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Statement of Thomas A. Stroup
President
Personal Communications Industry Association
Before the Federal Communications Commission
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I. INTRODUCTION

A. PCIA Background

Founded in 1949, the association recently changed its name to PCIA to reflect the dynamic changes underway in the personal communications industry, and to underscore the commitment of the association and its members to making viable, competitive new forms of PCS a reality.

In May, 1991, PCIA established its PCS Membership Section as a forum for companies seeking to provide new PCS services in the 2 GHz spectrum. Member companies include cellular, paging, mobile data, computer, specialized mobile radio (SMR/ESMR), PCS experimental licensees and entrepreneurs, cable, manufacturing, local exchange and interexchange sectors of the industry. To focus its efforts and the expertise available from member companies, PCIA's PCS Section is divided into three principle committees: Technical and Engineering, Marketing and Consumer Affairs, and Legislative and Regulatory. The decision process is upward through its committee structure, resulting in opportunities for all members to advocate positions and to contribute to the final product.

It has operated by consensus on decisions, whether on technical standards or policy positions. This process represents an enormous commitment of resources, not only of PCIA, but of individual companies. Because of its very diverse composition, reaching decisions within our PCS membership has not been easy or quick, but the positions taken represent extraordinarily broad and deep consensus. It is from this basis that the association has taken the lead in advocating, formulating and creating plans and policies to guide the development of the PCS industry until the licensing process is completed.

B. Commitment to PCS

PCIA's commitment to the allocation of spectrum and licensing of new PCS dates from December, 1989, when the association formally requested that the Commission launch a PCS proceeding. That helped establish a basis for the Commission's initiating its PCS Notice of Inquiry in June, 1990.

Through its PCS committees, PCIA has produced some of the most widely cited studies and white papers on PCS that the telecommunications industry has produced. They include industry consensus reports on market trials, service descriptions, market demand forecasts, standards requirements and a spectrum auction white paper. These documents have not only given direction to the industry and the Commission in preliminary PCS decisions, but produced valuable insights into consumer demand and identified critical issues to be resolved.

As PCS licensing issues have progressed, so too has the level of PCIA activity in support of the industry and the Commission's initiatives. Most recently, we have:

- Concluded an agreement with Rand McNally to remove all uncertainties, such as copyrights, with regard to the Commission's use of MTAs and BTAs for PCS areas of licensing;
- Documented that the Commission has the legal authority to secure outside contractors to implement competitive bidding under exceptions to federal procurement requirements;

- Been working with public safety organizations to develop sound E-911 policies and procedures, most recently at the E-911 tutorial here two weeks ago.

These activities have been undertaken to facilitate the finalization of sound, reasonable and workable rules for the successful deployment of the PCS industry and its emerging technologies.

C. Today's Hearing

Today's hearing comes after more than four years building a record on licensing new, broadband PCS services. Attachment I is a timetable, dating from December, 1989 to the present itemizing sixteen separate actions of the Commission and PCIA to move the licensing process forward. The PCS NOI was subject to extensive public comment, as was an FCC en banc hearing similar to this one in December, 1991. The PCS rulemaking itself has already seen three Reports and Orders. The Emerging Technologies proceeding involved no fewer than three Notices of Proposed Rulemaking, three Reports and Orders, and a final Memorandum Opinion and Order. Ancillary proceedings on regulatory treatment and competitive bidding have been subject to extensive and voluminous public comment. Congress weighed in last year not only on mandating spectrum auctions and regulatory parity, but on the need for PCS resolution and establishment of ambitious deadlines for licensing.

Now, it is time to move forward. The record is complete. Anyone with an interest in PCS has had numerous opportunities to comment, and many have done so at each stage in the formal proceedings. This is a very important docket--it is giving birth to a new industry and it is expected to immediately inject significant new competition into the personal communications industry and benefit millions of consumers and taxpayers. There will be winners and losers on each issue the Commission decides. But in reviewing the record, no one will be able to say any decisions were hastily made. Many of the arguments we are now hearing in this final consideration stage are merely reiterations of what has been said by the same people, for the same reasons, at each step in this protracted process. It is now time to move on, put ideological arguments and petty rivalry behind us and take final action.

The issue of the scope and demand for new PCS and the impact which delay in licensing will have demonstrate how urgent the need is for a final decision.

II. SCOPE AND DEMAND FOR NEW PCS

A major part of the effort to move licensing forward is to educate the industry and public in the potential of PCS. In 1992, PCIA completed its first Market Demand Forecast which was widely cited in Congressional hearings, quoted in trade media, examined by Wall Street analysts and referred to by many telecommunications companies interested in PCS. This year, PCIA updated the study to reflect new data from the dozens of PCS marketing and technical trials conducted during the last 18 months. The bottom line is a near explosion in demand for wireless services: over 31 million subscriptions for New PCS, 52 million subscriptions for cellular service, and 65 million subscriptions for paging and messaging services are projected within the next ten years.

