Satellite Communications: Effectively Addressing the Train Connectivity Challenge

Boundless Communications

Gilat

Introduction

The latest satellite technology, integrated with one of the oldest mass transportation methods, is delivering a premium travel experience – and opening up an attractive market for ISPs.

Sleek, spacious, and increasingly capable of high-speed, trains are as popular as ever. In busy urban corridors, trains are increasingly in competition with airways for passengers. This is particularly true for short hops between urban areas – a train ride is comparable in time and cost to a plane ride. In these cases, deciding between these means of transport can hinge on passenger comfort. Always-on connectivity is now an expectation rather than a luxury and the ability to provide this service is becoming a key differentiator. Studies show that mobile and Internet connectivity is a factor for travelers considering which method of transport to take. In train travel, there are two areas where traditional cellular connectivity solutions fall short: rural routes that lack network coverage and high-speed rail (HSR) trains that move between cellular base stations faster than a cellular network can handle the location transitions.

Changing the price equation

Intercity train routes often pass through remote, uninhabited areas where laying out a cellular network is not practical. The high cost of installing cellular towers every few kilometers along the entire track, as well as the lengthy implementation schedule, make this option unfeasible. What does work, however, is a satellite solution, which is impervious to these limitations. A low-profile train antenna continually points to the satellite, enabling a highly reliable, high-speed Internet connection. This solution is also ideal for serving high-speed trains, which cannot offer cellular connectivity. The speed of these trains prevents reliable handover between cellular base stations. Here, too, the only alternative is to rely on satellite connectivity.

While the price of satellite deployment may have served as a barrier to entry in the past, new High-Throughput Satellite (HTS) technologies are lowering the cost of satellite links by an order of magnitude, making such cost-competitive with other technologies. The main reasons are the availability of additional bandwidth at a lower price and higher frequency space segments that reduce the antenna size, which, in turn, drive lower CAPEX costs. According to industry analysts, this trend is expected to continue well into the future.

The high-speed rail market: How soon? How real?

Today, while other regions may be involved with constructing or planning high-speed railways, Europe and Asia Pacific remain the leaders in current capacity and in foreseeable future usage. According to a Frost and Sullivan report, the amount of operative HSR track is expected to grow from 14,000 km in 2010 to 50,000 km by 2020. This represents a growth market for Internet connectivity, which satellite communications is uniquely positioned to leverage.

Governments are interested in using HSR to dramatically reduce travel time. For example, a recently announced Russian HSR project will connect Moscow with Kazan, Russia's eighth-most populous city, in 3.5 hours, instead of the current 13 hours. In Turkey, HSR initiatives are in varying stages of completion. In Brazil, a planned HSR between Rio de Janeiro and Sao Paulo (511 km) will provide service in 80 minutes, as opposed to a six-hour bus ride that is currently the only ground alternative. In short, this emerging market represents an enticing opportunity for Internet service providers to increase revenue.

Access from every train car

The pending rollout of HSR lines has train operators looking ahead for an on-the-move connectivity solution that meets the unique requirements and constraints of high-speed train travel. Gilat Satellite Networks offers a comprehensive solution for all passenger communication needs.

Each car within the train is equipped with a FEMTO® noise-reduction cell and offers one access node for WiFi and a second node for a cellular connection. All access nodes are interconnected between the cabins and aggregate to the modem located within the locomotive. From this point, a Ka- or Ku-band antenna establishes an Internet connection between the train and the satellite hub, which also connects to an MNO's cellular gateway.

Full Gilat Solution for Train Connectivity
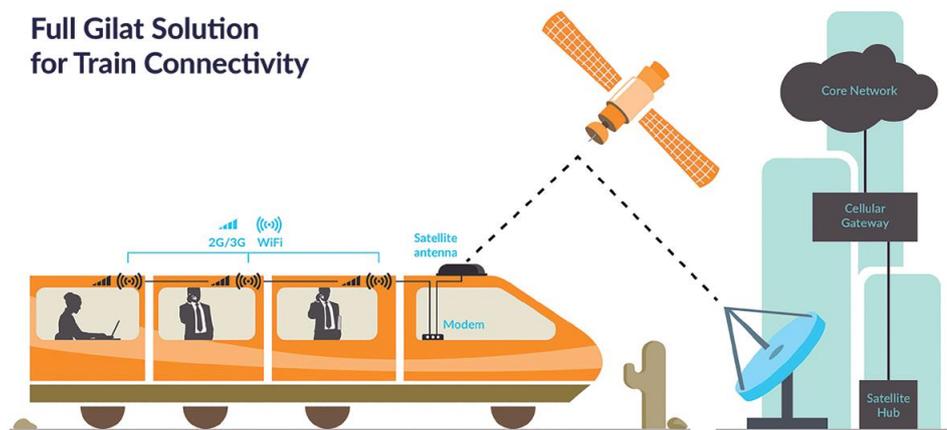
An obstacle inherent in satellite communications is the inevitable delay that limits throughput and performance. However, Gilat's patent-pending embedded acceleration techniques compensate for that delay, maintaining a user experience that is indistinguishable from terrestrial solutions and offering full capacity throughput on handheld devices.

Gilat provides an end-to-end solution from planning through implementation. From installing access nodes and satellite terminals, to equipment installation at ISP or cell operator premises, Gilat takes full responsibility for the network, freeing satellite ISPs from working outside their sphere of expertise and the worry as to whether or not their satellite link is optimized. With 24x7 NOC service, Gilat tends to every aspect of network management. With ultra-low-profile antennas, market-leading VSATs and extensive industry experience, Gilat is ideally suited to lead ISPs into the exciting and emerging train connectivity market.

All aboard!

For satellite ISPs, the selling proposition is clear: a chance to offer mobile network operators a complementary solution that expands their network to any destination a train can reach. For this market, timing is crucial. The broadband connectivity train is about to leave the station.

For more information about Gilat's train connectivity solutions, please visit http://www.gilat.com/train-connectivity
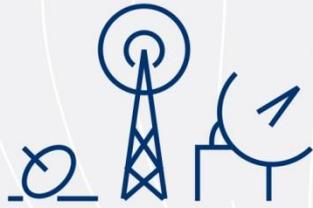
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