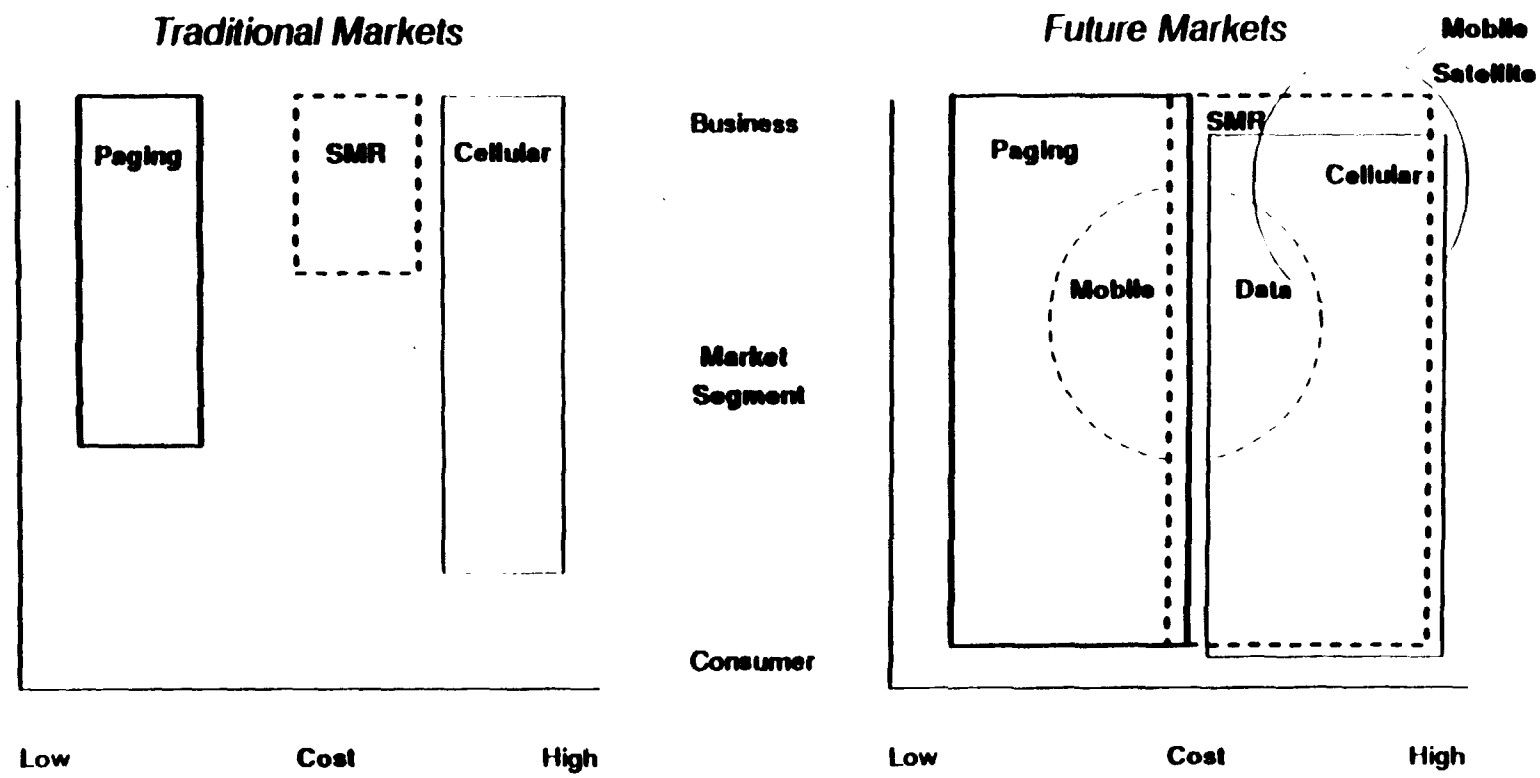
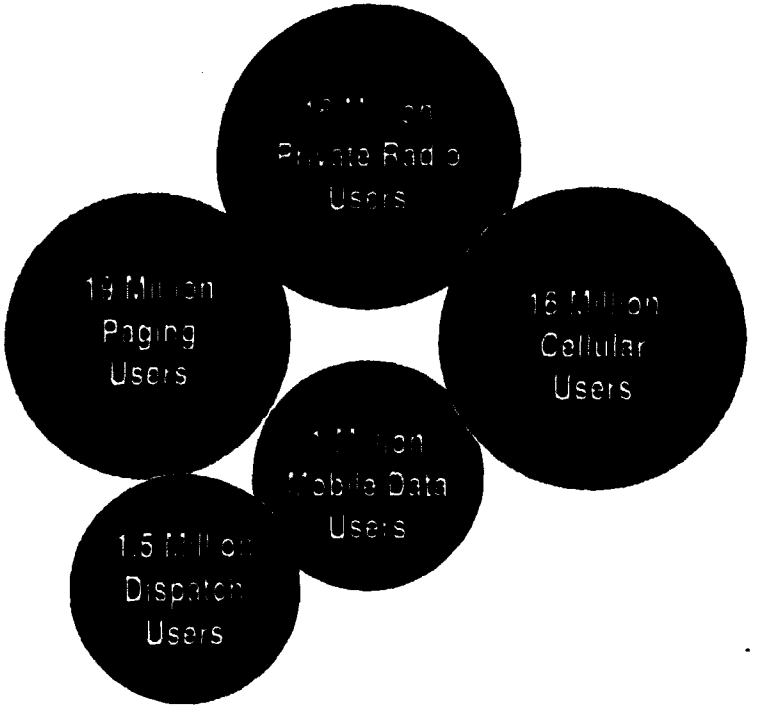
Figure 1. Mobile Communication Target Markets, by Technology



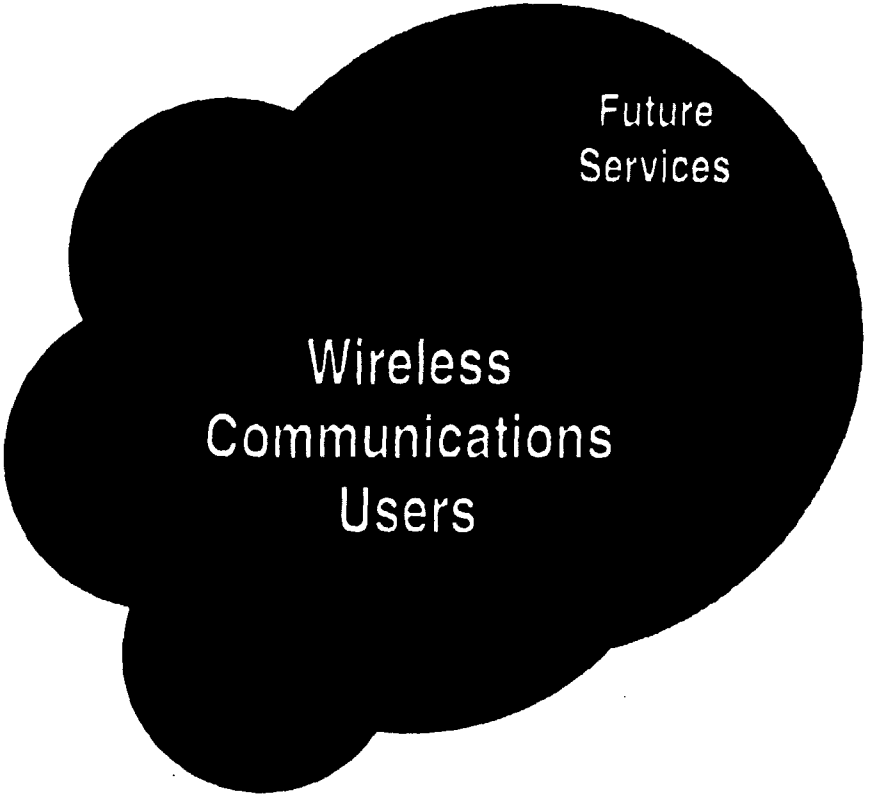
Note: Excludes PCS.
Source: EMCI, Inc.