The market demand studies are the starting point to understanding both the economic potential of PCS as well as the impact of delays in deploying the technology. The forecast represents how demand could roll out if deployment occurs early.

A. Study Methodology

To accurately assess scope and demand, it is necessary to avoid skewing or distorting estimates by focusing on only one or a few subsets of the total personal communications industry. We defined PCS as "a broad range of individualized telecommunications services that enable people or devices to communicate independent of location." This includes both the new PCS services to be licensed, as well as existing paging, cellular telephone, SMR/ESMR and dedicated data services. Because of the significant cross elasticity of demand between various members of this family, all must be considered.

PCIA solicited information from a qualified "key list" of member companies and respondents, which included representatives of every sector of the industry. Each provided data on each of eight services regarding total anticipated service penetration, business participation, equipment and service pricing for 1998 and 2003 (five and ten year forecasts from the 1993 survey date). Respondents included estimates based upon primary research, secondary sources and internal company estimates. This year, the forecasts included more primary and secondary, reflecting better data available from market trials.

It is also important to know that we differentiate subscriptions from individual subscribers. That is because a significant number of individuals will subscribe to multiple wireless services.

Statistical information was calculated using the Delphi method of removing the high and low responses and averaging the remainder.

B. Primary Findings

Although you may wish to consult the table (Attachment II) for additional details and the study assumptions, the primary findings are:

1. All eight PCS services studied, both existing and new, will continue to grow, despite increased competition.
2. Multiservice use is expected. The complementary nature of PCS offerings will create a market in which users of one service may adopt additional services to enhance overall functionality.
3. New PCS will add new value to the industry instead of replacing any existing wireless technologies. However, increased competition will certainly affect the growth rate of other services.
4. A wide array of services is developing, each with its own specific functionalities, service mix, and market advantages, each having varied price points and levels of technical complexity. PCIA's vision of PCS is a diversity of services from a diversity of sources.
5. New PCS will be heavily oriented to consumer service, suggesting it will not follow the traditional pattern of business to consumer migration.
6. As with landline telecommunications, data will comprise an increasing share of the personal communications services industry in the future.

7. Demand is dependent upon the timing of service deployment, with ESMR growing earliest, followed by CDPD, and then new PCS voice and data service. Timing of service deployment is expected to affect demand of specific services and the relative market share each member of the PCS family will win.

C. Service Specific Findings Highlights

Attachment III summarizes the projected demand for studied services. From the onset, it is important to stress that demand projections were predicated upon new PCS deployment in 1995. Since initial infrastructure will require 12 to 18 months to build, deployment in that time frame would require licensing by the end of the current year.

To elaborate on the most important findings relevant to the hearing:

- New PCS, while the "last entrant," will grow sharply: 8.55 million subscriptions are predicted at the end of the first three years of service deployment. That number will grow by 264 percent between 1998 and 2003.
- Demand for cellular service will continue to grow dramatically: a 154 percent increase between 1993 and 1998, resulting in 52 million subscriptions in 2003 compared to 13 million in 1993. It should be stressed that our most optimistic projections for new PCS still show the new services at less than 2/3 the number of subscribers as their established cellular competition.
- Paging services, with a very low price point, will maintain the largest market share, with 65 million subscriptions in 2003;
- ESMR/SMR will be 90 percent business-based with a penetration of 3.0 percent (8.9 million subscriptions).

The only conclusions to draw from both the first and second market demand studies is that new technologies greatly expand the demand for all types of wireless telecommunications services. New PCS will grow quickly in its markets, but so will all other existing wireless technologies. The overall market demand for wireless services will increase with the introduction of New PCS, thus making each service's share of the market even larger.

III. WHITE HOUSE ASPIRATIONS FOR NEW PCS

Licensing of PCS is and has been a very high priority of the Clinton Administration. In July, the President extolled the potential of PCS at a White House ceremony, stating that the industry would create an estimated 300,000 new jobs for the American economy in the next 10 to 15 years, while reducing the federal budget deficit more than \$7.0 billion through the spectrum auctions. He noted we are at the threshold of a new era in human communications where wireless technologies become information skyways, sending ideas and masses of information to remote locations in ways most of us would never have imagined. It was noted that this new spectrum will enable America's high-tech entrepreneurs to create high-wage jobs, spur economic growth and productivity, boost exports and offer exciting new products and services to American consumers.

IV. QUANTIFYING IMPACT OF DELAY ON SCOPE AND DEMAND

Although it is difficult, if not impossible, to be precise in projecting what might happen if certain actions are taken or delayed, the development and growth of other mobile telecommunications technologies can be instructive.

