New P25 LMR-satellite fly-away ends isolation for first responders

Despite tremendous advances in interoperability, emergency response teams still face a daunting scenario with respect to their communications in the field. What do you do when the supporting infrastructure of landline and microwave links has been destroyed or disabled, or when the location is so remote that none exist?

While immediate, radio-to-radio communications can often be quickly established with existing transportable LMR systems, the emergency responders may still remain isolated from a centralized command center and groups outside their usual jurisdiction.

As thousands of first responders along the Gulf Coast discovered in the wake of Katrina in 2005, the coordination of multiple resources across many jurisdictions is essential to effective search, rescue and recovery efforts.

Now, with M/A-COM's new P25, IP-based rapid-deployment satellite link technology, those responsible for rescue and recovery operations in the wake of natural or man-made disasters will soon find it easier to reestablish and coordinate their critical communications.

"The problem really came home to us last year, when we activated the emergency response center in Lynchburg for our customers along the Gulf Coast," said Mike Frazier, M/A-COM senior engineer. "It's not just the lack of electrical power that causes a problem for radio communications during emergencies – portable generators can take care of that. It's the lack of the basic communications infrastructure – no telephones, no Internet, roads that are impassable due to flooding and collapse – that can isolate responders."

"In some cases it took days for our customers in the Gulf simply to tell us what they needed, and where," Frazier said in reference to Katrina. "The word simply couldn't get out quickly. It was the same for local and regional law enforcement and emergency response teams who were trying to save lives."

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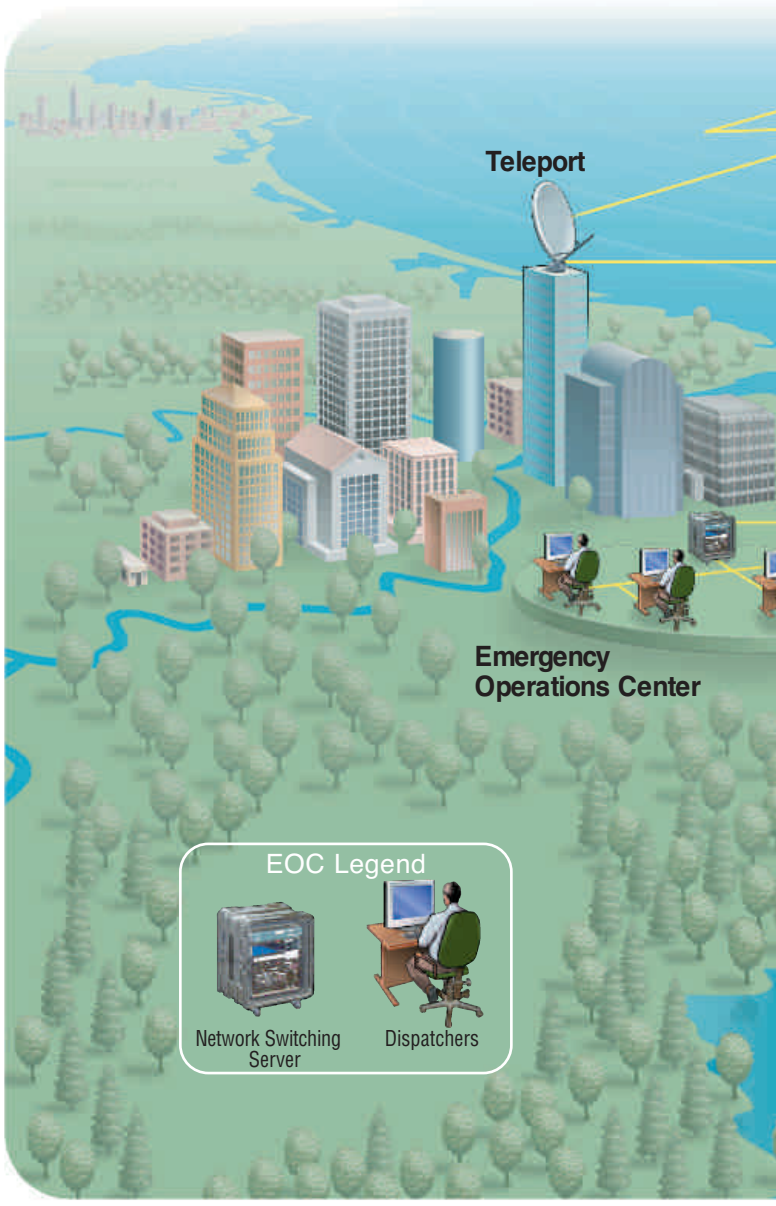

