

## What You Need to Know About Satellite Phones

Patti A. Reali

When terrestrial communication infrastructures are unavailable due to the remoteness of a location or because of a disaster situation, satellite phones are increasingly the technology of choice for first responders, military, businesses, governments and non-governmental agencies. Two top mobile satellite service providers — Iridium and Globalstar — offer a mix of technology and service offerings to meet communications needs when fixed or cellular networks are out of reach or during emergencies.

The devastating hurricanes which struck the southern United States in 2005 clearly demonstrated the need for emergency backup communications systems. Satellite technologies, especially satellite phones and mobile satellite systems, were crucial communication lifelines and were essential in aiding disaster recovery and search and rescue for first responders. This was true for first responders at all levels of government, including government agencies, the state National Guard, military units and other organizations and businesses.

Satellite phones are also the communications technology of choice for many businesses that operate in remote parts of the world where terrestrial wireline or wireless solutions are either unavailable or unreliable. Gartner analyzes two mobile satellite service companies — Iridium and Globalstar — for consideration in emergency and remote communications planning.

### Key Findings

Iridium and Globalstar are the two key mobile satellite service providers whose networks can deliver voice and data communications services over most of the world's landmass and, in the case of Iridium, oceans.

### Predictions

- Mobile satellite service providers will experience a 30 to 40 percent increase in satellite phone subscribers as a result of the increased awareness of the need for disaster recovery communications planning.
- Most large businesses and major Federal, state and local organizations will now incorporate satellite phones in their disaster recovery and backup communications planning.
- Wireline and wireless carriers will increasingly consider augmenting their communications portfolios by aligning themselves with mobile satellite service providers.

## Recommendations

- Satellite phone technology should be assessed and considered as an integral part of government and corporate disaster recovery planning. For example, when buying communications insurance.
- Satellite phones should be designated for all "mission-critical" business or operational divisions at all locations and, potentially, for all key executives or officials in those organizations.
- Organizations need to designate people to ensure the readiness of all satellite phone units and associated accessories, such as extra batteries and car kits.
- There are various approaches to buying satellite phone services. Strategies will vary depending on an organization's geographical area and the locations that require coverage — options will include choosing between buying and renting, prepaid and postpaid and by service provider.

## TABLE OF CONTENTS

---

1.0 Introduction .....	4
2.0 Summary .....	4
3.0 Target Markets .....	5
4.0 In-Orbit Satellite Network Comparison .....	5
5.0 Globalstar .....	5
5.1 Network of Terrestrial Gateways .....	6
6.0 Iridium .....	6
7.0 Coverage .....	7
7.1 How it Works .....	7
8.0 Satellite Phone Equipment .....	8
9.0 Next-Generation Handsets .....	9
10.0 Fixed Solutions .....	10
11.0 Service Pricing .....	10
12.0 Near-Term Service Expansion .....	11
13.0 Iridium Push-to-Talk .....	12
14.0 Globalstar Ancillary Terrestrial Component.....	12
15.0 Distribution Channels and Service Partners.....	12
16.0 Next-Generation Mobile Satellite Network Infrastructure .....	13

## LIST OF TABLES

---

Table 1. Globalstar and Iridium Satellite Phones: A Comparison .....	8
----------------------------------------------------------------------	---

### 1.0 Introduction

It is now evident that satellite networks provided a communications lifeline to the outside world in the days and weeks following the Indian Ocean tsunami in 2004 and the hurricanes that hit the southern states in 2005. Satellites played an important role in delivering key services via radio, television, fixed satellite broadband networks and mobile satellite telephony. Phones in particular gave organizations the ability to communicate to mobilize assistance, personnel and materials to areas in critical need when both landline and cellular networks failed.

As a result, Federal, State and local governments, first responders, the media, non-governmental organizations (NGOs) and others are reassessing their emergency communications capabilities. They are looking in particular at what their requirements should be in the event of a total collapse of the traditional land-based communications infrastructure.

This document examines the technology and service offerings of two mobile satellite service (MSS) providers: Iridium Satellite, of Bethesda, Maryland, and Globalstar, of Milpitas, California. Both companies serve the North American market and other regions of the world. While there are other mobile satellite companies, including Inmarsat, Mobile Satellite Ventures, Thuraya and Asia Cellular Satellite, these will be considered in future documents.

