Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
SIGNALBOX TECHNOLOGIES LIMITED	Using geospatial visualisation to deliver personalised real-time information to rail passengers	£96,550	£96,550

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Signalbox will build and demonstrate technology that allows real-time geospatial visualisation of train movements across the entire rail network of Great Britain. The project will create and deploy an API and SDK that will allow partners to embed real-time geospatial train maps, enabling passengers to view and track live train movements across the network, making it easier to plan and manage their journey. The new suite of tools developed for this project will enable a smartphone to pinpoint the train that a passenger is on and create journey visualisation, unique to them, that can be shared with friends and family. We will research and develop a sophisticated data pipeline to stream this data in real-time and allow it to scale to the large number of connected client devices and systems that are necessary for it to operate effectively in a live railway environment. The technology will support a range of use cases, including mobile apps that offer real-time mapping of a passenger's train journey, digital signage in stations that display engaging visual content for service updates, and tools for TOC websites to enhance the customer experience.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MISSION ROOM LIMITED	Mission Room - Passenger Orientation Guide (POG)	£308,250	£308,250

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
This project is building an innovative Passenger Orientation Guide (POG) to help passengers navigate stations and trains. It will help reduce passenger anxiety and explain the specific bits of the station and train that relate directly to your journey. It will take the complexity out of your trip and explain it using simple but powerful immersive images. The project has been funded by Innovate UK under the SBRI, First of a Kind programme that is designed to bring new technology in to the rail sector. Based on some simple information that the customer provides about their journey and individual circumstances, POG will build a personalised visual 360 degree tour that will take you from the station entrance, to your platform, onto the train and to your own seat. It will be able to customise tours to take account of personal disabilities and simplify journey preparation. The technology can be accessed in the home (via the web), in the station (via a touchscreen kiosk) or on your smart phone (as a mobile app). The project is a collaboration between Mission Room Limited and TransPennine Express (TPE). The organisations have worked together on previous projects over the last 18 months that have focussed on using immersive technology to help develop staff skills for improving passenger service. This technology demonstrator will focus initially on routes and trains running out of Huddersfield Station, one of TPEs main stations. Mission Room is an immersive technology company that specialises in developing new technology for the rail sector. Established ten years ago, Mission Room has built a reputation for innovation and thrive on the challenge of making 360 degree technology useful. TPE are an established train and station operator and are part of the First Group that run a number of rail franchises. The franchise operates all its services to and through Manchester covering three main routes and has recently upgraded much of its rolling stock to enhance customer experiences. Once the technology has been proven on this project, it is planned to roll this out more widely across the rail network. By building a technology process as part of the solution, we will be able to quickly and cost-effectively apply it to other train and station operators. It is also planned to offer this to international rail operators to help boost export performance. For more information contact [info@missionroom.com][0] [0]: mailto:info@missionroom.com

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Participant organisation names	Project title	Proposed project costs	Proposed project grant
SPOKEN INK LIMITED	The Real-Time Journey Dashboard via QR Codes	£169,482	£169,482

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Rail passengers already generate large amounts of data through ticket purchase and searches for journey details whilst on board trains. Every TOC has a strong interest in maximising commercial value from this. It could allow them to send passengers personalised and specific messages about their journey. Such messages would have even greater value if TOCs could unequivocally determine on what service a user is travelling, on what vehicle and where in that vehicle. Currently, obtaining this information relies on customers providing it. This is error-prone and customers do not like doing so. We, at Whoosh Media, are establishing a position as a supplier of entertainment systems to TOCs, able to navigate the challenges of working in the rail industry. This has highlighted the issues that TOCs face and missed opportunities in being unable to determine where someone is automatically. We recently filed a patent covering a technology to determine what vehicle a passenger is on using on-board WiFi routers. In this project, we will work with Grand Central to develop this technology further. We have also developed a system to generate unique QR codes. Our ultimate aim is for these to be placed at every station and at every seat in rail carriages. Passengers will be able to access relevant information by scanning these QR codes, without having to download an app. Post-project, we wish to build a talk-to-us function. This will enable passengers to report issues like antisocial behaviour discreetly. Critical location information will be captured automatically. Similarly, passengers can report cleaning and maintenance issues, with location information to enable staff to take action automatically captured. In combination with external datasets, the technology could greatly improve last mile travel by presenting passengers with changes in real-time. This overcomes difficulties caused by delays in multi-modal journeys that static datasets cannot. The technology will improve journeys for passengers and deliver operational efficiency for TOCs.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MASSIVE ANALYTIC LIMITED	Project EDGE: Using AI to fuse terrestrial and satellite signals to improve connectivity on the rail network	£398,840	£398,840

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Massive Analytic Limited will firstly build a digital twin of a section of rail track near Workington, demonstrating the availability, strength and latency of different terrestrial mobile phone signals, as well as satellite signals. We will demonstrate how, by utilising our patented AI technology to combine terrestrial and satellite signals to meet predicted demands in real-time, we can enhance on board voice and data connectivity for customers travelling by rail, as well as improve connectivity for train staff and provide better real-time information on train locations. This will be the first time that our technology has been used in the rail sector. Secondly, we will apply our technology to a Network Rail maintenance vehicle to demonstrate that the system can operate effectively in a real world setting. This will provide evidence that the system can be applied to a real world setting, enabling us to move forward with our plan to apply the technology to passenger trains in the future. Our project has been put together in collaboration with Network Rail as the first step in developing a system could be used to meet the future communication needs of railway staff and passengers.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
DYNAMIC CROWD MEASUREMENT LTD	CCTV-based passenger density sensing & optimisation	£369,871	£369,871

