CELLULAR DIGITAL PACKET DATA (CDPD)

Cellular Digital Packet Data (CDPD) systems offer what is currently one of the most advanced means of wireless data transmission technology. Generally used as a tool for businesses, CDPD holds promises for improving law enforcement communications and operations. As technologies improve, CDPD may represent a major step toward making our nation a wireless information society. While CDPD technology is more complex than most of us care to understand, its potential benefits are obvious even to technological novices.

WHAT IS CDPD?

Worldwide, more than 30 million people use cellular telephone services on a regular basis. Despite their popularity, cellular telephones are still primarily used as a tool for voice communications. The vast majority of American cellular telephone users rely on analog telephones and analog cellular networks. Put simply, analog networks transmit the actual sound of a user’s voice, much like a conversation over a two-way radio. The last few years have seen the emergence of digital cellular telephones. Again, put simply, digital cellular systems transform voice communication into computerized data. This data, rather than vocal sounds, is transmitted via radio frequencies, and subsequently transformed back into voice communication.

For voice transmission, digital cellular telephones offer superior sound clarity. For data transmission, digital networks allow data to be sent at much faster rates than analog networks. In addition, data transmitted on digital systems are encrypted (increasing security) and have a lower rate of transmission errors. Digital telephones were designed to overcome some of the weaknesses of analog systems. The result is a phone which provides more dependable communication.

As a tool for transmitting data, CDPD utilizes digital networks. Placing data, conversations, photographs, and multimedia into binary (digital) form and transmitting the information through a network with a large bandwidth permits more information to be sent more quickly with greater clarity.

Thus, data sent using CDPD is received in a quick, secure, and accurate fashion. Data sent using CDPD systems is less likely to be “lost” between senders and receivers due to the position of mobile units, weather conditions, or other anomalies.

LAW ENFORCEMENT APPLICATIONS

CDPD technology represent a way for law enforcement agencies to improve how they manage their communications and information systems. For over a decade, agencies around the world have been experimenting with placing Mobile Data Terminals (MDT’s) in their vehicles to enhance officer safety and efficiency. Early MDT’s transmitted information using radio modems. These systems were subject to the same flaws as conventional two-way radio communications; data could be “lost” in transmission during bad weather or when mobile units were not properly located in relation to transmission towers. More recently, MDT’s have transmitted data using analog cellular
telephone modems. This shift represented an improvement in mobile data communications, but systems still had flaws which limited their utility.

Since the mid-1990’s, computer software manufacturers and the telecommunications industry have been experimenting with the use of digital cellular telecommunications as a wireless means to transmit data. The result of their efforts is CDPD systems. These systems allow users to transmit data with a high degree of accuracy, few service interruptions, and strong security. In addition, data transmitted on a CDPD system travels several times faster than data sent using analog networks. This results in the capacity for mobile users to enjoy almost instantaneous access to information.

Wireless cellular communications such as CDPD are an advanced form of radio communication (operating in the 800 and 900 MHZ bands). As such, cellular transmissions are “out there” for anyone to intercept. While the system may only intend for transmission to be received by a specific unit (i.e., a specific cellular telephone), it is possible for other parties to listen to a conversation or to capture data as it is being transmitted. CDPD transmissions are encrypted (or scrambled) to make it difficult for an unauthorized third-party to intercept secure information.

The need for this security is especially profound in many commercial and law enforcement applications. A taxi driver or street merchant could use CDPD to charge a customer’s bill to a credit card; the encryption would ensure that the transaction was secure. Police officers equipped with MDT’s linked to headquarters using CDPD can perform record checks, transmit reports, and send messages to other officers without worrying about compromising security or privacy.

By merging laptop computers and telecommunications technology (such as CDPD) police departments can transform the way their employees perform their duties. The speed and security of CDPD allows officers to use an MDT in the field just like they would use a computer at a police facility. Officers can access the National Crime Information Computer (NCIC) or state motor vehicle databases. This access allows them to perform their own warrant and records checks with virtually instant results; officers in some departments use their MDT’s to randomly run license plates while on routine patrol (recovering stolen vehicles and apprehending fugitives who would otherwise go undetected). This reduces the workload for police dispatchers, provides officers with rapid access to critical information, and reduces the amount of traffic on radio frequencies.

Officers in Philadelphia have been successfully experimenting with MDT’s operating on a CDPD system. In addition to being able to run their own records and warrant checks, officers can also access a wide range of departmental databases. These databases, once only available through a police dispatcher or using a computer at a police facility, allow officers to access a wide range of information. Personnel responding to a call can examine the call history for an address or examine other incidents where a suspect has had some contact with their agency. MDT’s in other agencies have been designed to allow officers to read and send intra-department electronic mail messages from their vehicle, enhancing communication.