### 2.0 Summary

Both Globalstar and Iridium experienced early difficulties because of major miscalculations about the market for their mobile satellite services, expensive infrastructure investment, flawed marketing plans, poor execution in terms of distribution channels, failed partner relationships and the rapid spread of cellular infrastructure. In addition, the uptake of mobile phones in their target markets contributed to their failure to win sufficient customers to sustain their operations.

After very public bankruptcies and the sale of both companies for a few pennies, both are now in the middle of a turnaround. Through a combination of reinvigorated leadership, major restructuring of operations, a focus on target markets and key industries, enhanced and diversified services (including paging, fax, Short Message Service (SMS), low-speed data, better handset equipment and key partner and distribution strategies), Iridium and Globalstar are now on the road to better performance. Ironically, in light of the major natural and terrorist events in the U.S. and abroad, both have reemerged to find a more secure place for themselves. They are now working in a very different world market, one that is increasingly in need of mobile satellite services.

In addition to their primary satellite phone services, Iridium and Globalstar are teaming up with value-added manufacturers to incorporate their distinct satellite technologies into other devices for services such as satellite-based tracking and monitoring. For the purposes of this document, however, we will only examine their satellite phone service products.

At the last count, Iridium had more than 137,000 subscribers and Globalstar had registered around 180,000. Globalstar was adding more than 10,000 new subscriber lines per month, while Iridium documents between 2,000 to 3,000 new subscriber lines in service per month. Since the end of August 2005, both companies have seen customer growth gather momentum. Gartner estimates that the number of satellite phone subscriber lines in service has the potential to increase by approximately 30 to 40 percent in 4Q05 as a result of the increased awareness for overall disaster preparedness.

### 3.0 Target Markets

Globalstar and Iridium are both targeting companies and organizations in key industrial markets that have employees and organizations operating in regions where cellular coverage is poor or nonexistent, and terrestrial services are either not readily available or are unreliable. Increasing numbers of organizations are considering satellite phones as a basic element to their disaster recovery planning and are purchasing satellite phones for their key executives.

These target industries include:

- Oil and gas
- Natural resource exploration and mining, and so on
- Maritime and shipping
- Forestry and fisheries
- Transportation and aviation
- Construction
- Energy and utilities
- Government: Federal, State, County, municipal, local
- Defense and military
- NGOs
- Business continuity and disaster recovery
- Emergency services and first responders
- Public safety: police, fire and EMS
- Recreational consumer and travel enterprise

### 4.0 In-Orbit Satellite Network Comparison

Iridium and Globalstar both use a network of low-earth orbit (LEO) satellites to enable voice communications and low-speed data applications. The result is that the LEO system causes less transmission delay than geosynchronous orbit (GEO) systems due to the shorter distance signals have to travel. This permits the use of smaller devices like handheld pagers and phones instead of laptop-size terminals, handsets and vehicle-mounted devices.

### 5.0 Globalstar

Globalstar's system was designed to work like a terrestrial-based cellular network and, as such, uses terrestrial gateways to deliver voice calls and narrowband data services. Its satellites act as a "bent pipe," which means that signals are transmitted to them from the ground and then sent back down again to the appropriate terrestrial gateway. The call is then switched or routed through the fixed line or mobile telecommunication network to the designated phone number.

In terms of in-orbit infrastructure, Globalstar's satellite constellation is a simple, yet proven, technology. It consists of 40 LEO satellites at an altitude of 1,414 kilometers (876 miles) above the earth. They are spread out in eight orbital planes, with five satellites in each, a design which

allows for path diversity and enables multiple satellite coverage for users on the ground. On any given call, several satellites transmit a caller's signal using code division multiple access (CDMA) technology to a satellite dish at the appropriate gateway. The call is then routed locally through the terrestrial telecommunications infrastructure.

Globalstar has two primary and two multiple backup Satellite Operations Control Centers (SOCCs). Its two primary SOCCs are located on different tectonic plates, use different power grids and different portions of the public switched telephone network (PSTN). They are close enough for staff to be redeployed from one to the other if needed.

## 5.1 Network of Terrestrial Gateways

One of the key differences between the Globalstar network and the Iridium system is the network of terrestrial gateways operated by the former. A given gateway receives transmissions from orbiting satellites, process calls and switches to the appropriate ground network. Each of the 25 gateway serves an area of more than 2 million square miles. Gateways consist of three-or-four dish antennae, a switching station and remote operating controls. All of the Globalstar network's switches and hardware are located on the ground.