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
CCTV-based passenger density sensing & optimisation uses AI and machine learning to deliver accurate and real-time platform and carriage occupancy insights directly to passengers on platforms. Allowing informed decisions on which train and in which carriage they will travel for a safer more comfortable experience. With significant changes around the world, people are even more conscious of crowded areas and travel on public transport has dropped sharply. The focus of crowd measurement has shifted to maintaining social distance between people and ensuring that there was an effective way for people to measure their progress and success of this endeavour. This project will see accurate information on crowd measurements put into the hands of rail staff to plan safer services and a better experience on transport for all. This project will also provide passengers information on crowding on platforms and in carriages to enable better self-management of the journey and an increased confidence in the rail system. Dynamic Crowd Measurement (DCM) is a crowd tech start up that gives any organisation that needs to manage crowds the detailed information needed for real time decisions that really matter. Its unique Artificial Intelligence engine can analyse crowd position, flow and mood without tracking or personally identifying individuals. The same system that has been successfully implemented in the event and stadium industry will be implemented and customised for rail travel in the UK. DCM is excited to be partnering with Nomad Digital, an intelligent transport specialist, which is part of the Alstom Transportation Group, who focuses on delivering connectivity and digital solutions on trains and platforms to deliver this first of its kind project for UK rail.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
University of Hull	Railfreight Energy & Emissions Calculator (REEC)	£345,358	£345,358

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
UK 2050 net carbon-neutral and DfT 2040 "no diesel-only" targets are challenging for the rail industry. The issue is more acute for Freight Operating Companies (FOCs) where a legacy fleet of mostly diesel locomotives will be operational for the next two decades and amplified by only 44% of the GB network being electrified. FOCs are actively pursuing ways to decarbonise and clean up diesel trains. However, a detailed energy and emissions profile calculator, performing on-the-fly computation for any path, that can evaluate efficiency improvements and mitigation measures is simply not available today. We propose to develop a novel Railfreight Energy & Emissions Calculator (REEC) that will be deployed on the existing NR+ platform used for railfreight planning. The NR+ platform is the first digital platform that fully describes the UK rail network capability. It will be augmented with gradient and line speed data together with train performance and OTMR data to deliver a low-cost intelligent emissions calculation and mapping solution. The net accelerative/decelerative force on a train (based on resistive forces, track gradient, available tractive effort or brake force, train speed and mass) can be computed to determine how the train speed changes over time, the power that is required to be applied to meet the force balance and the time taken to traverse a section of track. Hence the energy usage and emissions for a discrete track segment can be derived using the same approach in the recently completed RSSB T1187 project which developed emission factors by notch (in units of g/kWh). The resulting emissions computations are much more precise than using simplistic g/km emission factors. Railfreight customers and FOCs will be able to look-up the precise emissions for their routes and determine the effects on modal shift. Network Rail can use REEC to analyse the impact of delivering more efficient electrification strategies for freight trains. By including energy and emissions in freight bids, NR planners can start incorporating emissions optimisation in timetabling and make informed decisions on the impact of the emissions of delayed and longer freight trains. The lead organisation, University of Hull (UoH), has successfully developed the NR+ platform and demonstrated its ability to combine big data and analytics to deliver scalable rail applications. UoH will be supported by consultants from Aether, Carrickarory, and by an expert in emissions computation from the University of Derby.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
URBANTHINGS LIMITED	Rail+ Club : A Connected Loyalty Platform to Encourage Customers Back	£397,034	£397,034

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
With rail patronage now at a fraction of pre-pandemic levels, yet the environmental case for rail travel being stronger and more relevant than ever, it is vital that this sustainable, efficient means of mass transportation be revitalised. **'Rail+ Club'** is a **rail-focussed loyalty platform** which uses novel technology to **non-intrusively track passenger engagement** across the rail network. This enables a rewards and incentives programme to enhance the passenger experience and encourage passengers back to rail. This solution will bring **self-scan technology** to rail for the first time and involve an **interactive demonstrator** in a live operational environment. During this demonstrator, we will collect evidence and data to prove the business case that the solution can be used in a commercial environment, prove that the technology works as designed and de-risk it. Our solution is ultimately designed to be used by multiple railway organisations and benefits from a strong network effect, meaning that its utility to passengers and TOCs increases as it is more widely adopted.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
LENZ LTD	Proactive Mitigation of Adverse Weather Conditions to Increase Passenger Confidence in Rail Resilience	£343,328	£343,328

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
At Lenz Labs, our mission is to make train delays a problem of the past. During autumn and winter seasons, railway stakeholders face the challenge of operating passenger and freight services under low adhesion conditions that occur when vegetation is crushed onto damp rails to create a smooth, slippery surface. With reduced traction, drivers approach bends at high speed and encounter dangerous braking scenarios as they lose control over the wheels, resulting in platform and junction overruns, or even derailment. To mitigate, reduced speed limits are imposed on 10% of services resulting in £345m of economic damage per year across the UK and fines to Network Rail of over £300m due to poor service reliability. In essence, drivers and stakeholders are suffering from the "black ice of rail". To combat this problem, Lenz proposes the novel Traction Hub - a solution that delivers safe and predictable braking whilst improving acceleration performance by retrofitting to the wheelset and increasing adhesion levels at the wheel-rail interface. Mitigating slip has the added benefits of allowing vehicles to traverse greater inclines - currently limited to 3 percent above horizontal - with the product requiring no new infrastructure to install. Once installed, the product aims to deliver improvements to the key metrics of control period 6 in public performance measure, miles per technical incident and signals passed at danger. The founding team at Lenz Labs originally built Hyperloop prototype vehicles during their time leading the University of Edinburgh's Hyperloop Team from 2016-2019 and pioneered the use of novel traction principles within their roles. The blue-sky concept of Hyperloop alerted us to how much the rail industry stands to gain from the application of these underlying principles. This inspired us to apply the technology conceived in developing the transport systems of the future to solve problems facing today's rail network. With this SBRI First of a Kind project, we will be trialling the Traction Hub product on national rail infrastructure to accelerate the route to market and demonstrate the technologies' capabilities to rail stakeholders. **We are appealing to the UK rail industry leaders and anyone interested in viewing a demonstration of the technology, to get in touch, explore the offering and join the journey. Drop Hamish a line at hamish@lenzlabs.com to find out more.**