Combat-proven technology

In search of a solution, M/A-COM engineers turned to the military. The U. S. Army has relied on geosynchronous satellites to establish battlefield communications for years, and the techniques are well proven.

"With recent improvements in VoIP technology and the ready availability of affordable bandwidth on commercial satellites, we realized that with the right partner we could offer a similar service to help first responders and our customers during large-scale emergencies," said Frazier.

The right partner proved to be 3Di Technologies of Annapolis, Maryland and its LongReach LMR system. "3Di has extensive satellite broadband and IP telephony services at DoD locations worldwide. They have well over 130 installations in places like Afghanistan, Iraq, and in other countries around the world. Just as important, they [3Di] can quickly set up and manage satellite backhaul services just about anywhere it's needed," said Frazier.

Deployed when normal landline, radio and cellular communications have been disrupted, the emergency P25^{IP} fly-away system is available

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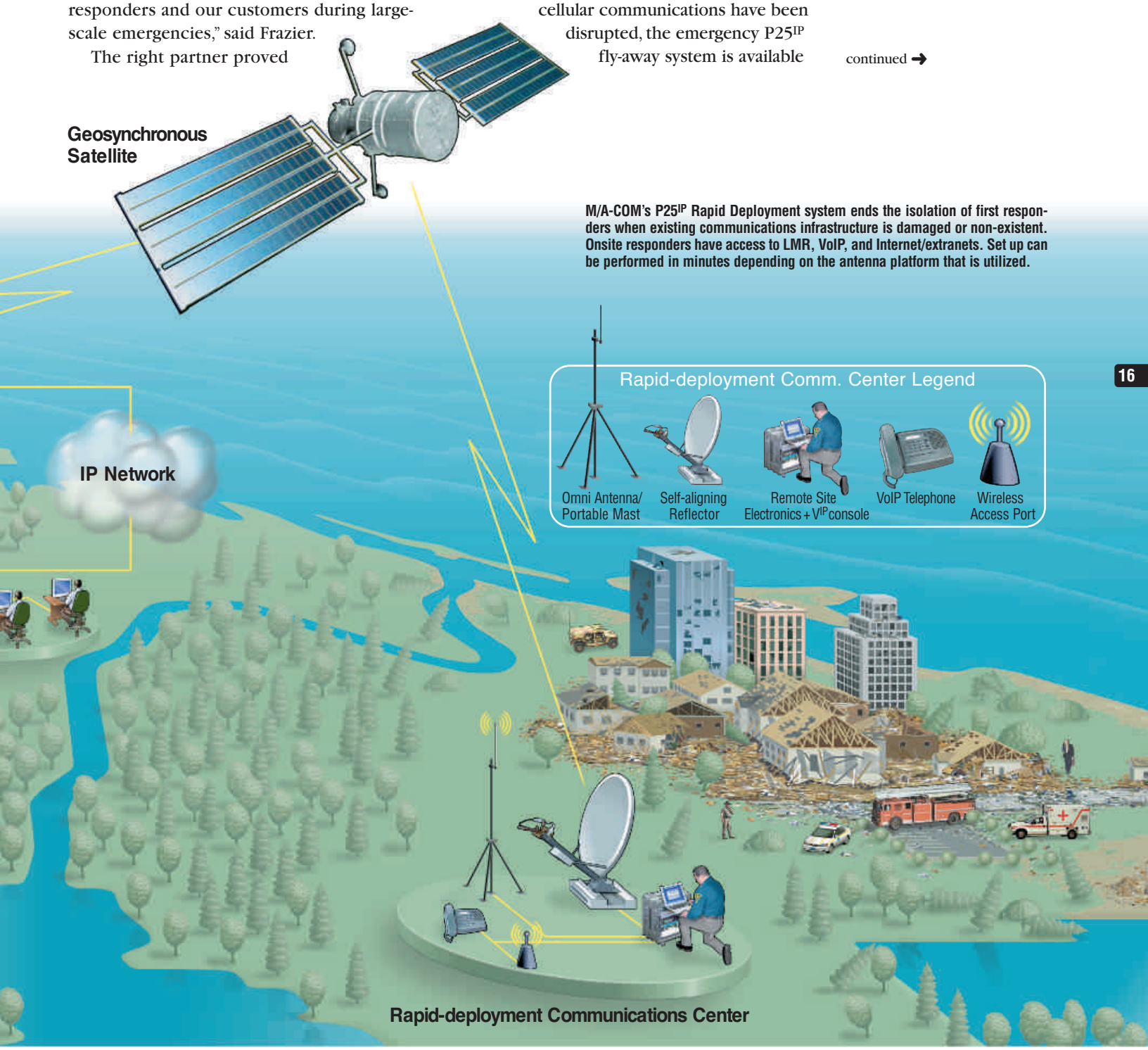