Globalstar states that terrestrial gateways provide a number of advantages, including better call quality and convenient regionalized local phone numbers for inbound calling. It also argues that its network design, which relies more heavily on these terrestrial gateways than in-orbit switching, enables faster and more cost-effective system maintenance and upgrades because the system software is based on the ground.

Each of Globalstar's 25 gateways has its own Gateway Operations Control Center (GOCC), and each one serves as a backup to other gateways. If one gateway goes down, Globalstar can reconfigure the system to extend another gateway's coverage to make up some or all of the coverage of a disabled gateway. So, for example, if one of the system's Texas-based gateways lost an antenna during a storm, an adjacent gateway would be automatically configured to cover the area and traffic originally assigned to the Texas facility.

## 6.0 Iridium

Iridium's in-orbit infrastructure network is both different and more sophisticated than Globalstar's. It consists of a 66-satellite constellation plus 11 in-orbit spares located in a near-polar orbit at an altitude of 780 km (485) miles above the earth. Each satellite is cross-linked to four other satellites: two in the same orbital plane, and two in an adjacent plane. The satellite system works as a router in the sky, and uses inter-satellite links to switch voice and data signals. It does not depend on having a regional gateway available on the ground to deliver a call.

The ground portion of Iridium's network consists of a system control and two gateways used to support the mobile satellite customers and connect satellite calls from the Iridium network into the terrestrial telephone system. In addition, there are various tracking and control sites, operational support facilities and an NOC to manage the Iridium constellation, voice and data traffic, and mobile users.

There are various arguments for and against the dependence on terrestrial gateways in routing satellite phone traffic and which system would be more likely to survive a total failure of ground-based infrastructure.

Iridium's network is built to depend less on terrestrial components for end-to-end call completion than the Globalstar network. That said, however, Iridium does employ a number of terrestrial gateways. Its main gateway to manage commercial satellite phone traffic to terrestrial networks is located in Arizona. If there is a failure of its Arizona gateway due to any type of natural or man-

made event, Iridium would have no backup for U.S. subscribers. Iridium maintains a gateway in Italy, but this is not for use by U.S. subscribers. Intercept laws require that calls from U.S. subscribers must pass through U.S. territory so that U.S. governmental agencies can lawfully intercept them. Because of this, the Italian gateway is unavailable to U.S. subscribers.

The company maintains a separate gateway for all worldwide Department of Defense traffic. The U.S. military is one of Iridium's largest customers and accounts for about 25 percent of all revenue.

## 7.0 Coverage

The Iridium system is also the only one that provides true pole-to-pole coverage, including all land masses and oceans. Please note, however, that Iridium complies with all U.S. embargo restrictions, which may limit the use of their phones and coverage in certain countries, including Myanmar (Burma), Cuba, Iran, North Korea and Syria. The availability of Iridium's service may also depend on the available licensed MSS spectrum, but it may not always have a license to operate in many countries around the world. In Russia, the Iridium service is banned due to the lack of spectrum allocation and lack of lawful intercept compliance. In Mexico, Globalstar is the only licensed non-geostationary mobile satellite provider.

Globalstar has more limited coverage, but still provides coverage in about 120 countries. It operates in the Americas, Europe, some parts of North Africa, Australia, New Zealand and some Middle Eastern countries. It does not operate in many Asian countries, including India, or in most of sub-Saharan Africa. It also does not currently work in Hawaii, although the company is building a gateway in Alaska.

### 7.1 How it Works

Satellite phone users place outgoing calls using country and area codes, plus the number they want to connect to. The call is transmitted directly up to the satellite network and, in the case of Globalstar, the signal is passed directly through the satellite and downlinked to one of its 25 regional gateways. It is then routed to a terrestrial providers' network — either fixed or mobile — for call completion. Globalstar calls can also go back up to a satellite and down to another Globalstar phone in the same coverage area, completely bypassing the PSTN. This is an important feature, critical for use during a disaster when the PSTN is down.

Iridium calls travel up to their satellites, down through a single gateway and on to the terrestrial communications network, or can go directly from satellite phone to satellite phone, also bypassing the PSTN.

