

Competitive and Technical Advantages with Globalstar LEO Network

LEO is low earth orbit, which is a satellite system that operates with a constellation that orbit in low altitude and on multiple axis. Globalstar, Orbcomm and Iridium are Low Earth Orbiting (LEO) Network Providers. INMARSAT is GEO, much higher and stationary over the equator, i.e. not global from a single satellite.

HISTORICAL...THE START

LEO is the key to reliable global data telemetry, especially for battery operated devices. Axonn's core competency is **low cost, high reliability, packet telemetry, battery operated devices**. To that end, the best way to minimize cost is to make the tradeoffs associated with simplex. One-way data creates tradeoffs that limits some applications, but what remains are the larger volume opportunities. These larger volume opportunities are usually cost constrained, so low cost is a necessity to enable these markets. A good example of this is metering. Axonn developed this technology to fill an industrial/commercial electric, gas and water metering niche. Under license, our customers have manufactured and fielded 14+ million meters with simplex radios. The reason for this example is to demonstrate why Axonn partnered with Globalstar and not Orbcomm. Axonn knew that to satisfy the high volume, low cost applications that simplex is the key.

SIMPLEX NETWORK GROWS!

In 2003 Globalstar approached Axonn about creating a simplex satellite capability, and this enabling factor is how their satellites work.

The Orbcomm Satellites actively negotiates with the endpoint communicator for channel allocation. This means that every satellite communication transmission requires handshaking with the satellites for data communication, and this is a main difference with Globalstar. The Globalstar Network is different in that the satellites literally beam radio frequency signals (RF) to the ground station and all handshaking is done through the ground stations and not at the satellite. The satellite is a "mirror" in the sky, typically referred to as "bent-pipe". It is exactly for this reason that simplex works extremely well for fixed or mobile applications. The AXTracker signal actually rides under the Globalstar voice signal, within in the same frequency channel, as with voice communication. For the most part, the satellite doesn't know anything about the Simplex Data.

THE GLOBALSTAR GROUND STATION TECHNOLOGY:

Currently Axonn utilizes 10 of the 26 ground stations with the Simplex Appliqué. The Appliqué is a rack of Telemetry Equipment at the ground station takes an RF tap off the voice processors and decodes the simplex data. This is important for two reasons. First, since the decoding is done on the ground it is more easily scalable. To add capacity to the network, the appliqué must simply have the ability to handle more simultaneous messages (this is much less costly than needing to upgrade the actual satellites). The second reason this is important is centered on network capacity and the number of devices that can be deployed. Global star's capacity is not limited to the satellites, but the ground stations and additional appliqués can be added for additional capacity. With the Orbcomm Network, any additional capacity issues will require hardware and software upgrades to the actual satellites in the sky, which can be very costly and can take a great deal of time (launching new satellites can run into millions of dollars of cost). As the signal is direct sequence spread spectrum (DSSS), the network can simultaneously relay millions of endpoint devices simultaneously (provided the ground hardware is computationally capable). There is virtually no limit to endpoint volume or bandwidth with Globalstar, and this is not true of Orbcomm or Iridium or any other satellite service provider today. All require negotiation with the satellite for finite satellite data bandwidth.

SMALL AND LESS EXPENSIVE IS BETTER!

One more important Orbcomm vs. Globalstar distinction is frequency allocation. Orbcomm operates around 150 MHz in frequency, which in turn requires that the telemetry device on the asset have larger, more expensive antennas for communications. Globalstar operates around 1.6 GHz, which means the telemetry device can have a very small, inexpensive antenna. Both are LEO so output transmit power is low which equals lower battery requirements which equals lower endpoint cost.

CONCLUSION:

From Axonn's viewpoint, Globalstar is the only means to get a very low cost satellite endpoint devices that operates globally and on batteries without external power.