icomera
for the connected journey

Case Study

West Midlands 5G

West Midlands 5G (WM5G) is a multi-million-pound programme from the West Midlands Combined Authority and the government department for Digital, Culture, Media and Sport.

Its mission is to accelerate the adoption of 5G technology in its local communities of Birmingham, Coventry, Wolverhampton, Dudley, Sandwell, Solihull and Walsall.

West Midlands 5G

WM5G works in partnership with public and private sector organisations in the UK to deliver projects in the areas of manufacturing, transport and health and social care to speed up the launch of 5G networks, and to test, prove and scale up new 5G products and services – for local people, businesses and the public sector.

Making Public Transport More Attractive

Transport is at the heart of the West Midlands, which is why WM5G puts transport connectivity at the heart of its delivery strategy for 5G. Working with Digital Partners Icomera, its subsidiaries, GoMedia and dg8, Transport for West Midlands (TfWM), West Midlands Metro (WMM) and UK cellular operator, Vodafone, WM5G is implementing 5G solutions with the aim of:

- Making transport more efficient and reliable
- Improving access to work, study and leisure
- Enhancing the experience of travellers by improving services and products across the transport system

Designing for 5G

Central to the project was the commissioning of a 5G-enabled West Midlands Metro tram – the first of its kind in the UK.

dg8's design team were tasked with adding the 5G connectivity solution to the WMM tram, working with the multiple partners to package their systems and ensure the installation met industry standards.

The limited space available on the tram required a compact design solution to neatly package the installation around existing onboard equipment. Installation was completed over the course of a day at West Midland Metro's Wednesbury depot with the support of WMM's depot team.

Justin Smith, Project Engineer at dg8: "*Installation onto vehicles like the West Midland's Metro tram is always a challenge due to the limited equipment space available. Nonetheless, following the success of this project, we hope to see the trial moving forward into a wider fitment of 5G equipment.*"

Through the 5G installation, mobile Internet connectivity is delivered to the vehicle through Icomera's X5 Advanced Gateway and shared with passengers and onboard systems connected to the centralised onboard connectivity network.

The solution makes use of Icomera's aggregation technology and is backwards-compatible, meaning that in addition to 5G cellular networks, the WMM tram is also able to take advantage of the coverage and capacity of 4G networks and other wireless communication networks where available.

With fast and reliable mobile Internet connectivity guaranteed, WM5G and its partners were able to turn their attention to a range of 5G connected applications intended to make public transport a safer, more accessible, and more enjoyable experience for the passenger, while also being cost-effective for the operator.

Transport Accessibility

Two million people living with visual impairments in the UK are unable to complete at least part of their journeys on public transport independently. This creates a significant economic cost (an estimated £28 billion per annum) which could be alleviated by getting the right information to visually impaired passengers at the right time.

Developed in collaboration with the Royal National Institute of the Blind (RNIB) and NaviLens, GoMedia's Transport Accessibility solution provides timely and accurate information to passengers who need additional assistance when travelling on the UK public transport network, either in the station or on the vehicle.

Passengers simply hold up their smartphone. The device automatically recognises any NaviLens BIDI codes in view, connects to GoMedia's live cloud-based passenger information system and delivers the desired information.

Roger Matthews, Managing Director of GoMedia: "*When a passenger walks onto a platform we can directly tell them what platform they're on, what trams are going to be arriving to that platform, and when*".

Previously the level of content-rich, location-based information needed was not possible due to a lack of the necessary technology and infrastructure. Relevant information is now being transmitted to passengers' devices in the format that they require, over 5G cellular networks.

The reduced latency of the 5G network increases the speed of delivery of data to personal devices, improving current location tools. The increased capacity of 5G supports data-rich experiences, enabling passengers to stream augmented reality (AR) location-based video content on a moving vehicle.

John Worsfold, Innovation and Technology Implementation Manager at RNIB: "*Technology has and continues to open up the world for people with sight loss, and this opportunity has the potential to increase access to relevant information whilst travelling for blind and partially sighted people*".