Both Iridium and Globalstar require the satellite phone's antenna to have a clear access to the skies to ensure call success. Most of the time, users must be outdoors to use their satellite phones. However, both providers offer a fixed-unit product that enables in-building use and connection to a PBX or desktop phone.

For incoming calls to a satellite phone, callers must dial a special number. An Iridium phone number, for example, will be an international call with rates set by the caller's phone company. The Iridium country codes are 8816 and 8817. Iridium also has a two-stage dialing that eliminates the need for dialing an international number (8816 or 8817) and paying high long-distance charges (that can be as high as \$10 per minute, depending on the location and long-distance provider). Two-stage dialing allows customers to dial a U.S. 1-800 number and pay standard long-distance charges, plus approximately \$1.50 per minute.

For Globalstar customers, there are no special dialing patterns. Both incoming and outgoing calls are made by dialing the country code, area code and number.

## 8.0 Satellite Phone Equipment

Satellite phones are expensive and range from \$750 for a Globalstar phone to between \$1,100 and \$1,500 for an Iridium one. While prices have fallen slightly over the years, limited volumes, robust feature sets and, in Iridium's case, a U.S. Department of Defense and General Services Administration (GSA) requirement that they be manufactured in the U.S., all conspire to keep prices high.

The design of the in-orbit network and ground segment has an impact on the design of the handset device. Globalstar's network is dual-mode, capable of working with CDMA-based cellular networks and allows users to choose between satellite or cellular mode where there are roaming agreements in place. For end users, that means the Globalstar device automatically searches for a connection to the local analog or digital CDMA cellular networks when the satellite antenna is down. If cellular services are unavailable, users must lift the handset antenna to enable the phone to seek out the Globalstar satellite network automatically. The company has a position location service built into its handsets, which gives latitudinal and longitudinal coordinates using the satellite network

While Globalstar says it has a roaming agreement with Verizon in the U.S., this relationship has not generated significant business for it. However, this may change in future. In other parts of the world, Globalstar has more widespread roaming agreements with major mobile and cellular service providers.

Qualcomm is Globalstar's technology supplier and the two firms signed a four-year, \$140 million contract renewal in June 2005 that will see Qualcomm designing and delivering Globalstar's next-generation satellite phone handsets and fixed units. CDMA technology will continue to be an integral part of the Globalstar solution.

Iridium's handset had been closely tied to Motorola's intellectual property, as Motorola designed the in-orbit satellite network. Their current phone model, the 9505A, is being manufactured by Celestica, which is also engaged in design and delivery of the next-generation Iridium handset. The company is starting to manufacture offshore and the next-generation handset is expected to incorporate numerous enhancements, including smaller size.

See Table 1 for a comparison of Globalstar's and Iridium's satellite phones and services.

**Table 1. Globalstar and Iridium Satellite Phones: A Comparison**

	<b>Globalstar</b>	<b>Iridium</b>
Manufacturer/Model	Qualcomm GSP 1600	Iridium/Celestica 9505A
Weight	370 grams/13 ounces	9505/A: 375 grams/13.2 oz.
Talk Time	3.75 hours talk/19 hours standby	4 hours talk/35 hours standby
Dialing Instructions	Select 'Globalstar' from menu, dial the country code, the area code and the number (for example 1-800-555-1212)	Dial 00 and the country code, the area code and then the chosen number
Antenna	Omni-directional	Omni-directional
Cellular Capable	Yes	No
Coverage	North and South America, Europe, Australia and New Zealand, parts of Asia and Northern Africa	Global, including North and South Poles, all oceans
Handset Price	\$749 SRP Handheld	\$1,100-1,500 for new 9505A

	<b>Globalstar</b>	<b>Iridium</b>
Fixed Solution	FAU-200, \$625 voice only; GSP-2900, \$2,195 voice/data	Yes
Vehicle Solution	\$799 plus handset	Yes
Rental	Yes	Yes
Partners/Distributors	Over 200 dealers across the U.S. and Caribbean, multiple value added resellers	44+ service providers worldwide (a full list can be found on <a href="http://www.iridium.com">www.iridium.com</a> )
SMS	19-characters today, enhanced service coming by December 2005	Yes
Fax	Standard fax services offered with optional StarFax device	Available 1Q06
Paging	SMS for text pages on handheld phone	Yes
Conference Calling	Conference bridge service to be launched by December 2005	Yes
Push to Talk	No	In development. Phase I beta test for group push-to-talk feature for U.S. Department of Defense completed
Data	9.6 Kbps uncompressed. With free compression software, mimics dialup speeds for e-mail and Internet access. Enterprise data for SCADA and asset tracking also available	Up to 10 Kbps with data module