M/A-COM's P25^{IP} Rapid Deployment system ends the isolation of first responders when existing communications infrastructure is damaged or non-existent. Onsite responders have access to LMR, VoIP, and Internet/extranets. Set up can be performed in minutes depending on the antenna platform that is utilized.

An omni-directional portable mast provides LMR coverage while a self-aligning reflector provides the satellite link. Ruggedized containers protect electronics from shock and vibration during transit (***below***).

in either single-channel conventional or three-channel trunked configurations. Either version provides high-quality, IP-based digital voice with local interoperability to other P25 systems and radios.

"In addition to LMR, the IP-based satellite backhaul data stream provides remote users with VoIP, Internet and corporate LAN connectivity through a Virtual Private Network configuration, so emergency users are no longer isolated," said Frazier.

A typical deployment (*see previous page*) consists of three main elements: the on-site repeater; a geosynchronous satellite; and a fixed ground station (teleport) connected via high-speed internet to either a fixed or field-deployable Emergency Operations Center (EOC) containing a Network Switching Server (NSS) and dispatch consoles.

The onsite equipment includes a P25^{IP} LMR repeater and related equipment, portable generator, portable omni-directional antenna, VoIP telephone, V^{IP} console, wireless access port, satellite modem and "self-pointing" reflector. All equipment is housed in ruggedized fly-away containers that protect against shock and vibration during transit.

"The self-pointing reflector eliminates the need for a specially-trained technician to align the dish," Frazier explained. "You just point the dish north, turn it on, and it finds the satellite automatically."

Once on site, the system can be set up and operating usually within about an hour, providing localized digital voice LMR functions, including dispatch through a V^{IP} console, to mobile and portable users.

Emergency Operations Center

Once the onsite system is functioning, the digital data stream containing LMR, VoIP, and Internet/extranet information is relayed through a satellite to a selected downlink site such as a commercial or private teleport.

"Theoretically, the teleport could be located anywhere within the satellite footprint," said Frazier. "Ideally you would pick a teleport that was reasonably close to where you wanted to locate your Emergency Ops Center. This link can be accomplished either through a high-speed Internet connection or through a second satellite 'hop' using a second portable reflector. The only downside to the second hop is an additional delay in the satellite portion of the transmission."

The EOC itself consists of a transportable NSS and one or more V^{IP} dispatch consoles, depending on requirements. "An alternative to the transportable EOC would be to use an existing fixed EOC outside the disaster area or, for customer support, our 24-hour Emergency Response Center in Lynchburg, Virginia," Frazier notes.

Frazier said that tests have shown the voice quality of the deployable system to be excellent. "No degradation in voice quality was noted during our testing. This is quite different from the use of IP telephone over the Internet just a couple of years ago, when voice gaps and other artifacts were present. With the equipment we have now and the excellent digital quality provided by our P25^{IP} system, the only difference was an approximately 600 ms delay due to the satellite link. That's perfectly manageable for emergency applications," he said.

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Further testing of the fly-away emergency system is currently underway, with equipment availability scheduled for early in 2007. ■