Globalstar
Be Heard.

EMERGENCY MANAGER'S GUIDE
TO MOBILE SATELLITE COMMUNICATIONS

Addressing Interoperability & Operability Requirements Before, During and After Disasters

PREVENT | PROTECT | RESPOND | RECOVER

When it came time to provide satellite service to officials of the Boston Marathon, Globalstar is who we trusted to keep everyone connected in case other forms of communications failed for any reason.

— CHRIS LAQUIDARA
Director of Operations for All-Comm Technologies

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WELCOME

"Communication is key before, during and after disasters. Make sure Globalstar is part of your disaster plan."
– General Honoré

The entire country saw the devastation along the Gulf Coast after Hurricanes Katrina and Rita. It's always easy to look back and think about what you SHOULD have done to be better prepared. Lt. General Russel L. Honoré, U.S. Army, Retired, knows a thing or two about being prepared. Best known as an expert on global disaster preparedness, he led the joint task force responsible for the massive search-and-rescue mission and restoration of order in New Orleans and the Mississippi Gulf Coast following Hurricane Katrina in 2005.

General Honoré states, *"My motto is simple – you should prepare not just when you notice something is headed your way, but prepare now. You need the ability to maintain communications continuity at all times, should the grid go down. Globalstar provides that with the world's newest Mobile Satellite Service (MSS) network: the most solid long-term, and clearly the most reliable redundant communications investment.*

Globalstar's communications network delivers what is most important to emergency services personnel: user-friendly phones conducive to staging a rapid response, by far the best audio quality which is not to be compromised on critical telephone calls and the ability to move data far faster than anyone else in the business."

In addition to his role as Commander of Joint Task Force Katrina, General Honoré also coordinated military relief efforts following Hurricanes Floyd, Isabel, Charley, Frances and Ivan. He is also a distinguished recipient of the Global War on Terrorism Service Medal.

WHY GLOBALSTAR

Emergency communications networks serve a universal purpose of ensuring continuity of communications when primary networks fail or are disrupted. They must match not only the demands of the users of such equipment but must also be transparent to the outside world. They must be easy to deploy, user-friendly and able to create fast and robust connections. The equipment should be capable of multiple modes of communication including voice, data and geolocation-based messaging, regardless of the scenario.

Globalstar's voice and data communication solutions were designed for total system reliability, with attributes that address the rigorous demands of the public and private sectors. In addition to owning the fastest and most modern MSS satellite constellation in the world, other key attributes of the Globalstar system include:

- The Globalstar network was designed with redundancy in the sky and on the ground with around-the-clock monitoring:
  - Multiple satellite visibility ensures that calls are not disconnected despite blockage to the sky
  - A network of redundant gateways provide overlapping coverage and can serve as backup in the event of a localized outage
  - Primary and backup network operations centers to monitor all satellites, gateways and switches which connect the Globalstar system to the landline network
  - Backup batteries, dedicated generators and other secondary power supplies are at all gateways and come standard with Globalstar's fixed satellite phones
- Standard US-based numbers for simple outbound dialing and easy to reach inbound calls
- CDMA also provides Mission Critical Voice Quality to make sure users can easily recognize who's calling and quickly convey data without having to repeat time-sensitive information
- The most reliable space segment design based on a bent pipe architecture, minimizing the distance that signals travel, dropped calls and periods of no service without complex intersatellite links reducing call quality and service
- U.S. standards-based numbering system as a direct result of Globalstar's gateway-based architecture

Globalstar owns and operates a constellation of Low Earth Orbit (LEO) satellites orbiting at an altitude of 1410 km above earth. The orbit of Globalstar satellites is inclined at 52 degrees, providing ubiquitous satellite coverage around the globe between 70 north and 70 south. The satellite's altitude produces large spot beams for coverage, minimizing the number of satellites required for service, resulting in lower costs to the end user. In addition, Globalstar satellite footprints concentrate the system resources in the temperate zones of the earth where the vast majority of its users are located. 24 ground stations interconnecting to local telephone networks on six continents provide affordable, high-quality, communications to over 120 countries worldwide.

Unique Benefits of Globalstar

Communications satellites have distinct benefits over terrestrial alternatives. Globalstar combines the reliability of space-based communications and standards-based interoperability to provide an always on, always compatible solution. Globalstar offers significant benefits over terrestrial-based and most other satellite-based alternatives.

Unique Benefits of the Globalstar System Include:

- **Continuity of Operations (COOP) –** Many government agencies and companies are required to have a redundant communications network in place in the event of a disruption of any type. Disasters and anomalies may include hurricanes, tornadoes, power outages/blackouts, terrorist attacks or even the threat of an attack.
- **Temporary Network Solution –** When rapid response is essential in restoring basic services or carrying out rescue operations of people victimized by a disaster, Globalstar products and terminals are easy to deploy for a "quick-fix" solution. Largely modeled after every day cellular and home phones, little to no preparation is needed whatsoever to get a Globalstar system up and running.
- **System Scalability –** The Globalstar network is flexible and can meet changing demands. Globalstar gateways can concentrate system resources in a localized area until the primary communications network is restored or stabilized. Additional gateways can also be deployed if broader coverage is needed.
- **Communications Interoperability –** Globalstar enables connectivity among users who would otherwise be separated by jurisdictions, frequencies, communications standards, methods and large land masses.
- **Communications Operability –** Globalstar allows users to communicate on one single end-to-end backbone infrastructure. Calls between two or more Globalstar phones remove all dependence on the Public Switched Telephone Network (PSTN) and any other terrestrial network.

Establishing a Communications Network

An emergency communications network must address the numerous possible communications needs and scenarios between public and private sectors that may be involved in the response and recovery efforts.

The first and most important step in developing a crisis communication plan is to open the lines of communication to the outside world and the vast network of inter-agency partners. Simply having a way to communicate with each other will help tremendously in a crisis.

Type of Services Needed:

- Voice (telephony, dispatch, talk groups and conference calling)
- Data (text, email, Internet and file sharing)
- Video/Multimedia (where broadband capability is required)

Calling Scenarios to and from Your Emergency Communications Network

These are likely calling scenarios between possible "calling parties." In other words, who are you likely to call and who is likely to call you. Seamless communications are understood as the ease of placing a call to and from emergency satellite phones. Any dependence on special procedures, such as a roundabout, two-stage dialing technique (such as special codes just to make a call) is an unacceptable liability to any emergency responder and should be avoided at all costs.

Seamless Connectivity (Interoperability)

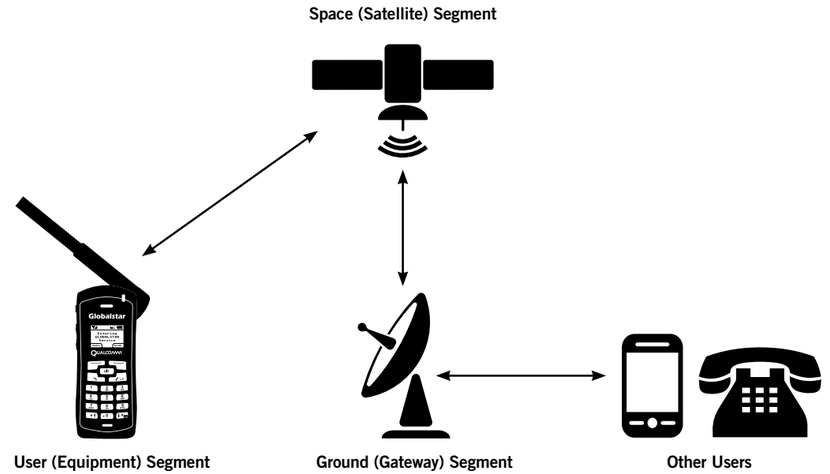
This is often understood as the ease of placing a call to and from your emergency communications device to other communications networks and equipment. With respect to satellite communications, interoperability is crucial.

