



Satellite Telephone Options Overview

For further questions:

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**Knowing what works with what is our biggest competitive advantage.
We don't sell boxes. We solve problems**

In addition to the High Speed Digital Wireless Data, and long-range LAN/WAN wireless communication options, the **TAC•PAK** can be configured to provide reachback communications using satellite telephones. This document provides a real world summary of the satellite telephone systems, their operational benefits and limitations, and approximate operating costs.

Please note –

as a courtesy to our clients, 308 SYSTEMS also offers bundled wireless service pricing and budget friendly options for zero recurring service costs.

There are five separate and distinct satellite telephone systems available for use in the **TAC•PAK**: INMARSAT, Globalstar, Iridium, Globalstar, Thuraya and VSAT systems. Each of these will be discussed below:

INMARSAT

The INMARSAT satellite system provides **TAC•PAK** high speed data(Internet, connect to your office LAN, etc) access at data rates up to 492kbps using the BGAN satellite networks. The user equipment is a laptop-sized package with stand that folds out. For data access, the satphone is connected to the **TAC•PAK** laptop via an Ethernet cable. Although not extremely difficult to use, the INMARSAT system is more complex than the Iridium/Globalstar/Thuraya handheld **TAC•PAK** satphone options. Also, the phone handsets(ISDN, analog, or VoIP) must be used near the stationary antenna location.

When using the INMARSAT satphone in the field, the user must be aware that the satellite is geostationary and typically sits low on the horizon. In order for the user to acquire a satellite signal, you must be able to see the geostationary satellite typically 20-30degrees above the southern horizon. Thus, if there is a building(i.e. – downtown New York), valley(i.e.- mountains of West Virginia), or other obstruction between the user and the geostationary satellite, the satphone will not work. To alleviate this issue, we have developed our “SATPAK” repeater

technology(see below) available to enable placement of the antenna high in a LOS position, and then relay the data signals up to 1 mile down the mountain/building to the **TAC•PAK** operating location.

INMARSAT BGAN voice/data charges can be either pre-paid or post-paid. The pre-paid plans use SIM cards just like your cell phone, and these are purchased in multiples of 1000 "units". Each "unit" can be used for either voice or data, thus there is no exact amount of each - the quantity varies in proportion to usage, up to the maximum purchased on the SIM card. These plans have a 1 year expiration, thus you can use them anytime within the year. NOTE - we recently came out with shared SIM plans, wherein the **TAC•PAK** user could purchase a block of units to be shared across multiple SIM cards. The post-paid plans require a yearly contract wherein they agree to keep the service active, and you then agree to purchase anywhere from 0 to thousands of units/month. They then send you a bill every month for the base rate plus any additional overage charges.

Globalstar

As of February 2013, Globalstar is now back and operational. The Globalstar satellite system provides **TAC•PAK** data(Internet, connect to your office LAN, etc) access at 9.6kbps, with 33.6kbps effective rate using compression software. The user equipment is a small package which will fit in your pocket(if you have large pockets) and is easily portable. You can walk around and talk on the Globalstar satphone. Data connectivity is through a USB cable connected to the **TAC•PAK** laptop. This satphone is very easy to use, similar to a cell phone.

When using the Globalstar satphone in the field, the satellite system is composed of earth orbiting satellites, which orbit over the user. Thus, the "talk time" is only limited by your skyview. If you are in a valley the Globalstar satphones will work, however you will lose signal as the satellite orbits out of your skyview. Thus, talking from a very narrow "urban canyon" or mountain valley will give you a talk time of approximately 5min, whereas out in the desert you can talk forever.

Globalstar hardware is priced under \$750, and they have various service packages, with a minimum monthly fee of \$24.95/mo, which includes 10 minutes/mo. If desired, **TAC•PAK** users may purchase multiple years worth of service on a single PO.

Iridium

The Iridium satellite system is primarily a voice provider and does not provide robust data services. The Iridium data service is limited to an effective 4.8kbps throughput, thus it is not recommended for **TAC•PAK** data(Internet, connect to your office LAN, etc) usage unless you are near the Arctic Circle. The user equipment is a small package which will fit in your pocket(if you have large pockets) and is easily portable. Data connectivity is through a USB cable connected to the **TAC•PAK** laptop. This satphone is very easy to use, similar to a cell phone.

When using the Iridium satphone in the field, the satellite system is composed of earth orbiting satellites, which orbit over the user. Thus, the "talk time" is only limited by your skyview. If you are in a valley the Iridium satphones will work, however you will lose signal as the satellite

orbits out of your skyview. Thus, talking from a very narrow “urban canyon” or mountain valley will give you a talk time of approximately 5min, whereas out in the desert you can talk forever.