A. Impact on Paging Industry

The introduction of new spectrum and new providers in the mobile market place can result in lower prices and more service choices for consumers.

For example, in the paging industry, the Commission decided in 1982 to double the amount of spectrum allocated to paging services. The result was not bankruptcy for established carriers. On the contrary, it resulted in substantial new and greater competition faced within the industry. Prices dropped 50 percent between 1987 and 1992 (from an average of \$25.80 per month in 1987 to \$12.79 in 1992) while the number of pagers in service has grown by leaps (Attachment IV). The industry is currently experiencing a 30 percent growth rate in a highly competitive market in both pricing and number of companies.

B. Impact on Cellular Industry

It is necessary only to look back twelve years ago to realize the likelihood of long term harm to the PCS industry which will result from a delay in auctions and licensing. At that time, the Commission experienced significant delay in licensing cellular telephone service, some of which was not the Commission's fault, such as using comparative hearings to issue licenses and the intense speculation in lotteried licenses. The agency moved cautiously by delaying the filing deadline for applications from 1981 to 1982 and later reversed its plan to permit a fixed date for filing all applications and staggering filing for licenses in the top 90 markets. It was five years before there was at least one license issued in each of the 306 metropolitan markets. Rules were not adopted until 1986 for Rural Service Areas (RSAs) and only three years ago, in 1991, were rules released for licensing unserved areas within existing cellular markets.

An often-cited 1991 National Economic Research Associates study estimated the cost of the delay in licensing and deploying cellular telephone service at \$86.0 billion. Consequently, growth in cellular was slow until 1990, when service became widely available in the U.S.

The cellular experience illustrates clearly that unless expeditious action is taken, new PCS delay will have a steep price. That situation is even more acute with the vision that PCS is to emerge in direct competition with established and deployed technologies and companies. It must attract vast capital to build out systems, pay for both licenses and the relocation of incumbent spectrum users. Because, clearly, some of these costs are unavoidable, the Commission should feel absolutely compelled to move forward as quickly as possible to prevent a repetition of those costs which will inevitably result from delay.

IV. DELAY IN LICENSING OF NEW PCS WILL NEGATIVELY IMPACT THE INDUSTRY AND ECONOMY

A. Diminished Demand

Many wireless analysts and the PCIA membership agree that the effect of delayed deployment of new PCS will be to diminish demand for emerging services. A study conducted by DSS Research quantifies this effect.

According to that study (a copy of which has already been placed in the record of Docket Number 90-314), a delay of licensing of just one year (licensing in 1995 rather than 1994) would result in a 15 percent reduction in new PCS' market penetration. A delay of just two years (licensing in 1996) would reduce the total market penetration for new PCS by one-third of what was predicted with 1994 licensing.

Existing forms of personal communications (cellular and enhanced SMR) would be beneficiaries of this delay. However it is significant to point out that DSS Research's study indicates that the total market for PCS (both existing and emerging forms) will be diminished if new PCS services are delayed. Projected market shares for all services (new PCS, ESMR, and cellular) in the year 2003 is projected to reach a penetration rate of 23.8%. If new PCS is delayed three years, ESMR and cellular's market shares go up, but the total wireless penetration rate drops to 23.2%.

Any reduction in new PCS market share translates into proportionate reductions in the benefits these new services are expected to bring to the American economy. That means a reduction in revenues generated; fewer new, high technology jobs; and a loss in the productivity gains which new PCS promises.

B. Less Effective Competitors

Delay in licensing new PCS also translates into less effective competitors once new services are introduced. Cellular carriers are adding new customers to their networks at the rate of 14,000 per day. ESMR is also projected to achieve rapid market penetration as these new networks come online in the coming months. Every day the licensing of new PCS is delayed, the embedded customer base of existing service providers against which these new entrants must compete grows larger. The greater the delay, the greater the chance that existing services will be able to pre-empt new entrants by targeting and capturing the consumer market which is key to new PCS' success. Other advantages to the existing networks include their ability to convert to digital technology, to improve billing and distribution, to continue site acquisition, and to introduce pricing and marketing packages that emulate and appeal to the emerging PCS consumer before these new competitors actually enter the market. The existing networks will also have the opportunity and incentive to establish exclusive and/or quasi-exclusive contracts during the interim period (i.e. for site locations, equipment, software, consultant services, etc.) which may have the effect of disadvantaging the new PCS entrant.

The benefits of effective competition to the consumer are too numerous and too well accepted to warrant reiteration here. Delay in licensing new PCS will result in substantially weaker competitors forced to challenge more formidable and well-established incumbents. The lower prices and increased consumer choice characteristic of highly competitive markets will be diminished.

C. Potential New PCS Entrants May Not be Able to Survive Delay

A further threat to the fully vibrant competitive marketplace which is the Commission's and the industry's vision for personal communications is that each day of delay in licensing means a delay in any return on the significant investment that new PCS hopefuls have already made in these new services.