The satellite communications industry is governed by far fewer federal standards and requirements than most any other communications industry in the U.S. Many features commonplace among cellular and long distance operators are not available with most satellite providers. Globalstar, however, is the only satellite provider which has:

- U.S.-based number
- Calling to 800 toll-free numbers
- 9-1-1 routing with connection to local PSAP (no special provisioning required)

THE GLOBALSTAR COMMUNICATIONS NETWORK

The Globalstar Network is comprised of 3 segments: Space (satellite), Ground (gateway) and User (equipment/phones).



1. Space Segment

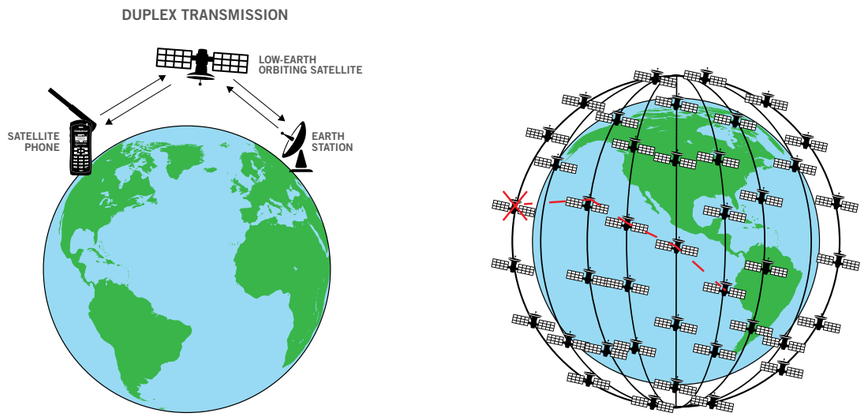
The Globalstar space segment consists of a constellation of LEO satellites, providing global two-way (duplex) and one-way (simplex) communications. Operating at an altitude of 1410 km above earth, the footprint of a Globalstar satellite provides the largest coverage of any LEO operator, and as a result, fewer are required in the Globalstar system.

In August 2013, Globalstar became the first global Big LEO Mobile Satellite Service (MSS) voice and data provider to complete the launch and deployment of a state-of-the-art, second generation MSS constellation.

Globalstar maximizes “continuity of service” through redundancy features not possible on other LEO satellite networks. At any given time, the footprints of two or more satellites may overlap, providing alternative look angles for the phone. This can be crucial in maintaining a call even under suboptimal conditions, especially in mountainous areas or urban canyons. This multiple satellite coverage is a Globalstar patented technology, which we call “path diversity.” A single satellite failure in the Globalstar constellation can be transparent to the user, as the call automatically hands off to another available satellite to provide uninterrupted communications.

By contrast, satellite constellations based on cross links or switching in the sky may produce a widespread system outage if just one satellite within the entire mesh of satellites has failed. Unlike GEO systems, where it is impossible to determine all locations where a GEO based satellite phone will or will not work, Globalstar’s rapid orbiting satellites ensure visibility from most any part of the sky. This satellite diversity sets our system apart from our competitors.

Advantages of the Globalstar Bent Pipe System:
- Allows for local, in-country numbering assignment and local area codes
- Numerous gateways provide redundancy
- Single satellite failure does not result in total system outage
- Less call dropping



Bent Pipe System

Satellite Crosslink System

All satellite systems, no matter what type of satellite constellation or technology used, share one common characteristic: an operational gateway which is required for all satellite calls, regardless of the satellite system or equipment being used.

Gateways are necessary for all systems in authenticating the user’s subscription or SIM card, monitoring the call for lawful intercept purposes and establishing and terminating the call for billing purposes. In some cases, even position location must be established and passed to the billing system at the gateway prior to initiating the call.

2. Ground Segment

Globalstar’s ground segment consists of 24 gateways around the world. Gateways process and route calls to other Globalstar phones, landline, cellular, other satellite networks or the Internet. Each gateway has between three and four tracking antennas which follow the movement of the orbiting satellites.

Globalstar gateways are connected to the PSTN via automatic switching hubs and have multi-channel telephone lines and microwave links to switching centers for long distance and international call routing.

Globalstar gateways are all interconnected via the GDN (Globalstar Data Network). This link between networks allows customers to travel either across country or around the world while still remaining on one universal and global network.

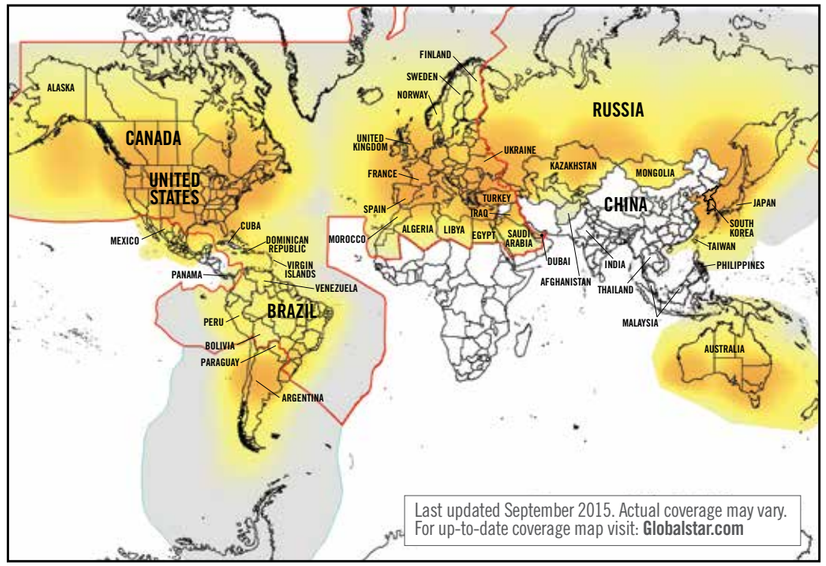
Globalstar gateways include safeguards and backup resources in all the critical subsystems, including:
- Gateway equipment
- Facility power supply
- Ground network
- Multiprotocol Label Switching (MPLS) network as primary backhaul
- Secondary Virtual Private Network (VPN) backup links

The most important feature of Globalstar’s ground segment redundancy is that an entire gateway facility itself has a backup. Neighboring gateway facilities can provide backup to each other, again eliminating the chance of call failure or even localized failure at the “weak link.” Coverage provided by tracking antennas at a neighboring gateway is known as “Beam Overreach.”

Globalstar’s gateways also provide for local, in-country numbering assignments and is the only satellite operator to have authentic U.S.-based telephone numbers. Standard 10-digit numbering plans in the U.S. include local area codes for Florida (863), Texas (254) and Alaska (907).

Globalstar Gateway in Wasilla, Alaska.