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ATMO TECHNOLOGY LTD	Creating the Gold Standard Air Quality and Exposure Monitoring Tool for Train Stations and Train-Care Depots, using High Spatial & Temporal Resolution Data, Real-time Automated Outputs, Digital Twins and Dispersion-Modeling using Advanced Ray-Tracing	£355,106	£355,106

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Project description - provided by applicants
Summary The goal of the Atmo consortium is to devise **the new gold-standard for air quality monitoring** in the rail industry. For this purpose, we have assembled a uniquely qualified R&D team; Atmo, Frazer Nash and Bristol University - combining the innovation of a high growth tech start-up, the experience of a world-leading engineering company and the academic-rigour of a world-class research institution. Over 12,500 people die every year from accumulated exposure to harmful pollutants whilst at work and we are creating next-gen technologies to help save lives going forward and create cleaner industries. We seek to empower managers in the rail industry and ensure that decisions to reduce emissions and minimise exposure to staff are data-driven. The outputs from this project are a genuine 'First of a Kind' in both the rail and depot setting, delivering innovation and - most importantly - maximum value to Network Rail and our project partners. The Atmo consortium sees FoaK as a means for our world-class technologies, rather than an end. Our goal is to facilitate widespread adoption of these new best-practices across the entire rail industry. We believe the calibre and site activities of our chosen test partners are an ideal spring-board to working with Rail companies around the country and that an Atmo-FN partnership is inherently scalable.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
CLEAN AIR POWER GT LIMITED	Reducing Emissions by Accelerating the Shift to Low Carbon Transport in Heavy Rail Freight	£399,670	£399,670

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
This project will demonstrate the feasibility that hydrogen and low carbon gas can be used to dual fuel freight locomotives. This approach will generate sufficient power to meet operational requirements and provide a first stage deployment of low carbon energy from which a transitional road map, to deploy hydrogen fuelled locomotives in future, using low carbon multi-fuel as a transition technology. It is proposed that this will deliver a demonstration of a Class 66 running on hydrogen, a hydrogen gas blend or biomethane with low emissions across the drive cycle, particularly at idle where rail industry air quality issues currently exist. This project is led by Clean Air Power GT Ltd with support from Freightliner Group Ltd, Network Rail, RSSB, Tarmac, Flogas, University of Birmingham and Carrickarory Consulting Ltd.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
FURRER + FREY GB LIMITED	IMAGE: Innovative composite Mast for Greener Electrification	£399,956	£399,956

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Despite much investment and focus on modernising and decarbonising UK railway vehicles from diesel locos and multiple units to electric, railway infrastructure has often been the poor relation in terms of investment and development. One area of the infrastructure which has not changed significantly for many years is that of Overhead-Line Equipment (OLE) and the materials used therein. OLE still relies on the same basic design first conceived in the 1950s with masts made from galvanised steel and maintenance performed either upon failure (due to fatigue or impacts) or as prompted by regular manual inspections (typically an annual manual inspection from the ground and a 6-yearly manual inspection of the upper structure). This project sees a major railway infrastructure installer, Furrer+Frey, take a disruptive approach to the materials used in OLE as well as the manufacturing methods, the lineside installation, and automating of the condition monitoring of the masts throughout their operational lives (approximated to be up to 100 years as per their steel counterparts). The "**I**nnovative composite **MA**st for **G**reener **E**lectrification" (IMAGE) is one such disruptive approach. It will offer a significant improvement of the mass of the mast, but the real benefits lie in the cumulative positive "snowball" effects of enabling reduced volume & mass of CO2-intensive concrete foundation material needed, the depth of piling required, and therefore the lifting capability of installation machinery. Additionally, the new mast will also include an integrated, automated structural condition monitoring system, thus enabling pre-emptive maintenance and removing the need for disruptive, expensive, and imperfect visual condition checking. To help Furrer+Frey realise this ambition, they have engaged some of the UK's leading researchers at Cranfield University, University of Southampton, and Newcastle University as subcontractors to develop the masts and Prodrive Composites - a manufacturer with considerable experience in complex composite structures for demanding applications. TruckTrain Developments will be supporting work on the commercialisation and export potential. The project has attracted the interest of HS2 and Network Rail, amongst others.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
HOWELL ENTERPRISES LTD	Reducing Fatality Disruptions with 8K Forward Facing CCTV Optimised for Remote Access	£396,349	£396,349