Source: Gartner Dataquest (October 2005)

In addition to voice services, both companies offer a number of enhanced capabilities. This includes the following:

- Voice mail
- Short Messaging Service (SMS)
- 800, 911 dialing
- Paging
- Fax
- PBX integration
- Low-speed data transmission

## 9.0 Next-Generation Handsets

Both companies are developing a next-generation satellite handset. End users should not expect drastic reductions in size for the handsets of either provider, but they will feature enhancements or software modifications that will enable additional services.

Market research of Iridium users indicated that its customers don't necessarily require consumer-sized phones. There was a general consensus instead that the phones need to be sturdy and robust, resistant to water, dust and shock, be able to operate well in rugged and industrial

conditions, yet be sufficiently convenient and appealing to traveling professionals. Iridium says its users want larger screens, larger buttons, smaller antenna size for a better user experience, longer battery life, as well as the ability for dual-mode usage with terrestrial networks.

Look for Celestica to deliver Iridium's next-generation portable satellite handset by 2006. In addition, the company will introduce dual-mode satellite-GSM phones in late 2006 or early 2007. Iridium's network already has the global positioning system (GPS) embedded in it so that users can be tracked by the phone's location. Iridium will look at compatibility with the Galileo GPS currently under development in Europe, as well as compatibility with next-generation U.S.-based GPS systems. Currently Iridium handsets are not GPS-enabled, however.

Globalstar's next-generation phones are expected to incorporate Ancillary Terrestrial Component (ATC) functionality, but deployment details of the ATC network itself are uncertain at this time. Globalstar phones already work in dual satellite/GSM mode and the company has extensive agreements in place for roaming with terrestrial mobile operators outside the U.S.

## 10.0 Fixed Solutions

Many organizations, especially businesses, are interested in having a fixed voice solution for a back up they can use inside their buildings in the event of emergencies or lost communications. This would be particularly useful for airports, manufacturing facilities, transportation systems, property management companies and multi-campus organizations where communications between buildings and locations is crucial. Both Globalstar and Iridium offer satellite phone fixed-line solutions.

Iridium offers a fixed mount unit for use onboard ships as well as inside buildings. This can be integrated with a PBX or external analog desktop phones using an RJ-11 jack. It also offers a four-channel multi-exchange unit (MXU) that connects PBXs, PSTNs and telephones to the Iridium global satellite system. This solution is targeted at organizations that need a permanent emergency communications system and businesses that want to implement a back up system for their own private communications. These solutions are manufactured for Iridium by outside companies.

Globalstar also offers a number of fixed-phone products that enable standard PABX, key systems, or single business phones to be connected to the public telephone network. It has a fixed antenna unit (FAU) that can be installed on the outside of the building and requires a clear view of the sky. The fixed antenna is connected to the desktop phone through a telephone interface device (NID) or junction box and, depending on which solution is implemented, can support either voice alone or voice and data. The connection length from antenna to telephone equipment varies and can be positioned up to a mile away. It also supports multiple phone jacks on a single phone line, including cordless phones.

## 11.0 Service Pricing

Service pricing also varies depending on who the provider is, and may include rebates on phone purchases and discounts on packages and extended periods for unused minutes.

Globalstar's most popular price plan in the U.S. is the \$65 per month for 150 minutes, or \$780 per year for 1,800 minutes package. Airtime costs can be as low as 14 cents per minute on the highest-volume plan. In Europe, for example, prices range from 50 euros for 75 minutes per month to 250 euros for 800 minutes per month, to more flexible packages such as the Liberty 5000 plan that gives customers 5,000 minutes of use that can be spread over a 12-month period for 1,800 per year.

Globalstar expects to introduce prepaid pricing in December 2005. Pricing plan information is not yet available, but customers can expect prices to be at a slight premium to postpaid plans. For emergency users, the best pricing will continue to be the Liberty Plans.

