them. Part of the reluctance to subscribe to the voice paging service among users without voice mail is due to that almost all of them owned their own pager versus having a rental pager. Subsequently, they expressed concerns regarding the investment they already made in their present pager. This concern will not be as evident among the general population of pager users as approximately 70 percent of users rent their pager, according to EMCI's latest paging survey.

Appendix A: Potential Paging User Focus Group Materials

Focus Group Screener for Non-users

1. Have you been in a focus group in the past six months?

- Yes: terminate
- No: continue

2. Do you work in the cellular or paging industry?

- Yes: terminate
- No: continue

3. Do you currently use or own a pager or beeper?

- Yes: terminate
- No: continue

4. Are you aware of mobile communications devices such as pagers and cellular phones?

- No: terminate
- Yes: continue

5. Are you interested in a low cost mobile communication device for your personal or business use?

- Yes: recruit
- No: terminate
- Maybe/Don't Know: terminate

6. Is your salary or earnings over $18,000 per year?

- No: terminate interview
- Yes: continue

7. What age group are you in?

- 0-18: terminate
- 18-30: continue
- 30-50: continue
- over 51: terminate

8. What is your occupation?

list_____

9. List male/female (have at least 50% male)

Voice Pager Description

Here is a new pocket-sized voice pager. This pager can play your messages immediately upon receipt or can store voice messages from callers so that you can play them back whenever it is convenient. There is no need to find a telephone to call for your messages, as the voice message is already stored in the pager.

Here is how it works:

You record a greeting for callers, just as you would for a home telephone answering machine. The greeting tells callers to leave a message after the tone. When someone wishes to leave a message, they call your pager number, hear the greeting, and leave a message. After the caller hangs up, your pager will alert you that it has received a message either through a tone or by vibrating. At your convenience, you can replay the message by pressing a button on the pager. The voice pager can also display a numeric message just the same as current numeric display pagers if the caller wishes not to leave a voice message.

Coverage is the same as for existing numeric pagers, with coverage available throughout the metropolitan Washington area. Regional and national coverage is also available. Battery life is also the same as for numeric pagers, approximately one month. The voice pager has the capacity for up to 120 seconds of messages (for example: six 20 second messages).

Please anwer questions 1-5 before we start discussions

Name_____

Place of Employment_____

Occupation/Job Title_____

1. Do you currently use any mobile communication device?

_____ Cellular phone
_____ SMR
_____ private two-way radio
_____ CB radio
_____ Other (write in _____)

2. Have you ever in the past used a mobile communication device?

_____ Pager
_____ Cellular phone
_____ SMR
_____ private two-way radio
_____ CB radio
_____ Other (write in _____)

3. On average, how many hours of your normal working day is spent away from a standard telephone?

_____ Hours per day

4. What is your age category?

____ under 25
____ 25-40
____ over 40

5. What is your total annual household income level

____ less than $25,000
____ $25,000 - $50,000
____ $50,000 - $75,000
____ over $75,000

6. Based on the description of the voice pager, how interested are you in subscribing to a voice pager service?

____ definitely subscribe
____ probably subscribe
____ may/may not subscribe
____ probably not subscribe
____ definitely not subscribe

7.

____ definitely subscribe
____ probably subscribe
____ may/may not subscribe
____ probably not subscribe
____ definitely not subscribe

8.

____ definitely subscribe
____ probably subscribe
____ may/may not subscribe
____ probably not subscribe
____ definitely not subscribe

9.

____ definitely subscribe
____ probably subscribe
____ may/may not subscribe
____ probably not subscribe
____ definitely not subscribe

Appendix B: Pager User Focus Group Materials

Focus Group Screener for PageNet Users

1. Do you or your company still receive paging service from PageNet

   - Yes: continue
   - No: terminate

2. Do you personally use a PageNet pager.

   - Yes: continue
   - No: find out who is actual user in company and ask to speak to them

3. Do you have PageNet's voicemail service

   - Yes: invite to 6:00 group
   - No: invite to 8:00 group

Voice Pager Description

Here is a new pocket-sized voice pager. This pager can play your messages immediately upon receipt or can store voice messages from callers so that you can play them back whenever it is convenient. There is no need to find a telephone to call for your messages, as the voice message is already stored in the pager.

Here is how it works:

You record a greeting for callers, just as you would for a home telephone answering machine. The greeting tells callers to leave a message after the tone. When someone wishes to leave a message, they call your pager number, hear the greeting, and leave a message. After the caller hangs up, your pager will alert you that it has received a message either through a tone or by vibrating. At your convenience, you can replay the message by pressing a button on the pager. The voice pager can also display a numeric message just the same as current numeric display pagers if the caller wishes not to leave a voice message.