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Right-Time performance is key to railway customers having a good journey on the railways and fatalities are a major source of disruption. These incidents cause lines to be closed whilst British Transport Police (BTP) investigate and the railway is readied to reopen. TRUST data extracted by the National Disruption Fusion Unit of Network Rail (NR) show that, on average, there have been approximately 350 fatalities pa on GB railways causing 790,000 Delay Minutes pa, equating to 2,300 Delay Minutes per incident. Project partner Train Operating Company Avanti West Coast states that, after a suicide, services typically recover relatively quickly, but after an Unexplained fatality, services typically do not recover until the next day, disrupting passenger and freight journeys and reducing customer confidence in the railways. After a train encounters a fatality, the driver must report the incident to the NR signaller who informs BTP. BTP establish whether the incident was a "Suspected Suicide" or was "Unexplained" by interviewing the driver. If the driver did not have clear sight of the victim or is traumatised and cannot provide a reliable statement, then, if available, BTP can review the Forward-Facing Video of the event from the train. If the involvement of other parties cannot be ruled out, then BTP have to declare the incident Unexplained and, on average the requirement to treat the site as a crime scene, take witness statements and record the scene adds 1h45m (70%) to the time taken to resolve the incident. Declaring a fatality as a suicide can therefore depend on the Forward-Facing Video, but the limitations of the current Full High Definition standard of Forward-Facing Video cause quality problems. Recordings are notoriously poor in anything other than bright lighting, and real-life conditions (dark shadows on platforms, an overcast day or twilight) render footage unusable. In response, this project will use emergent 8K video technology, Cloud technology and advanced Artificial Intelligence image recognition to provide BTP with high quality video they can forensically analyse quickly. With better recordings, more incidents that would be judged as Unexplained due to current technology limitations, will correctly be deemed as suicides, reducing hand-back time and alleviating wider customer disruption. Our consortium, led by Rail Innovations, and comprising video software company One Big Circle Ltd, University of Surrey, Avanti West Coast and train owner Angel Trains Ltd, will apply innovative technologies and novel techniques to enable the deployment of 8K Forward-Facing Video.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
HITACHI EUROPE LIMITED	Optimising passenger flows through stations	£96,000	£96,000

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants

Background

Restoring passenger confidence in the rail system, post COVID-19, is a critical issue for train and station operators; and the need for safe social distancing has the potential to cause significant congestion at "bottlenecks" including entrances, exits, ticket counters, gates, walkways, escalators, bridges and platform.

By monitoring people flow, congestion points and behaviour, stations may be optimised to the benefit of railway operators as well as passengers. Staff can quickly get an overview of the situation and promptly deploy countermeasures, making passengers feel more comfortable as they are not left waiting in congested spaces and reducing stress on staff. Our proposed solution proposes to leverage existing CCTV infrastructure to calculate and propose an optimal configuration of station facilities such as gates, escalators and passageways to avoid unnecessary passenger congestion.

Solution

The proposed solution includes:

1. A method to detect passenger flows through the station using algorithms to deduce flows that cannot be captured on CCTV ("blind spots"), reducing the need for investment in significant new sensor infrastructure.
2. A dashboard visualising current passenger flow, direction, predominant routes and congestion levels, providing operational staff with the visibility that they need to take informed decisions e.g. where to dispatch staff, when to announce train departures, and whether to open or close gates.
3. A dynamic model to recommend the optimal positioning, deployment, and configuration of equipment (e.g. gates and escalators) and passageways in order to eliminate points of congestion.

Differentiation

We believe that our proposed solution approach will convey three key advantages over those currently available:

1. Rather than focusing on removing specific local points of congestion, e.g. on escalators or platform bridges, where remedial intervention risks moving congestion to other parts of the station; our solution will take a holistic approach to optimising passenger flow across the entire station.
2. We aim to use algorithmic and / or machine learning approaches to infer flows across camera and sensor "blind-spots"; thereby minimising the level of CCTV infrastructure investment needed.
3. Our solution will not need to track individual passenger movements across the station; reducing computer processing overheads and assuring passenger privacy and GDPR compliance.

Commercialisation

Opportunities exist to scale the proposed solution across the UK and global rail industries and into other transportation sectors, including airports, that are facing similar challenges in facilitating the safe and smooth flow of passengers.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ENERAIL LTD	Driving Approach Optimisation for Alternate Energy Systems	£261,240	£261,240

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
This project directly addresses the challenge of supporting the in-service deployment of battery and hydrogen vehicles to the network, by providing tools for drivers to readily adapt to driving these vehicles. It has been well documented that driving approach can have a significant impact on energy usage, the University of Birmingham (UoB) has previously demonstrated between 17-20% energy savings in tram and metro systems. EneRail has commercialised this approach through the development of a low-cost DAS for trams, that is about to under operational testing in Australia (TRL 8). We propose to modify this DAS for energy optimised driving for battery and hydrogen vehicles, connecting it with the power management system to provide real-time energy optimised driving approaches.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ARTONEZERO LIMITED	An AI based Information System for Passengers (ISP) for the Rail Industry	£396,367	£396,367

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
For many years UK rail passengers have suffered from poor information during disruption, despite considerable efforts from Train Operators (TOCs) and Network Rail. For example, research from Transport Focus identified that 'how train companies dealt with delays' was the primary cause of dissatisfaction for the last 6 years When a train is cancelled or delayed, passengers often have to wait anywhere from 20 mins to over an hour for updates, or advice on alternative routes to take, causing frustration. Front-line station staff are also poorly informed. JNCTION identified that control staff still mainly use 1980's technology, which doesn't provide real-time information to predict delay length, or how delays will affect services. When disruption occurs, train operators operations staff use inefficient manual processes to resolve the problems, leaving little time to inform their customer experience front-line teams or passengers. A new 21st-century solution is needed. In our original Innovate UK project (JNCTION's Decision Support Tool), JNCTION identified that by using machine learning techniques, the impact of disruption could be predicted in real-time to allow control staff to make faster and better decisions and achieve real performance gains. This system has now been successfully deployed at LNER. During the course of the project, a second major opportunity for innovation and improvement was discovered, which forms the basis of this application -- the 'Customer Experience and Information System -- CEIS'. Existing Network Rail/TOC Passenger Information In Disruption processes take too long to inform passengers and front-line staff by Customer Experience teams, even once they have finally received the new train plans from their Control Room colleagues. JNCTION identified that AI technology could solve this problem. The new CEIS tool will deliver rapid, accurate information for customers and front-line-staff in disruption. With a joined-up system of communications in which the central passenger IT source of truth, Darwin, is automatically updated, along with social media channels, station customer information screens (CIS), messaging to frontline staff and directly to smartphone apps, it will be possible to continuously update the majority of passengers with accurate and timely information within minutes. An additional benefit is that the system frees up front-line staff to prioritise helping users without technology, such as older or disabled users. The result: a step-change in the speed and quality of information to passengers in disruption, resulting in happier passengers, better informed front-line staff, and improved customer satisfaction ratings for train operators in passenger surveys.

