

Innovate UK

Results of Competition: SBRI First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
Porterbrook Leasing Company Limited	Green Rail - Exhaust After Treatment System ("GR-EATS")	£348,768	£348,768

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

Porterbrook has a reputation for innovation in support of asset management and is actively looking to improve the environmental performance of their rolling stock. Porterbrook will collaborate with Eminox, a world-leader in exhaust and after-treatment technology, based in the UK, to deliver the GR-EATS project. GR-EATS seeks to transfer Eminox's proven on-road after-treatment system, widely fitted to heavy duty vehicles, including buses, to a railway operating environment for the first time.

Our first-of-a-kind collaboration will integrate advanced emissions technology onto an existing Diesel Multiple Unit (DMU) train and operate it in normal passenger service. We will prove fitout, rail standards conformance; quantify durability and emissions performance; and ascertain ongoing maintenance requirements. State of the art telemetry will be fitted as standard to provide real-time onboard diagnostics and abatement performance data from the system. Rail-specific challenges, such as high exhaust temperature duty cycles, will be overcome as part of the project, utilising advanced catalyst technology in the first on-rail application.

By partnering with First Group, through Porterbrook's customer South Western Railway, we will modify a Class 158 DMU and gain valuable feedback on the innovation from the train's drivers, depot maintenance staff and other stakeholders.

"South Western Railway is committed to supporting international agreements on climate change and fully support working with the owners of the rolling stock we lease in the development and adoption of technologies, fuels and controls to reduce greenhouse emissions associated with our fleets. We are keen to support Porterbrook and Eminox's proposal to trial a retrofit aftertreatment onto the UK railways, targeting the Class 158 fleet which we lease. This will enable us to provide feedback, as a potential customer, on the fitment, ongoing operations and performance of the system."

GR-EATS will enable the technical and commercial viability of after-treatment for rail vehicles to be established, so it can be offered for widespread fitment to 'second generation' DMUs across the UK, and potentially overseas, thus significantly reducing emissions from industry rolling stock.

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 First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
Unipart Rail Limited	Commercial Digital Displacement Pump (CODD-P)	£349,960	£349,960

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 CODD-P seeks to deploy for the first time a COmmercial version of a Digital Displacement Pump and its electronic controller in place of a traditional hydraulic pump with a swashplate design. This revolutionary technology is highly efficient with minimal part load losses such that a significant saving in fuel consumption (and hence carbon emissions) will be achieved. In-service testing of a fully certified system, combined with accurate measurement of fuel consumption will demonstrate this is the case

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 First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
Vortex Developments 2014 Ltd	Diesel Freight Carbon Reduction Technology	£344,556	£344,556

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 8-month project, commencing March 1st 2019, led by Vortex Developments 2014 Ltd, involves technology transfer from automotive to rail. The technology is a patented 'game changing' exhaust design that produces volumetric efficiency of combustion in the engine cylinders, and reduces fuel consumption as a result, as well as reducing diesel particulates because of improved exhaust gas scavenging. This technology reduces the carbon footprint of rail diesel engines as well as reducing diesel particulates by more than 50%. The exhaust design will allow for further development of a Vortex emissions reduction technology when this is required or requested.

The development of the technology for Class 66 freight engines follows the development of a vortex exhaust for passenger Class 156 trains. In a live longitudinal test of a Class 156 train in service a 13.2% mean reduction in diesel was obtained in the back to back trial of the Vortex exhaust against the standard exhaust on the same train engine.

The latter trial has given the technology a high Technology Readiness Level, and its next application will be on the 2-stroke Class 66 engines. The latter differ substantially from the Class 156 engines; they are more powerful, lower revving electric generator diesel and are 2-stroke rather than 4-stroke, which presents some challenges. The Class 66 exhaust system is also substantially larger than the Class 156, so construction materials will be stronger and the physical size substantially larger in diameter with the exhaust shorter in length. The Vortex exhaust will be constructed from stainless steel and the warranty will be life time, meaning 20-years.

Design and flow calculations will be done with the support of Surrey University whose engineering department has considerable experience in this field, testing will be done with the support of SBL-Rail, a division of Westerton Agencies Ltd, who have substantial experience in testing engines in the automotive and rail sector. The vortex exhaust demonstrator after successful completion of load bank tests and then a six-month live test on a Deutsches Bahn UK Class 66 freight train of the standard versus Vortex exhaust, will go to the Manufacturing Technology Centre in Coventry, and they will assist with manufacturing consultancy. Deutsches Bahn will be the first customer of this exhaust technology should it prove economically acceptable. In that case manufacturing will be carried out by Benson Components Ltd, an SME tier-1 producer for HGV and plant and machinery OEMs. The commercialisation will be undertaken by Unipart Rail, the commercial partner of Vortex Developments 2014 Ltd, and Vortex will work with the PR department of the RSSB to gauge public and rail sector interest in this technology, and disseminate data and information gained from this project. The manufactured product is planned for roll-out into the market within one-year of the project completion.

