

# LAW ENFORCEMENT TECHNOLOGY



## The pocket PC goes tactical

By Sam Simon

Disasters such as 9/11 and Hurricane Katrina can offer a multitude of lessons. Though unwanted and unfortunate, these types of incidents have the ability to expose the weaknesses of an established system. Another crisis of the same scale may not present itself again, but the same conditions will continue to exist to a lesser extent. If lessons can be learned from these crises and improvements made, the system set up to protect America can be strengthened.

The 9/11 crisis exposed several communication deficiencies. There were interoperability problems between the different radio frequencies used by the plethora of first responders; departments had

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difficulties knowing where their personnel were; on-the-scene police did not know where fire and EMS personnel were, and vice versa; department headquarters were unaware of what other departments were doing; and vital building information was unavailable to those fighting fires, and performing search and rescue.

Basically, organizations were without a Common Operational Picture (COP) of what was occurring and how on-scene first responders were reacting to the emergency, explains Scott Brown Advanced Ground Information Systems Inc. director of training. A COP lets everyone see the same theatre in real time.

Reviewing the events of 9/11, Advanced Ground Information Systems of Jupiter, Florida, saw the need for a system to provide all first responders the ability to know where all others are located, supply information as to which first responders are on the way, allow for interoperability between those on the scene, and send that data back to headquarters or an emergency response center.

### **The AGIS system**

The Advanced Ground Information System (AGIS) is a many-to-many communications and display system that allows users of a dedicated network to view the identity, location and status of all other users on the color display of a PDA cell phone. “We designed our software to work on over-the-counter pocket PCs, laptops, tablets and other products like these,” says Brown. “The idea being — why should any government spend billions of dollars to create a new technology when an existing technology is already in place — that is our cell phone system here in the United States.”

AGIS can be easily implemented since the majority of first responders carry cell phones, and AGIS software allows different varieties of cell phone PDAs to participate in the same operational network.

The AGIS network and software runs on standard or ruggedized PDA cell phones with Microsoft Windows Pocket PC 2003 (or newer) operating systems. Following the theory that on-the-scene first responder commanders can better view the situation, AGIS software also functions on tablets equipped with cellular or Wi-Fi communications.

For emergency response centers behind the lines, AGIS provides software which permits PCs with access to the Internet to join the AGIS network. The use of either high-speed digital cellular or Wi-Fi enables users to rapidly exchange voice, text, photo, video data and other information desirable to coordinate activities with all users.

The cellular architecture of AGIS’ system moves the weight, size and power consumption issues associated with radios from the individual to the mobile cell station. Since an antenna for a standard base station is mounted high, the range for handheld cell phones typically extends beyond distances normally associated with mobile radio point-to-point communications.

An added benefit of using a cellular system is that handsets in America operate on four different bands and one of those is the U.S. military’s 1,800 MHz. Handsets are automatically acclimated to the military’s bandwidth or network without having to make any adjustments. “In a situation such as New Orleans, a response team could move in, obtain permission from the U.S. military to operate on 1,800 MHz band and send individuals into the field,” says Brown.

Users would be easily located and they could report on situations such as an individual stranded on a roof as was the case in the hurricane’s aftermath. The user would simply report the necessary information and a rescue vehicle could come and evacuate that individual. As it was in New Orleans, helicopters were flying in patterns, trying to identify and rescue individuals. The rescuers in the boats had no way of designating

targets for the choppers because they had no communication — all they had was line-of-sight radio.

### **Information at hand**

The AGIS system presents a COP on each user’s PDA, tablet, laptop, etc. “Basically, we’ve taken cell phones and made them tactical devices that allow everybody to see a common operational picture,” explains Brown.

Each user’s handheld unit transmits information including identity, location and status. This is sent to the IP server and the

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information is then broadcast to all users. A user is then represented by a symbol superimposed on a displayed map in the COP.

Since the devices operate on a high-speed digital communications system, data is easily transmitted and units are more than symbols; they become information bubbles. Available to all other units on the network, information bubbles include identification, cell strength, heading and other information updated after a defined limit of time or distance traveled. The frequency at which information is updated can be changed as can the type of

## Where am I?

In the process of creating the Advanced Ground Information System, it became evident that maps would be required to overlay the various symbols indicating participants' identity, location and status. The maps are implemented in a manner that permits the user to quickly zoom in and out, and offset the display.

Geographic Information System (GIS) is provided to access and interface with AGIS. This allows departments to use existing maps and not be required to purchase any special map or media.

Having to deal with a limited amount of memory, storing every possible map directly on the handset would not be beneficial to the officer. Because of this, maps and other large stores of information can be housed on the server and accessed when needed. "Rather than put the burden of storage on the handset, AGIS put the burden of storage on the home server," says Scott Brown, Advanced Ground Information Systems director of training. Since the server can be a mega-computer, it can be used to house entire databases, schematics of an entire city's buildings or any other information a department would want to make available to its officers.

