

## Breaking New Ground Technical Report Assistive Communication Devices for Farmers/Ranchers with Physical Disabilities

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### Introduction

Imagine, if you will, a farmer in a wheat field at harvest time. He is sitting in the combine going about his work when a spark ignites the chaff that has settled on his engine. As the fire progresses from a mere smolder to a full burn, the farmer sits in the seat unable to scramble to the assistance of his machinery. You see, the farmer has a spinal cord injury, and is unable to move with the speed it would take to put out the fire. He does, however, have a good chance of saving himself and the crop in the field. This is possible only as a result of planning for such an emergency. What you might not have imagined is the cellular phone placed beside him. He, as soon as trouble was apparent, called the fire department and a family member directly from the seat of his combine. The farmer is able to get out of the burning machinery and wait until help arrives.

The situation just described is a true story, the farmer who experienced the incident understands all too clearly the importance of having good communication equipment when farming with a physical disability, especially when the disability limits your mobility (*Fig. 1*). This farmer's emergency preparation saved time, money, and his life.

Many farmers and ranchers without physical disabilities have had accidents, equipment fires, and break downs that could have benefited from a quicker response. The time and money lost in these incidents would have made communication equipment a worth while investment. Adding a physical disability makes it even more imperative to plan for these problems and to have effective communication equipment.

In this report, we will include a description of the most common communication devices, their approximate cost range, and their advantages and disadvantages. The purpose here is to present the positive and negative aspects of these communication devices as they relate to farming with a disability, not to recommend any particular one to an individual with a specific disabling condition.

### Cellular Phones

A cellular phone (*Fig. 2*) is similar to a regular phone with one major difference—it is linked to other phones by antennae rather than direct wiring. Signals are sent to and from the mobile unit allowing it to send and receive calls like an in-home phone.



*Figure 1. Good communication is a vital aspect of farming with a physical disability. Situations often require quick attention to keep the farmer safe and to speed farm operations.*



*Figure 2. Cellular phones can be attached to a specific machine or can be mobile. If it's mobile, the individual can have it with them at all times.*

### **Cost**

At this time, cellular phones can be obtained at a lower cost than ever before. Prices range from \$80 to \$550 depending on the options selected, such as a battery-operated phone or a phone that has a microphone and speaker system for "hands-off" communication.

Telephone service costs include a hook-up charge, a monthly service fee, and a per-minute charge for phone use. For one cellular phone, the monthly service fee ranges from \$20-\$35. The usage charge ranges from 16 cents to 60 cents per minute depending on the range of service area, call location, and the time of day the call is made.

### **Advantages**

Cellular phones are the most versatile communication devices available to date. They can be stationary in one vehicle, movable from one vehicle to another, or totally portable using a battery pack (*Fig. 2*). An individual with a cellular phone can call any-

one with a regular or cellular phone. This eliminates the need for the home-base radio other devices require. The person monitoring the farmer's progress in the field doesn't have to be at the home-base to receive a call. As long as they are near a phone, the farmer can contact them immediately for assistance.

Cellular phones have the capability to call for emergency services without using unauthorized access to special channels. With the 911 emergency service, this process is much faster and easier.

### **Disadvantages**

The primary disadvantage of a cellular phone is the cost. With all of the charges that are included, the monthly bill for 200 minutes of service could be as high as \$140. (This estimate is based on the highest service charges at the peak time of day.) Another disadvantage is the possibility of needing to communicate while outside the service area of the cellular phone company. There are areas in the country that are not covered by the relay stations used in the signal transfer for cellular phones.

### **FM Radios**

The FM radio (*Fig. 3*), also known as the two-way radio, has been used for many years as a means of communication on construction sites, in factories, and on farms. As the name implies, it is a means of sending and receiving messages (two ways) between two or more points via radio waves.

FM radios are available in a variety of small, rugged, and simple to operate models. There are three basic types of two-way radio systems: (1) base stations, (2) mobile stations, and (3) portable stations.

A **base station** is designed for use as a central dispatching unit and is used at a fixed location. An example would be the table-top base station in the farm home that enables the operator to contact someone who may be working in the field.

