SBRI Competition Rail Demonstrations: First of a Kind 2023

14 June 2023

Department for Transport

HS2

UKRI Innovate UK KTN

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www.ktn-uk.org

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Housekeeping

Amenities

- Refreshments available all day
- Lunch served in the area outside the conference room
- Toilets

Other

- We are live streaming this event, therefore, try not to walk in front of the camera
- Mobile phones on silent during the event
- Fire alarms

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KTN

Agenda

11.00	**Welcome**
11.10	Rail Minister's welcome & competition launch
11.20	Competition scope & Application process
12.20	Q&A
12.40	**Lunch**
13.40	Challenge owners presentations
15.00	Elevator pitches
15.30	**Session Wrap up**
15.35	Networking & Refreshments
16:00	**Event Close**

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Department for Transport

Huw Merriman

Minister of State for Rail and HS2

SBRI: FOAK 2023 – Customer Experience Rail Demonstrations
SBRI: FOAK 2023 – Reliable and Maintainable Assets Rail Demonstrations
SBRI: FOAK 2023 – Optimised Train Operations Rail Demonstrations
SBRI: FOAK 2023 – High Speed Rail Systems Installation Demonstrations

Applicant Briefing
14th June 2022

Department for Transport

HS2

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The seventh ‘First of a Kind’ Competition delivered by Innovate UK on behalf of the Department for Transport and High Speed Two (HS2) Limited

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Agenda

- **Welcome and introductions**

- **Part 1**

SBRI key features, intro to Innovate UK and UKRI

- **Part 2**

Scope, eligibility criteria

- **Part 3**

The Innovation Funding Service, application finances

- **Part 4**

Submitting your application, assessment, project setup for successful applicants

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Welcome and Introductions

Mark Cairns	Department for Transport
Howard Mitchell	High Speed Two (HS2) Limited
Jonathan Kelly	High Speed Two (HS2) Limited
Declan Meiklejohn	Competitions Team, Innovate UK
Lydia Weir-Blankenstein	Competitions Team, Innovate UK
Kelly McGrath	Competitions Team, Innovate UK
Klara Ludinova	Innovation Lead Rail, Innovate UK
Michelle Carter	Head of Transport, Innovate UK KTN
Rhianne Lucas	SBRI Portfolio Manager, Innovate UK

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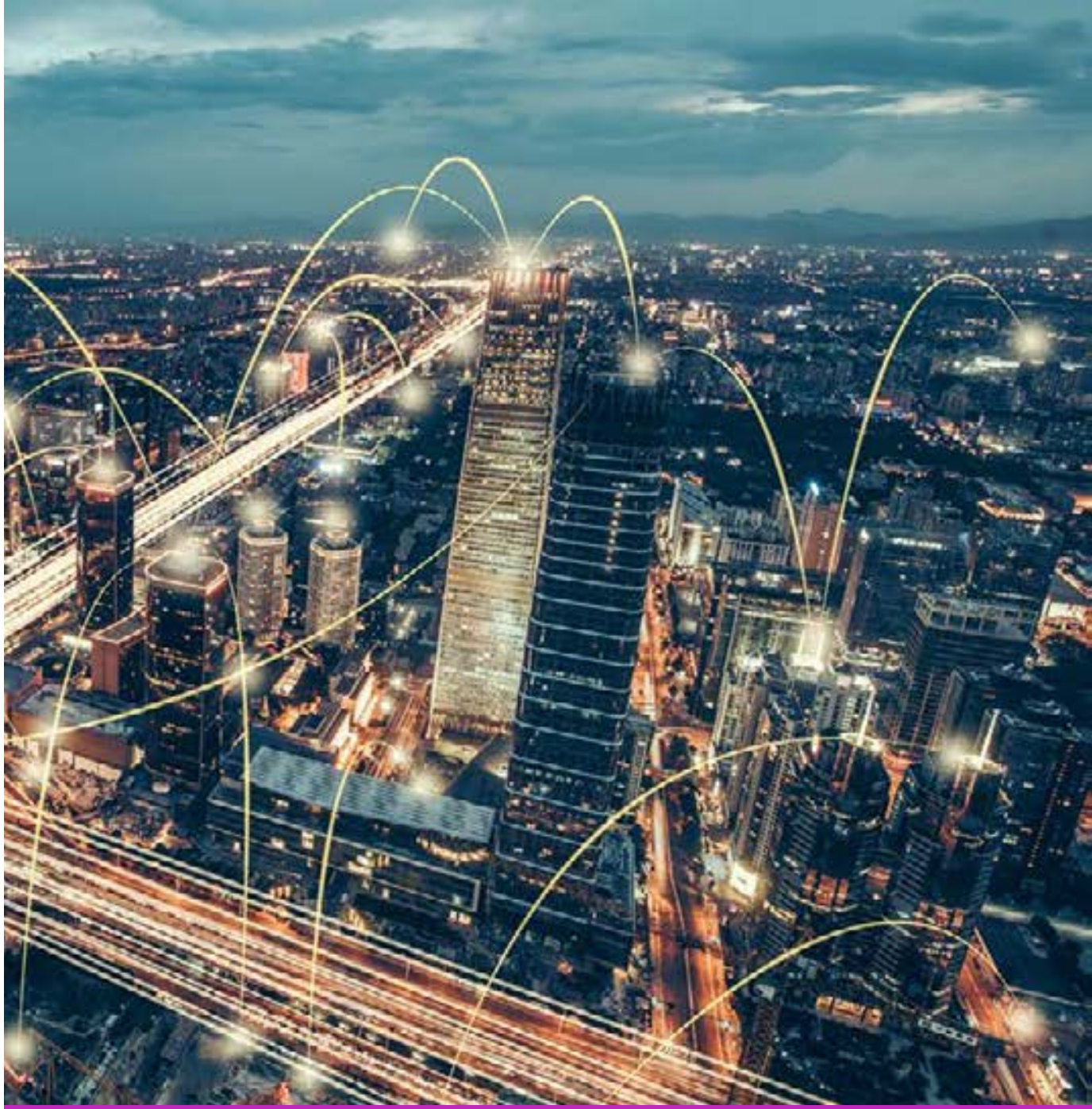
Introduction to Innovate UK and UKRI



UKRI Innovate UK

UK Research and Innovation

We work with the government to invest over £7 billion a year in research and innovation by partnering with academia and industry to make the impossible, possible. Through the UK's nine leading academic and industrial funding councils, we create **knowledge with impact**.

Innovate
UK

Innovate UK

- We are the UK's innovation agency
- We support business-led innovation in all sectors, technologies and UK regions
- A key delivery body of the Government's Innovation Strategy

Our Mission

To help UK businesses grow through the development and commercialisation of new products, processes, and services, supported by an outstanding innovation ecosystem that is agile, inclusive, and easy to navigate.

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UK ranks 4th in Global Innovation Index

- Innovation accounts for up to 50% of labour productivity growth
- Firms that persistently invest in R&D have higher productivity
- Innovating companies are more likely to export and generate growth

About SBRI

Innovate UK

SBRI Government challenges. Ideas from business. Innovative solutions.

SBRI: the small business research initiative

Helping government, helping businesses

Helping government:

SBRI helps government organisations solve tough challenges by connecting them with innovative businesses.

Helping businesses:

SBRI offers innovators the chance to win a government contract to help demonstrate and develop their new technologies.

- over 100 public sector organisations participated
- average annual sales grow 30%

Jenny Griffiths, founder, Snap Fashion

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SBRI Government challenges. Ideas from business. Innovative solutions.

What is SBRI?

Small business research initiative

- → Pre-commercial procurement
- → Requires a lead customer
- → Outcome-driven solutions
- → Well-defined challenges
- → R&D services procurement contracts

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SBRI Key Features

Development Contracts

- 100% funded R&D (procurement contract for R&D Services)
- UK implementation of EU pre commercial procurement

Contract with Lead Applicant

- Who may choose to sub-contract but remains accountable

IP rests with Supplier

- Certain usage rights for the Public Sector (licenses etc)
- Companies are encouraged to exploit IP and will be assessed on this basis

Eligibility

- Open to all organisations. There is no limit on the size or type of company.
- Open to companies not currently engaged in the sector
- Research organisations may also apply
- All organisations must demonstrate a route to market

Applying to an SBRI competition

- In addition to the technical criteria, you will be assessed on your plans to commercialise your technology; value for money; potential benefits.
- This is a contract to deliver a specific outcome, be sure you can deliver what's in your application. Academia can lead but must meet the eligibility criteria.
- You must include **VAT** (if registered), as this is a contract for R&D services and the award is classed as trading income.
- You **must not** include profit within your application
- We cannot increase your costs once you've been awarded a contract
- Explain the problem your project is looking to solve and who your target customers will be.
- Familiarise yourself with the contract, our terms and conditions are non-negotiable.

Scope

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Challenge

The competition is delivered by Innovate UK on behalf of the Department for Transport and High Speed Two (HS2) Limited.

The aim of the competitions is to deliver demonstrations to the UK's railways.

The overarching principle for First of a Kind 2023 is **cost efficiency and increasing value for money** and it must have the following priority themes:

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Challenge

DfT competition strand

- Customer Experience
- Reliable and Maintainable Assets
- Optimised Train Operations

HS2 competition strand in High Speed Rail Systems Installation

- Slab Track Installation Processes
- Cable Troughing and Cable Laying
- Installation of ERTMS (European Rail Traffic Management System) related equipment
- Tunnel Fit Out Installations
- Electric Multi-Purpose Vehicles Deployment

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Challenge

Teams must demonstrate how proven technologies can be integrated into a railway environment for the first time as ‘first of a kind’ demonstrations. Deliverables must include a highly interactive and innovative demonstrator in an environment where railway customers and industry representatives can witness the product as a compelling business proposition and must be as close to a live railway environment as possible.

The most appropriate environment for this must be agreed with your rail industry/integration partners. In their role as potential future customers, they will be well-placed to propose an appropriately representative railway environment.

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Challenge

Access the full competition details:

SBRI: FOAK 2023 – Customer Experience Rail Demonstrations

https://apply-for-innovation-funding.service.gov.uk/competition/1626/overview/eb29b7be-d829-49d8-bb57-4fbd7e87d2f7

SBRI: FOAK 2023 – Reliable and Maintainable Assets Rail Demonstrations

https://apply-for-innovation-funding.service.gov.uk/competition/1629/overview/30f06e9d-ce61-49a7-bf29-fdcf5a35f3e4

SBRI: FOAK 2023 – Optimised Train Operations Rail Demonstrations

https://apply-for-innovation-funding.service.gov.uk/competition/1628/overview/e8076c8c-590b-46ac-9153-f1438ed59ec4

SBRI: FOAK 2023 High Speed Rail Systems Installation Demonstrations

https://apply-for-innovation-funding.service.gov.uk/competition/1627/overview/32593895-08af-4ff4-b2cc-a5b926fae18c

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Common competition objectives

- Demonstration of innovations in a railway environment
- Teams must work with railway/integration partners to achieve this, obtaining all required permissions and approvals
- Teams should de-risk all aspects of this before bidding into this competition
- Evaluation Activity, measuring data to anticipate the commercial impact that adoption of the innovation will have on the railway network

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Common competition objectives

Your project must support the overarching principle for FOAK 2023: **cost efficiency and increasing value for money.**

Delivering financial sustainability is a strategic objective of the long term strategy for rail, and a pressing need for the sector given a drop in revenue and increasing costs in the light of inflation.