Globalstar Duplex Coverage Map



The Caller I.D. and SMS text messaging for Sat-Fi are NOT available outside the Home Zone. Voice calls and data transmissions for Sat-Fi will work the same as regular voice/duplex outside the Home Zone according to the following service areas:

Primary service areas

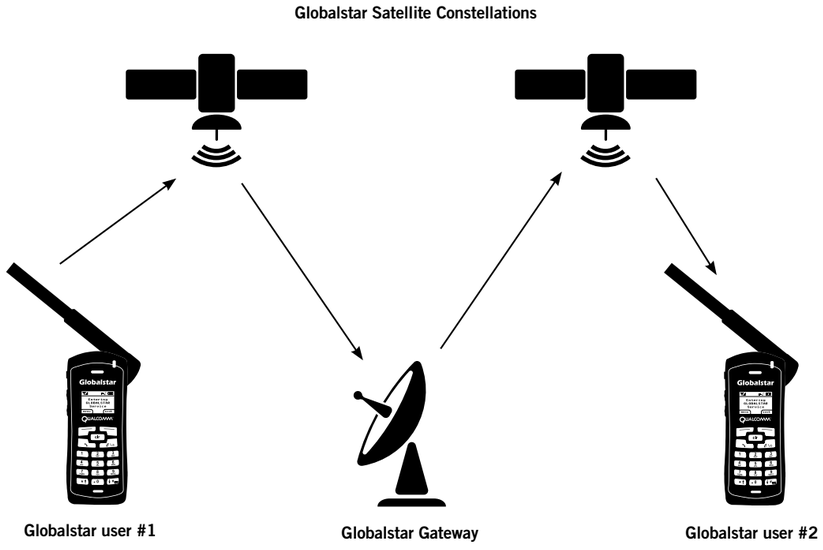
Extended service areas
(Customers may experience a weaker signal)

Fringe service areas
(Customers should expect to experience weakest signal)

Customers who have purchased their Globalstar phone outside of this area: Roaming is not currently available when traveling to the following countries and surrounding ocean areas: Argentina, Chile, Uruguay, and Paraguay. Your phone will not work in these areas, however we are working toward resolving this.

Home Zone: Within the **Home Zone**, **Globalstar** North American customers can freely roam without incurring additional airtime costs. This map is intended to highlight Home Zone coverage for Orbit and Galaxy customers in North America. Coverage is subject to change without notice. For a list of Home Zone countries, visit **Globalstar.com**

Globalstar to Globalstar Satellite Phone Calls "Double Hop" Bypasses 100% of Local Infrastructure within the Disaster Area



3. User Segment

The user segment consists of Globalstar's equipment which operates on its LEO network. It includes but is not limited to:

- Handheld and fixed telephones (akin to cellular and landline phones)
- Two-way (duplex) data modems
- GPS-enabled tracking devices
- Specialty broadband data terminals
- Other simplex based transmitters

The Advantages of LEO Technology for Users Include:

Low Power Requirements – Globalstar phones require very little power to operate and are generally very small in size and portable. The **Globalstar GSP-1700** handheld satellite phone easily fits in a pocket.

Mobility and the Ability to Travel at Any Speed – The mobile terminals may be transported virtually anywhere in the world and still maintain communication with the LEO satellite in the closest orbit to the terminal. Antennas are omni directional, allowing users rapid network registration. Globalstar's omni directional antennas also allow users be continuously on the move without disruption of service.

Low Latency – The low latency of Globalstar signals eliminates any noticeable delay in voice or data transmission. Globalstar delivers calls over an exceptionally clear satellite signal, and does so far faster than any competitor.

CODE DIVISION MULTIPLE ACCESS (CDMA)

Globalstar is a system based on the robustness of CDMA, an implementation of direct sequence spread spectrum techniques based on the IS-95 terrestrial cellular protocol. CDMA is superior to Time Division Multiple Access (TDMA) used by other LEO satellite systems and sets the industry standard for speed and efficiency.

Security – The Low-Probability-of-Intercept (LPI) features which are inherent with the CDMA waveform provide over-the-air security between the user terminal and the gateway.

Globalstar has the most secure satellite network against outside intruders. Globalstar CDMA has never been compromised or hacked in real-time. Other satellite operators have not fared as well. Amateur security experts were recently able to reverse engineer the GMR-1 and GMR-2 ciphers used in their encryption techniques and hack into real-time calls.

Capacity – Globalstar satellites have the highest channel capacity in the industry. Generally speaking, CDMA will carry between 2-3 times as many calls simultaneously as TDMA in the same amount of bandwidth through "frequency reuse."

Speed – The Globalstar system offers the fastest data bandwidth among all LEO satellite operators. Dynamic bandwidth allocation via CDMA reduces the actual amount of data to be transmitted.

Reliability – CDMA also plays a large role in the higher call success rates than competing satellite systems.

Globalstar uses a patented method of signal reception called path diversity, which permits the combining of multiple signals of varying power into one coherent signal. A user can operate the Globalstar phone without a problem with a single satellite in view.

Users can communicate with as many as three satellites simultaneously. Using a rake receiver, the signal from these multiple satellites can be combined into a single static free signal.

The Globalstar satellite constellation is constantly in motion moving in and out of view. The user will be seamlessly added and removed from the satellites while on an active call which will reduce the risk of the call being interrupted. This allows the Globalstar system to provide fewer dropped calls.

The Globalstar satellite phone or terminal has an average power output range of between 50-300 mw. The phone will alter the power levels to compensate for shadowing and interference as needed. In the event of signal fading, CDMA data speeds can be switched down from 9600 to 7200 to 4800 to 2400 to 1200 bits per second rather than drop the call altogether.

By contrast, TDMA-based networks have far slower fixed data rates around just 2400 bits per second. In addition, TDMA does not allow for switching adaptive data rates. As a result, signal fading over TDMA will likely result more often in dropped calls.

GLOBALSTAR SYSTEM REDUNDANCY

A public safety communication system must be robust and reliable on a daily basis. Its design must take into account power failures and loss of critical components (e.g. relays, cell towers, routing and switching equipment).

Gateway Equipment
- All critical gateway subsystems are redundant
- Multiple co-located gateway antennas tracking satellites simultaneously to provide reliable coverage
- Beam overreach coverage from neighboring gateways in case of outage or increased capacity needs

On-Orbit Satellite Assets
- Constellation-wide satellite-to-satellite hand off and redundancy
- Internal critical equipment redundancy within each satellite

Network
- MPLS network provides highly reliable connectivity in North America and Europe
- Secondary/VPN backup links available at all gateways in North America, Europe and Brazil

Facility
- Backup power generator available at all gateways
- UPS and DC batteries to sustain hours of operations in case of generator failure during commercial power outage

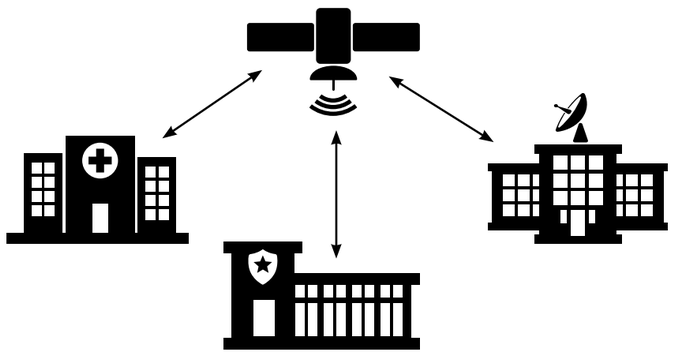
Network Monitoring
- Three geo-redundant network operations centers provide 24/7 system monitoring
- Gateway staff 24/7 on-call
- 24/7 engineering Tier 2 and 3 technical support

