



Kazakhstan Temir Zholy, Kazakhstan

Challenges

- Provide each train with data transfer connectivity of not less than 60 Mbps at any point in time
- Ensure uninterrupted connection at speeds of up to 200 km per hour for trains with data transfer remaining constant in tunnels and repair depot;
- Keeping cost as low as possible by installing reduced form-factor wireless devices externally on the carriages;
- Develop and implement a first of its kind wireless solution in the whole of Kazakhstan.

High capacity connectivity

InfiNet Wireless, in joint partnership with the local systems integrator KRIS-Service, has successfully implemented a state-of-the-art Train-to-Ground infrastructure which provides a high capacity Internet connectivity on board passenger and cargo trains in Kazakhstan.



The geographical conditions of the Republic of Kazakhstan (e.g. the lack of direct access to the sea or navigable rivers), the vastness of the territory and a poor road infrastructure make the role of railway transport in the economy extremely strategic. The Republican State Enterprise 'Kazakhstan Temir Zholy' (also known as KTZ) has operated the national railway for more than 20 years, with much of its core business focused on passenger and cargo transportation, in themselves major contributors to the productivity and economic success of the country.

Train-to-ground communication in the Kazakh railway sector has generally been based on the use of satellite technology because of its country-wide coverage and usually not requiring any special infrastructure along the rail tracks. However, the main negative points of a satellite-based solution include signal instability, high space segment recurring cost, high latency and rather low speed. Over the past few years, KTZ experienced an increasing demand for wireless broadband connectivity on board its rolling stock, a demand which simply could not be satisfied via its existing infrastructure. The train operator contacted InfiNet's partner in the region, KRIS-Service, to identify and design a suitable solution for this new value added service.

Since 1992, KRIS-Service has implemented various complex projects in the fields of information and analysis systems, wide area communication, safety, industrial automation, energy management as well as providing data communication services through its own wireless infrastructure across the whole territory of Kazakhstan. To implement the new project required by KTZ, KRIS-Service contacted its long-standing partner InfiNet Wireless to provide a more reliable and robust alternative solution to the operator's legacy satellite-based platform.

As part of a pilot project to demonstrate its networking capabilities, InfiNet Wireless deployed a small network connecting trains and railway stations, covering the 250km Astana to Borovoye section of the railway network. Optical fiber transmission entry points were installed along the rail network, at every 20km. The InfiNet nodes and base stations were installed externally on top of the trains as well as on existing poles along the railway line, every 2 to 4 km. All trains were equipped with two individual subscriber terminals to enable smooth signal switching and handover.

Solution

- Wireless nodes were installed every 20 km along the existing optical fibre infrastructure;
- Base stations were installed externally every 2-4 km along the railway tracks;
- Every carriage was fitted with small form factor wireless terminals and antennas.

Benefits

- Network speeds achieved up to 80 Mbps for every train;
- High reliability of the links;
- Very low latency;
- Provision of additional revenue-generating services by KTZ;
- Small form factor and low wind load of the external units made it ideal for installing on carriages

This same platform was also used to create an interactive and automatic system for monitoring and registering passenger tickets, as well as connecting every train to the operator's corporate data network. Additionally, the trains' on-board access control and camera systems were upgraded to provide future-proof passenger safety, now comprising of full video surveillance and alarm buttons, all connected to a centralised monitoring centre.

The next planned phase of this state of the art train-to-ground broadband network will be the deployment of a similar solution along the 200 km Astana to Karaganda section, to be soon followed by connecting various shuttle trains along the 210 km Tulpar to Talgo section of the country's railways network.

"Today, an increasing number of modern train carriages need reliable high speed connectivity to allow passengers to remain in touch with families, friends and colleagues. We worked very closely with InfiNet Wireless to successfully test then deploy a broadband wireless platform that is far exceeding other available wireless solutions. This new technology has allowed to better manage our rolling stock and provide seamless connectivity for our trains, with uninterrupted speeds of up to 80 Mbps, even when the trains reach speeds of up to 200 km per hour", said Vladilen Yakunin, Director at KRIS-Service Company.

"It was very rewarding for us to implement this project in the Republic of Kazakhstan and the Eurasian space. We have not only succeeded in providing reliable connectivity across KTZ's rail network but also allowed thousands of people to remain in constant touch, e.g. improving productivity for the business community, enabling schoolchildren to complete their homework whilst on the move, etc.", said

Sergey Chetvergov, regional representative at InfiNet Wireless Kazakhstan. *"Implementation of this project is a good indication of successful cooperation between interstate and commercial entities, all sharing the same objective. For more than 20 years InfiNet Wireless experts have developed highly efficient devices and reliable communication solutions to meet the needs of service providers of all types. This particular project goes a long way to demonstrate our capabilities when it comes to improving passengers safety, optimizing fixed and rolling stock management and providing passengers with a new and more enjoyable customer experience whilst travelling".*