Your project, regardless of priority theme, must demonstrate how you will improve value for money, through increasing revenue or reducing costs whilst delivering positive outcomes in relation to your chosen priority theme.

SBRI: FOAK 2023 – Customer Experience Rail Demonstrations (DfT)

Themes

In this theme we are seeking projects which will help attract and retain rail passengers through an improved rail experience (including customers of international rail services).

Possible examples include:

- making independent rail travel accessible for all, including physical barriers to accessible travel for disabled customers (such as the platform and train interface and the built environment) and making accessibility data and information about accessible facilities available
- improving customer experience in the event of disruption and delay
- innovation to enable to-the-second reporting on delay causes to support root-cause-analysis of delays of less than 3 minutes
- personal safety and security, including safety on stations and physical design of station environment and products in a station environment

Themes

(2 of 3)

- simplifying rail travel for customers, including information and data sharing and making intermodal connection easier, including ‘first mile and last mile’ travel and improving the ticketing experience
- informed customer, including easy access to relevant, accurate and personalised information before, during (real time) and after journey, especially during disruption, improved communication between staff and customers
- increase public confidence in the rail and to encourage customers to make greater use of the railway, including those with changed work patterns
- encourage new customers to embrace rail travel as the transport mode of choice, including an increase in leisure travellers and supporting return to travel by commuters
- deliver a more productive and pleasant travel experience for the business traveller and a more enjoyable experience for the leisure traveller, including sleeper trains and catering, space and temperature onboard and in waiting rooms and seat comfort

Themes

(3 of 3)

- accommodate a wider range of travel patterns and customer requirements, for example: interior design, onboard storage, maintenance scheduling, timetabling, capacity management, innovative storage for bulky items at stations
- to create local community hubs at stations, including playgrounds, cafes, local shops, offices to draw more customers to the stations
- to facilitate passengers to consider international rail travel through addressing barriers, such as, in relation to border checks relevant to international rail
- use of artificial intelligence (AI) to improve passenger experience, particularly passenger communications
- use of data more generally to improve passenger experience, including exploitation of open data

Eligibility criteria - SBRI: FOAK 2023 – Customer Experience Rail Demonstrations

Project eligibility	✓ Applicant can be an organisation of any size ✓ Can work alone or with others organisations as subcontractors only ✓ Contracts will be awarded to a single legal entity ✓ Main contractor can subcontract components of work with justification to specialist consultants or advisers Your project must involve: ✓ an owner of railway assets (for example stations, rolling stock or infrastructure) ✓ an experienced railway organisation ✓ a rail organisation that has the potential to become a customers These criteria can be met by a single organisation or up to three separate organisations. You must also: ✓ include a potential integration partner ✓ have a letter of support signed by a senior individual, from a potential railway customer organisation
Project cost	Up to £300,000 inclusive of VAT for each project All awarded projects must spend 50% of the funding by 31 March 2024 and remaining 50% of the funding must be spent by 30 September 2024. This must be reflected in the eligible project cost breakdown and your milestones.
Project length	Up to 12 months start by 1 October 2023 end by 30 September 2024

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SBRI: FOAK 2023 – Reliable and Maintainable Assets Rail Demonstrations (DfT)

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Themes

In this theme we are seeking projects which will help extend the life of rolling stock and passenger-facing assets specifically, make their repair and maintenance easier and more cost-effective, or enable them to better deliver for customers.

Possible examples include:

- innovation to help prioritise rolling stock and passenger-facing assets for improvements to their reliability and availability
- innovation to support the reporting of defects and repairs, including customer reporting, allowing a system-level diagnosis of complex faults
- future proof design of trains and station environment with a focus on upkeep and repairs
- non-destructive testing and predictive maintenance, including digital twin and customer feedback, weather resilience

Themes

(2 of 2)

- innovation to encourage behaviour change in customers in tidying up after themselves and reporting failures and faults
- innovation to support automation and minimising human manual input in cleaning and inspection of the train interiors, including toilets
- innovation towards demonstrating robotic and AI inspections in live environments with remote supervision, including a demonstration of initial robotic and AI repair, drones and 3D printing
- roll out of robotics and AI inspection of rolling stock and passenger facing assets
- future proof design to achieve faster and lower cost maintenance

Eligibility criteria - SBRI: FOAK 2023 – Reliable and Maintainable Assets Rail Demonstrations

Project eligibility	✓ Applicant can be an organisation of any size ✓ Can work alone or with others organisations as subcontractors only ✓ Contracts will be awarded to a single legal entity ✓ Main contractor can subcontract components of work with justification to specialist consultants or advisers Your project must involve: ✓ an owner of railway assets (for example stations, rolling stock or infrastructure) ✓ an experienced railway organisation ✓ a rail organisation that has the potential to become a customer These criteria can be met by a single organisation or up to three separate organisations. You must also: ✓ include a potential integration partner ✓ have a letter of support signed by a senior individual, from a potential railway customer organisation
Project cost	Up to £400,000 inclusive of VAT for each project All awarded projects must spend 50% of the funding by 31 March 2024 and remaining 50% of the funding must be spent by 30 September 2024. This must be reflected in the eligible project cost breakdown and your milestones.
Project length	Up to 12 months start by 1 October 2023 end by 30 September 2024

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SBRI: FOAK 2023 – Optimised Train Operations Rail Demonstrations (DfT)

Innovate UK

Themes

(1 of 2)

In this theme we are seeking projects which will help improve train planning, decision making and services to support effective use of capacity and support train service delivery.

Possible examples include:

- development and validation of new simulation tools to reflect the complexity of the railway and allow the outcomes of different optimisations to be compared and understood
- innovation to prevent and help mitigate disruptions or aid service recovery after incidents – including new technology, such as drones
- innovation to deliver integrated or shared data systems and connect disparate data sources to improve real-time operation and decision making across key functions

Themes

(2 of 2)

- reduced disruption during signalling failures
- innovation to allow Automation Train Regulation (ATR) to provide an enhanced regularly spaced service
- innovation to improve system operation, including through improving the effectiveness of timetabling

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Eligibility criteria - SBRI: FOAK 2023 – Optimised Train Operations Rail Demonstrations

Project eligibility	✓ Applicant can be an organisation of any size ✓ Can work alone or with others organisations as subcontractors only ✓ Contracts will be awarded to a single legal entity ✓ Main contractor can subcontract components of work with justification to specialist consultants or advisers Your project must involve: ✓ an owner of railway assets (for example stations, rolling stock or infrastructure) ✓ an experienced railway organisation ✓ a rail organisation that has the potential to become a customers These criteria can be met by a single organisation or up to three separate organisations. You must also: ✓ include a potential integration partner ✓ have a letter of support signed by a senior individual, from a potential railway customer organisation
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Project length	Up to 12 months start by 1 October 2023 end by 30 September 2024

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SBRI: FOAK 2023 – High Speed Rail Systems Installation Demonstrations (HS2)

The Value of Innovation at HS2

Portfolio of innovation

>200

projects

Identified Carbon Reduction

1.7m

TCO2

£2bn

Identified savings programme wide

Attracted additional

£5.5m

of external investment wide

£800m

identified savings and

£350m

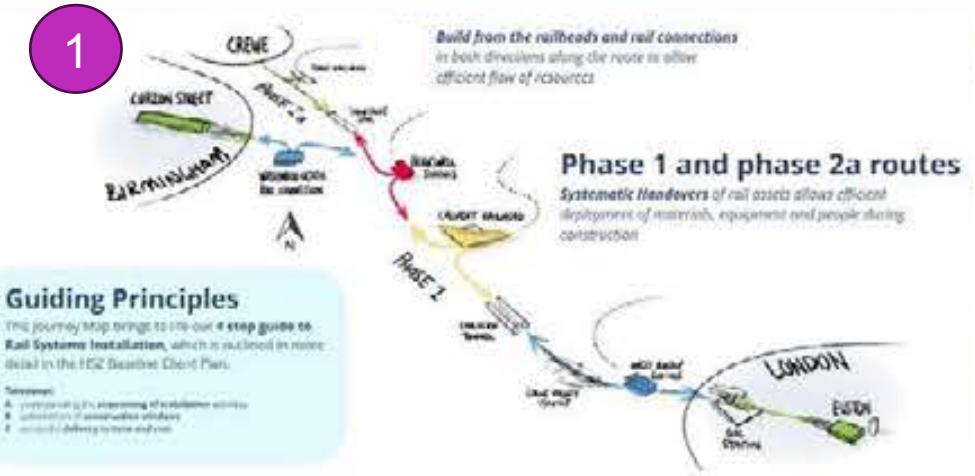
enabled savings in Phase 1

UKRI Innovate UK HS2 Innovate at HS2

HS2 Rail Systems Installations

Innovate at HS2

1



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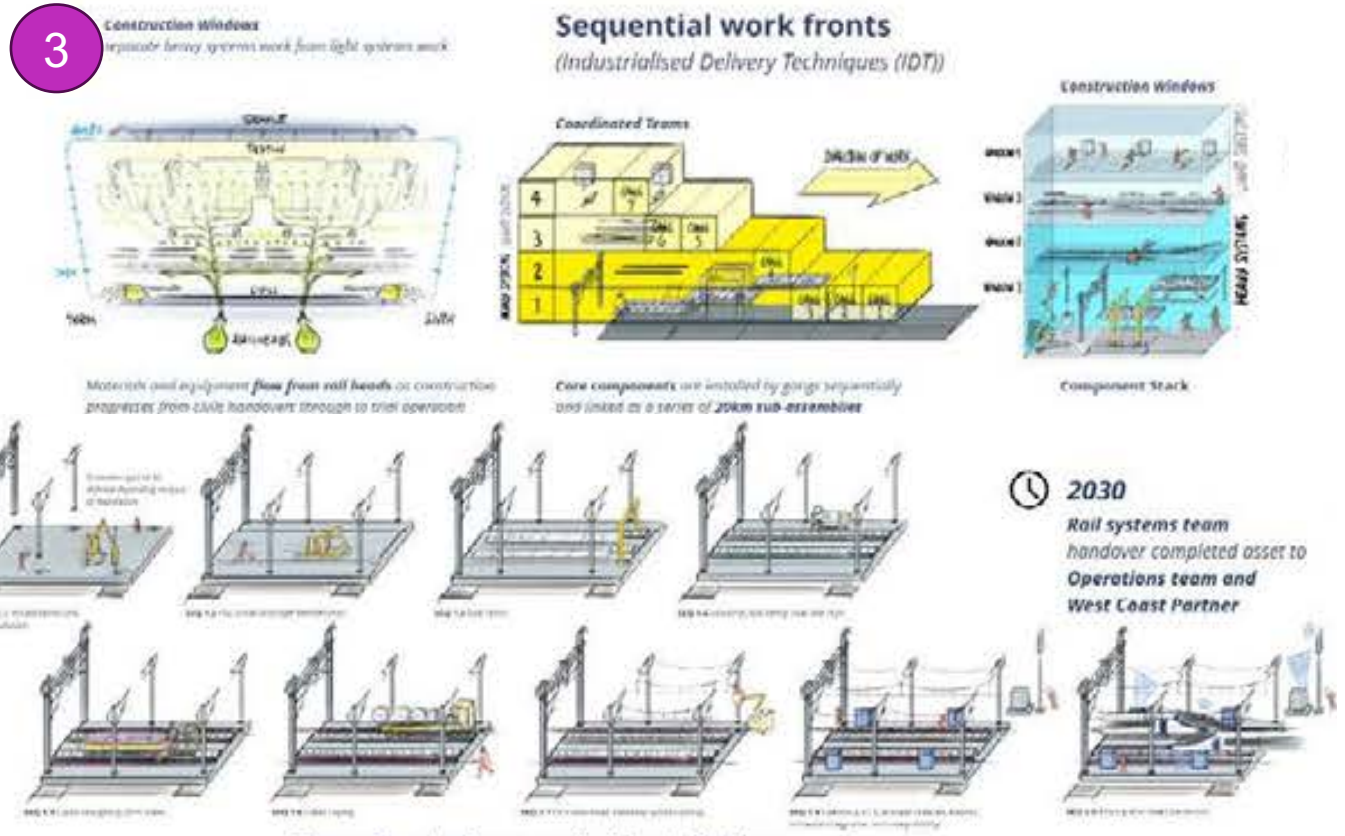