Coverage is the same as for existing numeric pagers, with coverage available throughout the metropolitan Washington area. Regional and national coverage is also available. Battery life is also the same as for numeric pagers, approximately one month. The voice pager has the capacity for up to 120 seconds of messages (for example: six 20 second messages).

Please answer questions 1-10 before we start discussions.

Name_____

Place of Employment_____

Occupation/Job Title_____

1. What type of pager do you use?
   _____ Digital display pager (numbers only)
   _____ Alphanumeric display pager (numbers and text)

2. Do you use voice mail with your pager? _____ Yes
   _____ No

3. Which coverage area do you subscribe to?
   _____ Washington/Baltimore metropolitan area only
   _____ Regional service
   _____ Nationwide service

4. Is the pager you use owned or rented?
   _____ Rental pager
   _____ Customer owned pager

5. What is the average number of messages per day received on your pager? _____

6. What percent of your paging messages are business related and what percent are personal
   _____ % personal
   _____ % business
   Total 100 %

7. What other mobile communication devices, if any, do you use in conjunction with your pager?
   _____ Cellular phone
   _____ SMR
   _____ Private two-way radio
   _____ CB radio
   _____ Other

8. How long have you had paging service?
   _____ Less than 1 year
   _____ 1-2 years
   _____ 2-3 years
   _____ 3-5 years
   _____ over 5 years

9. What is your age?
   _____ under 25
   _____ 25-40
   _____ over 40

10. What is your total annual household income level?
   _____ less than $25,000
   _____ $25,000 - $50,000
   _____ $50,000 - $75,000
   _____ over $75,000

11. Based on the description of the voice pager, would you prefer having a voice pager over your current pager?

____ definitely prefer voice pager
____ probably prefer voice pager
____ may/may not prefer voice pager
____ probably not prefer voice pager
____ definitely not prefer voice pager

12.

____ definitely subscribe
____ probably subscribe
____ may/may not subscribe
____ probably not subscribe
____ definitely not subscribe

13.

____ definitely subscribe
____ probably subscribe
____ may/may not subscribe
____ probably not subscribe
____ definitely not subscribe

14.

____ definitely subscribe
____ probably subscribe
____ may/may not subscribe
____ probably not subscribe
____ definitely not subscribe

EXHIBIT 2

Figure 2 from Comments of Motorola Inc. in RM-7617

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of:

Telocator Petition for Rulemaking to Amend Part 22 of the Commission's Rules Concerning the Use of 930-931 MHz for an Advanced Messaging Service	)))))	RM - 7617

Motorola Inc. ("Motorola") is pleased to submit its comments in the above-captioned rulemaking.

Respectfully submitted,

Leonard S. Kolsky
Vice President & Director
Regulatory Affairs
Government Relations
Motorola Inc.
1350 I Street, N.W., Suite 400
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(202)371-6932

