



# New Satellite Services Need Public Safety's Influence

By Tim Farrar

Mobile satellite services (MSS) are billed as providing "ubiquitous" wireless services when terrestrial alternatives are unavailable. However, from a user's perspective, current MSS services are far from ubiquitous. While they may provide a dial tone on the most remote mountaintop, MSS services are not reliable inside buildings or



cars. In the aftermath of last year's hurricanes, numerous complaints were registered by Iridium and Globalstar from satellite-phone users who couldn't get service, but who were trying to use their phones indoors, as they would cell phones.

The cost and size of the handsets also are inhibitors. While the cost and size are not much different than two-way radios, few potential users regularly require MSS service, so MSS phones tend to be kept in storage for use in emergencies. This leads to problems for users, not only due to their lack of knowledge about using the phone, but also because the phones may be inaccessible in a disaster situation and may not even have charged batteries.

New satellite systems that claim to solve those problems are now being developed. By installing terrestrial base stations, known as ancillary terrestrial components (ATCs), on existing cell towers, a more powerful signal, capable of penetrating buildings and urban canyons, can be delivered. These base stations will re-use some of the satellite frequencies, allowing phones to roam between the terrestrial and satellite networks as necessary to ensure coverage. In addition, more powerful satellites will support smaller MSS phones, which could be integrated into two-way radios or cellular handsets and carried daily by public safety

workers, so they could be used immediately when satellite service is needed.

Three new North American systems by Mobile Satellite Ventures, Terrestrial, and ICO are proposed, the first of which plans to be operational in mid-2007. The companies together have raised more than \$1 billion during the past 18 months to begin construction of new satellite systems. In addition, Globalstar and Inmarsat expect to use their existing global MSS satellite networks to support ATC deployments in the United States and elsewhere.

That, at least, is the theory. But several notes of caution need to be sounded. The ability of the satellite signal to penetrate buildings and cars will still be limited. In a disaster situation when the terrestrial network goes down, users still will only be able to use the satellite service outdoors, and will have difficulty receiving incoming calls unless they are outdoors. So a premium must still be placed on ensuring that users are familiar with how to effectively use MSS.

In addition, the ATC base-station buildout will be limited by the same cost constraints as existing cellular networks, so coverage outside the network will fall back to outdoor-only satellite service. Notably, ATC base stations from one MSS provider are unlikely to be interoperable with those of other providers, due to the different frequency bands used by each system. Satellite coverage alone will therefore tend to be a backup rather than a truly ubiquitous service.

Substantial work also will be required by handset manufacturers to integrate these new MSS services into

existing LMR or cellular handsets. Given the relatively limited volume of equipment sales in the two-way radio sector, manufacturers may concentrate their efforts on developing integrated cellular/MSS handsets for the mass market.

While increasing numbers of public safety workers carry cell phones in addition to their radios — and in the future many personnel may use commercial handheld e-mail services such as BlackBerrys — a lack of integration with two-way radio networks could make it more difficult to employ MSS for mission-critical applications.

However, not all is doom and gloom. Mandating deployment of satellite communications within the public safety community could ensure funding is made available either by MSS operators or via

government grants to integrate MSS capabilities into future generations of LMR terminals. Dual-mode satellite/terrestrial cell phones may be sufficiently cheap that public safety workers could carry them as backup handsets. Public safety agencies can also deploy their own portable ATC base stations, recently demonstrated by Globalstar, to ensure adequate service quality in disaster areas or even just in the region around their headquarters on a daily basis.

Public safety agencies need a comprehensive plan to effectively use satellite backup communications, taking into account both the advantages and limitations of new MSS systems. For example, use of different MSS systems by various agencies could limit the usefulness of incompatible portable

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ATC base-station deployments during disasters. Agencies must also consider how they will cope with the limited ability of satellite phones to reliably deliver incoming calls when users are inside buildings or cars. Although vehicle-mounted terminals are one step along this path, deciding how to couple satellite coverage with higher-penetration terrestrial services is more important.

Options for terrestrial services include existing two-way radio networks, MSS operators' own ATC base-station deployments, portable ATC base stations operated by public safety agencies, and other commercial cellular networks. Important aspects of the

new MSS systems that will impact this choice, most notably the range of networks — satellite, ATC, two-way radio, cellular — that will be supported by a single multi-mode handset, are still being decided. As a potential service user, public safety agencies should influence the decisions made by MSS operators and equipment vendors to ensure that their preferred combination of networks can be supported.

Based on agencies' desired architecture for integrating MSS services into their other communications networks, their contingency plans must account for the reliability of each type of network, fallback positions if a network goes down, and the availability of

equipment, especially handsets, among end users. Only if all these factors are properly understood will public safety agencies be able to use the new capabilities of MSS systems to the fullest and ensure that near-ubiquitous communications becomes a reality during the next major disaster. ■

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