In reaction to the "final rules" adopted in the FCC's Second Report and Order, manufacturers and carriers have invested time and effort in researching and developing the technical solutions to facilitate use of the proposed spectrum blocks, developing aggregation scenarios, and adapting technologies so they can work optimally in various size bands. Software applications development is also underway. Tedious, expensive valuation work is currently being undertaken based on the parameters in that ruling in order to be prepared for informed and effective participation in auctions. Companies that want to invest in PCS need to carefully scrutinize the potential cost of licensing, the demographics of each BTA/MTA, and conduct preliminary network designs (possibly one for each type of technology considered) in order to ascertain capital requirements, cash flow, cost of capital and ultimately, the feasibility of building a profitable network based on buildout requirements, cost of capital and price structures. This work builds high confidence decisions about what to bid at auction, and helps a company determine its development strategy.

It is difficult to quantify the aggregate costs in research and development, market trials, and in planning capital expenditure, engineering, legal, market valuation, and staffing requirements that have already been invested by businesses that hope to ultimately win new PCS licenses. We can argue with confidence that many millions of dollars have already been invested in the emerging PCS industry by potential carriers studying the market. There will be no return on that investment until licenses are assigned, networks are built and customer revenues start coming in.

The combined effect of having to pay full value for spectrum, pay expenses incurred in engineering and valuation of each market, pay equipment and capital costs, and the prospect of competing with many other new and existing services, presents a formidable challenge to even strong competitors. In short, business cases for PCS are already marginal, and the uncertainty associated with delay will make the problems worse, particularly for smaller companies and new entrants.

Simply delaying the commencement of auctions increases the chances that smaller PCS aspirants will run out of money, be forced to abandon their existing investment, and drop out of the industry before licensing ever occurs.

D. International Trade Opportunities are Jeopardized

One of the bright spots in the U.S. economy over the last decade has been in maintaining a distinct edge in high level technology research and development, manufacturing and services.

A clear pattern in current U.S. exports and the telecommunications industry is the extraordinary number of joint ventures, consortia and other mechanisms for U.S. telecommunications exports in satellites, cellular and fiber optic transmission systems and services overseas. One commonality has been a demand for U.S. products and expertise because there has been extensive experience in developing and building advanced landline and

wireless telecommunications systems domestically. The industry worked out the problems associated with technology development and deployment, and there is now a demand for these exports.

There is every certainty that new PCS will be high on the list of demand for U.S. exports. The lessons apparent from other sectors of the communications industry show that U.S. companies need experience to pioneer research and to offer newly developed products to capture market share abroad.

To the extent that a mass market for broadband PCS can be developed in the United States, American expertise and hardware are exportable. PCS offers the opportunity to build technology here and achieve manufacturing economies of scale that support an export industry. Delay in deployment creates the potential that foreign markets will have committed to other technologies and other manufacturing sources before the United States is prepared to compete in the international marketplace. Substantial delay will likely cede potential markets abroad to foreign competitors. Potential, good, high-paying domestic jobs will evaporate.

E. Uncertainty and Delay Threaten Financial Market Confidence

Even a casual audit of trade publications, financial community journals and the general press reveals a growing public opinion that uncertainty and delay has made new PCS less attractive, more risky and a poor gamble for the investors who will be vital to the success of new carriers. Attachment V presents a representative but by no means exhaustive sample of such public opinion.

The increasing uncertainty over the form of the broadband PCS rules is a cloud growing over the industry. It makes finalization of business plans, partnering decisions and development of auction strategies impossible. Bidders must now be making arrangements to secure firm financial backing and they are impeded by the lack of final rules. It develops a domino effect in which manufacturers are hesitant to make commitments to produce PCS equipment.

