

# AIR WAVE

*For any physically disabled person needing emergency help, cellular phones can make a difference between being safe or sorry.*

by John H. Stevens, B.S.

**L**aura Lee McCormick is a quadriplegic who considers herself a lucky person. While driving home alone from a visit to Georgetown, S.C., her van overheated in rural Williamsburg County. The damage to the engine completely immobilized the vehicle. McCormick was able to get prompt assistance by contacting the highway patrol from her cellular phone installed just a month before. Her case is typical of the added safety and convenience now possible through cellular technology and its expansion into rural areas of the country.

Professionals involved with adaptive driving prescriptions should give serious consideration to an emergency communications system in the event of vehicle failure. Because of the cost of adapting vans and minivans for severely disabled drivers, the added expense of communications is sometimes not addressed. Getting roadside assistance in the event of vehicle failure has long been a concern among drivers with disabilities. In past years, many drivers relied on CB (Citizen Band) radios to summon help in the event of a roadside emergency. In some cases, this might still be an appropriate choice. More recently, though, the advantages of cellular telephones are gaining popularity with disabled drivers.

## **Peace of Mind**

Disabled people who drive independently are very conscientious about preventive maintenance. However, the unexpected can happen, and sometimes out on the open road.

The potential consequences are a greater concern to a disabled motorist. Stopped along the roadside, a vehicle displaying a handicapped license tag can attract a good Samaritan, or, on the other hand, a thief or rapist.

In addition, given the nature of certain physical disabilities, it is imperative for some individuals to get prompt assistance. For example, on a humid 95-degree day in the Southeast, people with spinal cord injuries or multiple sclerosis will need to get to a temperature-controlled environment fairly soon.

## **A Wide Range of Uses**

In addition to enhancing safety for drivers, cellular phones are beneficial for a wide variety of recreational and vocational applications.

"Having a cellular phone along with me has removed all my apprehensions about getting back into the woods," says Larry Altman, a disabled hunter from Florence, S.C. Altman uses the phone in his all-terrain vehicle when he goes hunting.

Another devout cellular advocate, Lewis Stephens, a quadriplegic and employee of the South Carolina Electric and Gas Co., uses a powered wheelchair to travel three city blocks to and from his job each day. He has a voice-activated cellular phone installed on his chair. "Nothing can take the place of the peace of mind you have in knowing that help is just a word away," he said.

Other consumers with disabilities are finding cellular phones useful in activities such as canoeing, camping and other out-

door events. Kermit Short, associate director of Dorn Veteran's Hospital in Columbia, S.C., has been using a cellular phone for two years. "It is one of the best investments in safety that a disabled consumer can make, and it is not sold as an expensive medical device," he said.

Cellular technology is likely to open a new realm of vocational possibilities for people with disabilities. Some people are still unaware that fax machines, personal computers and certain medical monitoring equipment are fully compatible with cellular phones. In certain situations, some or all of the equipment might be tax deductible as an 'impairment-related' work expense.

## **Factory Design**

Because of factory design characteristics, cellular phones have a number of features that are especially useful for people with disabilities.

The handsets are lightweight and consume minimum space. Having no knobs to grasp and rotate, practically all the operating functions can be performed with a minimum of manual dexterity. Some models allow up to 100 phone numbers to be stored and dialed by pressing three buttons with a finger or knuckle. A high-quality, hands-free microphone is often a standard feature that enables the user to operate it without lifting the handset. Although more expensive, some models are available with a voice-activated feature that requires no hand or finger dexterity. When each individual phone number is entered for storage, so is a 'voice' command. When the user wants to make a call,

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he or she simply speaks the desired command and the phone automatically completes the dialing procedure. This is of particular importance to drivers using hand controls and steering assistive devices, since one hand is committed to steering and the other to operating the brake and accelerator.

Another feature is a 'no service' light or other indicator that will automatically illuminate if the user enters a geographical area that has no cellular service. Most models also have a lighted keypad that facilitates night use.

