

# Trackside Radio Networks





# NEXT GENERATION CONNECTIVITY

In today's rail environment providing good quality, consistent passenger WiFi is increasingly challenging when relying purely on Mobile data networks to provide the train-to-ground connectivity.

Data costs can spiral as user consumption increases, making an often-criticised service even harder to accept and to deliver. Patchy mobile coverage contributes to a poor user experience across the journey, and therefore it cannot be considered to be a reliable and effective medium to allow business users to include their travel time as productive work time, or to provide the leisure passenger with a good on-line experience.

There is a very clear point at which annual mobile data costs exceed the cost of deploying a private train-to-ground radio and backhaul network with a complete return on investment in most cases of less than 3 years.

With a private trackside train-to-ground network, the passenger WiFi experience is significantly faster and more consistent across the journey. This allows business users an office style, online experience and leisure travellers the ability to stream their favourite films or indulge fully in social media.

## ASK YOURSELF...

Is your on-board WiFi **slow and intermittent** on your busiest routes?

Do you feel you're **paying a huge amount of money** to mobile operators for a **poor inconsistent** service?

Are you wondering how you can provide a **better passenger WiFi** service at a more **realistic cost**?

**With Trackside Radio Networks** you can do so much more – let us introduce you to the next generation connectivity solution.

# Fixing connectivity with Trackside Radio Networks

Nomad's train-to-ground Trackside Network solution ensures continuous high-speed, high quality wireless connectivity between the train, the wayside and the network operations centre.

With a high-speed train-to-ground radio link, services will be reliable and low connectivity due to tunnels, cuttings and bridges will be overcome. On-board communications, media updates, real time safety and security images from CCTV, rolling stock condition-based maintenance data and real time point of sale data, will remain connected.

The most appropriate train to ground radio technology, will be designed into your solution creating a stable, resilient and highly performant connectivity solution.





# High performance guaranteed

Nomad's trackside solution offers radio-based connectivity that can provide greater than 1.5Gbps of throughput between the train and ground.

As radio technology improves the distances between wayside base stations are increasing, and this combined with increased data throughput is resulting in a reduction in the cost of infrastructure and installation as well as on-going maintenance and support.

Trackside offers a solid return on investment, additional revenue opportunities and best in class connectivity performance.

## RELIABLE ARCHITECTURE

We design networks that provide resilience and security tailored to your needs, guided by the applications using the network. The key areas are:

- radio frequency design for resilience in the air interface
- redundant wayside backhaul fibre networks
- diverse network routes to the operations centre
- no single point of failure in the radio network architecture chosen
- encrypted train to ground radio links
- DNS servers for web filtering
- carrier grade firewalls.

All of the equipment deployed as part of the solution architecture meets the appropriate rail standards and certifications.

Reliability is supported by a suite of monitoring and management tools that help with the operations and maintenance of the network, all provided by us!