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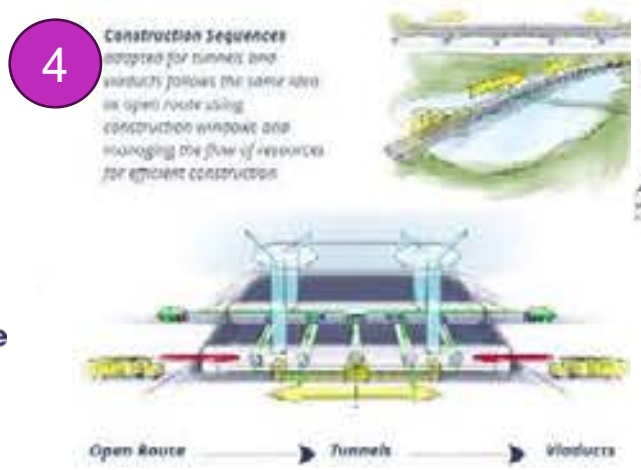

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Themes

This competition focuses on the following priority themes in relation to High Speed Rail System Installation:

- Theme 1 – Slab Track Installation Processes
- Theme 2 – Cable Troughing and Cable Laying
- Theme 3 – Installation of ERTMS (European Railway Traffic Management System) related equipment
- Theme 4 – Tunnel Fit Out Installations
- Theme 5 – Electric Multi-Purpose Vehicles Deployment

You must select one of the following scope themes. If a project covers more than one theme, choose the one in which most of the work is being undertaken:

Themes

Theme 1 – Slab Track Installation Processes

Innovation that has the potential to deliver efficiencies in slab track installation processes in a semi-automated way.

You project must focus on:

- operational cost reduction
- logistic feeds
- time saving
- improving safety

Examples include but are not limited to:

- **Robotic Systems:** One potential innovation that could deliver efficiencies in slab track installation processes in a semi-automated way is the use of robotic systems.
- **3D Printing technologies**: 3D printing technologies to create pre-fabricated concrete slabs that are designed to fit perfectly into place.
- **Data analytics:** Another option could be the use of advanced data analytics and machine learning algorithms to optimise the installation process.

Themes

Theme 2 – Cable Troughing and Cable Laying

Innovation that has the potential to improve cable troughing and cable laying efficiencies.

Your project must focus on:

- installation speed
- adaptability to obstacles
- cable jointing resources
- required on-site logistics efficiencies

Examples Include but are not limited to:

- **Robotic cable laying systems: :** These robots could be designed to carry out a variety of tasks, such as excavating the ground, laying cables, and jointing cables.
- **Advance materials in cable trough manufacture**: By using lightweight and durable materials such as composite plastics, cable troughs could be made easier to transport and install.
- **Modular cable troughing systems:** By designing components that can be easily assembled on site, this could reduce the amount of time and labor required for installation.
- **Augmented Reality (AR)**: By using AR to provide installers with real-time information on cable routing and jointing, this could reduce the time and resources required for on-site training and installation.

Themes

Theme 3 – Installation of ERTMS (European Rail Traffic Management System) related equipment. Innovation that allows rail organisations to increase the pace of ERTMS installation including ETCS (European Train Control System) and GSM-R (Global System for Mobile Communications – Railway) related equipment, for example Balises and lineside cabling across their rail network.

Project must focus on:

- improving installation speed
- accuracy of component position finding and setting
- ease of documentation
- high safety precautions

Examples Include but are not limited to:

- **Automated track inspection & installation systems:** These systems could be equipped with high-precision sensors and cameras to accurately install, locate and document the position of existing objects, and to provide real-time feedback to installation teams.
- **Augmented Reality (AR):** By using AR to provide real-time visual overlays of the installation area, installation teams could more easily identify the precise location and orientation of each component.
- **Unmanned Aerial Vehicles (UAVs):** UAVs could be equipped with cameras and sensors to provide real-time visual feedback on the installation area, while also being able to access hard-to-reach areas and provide aerial views of the installation site.

Themes

Theme 4 – Tunnel Fit Out Installations

Innovation that allows rail organisations to increase operations efficiencies across tunnel fit out installations.

Project must focus on:

- improving installation speed
- transportation and inventory management
- automated positioning of components
- adaptability to different scenarios

Examples Include but are not limited to:

- **Automated Tunnel Surveying systems:** These systems could be equipped with high-precision sensors and cameras to accurately locate and document the position of existing structures, while also providing real-time feedback to installation teams.
- **Inventory management software:** . By implementing software solutions that can track the movement of materials and equipment from the warehouse to the installation site, rail organisations could improve logistics feeds.
- **Modular components:** By designing components that can be easily assembled on site, this could reduce the amount of time and labour required for installation, while also improving adaptability to different tunnel configurations.
- **Automated positioning systems**: By using robots to position and install components, installation teams could reduce the amount of manual labour required.

Themes

Theme 5 – Electric Multi-Purpose Vehicles Deployment

Innovation that allows electric multi-purpose vehicles (MPV) to be deployed faster and run more efficiently, based on tractive power, capacity, speed, cost efficiency, environmental impact and safety. Solutions should support the delivery and transportation of rail systems materials to the installation work fronts along the constructed route by means of rail and road.

Innovations should consider MPVs capability for hauling and ease of deployment of large bulk materials such as slab track panels, cable drums, lineside equipment and personnel.
MPVs will preferably need to have working battery life of 8 hours or more with a view to fast re-charge times. Vehicles will need to be future proofed in line with latest technology industry thinking.

Examples Include but are not limited to:
- Hybrid/Electric Power trains – Automated driving systems - Advance Telematics – Smart Sensors and Analytics

Eligibility criteria - SBRI: FOAK 2023 – High Speed Rail Systems Installation Demonstrations

Project eligibility	✓ Applicant can be an organisation of any size ✓ Can work alone or with others organisations as subcontractors only ✓ Contracts will be awarded to a single legal entity ✓ Main contractor can subcontract components of work with justification to specialist consultants or advisers Your project can involve: ✓ an owner of railway assets (for example stations, rolling stock, track machinery or infrastructure) ✓ an experienced railway organisation ✓ a rail organisation that has the potential to become a customers You must also: ✓ include a potential integration partner to facilitate the live demonstration
Project cost	Up to £200,000 inclusive of VAT for each project All awarded projects must budget a spend of 60% of the funding by 31 March 2024 and remaining 40% of the funding by 31 May 2024. This must be reflected in the eligible project cost breakdown and your milestones.
Project length	Up to 6 months start by 1 December 2023 end by 31 May 2024

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Out of scope (all themes)

We will not fund projects that:

- are not likely to be successfully exploited by the rail industry
- do not create a significant change in the level of innovation available
- are not already well-developed technology at Rail Industry Readiness level 5, above
- do not have low technical risk
- do not deliver a demonstration within a railway environment
- do not include an evaluation phase, and a plan to collect information to inform a cost/benefit analysis
- have total eligible costs or project terms outside of the eligibility guidance
- duplicate other UK government or EU funded initiatives already funded
- are covered by existing commercial agreements to deliver the proposed solutions
- do not address how any potentially negative outcomes, such as on the environment or society, would be managed

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Additional Requirements for DfT themes

- Your project must involve:
  - an owner of railway assets (for example stations, rolling stock or infrastructure)
  - an experienced railway organisation
  - a rail organisation that has the potential to become a customer

- You must include a potential integration partner (an organisation with expertise in integrating systems into the railways)

- You must have a letter of support signed by a senior individual from a potential railway customer organisation (this should be uploaded with your application)

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Additional Requirements for HS2 themes

- Your project can involve:
  - an owner of railway assets (for example stations, rolling stock, track machinery or infrastructure)
  - an experienced railway organisation
  - a rail organisation that has the potential to become a customer

- You must include a potential integration partner (an organisation with expertise in integrating systems into the railways)

Additional Requirements (all themes)

- If you have previously been funded for the same or similar innovations, you will not be eligible for this competition. Applications need to be materially different from previously funded innovations. The decision of Innovate UK and DfT and HS2 on this matter will be final.
- Proposals for these competitions must already be high maturity at Rail Industry Readiness level 5 or above.
- You must work with a railway/integration partner to deliver a demonstration of your innovation in a railway environment. This is a key deliverable and must be included as part of your milestones.
- You must deliver a demonstration event to industry stakeholders (e.g. a product launch or similar)
- You must complete an evaluation activity at the end of the project, measuring data to anticipate the commercial impact that adoption of the innovation will have on the railway network.
- If you are awarded a contract, you will be required to exhibit your project at the 2024, 2025 Innovate UK annual rail exhibition.
- Please note the VAT requirements

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Types of organisations we fund

- Business – Small or Micro, Medium or Large registered in the UK
- Research Organisation (RO):
  - Universities (HEIs)
  - Not for profit distributing Research & Technology Organisation (RTO) including Catapults
  - Public Sector Research Establishments (PSRE)
  - Research Council Institutes (RCI)
- Public sector organisations and charities doing research activity of any size
- The lead applicant can use subcontractors from any type of organisation where needed.

If you are 100% owned by a large parent company as a small subsidiary this means you are classed as a large company. For more information on company sizes, please refer to the company accounts guidance.