Iridium's partners offer plans that range from \$30 per month and no minutes, including a calling rate of about \$1.50 per minute, to \$150 per month for 120 minutes and extra minutes billed at \$1.19 per minute. Iridium also offers prepaid SIM cards for voice and data services that require neither activation fees nor monthly subscription fees. These global prepaid SIM card plans are active for either one year or two. A typical price for 1,000 prepaid minutes for use during a one-year period is \$990, with extra minutes billed at \$1.09 per minute. More minutes result in lower per minute costs, as well as the ability to extend their use over longer periods of time.

Both companies have introduced more flexible pricing and packages for voice and data depending on the types of users. Some customers depend on their phones all year and expect to use about the same number of minutes from one month to the next. Others require heavy usage over shorter periods of time (for example, in disaster scenarios such as last year's tsunami in southern Asia or the hurricanes in southern U.S. in 2005). Customers also have the option to buy satellite phone handsets and packages of minutes, or rent them for short-term and seasonal requirements, to meet their communications needs.

Since published pricing information is based on single units for phones and per user for monthly rates, Gartner assumes that large organizations with higher unit purchases will be able to structure better deals. Purchasing a large number of phones from one of the Iridium or Globalstar's partners or resellers is likely to result in lower costs per unit and potentially cheaper per minute charges based on greater number of minutes.

There are a number of ways of buying satellite phone services, including purchasing prepaid bulk SIM cards or postpaid accounts with monthly service fees and minutes. A postpaid account can be less expensive and does not limit the number of minutes that a user gets, helping reduce the upfront cost to the purchaser. Depending on the products of Globalstar or Iridium's service partners and resellers, prepaid minutes may also be an option and minutes can often be extended over longer periods of time than the initial year. Buying strategies may differ depending on the service provider, because their packages are very different. Each has benefits and drawbacks and it pays to negotiate with your service provider.

Disaster recovery planners and budgeters should be mindful that unused monthly minutes as part of a monthly package may not be recoverable or carried over. Annual prepaid bulk minutes may also go unused, and the per-minute rate can be higher if prepaid. Moreover, unless an organization is a regular user of satellite phones due to harsh environments or remote locations, most satellite phones are going to sit on a shelf or in a drawer for extended periods of time until they are needed. Organizations must therefore designate someone to ensure the readiness of all satellite phone units and associated accessories such as extra batteries and car kits.

**The bottom line:** Satellite phone services are not cheap, but organizations need to remind themselves that they are buying "communications insurance" when entering into these contracts.

## 12.0 Near-Term Service Expansion

While the technical planning for next-generation satellite constellations is ongoing, both Iridium and Globalstar have a number of service innovations in the works for deployment during the next year or so.

## 13.0 Iridium Push-to-Talk

Iridium is in the process of carrying out phase I of a two-part technical trial with the U.S. government to introduce a push-to-talk feature on the Iridium handsets — a potentially valuable feature for emergency workers and first responders. They have requisitioned spot beams to be able to deliver the feature to users within a 70-mile radius without the need for either radio towers or repeater sites. Iridium technical executives indicate that today's phones have sufficient wattage on the handsets to allow users to transmit to other phones within a seven-to-12 mile radius. The beta test with the U.S. military has expanded that phone-to-phone capability considerably.

In phase II of the test, Iridium hopes to be able to deliver a feature that would enable a network of users from different parts of the world to be able to use a push-to-talk function. Phones could have the feature downloaded over the Internet and, as a server-based application, the feature can be activated or deactivated as needed.

In addition, the company says that when this system is fully implemented, the mobile handsets should be capable of Iridium subscriber unit (ISU) to ISU in-building coverage with the addition of a small antenna unit to the outside of a customer's premises.

Push-to-talk is not on Globalstar's product road map, according to Globalstar technical executives, as the CDMA air interface will not permit the efficient implementation of this feature. However, the company is installing a conference "bridge" feature that will enable multiple users to speak to one another from around the world on their network.

## 14.0 Globalstar Ancillary Terrestrial Component

Globalstar has filed an application to the Federal Communications Commission (FCC) for the authority to incorporate a terrestrial wireless component to its satellite-based service for use in populated areas. It is seeking permission to offer Ancillary Terrestrial Service (ATC) in the U.S. in conjunction with its mobile satellite services. ATC would enable Globalstar to use authorized 2GHz satellite radio frequencies to integrate a terrestrial wireless service similar to cellular, or PCS, into its satellite service offerings. Globalstar says it will use this capability to enhance coverage in urban areas, where buildings and other infrastructure can physically block satellite signals, and in rural areas, where the telephone infrastructure is inadequate or nonexistent.