Wireless Services

1993

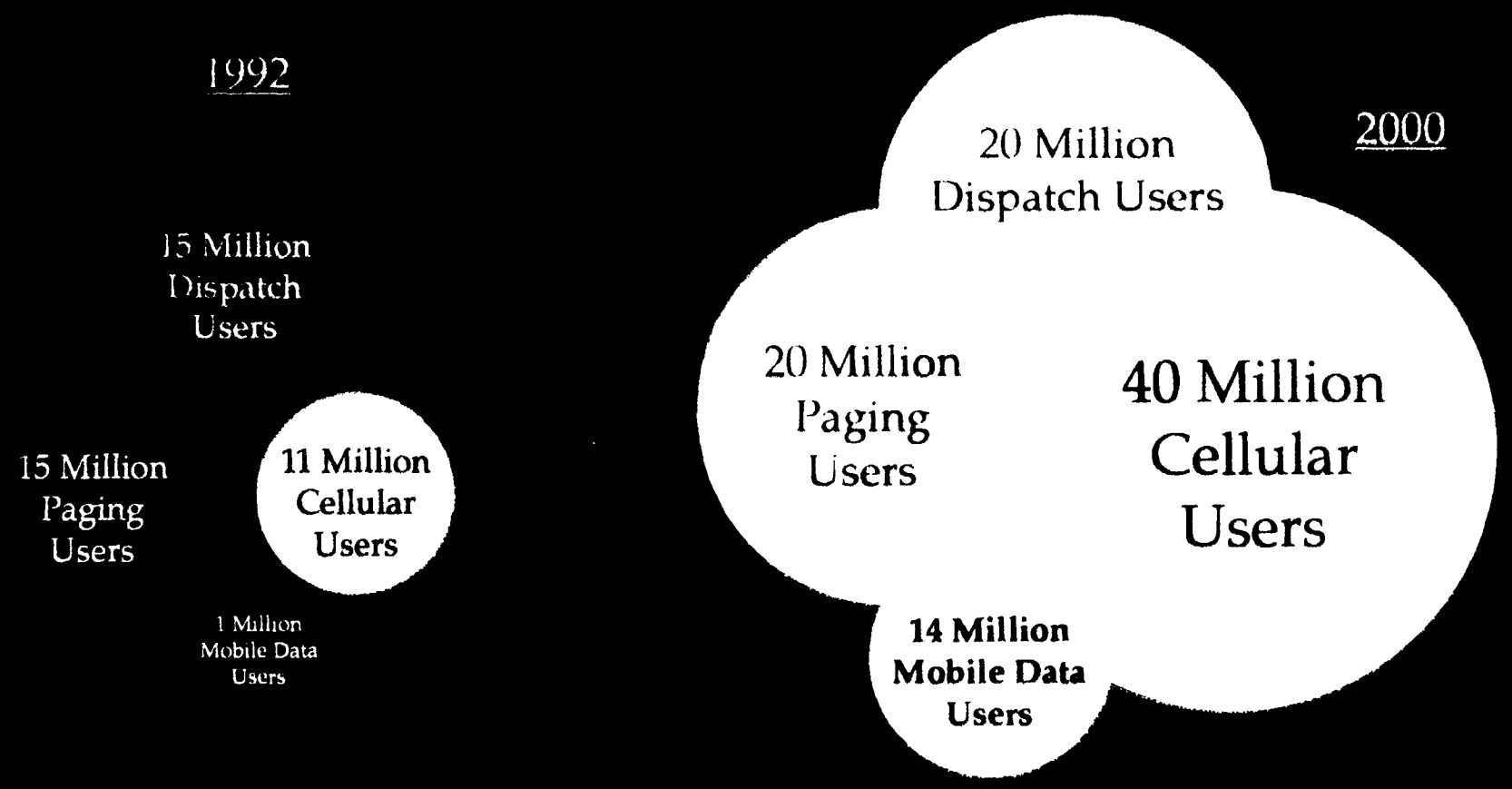


2000



DIAL PAGE

Integrated Services



Paging Origins

Paging had its origins in the simple signaling services of the 1940s and early 1950s. The allocation of additional frequencies and the development of new technologies have dramatically expanded capacity and capabilities. From tone paging, to alphanumeric and voice paging, hundreds of companies, large and small, are moving to meet the messaging needs of the growing consumer and business market. According to recent analysis, U.S. paging subscriptions grew from 15.3 million at year-end 1992 to 19.8 million by year-end 1993.

Sources: Huber, Kellogg, Thorne *Geodesic Network II* (1992), and EMCI.

In fact, Fleet Call (since renamed NEXTEL), Dial Page (via its Dial Call subsidiary), CenCall (since renamed OneComm), and other SMR companies moved to position themselves as the "third cellular carrier" in local markets across the country.[6]

The result, in under two years, has been the creation of a single powerful entity with a nationwide footprint -- NEXTEL Communications -- and a host of other ESMR and advanced SMR companies with regional or national ambitions. These companies include Geotek Communications (in the northeast), Pittencrief Communications (in the southwest), Racom (in the midwest), American Digital Communications (in the west and northwest), and many others.

Some SMR/ESMR companies (including NEXTEL, Pittencrief, OneComm and Dial Call) have adopted Motorola's MIRS (Motorola Integrated Radio System) technology in order to provide integrated services, from dispatch and messaging services, to voice telephony. Geotek uses a different technology, Frequency Hopping Multiple Access (FHMA), while other SMRs (including Racom in the midwest, and a consortium of California SMRs) use Ericsson's Enhanced Digital Access Communications System (EDACS) to provide voice and data services for a wide range of commercial, industrial, agricultural and public safety users.[7] These digital technologies allow less spectrum to yield greater capacity, thus reducing the power of spectrum scarcity to constrain subscriber numbers.