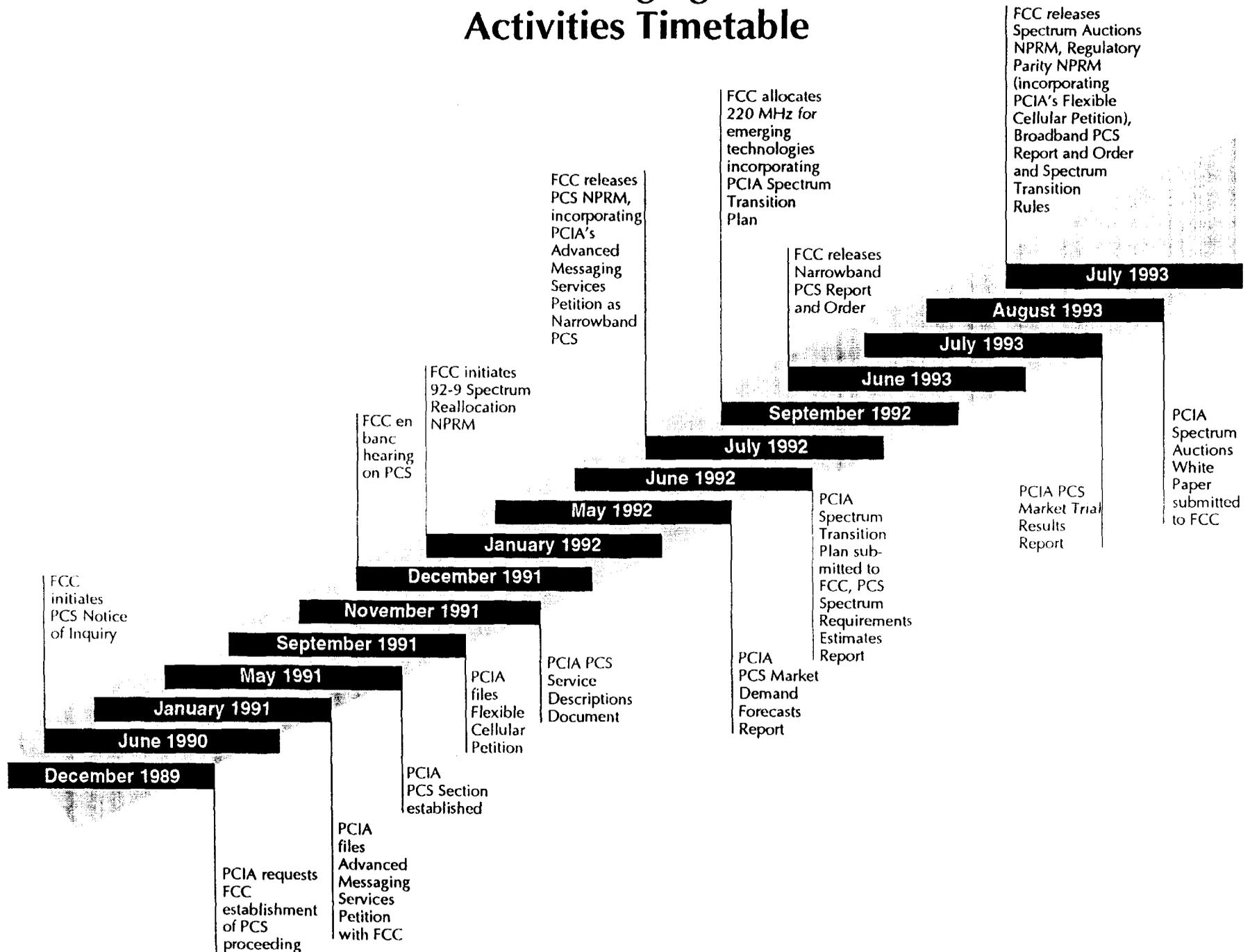
The delay, or the perception of delay in concluding the PCS proceedings, is starting to undermine investor confidence in the industry and jeopardizes the ability of the industry to raise the capital necessary to acquire licenses at auction and build their infrastructure. The situation increases the likelihood that carriers and investors will turn to other technologies and opportunities, as for example, MCI has done with its recent investment in Nextel. There are opportunity costs incurred as a result of uncertainty and delay, and we may be seeing it demonstrated in potential investments in PCS being diverted to existing services.

V. CONCLUSIONS

The wireless telecommunications industry knows it is on the brink of the next revolution in communications. We are now at the crucial turning point in determining whether it will be launched quickly and successfully or whether delays, for reasons however well-intended, will hamper its start and diminish the promised benefits to consumers, the economy and the nation's taxpayers.

Simply, delay in licensing new PCS will mean less investment in the industry, less economic growth, diminished consumer choice and savings, weakened competition, fewer jobs domestically, and fewer exports abroad. The Commission has an opportunity to avoid mistakes of the past. Today's hearing is an excellent opportunity to send a clear message to the industry and to Wall Street that uncertainty will be removed expeditiously.

PCIA PCS/Paging/Cellular Activities Timetable



Primary Findings

The attached "PCS Technologies Forecast" summarizes aggregate statistical findings for the six carrier based services. The primary findings were developed from these findings. The next section lists assumptions PCIA took into account in developing the analyses below.