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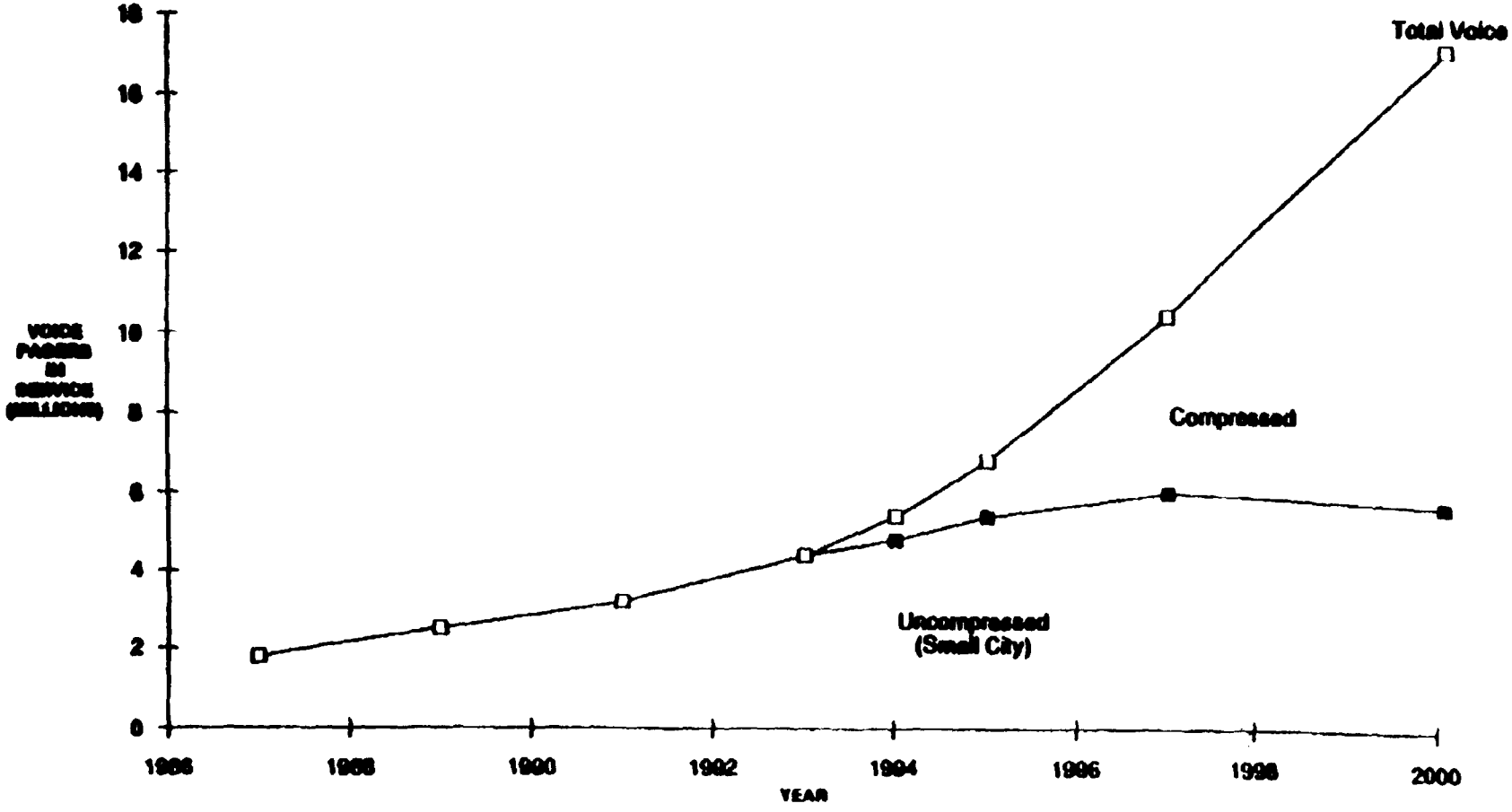
March 11, 1991

PAGING SPECTRUM NEEDS
NEW SERVICES SCENARIO - PAGER TYPES



3/6/91

FIGURE 2

EXHIBIT 3

Paging: The Whole Story, Mobile Office, November 1991

PAGING: THE WHOLE

Pity paging. Scorned as a favorite among drug dealers and prostitutes, barred from courtrooms and Congress, suspended from inner-city high schools and seen as a blue-collar substitute for cellular telephones, paging has developed an image problem among the uninitiated.

But for 10 million beeper-toting Americans, paging is an effective productivity enhancement that allows freedom of

LE STORY

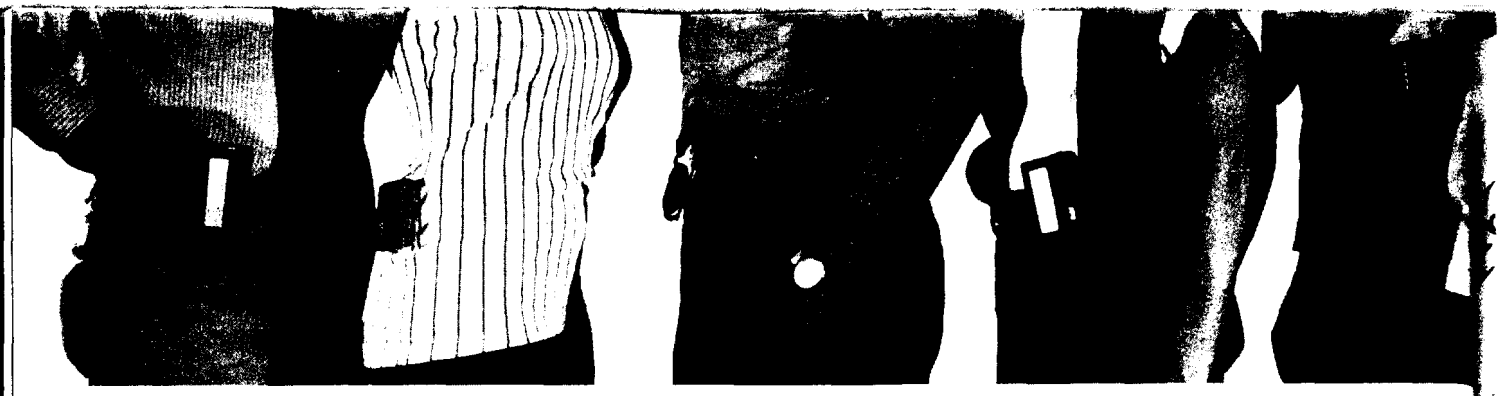
New developments are revolutionizing our concept of paging, making it far more than a simple beeper service

By Jeff Ubois

s and movement at a bargain-basement price. And the service just
ended keeps getting better.

collar Despite booming demand, which has doubled the number
ed an of pagers in the U.S. every three and half years for the last decade, the 2000 paging companies across the country are engaged in a brutal price-cutting war. Their competitive

is an efforts have prompted them to provide more and more
om of



features as part of their standard service. As a result, paging has been transformed from a simple local service into a complex global messaging technology that can deliver a lot more than a beep. New paging networks offer regional, national and international service, integration with other messaging technologies, such as voice mail, and delivery of full text messages several pages long.