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
CHROME ANGEL SOLUTIONS LIMITED	Covid Secure Travel Virtual Reality Simulation for Passengers	£118,307	£118,307

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Official statistics from the Office of Rail and Road (ORR) have revealed that rail passenger journeys across the UK fell to the lowest levels last seen in the mid-nineteenth century during mid-2020\. Working patterns are likely to permanently shift and travel be more discretional. Consequently, railways are going to need highly innovative approaches to increasing confidence in rail services, attracting back customers and welcoming new customers by providing assurance that travel by train is safe, and making it an enjoyable and productive experience. Chrome Angel Solution (specialists dedicated to implementing transformational technology & enabling organisational change for railways) and subcontract partner Totem Learning (experts in digital solutions and Serious Games) are collaborating with Northern (operator) and Angel Trains (asset owner) to design and develop a highly immersive & interactive Virtual Reality Simulation experience of the Covid Secure Travel arrangements and customer support in place at stations & on trains. This will enable passengers to explore and interact with them in operation, providing reassurance about the measures in place to protect passengers during the current pandemic (and creating a resilient toolset for managing any future wave or new virus), whilst also creating a powerful positive perception of the travel experience and customer service offered. The Virtual Reality Simulation will be installed on individual's mobile touch devices/tablets and desktop PCs through app stores and websites, enabling rapid deployment to large numbers of people. Mobile devices in VR Headsets (e.g. Google Cardboard) will provide a fully immersive and interactive experience of the journey for those who want it. Others may prefer touch screen interactions or large screen versions on PCs will also provide greater accessibility for those that need it. Applying proven technology and "Serious Game" approaches increasingly used successfully in other industries, this Virtual Reality simulation will provide an immersive interactive experience available on passenger devices that will directly support and encourage customers to travel on Northern Trains. Realistic Virtual Reality will enable passengers to experience their journey and the specific arrangements in place to ensure their safety in advance, providing clear information that all passengers can access and understand whilst building familiarity and confidence to travel. Once proven, it can be deployed rapidly and in scale to support Northern engaging with customers to rebuild confidence in travel.

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
INCREMENTAL SOLUTIONS LTD	TRACO	£393,371	£393,371

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
In order to maximise the growth opportunities currently being presented to the rail freight industry through the availability of increased capacity today and in the future, intermodal terminal transition improvements must be made to better optimise the modal shift from rail to road and rail to port. TRACO will provide an innovative solution to this challenge by presenting better and more accurate location information and predicted terminal arrivals to all organisations within the logistical supply chain. By accurately tracking and predicting arrivals for all vehicles, wagons and containers within the supply chain, paper-based systems can be reduced, and freight operations can be better planned and managed to improve the delivery of goods for customers. With this information readily available, rail freight growth opportunities such as high-speed deliveries and perishable goods can be realised thereby further boosting the £1.7Bn which freight already brings to the economy By reducing uncertainty in the timings of freight movements, and demonstrating enhanced predictability of modal transitions, capacity, growth and diversity of goods can be maximised and a much-needed modal shift towards rail freight can be realised, helping to reduce road congestion, optimise port logistics and bring about a significant decrease in carbon emissions.

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
THE TICKET KEEPER LTD	TTK Scanning-Post for Barcoded Train Tickets	£381,754	£381,754

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Barcoded tickets, which account for a major proportion of UK rail tickets, are currently scanned by automated gates (ATGs) on entry and exit at railway stations and by hand-held validators on trains. At present, over 80% of mainline stations are ungated (no ATGs), where tickets are inspected manually by train staff or not at all. This is a large gap in the existing infrastructure which we want to address by providing an attractive proposition for automatic ticket validation at these stations. Installing traditional ATGs is prohibitive due to both the significant cost and inconvenience/undesirability of a fixed physical barrier. The challenge is to provide an attractive alternative for fixed-point validation at ungated stations. Our proposal for a freestanding scanning-post or wall mounted scanning-box introduces self-scanning by customers and provides the opportunity for customers to "check-in". The scanning-post works with existing barcoded tickets either on paper or displayed on a smartphone. No changes to any existing ticket formats or rules are required. The idea is a further development of TTK's existing ticket validation system, which uses a smartphone and handheld scanner and is currently deployed by several TOCs. By validating their tickets before boarding a train, passengers gain the confidence of having checked-in with a valid ticket. Some TOCs are also keen to reward "self-validation" through their loyalty schemes. As a result of the comprehensive installation of scanning-posts at stations, we believe that the rail industry will benefit from lower costs associated with revenue protection, reduced fraudulent activity and improved information on customer travel behaviour. This is an exciting innovation for UK rail ticket validation and represents a radical change from existing practices. It offers huge benefits to both passengers and train companies: * Installation at a tiny fraction of the cost of traditional ATGs; * Integrated with the established industry validation system and, therefore, future-proof and always up to date with the latest ticket technology and regulations; * Improved information for marketing, travel statistics, customer communication and customer loyalty schemes; * A modern, customer-friendly approach to ticket validation; * Full and easy access for all including disabled passengers and those with mobility issues. The key objective is to design, test and produce a commercially viable barcoded ticket scanning-post that can be easily and cost effectively deployed at UK railway stations.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
GOMEDIA SERVICES LTD	Hearing Enhanced Audio Relay (HEAR)	£291,077	£291,077