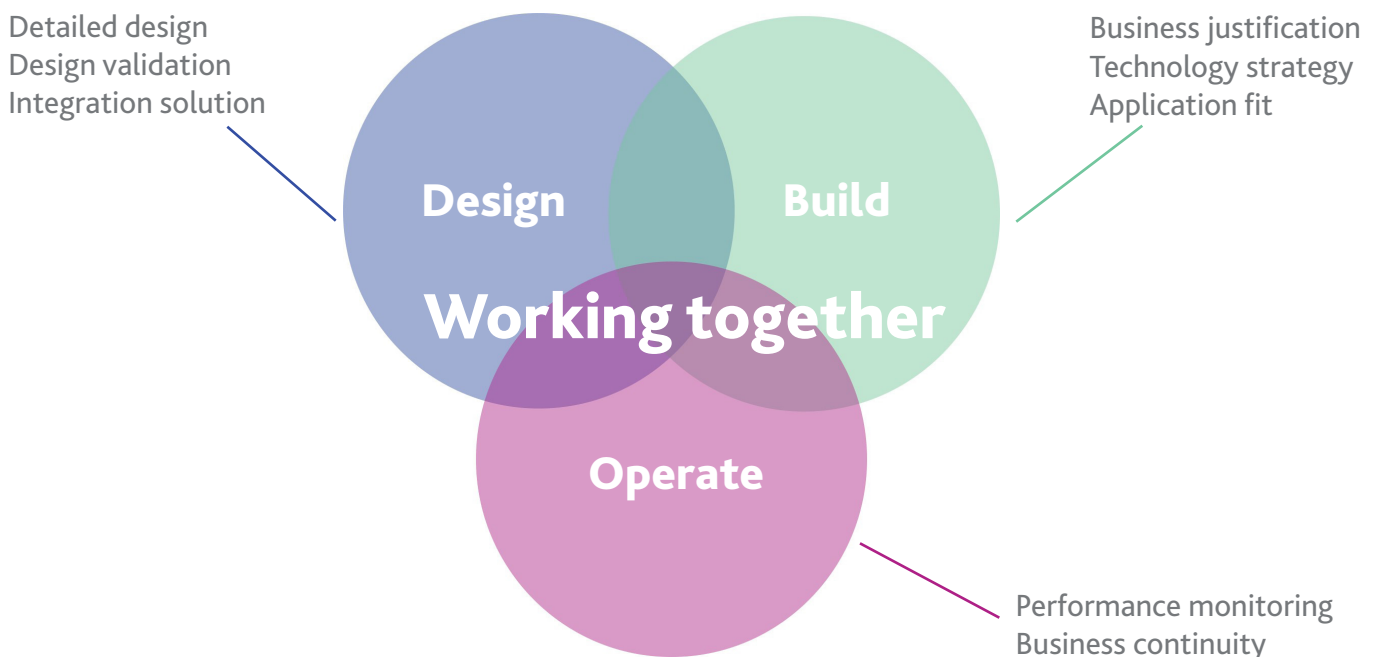


# Keeping you connected

Nomad's turnkey integrated trackside solution is tailored to meet the specific needs of rail operators, by providing an entire solution for trackside connectivity, including:

- the most appropriate radio technology for the challenge
- radio planning for excellent coverage
- designed to reduce infrastructure required to support train to ground radios at the wayside
- cost effective backhaul networks and massive data savings
- on-train designs
- asset planning and management
- performance reporting
- financial strategies to help spread the cost.

Trackside Networks are becoming more prevalent across the industry, the 'gigabit train' is fast becoming reality.





# THE MARKET LEADERS

Nomad Digital offers benefits to both passengers and operators by improving connectivity for trains, metros, trams and buses globally - we specialise in intelligent transport.

With a unique combination of deep technology, rail sector experience and know-how, our experts are what set us apart.

Our cutting-edge, future-proofed technology offers a comprehensive portfolio of solutions and services that deliver both connectivity and operational savings.

Keeping passengers and operational data connected with a reliable solution is a must. In areas of low or no cellular coverage or over capacity this can be a problem. We will work with you to provide a solution to the problem, creating innovative, cost effective and robust technical solution.

## **We put our customers first**

Your needs and requirements go ahead of anything and everything else. We constantly strive to build healthy relationships by identifying your needs and providing the best possible solutions.

We are really proud of the services we provide and the challenges we can help you, our customers overcome. Read on to find out how we've supported our customers.



# Heathrow Express - a seamless passenger experience

## CHALLENGES

Heathrow Express (HEX) wanted to provide strong, uninterrupted internet access throughout the passenger's journey requiring the introduction of seamless cellular coverage via the tunnel between Heathrow and Paddington.



**Heathrow  
Express**



## SOLUTION

By introducing Nomad's cutting-edge technology, along with its advanced WiMAX network, HEX was able to provide extensive connectivity along the 8km tunnel, providing a seamless connection from the platform WiFi to the train WiFi and throughout the journey.

## RESULTS

Within four months, Nomad efficiently installed the solutions on 61 carriages and three stations. Now millions of passengers enjoy seamless station platform to train connectivity and sustained internet throughout their journey.

**SIMPLE**  
**ENJOYABLE**  
**SMART**



# Xorail - enhancing safety

## CHALLENGES

Xorail needed to create a secure, reliable radio network connection that served several operational applications. This was an extremely complex process, requiring multiple parallel systems to ensure that if any one element of the connectivity fails, the system still operates.



## SOLUTION

Nomad has developed a unique trackside communications solution. Through IP technology, Nomad has connected the railcar fleet to 50 trackside WiMAX transmission sites, giving maximum availability. The solution provides a secure connectivity platform, which enables the delivery of critical operational applications such as positive train control etc.

## RESULTS

The new system now supports critical rail signalling communications via PTC, the North American standard. Most importantly, the system complies with the FRA mandate that requires every rail system to provide an automated service that has train-stop safety capability.



# The connected metro

## CHALLENGES

The customer requires new tunnels, bridges and lines and with that, a reliable and seamless connectivity solution, so that the WiFi signal is not interrupted, creating a positive passenger experience. The solution also cannot interfere with signalling or CCTV systems.

## SOLUTION

Nomad has developed a unique trackside communications solution for 106 trains and 27 stations. Delivering initially 225Mbps, growing to 450Mbps, per train. This solution will provide passengers a seamless, high speed WiFi connection throughout their journey, with more than 200 trackside radio based stations.

## IMPLEMENTATION

In partnership with Alstom, Nomad will install two on-board train radios and six antennas on the 106 trains. Two WiFi Access Points (AP), along with a router and two ethernet switches will also be installed on each of the trains. Additionally, there will be WiFi AP's throughout 27 stations.

## EXPECTED RESULTS

Nomad, in partnership with Alstom, will deliver and achieve a reliable and fast WiFi service to passengers for a positive passenger experience with the use of an internet landing page.





# Get in touch with our experts today

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