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Key Dates

Timeline	Dates for DfT strand	Dates for HS2 strand
Competition Opened	14 June 2023	14 June 2023
Briefing Event	14 June 2023	14 June 2023
Submission Deadline	26 July 2023, 11:00am	9 August 2023, 11:00am
Interviews	NA	w/c 23 October 2023
Applicants informed	30 August 2023	03 November 2023

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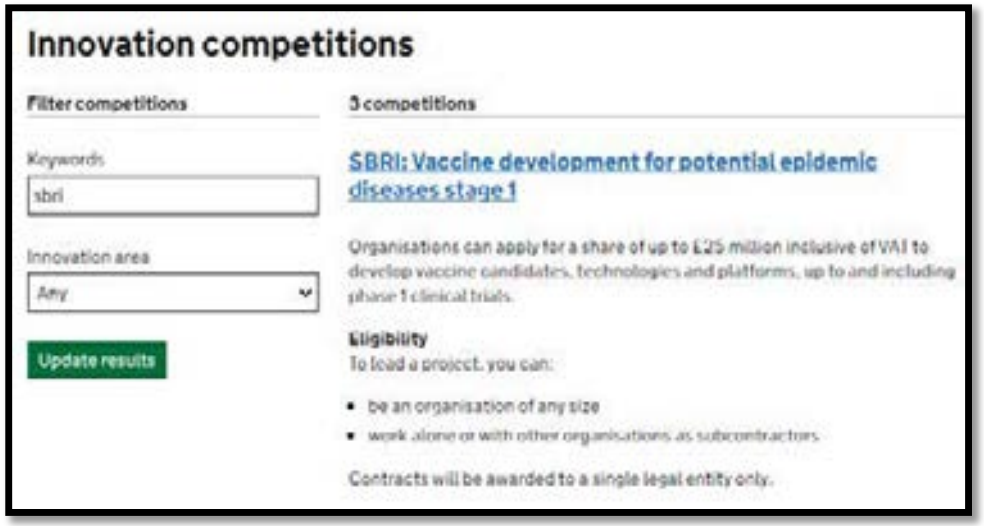
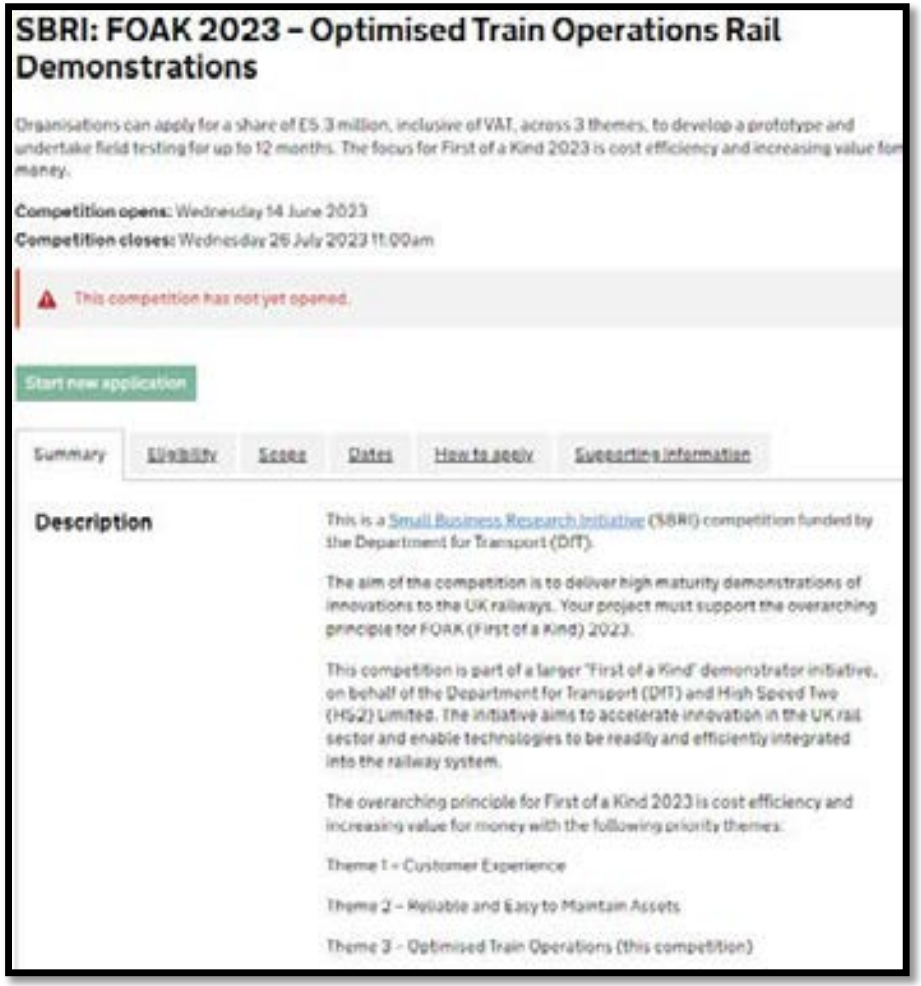
Innovation Funding Service (IFS)

Search for a funding competition and review criteria





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Lead Applicant: create an account

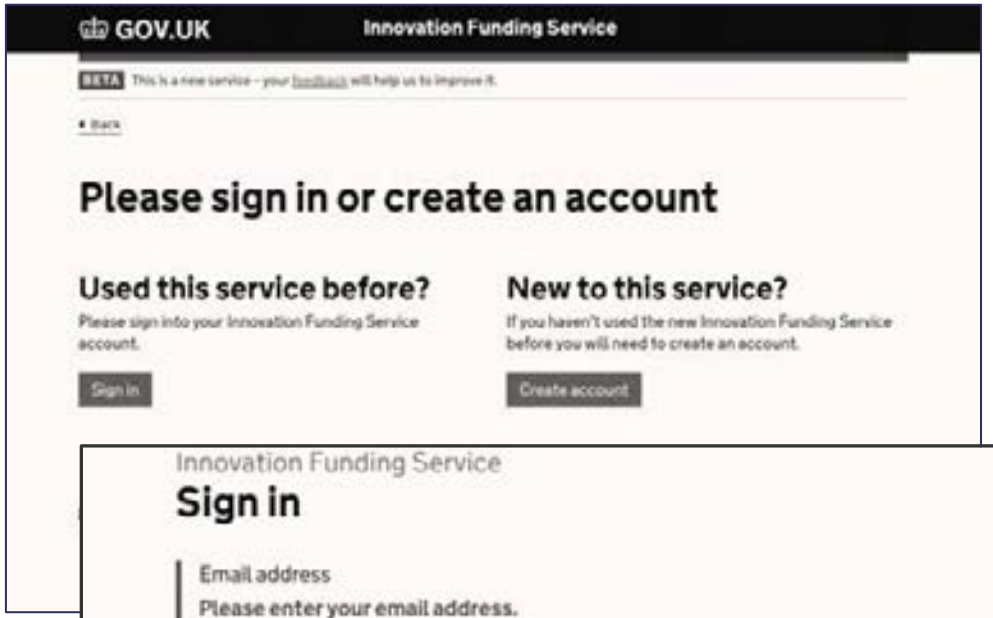
The lead applicant must create an account:

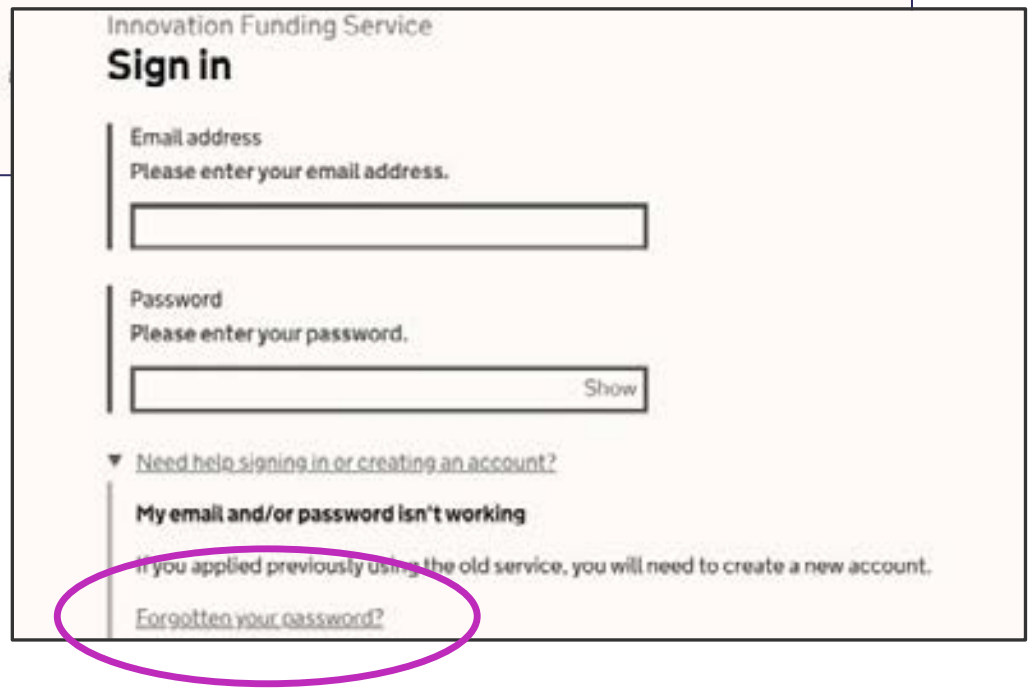
UK registered businesses

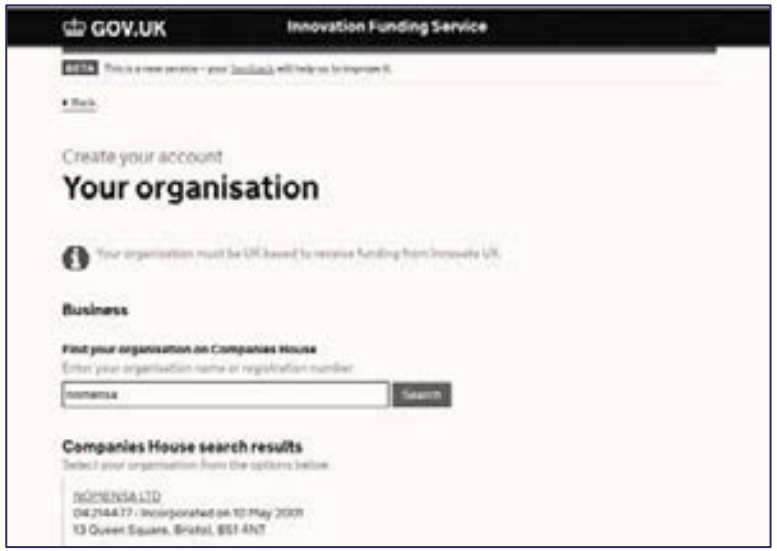
Use Companies House lookup as it speeds up our checks by providing your company number. You are unable to enter this at a later date.

Research organisations, academics and universities

Enter your information manually so you are not listed as a business on IFS and ensure you receive the correct funding.







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Project Details

- **Application Team** - Contributors: Invite colleagues from your own organisation to help you complete your application
- **Application Details** - Title, timescales, **Who made you aware of the competition?** Select a category to state who made you aware of the competition. You cannot choose more than one.
- **How long has your organisation been established for?** Select a category to state how long has your organisation been established for. You cannot choose more than one.
- **What is your organisation's primary area of focus?** Select a category to state your organisation's primary focus area. You cannot choose more than one.
- **Equality, diversity and inclusion -** We collect and report on equality, diversity and inclusion (EDI) data to address under-representation in business innovation and ensure equality, diversity and inclusion across all our activities.
- **Project Summary -** Please provide a short summary of your project and describe how it meets the scope of the competition.
- **Public Description -** Description of your project which will be published if you are successful
- **Location -** Please list the name and location of any subcontractors you are planning on working with.