Satellite Monitoring
- 24/7 satellite operations monitoring from two control centers
- 24/7 satellite engineering on-call for emergencies

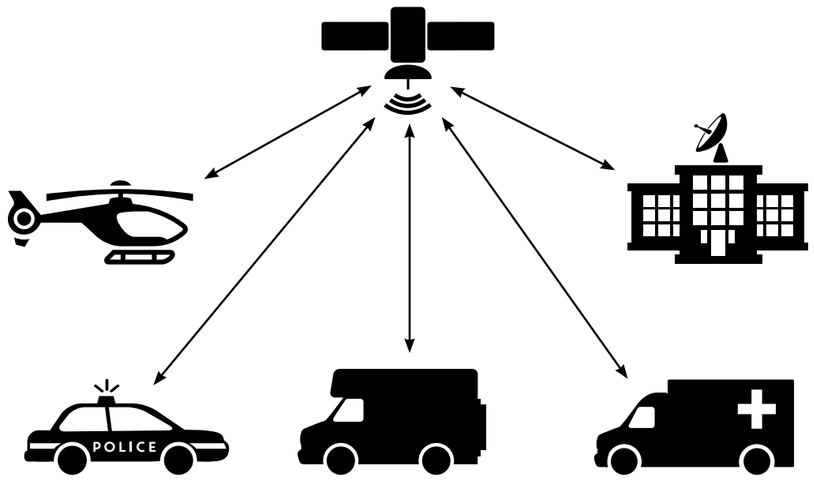
GLOBALSTAR CALLING SCENARIOS

One aspect of Globalstar's interoperability is evident in the vast array of calling scenarios possible over its network. This includes, but is not limited to: end-to-end connections among MSS users, between MSS users, the Public Switched Telephone Network (PSTN), LMR systems, the Internet, etc.

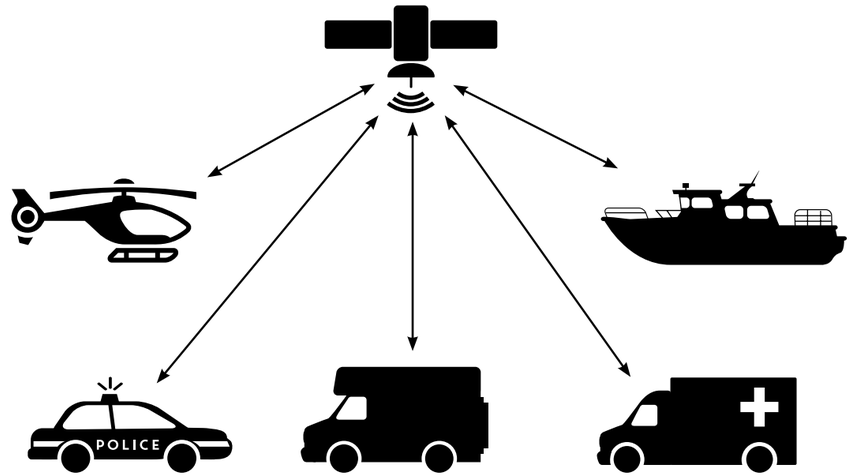
Fixed-to-Fixed



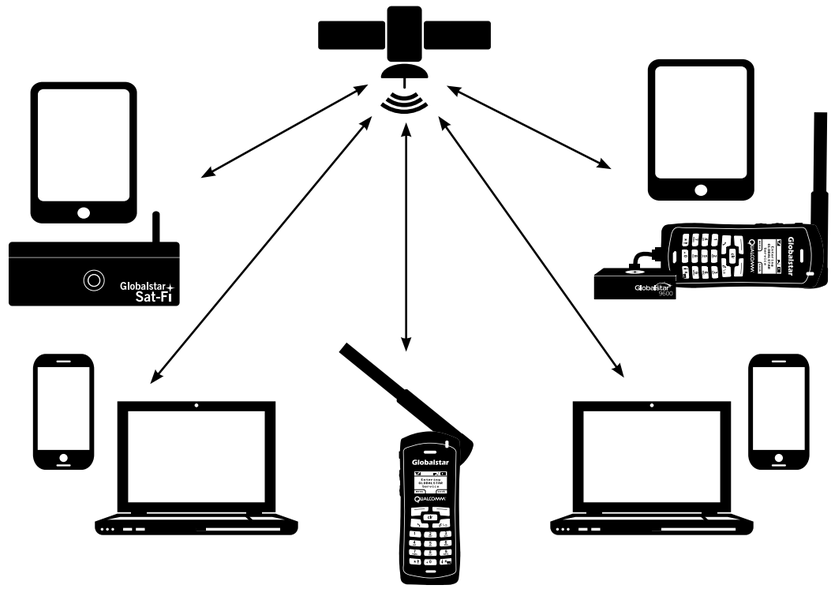
Fixed-to-Mobile



Mobile-to-Mobile



Device-to-Device



GLOBALSTAR SERVICES

Voice Services

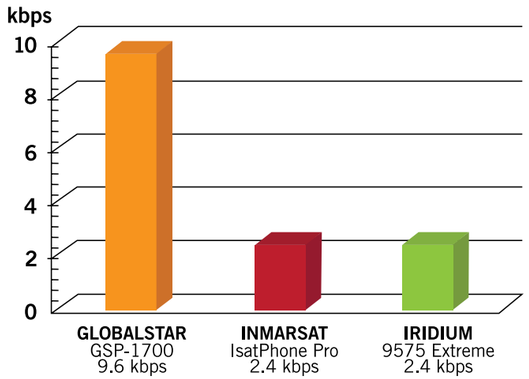
Globalstar is a Mobile Satellite Service (MSS) providing communications on the move and includes equipment that can be used from inside a car, truck or maritime vessel, as well as helicopters and other aircraft. Globalstar can provide the voice and data connections necessary to expedite damage assessments, medical evaluations, or any of the following:

- Emergency Response Coordination
- Dispatch Coordination
- Asset Tracking
- Rapid Mobile Data Transfer
- Environmental Monitoring
- Event Reporting
- Text Messaging

Globalstar products can be deployed and operational within minutes. Technical staff is not needed to set up phones or data terminals, and within seconds, emergency personnel and first responders will benefit from:

- **Crystal-Clear Voice Quality –** Globalstar is the only MSS provider using the patented Qualcomm-based CDMA technology, which provides crystal-clear voice quality similar to modern day digital cellular service.
- **No Perceptible Voice Delay –** Calls occur with no noticeable time delays.
- **Superior Data Speeds and Data Functionality –** Globalstar provides far and away the fastest data speeds among all mobile satellite operators. Users benefit from dedicated channels of 9.6 Kbps with boosted speed of up to 38k with data compression software. This is, at a minimum, four times faster than the closest MSS competitor.
- **Dedicated Data Bandwidth Allocated to Each User –** No need to share and dilute data speeds when others attempt access.
- **Simplicity –** Globalstar mobile handsets have U.S.-based numbers, giving users direct dialing to 9-1-1 services right out of the box. Fixed phones have RJ 11 jacks and connect to analogue handsets, cordless phones or PBX systems. Getting connected takes very little time and requires no special instructions.