There are three basic types of cellular phones available from a variety of manufacturers. One of the most commonly used is the

'mobile' or 'vehicular phone' which is permanently installed in a car or other vehicle. It is powered by the 12-volt DC electrical system.

The 'transportable' or 'bag phone,' with its handset, battery-pack, transceiver and antenna self-contained in a case, can be installed on powered wheelchairs or easily transferred from vehicle to vehicle.

A third type, the 'personal' phone, is useful inside multi-story buildings and along inner-city sidewalks. Some are smaller than a walkie-talkie and can be easily carried in a pocket, purse or briefcase.

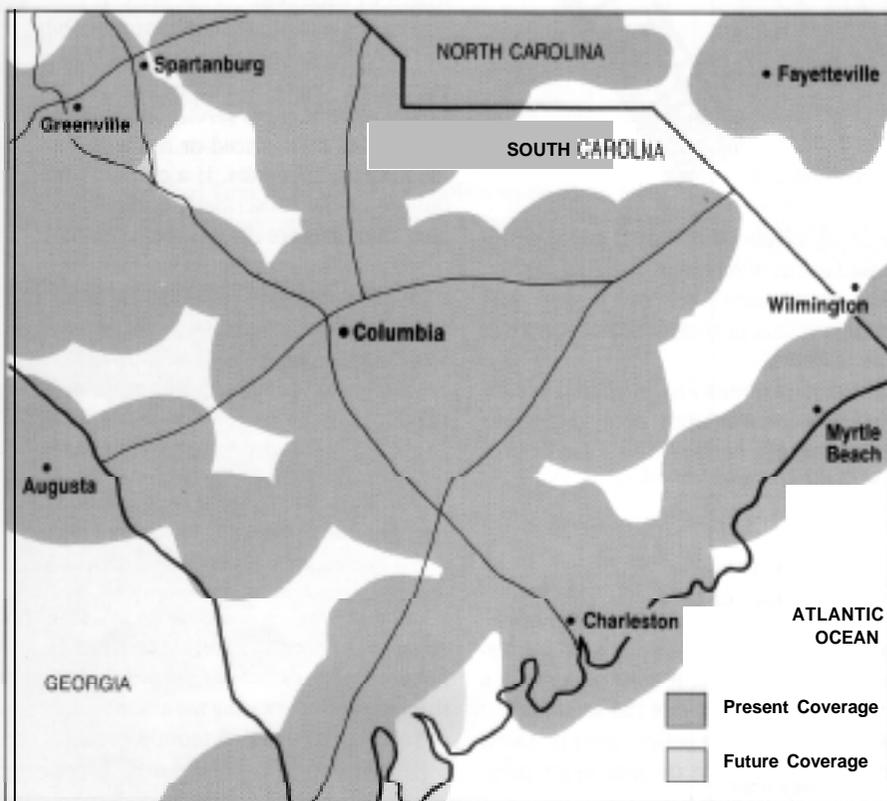
The 'transportable' and 'personal' models are best suited for use by disabled individuals

who use powered wheelchairs or three-wheelers and want a phone by their side at all times. They can be mounted at a convenient location on the chair or carried in a backpack or accessory bag.

## Limitations

Before investing several hundred dollars in a cellular phone, disabled consumers and those professionals who serve them need to know the limitations of this new technology. Essentially, the phones are very much like a two-way radio in that they use RF (Radio Frequency) to transmit and receive signals. Cellular technology uses FM (Frequency Modulation) and operates in the 800 MHz spectrum of the UHF (Ultra High Frequency) band. This normally produces a clear signal with minimum static and atmospheric noise. FM signals, however, travel in a straight line-of-sight. Therefore, factors such as the terrain of the land, the presence of tall inner-city buildings and other environmental factors will occasionally block signals, resulting in calls being prevented or disconnected. Cellular phone users in low-lying coastal areas might have a slight performance advantage because of the flat terrain with fewer hills.