Application Questions for DfT Competitions

Application Form		Appendix?
Question 1	Public synopsis (not scored)	No
Question 2	Previous applications and Rail Industry Readiness Level (not scored)	Yes
Question 3	Proposed idea or technology (scored out of 1)	Yes
Question 4	Technical project summary (scored out of 10)	No
Question 5	Current state of the art and intellectual property (scored out of 10)	No
Question 6	Project plan and methodology (scored out of 10)	Yes
Question 7	Technical team and expertise (scored out of 10)	No
Question 8	Costs, cost efficiency and value for money (scored out of 20)	Yes
Question 9	Commercial potential (scored out of 10	No

Detailed guidance available on IFS

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Application Questions HS2 Competition

Application Form		Appendix?
Question 1	Themes (not scored)	No
Question 2	Public synopsis (not scored)	No
Question 3	Previous applications and Rail Industry Readiness Level (not scored)	No
Question 4	Proposed idea or technology and relationship with the challenge (scored out of 20)	No
Question 5	Technical project summary (scored out of 20)	Yes
Question 6	First of a Kind technology and intellectual property (scored out of 10)	No
Question 7	Project plan and methodology (scored out of 10)	Yes
Question 8	Technical team and expertise (scored out of 10)	No
Question 9	Costs, cost efficiency and value for money (scored out of 20)	Yes
Question 10	Commercial potential and market readiness (scored out of 10)	No

Detailed guidance available on IFS

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Application finances

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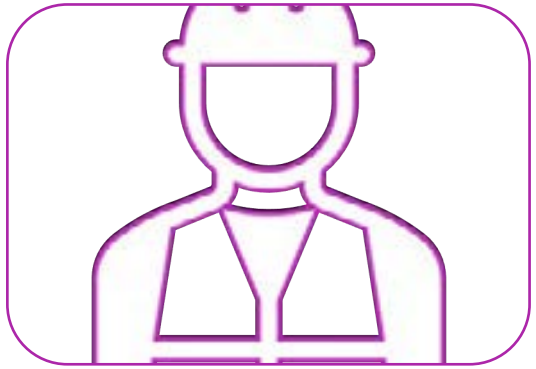
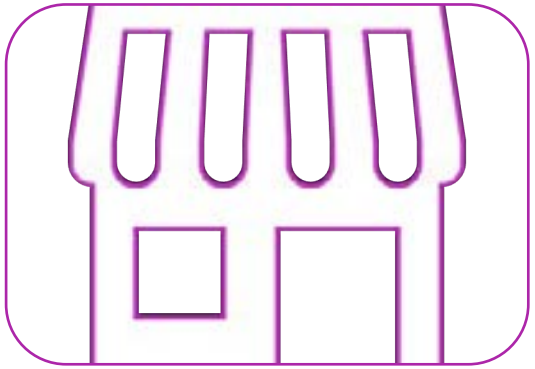
UK

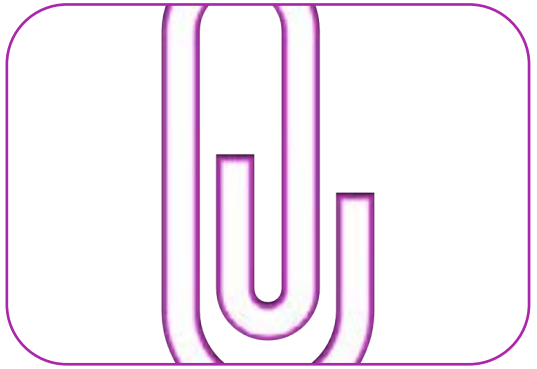
Your Project Cost Categories



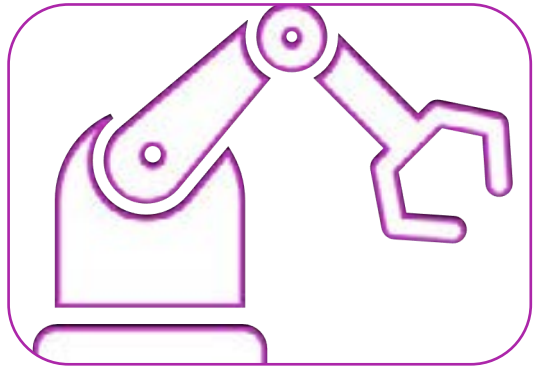
Labour



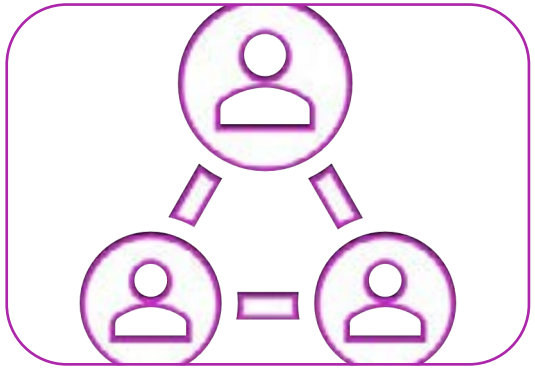
Overheads



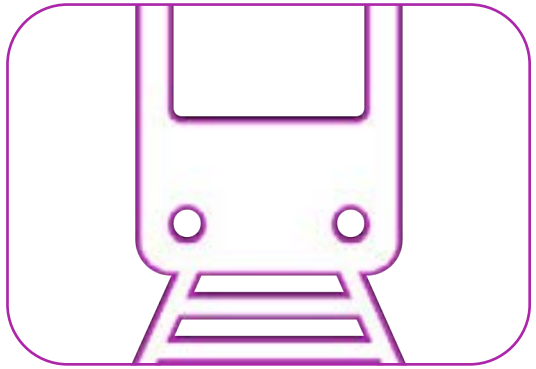
Materials



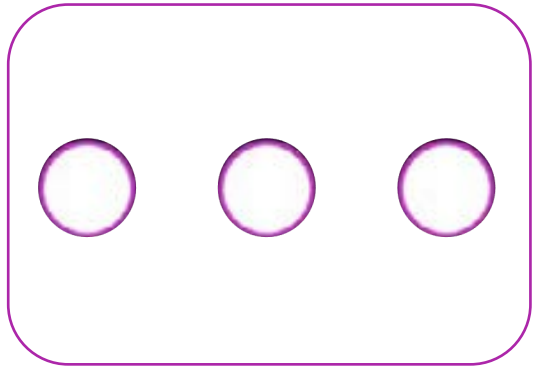
Equipment Usage



Subcontractors



Travel & Subsistence



Other

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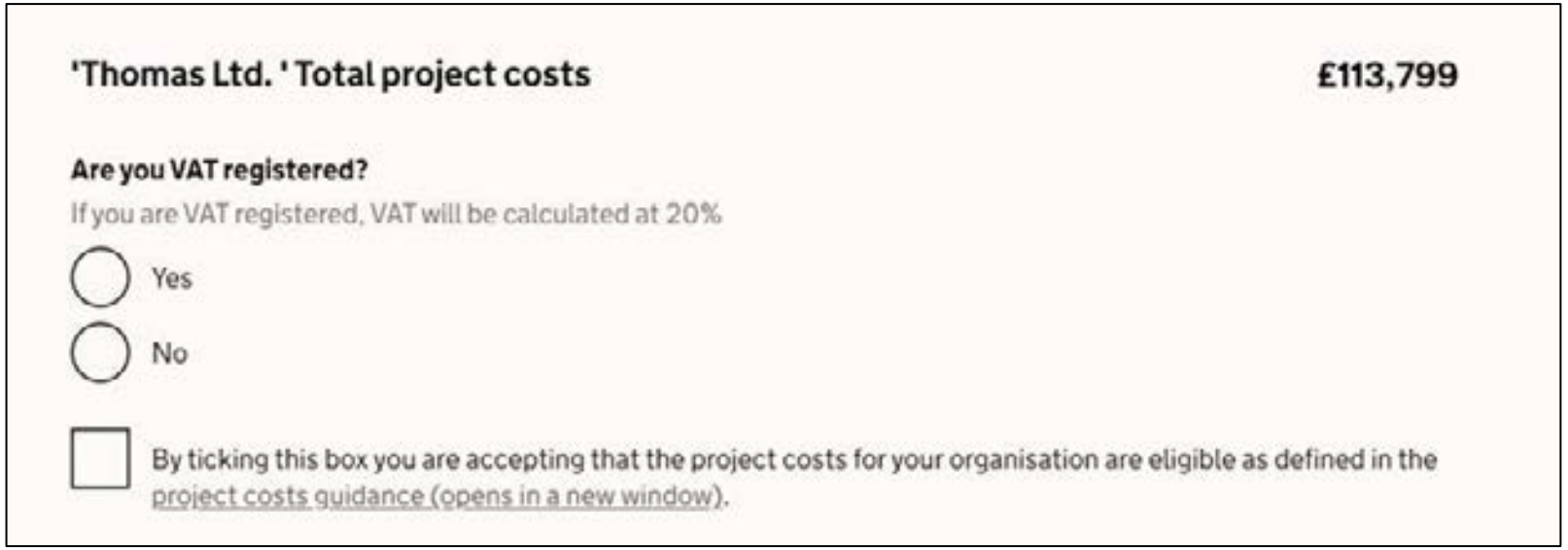
VAT

Once you have completed your costs you will be asked to confirm if you're VAT registered. If you select 'yes' IFS will automatically add on VAT calculated at 20%.

If you are a VAT registered organisation you will not need to enter your project costs inclusive of VAT as the application form will calculate the VAT for you.

If you are not VAT registered then you can quote without VAT, but you will not be able to increase invoice values to cover VAT later on.

Make sure not to double count this as it may increase your project costs over the limit



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Project cost summary

Finances

Close all

Funding breakdown

✓ Complete —

Return to your project finances to complete or make changes to your organisation's financial information.

	Total	Labour (£)	Overheads (£)	Materials (£)	Capital usage (£)	Subcontracting (£)	Travel and subsistence (£)	Other costs (£)	Total VAT (£)
Thomas Ltd. Organisation View finances	£136,559	24,784	15	25,000	4,000	50,000	0	10,000	22,760

Ensure the highlighted costs fits the criteria for this competition. The maximum project costs for this competition are

DfT- £300,000 for Customer Experience theme and £400,000 for Reliable and Maintainable Assets theme and £400,000 Optimised Train Operations theme

HS2 - £200,000 for all themes

The lead organisation can see a summary of project costs calculated inclusive of VAT (if VAT registered)

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Your organisation

Once you have completed your costs you will be asked to select your organisation size, enter your turnover from the last financial year and number of full time employees at your organisation