The primary findings include the following:

- o **All eight PCS Services studied will continue to grow, despite increased competition.** (See attached "PCS Technologies Forecast" page.) Available market research indicates that there is a very high amount of unmet demand for personal communications. Decreasing prices, advanced technologies, and creation of licenses will enable service providers to fill the demand gap.
- o **Multiservice use is expected.** The complementary nature of PCS services will create a market in which users of one wireless service may adopt additional services to enhance overall functionality. For example, cellular users may adopt an alphanumeric pager for message screening and response queuing, or companies with many mobile workers already using PCS may install a wireless PBX. Since PCIA's results show that a person is likely to use multiple services, and the demand for more than one service per subscriber may be high, the forecasts refer to quantity of subscriptions, instead of subscribers.
- o **The respondents see the New PCS as adding new value to the industry.** New PCS is not expected to replace any existing wireless technology studied, although increased competition will certainly affect the growth rate of the other services. Rather, respondents see the new services as adding new value to the industry by complementing existing services, and increasing demand for all wireless services.
- o **A wide array of services is developing, each with its own specific functionalities, service mix and market advantages. These services each have varying price points and levels of technical complexity.**
- o **Residential service growth:** New PCS will be heavily oriented to consumer service. Results show that business penetration for New PCS in Year 5 is a modest 30%, suggesting that New PCS will not necessarily

follow the traditional pattern of business to consumer migration; rather PCS may begin with the non-business or residential customer. Our results also showed paging, and to a lesser extent cellular, further expanding into the residential marketplace.

o **Data PCS:** As with the landline communications, data will comprise an increasing share of total wireless communications in the future. This was reflected by data services growth in cellular data (anticipated 2.69% penetration in 2003). Voice-plus-incremental-data is a strong component of New PCS demand, and participants projected over 70% of New PCS usage will include some type of data service.

o **Deployment:** Demand is dependent upon the timing of service deployment. The data illustrates that ESMR will grow earliest followed by CDPD, and finally New PCS voice and data service.

Assumptions

The following assumptions were used by the survey respondents in formulating their market estimates:

- o Penetration is based on US population figures that assume 1.5% annual growth: 1992 / 255 million; 1993 / 258.5 million; 1998 / 275.8 million; and 2003 / 300.3 million.
- o Recently we received end of year 1993 reported penetration and subscriber figures for New PCS, Satellite, Paging, Dedicated Data, Cellular and SMR/ESMR. Wherever possible, five and ten year growth figures use the 1993 figures as the baseline.
- o Service descriptions and capabilities are based on definitions set forth in the *Telocator (PCIA) Service Descriptions Document for Personal Communication Services*. This document is available at PCIA.
- o We assume the existence of a fully competitive environment, where services coexist simultaneously and the demand for one service may influence the demand for others.
- o Existing services evolve into more mature services possibly offering greater functionality. For example, paging services evolve to advanced paging where customers are offered greater messaging capabilities. The survey matrices listed these services together and a single forecast was requested.
- o Cellular, Advanced Cellular, ESMR, and New PCS share similar service descriptions. Although at the point of licensing these services may not all provide the same set of capabilities, it can be assumed that over time each will meet their full range of capabilities as described in the *Service Descriptions* document.
- o Quantity of subscriptions was used; not quantity of subscribers. For instance, New PCS 1800 and other listed services may include a pager for call notification. Subscribers for such multiple services were counted as both a New PCS 1800 customer, for example, and a paging customer. When a single customer uses more than one type of service, the customer is included in each service count as one subscription.

Service Specific Findings

NEW PCS: Although New PCS will clearly start service later than other existing wireless services, dynamic growth is expected to continue for the next decade. With service deployment anticipated for approximately 1995, total penetration is expected to grow to 3.1% by 1998 (8.5 million subscriptions) and reach 10.4% penetration in 2003 (31.1 million subscriptions.) The Year 5 to Year 10 growth rate is projected at 264%, the highest maintained growth rate of the services studied.

PAGING: With a lower price point, demand for paging and messaging services will remain strong. Today's over 19 million subscribers are predicted to grow to 36.8 million by 1998, with a predicted total penetration of about 13%. (This indicates a 1993-1998 increase of 93.7%) Results suggest Year Ten penetration will reach close to 22%, indicating that over 46 million new paging/messaging subscriptions will be registered by 2003, many of which will be consumer or non-business. Paging maintains the largest market share, anticipating 65 million subscriptions in 2003.

CELLULAR: Demand for cellular services will increase dramatically from 13 million subscriptions in 1993 to 33 million in 1998, a 154% increase. Cellular penetration is expected to grow from a reported 5% penetration at year end 1993 to approximately 12% penetration in 1998 and 17.4% penetration in 2003. Cellular is predicted to have the second largest number of subscriptions in 2003: 52 million.

ESMR/SMR: Our respondents predict that ESMR/SMR use will be over 90% business based. Anticipated penetration in Year 5 is 1.9% (5.1 million subscriptions) representing a five year growth rate of about 246%. Year Ten results predict penetration of about 3% (8.9 million subscriptions). Customer premise equipment (CPE) prices are expected to be relatively high, (\$467 average in 1998, dropping to \$275 in 2003). This price level is second only to satellite CPE.