A **mobile station** is one capable of operating while in motion. It is designed to be used in a vehicle or a piece of farm equipment, and operates off of the

vehicle's electrical system. Most are a dash-mounted design; however, a trunk-mounted mobile radio may be more acceptable if space is limited. In farm equipment, radios are typically mounted overhead to prevent interference with vehicle operation.

A *portable station* is a "walkie-talkie" type of unit. They are compact in size and can be carried via a belt-clip. Portable units require the use of battery packs and charges which power the unit. A portable unit is most practical when a farm operator cannot be near a base or mobile unit.

### **Cost**

Prices for FM radios vary greatly depending on features, brand, and type of system. Portable units are normally more expensive and can range between \$150 and \$260. The antenna and hardware required to operate the FM radio base and mobile units will typically cost less than \$50.



*Figure 3. Using an FM radio allows easy access to others helping on the farm. By the press of a button, the individual is in contact with the person needed for assistance.*

### **Advantages**

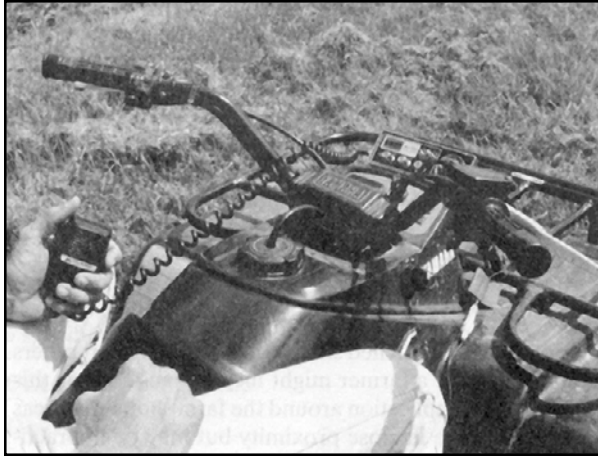
An advantage of the FM radio is the clarity of its signal, due primarily to a characteristic of FM radio waves known as the "capture effect." Many of us have heard the results of two AM radio stations operating on the same channel when trying to tune in a station late at night. These AM "heterodynes," caused when two or more signals are received simultaneously, make listening nearly impossible. However, if two FM signals are received simultaneously, the stronger signal captures the receiver and is the only station heard. This means that many stations can share each available channel with less interference if enough distance separates each one.

The range of the FM radio depends greatly on the output power of the unit. Higher powered units generally have a higher cost. The range of a unit can depend on other factors, such as area of use, city vs. rural, or near an area that has varied terrain conditions. Consult with your dealer to discuss the range appropriate for your specific needs.

The FM radio is extremely practical if the primary need is to communicate simultaneously with several mobile or portable units. They are very effective in coordinated operations of an entire fleet when it is important to monitor exchanges between units. In comparison, cellular telephones may be both practical and cost-effective for those, like many individual sales persons, who use the public telephone network to communicate with their office, a customer's office, or supplier one at a time. But if only communicating with others in your organization, a FM radio is more practical than a cellular phone.

### **Disadvantages**

When operating the FM radio, there must be another party on the receiving end of the radio, and the radio must be turned on, or the message will not be heard. This is a disadvantage when compared to the cellular telephone which can place calls to any telephone.



*Figure 4. CB radios are useful in cases where inexpensive communication is needed. These units can be attached to many types of vehicles as well as be portable for the farmer's convenience.*

## **Citizen Band Radios**

Citizen Band—or CB—radios (*Fig. 4*) have long been a popular source of open communication. CB radios are the main source of communication for truckers on the open road, and many people who spend long hours traveling. Farmers have used CB radios as a source of communication for many years to talk to family or co-workers from the field.

There are three basic types of CB radio systems which are very similar to that of the FM or two-way radio—i.e., base stations, mobile station, and portable station. Today, CB radios give the operator the opportunity to utilize 40 channels, unlike the older models which only had 23 channels.

### **Cost**

Today, the CB radio is a relatively inexpensive piece of communicating equipment. CB radios can be purchased from nearly any electronics store such as Radio Shack, Wal-Mart, K-Mart, and others also carry a variety of CB radios in a wide range of prices. The CB radio is one of the most inexpensive communication items discussed in this publication. Several “hand-held” 40 channel models are available with prices ranging from \$45 to \$70. Mobile stations generally range in price from around

\$40 to \$150 depending on features. Mobile stations are the most expensive, and normally run in the \$150 to \$200 price range. The antenna and hardware required when using the mobile and base units typically cost under \$50.