These new networks are working in combination with new equipment, like paging receivers for laptop computers to deliver financial information, news feeds and wireless electronic mail. Paging is even being used for remote control: The next glass of wine you drink may have a better taste thanks to the paging technology that now controls irrigation in California's vineyards.

"Paging as we used to know it is in a transitional period," says Andy Andros, President and CEO of Telefind, a nationwide paging company. "Beep-call-this-number paging is as obsolete as buggy whips."

From Local to Nationwide

For most users, paging services are defined by four main elements: coverage area, type of service, equipment and integration with other messaging technologies. All four are mutually interdependent, with developments in one area affecting the others.

While local service still dominates the market for paging, industry executives say that in a year's time, up to half the new customers for paging services will be opting for regional, national or international coverage.

"We have an increasingly mobile business community of 120 million professionals in the United States. Thirty percent of them are required to travel an average of 5.2 times a year, and their typical trip is over four days," Andros explains. For these users, a local pager doesn't make any more sense than a "local-only" phone.

By the end of this year, six companies will offer nationwide service at prices ranging from $25 to $70 per month. While all of them call their service nationwide, what they offer is service in most large metropolitan areas. Thus, for users outside major cities, it's important to determine whether coverage is in fact available. Once users begin to compare services, however, they will find that these companies differ primarily in the types of add-on services they provide (see sidebar).

Four Types of Service

Within a given coverage area, four basic types

Nationwide Paging Providers

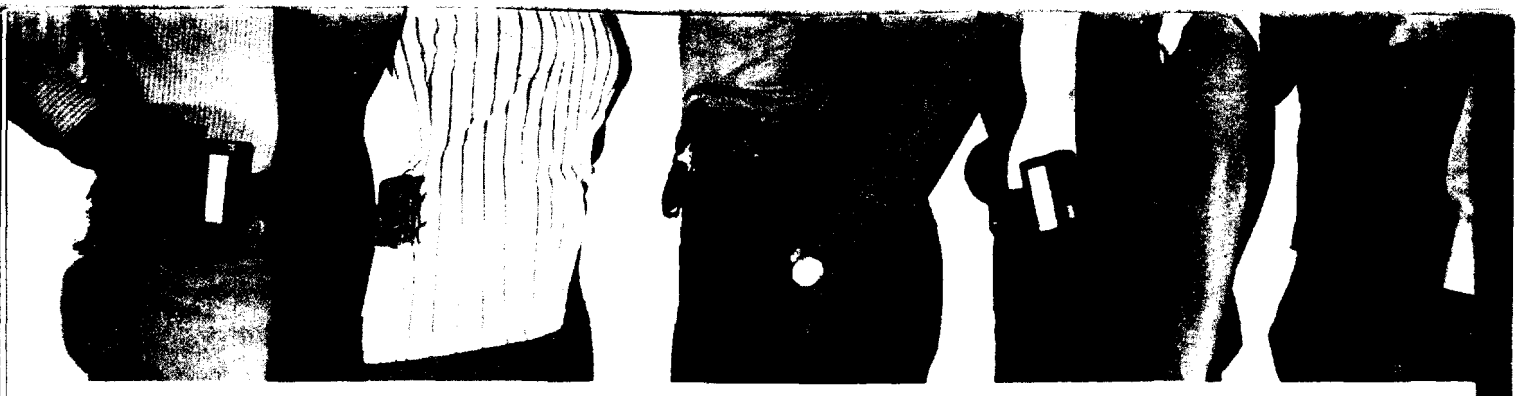
CUE Network Corporation
2737 Campus Drive
Irvine, CA 92715
(714) 752-9200

CUE provides its service through FM radio stations and offers several equipment and service options, including voice mail, a fax store and forward service, and the CUE LapComm modem for sending electronic mail to laptop computers or to the Sharp Wizard business organizer. CUE has an additional option called Numeric ECHO that allows users to call an 800 number and retrieve old messages, which is especially useful when there's cause to think a message has been lost—after spending half an hour on a subway, for example, or a week out of the country.