DEDICATED DATA: Anticipated to be positioned primarily for business users, our results show growth from 50,000 subscriptions in 1993, to 3.36 million in 1998, representing an increase of over 6600%. The results forecast about 5.6 million subscriptions by 2003. The

networks will provide added value through increased flexibility and mobility for those businesses that require such services.

SATELLITE: The highest priced of the PCS services examined, CPE price will be \$1200 in 1998. Satellite service will be over 98% business, and will serve about 1.3 million subscriptions by 1998, and over 4 million subscriptions by 2003. Although satellite networks may have the fewest subscriptions of those we examined, the Year Ten growth registers at 211%.

WIRELESS PBX: Wireless PBX data in our survey had a relatively wide variance of responses on CPE price, monthly service charge, and penetration. This may suggest some confusion within the industry about this products' relative positioning. Based on data received this report does not make any conclusions about WPBX services.

CORDLESS: Nominal growth in the cordless market is anticipated, the product will remain a primarily residential product.

PCS Technologies Forecast

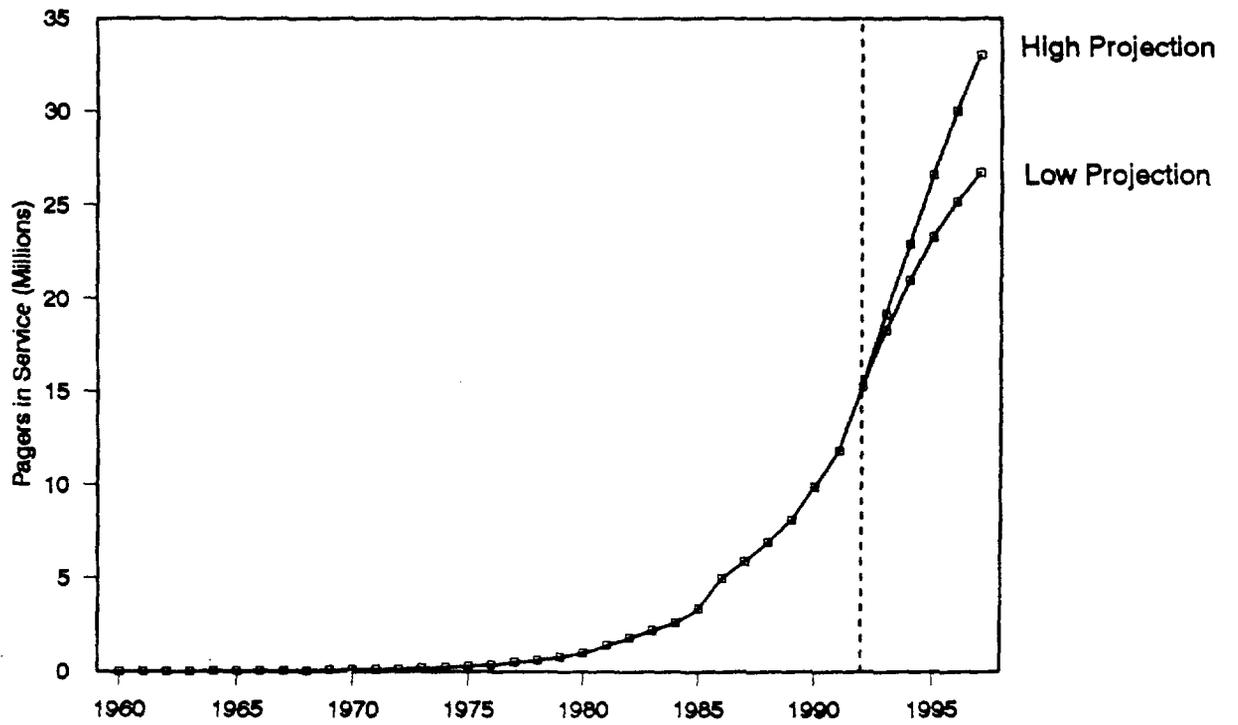
1993 - 2003

Service	1993			1998			2003		
	Subs. (millions)	Penetration (% of pop)	Subs. (millions)	Penetration (% of pop)	5 Yr. Subs. % Increase	Subs. (millions)	Penetration (% of pop)	5 Yr. Subs. % Increase	
New PCS			8.55	3.1%		31.11	10.4%	263.9%	
Satellite	0.1	.04%	1.32	0.5%	1224.0%	4.11	1.4%	210.8%	
Paging	19	7.4%	36.8	13.3%	93.7%	65.3	21.7%	77.4%	
Dedicated Data	0.05	.02%	3.36	1.2%	6630.2%	5.65	1.9%	67.8%	
Cellular	13	5.0%	33.07	12.0%	154.4%	52.3	17.4%	58.1%	
SMR/ESMR	1.5	.6%	5.19	1.9%	245.7%	8.95	3.0%	72.6%	
Total PCS Services	33.7		88.3		162.4%	167.4		89.6%	

The following US population figures were used: 1992/255 million; 1993/258.5; 1998/275.8 million; 2003/300.3 million.