GLOBALSTAR MSS DATA SPEEDS 4X FASTER



Data Services

Globalstar is the only direct provider of off-the-shelf, ready to use duplex (two-way) and simplex (one-way) data solutions and services.

- Globalstar's lines of duplex data products include: mobile and fixed phones and Wi-Fi enabled devices like Sat-Fi®, The World's Most Powerful Satellite Hotspot, and the Globalstar 9600™ Data Satellite Hotspot.
- Globalstar is the only MSS provider whose speeds are sufficient for real-time web browsing (2016) and file/photo transfer. All other mobile satellite operators offer data speeds of only 1.2 and 2.4 Kbps data speeds which are insufficient for most practical data applications.

GLOBALSTAR PRODUCT PORTFOLIO

GSP-1700 Mobile Satellite Phone

Key Features:

- **Powered by 100% Satellite Technology –** Works where cell phones don't
- **Crystal-Clear Voice Quality –** No "tunnel sound" or voice delay during conversation like the competition
- **Fastest MSS Data Speeds –** Send and receive emails and access the Internet (2016) when using the Globalstar 9600 Data Satellite Hotspot (sold separately – see below for more information)
- **Lowest Priced Airtime Plans –** Over 50% savings vs. the competition
- **U.S.-based Phone Number –** Direct dialing to 9-1-1 services right out the box
- **Smallest and Lowest Priced Handset –** Easily fits in your pocket

Specifications:

- Dimensions: 5.3" (H) x 2.2" (W) x 1.5" (D)
- Weight: 7.05 oz.

Globalstar 9600 Data Satellite Hotspot

With the Globalstar 9600 Wi-Fi data hotspot, emergency personnel and first responders can now use a convenient app to seamlessly pair their existing GSP-1700 satellite phone with a smartphone, tablet or laptop to send and receive email and text messages over the world's most modern and fastest MSS network.

Compatible Operating systems:

- Android
- Apple iOS
- Windows
- Mac

(Recommended Antenna)

GIK-1700 Car/Vessel Installation Kit

The GIK-1700 provides convenient, in-vehicle and in-vessel operation of the Globalstar GSP-1700 mobile satellite phone by connecting it to an easily mountable external antenna. The GIK-1700 offers flexibility and handsfree usability when traveling and working in areas where cellular coverage is unavailable.

GPH-1700 Privacy Handset Sold Separately

GPDK-1700 Portable Docking Kit

The GPDK-1700 does everything that the Globalstar Installation Kit (GIK-1700) does - provides in-vehicle and in-vessel operation of the Globalstar GSP-1700 mobile satellite phone - with the added bonus of being able to take the entire kit with you when you exit your vehicle or vessel.

(Recommended Antenna)

Sat-Fi® – The World's Most Useful Satellite Hotspot

Similar to the Emergency Response Interoperable Communications (ERIC) system, Sat-Fi provides immediate localized communications services to first responders, using their existing Wi-Fi enabled devices.

Key Features:

- **Powered by 100% Satellite Technology –** Works where cell phones don't
- **Crystal-Clear Voice Quality –** No "tunnel sound" or voice delay during conversation like the competition
- **Utilizes Globalstar's Fastest Data Speeds –** 4X faster than any other mobile satellite company and getting faster every day
- **Lowest Priced Airtime Plans –** Over 50% savings vs. the competition
- **U.S.-based Phone Number –** Direst dialing to 9-1-1 services right out the box while our competitors use country codes, making dialing very difficult
- **Connect up to 8 Users to Sat-Fi at One Time –** Competing devices can only handle 5 users

Specifications:

- Dimensions: 6.3" (H) x 6.3" (W) x 2.4" (D)
- Weight: 8.0 oz.
- Power Supply: 12 VDC
- Wi-Fi Range: Up to 100 ft.

(Smartphone shown as an example and is not included with Sat-Fi)

GSP-2900 Satellite Fixed Phone System

Globalstar's GSP-2900 satellite fixed phone system is installed safely and securely on a rooftop to bring a working phone line inside that can be connected to any standard phone or PBX. The device provides convenient in-building satellite voice and data services and also works with the Globalstar 9600 Wi-Fi data hotspot.

Key Features:

- **Versatile fixed satellite phone system powered by 100% satellite technology –** Works where cell phones don't
- **Utilizes Globalstar's fastest data speeds –** 4X faster than any other mobile satellite company and getting faster every day
- **U.S.-based phone number –** Direct dialing of 9-1-1 services right out the box while our competitors use country codes, making dialing very difficult
- **Redundant power –** Easily connects to a 12V generator or solar power system when standard 110V power goes down

Specifications:

- Housing Dimensions: 9.84" (H) x 8.5" (W) x 3.3" (D)
- Antenna Dimensions: 19.48" (H) x 0.98" (Diameter)
- Weight: 6.7 lbs.
- Power: Universal AC Power Supply with Battery Backup

(Connects to standard analog phone - not included)

LESSONS FROM HURRICANE KATRINA

The hurricane season of 2005 illuminated the preparedness and response deficiencies of coordination and communication during response at all levels of government, as well as deficiencies within the health care system.

Globalstar's network provided seamless communications in the Gulf South region where terrestrial communications systems were damaged and rendered unavailable. Globalstar's efforts and capabilities in the aftermath of Hurricane Katrina in 2005 have been acknowledged by many prominent figures.

Senator Mary Landrieu (D-LA) stated that following Katrina, *"satellite-based communications were vitally important when terrestrial communications networks became overloaded and failed after this disaster. After Katrina, Globalstar had system capacity sufficient to handle this load of traffic (no overload)."*

Globalstar's post-disaster contributions were also recognized by such public officials as **President George W. Bush and Mississippi Governor Haley Barbour.** (Letter from President Bush on page 26)

As we learned from Hurricane Katrina, satellites provide the only operable solution in the aftermath of a disaster and are essential to emergency and communications preparedness. As part of the National Preparedness Goal (NPG) developed by the Department of Homeland Security, all 50 states are required to be prepared for 15 different terrorist attack or national disaster scenarios and to develop and maintain almost 40 critical capabilities. Among these capabilities, interoperable and operable communications remain chief.

"State and local emergency operations centers and 9-1-1 call centers should prioritize investment in the next phase of redundant communications; sometimes known as "operability" which only satellite-based carriers can deliver Satellite based platforms have demonstrated time and again they are by far the least vulnerable backup or redundant connections available." - The National Infrastructure Advisory Council – 2013

Congressman Cedric Richmond (D-LA) echoed this view, saying that "[my] constituents and I experienced the effects of Hurricane Katrina firsthand when satellite-based communications were so integral in performing safety of life services and response…We need to ensure that Globalstar has the ability to continue providing these unique services well into the future."

FUNDING & GRANT INFORMATION

FEMA – Homeland Security Grant Program (HSGP)

The terrorist attacks of September 11, 2001 served as a catalyst for a rethinking of emergency preparedness and disaster response practices in the public and private sectors. The lapses in response and recovery efforts in the wake of that catastrophe revealed serious gaps in emergency communications planning, equipping and training among agents and responders.