This feature is beneficial when a user travels to an area where there is no media for his tactical map. Using a request SoftSwitch, AGIS sends a message to the server to examine the database to find any map that would best illustrate the area the user is located. This is possible because of the cell phone's GPS, which is constantly reporting a user's location data back to the server. Once the server has searched its database, it determines which maps would best illustrate the position and sends four of those maps to the handset. "You don't have to store a mess of maps on your handset," explains Brown. "You can just request the maps as you need them." When finished with the maps, they can be deleted from the cell phone's database. New maps can then be requested as needed.

data transmitted in the information bubble.

In addition to the symbols which represent each user, AGIS also provides users the ability to enter geo-referenced events on the COP. Incidents such as car accidents, fires, fallen people, and friendly and hostile force locations are automatically transmitted to all other users and displayed on their maps. This provides overall situational awareness to AGIS network participants.

When establishing an event on the system, critical information related to the incident is entered, which creates its own information bubble. When the

track is selected by any of the users, they will be able to access all of the provided information.

Selecting a symbol on the map is referred to as hooking. When a symbol is touched with a stylus or finger, a blue circle forms around the unit indicating it is hooked. The details of the symbol are then displayed in the multi-function inset area at the bottom left of the screen. As an example, hooking a unit could provide the user with information such as name, friend/foe status, network status, latitude/longitude, cell strength, availability status, target designation, heading, speed and altitude.

Hooking a group of people or the same people in a habitual manner can be a cumbersome task. To combat this issue AGIS has set up a feature that lets users develop a net of users. Rather than having to hook each user separately, just an established net has to be selected.

Data transmission also can be limited to those in a certain radius determined by the sender. Using a SoftSwitch, an expanding drop-down menu, a user can be designated as the furthest person to receive the data. Everyone within his radius will then be the target of the data transmission.

When data is sent over the network, it is automatically converted to a digital file and sent through the server. The server acts as a central hub and relays the digital data to the intended recipient(s).

## SoftSwitches

Intelligence does not have to reside in an information bubble waiting to be accessed. Messages, video, voice communication and other functions can be initiated by one user and sent to another or group of users through the use of SoftSwitches.

To deal with the limited screen space available on handsets, AGIS has created SoftSwitch tiers in which most operator actions are accomplished. Other than the single row of SoftSwitches, the rest of the options remain hidden. Once the main tier of SoftSwitches is selected, additional SoftSwitches are exposed providing the user with more operational functions and actions.

Using the SoftSwitch options, users are able to access functions to send free text messages, variable formatted text messages, photos

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and videos; receive messages and maps; access set up options and participation lists, and a multitude of other commands.

## Types of data transfers

There are a variety of communications' capabilities using the AGIS system. Messaging is an integral part of this system because of its reliability in a time of crisis. "Although most cell phone communications became overloaded during 9/11, digital cell phone communications (text messaging) continued to work," explains Brown. "For this reason, individuals found themselves sending text messages for directions."

One type of messaging available on the AGIS system is free text messaging. Another is variable formatted messages which are previously established messages a user can simply select and send. These are messages users habitually send or in an emergency may not have time to enter. This way, all that has to be done is select a message and deliver it to the desired units.

AGIS software also enables rapid call initiation. Units can be hooked and called using a call SoftSwitch. Conference calls are simple as well. Selecting the 800-call SoftSwitch will call everybody in the tactical operational field and alert them to dial an 800 number. "They punch in a code and now everybody in the network is on the phone at the same time," says Brown. In addition to voice and text communications, photographs and video clips are other forms of data which are transmittable on the AGIS system.

Choosing who to communicate with is as easy as hooking other

units — just select a single unit, a net or define a radius. When a communication has been received the device will give an audible or vibration alert, depending on the user's preference. The type of alert can be customized to the type of data sent. "The handset is actually going to announce when it receives a message; it's going to say 'message received,'" says Brown.

## The AGIS advantage

"The people who have the best information about disasters, or any type of situation, are the people in the field," says Brown. "However, quite commonly, the people in the field who have this excellent information are unable to communicate not only with each other, but with the people in the back lines."

Brown notes there are numerous software programs that enable many-

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to-one communications where a watch commander or other entity running a scenario has the ability to see where police officers are in the field. What is not available to the officers in the field is the ability to have this information. "Those in the field are unable to see what the watch commander sees back at the office," says Brown.



**The AGIS Systems' COP includes a graphical map, user/incident icons, SoftSwitches and information needed to successfully complete missions.**

Recognizing the deficiency of a communication system that would fulfill first responder's needs in a crisis, Advanced Ground Information Systems responded to this situation by developing the AGIS system for first responders. The concept of the AGIS system is the ability to effectively manage a civil disaster response using cellular technology. "AGIS is a tracking system that's really the ultimate communication system," adds Brown.

## Mobile data has much to offer

The AGIS System may not be best suited for use in the everyday situations officers are presented with. But when a major incident does occur, the ability to transmit and receive information while seeing a picture of the scene as it unfolds may prove to be a crucial tool. ■