MobileComm
1800 East County Line Road, Suite 300
Ridgeland, MS 39157
(601) 977-0888

Owned by BellSouth, MobileComm will begin offering local, regional and nationwide service sometime in the fourth quarter. One of MobileComm's main selling points is that it offers more extensive local coverage than most other local services, in addition to regional and national coverage. MobileComm will also introduce a voice mail service. Pricing has yet to be determined.

(continued)



of paging are commonly available: tone only, numeric display, voice and alphanumeric.

"Tone-only" paging is the most basic and the cheapest. It sends a beep that tells users to call a pre-arranged number. In many areas it is available for as little as $5 a month, but it has fallen out of favor because it is much less powerful than the other types of paging. It can be more effective when coupled with a voice mail service, which sends a beep signal whenever messages are waiting.

Numeric display paging is by far the most popular type. It uses a more sophisticated pager capable of receiving and displaying a message of up to about 20 digits—usually a telephone number to be called and sometimes an identifying code. Upon receiving the beep, the user dials the number displayed on the pager. This type of paging is easy for most people to use and can be accessed from any touch-tone phone. It costs a little more than tone-only paging (typically $10 to $15 a month), but is significantly cheaper than voice or alphanumeric paging.

Voice paging sends voice messages of six to eight seconds directly to a special pager. Popular in the 1970s, it is now almost unobtainable in many cities, because it is more difficult and expensive for carriers to provide. Compared to other forms of paging, fewer messages can go out in a given amount of time, or on a given radio frequency, using this method. Nevertheless, voice paging may stage a comeback if compression technologies are developed that allow voice pages to be "squeezed" into short messages that take less time and radio spectrum to broadcast. In the meantime, voice mail combined with a tone-only or numeric beeper provides a very similar service.

Nationwide Paging Providers

Motorola, Inc.
1301 E. Algonquin Road
Schaumburg, IL 60196
(708) 397-1000

Motorola's Embarc offering—which includes a dedicated network being built by Motorola, as well as the company's wireless modem, the DataStream Advanced Information Receiver—is expected in December. Motorola takes great pains to emphasize that this is not just an alphanumeric paging network, partly in an effort to avoid alienating the paging companies that buy its other products. Motorola stresses Embarc's role as an information services and wireless electronic mail network.

Network USA
512 E. Zarragossa Street
Pensacola, FL 32501
(800) 627-PAGE

Network USA furnishes numeric paging and voice mail in over 170 metropolitan areas through its network of independent local affiliates. Prices depend on the amount of coverage desired and vary between $15 and $80 per month. Local paging operates via a seven-digit number; nationwide paging employs an 800 number and a five-digit code. Callers to the 800 number are guided through the process of sending a page by customizable voice prompts.

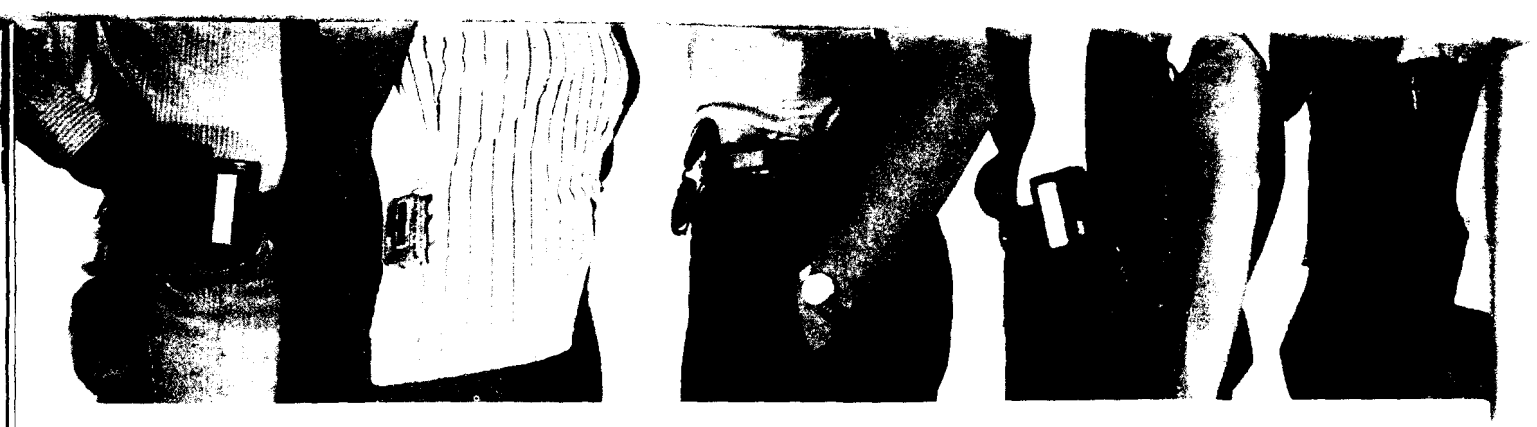
(continued)

The Alphanumeric Advantage

Alphanumeric (A-N) paging delivers full text messages along with the beep signal. Proponents say it offers major advantages over numeric paging and will enable a host of new services.

