranging from $250 million to $4.25 billion per year. A combined public-

[22] Insurance Information Institute, Facts & Statistics, http://www.iii.org-/media/facts/statsbyissue/homeowners/ (last visited Nov. 1, 2006).

[23] INSURANCE INFORMATION INSTITUTE, THE LESSONS OF HURRICANE ANDREW: IS FLORIDA REALLY READY? (2002), http://server.iii.org-/yy_obj_data/binary/627722_1_0/hurricanestudy.ppt.

private interoperable communication system, such as the one planned for the broadband network at 700 MHz, will provide more than sufficient capacity in cases of emergency, while also substantially expanding the U.S. national wireless network.

III
AUCTION REVENUE MODEL FOR REDUCED SPECTRUM

Reallocating to public safety communications 30 MHz of the available spectrum at 700 MHz could save hundreds of millions, and perhaps even billions, of dollars per year and many lives. Given the scope of potential natural and manmade disasters that the United States faces (see Figure 1), this should be enough justification for reallocating this spectrum. By taking this spectrum out of the auction, the remaining 30 MHz of 700 MHz spectrum (and potentially, spectrum in other bands currently available for commercial mobile radio services and scheduled for auction, e.g. the AWS) will immediately become more valuable and thus will help defray the so-called potential losses from the estimated $12.5 billion that might have been bid for the 60 MHz.

There are 60 MHz of spectrum in the 700 MHz band designated for auction, with projected total revenues of between $10 billion and $15 billion, according to the Congressional Budget Office (CBO).[24] Under the Public Safety Broadband Trust proposal, half of this spectrum, or 30 MHz, should be allocated to public safety, homeland defense, and law enforcement, with the advanced nationwide broadband wireless network in which that spectrum would be deployed to be funded by a process involving the award of spectrum lease rights to commercial users.[25] This proposal leaves 30 MHz available for commercial auction. As a result, the effective "investment" in public safety communications accounts for one-half of the total auction value, namely $6.25 billion (assuming bids total the CBO's estimate of an expected value of $12.5 billion in auction revenues).

Even without further analysis, this is a small price to pay for a safe, secure, reliable, interoperable, responsive, and state of the art public safety and homeland security communications network. However, the actual costs do not even come close to that and, when the enormous benefits are computed,

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[24] Grant Gross, *Digital TV Date Pushed to 2009,* PC WORLD, Oct. 21, 2005, http://www.pcworld.com/news/article/0,aid,123136,00.asp.

[25] *See* Cyren Call Commc'ns Corp., Petition for Rulemaking, filed April 27, 2006, *available at* http://www.cyrencall.com/downloads/CyrenCall_Petition-Rulemaking.pdf.

the country as a whole gains a great deal.

Fortunately, however, even using a conservative $12.5 billion, the United States will still gain an additional benefit from reducing the spectrum available for a pure commercial auction to 30 MHz – because the value of the remaining spectrum is increased when it becomes scarcer while the number of bidders will not decline. The result: more than a proportionate share of the total amount that would have been bid for the full 60 MHz – that proportionate amount here is assumed to be $6.25 billion-will be bid for the remaining 30 MHz.

While the actual results of the auction of the remaining spectrum are unknowable, one can build a simple model for the premium placed on the spectrum:

Increased Government Revenue = (Base Government Revenue) X (Scarcity Premium)

The scarcity premium is the increased value that the spectrum will have based on its newfound rarity. There is good justification for this increased valuation, as there is substantial interest in the 700 MHz spectrum. The major cable companies (Cox, Comcast, Time Warner), entertainment firms (Disney, Sony, Time Warner), satellite companies (Echostar, DirectTV, Sirius, XM), venture backed firms (NextWave, MetroPCS, Aloha Partners, ClearWire), [26] leading IT and technology firms (Microsoft, Qualcomm, Intel, Cisco, Google), and, of course, the existing wireless carriers (Sprint-Nextel, Verizon, and Cingular, which is owned by AT&T and BellSouth) all previously bid on, or are reported to have expressed an interest in bidding on, available 700 MHz spectrum in FCC auctions.

[26] *See* Aloha Partners, Open Letter to U.S. House of Representatives, Committee on Energy and Commerce (Apr. 18, 2005), http://www.aloha-partners.net/whitepaper.htm.