Note: Total subscriptions includes individuals with multiple subscriptions across services (i.e. there are more subscriptions than subscribers).

**Figure 1.1 U.S. Pagers in Service, 1960-1997
(Millions of Pagers)**



Source: EMCI, Inc.

U.S. Pagers in Service, 1960-1997			
(Millions of Pagers)			
1960	0.01	1981	1.4
1961	0.01	1982	1.83
1962	0.02	1983	2.2
1963	0.02	1984	2.8
1964	0.03	1985	3.35
1965	0.03	1986	5
1966	0.04	1987	5.9
1967	0.05	1988	6.9
1968	0.08	1989	8.1
1969	0.08	1990	9.9
1970	0.1	1991	11.8
1971	0.13	1992	15.3
1972	0.16	1993	19.2
1973	0.2	1994	22.9
1974	0.25	1995	26.6
1975	0.32	1996	30
1976	0.4	1997	33.3
1977	0.51		
1978	0.64		
1979	0.81		
1980	1		

Recent statements from press on issue of PCS delay

Press, Analysts and Industry Players Comment on the Cost of PCS Auction Delay:

"Some PCS companies, including those who criticized the plan unveiled last September, now are alarmed at reports of lengthy delays. **They argue that pushing the auction into next year could hurt their businesses by giving cellular companies and other wireless technologies time to catch up...** Industry executives said they have warned the FCC that delays could complicate their financing plans and are causing companies such as MCI Communications Corp. to seek alternative technologies to establish wireless networks."

- *The Washington Post*, "FCC May Rethink PCS," March 24, 1994

"While MCI officials said they would still bid on many of those [PCS] frequencies when the auctions begin later this year or early next, today's deal made it clear the company would invest primarily in radio frequencies already controlled by Nextel. **That could mean bad news for the Clinton Administration, which has been predicting the Government will reap \$10 billion from auctions of the nation's airwaves.** But with one of the biggest potential bidders directing much of its money elsewhere, the auctions could yield far less."

- *The New York Times*, "MCI Plans Big Nextel Stake As a Move Into Wireless," March 1, 1994

"For each year that PCS is delayed, market penetration could be cut by as much as 15 percent..."

- Statement by Scott Schelle, American Personal Communications, quoted in *Advanced Wireless Communications*, "PCS Companies Prepare To Fight Battle of Their Lives," March 30, 1994, p. 1

"The agency, too, must be mindful of the **financial community, which could get the jitters if there are more delays** or if it perceives that PCS licensing and auction rules will not foster competition with cellular, specialized mobile radio and local landline telephone companies."

- *RCR*, "PCS Ruling May Get Second Look," March 28, 1994, p. 1

"Admittedly, the complexities of running the PCS auction are mind-boggling. But **until auction procedures are ironed-out, companies are unable to make technology decisions, plan geographic coverage or project when service can commence.**"

- *PCIA Journal*, "Analysts' Outlook: Will PCS Be DOA?" April 1994, authored by Eric Zimits of Volpe, Welty & Co.

"The MCI-Nextel deal 'likely' would depress PCS auctions across the board, according to principals with Lexington, Mass.-based Mercer Management Consulting. Mercer indicated PCS fell behind ESMRs in market position, resulting in a 40-percent reduction in auction prices and eliminating roughly \$2 billion in bid money. "The money the Clinton administration was expecting may be slipping through their fingers," said Mercer principal Dekkers Davidson."

- *PCS News*, "MCI Endorses Nextel For Being Faster to National Digital Wireless Than PCS," March 17, 1994, p. 3

"MCI now has a golden opportunity to beat future PCS competitors to market by marketing its own brand of wireless digital service this year. Licenses for broadband PCS are not expected to be offered until late this fall, at the earliest, or sometime in 1995."

- *Inside Wireless*, "Nextel is MCI's Wireless Answer," March 10, 1994, p. 6

"We think this is the big wireless play...This gives us a quick start now. Auctions could be delayed."

- Statement by MCI Chairman and CEO Bert Roberts, Jr., quoted in *Land Mobile Radio News*, "MCI Decides the Fastest Way to Digital Wireless is With Nextel," March 4, 1994, p. 1

"Mr. Barrett added, 'I believe that the Commission should be concerned that entities like MCI, Sprint [Corp.] and the [Bell companies] maintain their interest and willingness to invest in PCS. To the extent they view our process as complicated and fraught with regulatory delays and uncertainty, it is unlikely that our PCS decision will attract significant private capital for a long-term investment.'"

- *Telecommunications Reports Wireless News*, "Barrett May Seek Greater Flexibility for Cellular Carriers in 'PCS Recon,'" March 24, 1994, p. 1