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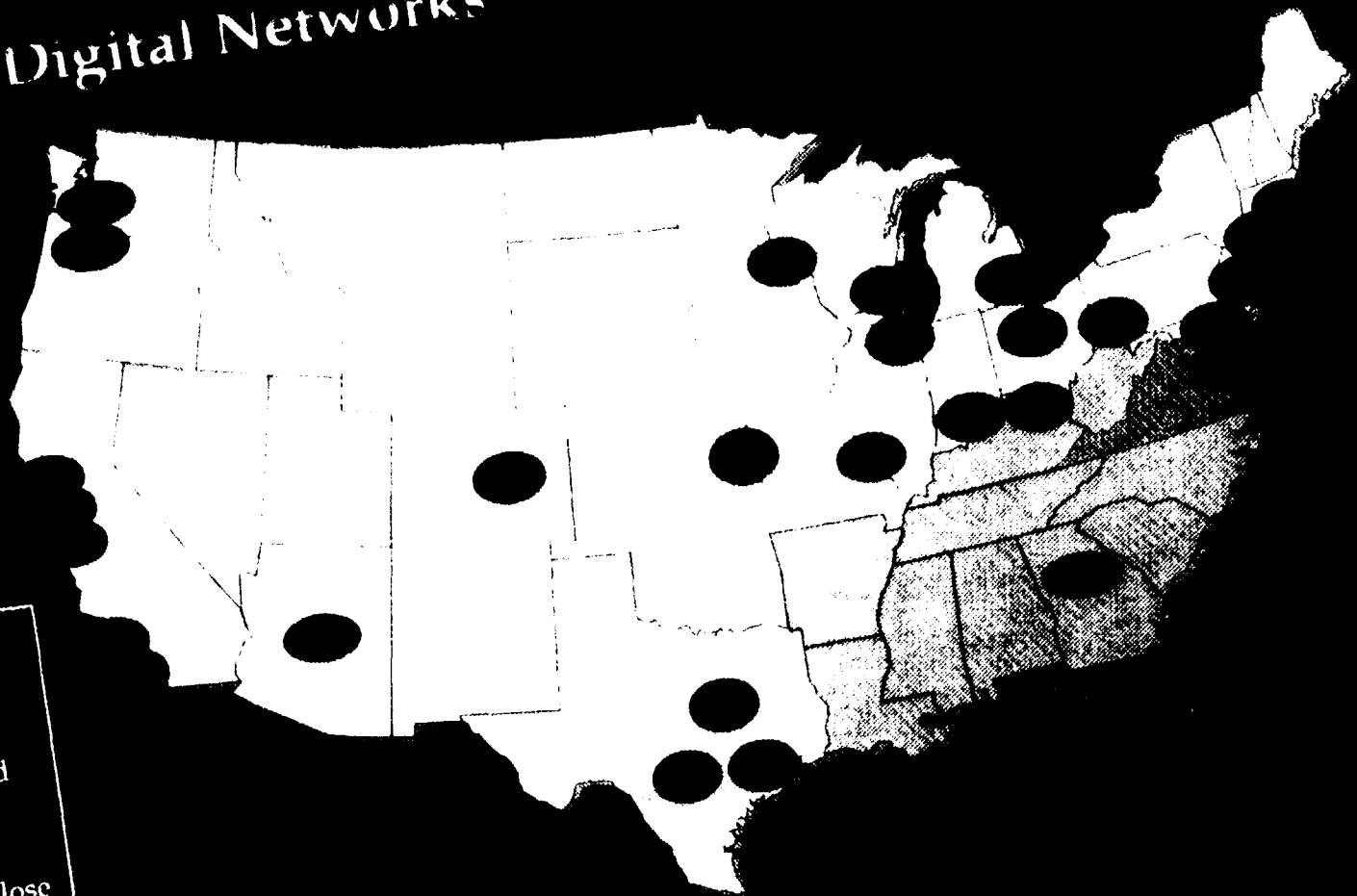
[6] *See* Merrill Lynch Capital Markets *Telecommunications/Cellular Industry Report*, August 17, 1993, at p.2.

[7] *See* Anne Lindstrom "Extending SMR's Reach -- Digital Technology will Mean Integrated Voice and Data," *Communications Week*, June 6, 1994, at p.33. *See also* "Ericsson's EDACS SMR Network to Serve Seven States in USA," *Regulatory News Service*, October 12, 1993 (noting Racom plans for midwestern/northwestern SMR system) and "Six California SMRs Taking 'Unique' Approach to Wide-Area Digital Dispatch," *Land Mobile Radio News*, July 15, 1994.

ationwide Digital Networks



- Cen Call
- NEXTEL
- Dial Call
- Dial Call and NEXTEL

Pro Forma: Subject to close of announced transactions

Top 30 MSA Markets

At the same time, the FCC's establishment of Personal Communications Services (PCS) has created an additional six broadband licenses for each area (two MTA-based, and four BTA-based), and an additional 26 narrowband licenses for each area (eleven nationwide, six regional, seven MTA-based and two local BTA-based licenses), effectively abolishing any federal licensing barriers to entry to the wireless marketplace.

These additional licensees will be capable of offering a full panoply of wireless services -- from advanced voice paging, two-way acknowledgment paging, data messaging, one-way and two-way messaging and facsimile, to cellular-like voice and broadband data services, wireless PBXs and local area networks.[8]

Companies previously viewed as operating in separate and distinct markets are positioning themselves to compete in the broad wireless marketplace -- or to enable others to compete more vigorously. Satellite-based systems like American Mobile Satellite and Iridium are preparing to offer mobile services across the United States. American Mobile Satellite, in particular, has approached the SMR community to form partnerships, making possible pervasive coverage -- extending service areas and "making SMR customers the ultimate roamers."[9]

Cable and utility companies propose to use their facilities as platforms for wireless messaging, either as PCS licensees, like Cox Communications, or as backbone providers, like Baltimore Gas & Electric, Phillips Broadband Networks, and the Tampa Electric Company.[10] Broadcast television companies are also agitating to apply 6 MHz of broadcast spectrum to the provision of wireless communications.

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[8]*See First Report and Order, Amendment of the Commission's Rules to Establish New Narrowband Personal Communications Services*, GEN Docket No. 90-314, 8 FCC Rcd. 7162, at para. 1 (1993). *See also Second Report and Order, Amendment of the Commission's Rules to Establish New Personal Communications Services*, GEN Docket No. 90-314, 8 FCC Rcd. 7700, at para. 22 (*Broadband Order*) (1993).

[9]"AMSC Exploring Manufacture of SMR-Satellite Terminal," *Land Mobile Radio News*, February 18, 1994.

[10]*See e.g.*, "Omnipoint, Phillips Join for Cable-Based PCS Trial," *PCS News*, July 20, 1994. *See also* "GSM Provides Good Coverage for Cox Enterprises," *Microcell News*, June 25, 1994, at p.1, *and* "New Motorola Technology Allows Wireless Calls Over Cable, *Microcell News*, *id.*, at pp.3-4. *See also* Herbert A. Cavanaugh, "Information Superhighways are Under Construction at Many Electric Utilities," *Electrical World*, February 1994, at pp. 5 *et seq.*

The Competitive Dynamic

The reality of competition in the wireless marketplace is recognized throughout the industry. Senior Editor Jane Bryant of *Mobile Satellite News* observed of the many players attending *Wireless '94* that:

> *With cellular, enhanced specialized mobile radio (ESMR), personal communications services (PCS) and mobilesat vying for a piece of the wireless pie, speakers addressed methods to compete and win. A resounding "the customer doesn't care what type of network service derived [from] but desires high-quality and ease of use" rang throughout sessions here as a philosophy to adopt to survive the competitive fray.*[11]

MCI Wireless Communications Service Director of Business Development Rick Calder has declared that ***"Fierce competition is expected. . . . 'One of the things that has drawn us into wireless is its incredible growth opportunity.'"***[12] Dennis Strigl, Bell Atlantic Mobile Systems' President and CEO, concurs, declaring: ***"Most of us have known this is a tough, competitive industry . . . with more on the way."***[13]

Cellular Origins

In a departure for common carrier telephony, the cellular industry was created in the 1980s with two-facilities-based providers in each geographic service area. These companies were allocated a total of 50 MHz of spectrum in the 800 MHz band. Resale requirements were imposed to ensure that competition would be possible prior to the build-out of a second facilities-based provider. And the objective was attained: hundreds of companies entered the market, built-out their systems, and pursued customers -- building a nationwide subscribership of over 16 million in ten years.

And this success was enjoyed not only by facilities-based cellular providers, but also by pure resellers. Nationwide Cellular Service, Inc., the premier reseller, has over 211,000 subscribers -- making it rank fifteenth in the industry when compared with over 350 facilities-based cellular companies.

Sources: CTIA, Nationwide Cellular Service, Inc.

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[11] "Cellular-Mobilesat Union Gains Momentum," *Mobile Satellite News*, March 14, 1994.