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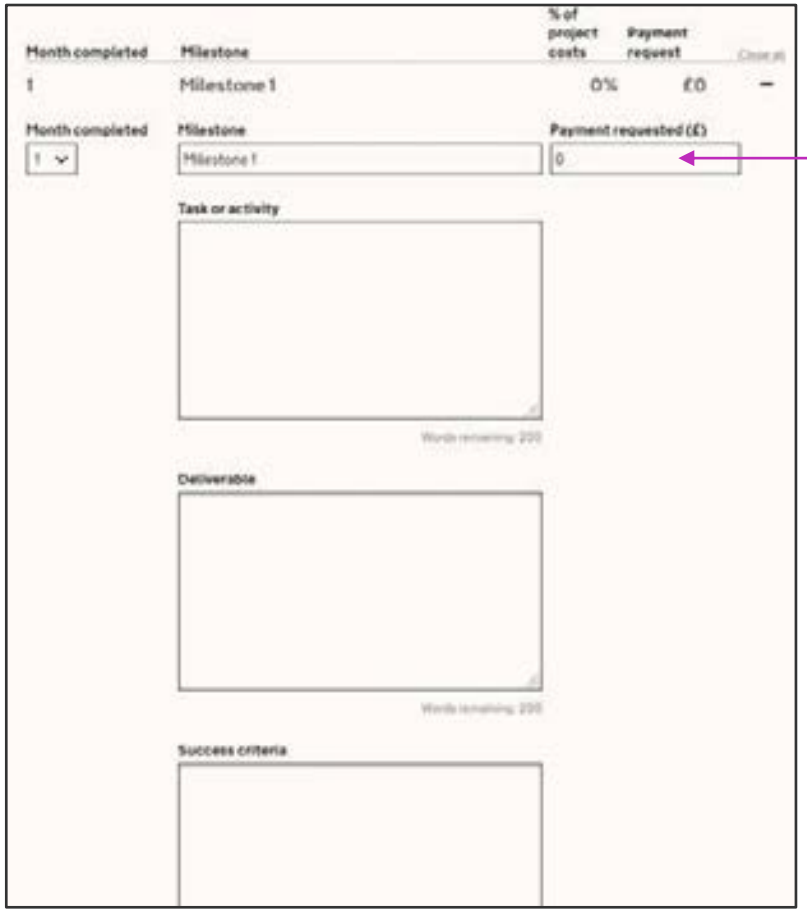
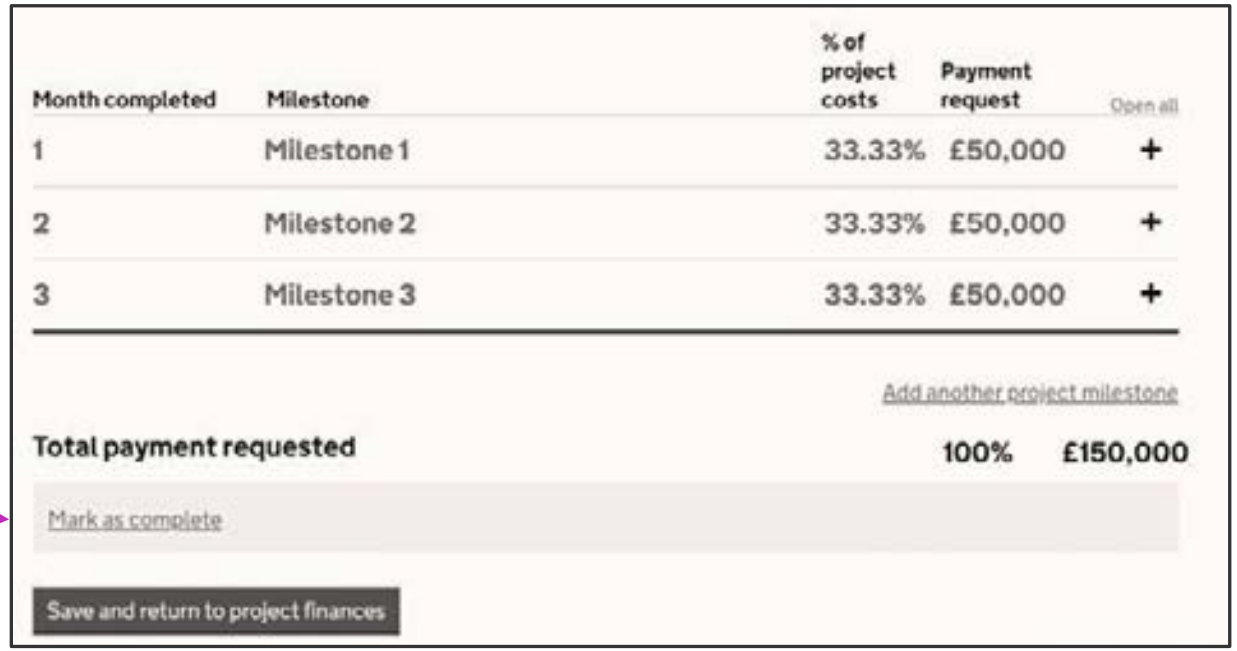
Payment milestones



Enter each milestone and any associated payments



Once all milestones have been entered, mark the section as complete

We will review your milestones prior to awarding a contract. You will be asked to amend them if your milestones are unacceptable. This will delay your contract award.

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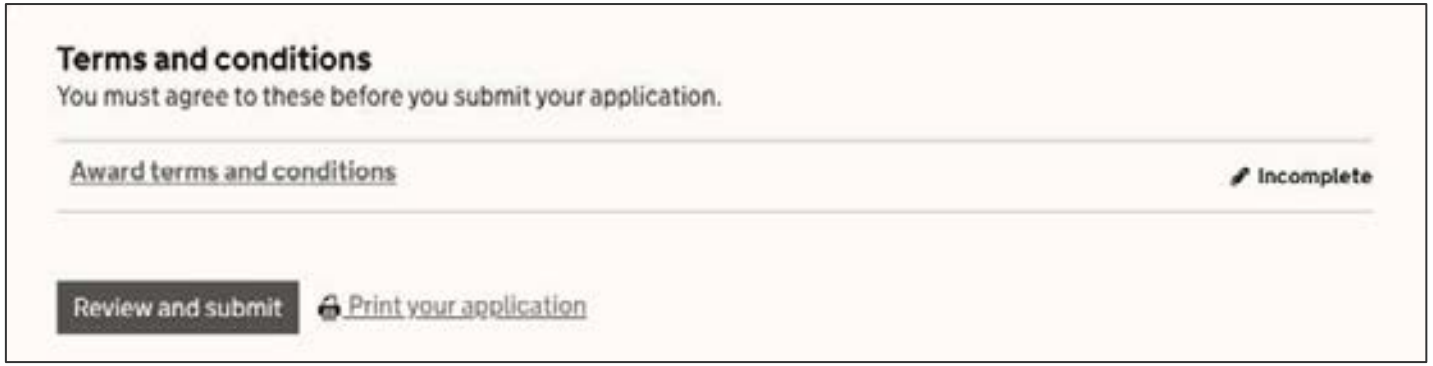
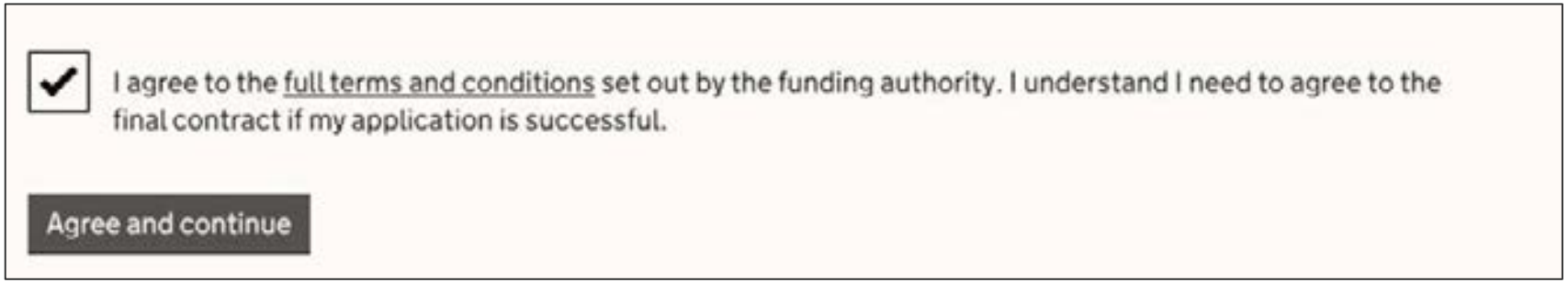
Information to include in your milestone template

- Details of **work packages** with clear description of the activities taking place in each milestone.
- The month the milestone will be completed, which will help form your quarterly payment schedule.
- **Clear and distinct deliverable(s)** from each milestone that you'll be able to evidence to confirm you've completed the milestone in full.
- Success criteria for each milestone, noting that it must be clearly relatable to the work packages, deliverable(s) and must be measurable.
- **Costs for each milestone** – check that the total costs on the milestones match the total project costs page within the finance section
- Do not cluster your milestones together, even if they occur in the same period. We need separate deliverables and costs for each milestone.

Terms and Conditions

Before you can submit your application you must agree to the draft terms and conditions for this procurement competition. They may differ from any you have agreed to before. These terms are set and are non-negotiable





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Submitting your application

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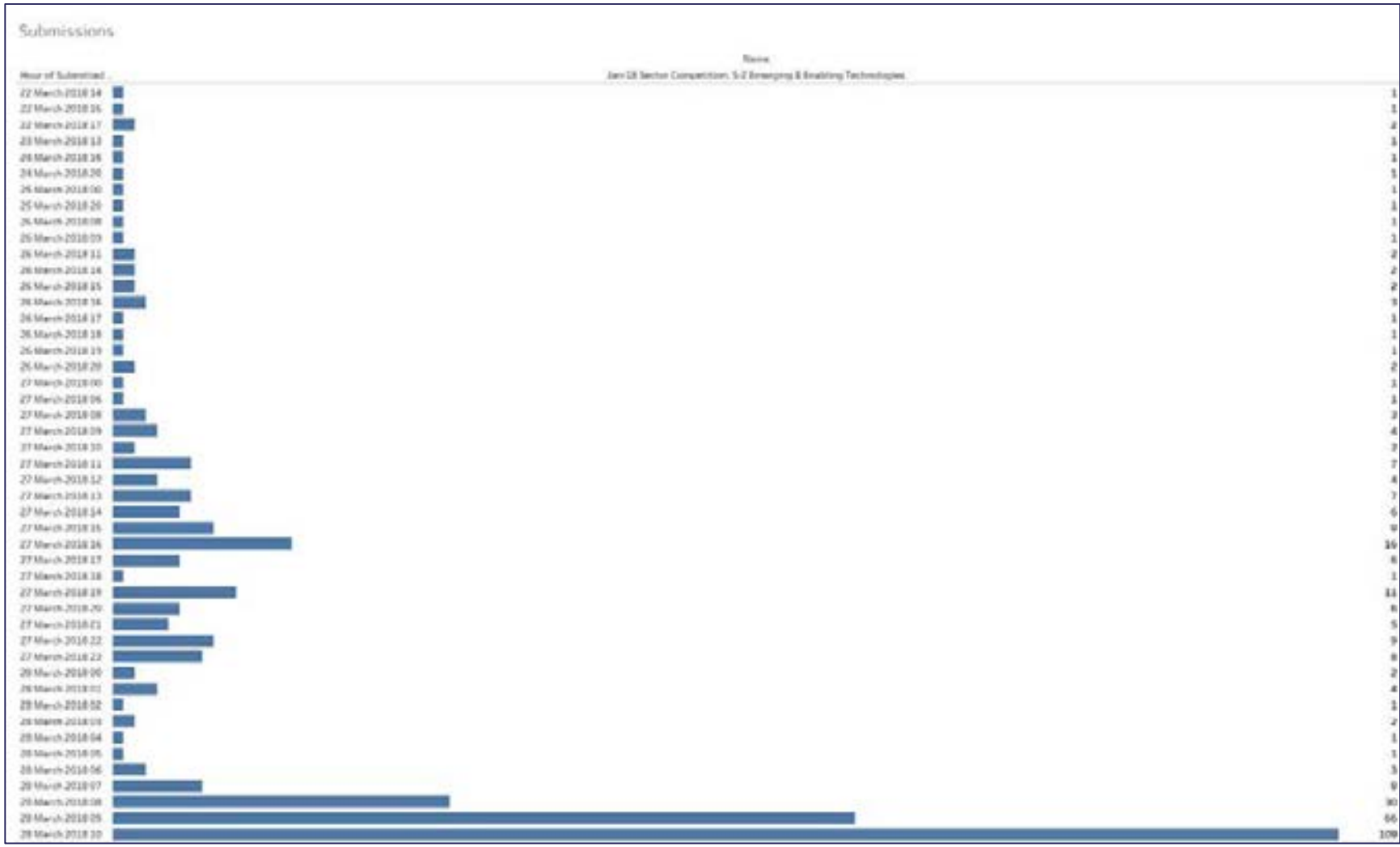
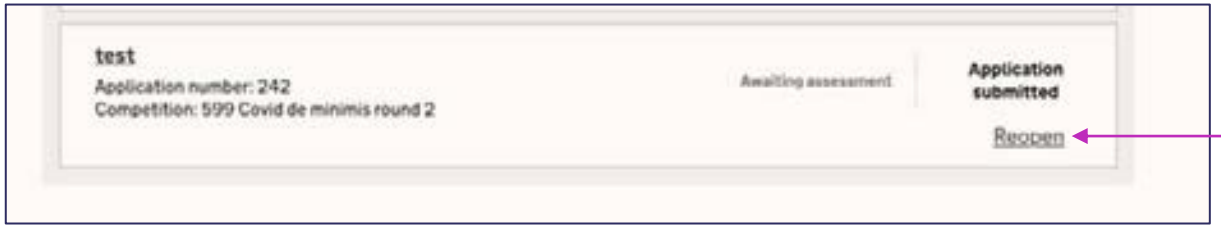
Submit your application early!