Table 1: Scarcity Impacts On Projected Additional Auction Revenues (Millions)

Scarcity Premium	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
$10 Billion Auction	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500
$12.5 Billion Auction	313	625	938	1,250	1,563	1,875	2,188	2,500	2,813	3,125
$15 Billion Auction	375	750	1,125	1,500	1,875	2,250	2,625	3,000	3,375	3,750
$17.5 Billion Auction	438	875	1,313	1,750	2,188	2,625	3,063	3,500	3,938	4,375

This scarcity premium is further supported by the fact that the first megahertz of additional spectrum that a company purchases is more valuable than the last. Thus, with a modest scarcity premium of twenty percent, the U.S. Treasury *collects $1.25 billion more* than it would have for the 30 MHz that is available for open auction. This number goes up to $1.75 billion if the auction reaches $20 billion, and even higher if the scarcity premium turns out to be higher than 20 percent.

While potential auction participants have less available spectrum, the Public Safety Broadband Trust model gives the American public the full benefit of the 700 MHz spectrum. By making this spectrum "dual use," the PSBT will enable the delivery of broadband commercial service for day-to-day service. This service may have the additional benefit of reducing prices for broadband service offered by other providers while, at times of crisis, making a high-reliability, IP-based, open network available to national, state and local public safety providers so that they can save lives and protect property.

In summary, the short, medium, and long term economic and broadly based public benefits stemming from a decision to remove this 30 MHz of 700 MHz spectrum from the traditional auction block, so that it instead may be used to enable the deployment of a high-speed, interoperable, broadband, secure and safe public safety communications network far outweigh the relatively insignificant financial shortfall stemming from the auction of all 60 MHz.

Public Safety Benefits

- Lives saved on an annual basis as a result of earlier and more reliable warning procedures and evacuation practices.

- The potential for reduced property damage and quicker recovery from disasters.

- Improved response times for local police, fire, and ambulance services, again resulting in the saving of lives and property, along with more effective and efficient crime fighting tools.

- Significant cost savings stemming from the interoperability of the public safety communications network and uniform equipment standards.

- A reduction in public anxiety and increased faith in the ability of first responders to deal with disasters at the national, regional and local levels.

- Lowering or leveling off insurance premiums for business and households who install emergency and security systems that receive instant warnings and evacuation instructions in emergencies.

Economic & Business Benefits

- New and vibrant competition to the incumbent wireless companies.

- New services and technologies on a local, regional and nationwide basis.

- Employment opportunities resulting in growth in the nation's Gross Domestic Product (GDP), employment opportunities, and increased federal, state and local tax revenues.

IV
MANAGING THE NETWORK

A. The Public Safety Broadband Trust

A Public Safety Broadband Trust (Trust), to hold the single public safety license for the 30 MHz of spectrum is essential to this proposal. The public safety community must be certain that the many organizations that comprise the Trust fully and fairly represent the interests of first responders at local, state and federal levels. There must be confidence that the Trust will be capable of developing the technical, operational and coverage specifications for the national network and that it will satisfy all of the public safety requirements. There must be certainty that the Trust has the skills needed to manage the public safety usage that it represents along with the equally necessary commercial operation that will pay for the construction and upkeep of the network, the viability of which is the foundation on which public safety operations are made possible.

Safeguards must therefore be put in place to make sure that the operations will be as secure, confidential, and responsive to individual user control as they are under a traditional "command-and-control" system. The Trust will be responsible for defining the software "locks and keys" of a mobile, technically advanced network that will satisfy those criteria and will also oversee their implementation.

The Trust will be responsible for meeting whatever construction timelines and coverage standards are established as conditions to the grant of its FCC license. As a result, it will need to develop tools for measuring carrier deployment status and prophylactic measures should those efforts fall behind schedule in any market (or should service in a market be discontinued after construction) so that nationwide coverage and interoperability are maintained. The Trust should also have latitude in defining and managing coverage obligations, consistent with the flexibility inherent in the FCC's spectrum leasing rules.

Because the Trust will speak with one voice to technology vendors and other providers on behalf of all public safety users on the network, it will have significant leverage to dictate product development and negotiate attractive terms.

The FCC will have the authority to approve the organizations that participate as public safety representatives during the first term of the Trust as well as the structure of the Trust itself, including the process by which new, qualified representatives replace existing organizations at predetermined intervals.

B. The Network Manager

The Trust will need experienced, qualified assistance in ensuring the success and the operation of this nationwide, interoperable emergency network. While the Trust will play the major role in defining network specifications and user controls and in establishing the necessary protocols for user priorities and interoperability, the members of the Trust cannot be expected to devote full-time attention to the day-to-day management. Even if they could, management of a network of the scope, scale, and complexity advocated here will demand highly specialized skills that are not likely to be found within the Trust itself, but are nonetheless readily available in the telecommunications-information industry marketplace.