[12] *Id.*

[13] *Id.*

Phil Evans, Vice President of Telecommunications of Perot Systems Corporation in Dallas, has concluded that "there is a lot of competition."[14] As Jamie Wexler of *Network World* observed: "Evans and others point[] to a wireless market brimming with existing and would-be suppliers and offerings."[15] Wexler cites NEXTEL, MTEL's two-way Destineer (Nationwide Wireless Network), ARDIS and RAM Mobile Data Packet radio networks, and the imminent PCS licenses as examples of the dynamic variety of choices the wireless marketplace offers.[16]

Earlier this year, Tom Stroup, then President of the Personal Communications Industry Association, concluded that: ***"Cellular, PCS and specialized mobile radio services undoubtedly will compete for many of the same customers."***[17]

And Brian McAuley, NEXTEL's President and CEO, has declared: ***"I see a market where wireline battles wireline, cellular battles cellular, dispatch goes against dispatch, and all network forms compete against all other systems of communications."***[18]

Mike Hirsch, Vice President of Geotek Communications, has stressed that SMRs interested in competing with cellular companies need to focus on a growth strategy to attract customers. *"As prohibitions are eliminated on providing phone, data, dispatch or whatever, each provider is going to have to come up with its arguments on choosing from SMR, ESMR, PCS or mobile satellite services. The key to success for any operator is who provides what kind of service and for how much."*[19] But strategy should not be confused with the demarcation of distinct product markets.

In choosing a strategy, as Tern Systems Inc. noted in a recent study, SMR operators "seeking to compete for cellular customers" can compete on the bases of (1) capacity, (2) coverage area, (3) cost, and (4) connectivity. The author, Walt Tetschner, told *Land Mobile Radio News* that: *"'Cellular subscribers are likely to find*

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[14]Jamie Wexler, "AT&T/McCaw Restrictions a Mere Formality," *Network World*, July 25, 1994, at p.33.

[15]*Id.*

[16]*Id.*

[17]James W. Crawley, "Communications Systems Are About to Get Real Personal," *San Diego Union-Tribune*, March 6, 1994, at p.I-2.

[18]"Competition Heats Up in SMR Race with Cellular for Customers," *Land Mobile Radio News*, February 15, 1994.

[19]*Id.*

alternatives in the near future. Clearly one of the most dynamic possibilities is enhanced SMR. . . . ESMR has the potential to improve service and get better pricing, which should motive the cellular carriers to accelerate digital deployment.'"[20]

Mark Lowenstein of the Yankee Group has described one such strategy by positing that: "ESMR providers hope to convince heavy cellular users and dispatchers to make additional investments in terminal gear by offering them [a] service which integrates voice, messaging, paging and dispatch capabilities" -- competing on the basis of functionality and not price.[21]

In fact, while equipment costs for integrated ESMR units may be higher than for analog cellular hardware, ESMR providers are committed to making the most of their competitive opportunities. As is described below, Pittencrief Communications has adopted an equipment leasing strategy to make ESMR units price competitive with cellular units.[22]

Indeed, Pittencrief confidently expects that their *"wireless communications services [will] appeal to a broad market including current cellular and SMR mobile telephone and dispatch customers, as well as other users of wireless communications services."*[23]

Morgan Stanley's March 1994 *Global Telecommunications Quarterly: Brave New Wireless World* concluded "the near-term alternative to cellular will be SMR . . . . [as] licenses used for these frequencies are being accumulated and turned into nationwide networks, which are then enhanced with the capacity to provide telephone interconnect as well as fleet dispatch, paging, and data transmission."[24]

And a recent report by EMCI -- *Positioning SMR in a PCS Marketplace* -- suggests that the SMR industry is well-positioned to provide affordable next-

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[20]"Study Peg Four Key Categories for Attracting New Wireless Customers," *Land Mobile Radio News*, June 17, 1994.

[21]Anne Lindstrom "Extending SMR's Reach -- Digital Technology will Mean Integrated Voice and Data," *CommunicationsWeek*, June 6, 1994, at p.33.

[22]*See* Pittencrief 1993 S.E.C. 10-K Report at p.14.

[23]*Id.*

[24]*Global Telecommunications Quarterly: Brave New Wireless World*, March 21, 1994, at p.38.

generation wireless service.[25] Twenty-three percent of the industry intends to implement digital technology in the next year, increasing capacity, and supporting a broad variety of voice and data messaging services.[26]

Looking beyond cellular-SMR competition, Action Information Services of Falls Church, VA, has concluded that *PCS will succeed "even with competition from other wireless services such as cellular, paging and enhanced specialized mobile radio."*[27]

Competition is Here and Now -- Not Just a Distant Prospect

Even though the broadband PCS auctions will not occur until later this year (nor be complete until 1995), the impact of those licenses should be swift and near. Scott Schelle, Executive Vice President for American Personal Communications, told investors at Donaldson, Lufkin & Jenrette's June 1994 Wireless Conference that PCS will happen sooner than skeptics think. In fact, according to Schelle, clearing microwave incumbents takes no more than six to nine months,[28] and APC's system will provide coverage to 80 percent of the Baltimore/Washington MTA on its first day of operations. As APC Vice President Anne V. Phillips recently noted, though PCS systems must deploy more base stations than comparable cellular systems, "'you're increasing capacity that way, and have better in-building coverage. It also costs less per base station, although you need three times as many, so it's a wash' in terms of cost."[29]

The result: PCS will be up and running in less time than anticipated. Indeed, PCS advocates have argued for immediate action throughout the FCC's proceedings -- emphasizing their eagerness to enter the competitive fray.

Likewise, while a number of issues remain to be resolved, ESMR and SMR service providers -- who already serve over 1.5 million subscribers -- are poised to roll-

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[25]"Study Says SMR Operators Have Headstart on Competing Technologies," *Land Mobile Radio News*, April 1, 1994.

[26]*Id.*

[27]"PCS Reaches 17.9 Million Subscribers by 2005," *Advanced Intelligent Network News*, June 1, 1994.

[28]*See* Paul Kagan Associates, *Wireless Telecom Investor News Bulletin*, June 22, 1994, at p.2.

[29]"Tests Begin on GSM for Personal Communications Service," *Newsbytes*, July 20, 1994.

out advanced services in short order. While not all of their existing subscribers will convert to ESMR service, they are a base from which ESMRs and advanced SMRs already have begun extending service. And as Lynda Runyon, a securities analyst at Merrill Lynch & Co., observed: *"The network is coming together faster than originally anticipated as other SMR carriers start to upgrade their digital mobile networks."*[30]

For example, *earlier this year NEXTEL announced its all-digital, integrated wireless communications services are now available in Los Angeles, San Francisco and Sacramento and that they would "become available throughout virtually all of California during 1994."*[31] NEXTEL's service areas encompass over 180 million pops.[32]

NEXTEL is constructing some 2,000 cell sites in its network (half of which are already being completed), and plans to construct more than 4,000 cell sites over the next five years. It has ordered some $ 200 million in additional system infrastructure to be deployed in its San Diego, New York, Chicago, Boston, Detroit, and Baltimore/Washington markets.[33] In fact, *NEXTEL plans to offer ESMR service throughout California, and in Chicago and New York, by the end of 1994.*[34] *NEXTEL's network is scheduled to be operational in the top 50 U.S. markets by the end of 1995.*[35]

OneComm, which signed agreements in principal to merge with NEXTEL earlier this year, has pressed forward with the acquisition of core channels in markets throughout the midwest and northwest. These acquisitions have bolstered OneComm's presence in the midwest, including the Ohio valley. *OneComm's service*

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[30]John Q. MulQueen, "SMR Nets Are Going Digital," *CommunicationsWeek*, September 27, 1993, at p.PNU3.