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
By 2050, 1 in 4 people will have hearing problems in the UK. GoMedia will with the support from the Royal National Institute of the Deaf develop and test Hearing Enhanced Audio Relay (HEAR). This solution will address the issue that audio announcements on trains are difficult or impossible to hear for passengers with hearing difficulties. We will develop an affordable software solution that broadcast automatically audio announcements to passengers own devices. It will give passengers with hearing problems the ability to hear audio announcements through their own audio devices. Also passengers can listen to their own content on their device, such as an audiobook. For example, whilst connected to HEAR, the audiobook will pause and make the audio announcement through the passengers own device. HEAR is being developed to be a cost effective solution that can be installed on the majority of train carriages in the UK, and because HEAR is a software solution it will save the UK train industry millions of pounds removing the need to install expensive hardware solutions on board trains. More importantly it will reassure and increase accessibility to the rail network for passengers with hearing problems.

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
TRANSREPORT LIMITED	National Rail Assistance Auto-Validation	£393,487	£393,487

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Context and challenge At present over 5% of all rail journeys are taken by disabled passengers, with a diverse range of assistance requirements. However, whilst technologies already implemented by Transreport have supported a wider step-change in accessibility, there remains no real-time automatic validation of accessibility equipment/facilities availability during booking, or means to validate a proposed travel plan in real-time. Even booking in advance therefore gives no guarantee that listed accessibility facility/equipment will be available/functioning; ultimately, disabled passengers hope for the best on the day, with potentially upsetting consequences. These translate to specific inventory, data management and operations challenges underpinning a lack of existing technology that can validate a given journey in real-time to realise a zero-time booking-window. **Project vision** In response, Transreport are developing a platform-level solution to automate the validation of bookings including specific passenger assistance requirements. Uniquely based on new TOC data streams and crowd-sourced passenger data, the project seeks to deliver a highly interactive demonstration to operating staff and end-users in order to validate direct benefits for train operating companies and passengers.

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
TRANSREPORT LIMITED	Train and Station Cleaning Optimisation and Management	£95,395	£95,395

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Train cleanliness has taken centre stage in the last 12 months as rail users demand safe travel during and post the global Covid-19 pandemic. What was once a sufficient cleaning reporting process must now be optimised and extended beyond internal use to bring confidence to passengers and staff. The project will make available a full end-to-end cleaning management software system which will seamlessly integrate to existing TOC infrastructure. The system will record all cleaning activities from in-service cleaning to deep, overnight cleans/sanitisation. All outputs will be made available to applicable staff for simplified monitoring and process improvements, and to passengers to alleviate potential concerns for individual health and wellbeing, therefore reducing travel anxiety, leading to measurable uplifts in passenger comfort and confidence.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Window Seater	Window Seater Community Rail Content Platform	£149,955	£149,955

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Window Seater Community Rail Content Platform - a new rail passenger experience Window Seater is a startup that **connects rail travellers to the world outside their window**, providing high quality **geolocated audio stories** which link all the fascinating features along the railway. For the SBRI 'first of a kind' competition, Window Seater will partner with **Community Rail Network** and **GWR** to develop a new Community Rail Content Platform that can integrate **local stories** collected and held by community rail partnerships (CRPs) with passenger-facing technologies used by railway organisations. At a critical point for rail, the Platform will allow: * Rail organisations and Train Operating Companies (TOCs) a cost-effective way to **improve customer experience** and attract **leisure travellers**. * Post-Covid, an innovative and engaging new way to **bring passengers back to rail**. * Community rail partnerships (CRPs) to showcase **local stories** and use them to better **connect rail passengers to their communities**. * An improvement of Window Seater's user (rail passenger) and client (rail organisation) **experience**, and its ability to **scale content** (audio guides). **The Window Seater story** In 2018, a Window Seater prototype was built and successfully tested with rail passengers in Thailand and in 2020 a second prototype was built as part of the Transport for Wales Lab Programme, yielding **user research** that showed **significant improvements in customer experience** and **propensity to use rail over other modes** with Window Seater: * An increase of **22%** in the number of people saying they **"enjoyed their rail journey"** using Window Seater. * **89%** of users said a rail journey with Window Seater would be **"much better"** than non-rail travel, compared to 20% without. The app is available on Android and Apple stores. **Project deliverables** The Platform will take six months to develop and implement, with completion in **December 2021**. Anticipated commercial take up of Window Seater guides by TOCs would begin in 2022, with a goal to cover all of the UK long distance and rural network with guides by the end of 2023\.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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With the support of GWR throughout the project to give **operational and business insight**, the project structure gives the best possible chance of realising value to local communities, rail passengers, rail organisations and the wider industry.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
WHEREVERLY LIMITED	Making Travel on the Highland Mainline part of the Highland Adventure!	£63,186	£63,186