Iridium hardware is priced at approximately \$1,700 and Iridium does not charge a monthly fee for prepaid service. They use SIM cards which can be prepurchased and recharged by a credit card. In low volume, each minute costs approximately \$1.55/min. Numerous postpaid plans are also available, starting with a \$49.95/mo fee. They also offer many increased usage plans, similar to a cell phone company. If desired, **TAC•PAK** users may purchase multiple years worth of service on a single PO.

THURAYA

The THURAYA satellite system is available for **TAC•PAK** clients operating in Europe and Africa. The handheld THURAYA phones do not provide robust data services(effective 4.8kbps throughput) and is not recommended for **TAC•PAK** data(Internet, connect to your office LAN, etc) usage. The user equipment is a small package which will fit in your pocket(if you have large pockets) and is easily portable. Data connectivity is through a serial cable connected to the **TAC•PAK** laptop. This satphone is very easy to use, similar to a cell phone.

The separate THURAYA DSL service is based upon a laptop sized antenna, is data-centric and supports up to 144kbps, which is acceptable for limited TAC-PAK data connections. It must be setup and pointed at the Line Of Site satellite, similar to the INMARSAT BGAN systems.

When using the THURAYA satphone in the field, the satellite system is composed of geostationary satellites. Thus, the “talk time” is limited by your skyview. If you are in a valley out of LOS, the THURAYA satphones will not work.

THURAYA hardware is priced approximately \$850 and THURAYA does not charge a monthly fee. They use SIM cards which can be prepurchased and recharged by a credit card. Each minute costs approximately \$.65/min. They also offer many increased usage plans, similar to a cell phone company. If desired, **TAC•PAK** users may purchase multiple years worth of service on a single PO.

VSAT

VSAT satellite systems utilize smaller traditional dish equipment to provide transmit/receive Internet connections through geostationary satellites in the Ku and Ka bands. These connections can range from 128Kbps to 6Mbps. The user equipment is typically multiple packages containing a deployable antenna system(.75m to 1.2m), antenna controller, modem/router, and 3w, 4w or 6w Block Up Converter(BUC).

For data access, the VSAT system is connected to the **TAC•PAK** laptop via an Ethernet cable. More difficult to use, the VSAT system is the most technically complex of the **TAC•PAK** satphone options.

When using the VSAT system in the field, the user must be aware that the satellites are geostationary. In order for the user to acquire a satellite signal, you must be able to see the geostationary satellite above southern horizon. Thus, if there is a building(i.e. – downtown New York), valley(i.e.- mountains of West Virginia), or other obstruction between the user and the

geostationary satellite, the VSAT satphone will not work. To alleviate this issue, we have developed our “SATPAK” repeater technology(see below) which enables placement of the satellite antenna high in a LOS position, and then relay the data signals up to 1 mile down the mountain/building to the **TAC•PAK** operating location.

Various Ku and Ka band satellite service providers are available, and unlimited bandwidth can be purchased in hourly/daily/weekly/monthly packages ranging from \$13/min to \$56k/month for up to 4.5mbps dedicated bandwidth. A typical unlimited 512mbps up/dn package would be approximately \$3,000/wk. Hardware costs are typically \$60 – 120k for auto-acquire packages, and 10-40k for manual pointing packages.

SATPAK Beyond Line of Sight(BLOS) satellite connectivity

Responding to the need for robust Beyond Line of Sight(BLOS) SATCOM, 308 SYSTEMS developed and deploys the SATPAK signal relay system.



SATPAK Relaying Existing Sat/Cell Signal



SATPAK Relaying Signal Into BLOS Location

In deployed operations, the TACPAK user may experience loss of satellite connectivity due to Beyond Line of Sight(BLOS) signal degradation. This can be caused by a terrain feature(mountain, jungle vegetation, etc), urban feature(“urban canyon” in a downtown environment, and various related signal blockages such as a truck pulling up and parking in front of your satellite antenna. For example, in most of North America, if you cannot see 30deg + off the southern horizon you will have a hard time acquiring and keeping an Inmarsat BGAN signal.

Utilizing the SATPAK, the TACPAK user can now enjoy robust, reliable BGAN and VSAT satellite connections while operating in mountainous terrain, or at street level in an urban operation. For example, this system supported the G20 meeting in Toronto, ON Canada by providing rock solid BGAN service at street level while deployed in Toronto’s urban canyons.

In another use, the SATPAK will relay existing satellite or cellular signal from a basecamp location over to another operating location 2-3 miles away. Thereby providing an Internet WiFi bubble to teams deployed without traditional Internet access.

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