"With A-N paging, you can act on the information you receive," says Alan Reiter, editor of *Mobile Data Report*. "If you just get a number, you don't know what the problem is, but if you get a message that says, 'We need revised figures within an hour,' you can do something."

Full text messages allow users to set priorities and decide, for example, whether to interrupt a meeting, cut short a phone call or stop the car to use a payphone. "I don't want to walk a block to make a phone call to find out how important a message is,"



Reiter asserts.

Most of the nationwide paging companies are moving quickly to provide A-N service. CUE, SkyTel, MobileComm and Telefind already offer it, and Motorola plans to have A-N service by the end of the year. "We think A-N will move dramatically," says CUE's Chairman, Gordon Kaiser. "Our estimate is that for 1992, half the [new users] in the nationwide market will be A-N."

Despite its advantages, A-N has been slow to catch on, primarily because entering the messages has been cumbersome and expensive. Until recently, most systems relied on operators to key in messages dictated over the telephone—a process that is both time consuming and prone to error. A few systems allow message entry from a telephone keypad, with callers pressing two numbers per letter. For example, the letter A might be entered as "21," because it is the first letter on the 2 button, while B would be "22," etc.

Other options are fast becoming available. PC software designed to send A-N messages over a phone line to the paging company is included as part of Borland's Sidekick 2.0. SkyTel has introduced "SkyWord," a service that sends messages of an average length of 20 words from a personal computer to a Motorola Advisor alphanumeric pager. Several other companies are looking at sending A-N messages via public electronic mail systems, such as AT&T Mail.

"I think people make too big a deal over alpha entry," Reiter says. "What will fuel the growth of A-N paging is the rise of computers; with everyone having a computer, everyone will be able to transmit electronic mail."

Nationwide Paging Providers

SkyTel
1350 I Street N.W., Suite 1100
Washington, DC 20005
(202) 408-7400

SkyTel's nationwide paging service covers 204 metropolitan areas using the popular Motorola Bravo pager and a voice mail service. Both the paging and voice mail services can be accessed via an 800 number and personal identification number (PIN). Basic service is $69, including pager rental, voice mail and paging services. SkyWord service is offered on a frequent-use, nationwide basis for $99 per month and on a regional basis for $79 per month.

Telefind
2333 Ponce de Leon Blvd., Suite 600
Coral Gables, FL 33134
(800) 422-4442