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
The project will bring the stations and journey of the Highland Mainline, Perth to Inverness, into the digital tourism experience of the central Scottish Highlands. From the Victorian era rail has always been an important way for leisure travellers to reach the Scottish Highlands and this is an opportunity to include rail travel and connect up rail travel with walking and cycling travel in destination. The project will leverage a 'key strengths' of rail over road travel, the station waiting rooms, platforms and the environment of the rail carriage, to make the journey part of the adventure, through AR, information and cultural audio. The project will bring the greenest forms of travel, rail, walking and cycling, into connected seamless green adventures for leisure travellers.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
GOMEDIA SERVICES LTD	Transport Navigation for the Visually Impaired (Vin)	£275,722	£275,722

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Navigating public transport can be challenging for passengers especially when they are visually impaired, stations can represent a complicated and daunting environment. This greatly reduces their access to public transport options impacting the lives of many and also increases the logistics of supporting passengers whilst travelling. GoMedia have partnered with the RNIB and technology provider Navilens, to develop a technical solution that can improve public transport accessibility for the visually impaired. Our solution will help the visually impaired find their way around stations guiding them to platforms, coffee shops, facilities and more with the use of simple visual markers recognised by a standard mobile phone that delivers relevant timely information. We are also combining this with our real time passenger information system to ensure passengers are kept up to date with the latest changes on the network. RNIB's knowledge, GoMedia's advanced Passenger Information Systems, Navilens's innovative visual recognition system will liberate the visually impaired travelling on Public Transport. Information can be sent to passenger devices that will empower visually impaired passengers to navigate around stations and onto their correct vehicle, even if they are unable to read standard signage and information screens. The information can be consumed by a passenger using the standard accessibility tools on their devices translating it in to a format that they are familiar with. The technical solution can be either standalone, or be integrated into the Train Operator's or National Rail Enquires App when available maximising access to the solution and access to the UK train network. Our focus is on the visually impaired, however, we will also investigate the impact on non visually impaired understanding if the solution will also assist other members of society, for example the elderly, school children or rural places where no screens can be installed at bus / tram stops. We have also been considering the benefit as we restart the economy of how our solution can be used to trigger information for all and reduce the number of physical touch points during a journey, increasing confidence to travel.

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
RAILSCAPE LIMITED	ROV Non-Native Invasive Species Vegetation Control for Rail: Herbidrone UAPS	£314,496	£314,496

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Project to deliver a Demonstrator of drone delivered herbicide service for difficult to reach Non-Native Invasive Species of vegetation (e.g. buddleia on brickwork) on critical infrastructure (e.g. bridges, retaining walls, embankments, cuttings and tunnel entrances), particularly in situations which currently involve personnel work at height and/or near live track. In addition to promoting native species and biodiversity, this will also lead to a more pleasant experience for customers and staff.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
METEOR POWER LIMITED	High Power Mainline Hybrid Electric Conversion For Freight Locomotives	£398,948	£398,948

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Saving the planet one delivery at a time. Governments all around the world are trying to legislate their way to much greener transportation whilst most transport operators are already finding their margins cut to the bone. In the rail industry the margins in the freight sector can be the difference between just one extra wagon. What if we could solve both problems in one? Many freight locomotives are still operational sixty years on even with the addition of many more modern locomotives. Despite this, many locomotives struggle with technology that was once cutting edge but is now a challenge to support and maintain. Rather than let these locomotives fall out of use due to a lack of spare parts or general unreliability, this project aims to give them a new lease of life rather than have the operator fork out £4M+ to purchase modern, greener mainline alternatives. Meteor Power are focused on reducing emissions and increasing profitability in the heavy duty freight haulage sector. We are unique in looking to offer a retrofit hybrid electric powertrain suitable for mainline freight applications. Not only is adherence to the many standards, etc. crucial but the documentation required for the certification process is equally important. As the lead organisation experience renovating and converting smaller, slower locomotives will prove extremely valuable in addition to having previously developed traction, auxiliary and generator/charging systems for other rail and automotive applications. Meteor Power already owns two Class 08 locomotives and are in the process of purchasing a Class 37 locomotive from potential customer Europhoenix. We also have a longstanding agreement in place to use Chinnor and Princes Risborough Railway for testing, etc. The heavy duty freight sector is unique in terms of: * Size & Power, 90+ tons and 1,750 hp - 3,000 hp * Speed, up to 75 mph * Technology, incl. AC & DC traction motors, etc. Our modular approach allows key items to be upgraded as technology progresses. More importantly, it will encourage the locomotive operator to upgrade to the financial fuel savings whilst also delivering the benefits of the some of the greenest freight locomotives of the modern era.

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
SKIGNZ LIMITED	A unique way to make 'Rail Travel 'as seamless, stress free & easy to use for all	£148,500	£148,500

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
skignz provides '_Precise Location Augmented Reality'_ (PLAR) that allows _'Rail Operators'_ and their partners to deliver interactive branded digital content in and around every station across the UK. Emerging from the current pandemic, the **skignz** PLAR technology will be used for passengers, staff and contractors to improve, enhance and improve the seamless flow through our stations. The **skignz** PLAR technology is real time, hyper accurate and can be managed either by the rail operators or through multiple data feeds pushing out live information to multiple locations and individuals. By providing a seamless link between the _'physical'_ and _'digital'_ worlds, the ability to reduce passenger anxiety, physical touchpoints, provide real time information to their fingertips. Key areas of focus for this particular project will include: **- Wayfinding** - Removing the reliance on Maps, providing real time travel & public information to each passenger, meeting their specific needs at that moment! Coffee? Toilets? Taxi? Member of staff? All are clearly identified, segmented for ease and allows the passenger to curate their own journey in and around the station environment. In addition this presents commercial revenue opportunities with existing partners **- Assisted Travel -** A unique way to support and enhance the experience of passengers with special/assisted needs. Immediate response through real time selection, allowing staff to respond quicker, regardless of the location of the passenger within the station. Ultimately allowing the _'assisted passenger'_ increased independence, enhanced experience and an overall improved journey **- Personalised Travel** - Placing the information at the fingertips of the passenger in a clear and concise way, enabling them to enter the station and seamlessly find where they need to stand in order to get on their specific carriage and platform. This approach will help reduce anxiety for passengers, whilst freeing up time for station staff **- End to End Travel** - Identifying modes of transport to/from stations regardless of the passengers varying requirements for each journey, essentially connecting the trains to all other modes of transport for a smooth journey from door to door Delivering this across the whole UK rail network, provides consistency of experience and leads to significant efficiency savings, introduction of new lean processes whilst delivering new opportunities to reduce carbon emissions.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
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Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
METEOR POWER LIMITED	Artificial Intelligence Driven Hydraulic Energy Recovery & Delivery for Rail Wagons	£399,360	£399,360