About NaviLens:

NaviLens helps make cities smarter and more inclusive. The capabilities of this code allow users to access and interact with their environment more easily in places such as subway stations, bus stops and museums or public buildings. **www.navilens.com**

Real Time Passenger Sentiment Analysis

Understanding the evolving landscape of passenger routines, sentiment and mindset will be essential to the public transport industry's post-COVID recovery plan. Once a passenger is on board, it is important to offer them a channel for a two-way conversation with the operator whilst the journey is in progress.

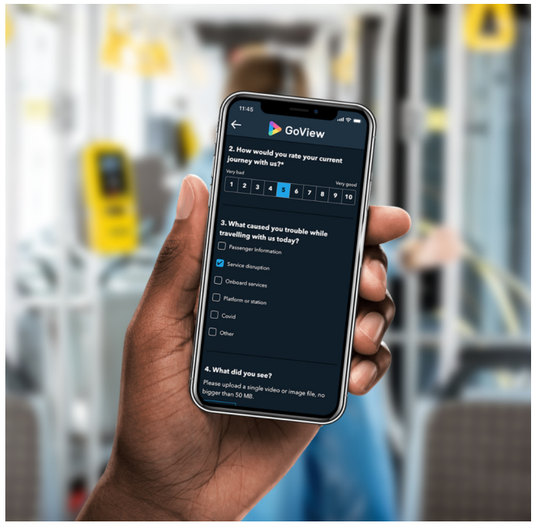
By combining GoMedia's contextual passenger feedback technology with Wordnerds' AI-led sentiment analysis tools, a new onboard and cloud-based solution aims to give West Midlands Metro unprecedented access to measurable and actionable passenger feedback.

West Midlands Metro will have access to dashboards and trends of passenger feedback on different levels, such as vehicle type, route, or time of day. There is also an alert tool that automatically notifies the operator of priority issues.

Sophie Allison, Head of Business Transformation at West Midlands Metro: "*We're understanding what our passengers are talking about, so, for example, if a passenger said, 'it's a bit cold on this tram', we'll know exactly which tram they're talking about, through the 5G technology, and we can turn on the heating*".

The speed at which the data is processed is dramatically increased when using the 5G network. It also allows for the use of different types of passenger-generated data. For example, passengers connected to Icomera's centralised onboard connectivity network can send videos and images of any issues to the operator using the onboard Wi-Fi, without incurring any data costs themselves.

Pete Daykin – CEO of Wordnerds: "*Immediate problems can be resolved in real-time, and a database of categorised issues will provide insights for the operator to improve services. This will enhance the traveller experience by improving the products and services available to passengers across the transport system*".



About Wordnerds:

Founded by linguists, Wordnerd's SaaS platform builds on the very latest AI/NLP techniques, but does so through the lens of advanced corpus linguistics. The result is a user-trainable model that genuinely understands language. Wordnerds group ideas by meaning – not vocabulary – and link sentiment to topics. It uncovers the true voice of the customer, helping brands to listen, understand and act. **www.wordnerds.ai**

Live Video Surveillance Data

Trams collect a variety of valuable information, including CCTV footage, vehicle performance and maintenance data. Traditionally, this information is accessed and downloaded manually, outside the hours of operation.

To hasten this process, 5G-enabled video surveillance equipment was installed on the WMM tram. The increased bandwidth offered by 5G connectivity allowed for the high-definition CCTV footage captured on the tram to be securely and remotely transferred to the Regional Transport Coordination Centre whilst the tram was in operation.

In the event of an incident, access to real-time data, including live video footage, will allow the operator to action a fast and appropriate response, and for normal service to be resumed as quickly as possible.

Sophie Allison, Head of Business Transformation at West Midlands Metro: "*As well as unlocking the potential for a host of initiatives to enhance the customer experience, we now have the proven ability to transmit CCTV footage to our Operational Control Centre and the Regional Traffic Control Centre quickly, reliably and securely – helping to improve passenger safety."*

In the future, entire networks of trams could be equipped with 5G-enabled equipment to help engineers identify issues and perform maintenance on carriages and vital infrastructure. This will make the upkeep of the network more intuitive and cost-effective.