### **Advantages**

CB radios are the cheapest to own and operate, and relatively easy to install in a vehicle or tractor.

### **Disadvantages**

Because of newer technology, the CB radio seems to be losing its popularity as the farmer's choice of communication. This is due in part to CB radios being “open-band,” which allows anyone who may be listening on that channel to eaves drop on your conversation. Also, as the distance between two units is increased, the ability of the CB radio to receive a clear message is decreased. Many farmers have indicated that they do not use a CB radio due to the excessive amount of noise. This is also becoming a greater problem with the FM radio as more companies and businesses have gone to using the FM radio as their main source of communication. Again, a major drawback to using a CB radio is that the person being contacted must have their CB radio turned on and tuned to the same channel.

## **Other Communication Devices**

There are other ways in which farmers with physical disabilities can communicate distress to others. Devices designed to draw attention to the farmer can also be useful and may be less expensive than those items which allow the farmer to call out to others for help.

In instances where the farmer may be hearing impaired or is unable to speak, types of communication other than those previously discussed need to be considered. Although new technology may be available to enable persons with such impairments to make use of cellular telephones, FM radios, and CB's, such devices may not be economically feasible or readily available. Low-tech options for com-

munication with any physical disability may include the use of horns and sirens or flashing lights.

### ***Horns and Sirens***

Horns and high-pitched sirens can be used to alert others to problems that a farmer might incur. Items such as this may have best application around the farm shop or in areas where others are in close proximity but may be impractical when the farmer is working alone in a large field. The farm operator who experiences a problem and activates such a device may be at a great disadvantage if he or she is too far away for the alarm to draw the attention of anyone else. Another problem may exist if others are operating farm machinery in the area and the alarm goes unnoticed because of the noise generated by machinery.

Horns or sirens may have merit for some farm situations, but certainly are not as well suited to call for help as are other devices. These probably should not be considered the farm operator's only means of communication.

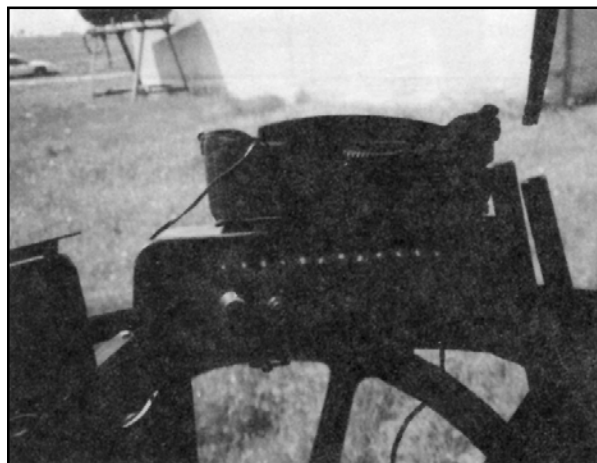
### ***Flashing Lights***

Another type of device which can be utilized to alert help is a strobe or flashing light. Such lights are relatively inexpensive and can be easily carried by the farmer at all times. Hand-held models are even available that run off battery packs. Again, this device can be very effective if others are in the immediate area and are able to recognize that help is needed by seeing the flashing light. A major disadvantage to using a strobe light is that it may be less likely to be seen during daylight hours even if others are in close proximity. Devices such as this would be most effective during the evening hours.

Again, just as with horns and sirens, flashing lights probably should not be used as the only source of communication, if possible. If an extreme emergency should occur, a farmer needs to have a more reliable source of communication available to be used to call for help. Certainly, however, horns, sirens, and flashing lights can be incorporated as a means of secondary communication.

### **Summary**

We live in the communication age. We learn information from across the world within minutes instead of days or weeks. Agribusinesses or production operations need to have communication capabilities similar to those of large corporations to maximize their success. If an individual working in an agriculture operation has a physical disability, the need for increased communication is a necessity, not only for success, but for convenience and safety as well (*Fig. 5*). Fortunately, modern technology has enabled the development of practical and efficient ways of communicating with others.



*Figure 5, This cellular phone rests on top of the planter monitor by the steering wheel. It is important that communication devices be located within reach for a quick response.*

### **Acknowledgement**

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