[31]NEXTEL Communications, Inc., 1994 Annual Report 2 (1994). *See also* "NEXTEL Announces Full Commercialization of its All-Digital Integrated Wireless Communications Network in Los Angeles," *Business Wire*, May 18, 1994.

[32]"Motorola Could Strengthen Strategic Position of MIRS Technology Following Merger of Major SMR Companies," *Mobile Phone News*, August 15, 1994, at p.1

[33]"NEXTEL Installs All-Digital Integrated Wireless Communications Network in Los Angeles," *RBOC Update*, September 1994.

[34]Anne Lindstrom "Extending SMR's Reach -- Digital Technology will Mean Integrated Voice and Data," *CommunicationsWeek*, June 6, 1994, at p.33.

[35]Joanie Wexler, "NEXTEL Stockpiles Spectrum; Buys Motorola SMR Licenses, Merges with Dial Page," *Network World*, August 8, 1994, at p.6.

areas currently cover 54 million pops in 23 states,[36] *and its activation plans call for turning up service for 22 million pops in 1994.*[37]

OneComm turned-up service on Colorado's Front Range in July, and will begin offering service in Seattle and Portland in September. Over the next year, OneComm plans to build out its network westward through Colorado to Cheyenne, Wyoming.[38] OneComm expects to offer its ESMR service in Kansas City, Oklahoma City, Tulsa and Wichita in the fourth quarter of 1994, and in Phoenix, Minneapolis/St. Paul and St. Cloud by the second quarter of 1995, and its build-out in the last three markets is ahead of schedule.[39] In the eyes of OneComm CEO Stephen W. Schovee, *"the traditional duopoly between two cellular companies for wireless communications services is finished."*

As OneComm's President Justin Jaschke declared a year ago: *"The increased capacity, enhanced features, and high-quality service made possible by digital technology will allow [OneComm] to effectively compete with cellular service."*[40]

Dial Call has also signed a merger agreement with NEXTEL,[41] and *has moved forward with its plans to build an ESMR network extending throughout 13 states in the southeast, running from Florida through Louisiana and South Carolina.*[42] *Dial*

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[36]"CenCall's Latest SMR Activity Extends Network to 54 Million Potential Users," *Land Mobile Radio News*, April 19, 1994. *See also* "Motorola Could Strengthen Strategic Position of MIRS Technology Following Merger of Major SMR Companies," *Mobile Phone News*, August 15, 1994, at p.1

[37]"The Denver Connection," Paul Kagan Associates *Wireless Market Stats*, June 30, 1994, at p.13.

[38]Dinah Zeiger, "OneComm Corp. Ready to Tackle Cellular Telephone Giants," *The Denver Post*, June 23, 1994.

[39]"CenCall Changes Name to OneComm, Confirms Plans to Initiate Digital Service in Second Quarter," *PR Newswire*, February 16, 1994. *See also* "OneComm Rolls Out Commercial Service Along Colorado Front Range," *PR Newswire*, July 19, 1994.

[40]"CenCall Communications Corp. Announces Initial Public Offering of 4,750,000 Shares of Common Stock," *PR Newswire*, August 11, 1993.

[41]"NEXTEL Reaches Merger Agreements with Motorola and Dial Page, Further Strengthening its Continent-wide Wireless Network," *Business Wire*, August 5, 1994.

[42]"Dial Page Adds to Management Team," *PR Newswire*, August 19, 1994.

Call's service areas cover 72 million pops, and construction is underway, with commercial ESMR services to be available in four states in 1995, ten states in 1996, and all 13 states in 1997.[43]

Pittencrief Communications *will begin construction of their MIRS network in Texas, New Mexico and Oklahoma in the last quarter of 1994, and build out the remainder of their markets in 1995.*[44] Earlier this year, Pittencrief bought channels in Tucson and Phoenix, Salt Lake City, and Las Vegas, expanding their footprint to provide coverage "from the Gulf Coast to Nevada."[45] Pittencrief's service areas cover more than 18 million pops.[46]

Geotek Communications *plans to roll out its GeoNet SMR systems in 35 major markets next year*, using its FMHA digital spread-spectrum technology,[47] providing integrated voice, data, dispatch, telephony and fleet management services."[48] Geotek's service areas cover 80 million pops.[49]

And a multitude of other wireless providers are turning on their systems and offering service every day. For example, in June, 1994, Metrocom Inc. launched its Ricochet Micro Cellular Data Network (MCDN) -- a high-speed, low-cost regional wireless network -- that is already providing service in the Silicon Valley, in 1994,

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[43]*See* President's Letter to Shareholders, *Dial Page Inc. 1993 Annual Report.*

[44]"Around the Country: Texas, New Mexico & Oklahoma ESMR Expansion," *Mobile Product News*, August 1994, at p.35.

[45]"Pittencrief Grabs 600 SMR Channels for $ 57.8 Million," *Land Mobile Radio News*, April 29, 1994.

[46]"Pittencrief Revises Restructuring Terms with U.K. Parent and Announces 1993 Financial Results," *Business Wire*, March 24, 1994.

[47]"Motorola Could Strengthen Strategic Position of MIRS Technology Following Merger of Major SMR Companies . . . FMHA is a Competing Technology," *Mobile Phone News*, August 15, 1994, at p.2

[48]"Geotek Finding Opportunities in European SMR Markets . . . Has Big Plans for Technology in the United States," *Land Mobile Radio News*, June 3, 1994.

[49]"Motorola Could Strengthen Strategic Position of MIRS Technology Following Merger of Major SMR Companies . . . FMHA is a Competing Technology," *Mobile Phone News*, August 15, 1994, at p.2

with nationwide coverage scheduled for 1996.[50]

Taking to heart Geotek Vice President Mike Hirsch's recommendation of strategic focus, SMR companies are adopting a variety of strategies. SMR Advisory Group and A.K.s. DAKS recently turned-up a 220 MHz SMR system focused on providing wide-area dispatch. Wyoming-based American Digital Communications and six California SMR companies (Cook Communications, Applied Technology, Hi Desert Communications, Dial Communications and Bay Area Service Center), have formed a wide-area SMR consortium focused on 220 MHz SMR.[51]

In separate developments, on April 4, 1994, Wireless Plus Inc. announced that the first of its 28 220 MHz SMR systems was turned-on in Oakland, California. Wireless Plus' construction plans call for their network -- covering the Central Valley and major metropolitan areas of California -- to be completed by October. Wireless Plus described their goal as being "a major provider of land mobile service to the business community for fleet management."

And SIMROM Inc. has signed management agreements for another nationwide network of 220 MHz SMR systems, to be known as "Roamer One." As of May 1994, over 120 SMR licensees had agreed to form part of the Roamer One network.[52]

What is making this profound reformation of the wireless marketplace possible?

A Contestable and Competitive Market

The rapid growth in demand for wireless services over the past decade has produced both a broad awareness of them on the part of the consuming public, and a broad pool of expertise on the part of service providers. The sophistication of both consumers and providers accentuates the substitutability of these products and services -- from both supply and demand perspectives. The mix of features and functions at various costs permits customers to choose the packages of services

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[50]Nathalie Welch, "Regional Wireless Network Goes Live," *MacWEEK*, June 22, 1994.

[51]*See* "Basic Dispatch As Old Market Offering New Opportunities," *Land Mobile Radio News*, July 29, 1994.

[52]"Roamer One SMR Network Adds 120 License Sites," *PR Newswire*, May 11, 1994.

which they desire -- at the prices they deem reasonable.[53]

Thus, cellular users may prefer to have more functions at a higher price than a paging unit, or may prefer the less expensive paging unit which places the decision to accept or return a call on the called party. ESMR promises to provide multiple voice and data functions to a consumer at a discount against the cost of multiple units with separate functions -- as both Dial Call and OneComm have stressed. And PCS, in turn, and many wireless devices supported by a host of systems, provide even more choices to the consumer -- mixing precise functions and prices, and leaving the choice to the consumer.