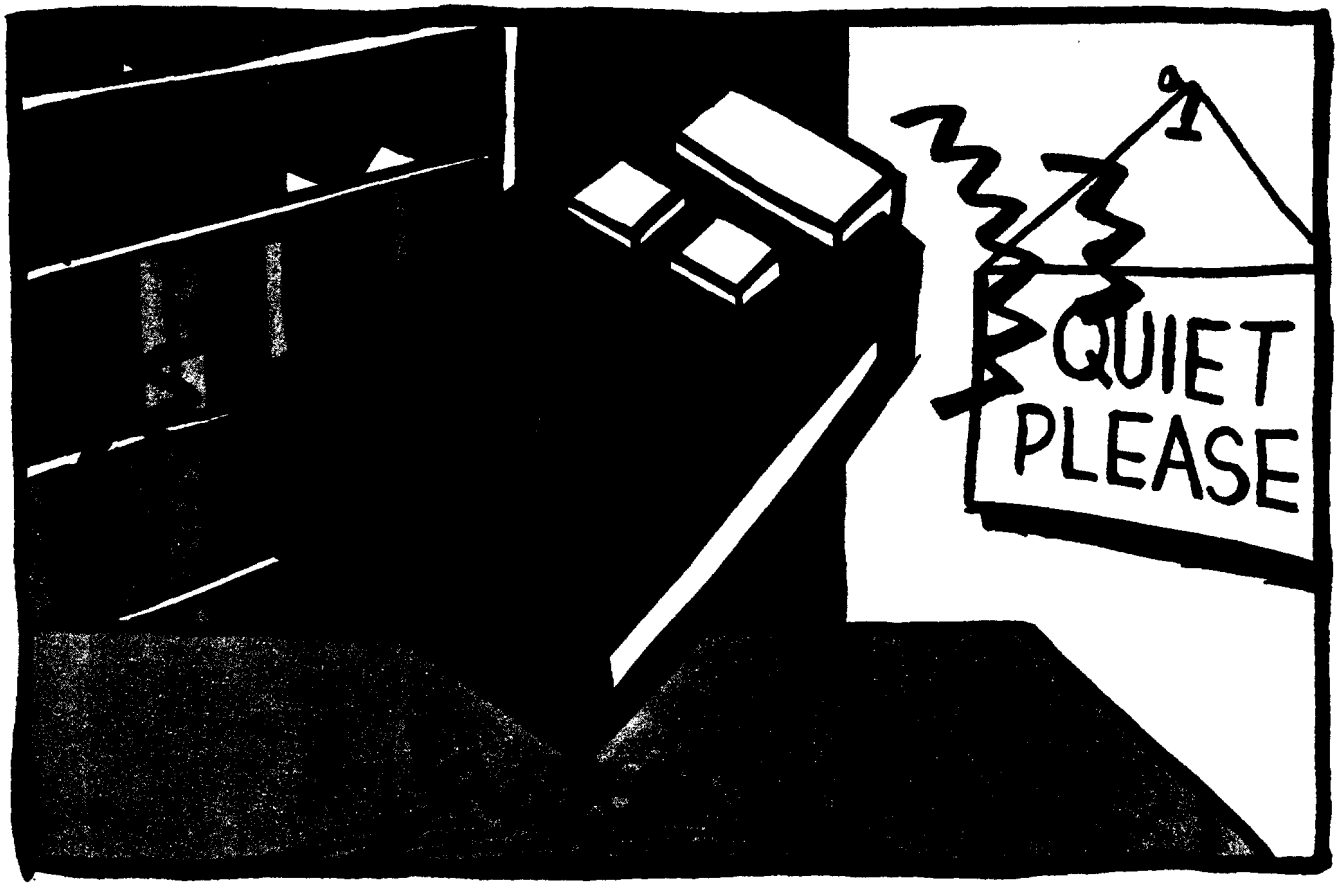
Telefind broadcasts messages through a network of independent local affiliates. Its offerings include alphanumeric service, voice mail and 800-number access. Telefind differs from other services in its pricing structure, which works on a pay-as-you-go basis. Monthly service is cheap, but each page is relatively expensive.
Telefind also provides some of the most extensive data broadcasting features, including electronic mail coupled with AT&T Mail, the AT&T Safari notebook computer and a stock quote notification service. Telefind already operates overseas, with service in London, Paris, Japan and Taiwan.

Synergy: Integration With Other Services

Paging is being integrated with an increasing number of other messaging technologies. Already, it serves as a convenient way to alert users of voice mail to awaiting messages, and similar systems for electronic mail and fax mail will follow not far behind.

Paging companies have been quick to pick up on the voice mail/pager combination, and all of the nationwide paging services offer voice mail. "We find over 50 percent of pages in our system are generated by a voice mail system," Kaiser says. "Two years ago, less than two percent of the pages were from voice mail."

The electronic mail and fax mail alert services are uncommon now, but Reiter says "the integration of paging with electronic mail is just inevitable. Integration with fax notification is also inevitable—it's



The "Stealth" Pager: Its vibrations go undetected (except by the wearer) in sensitive zones.

not a technical problem, it's just a marketing problem."

Another possibility is the combined use of paging with cellular. Paging is a natural adjunct to cellular telephone service, because it provides a solution to the dilemma faced by all cellular users: whether to keep their numbers confidential. If their numbers are secret, after all, they are out of touch. But if they give out the number, they're certain to receive unwanted calls. A pager allows cellular users to give out a number to everybody, but to decide which calls to return and when.

Also, for cellular users who travel frequently, nationwide paging can solve the problems associated with roaming (reaching a cellular phone that is out of its normal service area). Roaming sometimes requires callers to enter a complicated series of codes. Reaching a nationwide pager, on the other hand, is relatively simple.

Advances in Wireless Technology

Further advances in paging will depend heavily on new equipment, especially "wireless modems," which allow text messages to be sent directly to computers and business organizers. Slightly larger than typical A-N pagers, these devices connect through the standard RS-232 serial port found on nearly every computer.

Again, it is the nationwide paging companies who are at the forefront of this technology, and all of them are basing their offerings so far on proprietary equipment. Telefind's Message Link was the first out of the starting block and is being marketed with AT&T's new notebook-size computer, the Safari NSX/20. CUE Network Corporation's LapCom data receiver can work with laptop computers and the Sharp Wizard business organizer to receive data sent over CUE's paging network.

Motorola's DataStream Advanced Information Receiver is designed to work with a special wireless information network Motorola is building and Hewlett-Packard's 95 LX palmtop PC. Sometimes known as Embarc, it will be available in December and will provide information services in addition to wireless electronic mail.