Customer Support can help resolve any issues you might have when submitting but only if they are contacted before the deadline. Once the deadline has passed, your application cannot be submitted.

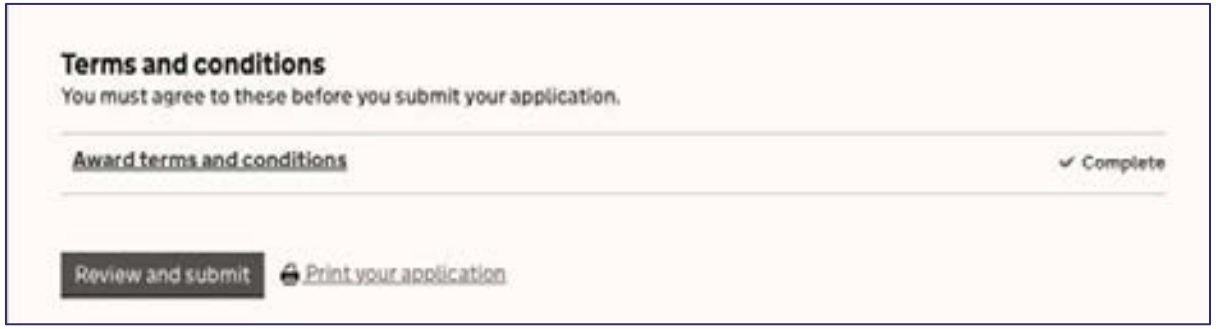


Innovate UK

Editing a submitted application



Reopen by clicking here



Remember to press ‘Submit application’

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Assessment

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How our assessors assess?

All applications are assessed by an independent **pool** of assessors drawn from industry and academia.

We require our assessors to maintain confidentiality and declare any conflicts of interest, ensuring a fair and transparent process.

Assessors are unable to contact you regarding your application content. Therefore, your application should contain:

- a justification for a viable opportunity for growth and a level of innovation that necessitates public investment. **Remember that SBRI must not include profit.**
- clear and concise answers
- the right amount of information
- no assumptions

We recommend you review the competition brief and guidance for help.

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How are successful applicants selected for funding?

Assessors will score each section of your application.

After the assessor process, Innovate UK will independently moderate assessor scores. Any outliers in scores may be removed and your total score will be updated.

You will then receive email notification to offer grant funding or to inform you that your application has been unsuccessful on this occasion.

Whether successful or unsuccessful in receiving grant funding, you will receive feedback on your application. It is intended to be constructive in nature and to highlight both the strong as well as the weak areas of your application.

We check assessor scores for outliers and remove any we feel are unjustified. Please note, this happens outside the system so you will still receive all the assessors feedback.

Innovate UK

Note on feedback

- The feedback is compiled using the written comments of the independent assessors who review and assess the applications
- It is intended to be constructive in nature and to highlight both the strong as well as the weak areas of your application
- Please bear in mind that because applications are assessed by a number of assessors, you may receive information which appears to be conflicting. This may reflect their different interpretations of the proposal that you submitted
- Note, some proposals may appear to have been favourably assessed based on their comments, in such instances it could be that your proposal simply fell below the funding threshold, with others achieving a higher merit score overall

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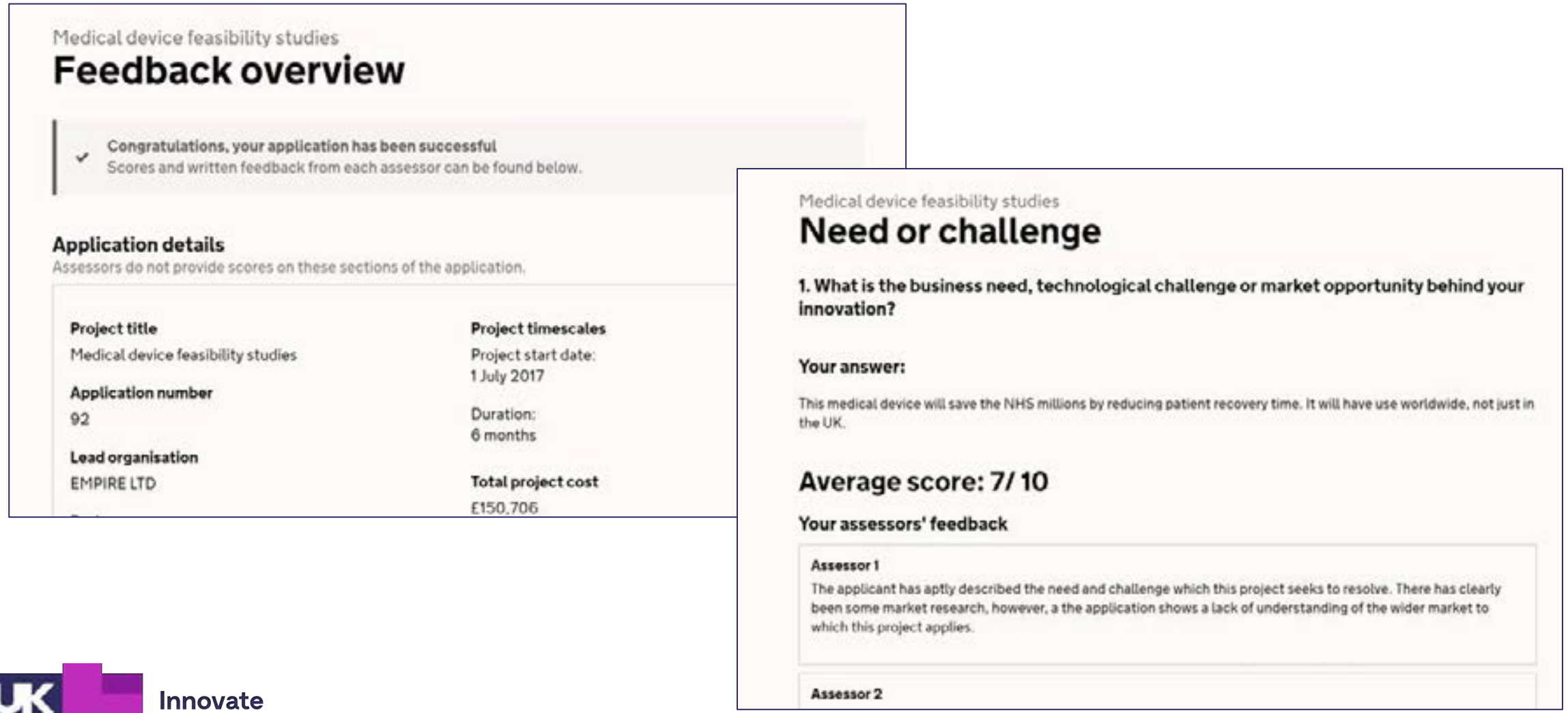
Scores and feedback



Medical device feasibility studies

Feedback overview

Congratulations, your application has been successful
Scores and written feedback from each assessor can be found below.

Application details

Assessors do not provide scores on these sections of the application.

Project title
Medical device feasibility studies

Application number
92

Lead organisation
EMPIRE LTD

Project timescales
Project start date:
1 July 2017

Duration:
6 months

Total project cost
£150,706

Medical device feasibility studies

Need or challenge

1. What is the business need, technological challenge or market opportunity behind your innovation?

Your answer:

This medical device will save the NHS millions by reducing patient recovery time. It will have use worldwide, not just in the UK.

Average score: 7/ 10

Your assessors' feedback

Assessor 1
The applicant has aptly described the need and challenge which this project seeks to resolve. There has clearly been some market research, however, a the application shows a lack of understanding of the wider market to which this project applies.

Assessor 2

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Interviews for HS2 Competition

If you are invited to progress to interview:

- you can bring up to **three** people to attend the interview
- you will have **10-minute** to present a maximum of **10 PowerPoint slides**, with no videos or embedded links
- there is a **30-minute** Q&A session lead by members of the panel
- This is optional and is an opportunity to answer the assessors' concerns. It can:
  - be up to 2 A4 pages in a single PDF or Word document
  - include charts or diagrams
- the response to feedback, presentations and presenters' names have to be provided ahead of the interview

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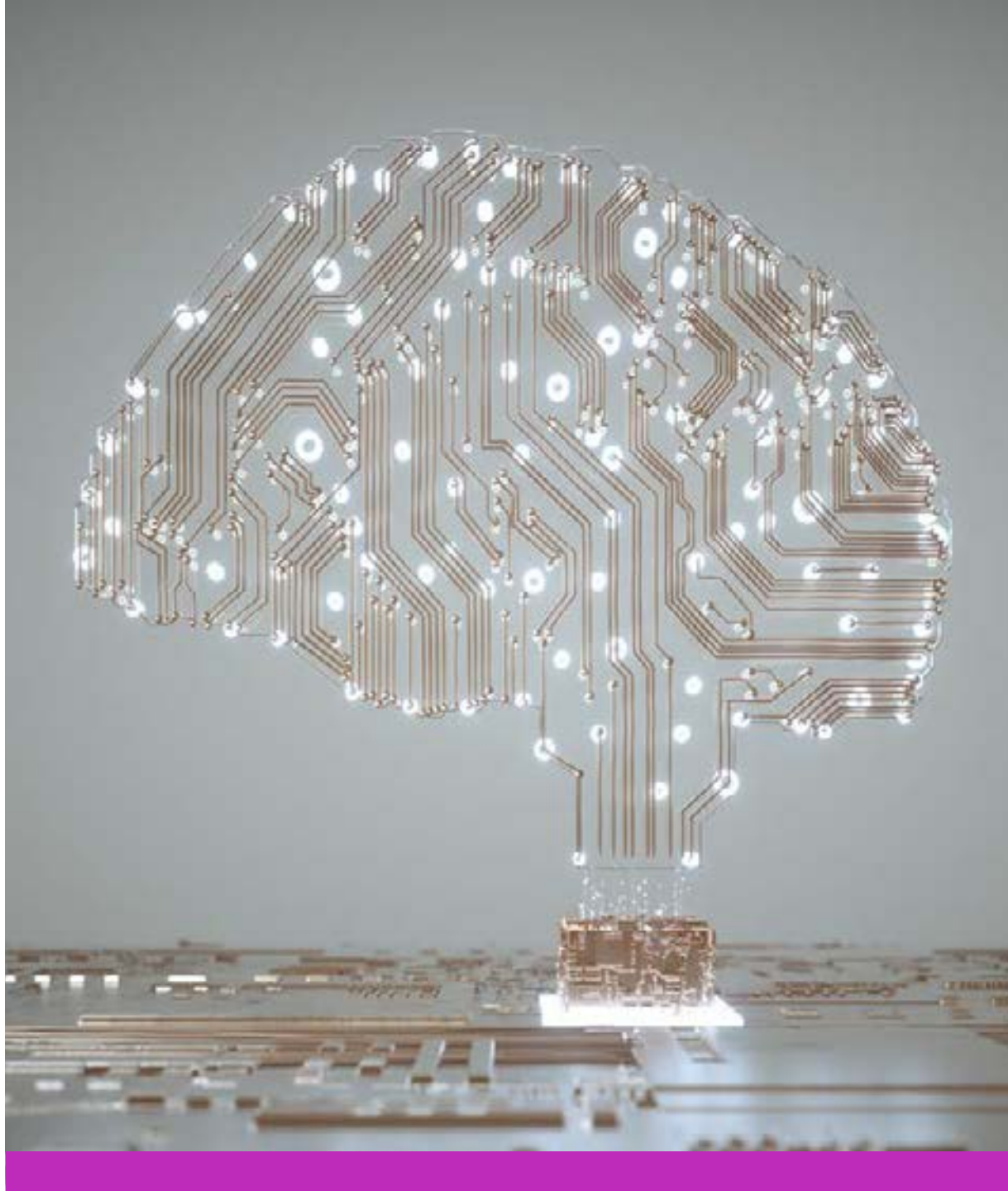
Project setup for successful applicants