The many PCS trials and demand studies performed by would-be players in the wireless marketplace -- and submitted or described to the Commission in the PCS proceeding, and at the PCS panel discussion held in April 1994 -- make clear the commitment of these many providers to finding the broadest possible customer base for wireless service. This base may reach as many as 167 million users by the end of the decade, according to some analyses.[54]

According to Dr. Stanley M. Besen of Charles River Associates:

> ***Under reasonable conditions, all firms licensed to provide wireless telecommunications services -- including companies supplying cellular services, PCS, and ESMR services -- should be considered to be competitors in the same antitrust market. The key to this conclusion is that providers of mobile telecommunications services are legally able to provide a range of services and will be able to move from one to another rapidly and at modest cost. If firms can easily offer any of a wide range of services, they are in the same market.***[55]

Factors relevant to this flexible dedication of plant and resources include: (1) absence of legal/regulatory restrictions, (2) fungibility of spectrum at roughly

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[53]Pepsi-Cola and National Brand Beverages Ltd. made the precise analysis of incremental costs described by John Caner of NEXTEL in evaluating cellular's and SMR's abilities to meet their needs. *See* "The Role of Mobile Data Demand," *infra*, at p.23. *See also* "Pepsi-Cola Distributor Embraces Racotek Mobile Data Dispatch System," *Land Mobile Radio News*, July 8, 1994.

[54]PCIA, "1994 PCS Market Demand Forecast," January 1994, at p.1.

[55]Dr. Stanley M. Besen, "Competitive Issues in the Mobile Telecommunications Market," prepared for the FCC's Panel Discussions on PCS Issues, April 7, 1994, at p.4. *See also* Besen and Burnett, "An Antitrust Analysis of the Market for Mobile Telecommunications Services," December 8, 1993, at pp. 16-24.

comparable costs, (3) flexibility of provider equipment, (4) flexibility of subscriber equipment, and (5) demand substitutability.[56]

While some applications may be subject to constraint (and it is ironic that such restraints may take the form of entry and exit regulations purportedly adopted to protect the public), the spectrum is essentially fungible. Whether at 220 MHz, 800 MHz or 1.8 GHz, the spectrum is capable of delivering service.[57]

Moreover, the various alliances of PCS, ESMR and cellular companies demonstrate an acute awareness of the need to adapt their service offerings (and to construct and operate cost-efficient networks) for the increasingly competitive marketplace. As a result, it is becoming clear that provider equipment will be flexible and that the spectrum therefore is fungible at comparable cost.

Subscriber equipment is also becoming more flexible as the efforts of manufacturers and service providers are being bent to creating and marketing multifunction units for companies like U S WEST Cellular, OneComm, NEXTEL, Dial Call, Racom and Geotek.

Customers do not have a sunk investment tying them to a specific service or provider. Where not inhibited by inconsistent state regulation, cellular companies have packaged customer equipment and service to attract new customers. As a result, the price of equipment does not constrain customer choice.[58]

In fact, customers are free to change providers or services without incurring a significant equipment cost. Indeed, the record of the industry indicates not only that it is growing, but that customers can and do change providers. EMCI's annual report on the cellular industry, *U.S. Cellular Marketplace, 1993*, indicates that the annual cellular churn rate was 24.36 percent -- one-third of which was attributable to

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[56] *Id.*

[57] *See* Letter from Randall S. Coleman, CTIA, to William F. Caton, Secretary, FCC, dated May 3, 1994 transmitting "Technology Briefing Book" used in Ex Parte Presentation with Commissioner Andrew C. Barrett and Senior Legal Advisor Byron F. Marchant.

[58] As the Commission found in its *Report and Order* on *Bundling of Cellular Customer Premises Equipment and Cellular Service*, 7 FCC Rcd. 4028 (1992), and as both the Department of Justice and the Staff of the Bureau of Economics of the Federal Trade Commission concurred, packaging of service and equipment is "an efficient promotional device which reduces barriers to new customers and which can provide new customers with CPE and cellular service more economically than if it were prohibited." 7 FCC Rcd. at 4030 para. 19.

changing service providers. Of the remaining churn, 27 percent was attributable to moving or job changes, and 24 percent was attributable to "insufficient usage."[59]

Other industry surveys which also track churn indicate that total customer disconnection rates actually run at about 18 percent a year. These surveys indicate that over the past two years, annual total disconnection rates (including those terminated for non-payment) have been:

1992 - 18.3 percent

1993 - 17.7 percent

These churn rates clearly demonstrate the ease with which customers can (and do) change providers or discontinue service if they so desire.

Pittencrief Communications has an equipment leasing program intended to lower the cost of ESMR equipment to their customers; proving that the lesson of equipment affordability has not been lost on the ESMR market.[60] (PCS providers like American Personal Communications have also indicated that their subscriber units will be priced comparably with digital cellular units.)

The linkage of cost savings and functional gains emphasized by NEXTEL, OneComm, and Dial Call also affirms this provider awareness -- as does the competitive response of cellular carriers like U S WEST Cellular and McCaw.[61]

And while paging services traditionally functioned as one-way messaging, and have used far less spectrum than cellular or SMR telephony, the evolution of new features and functions, and their advantageous cost and price relationship with wireless voice telephony make them a clear supply substitute for some cellular and ESMR subscribers.

The pattern of uses to which paging units are increasingly subject in the growing consumer market (including the intended signaling function, whether or not the called party will be returning the call with a landline or mobile phone) suggests that paging -- and increasingly, advanced voice and data messaging services -- are

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[59]EMCI, *U.S. Cellular Marketplace, 1993*, at pp.34-35.

[60]*See* Pittencrief Annual 10-K Report, at p.14

[61]*See e.g.*, Paul Kagan Associates *Wireless Market Stats*, June 30, 1994, at p.13.

also a demand substitute for cellular services.[62]

For example, PageNet "owns and operates the country's most extensive nationwide digital transmission network which covers more than 90 percent of the U.S. population. PageNet provides local, regional and nationwide paging services and it currently has more than 3.3 million pagers in service. PageNet also provides news and stock updates, voice mail, fax forwarding and wireless data transmission to palmtop computers."[63] And new narrowband PCS applications -- such as acknowledgment paging, verification and locator services, telemetry and voice messaging -- "are likely to emerge within 18 months."[64]

Of course, the degree to which these services -- cellular, SMR, ESMR, PCS and paging (and land mobile radio generally) -- are close substitutes will be best demonstrated by the market. The development of specific features and forms should be driven by customer demand, and not foreclosed or distorted by unnecessary restriction of either the number or classification of providers.

Congress and the Commission eliminated many barriers to entry by: (1) increasing the amount of spectrum available for wireless services, (2) increasing the number of licenses, (3) allowing licensees to adopt and deploy technologies which greatly expand the effective capacity of the spectrum, and (4) establishing parity for Commercial Mobile Radio Services.

This has ensured that (1) entry will be easy, (2) there will be (as there already are) many providers in the marketplace, and (3) no one firm will have a market share (measured in terms of market concentration based on effective capacity) inconsistent with competition.[65]

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[62]Michael Putzel, "Pagers' Popularity Soars as Prices Fall," *The Boston Globe*, May 11, 1994.

[63]"McCaw Cellular Communications Inc. Messaging Division to Resell PageNet's Paging Service," *Business Wire*, June 1, 1994.