Matthew Hack, Midland Metro Ltd.'s Head of Engineering: "*Technology never stands still and 5G brings us new opportunities to serve our customers better and improve the way we deliver maintenance. There are huge benefits from being able to collect and process data in real time, enabling our 'predict and prevent' maintenance strategy and offering enhanced levels of security and safety to the travelling public.*"

The UK's First 5G Connected Tram

This ability to wirelessly transmit high quantities of data almost instantaneously to and from the tram while it is out in operation unlocks incredible opportunities to further strengthen passenger safety. This has now been proven by WM5G and its partners.

The same onboard connectivity would also allow passengers to enjoy live travel updates and the ability to stream onboard entertainment, a feature that has become the gold-standard for public transportation. It will additionally enable operators to more flexibly manage services to meet passenger demand and navigate challenges related to COVID-19, including managing social distancing and boosting public confidence as life returns to normal post-pandemic.

Being able to access real time information such as passenger numbers will help operators establish capacity, minimise crowding in stations and onboard services. It will also make journeys safer and better tailored to real-time passenger demand, meaning a more agile, cost-effective service.

"Transport is an integral cornerstone to any region and the West Midlands is breaking new ground in using 5G to develop transport that is fit for the future. The development and improvement of our regional transport network also provides better connections to jobs and employment opportunities, helping local communities and businesses to grow and thrive."

Andy Street
Mayor of the West Midlands

"This project is a great demonstrator of how 5G can transform the way that public transport services are delivered. Our 5G-connected tram is a great showcase for what the future of connected transport could look like across both the West Midlands and beyond."

Chris Holmes
Programme Director of Transport at WM5G

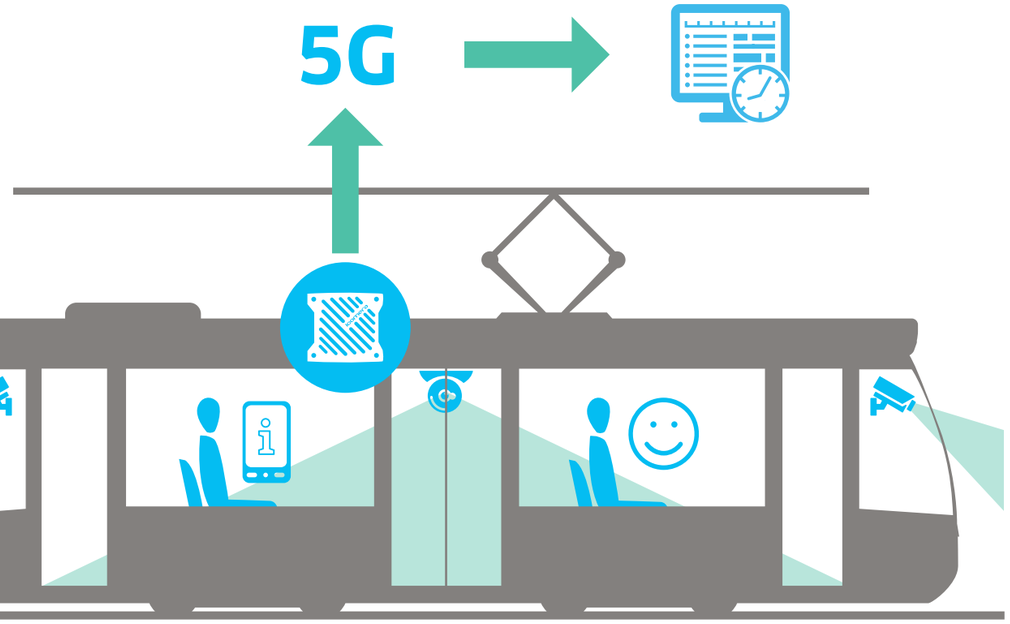
"This pioneering 5G transport initiative has shown the first tangible benefits of 5G in a mobility environment. There is no doubt that we have only scratched the surface and Icomera looks forward to helping unlock much more value from 5G for our transport customers."

Peter Kingsland
Icomera's SVP for the UK

WM5G Solution Architecture

Icomera's X5 Advanced Gateway platform

Real time remote monitoring of onboard data sources



Content-rich information available for visually impaired passengers

Real time onboard passenger sentiment analysis

Front/rear facing & internal cameras for live video surveillance

Icomera
Odinsgatan 28, 411 03 Göteborg, Sweden
T +46 31 799 21 00
sales@icomera.com

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