Another factor that determines cellular voice quality is the type of phone being used. The smaller 'personal' phones have a lower



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wattage output (0.6 watt) and may not be as effective if the user is located more than 10 miles from the nearest cell site. 'Vehicular' and 'transportable' phones have a higher output (3 watts), with antennas that produce a higher DB (Decibel) gain.

## Rural Expansion

The best news for disabled consumers who live outside of larger cities is that cellular service is rapidly becoming available in more rural areas. The United States is divided into 734 service areas, 306 of these are MSAs (metropolitan service areas) and 428 are RSAs (rural service areas). A typical service area might consist of several counties or a portion of a state, depending on the popula-

tion and other topographical data.

At the end of 1991, all of the metropolitan areas were 'on-line,' while about half of the rural service areas had begun offering service. The remaining areas are scheduled to begin service in 1992. Expansion into rural, less populated areas not only brings service to consumers, but also helps to bridge the service gaps along the interstates and secondary highways.

## The Role of the Professional

Professionals in rehabilitation hospitals, vocational rehabilitation agencies or other settings that offer driver rehabilitation services should acquire a general knowledge of the advantages of cellular technology and

what is available in the home areas of the clients they serve.

This basic information can be obtained from local cellular companies, public libraries, industry associations and cellular industry trade publications. Desk references for professionals should include cellular coverage maps for their state or region, literature on monthly pricing packages and product brochures on available equipment models.

At a minimum, the responsibility of the professional should be to arm the client with information about the appropriateness, availability and overall use of cellular technology as it might apply to the client's individual need and lifestyle. ■

## How Cellular Technology Works

**W**hen a number is dialed from a cellular phone, the user taps into a sophisticated and complex high-tech network of transmitters, antennas, computers and data recording equipment. The call is completed in only a few seconds.

As the user talks and travels within a service area, the quality of the voice signal is constantly monitored by computers and compared to the signal strength received by neighboring cell sites. When necessary, the call is automatically switched, in less than half a second, to the appropriate cell site that will provide optimum voice quality.

For the most part, cellular technology is designed to ensure the voice quality of the conversation will be good; otherwise the system does not allow the connection to be made.

## Acquiring Service

A cellular phone is of no benefit unless the area where the user resides is served by a company that provides cellular service. When the Federal Communications Commission originally allocated portions of the radio spectrum for cellular service, it ruled that the public would be best served if there were two competing systems in each service area.

One license is usually issued to a local



existing telephone company and is designated as the wireline or 'B-Band' carrier.

The other license is held by a non-wireline company that provides cellular service in the 'A-Band.'

Once a customer has purchased a cellular phone, he or she must apply for service. In most market areas, service can be provided by either the 'B-Band' or 'A-Band' carrier.

## Operating Costs

There are three different costs associated with using a cellular phone. They are:

1. The initial purchase price and installation of the equipment itself along with a one-time fee to activate the service.

2. An ongoing cost is the monthly access charge which allows the user to intercon-

nect with all other cellular and landline telephone systems.

3. There will be a monthly airtime charge. This will vary depending on the number of incoming and outgoing calls and the length of each call.

A user's start-up cost and monthly bill can vary depending on the type of phone purchased, the local airtime rates of the carrier providing the service, the number of monthly calls placed or received, and the length of the calls. If a call is placed outside of the subscriber's home service area, long distance charges apply as usual.

Many cellular carriers around the country offer a monthly pricing plan that includes 30 minutes of free local airtime. Such plans are particularly attractive to disabled users who need a phone for safety reasons rather than business purposes. In most parts of the country, calls to the local 911 system or law enforcement agencies are free of airtime charges. Other carriers provide free airtime for calls to radio and television stations to report traffic conditions or news-making events.

Most any feature available on a residential telephone is also available on a cellular phone. Call forwarding, call waiting and three-party conferencing are available, but, of course, at an added monthly cost.

-John H. Stevens