A number of responsibilities will devolve to the network manager, including:

1. Assisting the Trust in defining terrestrial coverage requirements, reliability levels, redundancy arrangements, quality of service levels and other network criteria;

2. Assisting the Trust in evaluating technology options;

3. Assisting the Trust in establishing capacity requirements and procedures for seizing additional capacity when necessary;

4. Developing procedures to manage the Trust's relationship with the commercial carrier lessees;

5. Overseeing carrier compliance with network deployment, other lease requirements and network protocols on behalf of the Trust;

6. Negotiating with equipment and service vendors on behalf of the Trust to obtain optimal pricing and packages;

7. Establishing procedures for, and managing, ongoing network operations in areas such as activation and deactivation of units, formation of talk groups, and interoperability;

8. Developing technology and product "roadmaps" for public safety, including processes for keeping the network "evergreen" through technology upgrades;

9. Administering revenue streams on behalf of the Trust, including distributions of negative auction monies;

10. Establishment and distribution of network usage charges consistent with supporting nationwide participation and other billing and collection activities.

The Trust will need to engage a qualified entity to manage this project under the Trust's direction and control. The selection of a manager will be entirely at the Trust's will.

V
CONCLUSION AND RECOMMENDATIONS: TOWARD A PUBLIC-PRIVATE PARTNERSHIP

The FCC has a long tradition of innovative oversight of America's valuable spectrum resources. It has carefully balanced societal, public safety, and national security needs while spurring commercial innovative use of spectrum to benefit the public and the national economy. The Commission's historical commitment to the introduction of new technologies and services has resulted in pro-competitive polices in the provision of long distance, local and wireless communications services, cable television, satellite entertainment and information services, and an increasing array of broadband services delivered over a variety of competing networks.

The management of government spectrum has been much more traditional. Until now, the military, law enforcement, and public safety spectrum was allocated in order to deploy specific, "stovepipe" networks. While this made sense at the time, it has resulted in a multitude of incompatible, non-interoperable communication systems that use spectrum inefficiently and fail to meet the rapidly evolving communications and information sharing requirements for the 21st century. This situation has been aggravated by the same budgetary constraints that have driven the government to auction spectrum in the first place.

Public safety has been particularly hard hit. The scale of potential catastrophes has grown tremendously while the resources available to the responsible agencies have declined. Even in the wake of 9/11, numerous hurricanes, and several earthquakes, public safety communications remain in disarray. While improving public safety communications will not stop these disasters, even modest system enhancements can reasonably be expected to help save lives and reduce the costs to the United States and its citizens by hundreds of millions, if not billions, of dollars per year.

Meanwhile, the limitations of pure market models, like the drawbacks of auctions, have become apparent. In addition to the delay in deployment of wireless networks that bring billions of benefit to the U.S. economy every year, the nature of these market models has shortchanged public safety and national security needs. Incumbent wireless carriers continuously fight for delays and waivers in meeting public safety and law enforcement needs. Endless delays in E911 deployment and the inability of the U.S. Government to maintain its lawful surveillance capabilities for rapidly evolving communications under Communications Assistance for Law Enforcement Act (CALEA) have amply demonstrated the failure of markets to meet the nation's long-term public safety and national security objectives.[27]

There must be a better way.

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[27] *See* Dale N. Hatfield, *A Report on Technical and Operational Issues Impacting The Provision of Wireless Enhanced 911 Services* (Oct. 15, 2002), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6513296239); *see also* Communications Assistance for Law Enforcement Act and Broadband Access and Services, Notice of Proposed Rulemaking and Declaratory Ruling, 19 F.C.C.R. 15676 (2004) (the FCC undertook a comprehensive review of issues relating to CALEA implementation, including policies regarding section 107(c) extensions and section 109(b) after the DOJ, FBI and DEA asked the FCC to take certain steps to accelerate CALEA compliance.).

A. Toward a New Public-Private Spectrum Partnership

Pure market based systems are driven to meet the short-term needs of commercial shareholders. Conversely, government-only solutions are driven by budgetary limitations, bureaucratic and political battles, and inability to respond to rapid technological and market changes. The United States has a long history of addressing these challenges through innovative public-private entities. Independent regulatory entities such as the New York Stock Exchange (NYSE) and National Association of Securities Dealers Automated Quotations (NASDAQ); research organizations such as RAND Capital Corporation (RAND), Massachusetts Institute Of Technology Research And Engineering (MITRE) and International Development Association (IDA); and even the U.S. Postal Service are hybrid government-commercial entities. All of these organizations balance commercial flexibility with long-term national policy goals.