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

Innovate UK

Results of Competition: SBRI First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
Riding Sunbeams Ltd	RIDING SUNBEAMS: FIRST LIGHT	£349,514	£349,514

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

Riding Sunbeams is a world first initiative to bring together Britain's favourite energy source - solar - with our biggest electricity consumer - the railway network.

The cost of solar power has fallen dramatically in recent years, and solar is now cheaper than fossil energy in most markets around the world. Meanwhile UK railways already use around 1% of all our electricity, and demand for traction power on our rail networks is rising. Electrified railways and solar power are two of the key technologies for tackling climate change by moving Britain away from reliance on fossil fuels, but they also share another important characteristic: their intrinsically distributed nature.

While Britain's ageing power grids are struggling to cope with connecting new renewable generating capacity, the UK's thousands of miles of electrified railway lines are in effect operated as a parallel, semi-independent 'shadow grid', with high energy demand distributed throughout: each traction substation on the DC network South of London has the annual power demand of a small factory. Riding Sunbeams has recognised this 'shadow grid' as potentially offering an entirely new route to market for decentralised energy generation.

The modular nature of solar generation and the diffuse nature of the energy resource - sunshine - means it can be deployed almost anywhere, from small rooftop arrays to solar farms a mile wide. This feature of solar PV also makes it an ideal candidate for installation on rail corridors and south facing embankments, turning otherwise unproductive land that cannot be used for any other purpose into a revenue generating, carbon-busting productive asset. Network Rail is one of the UK's biggest landowners.

Although some rail stations and trains have begun to install solar PV in Britain and elsewhere, nobody anywhere in the world has yet connected solar generation directly to rail traction networks to power trains. Our Riding Sunbeams: First Light demonstrator project will develop a solution to this challenge, helping us to realise our vision of a 21st century railway, with community and commuter-owned solar traction farms located alongside electrified routes, powering Britain's train journeys with cheap, clean and unsubsidised renewable energy.

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

Innovate UK

Results of Competition: SBRI First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
Steamology Motion Limited	W2W Zero Emissions Power System	£350,000	£350,000

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

Earlier this year (2018) the Minister for Transport announced an ambition to remove all diesel only trains off the track by 2040. This is part of the overall UK government target to reduce greenhouse gas emissions by at least 80% (from the 1990 baseline) by 2050.

Steamology are developing innovative, hydrogen based, power generation and storage products that deliver zero emission solutions when powered by Renewable Energy (RE). The SBRI first of a kind round 2, demonstrating a greener railway, will enable the application of this technology to Theme 1 : decarbonisation of the railway.

This project team will be able to tackle the key competition priorities of:

- Transferring ideas from other sectors such as automotive
- Improvements in air quality in stations
- Innovative power train and energy storage systems for rolling stock
- Alternatives to fossil fuels based on advances in automotive to reduce noise and pollution with more self-powered rail vehicles
- Examining the energy requirements of the whole system and optimising efficiency with a more flexible and integrated energy system
- More holistic approach to energy use making better use of energy generation and storage technologies to reduce operational costs and carbon footprints

Steamology is an innovative technology development company with an extreme engineering pedigree and a land speed record-breaking heritage. Founded to commercially exploit the technology legacy from a successful world record attempt and to explore the potential of novel clean green renewable hydrogen steampower generation. Steamology has a proven record in delivering complex functioning systems. At the heart of the W2W (Water 2 Water) system is a compact energy dense steam generator. Steam is generated using energy stored as compressed hydrogen and oxygen gas in tanks. High pressure superheated steam is used to drive a turbine to do useful work by generating electricity. This will provide an innovative power train for Vivarail Class 230 rolling stock. The turbine is a range extender concept that will be able to charge the battery packs already installed. Renewable Energy is used to power electrolysis to generate the hydrogen and oxygen gas and to compress the gas into storage tanks. This W2W closed cycle is emission free producing no carbon or NOX emissions in a repeatable cycle without charging losses.

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

Innovate UK

Results of Competition: SBRI First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
PAULEY Group Limited	Stations AR Digital Twin	£333,791	£333,791

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

Augmented reality (AR) is the integration of digital information with the user's environment in real time. Unlike virtual reality, which creates a totally artificial environment, augmented reality uses the existing environment and overlays new information on top of it.

The project team (led by PAULEY, supported by HS2, the National College for High Speed Rail, WSP (lead developer of two HS2 stations) and Inventya) will demonstrate the unique capabilities of a AR digital twin platform for use within a station environment. The project will focus on the potential for AR technology to revolutionise the way in which rail station staff are trained and upskilled. The immersive environment will be modelled on HS2's Old Oak Common station.

The AR platform will allow companies to collaborate in this new synthetic environment. Broader end uses include:

- Skills and training – Provide opportunities for professional training and competencies that are currently learnt in situ.
- Customer experience – Attempting to imagine the world of expectation for millennials, their travel requirement and the impact that a station has on this process.
- Maintenance – Visualise engineering maintenance activities to ensure that the impact on passenger experience is minimised.
- Health and safety – Deployed to the emergency services to optimise scenario planning of major incidents (people flow, evacuation, emergency procedures).
- Variable usage of space – Visualising the impact of design concepts upon the traveling public will facilitate improved engagement with perspective users and stakeholders.
- Wayfinding and signage – Relieving the directional frustration of travellers, enabling customers to locate their platform (or shop, restaurant, preferred exit etc) quickly and easily.