Federal inquiries that followed were largely focused on finding solutions to the communications breakdowns that occurred among public safety and first responders. The lack of a national strategy, universal standards and funding assistance at local levels slowed the adoption of solutions like Globalstar, which had already existed.

Programs enacted by the U.S. Department of Homeland Security has fostered and prioritized focus on emergency preparedness and disaster response among local, state and federal government jurisdictions and first responders.

The National Response Framework, developed by the Department of Homeland Security, provides the blueprint for how communities can cooperate to fulfill all four domestic preparedness mission areas: prevention, protection, mitigation, and response and recovery. Globalstar's interoperable communications have become a cornerstone of the U.S. Federal Government's response and recovery strategy.

The HSGP provides funding to states, territories, urban areas, and other local and tribal governments to prevent, protect against, mitigate, respond to, and recover from potential terrorist attacks and hazards.

The Office of Emergency Communications (OEC) ensures implementation of communications interoperability at state and local levels through the SAFECOMM program. This federal umbrella program is designed to foster interoperability among the nation's public safety practitioners.

SAFECOMM coordinates with existing federal communications programs, elected and appointed officials, and key emergency responder organizations to provide standards, guidance and assistance in obtaining emergency communications grant funding.

The 2015 HSGP is comprised of three related grant programs:

- **State Homeland Security Program (SHSP) –** SHSP provides $401,346,000 to support the implementation of the NPS to address planning, organization, equipment, training, and exercise needs to prevent, protect against, mitigate, respond to, and recover from acts of terrorism and other catastrophic events. SHSP also provides funding to implement initiatives that address shortfalls and deficiencies identified in the State Preparedness Report (SPR).
- **Urban Area Security Initiative (UASI) –** UASI provides $587,000,000 to address the unique planning, organization, equipment, training, and exercise needs of 64 high threat, high density urban areas, and assists them in building an enhanced and sustainable capacity to prevent, protect against, mitigate, respond to, and recover from acts of terrorism and other catastrophic events.
- **Operation Stonegarden (OPSG) –** OPSG provides $55,000,000 to enhance cooperation and coordination among local, tribal, territorial, state, and federal law enforcement agencies in a joint mission to secure the United States' borders along routes of entrance from international borders to include travel corridors in states bordering Mexico and Canada, as well as states and territories with international water borders.

Additional guidance and application kits are available at **http://www.fema.gov/grants** as well as the Notice of Funding Opportunity.

FEMA Authorized Equipment List (AEL)

The AEL is a tool used to determine qualification of equipment types for FEMA's Preparedness Grant Programs. The AEL is used to facilitate more effective and efficient procurement of items under specific FEMA Preparedness Grants by informing grantees of equipment items allowed under specific grant programs and relevant programmatic considerations associated with each equipment item.

The following are FEMA codes found on the AEL that apply to Globalstar's product offerings:

- 06CC-03-SATB – Satellite communication device, fixed phone
- 06CC-03-SATM – Satellite communication device, mobile phone
- 06CC-03-SATP – Satellite service with handheld device
- 06CC-03-SADS – Satellite data services (Internet access via satellite connection); commercial providers of Internet connectivity via satellite
- 06CC-02-2WAY – two-way text messaging device

US Dept. of Health & Human Services (HHS)

The hurricane season of 2005 illuminated the preparedness and response deficiencies of coordination and communication during disaster response at all levels of government, as well as deficiencies within the health care system. The health care system response to Hurricane Katrina contributed to 195 documented fatalities in Louisiana hospitals, and now focus has shifted to the health care industry and to the poor coordination that resulted in hundreds of lost lives.

Following U.S. Federal Inquiries, Congress agreed on the need to upgrade preparedness and response capabilities in the health care industry. Redundant communications was one of the major priorities, as reflected today in the cooperative agreement between the CDC and ASPR.

Federal funds provided for health care system emergency preparedness are awarded by the Centers for Disease Control and Prevention (CDC) to public health agencies and by the U.S. Department of HHS, Assistant Secretary of Preparedness and Response (ASPR) for hospitals. The ASPR department funds the Hospital Preparedness Program (HPP) and requires that health care coalitions be established as the structure for coordination of regional health care system emergency preparedness and disaster response.

The federal guidance provides broad preparedness, response and recovery expectations for health care coalitions without distinction of available resources. It is the responsibility of local and regional providers to agree on the architecture of their redundant communications network, although the ASPR and CDC make strong suggestions in its grant guidance on the irreplaceable benefits of a satellite phone-based system.

The Hospital Preparedness Program (HPP) Grant Program is focused on addressing eight key capabilities found in HPP's Healthcare Preparedness Capabilities: National Guidance for Healthcare System Preparedness. One of these eight capabilities, essential to providing medical care in the event of a pandemic or epidemic, is interoperable communications.

Public Health and Emergency Preparedness (PHEP) grants have been crucial in providing effective response resources to the private sector, represented by the hospitals, health care and urgent care clinics. In 2014, the amount of money allocated through PHEP to health departments was three times the size of funds allocated to the private-sector-based health care facilities.

NOTES AND FREQUENTLY ASKED QUESTIONS (FAQ)

PLEASE NOTE

In a recent survey carried out and co-produced by Emergency Management magazine and Hughes, over 500 organizations in both the public and the private sector were surveyed about their emergency communications readiness.

Nearly 90% of all organizations confirmed they had responded to an emergency in just the past five years. Disturbingly, over 60% felt that their existing communications network was insufficient to ensure Continuity of Operations (COOP) with key government and first responder organizations in post disaster recovery efforts.

The first and most important step in developing a crisis plan is to open the lines of communication between emergency health facilities. Simply having a way to communicate with each other will help tremendously in a crisis.

Globalstar is the Only Emergency Communications Network Capable of the Following:

- True interoperability
- Mobile data speeds able to fulfill requirements of DHS and U.S. DoH grant programs
- Local U.S.-based numbers through its network of U.S.-based gateways
- Redundancy
- The lowest prices in the MSS industry
- Mobility and the ability to travel at any speed while communicating
- Mission Critical Voice Quality

Upcoming for Globalstar

Globalstar has contracted with Hughes Network Systems to deliver next generation ground network equipment, software upgrades and satellite handset chipsets, and it expects this new ground segment to be operational by the first quarter of 2016. Globalstar should be able to provide customers with new service features including advanced (and affordable) voice and two-way data and messaging services with uplink and downlink data speeds of up to 256 kbps for mobile service. These data speeds should meet the needs and expectations of mobile consumers who find themselves out of range of terrestrial services.

FAQ

Do Globalstar satellite phones work like cellular/mobile phones?

Globalstar satellite phones offer many of the same characteristics as cellular/mobile phones, including a similar user interface and design. Satellite phones are slightly larger in size than today's cellular/mobile phones because the antenna required to communicate on the satellite frequencies must be larger than a cellular phone antenna. Another fundamental difference between traditional cellular/mobile phones and satellite phones is that a satellite phone must be within line-of-sight of the satellite in order to make and receive a call. The satellite phone antenna must have a clear view of the sky without any obstructions. Therefore, a satellite phone will not work indoors unless there is an external antenna located outside connected back to the satellite phone.

Are Globalstar's satellite services and hardware reliable?

Yes. Globalstar's satellite service and hardware are extremely reliable. A significant portion, if not the majority, of problems encountered in the field with dropped service are traceable to operator error resulting from lack of training or familiarity with the equipment. A common example is not fully extending the satellite antenna and pointing it up to the sky. Ease of operation leads to more reliability.