[64]"New PCS Licensees Outline Application, Pricing Plans," *Network World*, August 14, 1994. *See also* "Two Way is the Way Ahead for U.S. Paging Operators," *FinTech Mobile Communications*," August 16, 1994; Bill Burch, "Narrowband PCS Spectrum Auction Brings in Big Bucks," *Network World*, August 1, 1994, at p.4 (noting that the investments by auction winners serve as strong incentives to rapid roll-out of service).

[65]*See* Besen and Burnett, "An Antitrust Analysis of the Market for Mobile Telecommunications Services," at pp.35-40, 40-46.

These accomplishments, however, will be at risk if the Commission allows parity to fall victim to inconsistent state action. The benefits of the competitive market may be lost if the Commission does not preempt inconsistent state regulation.

Customer Satisfaction

Cellular companies -- indeed the wireless industry as a whole -- seek to satisfy their customers, providing value for value.

And the American public -- personal and business users alike -- have responded. In just nine years cellular companies grew to serve 10 million customers, from 1983 to October 1992. And by the end of 1993 cellular subscribership grew to over 16 million customers. From December 1993 to July 1994, cellular subscribership jumped by 3.3 million, to over 19.2 million customers, a 49 percent annual growth rate.

From 1983 to 1993, paging subscriptions also skyrocketed, from 2 million to 19 million customers.

Both cellular and paging companies innovated over this period, implementing new technologies, and introducing new features and functions -- from cellular's simple but critical ability to call and be called regardless of location, to vertical features such as voice messaging and three-way calling, and paging's alphanumeric functions. Each has extended service -- reaching nationwide, from urban to rural America. Over this period, cellular companies invested in improvements in coverage, voice quality, and technical characteristics.

Since 1990, Economic and Management Consultants International (EMCI) has conducted quarterly "CELLTRAC" surveys regarding usage and non-usage of cellular. Based on their research, EMCI produced a report on "Customer Satisfaction with Cellular Service" for CTIA in November 1992. EMCI reported that:

> ***The result of our research shows that satisfaction with cellular service is very high, and compares equally with other mobile communications such as paging service.***

EMCI's research indicated that:

> ***Satisfaction with cellular service among users has been and continues to be at very high levels. [On a scale of one to ten,] satisfaction ratings were 7.76 in 1990, 7.8 in 1991, and 7.86 in 1992. . . . the distribution of consumer satisfaction ratings reflect the very favorable ratings. Over two-thirds of the scores are above a seven rating, with only 6 % below a five rating.***

The FCC's informal complaint data confirms the EMCI data. The FCC's own records show relatively few complaints have been received about cellular service. The following chart shows the distribution of informal complaints about cellular service both among the petitioning states, and nationwide, received from June 1993 through July 1994.

FCC Informal Complaint Log

	AZ	CA	CT	HI	LA	NY	OH	WY	50 States
Celco. Interst. Rates	0	3	1	0	0	2	0	0	26
Celco. Intrast. Rates	3	7	1	0	1	10	1	0	89
Celco. Quality	1	11	1	0	1	4	3	0	98
Celco. Gen'l	0	0	1	0	0	0	0	0	4
Celco. Roam Rates	1	1	0	0	1	1	1	0	28
Total	5	22	4	0	3	19	5	0	245

Source: FCC Common Carrier Bureau, Enforcement Division, Informal Complaints

The 245 cellular-related informal complaints received by the FCC over the past thirteen months can be contrasted with the 5,993 formal cable television rate complaints which were filed with the FCC for 1993, and the 9,000 informal cable television rate complaints which had been filed with the FCC by the February deadline for pre-September 1993 rates.[66] Similar comparisons may also be made with the complaint records of other services.

The Promise and the Pull of the Mobile Marketplace

This is all the more important because the potential of this broad wireless marketplace is so great that a legion of would-be providers are eagerly seeking to enter or expand their presence in it. Current wireless companies, broadcast and cable television companies, landline telephone companies, interexchange carriers, energy utilities and companies or investors from dozens of related fields are eager to play a role in the new wireless marketplace.

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[66] *See* "Cable TV Industry Seeks Rate Cut Accord; FCC Eyes Enforcement," *FCC Report*, April 7, 1994.

Companies like Pacific Telesis Group consider the potential of the wireless marketplace to be so great that divestiture of their cellular subsidiaries is preferable to exclusion or restriction based on the degree of their incumbency.[67] And the reentry of such experienced players guarantees strong competition. As Phil Quigley, Chairman and CEO of Pacific Telesis, declared: "We're determined to offer our customers a full array of telecommunications options, including wireless, to meet their mobile communications needs."[68]

Even companies which once exited the cellular and paging business because of perceived limits to their wireless opportunities have reconsidered, recognizing the vast potential of the wireless market. For example, MCI sold its cellular and paging licenses in the mid-1980s because it felt that its holdings "did not constitute a critical mass in the national market" for wireless services, but it has since sought to re-enter the market via several vehicles.[69]

In seeking to re-enter the wireless market, MCI first sought to persuade the FCC to establish a nationwide PCS license, and then tried to form a nationwide consortium with small local exchange carriers, before investing some $ 1.3 billion in NEXTEL.[70] While MCI has withdrawn from the NEXTEL deal, it nonetheless has re-affirmed its faith in the technology underlying NEXTEL's service, and its interest in the wireless marketplace.[71]

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[67]"Pacific Telesis Returns to Cellular Business," *Telecommunications Alert*, July 15, 1994 (announcing that Pacific Telesis would create a new wireless unit, Pacific Bell Mobile Services, to replace the AirTouch Cellular unit divested earlier in the year).

[68]"Pacific Telesis Earnings Reflect Cost-Cutting Efforts, Improving State Economy," *Business Wire*, July 20, 1994.

[69]*See MCI Annual Report to Stockholders, 1985*, at p.2. *See also* Elizabeth Tucker, "MCI Sells Cellular Radio Units," *The Washington Post*, August 13, 1985, at p.E1a.

[70]*See* "MCI Goes for 'Now' Wireless Technology for Nationwide Network," *Communications Daily*, March 1, 1994 ("For MCI, deal is a decided move away from piecing together nationwide wireless network through patchwork of PCS licenses it would have had to buy up during FCC's pending spectrum auctions. . . . Before FCC made final decision on how it would allocate spectrum, MCI made big PR splash, announcing that it had signed in principal some 150 companies that had pledged to work with it in designing and deploying nationwide wireless network.").

[71]Edmund L. Andrews, "MCI Severs Negotiations With Nextel: Motorola Disagreement Unravels Wireless Deal," *The New York Times*, September 2, 1994, at p.D4.

Entrepreneurial investors with experience in the wireless industry also have a keen interest in bidding on PCS licenses. As Steven A. Zecola, President and CEO of Columbia PCS (since renamed GO Communications Corp.), declared:

> The FCC has recognized the vision, creativity, talent and drive that entrepreneurs bring to the market -- and consumers will be grateful for the competition that we will bring to the cellular, local telephone and long distance industries.[72]

While some analysts are focusing on specific niche applications as strategies for entry, the spectrum is essentially fungible, and both current and potential providers view the licenses as opportunities to enter or expand their presence in a broad and effectively unitary market.[73] ESMRs like NEXTEL offer integrated packages of services over "SMR spectrum," while analysts like Dale Hatfield of Hatfield Associates have observed that narrowband PCS spectrum could be used to provide:

- Duplicates of current paging services;
- Advanced paging, including acknowledgment paging and digital voice messaging;
- Two-way messaging, "comparable to RAM Mobile, ARDIS and cellular digital packet data offerings;"
- Narrowband advanced mobile phone service (NAMPS); and
- Paging integrated with cellular and ESMR.[74]

And potential broadband PCS licensees, from American Personal Communications to Time Warner Telecommunications have described the possibilities of the PCS marketplace both in providing new competition for existing licensees and enhanced services for consumers.