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 First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
OpenSpace Group Limited	OpenSpace Thameslink	£342,348	£342,348

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

OpenSpace will deploy their technology platform into Kings Cross St. Pancras Thameslink Station, in conjunction with Govia Thameslink Railway Ltd, to provide station management and network operation teams with a set of next-generation tools to better understand and manage the situations that cause disruptions and detract from passengers having a good end-to-end customer experience. By making use of cutting-edge data and simulation tools to understand how people move through stations and the wider railway network, we aim to ensure that customers are put at the heart of the decision making process.

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

Innovate UK

Results of Competition: SBRI First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
DW Windsor Limited	Personalised accessibility and wayfinding in stations	£348,710	£348,710

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

A collaboration of three British based SME's DW Windsor, Digital Rail Ltd, Urban Control and the University of Nottingham are going to create 'Personalised Accessibility and Wayfinding at Stations' (PAWS). The team will develop and integrate dynamic lighting technology with a vision system to create a new autonomous solution for improving customer experience at stations. PAWS will alert station staff when customers who need assistance enter the station. PAWS will use lighting to help customers who need to use a lift, as they have a bike, pushchair or heavy luggage, by showing the route through the station using intuitive, temporary light projection. Once on the platform we will use lighting to help customers to find the correct carriage.

The project is working with key rail industry partners: First Group, Great Western Railway, High Speed 2 and Network Rail. The new technology will be installed at busy trial station, Slough. The project will be developing technology which has been developed for different use case under previous rail innovation projects. The University of Nottingham will undertake an evaluation of the project. PAWS will seek to improve the part of the door-to-door journey which has the lowest level of satisfaction from customers. Other benefits include: Improving accessibility, dynamic wayfinding without making stations more complicated to navigate through, improving passenger flow and reducing train boarding time and safety by encourage better segregation of customers.

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 First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
Liverpool John Moores University	COINS - Customer-Operational Information System for railway stations	£264,402	£264,402

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

COINS, the Customer-Operational INformation System for railway stations. COINS is your future friendly departure board. Besides the usual departure information, it can provide you with regular updates on any current and future disruptions, specifically tailored to your specific journey. It will tell you why your train is delayed, how severe the delay is going to be and what should be solution. If you have to take a replacement bus, it will estimate how long the bus trip would be for you to get to your destination. It will try to always be on and bring you information from alternative sources even if some of its data servers are offline. It can even interact with you via a touch screen so that you can explore a whole lot more information. If you cannot see well, COINS can talk back to you or magnify the screen for you. COINS is accessible at waist level, so no matter who you are, COINS will always be within reach.

The COINS system arises from successful research undertaken at Liverpool John Moores University in several projects, notably a recent RSSB funded project Data Sandbox. These projects were for different applications, but we are excited to find out that their technologies could be used to bring a new life to COINS.

Working with partners from Merseyrail, Network Rail and Merseytravel, we at Liverpool John Moores University are very much looking forward to the day when COINS will see you for the first time at Liverpool South Parkway station, ready to bring you a new kind of experience at 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

Innovate UK

Results of Competition: SBRI First of a Kind Round 2: Demonstrating Tomorrow's Stations and a Greener Railway

Competition Code: 1810_SBRI_DFT_FOAK_R2

Total available funding is £3.5 million

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
Calvium Ltd	NavSta app	£314,760	£314,760

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 Inclusive Transport Strategy recently stated "disability affects 13.9 million people in the UK and can include visible... or less visible disabilities". Innovative, novel solutions need to be developed to support the Government's wider commitments to enable a million more disabled people to take up employment over the next 10 years.

Calvium work at the intersection of people, place and tech to create beautiful and useful solutions. For this competition, we will create a free mobile application that helps people with invisible impairments to plan for their visit through immersive experiences and navigate stations independently and with confidence. It will be a user-led solution which focuses on human factors whilst also providing a cost-effective answer for stations facing increasing demand for vitally needed passenger assistance. Key Benefits of the project will be it:

- Improves people's ability and motivation to engage in social and employment activities that are fundamental to a good quality of life and the UK economy.
- Reduces stress or anxiety about visiting station premises as the user can prepare for their visit beforehand and build up a mental model of the venue prior to arriving. Once there, the visitor is able to use the app to help them navigate the space.
- Is retrofittable to other stations.
- Improves the accessibility of stations.
- Improves overall customer satisfaction.
- Allows station owners compliance with new Innovation UK Strategy, disability regulations and their industry licences.
- Will be a virtual alternative to the passenger assistance programmes and will provide a cost-effective solution for stations owners facing increased demand for assistance.
- Will meet the current gap for assistance with people with invisible impairments which has been confirmed by multiple papers, including the Inclusive Transport Strategy.

Consortium partners include Transport for London who will be our key railway industry partner, Transport Systems Catapult who will provide invaluable support for dissemination of the solution and Open Inclusion who are experts in accessibility research and solutions consultancy.

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