The firm documents that it is making progress toward this hybrid terrestrial wireless/satellite ATC. The key issue for success is how to pay and with whom. While there are other companies, such as Mobile Satellite Ventures (MSV), ICO Satellite Services, Terrestar and Inmarsat, either applying for authorization to operate an ATC service, or already developing and building hybrid satellite/terrestrial wireless services, Gartner has limited this document to Globalstar's activities in building next-generation capability. ATC is not without controversy, as many companies and organizations have filed petitions, complaints and comments at the FCC regarding the use of 2GHz spectrum for this and other uses.

## 15.0 Distribution Channels and Service Partners

The global mobile satellite companies sell their products and service through a network of both direct and indirect channels. In the U.S., Globalstar uses a combination of indirect channels, such as dealers, value-added resellers (VARs) and direct sales. Almost half of its business is wholesale. GMPCS in Florida, and Globalcom in Alabama are two of Globalstar's largest dealers. Stratos Global is also large reseller of Globalstar mobile satellite phone services. In Canada, Europe and Venezuela, the company uses corporate-owned service providers with indirect dealer and reseller/VAR distribution channels. For the rest of the world, Globalstar uses a series of independent gateway operators. Globalstar partners in Europe include Elsacom in Austria,

Germany, Denmark Finland, Italy and Greece; Fibertel in Spain; TDCOM and France Telecom in France, to name just a few.

Except for its direct sales to the United States Department of Defense, all of Iridium's sales are handled via its partners. These include Stratos Global, Telenor and RoadPost in North America; France Telecom through its mobile satellite communications division in France; KDDI in Japan; SingTel in Singapore; Telespazio in Italy; Telstra in Australia; Globalcom and GlobalPlus and Satellite Communications Africa in Africa.

## **16.0 Next-Generation Mobile Satellite Network Infrastructure**

While both the Globalstar and Iridium systems are technically and operationally sound (with projected satellite life spans to 2012 and 2014, respectively), technical planning and engineering evaluations for second-generation satellite network architecture are now under way. Planning backward from that date means that both companies are now starting to define what a next-generation mobile satellite network will deliver in terms of services and bandwidth.

In the interim, Globalstar plans to launch the approximately eight spare satellites it already has in storage for delivery into orbit between 2006 and 2007. Both companies are considering adding GEO satellites to their networks. These have the advantage of providing a wider area of coverage using fewer satellites, more capacity and higher bandwidth, but have the potential to introduce more latency due to the longer distances from the earth.

Iridium says that their system could start to dip below the critical 99 percent availability mark after 2012. This means the company is aiming for a 2009 or 2010 date to have the satellite replacements and rocket launches scheduled. Iridium's CEO told Gartner that fleet replacement will take place over a number of years and that costs will be covered for design, building and the launch of new satellites from 2006.

Gartner understands that there is strong a likelihood that there'll be a mix of LEOs, MEOs and GEOs in the next-generation system architectures of both companies and that it might be too expensive and time consuming to duplicate the present all-LEO satellite systems.

### **This document is published in the following Dataquest Clusters:**

Mobile Communications Worldwide

## REGIONAL HEADQUARTERS

---

### **Corporate Headquarters**

56 Top Gallant Road  
Stamford, CT 06902-7700  
U.S.A.  
+1 203 964 0096

### **European Headquarters**

Tamesis  
The Glanty  
Egham  
Surrey, TW20 9AW  
UNITED KINGDOM  
+44 1784 431611

### **Asia/Pacific Headquarters**

Gartner Australasia Pty. Ltd.  
Level 9, 141 Walker Street  
North Sydney  
New South Wales 2060  
AUSTRALIA  
+61 2 9459 4600

### **Japan Headquarters**

Gartner Japan Ltd.  
Aobadai Hills, 6F  
7-7, Aobadai, 4-chome  
Meguro-ku, Tokyo 153-0042  
JAPAN  
+81 3 3481 3670

### **Latin America Headquarters**

Gartner do Brazil  
Av. das Nações Unidas, 12551  
9º andar—World Trade Center  
04578-903—São Paulo SP  
BRAZIL  
+55 11 3443 1509