
The Business Case

Satellite Services: Don't Join the Space Race

Satellite services are getting a lot of press these days. Grand projects such as Teledesic, with hundreds of low-earth orbiting (LEO) satellites and funding from the likes of Bill Gates and Craig McCaw, can't help but generate attention. Of course, not all the press is good. Iridium LLC (Washington, D.C.), the first LEO system, turned on service only last year and has already filed for bankruptcy. But satellites do represent a multi-billion-dollar industry and are currently being used in a wide variety of voice and data applications.

The question is, do they make sense for typical data communications applications? Should a network manager have a satellite link in his or her Swiss army knife of network solutions?

The answer: No. They cover vast regions of the planet and cost huge sums of money to deploy—billions of dollars in the case of newer systems like Iridium. For point-to-point connections, satellites are almost always more expensive than terrestrial options.

Premium Pipes

Let's compare two scenarios. In the first, frame relay is deployed at 10 sites spread across the U.S., each requiring a 128-kbit/s connection with every other site. In the second, a VSAT (very small aperture terminal) satellite is deployed in the same configuration. Using distance-insensitive pricing from a nationwide frame

relay provider, the port cost per site is \$500 per month and the PVC (permanent virtual circuit) cost is nine times \$180, or \$1,620, for a fully meshed configuration. Add \$500 for the local access charge and you have a total of \$2,620 per site per month from a premium provider. (You could get a lower price from a more aggressive service provider.) In contrast, the same setup would cost just over \$3,000 per month from a satellite provider.

VSATs could come in handy—but only under the right circumstances. For companies that are establishing connections to remote oil fields, the depths of the rain forest, or locations at sea, terrestrial options simply do not exist. In such cases, there are service providers such as Gilat Satellite Networks Ltd. (Petah Tikva, Israel) or Panamsat Corp. (Greenwich, Conn.) that can quickly set up satellite links at rates from 9.6 kbit/s all the way to DS-3 (45 Mbit/s).

Ever wondered how some gas stations can authenticate your credit card so quickly? A satellite connection eliminates a traditional dial-up modem connection. In this instance, ground stations at many hundreds of gas stations can share the same slice of expensive satellite spectrum using a TDMA (time-division multiple access) approach. Since the duty cycle for any one station is very low, this approach is extremely efficient. The net result is that rather than paying five cents to complete the transaction with a long-distance call, the company only pays a few pennies to do so via satellite. And in a busy gas station, the resulting savings can pay for the \$3,000 satellite terminal in just 18 months.

Wal-Mart Stores Inc. (Bentonville, Ark.) uses VSATs to link hundreds of their facilities together. Paging networks use VSATs to send paging messages to transmitters. Nationwide newspaper companies use satellites to send contents to multiple printing locations. Why? Because the same message is sent out to multiple transmitters for time-synchronized transmission.

VSATs are also useful as redundant connections. For critical operations, companies may prefer two circuits to the outside world. But in regions where only one LEC

(local exchange carrier) is available, both circuits are likely to go through the same central office. This is not true redundancy, so a satellite backup connection may be a good option. Note also that the \$500 LEC access charge mentioned above might actually be as high as \$2,000 per month in some less developed areas. The cost of a satellite connection then becomes competitive.

Still, given the special business case for fixed-satellite services, one has to wonder about the \$20 billion that will be spent for new broadband LEO satellites from outfits such as Teledesic LLC (Kirkland, Wash.) over the next five years. Where is the market? The stock answer: all those areas that do not have good terrestrial coverage.

The problem is that those areas of the world are shrinking rapidly. Not only is fiber being deployed at a ferocious rate, but terrestrial broadband wireless systems such as LMDS (local multipoint distribution service) are already coming online. So the market is shrinking.

Meanwhile, if there is one constant in the satellite industry, it's delay. Satellite systems are almost always years late to market. Three years ago, Teledesic was projected to be deployed in five years. Today, Teledesic is projected to be deployed in five years. What market will be left then?

Satellite Similarity

Just like their terrestrial wireless counterparts, satellite systems come in mobile as well as fixed varieties. Services such as American Mobile Satellite Corp. (Reston, Va.), Iridium, and Ominitracs from Qualcomm Inc. (San Diego) offer voice and data to mobile users. End-user devices have traditionally been at least the size of a briefcase, but with new LEO constellations such as Iridium and Globalstar, handheld devices are possible for the first time. Data rates for these systems are relatively slow, ranging from 2.4 to 9.6 kbit/s. Prices are high. With per-minute charges ranging from \$2 to \$10, depending on the service and location, pricing is up to 100 times higher than cellular.

As with VSATs, mobile satellite data usage tends to be specialized. The biggest customer in the U.S. is the transportation industry, because optimizing truck routes and loads can save a ton of money. Even services such as Iridium that originally hoped to serve business users worldwide are reluctantly changing their emphasis to vertical markets such as the oil industry.

One area to watch is the consumer front. Hughes Network Systems Inc. (Germantown, Md.) offers Internet service via satellite with rates to 400 kbit/s; it plans two-way service for the future. And with America Online (Vienna, Va.) investing in this operation, and Microsoft Corp. (Redmond, Wash.) mulling an investment in Gilat, aggressive pricing could produce enough users to improve the economies of these services. But unless you're in the middle of nowhere or have a special need, stick to planet Earth.

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