"I think Embarc may set the stage for a new level of paging," Reiter says. "I would

not be surprised if Sharp or Casio or Poqet were to offer a unit with the Motorola pager (used in Embarc) inside."

These products and others like them are exciting because of the variety of services they accommodate, particularly wireless electronic mail and information delivery. "I believe the high-end pager of the future will be a computer with communications devices inside," says Reiter.

Wireless electronic mail differs from regular alphanumeric paging in that it accepts messages of much longer length in more complex formats. While it's almost impossible to send updates of a spreadsheet to a regular A-N pager, it's simple to send them through a wireless electronic mail system. Wireless electronic mail also integrates much more closely with electronic mail systems other than A-N paging. For example, in the Telefind/Safari/AT&T Mail application, messages can be sent from any AT&T Mail mailbox.

Though paging-based wireless modems don't offer two-way communications as cellular modems do, they are cheaper and easier to use. "When people think of wireless, they think of cellular; but if they don't need two-way communication, paging can be a lot better," Reiter contends. "The beauty of a pager is the battery lasts a long time, and it is very lightweight."

Information Delivery

Several information services are already up and running. Most of them are oriented toward providing time-critical financial data. Telefind is offering a stock alert service that beeps users when price changes for pre-selected stocks or commodities exceed certain limits. Metriplex, Inc. in Boston provides headline financial news and securities information. DocuPro, Inc. in Washington, D.C. offers information on foreign exchange, mergers and acquisitions.

Thus, as competition among paging companies increases and equipment improves, applications for this technology will be geared as much toward information monitoring and gathering as they are toward messaging. The fact that paging presents a less expensive alternative to some forms of data communication ensures a demand for this type of service. So, although paging's future will probably continue to be dominated by plain vanilla numeric paging for some years to come, it's clear there are now at least 31 other flavors to choose from. ■

Southern California Readers!

Tired of hit radio?
Weary of the headlines?
Yearning for some useful and stimulating information?

Then tune into *Mobile Office* radio on KBLA, 1580 AM!

In just 2.5 minutes, you'll hear about the hottest new cellular phones, notebook computers and other mobile products. Just tune in twice a day on weekdays, at 6:25 a.m. and 12:25 p.m.

Then, turn your radio dial back to KBLA on Sundays at 8 p.m. to listen to *Mobile Office*'s TechnoTrends, hosted by editor-in-chief Mike Meresman and senior editor Peter Otte. In one hour, we feature interesting interviews with manufacturers, service providers and users. And, it will be your chance to talk to the editors and these industry people, because we take live phone calls on the air.

TechnoTrends is produced by Larry Lewis for Media InterLink, the TechnoNews Network and *Mobile Office* Magazine.

EXHIBIT 4

Proposed Part 22 Rules for Implementing AMS Service

EXHIBIT 4
Proposed Rules for Implementing AMS Service

Additions are in bold face and underlined (e.g. **new**)
Deletions are in italics (e.g. *old*)

PART 22--PUBLIC MOBILE SERVICE

Subpart A--General

22.2 DEFINITIONS.

Advanced Messaging Service (AMS).

A one-way communication service provided by a common carrier engaged in rendering one-way message or data distribution utilizing extremely high capacity signaling formats in conjunction with frequency reuse transmitter topology to cover a specific MSA or RSA.

Cell.

The area reliably served by a transmitter located in a cellular system **or the protected service area of an advanced messaging system signaling transmitter.**

Paging Service, Advanced Messaging Format.

Paging service in which the receiver is hailed by a signaling channel and directed to a specific frequency for the reception of encoded data. The receiver may incorporate an automatic encoding transmitter for the purposes of message acknowledgment.

Messaging Frequency.

Any one of the eight frequencies in an advanced messaging system assigned for the transmission of messages to pagers in a cell.

Messaging Station.

A station operating on a messaging frequency.

Metropolitan Statistical Area (MSA).

306 areas including New England County Metropolitan Areas for the New England States (NECMA) defined by the Office of Management and Budget, as modified by the Federal Communications Commission, for which a common carrier may apply to provide cellular **or advanced messaging** service. See §22.903. This definition also includes the Gulf of Mexico Service Area (water areas of the Gulf of Mexico, its border defined as the coastline).

One-way Communication.

The unidirectional transmission of public initiated voice or data for reception and reproduction by an intended subscriber's receiver. In a one-way communications system, the incorporation of automatic encoding transmitters for the purposes of message acknowledgment does not render the communications service a two-way service.

Pager.

A *mobile* **portable** receiver for paging communications, also known as a "beeper" **which also may contain an acknowledgment transmitter.**

Rural Service Area (RSA).

An area not included in a Metropolitan Statistical Area for which a common carrier may have a license to provide cellular **or advanced messaging** service and which the Commission has specifically defined as an RSA.