Using CDPD technology, MDT’s can enable law enforcement agencies to improve the quality of the information they record, while reducing the amount of verbal traffic on conventional radio channels. For example, an officer equipped with an MDT connected with a CDPD system may be dispatched to a prowler call using a traditional radio frequency. While en route to the call, the officer may receive real-time updates via computer as the police dispatcher obtains additional information from the reporting party. Upon their arrival, the officer can press a single button on their computer keyboard to update their status from “en route” to “on scene.”
While on scene, the officer has complete access to departmental, local, state, and national databases to aid in handling the situation. After investigating the situation, the officer can update the incident record with any pertinent information. An officer can easily enter the details of a call for service into the system in the time it would take to verbally transmit that information to a police dispatcher (who would then enter the information and close out the call record). Pressing another button will again change to officers status to reflect their availability for other calls. A thorough record of the incident may be documented without tying up radio channels. Handling an incident which might have once required dozens of radio transmissions can be accomplished in virtually no extra time. The net result is a more thorough incident record and a reduction in radio traffic.

**The Future**

CDPD technology, coupled with specialized software and advances in MDT systems, is moving police organizations toward the day when it will be routine to operate as a “paperless” organization. Several agencies throughout the United States have already adapted existing technologies to allow them to make such a transformation. Using MDT systems, officers can file virtually any report from their patrol vehicle. Accident reports, parking tickets, court citations, and traffic citations can be prepared using the MDT, printed in the officer’s vehicle, and transmitted via CDPD to headquarters. Every report is legible, cannot be lost, and instantly appears in the agency’s computer system. This reduces the time officers spend in police facilities and increases time spent in the community.

As telecommunications technologies improve, the two-way radio may become obsolete except as a tool for priority traffic. Information once transmitted via radio can be transmitted via computer on a secure digital cellular frequency. Police communications personnel can dispatch officers, provide updated information on calls, and monitor the status of patrol units without touching a conventional radio. Officers in the field can receive calls for service, perform background checks, and complete reports without tying up a radio channel. Supervisors can monitor the status of all the units in their patrol area at the touch of a button. Personnel needing to use their two-way radio for a priority transmission may do so without having to wait for another unit to report on the status of a barking dog complaint.

A paperless department could significantly increase the operating efficiency of a department covering a large jurisdiction with few officers. Field personnel would no longer have to travel out of their patrol zone to drop off paperwork at the end of their shift. It would no longer take hours or days for a report to make its way from a field officer to the records division. Officers working in the most remote recesses of an agency’s jurisdiction can quickly and easily submit reports. Time once spend relaying paperwork can be spent on other priorities.

MDT options are quickly expanding beyond the confines of patrol cars. A British police force recently equipped a horse-mounted officer with a wireless, handheld MDT unit operating with CDPD technology. As technologies improve (and costs decline) it may be possible to equip all officers with such handheld units (just as most officers now are issued handheld two-way radios). Officers on patrol may take their computer unit out of their vehicle on calls for service. Investigators at the scene of a crime might be able to operate more effectively by accessing departmental records in order to check for similar offenses. Even officers working on a footbeat might be able to access databases and complete reports without leaving their assigned post.

As other technologies and the Internet continue to develop, CDPD may be used to support a wide variety of other police applications. Real-time digital cameras could link an investigator in the field with experts around the world. A
detective in a small town could link with a state arson investigator to receive instant assistance in processing a crime scene. Investigators in different countries could instantly share information as they track an international organized crime group or terrorist organization. Given the remarkable advances which have taken place in the past 15-20 years, it is hard to imagine the changes policing will undergo in the next two decades.

**USING CDPD TO SAVE RESOURCES**

CDPD has the potential to help police departments operate in a far more efficient manner. Police officers can conduct their own background checks and update incident records. Conventional two-way radio communications might make it “more trouble than it is worth” to contact a dispatcher in order to run a license plate or provide additional details about a call for service. With CDPD systems, these functions can be performed quickly and without burdening a police dispatcher.

A paperless department does not have to worry about illegible, lost, or incomplete reports. Paperwork can be completed in the field, printed out as needed, and transmitted to a department’s main computer. Officers can spend time in the community rather than filing out mountains of repetitive paperwork at a police facility. There is no need to hire civilian personnel to type reports or direct reams of paper to their final destinations. Technological advances such as CDPD allow virtually everyone in a law enforcement organization to do their job in a more efficient manner.

**RESOURCES**

Agencies interested in CDPD technology may find out more from the following resources. This list is not exhaustive and should not be viewed as constituting an endorsement of any specific products or producers.

- CDPD.Org: Your Wireless Data Guide
  [http://www.cdpd.org](http://www.cdpd.org)
- Compu-DAWN, Inc.
  12735 Gran Bay Parkway West, Building 200
  Jacksonville, FL 32258
  904/680-6680 (Voice)
  904/680-6642 (FAX)
- Litton PRC Public Sector, Inc.
  1-800-411-9781 (Voice)
  703/556-2626 (FAX)
  E-mail: psiinfo@prc.com
  [http://psiweb.prc.com/index.html](http://psiweb.prc.com/index.html)
- Multiple Options, Inc.
  PO Box 9507
  Providence, RI 02940-9507
  877/236-4113 (Toll Free Voice)
  401/885-0950 (FAX)
- RAM Mobile Data (UK)
  0500-992190 (Voice)
  0181-990-9110 (FAX)
  [http://www.ram.co.uk/](http://www.ram.co.uk/)

**IN-CAR TOUCH SCREEN WITH CDPD TRANSMISSION**

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