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
We have customers that haul loads of up to 2,700 tons over the mainline to and from specialist sites, such as quarries and ports. Many rely on ageing and highly specialised locomotives on site and Class 66s or 70s to haul cross country. One of the challenges in making good progress on the mainline is being able to get through each section without having to stop so as to not impede the progress of any passenger trains that have a schedule to keep. This results in long delays where the freight train has to wait until the is along enough gap to proceed. Felixstowe to Nuneaton, for example, can take up to 11 hours with several delays of over an hour, where the train sits with engine idling, until allow to proceed. Being able to accelerate more quickly from standstill, e.g. from red lights, would save a considerable amount of time and avoid some these unnecessary delays if the train could get through the sector more quickly. Rather than make complex changes to the locomotives, Meteor Power has designed an energy capture, storage and delivery system that can be fitted to the wagons themselves. Imagine 27 x one hundred ton fully loaded wagons able to move away from standstill under their own power leaving the locomotive to take over once they are moving. Our project is a standalone system fitted to the wagon that captures energy when the train slows down and releases it when it pulls away, or speeds up. Electric motors and battery packs would be both large and heavy. Our proposal uses hydraulics to aid braking and capture 'free' energy and release it later. It can even cut down on brake pad wear. Meteor Power will develop the hydraulic energy capture and storage system alongside the semi-autonomous electronic control to operate with as little input from the locomotive as possible. The system will use artificial intelligence to control the energy capture/release function and analyse whether the train is slowing down, accelerating or if the wagon is just rolling slowly backwards downhill slightly after the brakes were released and is about to drive in the opposite direction. Aside from monitoring the train brake pressure to determine levels of braking the system will be completely self reliant, even to the point of powering the electronics from energy captured from the compressed air train brake system.

Results of Competition: SBRI Competition Rail Demonstrations: First of a Kind 2021

Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
FURRER + FREY GB LIMITED	Decarbonisation & Electrification of Freight Terminals (DEFT Project)	£345,404	£345,404

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Decarbonisation & Electrification of Freight Terminals (DEFT Project): Furrer+Frey's Moveable Overhead Conductor-rail System (MOCS) is an innovative retractable overhead system that enables the electrification of freight terminals whilst also allowing obstruction-free loading and unloading of freight. MOCS eliminates the need for tug/shunting locomotives to manoeuvre electric trains into and out of freight terminals, eliminating the current barrier to end-to-end rail freight electrification, ending the reliance on diesel, and enabling the full decarbonisation of the rail freight industry.

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

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Competition Code: 2102_DFT_SBRI_RAIL_FOAK

Total available funding is £9m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
PRIESTMAN GOODE LIMITED	Proteus - Flexible Rail Interior System	£399,998	£399,998

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Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
This project responds to the rapidly changing landscape in rail, post COVID-19\. It aims to bring innovation to rail carriage interiors that will offer benefits and reassurances to passengers and bring commercial opportunities to leasing companies and operators. As a result of the various lockdown measures introduced since early 2020, train services in the UK are currently running at 20% capacity. Although surveys anticipate that passengers will return over time, patterns of travel are predicted to be different such as a flatter profile of morning and evening peak hours, longer but less frequent commutes, single-leg journeys with micro-mobility modes used to complete the last mile of journeys, and an increased leisure market at weekends. The Transport Focus 2021 research indicates that passenger anxiety around personal space and distancing and concerns for hygiene are two of the critical factors influencing the speed at which passengers will return to rail travel. Operators must also compete against a new-found attachment to working from home and the associated benefits in terms of work/life balance. However, the actual profile of passenger return is unknown and could be influenced by factors such as future waves of the pandemic and economic performance. Therefore, operators need flexibility built-in to allow them to manage through multiple future scenarios. As there have been no new train interiors put into service since the pandemic, this project aims to deliver a first-of-a-kind carriage environment and seating layout that address passenger concerns and provide operators with flexibility, allowing them to flex onboard accommodation for a gradual return. Key features would include: New definition of personal space within carriages; Seat designs that facilitate easier cleaning and reduction of dirt-traps; Built-in features that allow passengers to make best use of their time onboard to do work and be productive; Improved storage space for luggage, bikes and other micro-mobility modes; A layout with 'passive flexibility' allowing operators to bring seats in and out of service according to demand and be able to make those changes immediately or overnight in-depot, without taking the set out of service and needing engineering support. In addition, the structural changes ongoing in the rail industry, with a very high intensity of franchise re-leasing work in the next 5 years gives a once in a generation opportunity to carry out vehicle refreshes and capitalise on the disruption of the pandemic to provide a higher quality passenger experience as we recover from it.

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