Isn't purchasing satellite services expensive?

Globalstar offers the least expensive satellite communication services in the industry. With the purchase of specific airtime plans, Globalstar satellite phones are either FREE or extremely discounted. Additionally, service rates are available for under a dollar a minute.

Why are satellite communications an essential component for all critical telecom network planning?

To enable rapid deployment and/or restoration and truly mobile communications, emergency personnel and first responders should incorporate Globalstar satellite services as a redundancy requirement in any communications network or architecture. A satellite system should be emphasized and included in the early planning of these initiatives to ensure there is a backup communications solution when the terrestrial network is damaged or destroyed. Without a satellite component to any future emergency response communications network, emergency communications will be rendered useless when the terrestrial network sustains damage or is overloaded.

ABOUT US

Globalstar is a leading provider of mobile satellite voice and data services in the "Big LEO" band at 1610-1618.725 MHz/2483.5-2500 MHz. Since its inception, Globalstar has invested over $5 billion in the development of a global non-geostationary ("NGSO") MSS network, which today features a constellation of in-orbit satellites and 24 ground stations on six continents that, together, comprise the Globalstar System. The Globalstar System currently provides affordable, high-quality MSS to over 530,000 customers in over 120 countries around the world.

Initiating commercial MSS in 2000, Globalstar has been dedicated to providing mission-critical, safety-of-life offerings to the public, including emergency services and connectivity in rural and remote areas. Public safety entities involved in relief efforts in the United States and around the world have relied on Globalstar's satellite services after earthquakes, hurricanes and other disasters. Globalstar looks forward to continuing its critical partnership with the public safety community for years to come.

Contact Us

Globalstar Corporate Headquarters
300 Holiday Square Blvd. | Covington, LA 70433
1.877.SATPHONE (1.877.728.7466)

INSIDE SALES

1-877-SATPHONE (1-877-728-7466)
insidesales@globalstar.com

APPENDIX

THE WHITE HOUSE

WASHINGTON

November 21, 2005

Globalstar Telecommunications Limited
Milpitas, California

Dear Friends:

I learned about your contributions to help the victims of Hurricanes Katrina and Rita. Our Nation is grateful to all those who are helping their fellow citizens in need.

The scenes from the hurricanes have touched our hearts, and our Nation is again showing the world that the greatest challenges bring out the best in America. Together, we will continue to bring new hope to those affected by this tragedy, and the Gulf Coast will emerge better and stronger.

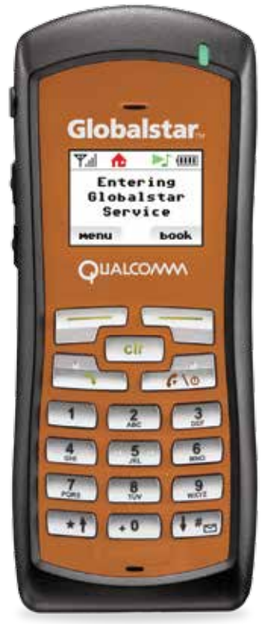
The good works of Globalstar demonstrate the character and great strength of our Nation. May God bless all those affected by these storms, and may God continue to bless America.

Sincerely,

George W. Bush

GSP-1700
Mobile Satellite Phone

Globalstar provides true interoperability for emergency management response personnel and their affiliated organizations to communicate within and across agencies, jurisdictions via voice, data, or video-on-demand, in real-time, when needed, and as authorized. Personnel can quickly, and clearly, coordinate with co-workers when terrestrial networks are down.



KEY FEATURES

- **Powered by 100% satellite technology** – *Works where cell phones don't*
- **Crystal-clear voice quality** – *No "tunnel sound" or voice delay during conversation like the competition*
- **Utilizes Globalstar's fastest data speeds** – *4X faster than any other mobile satellite company and getting faster every day (9600 hotspot required, sold separately)*
- **Lowest priced airtime plans** – *Over 50% savings vs. the competition*
- **U.S.-based phone number** – *Direct dialing of 911 services right out the box while our competitors use country codes, making dialing very difficult*
- **Lowest priced handset** – *Get it now for **FREE** for a limited time at Globalstar.com/PhoneDeals*

OPERABILITY BENEFITS

- **Instant Infrastructure** – Globalstar supplies communications in areas where existing infrastructure is outdated, insufficient, or damaged.
- **Independent of Terrestrial Infrastructure** – Globalstar provides redundancy in the case of terrestrial network outages. Business, recovery efforts and communication between loved ones never has to stop when using Globalstar.
- **Temporary Network Solutions** – For homeland security or military activities, Globalstar can often provide the only practical, short-term solution for getting necessary information in and out such as phone calls, emails or document and image sending.
- **Rapid Provisioning of Services** – Since satellite solutions can be setup quickly using the GSP-1700 mobile satellite phone or the Globalstar Sat-Fi®, the world's most powerful satellite hotspot, you can achieve a high level of communications rapidly without high budget expenditures.

DATA NETWORK AND SERVICES

- GDK-GS9600 Data Satellite Hotspot Accessory (sold separately)
- Data speeds compressed up to 38.6 Kbps (uncompressed speed 9.6 Kbps)
- Easily send and receive emails and post to social media from any Wi-Fi enabled device
- No additional cost, uses your existing Globalstar airtime plan minutes
- Wi-Fi range up to 30 ft

MEETS THE FOLLOWING FEMA AEL CODES

- 06CC-03-SATM – Satellite communication device, mobile phone
- 06CC-03-SATP – Satellite service with handheld device
- 06CC-03-SADS – Satellite data services (Internet access via satellite connection); commercial providers of Internet connectivity via satellite

Visit **Globalstar.com** for service plan and coverage details.

GSP-1700
Mobile Satellite Phone

SPECIFICATIONS

DIMENSIONS	135mm H x 55mm W x 37mm D (5.3”H x 2.2”W x 1.5”D)
WEIGHT	7.05oz (200g)

GSP-1700 SATELLITE PHONE PACKAGE INCLUDES

- GSP-1700 handset
- Rechargeable Lithium-Ion battery
- AC charger
- Quick-start guide
- User manual

OPERATIONAL

PHONE	-20ºC to +55ºC (-4ºF to +131ºF)
BATTERY CHARGING	0ºC to +40ºC (+32ºF to +104ºF)
BATTERY STORAGE	-30ºC to +60ºC (-22ºF to +140ºF)
VEHICLE/MARINE KIT ANTENNA (OPT)	-20ºC to +55ºC (-4ºF to +131ºF)
VEHICLE/MARINE KIT CRADLE (OPT)	-30ºC to +50ºC (-22ºF to +122ºF)
BATTERY	3.7V, 2600mAh
TALK TIME	4 hours (+26 dBm)
STANDBY TIMES	10 hours (with satellite signal) 36 hours (without satellite signal)

RF POWER OUTPUT	400 mW maximum (+26 dBm) (Phones) 794 mW maximum (+29 dBm) (Car kit)
VOCODER	8k variable rate vocoder for Globalstar mode
FREQUENCY RANGE	Globalstar Transmit: 1610.73 to 1620.57 MHz Globalstar Receive: 2484.39 to 2499.15 MHz (Channel Center Frequency)
CERTIFICATIONS	FCC, IC, CE, ANATEL

ACCESSORIES

GLOBALSTAR 9600™
By connecting the Globalstar 9600 to the GSP-1700, customers can use their existing Wi-Fi enabled devices such as smartphones, tablets and laptops to send and receive emails and text messages.