Setting aside the occasional arguments for the deliberate design of distinct product markets and the assignment of market share as incompatible with the antitrust laws, the pleadings filed in the FCC's PCS proceeding by and large illustrate

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[72]"Columbia PCS Applauds FCC PCS Decision," *PR Newswire*, June 29, 1994.

[73]Indeed, providers of services to wireless companies recognize this unity. Comsearch recently merged its Mobile Transmission Planning and PCS Departments to create a Wireless Communications Division for development of PCS, ESMR and cellular systems. "Comsearch," *Land Mobile Radio News*, July 8, 1994.

[74]*See* "Paging Companies Consider Anteing Up for PCS Auctions," *Land Mobile Radio News*, June 24, 1994. *See also* Dale Hatfield, "Forging Your Identity in 900 MHz Narrowband PCS," *Business Radio*, July/August 1994, at pp.13-16.

a deep interest and faith in the rich potential of the wireless marketplace.

American Personal Communications, for example, declared that the Commission's broadband PCS decision:

> will permit PCS to compete vigorously with existing wireless services, provide competition to the local loop monopoly, create a wireless on-ramp to the emerging electronic superhighway, create 300,000 good new jobs, energize the telecommunications economy, and permit U.S. industry to leap to the forefront of a breathtaking international market for PCS.[75]

The Role of Mobile Data Demand

In fact, other shifts in the marketplace are also helping companies to redefine their mission. For example, the future of wireless communications is increasingly being defined as digital data transmission. And this is reshaping the wireless industry into a unitary market in which paging, SMR, cellular and other providers are competing directly in the delivery of wireless data services.[76]

Charles Nahebedian, Vice President of Product Planning for RAM Mobile Data, recently stated that in the wireless market *"Most of the competition today is voice communications. RAM offers a data-only service. People are finding that they can communicate much more effectively with data-only communications."*[77]

Analysts concur, concluding that the wireless data market is a vast potentiality, as they observe hundreds of would-be providers and current providers rapidly implementing networks and signing agreements to deliver wireless service.

For example, Qualcomm's OmniTRACS two-way mobile satellite communications system provides data capabilities with real-time communication

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[75]American Personal Communications Opposition to Petitions for Reconsideration, GEN Docket No. 90-314, filed December 30, 1993, at p.i.

[76]Dwight B. Davis, "Marrying Wireless Communications to Mobile Computing; Electronic Industry Looks to Radio- and Microwave-based Wireless Communications," *Electronic Business*, May 1993.

[77]Anne Lindstrom, "RAM Maps Out Wireless Future, *CommunicationsWeek*, August 1, 1994, at p.37.

between drivers and dispatchers.[78]

Likewise, Metricom Inc., which develops, manufactures and market products supporting regional data communications networks, using frequency-hopping, spread spectrum technology, plans to operate through its Wireless Services Division "low-cost, high-speed public wireless data communications networks for use in a broad range of personal computer and commercial applications."[79]

Metricom's Ricochet service, MTEL's Destineer (formerly Nationwide Wireless Network), the RAM Mobile Data network, ARDIS, Cellular Digital Packet Data, Racotek's SMR data services, and dozens of other networks and applications offer a wide range of choices to consumers of wireless data services.[80]

As *En Route Technology* has observed: *"The specialized mobile radio (SMR) industry long has been considered perfect for offering data services because of its dispatching applications. Last year was a significant turning point because of the*

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[78]*See* "Manfredi Motor Transit Co. Purchases OmniTRACS Services for its Fleet; National Liquid Bulk Carrier Selects Qualcomm's Satellite Communications System," *Business Wire*, August 9, 1994. See also "Anderson Trucking Converts to the OmniTRACS System; International Dry Van Carrier Selects Qualcomm's Satellite Communications System," *Business Wire*, May 26, 1994.

[79]"Metricom Awarded $7-Million Contract Extension by Southern California Edison," *Business Wire*, January 19, 1994. *See also* "Loring Wirbel, "Metro-Area Network Uses Unlicensed Radio-Technology; Wireless 'MAN' Services Bridge LAN, WAN," *Electronic Engineering Times*, July 5, 1994.

[80]Vernon P. Essi Jr. "Wireless Data: Where's the Technology Headed?" *Wireless Business & Finance*, August 9, 1994. *See also* "Two-way is the Way Ahead for U.S. Paging Operators," *FinTech Mobile Communications*, August 16, 1994; "Sprint Launches Wireless Data Services," *Reuters Business Report*, June 22, 1994 (announcing SprintNet services); "Racotek to Develop Mobile Data Services for AirTouch CDPD and Cellular Network; New CellSmart Feature to Access CDPD & Cellular Networks," *Business Wire*, June 22, 1994; Nathalie Welch, "Regional Wireless Network Goes Live," *MacWEEK*, June 22, 1994 (announcing launch of Metricom's Ricochet Micro Cellular Data Network using unlicensed frequencies in the 902 to 928 MHz band); "Motorola Seeks to Expand Data Experience Through ARDIS Network," *Land Mobile Radio News*, July 29, 1994; "CDPD (Cellular Digital Packet Data) Forum Created; Wide Range of Companies Joining Together to Guide CDPD Industry, *Business Wire*, June 28, 1994.

development of digital systems by Motorola."[81] *En Route Technology* also noted that defense contractors Westinghouse and Rockwell International have entered the wireless data market, and SMR companies like Geotek and cellular companies are all positioning themselves to offer wireless data.[82]

The development of advanced paging devices, personal digital assistants (PDAs) like the Simon and Newton, and Motorola's "Unicator" MIRS-based multifunction unit, provide a vast array of supply substitutes for the wireless marketplace.[83]

John Caner, Director of Wireless Data Development for NEXTEL, spelled out the benefits of a multifunction unit over a year ago:

> The beauty of MIRS is that it lets people using the voice system to do data also as an incremental application. A dedicated data system can be expensive and sometimes difficult to justify. In addition to sending data messages, customers value the ability to call ahead to their customers to clarify issues. Providing integrated voice and data allows that.[84]

And the response of cellular companies like L.A. Cellular and AirTouch Cellular to the NEXTEL subscriber unit testifies to their awareness of the competition. This past March, L.A. Cellular said it would introduce a "personal digital assistant that will function as a cellular phone, fax machine and electronic scratch pad" while AirTouch Cellular (then PacTel Cellular) announced plans to "offer voice mail-for cellular phones and a 'one number' service that will ring a call through to a customer's cellular phone, pager or home or office phone."[85] As Maggie Wilderotter, President of the California-

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[81]"Year End Review: Verticals Remain Slow, But SMRs Show Promise; OmniTRACS Booms," *En Route Technology*, January 17, 1994.

[82]*Id.*

[83]Michael Putzel, "Pager's Popularity Soars As Prices Fall," *The Boston Globe*, May 11, 1994. *See also* Will McClatchy, "Central California Cellular Phone Service Expected to Advance Rapidly in '94," *The Fresno Bee,* March 7, 1994 (noting NEXTEL entry, and capabilities of cellular and paging company offerings); "Motorola Seeks to Expand Data Experience Through ARDIS Network," *Land Mobile Radio News*, July 29, 1994, at p.4.

[84]John T. Mulqueen, "Fleet Call Shores Up Its Specialized Mobile Radio Network Offerings," *CommunicationsWeek*, March 19, 1993, at p.35.

[85]Michelle Vranizan, "NEXTEL to Offer Cellular Service in Los Angeles, Orange County, Calif.," *The Orange County Register*, March 13, 1994. *See also* "AirTouch Makes Cellular Phones More Versatile; New Service Gives Customers More Message