The main problem facing public safety in the United States is that its communication requirements are minimal except at times of crisis, when demand is so great that it causes strains and breakdowns on the commercial networks. When a major disaster or national catastrophe strikes, public safety's communication needs skyrocket. Building a standalone network that operates in this manner is extraordinarily expensive. Beyond the issue of cost, most of the time and in most parts of the country, it is unnecessary. The current commercial companies, dominated by Cingular, Verizon and Sprint-Nextel, are not the ones to undertake this task. They are strictly commercial operators concerned with adding new revenue generating services in an attempt to increase profits. They are also preoccupied with managing existing and future mergers as the industry consolidates into fewer competitors.

In order to meet the critical public safety needs of the United States in the most cost-effective manner, this key 30 MHz slice of 700 MHz spectrum should be allocated to public safety to serve as the critical ingredient to fashion an effective Public-Private partnership. Such a public-private partnership for this 30 MHz of 700 MHz spectrum should have the following characteristics:

1. *Open IP Broadband Communications Network*

The Internet has shown that having a common standards-based technological approach and related network infrastructure has provided a robust platform for innovative services and businesses. An IP-based technology and network architecture also provides a naturally reliable and robust survivable network well suited to public safety requirements. Perhaps

the most important benefit of this architecture is that it allows a wide range of commercial participants. The Internet gracefully includes everything from large telecommunications carriers with their own massive networks to local, independent ISPs with a small cadre of clients and everything in between.

2. *Commercial Usage, Public Safety Standards*

Rather than build a dedicated public safety network, the public-private partnership approach will oversee the creation of a single network built to public safety specifications. The network would consist of multiple assignments of spectrum lease rights made available through a secondary market under the supervision of the public-private spectrum manager. This hybrid broadband wireless network will benefit from the enhanced reliability of building to a public safety designated standard and the large network size and commercial applications will substantially reduce the cost of meeting public safety communications needs by distributing the costs over a much larger user population.[28] This model will protect both the public and property in times of crises; result in billions of dollars in annual savings; and will introduce new competitors and new technologies and services to the incumbent and increasingly consolidated commercial wireless companies.

3. *Fully Pre-emptable*

In order to build a large, but cost-effective public safety network, the system must necessarily be primarily commercial. In times of national, regional, or local crisis, it must be designed to allow public safety users to pre-empt ordinary commercial users.

4. *Public Safety Specific Quality of Service & Priority Assignments*

Public safety entities, commercial users and infrastructure operators benefit from the ability to dynamically allocate available network capacity and to flexibly assign and change "quality of service" and priority levels for various users. The network neutrality debate[29] misses the advantage to all

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[28] The total public safety community in the United States comprises approximately 2.5 million members. The U.S. population is nearly 300 million individuals or 100 times larger. Even so, this overstates the size of the largest public safety networks, as current systems are separate stovepipes for individual national, state or local industries.

[29] "Network neutrality" refers to a proposed regulatory regime under which the owners of Internet infrastructure would be constrained in their ability to charge different prices to different content or service providers, for example,

parties for assigning various priorities and service levels to different users – while some services, such as real-time video, truly benefit from low-latency, high-speed services, others, like e-mail and SMS can take advantage of long-latency, low-speed services if prices are reduced. This ability to balance a service's cost, its importance and its user's status assures the utilization of scarce spectrum most efficiently.

The availability of this 30 MHz swath of 700 MHz spectrum has presented the FCC with a rare opportunity to address a public policy problem for public safety while adding a substantial new network for the U.S. public. As clearly shown by this analysis, the United States gains the most benefit from deploying major new wireless networks quickly. It is also clear that the public-private partnership strategy, quickly sketched herein, and discussed at length in the accompanying FCC filing, may provide the best means to open wireless spectrum to new entrants without the failures previously experienced.[30]

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based on quality of service differences. "Absolute network neutrality would require all bits on the network be treated exactly the same." STUART MINOR BENJAMIN, DOUGLAS GARY LICHTMAN, HOWARD SHELANSKI & PHILLIP J. WEISER, TELECOMMUNICATIONS LAW AND POLICY 1178 (2d ed. 2006).

[30] *See* Cyren Call Petition for Rulemaking, *supra* note 25.