GIK-1700 INSTALL KIT
Install your GSP-1700 in virtually any land based vehicle or vessel. Choose from three antenna options and three variable cable lengths up to 86 feet. (Choice of magnetic helix, magnetic patch or pole-mounted marine helix antenna)

GLOBALSTAR EMERGENCY PACKAGE
Yellow Pelican Case holds: GSP-1700, vehicle charger, spare battery and DC power cable.

GPDK-1700 PORTABLE DOCKING KIT
All-in-one GSP-1700 travel station for all mobile operations: air, land and sea. GPDK-1700 charges the GSP-1700 battery when the handset is connected to the GPDK-1700. (Choice of magnetic helix, magnetic patch or pole-mounted marine helix antenna)

ADDITIONAL ACCESSORIES

- Vehicle/Vessel Charger
- Auxiliary Battery Charger
- Backup Lithium-Ion Battery
- Rugged, Leather Phone Case

Visit **Globalstar.com** for service plan and coverage details.

Sat-Fi®
THE WORLD’S MOST POWERFUL SATELLITE HOTSPOT

With **Sat-Fi**, emergency management/response personnel can use their existing Wi-Fi enabled devices to send and receive calls, email and SMS text messages and use caller ID right out of the box, even when cellular and landlines are down.

(Smartphones shown as an example and are not included with Sat-Fi)

KEY FEATURES

- **Powered by 100% satellite technology –** *Works where cell phones don’t*
- **Crystal-clear voice quality –** *No “tunnel sound” or voice delay during conversation like the competition*
- **Utilizes Globalstar’s fastest data speeds –** *4X faster than any other mobile satellite company and getting faster every day*
- **Lowest priced airtime plans –** *Over 50% savings vs. the competition*
- **U.S.-based phone number –** *Direct dialing of 911 services right out the box while our competitors use country codes, making dialing very difficult*
- **Connect up to 8 users to Sat-Fi at one time –** *Competing devices can only handle 5 users*

MEETS THE FOLLOWING FEMA AEL CODES

- 06CC-03-SATM – Satellite communication device, mobile phone
- 06CC-03-SATP – Satellite service with handheld device
- 06CC-03-SADS – Satellite data services (Internet access via satellite connection); commercial providers of Internet connectivity via satellite
- 06CC-02-2WAY – Two-way text messaging device
- 06CC-03-SATB – Satellite communication device, fixed phone

SAT-FI INCLUDES

- **Sat-Fi** unit
- AC/DC power supply
- 12VDC car adapter
- Waterproof DC power cable
- Wi-Fi antenna
- External satellite antenna
- 14 ft coaxial antenna cable (32 ft, 47 ft and 86 ft also available)
- Mounting accessories
- Quick start guide

SPECIFICATIONS

DIMENSIONS	6.3 in x 6.3 in x 2.4 in 16 cm x 16 cm x 6.1 cm
POWER SUPPLY	12VDC
MAX POWER INPUT	14W
OPERATING ENVIRONMENT	-22F to +140F -30C to +60C
SIGNALING	SIP
DTMF FORMAT	RFC2833
# VOICE CHANNELS	1
AUDIO CODES	G.711u
FREQUENCY/POWER	2.4 GHz/100 mW Max Transmit
STANDARDS	802.11 b/g/n
WI-FI RANGE	Up to 100 ft

Works with: android iPhone

CHOICE OF ANTENNA

GAT-17HX
Active Magnetic Helix Antenna (recommended antenna)

GAT-17MP
Active Magnetic Patch Antenna

GAT-17MR
Pole-Mounted Marine Helix Antenna; 1” - 14 standard threaded base

For more information, visit **Globalstar.com/Sat-Fi**

GSP-2900
Fixed Phone System

The **GSP-2900** is a versatile fixed satellite phone system providing convenient access to satellite voice and data services, including Internet, email and voicemail. For disaster management and emergency preparedness, the **GSP-2900** can be used as an affordable and redundant communications system, providing temporary backup communications for any fixed-site location.

(Standard Analog Phone Not Included)

KEY FEATURES

- **Versatile fixed satellite phone system powered by 100% satellite technology** - *Works where cell phones don't*
- **Utilizes Globalstar's fastest data speeds** - *4X faster than any other mobile satellite company and getting faster every day*
- **Crystal-clear voice quality with connection for up to 5 analog phones** - *No "tunnel sound" or voice delay during conversation like the competition*
- **U.S.-based phone number** - *Direct dialing of 911 services right out the box while our competitors use country codes, making dialing very difficult*
- **Redundant power** - *Easily connects to a 12V generator or solar power system when standard 110V power goes down*

GSP-2900 INCLUDES

- Fixed Phone Unit
- Mini-Stick antenna
- Junction Box
- +12V AC/DC Power Supply
- Backup Battery
- Mounting Kit
- 50' power/phone cable

FLEXIBLE CONFIGURATION

- Can be installed on boats, skyscrapers, service vans and more
- Easily connect the GSP-2900 power supply to a 12V generator or solar power system where standard 110V power is not available
- Battery backup for redundant power
- Choose from 3 antenna cable length options 20', 30' and 55'
- Connect up to 5 analog telephones up to 800' away
- Interface with trunk line or phone switch loop start, both key systems and PBXs

DATA (OPTIONAL ACCESSORIES)

- Globalstar 9600 Data Satellite Hotspot
- GDK-G9600-ADPT - Serial to USB Cable

MEETS THE FOLLOWING FEMA AEL CODE

- 06CC-03-SATB – Satellite communication device, fixed phone
- GDC-2100 – Data cable kit

TECHNICAL SPECIFICATIONS

FIXED PHONE UNIT

DIMENSIONS	9.7 IN (H) x 8.5 IN (W) x 3.3 IN (D) 25 CM (H) x 21.6 CM (W) x 8.4 CM (D)
WEIGHT	6.7 lbs (3.04 kg)
OPERATIONAL TEMPERATURE	-22°F to + 140°F (-30°C to +60°C)
STORAGE TEMPERATURE	-40°F to + 185°F (-40°C to +85°C)
POWER	- Universal AC/DC power supply, with battery backup - Consumption 36 watt maximum at 12 VDC nominal input voltage - 12 watt typical operation
RF POWER OUTPUT	2 watt maximum (+33 dBm)

JUNCTION BOX

DIMENSIONS	6.0 IN (H) x 3.2 IN (W) x 2.1 IN (D) 15.2 CM (H) x 8.2 CM (W) x 5.3 CM (D)
WEIGHT	1.0 lbs (0.45 kg)
OPERATIONAL TEMPERATURE	-22°F to + 140°F (-30°C to +60°C)
STORAGE TEMPERATURE	-40°F to + 185°F (-40°C to +85°C)

Visit **Globalstar.com** for service plan and coverage details.

"The referral from our staff put Globalstar in front of me, but the affordability of it was the determining factor."

— GARY KING
Buyer, Materials Management
New Orleans East Hospital

300 HOLIDAY SQUARE BLD., COVINGTON, LA 70433 | **GLOBALSTAR.COM**