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Notification

If you are unsuccessful in this competition

You can use the feedback from the assessors to develop your idea and apply into another competition that allows previously submitted applications

If you are successful in this competition

- you will be assigned a Delivery Executive who will guide you through the Project Set Up process
- you will have **7** days in total to complete the project team; project details; bank details; VAT registration details
- you must return your signed contract to us, within **5** days of receiving it and no later than 30 days following notification of the award
- funding may be withdrawn if this is not completed within this timeframe

Please ensure all your contact details in the IFS portal are correct and up to date and that you regularly monitor it.

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Bank details for project set up

We accept most bank accounts with major high street banks. We would suggest you have a standard bank account to allow us to make payments to you during your project.

Examples of standard bank accounts:

- HSBC, NatWest, Barclays, Lloyds, Santander, Starling, Metro Bank, Mettle, Tide Bank, Revolut, Monzo, Wise (Formerly Transferwise), Cashplus Bank, Virgin Money, Silicon Valley Bank UK, The Co-operative Bank, Prepay Technologies (Trading as Prepay Solutions), Danske Bank, Coutts, Ulster Bank, Nordea, Clear Bank, Anna, Payoneer, CAF Bank, Advance Payment Solutions (Part of Cashplus Ltd), Axiom Bank, Triodos Bank, Counting Up (Part of Prepay Solutions)Advance Payment Solutions (Part of Cashplus Ltd)

Non-standard accounts could either lead to delays due to additional checks needed, or you will have to provide us with another bank account. This **will** delay your project start date.

Examples of non-standard bank accounts:

- Viva Payments – Wallet
- Ziglu Ltd
- Air Wallex

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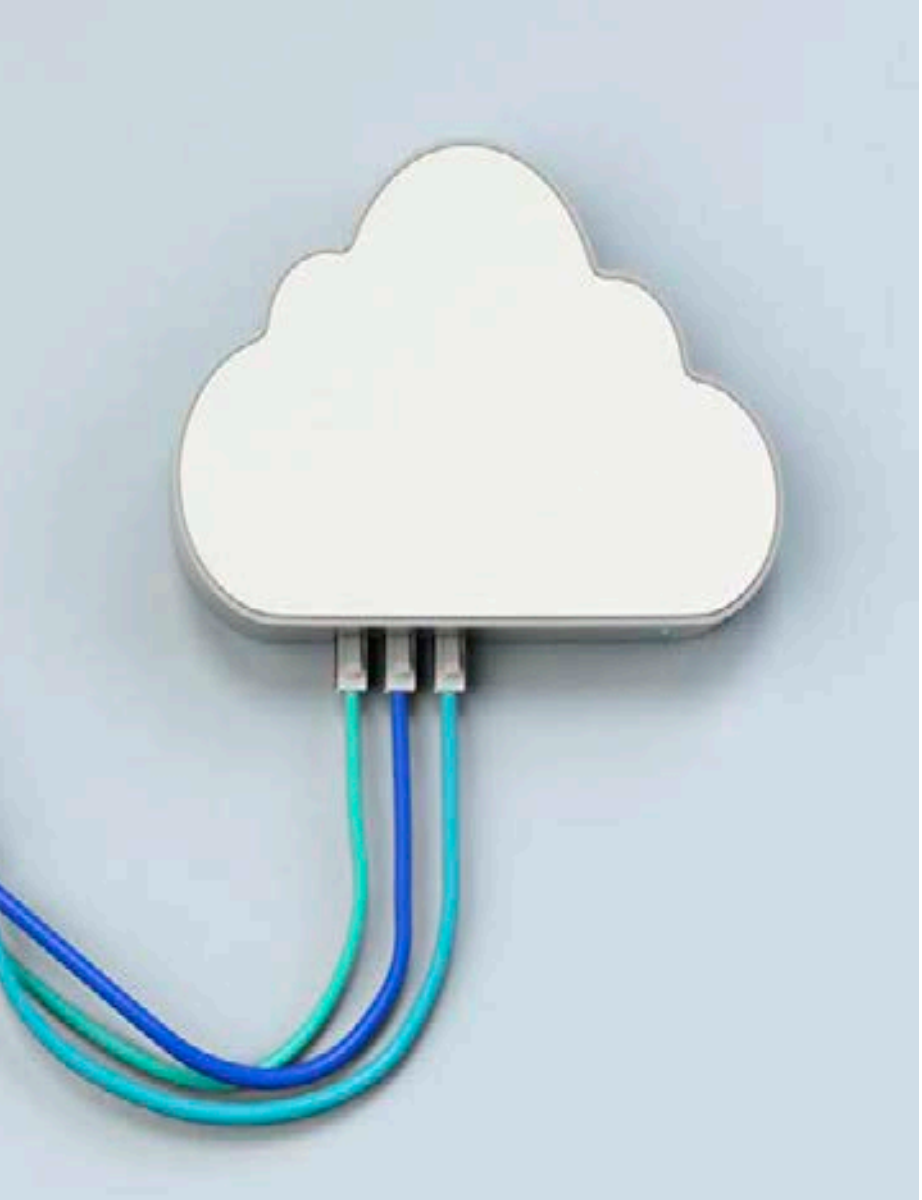

Project set up

- All communication will be through IFS
- Lead applicant must provide bank details, updated milestone register (if requested) and a signed version of the contract.

Project delivery

- All projects are paid quarterly in arrears and only following quarterly reporting and approval from the monitoring officer.
- You will be assigned a monitoring officer, who will monitor your progress against your application and will usually visit you quarterly.
- Claims can only be made for **milestones achieved** between the project start and end dates

Timeline if successful in DfT Competition

Timeline	Dates
Applicants Notified	30 August 2023
Project Set Up Team contact Successful Applicants	31 August 2023
Within 7 days of contact from Project Set Up, Successful Applicants must send in Project Details: • Bank Details • Project Location • Project Manager • Finance Contact	8 September 2023
Contracts must be signed within 30 days from successful notification and not later than	29 September 2023

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Timeline if successful in HS2 Competition

Timeline	Dates
Interviews	w/c 23 October 2023
Applicants Notified	03 November 2023
Project Set Up Team contact Successful Applicants	03 November 2023
Within 7 days of contact from Project Set Up, Successful Applicants must send in Project Details: • Bank Details • Project Location • Project Manager • Finance Contact	10 November 2023
Contracts must be signed within 30 days from successful notification and not later than	01 December 2023

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Equality, Diversity & Inclusion

- We are on a mission to embed Equality, Diversity, and Inclusion in everything we do, internally and externally.
- We believe that great ideas can, and do, come from anyone and everyone.
- We know that diversity and inclusion in businesses contributes to enhanced innovation, satisfaction, performance, and ultimately, commercial success.

UKRI Innovate UK

Available Support

- We welcome and encourage applications from people of all backgrounds and are committed to making our application process accessible to everyone.

- This includes providing support for people who have a disability or long-term condition and face barriers applying to us.

- So, if you would like any support, please contact our Customer Support Service Team on **support@iuk.ukri.org** or at **0300 321 4357**.

UKRI Innovate UK

What to Expect

1.	2.	3.	4.	5.
Contact our Customer Support Services team by email or phone as early as possible. We suggest at least 15 working days before the deadline.	Our Customer Support Service team will refer you to our partner Diversity & Ability (D&A).	D&A will conduct a Discovery Conversation with you and make recommendations for additional support.	D&A will organise and deliver bespoke additional support for and with you.	Submit your application! Please do so well ahead of the deadline as extensions cannot be provided.

UKRI Innovate UK

D&A Diversity and Ability

Contact

Customer Support Services

0300 321 4357 (Monday - Friday 9-5pm)

support@iuk.ukri.org

Innovate UK
ukri.org/councils/innovate-uk

Innovate UK KTN
iuk.ktn-uk.org

Innovate UK EDGE
innovateukedge.ukri.org

UKRI Innovate UK

Q&A

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Networking Lunch

Please return at 13:40

www.ktn-uk.org

Innovate UK
KTN

Challenge Owners: running order

Chair: Michelle Carter, Innovate UK KTN

- Network Rail | James Heslop, Head of Strategy
- Network Rail | John Edgley, Chief Track and S&C Engineer
- Great British Rail Transition Team | Rufus Impey, Lead Strategic Planner
- East West Rail | Will Reddaway, Head of Innovation
- South Western Rail | Dan Piner, Senior Innovation and Strategy Manager
- LNER | Ross Welham, Lead Research and Innovation Manager
- Arriva Rail London | Matt Bromley, Innovation & Business Excellence Manager
- HS2 | Jonathan Kelly, Senior Innovation Manager

Innovate UK KTN

Research and Development
Innovation is in our nature

Innovate UK First of a Kind 2023
DfT-funded Priorities

Network Rail Challenges

14th June 2023

James Heslop, Head of Strategy
james.heslop@networkrail.co.uk

Theme 1 – Customer Experience
Network Rail Challenges

Research and Development is in our nature

Challenge 1 – Intelligent insight from passenger data
Provide solutions that support collation of real-time usage data and customer experience/feedback to provide insight to inform system optimisation and enhance door-to-door customer experience for all.

Challenge 2 – Appealing and accessible travel environment
Provide solutions that improve the travel experience to meet the expectations and needs of the customer making the travelling experience more appealing and accessible to all users.

Challenge 3 – Network user surveillance
Provide solutions that deliver increased network surveillance and use other data sources to predict and mitigate risks to passenger, employee and public safety, both on and off network.

Challenge 4 – Trespass and vandalism prevention
Provide solutions to improve detection and prevention of trespass onto the operational railway.

Theme 2 – Reliable & Easy to Maintain Assets

Network Rail Challenges

Research and Development **Innovation** is in our nature

Challenge 1 – Remote inspection of assets and the local environment
Provide solutions that enhance the inspection of the built environment - including automation of manual processes, enhanced manual and automated inspection capability to increase coverage of individual assets, and data acquisition and analysis.

Challenge 2 – Automated design, compliance and approval
Provide solutions to automate selection and optimisation of standard designs for the built environment (stations, platforms, footbridges, lifts etc.) tailored to specific construction sites.

Challenge 3 – Effective, continuous remote condition monitoring
Provide solutions for built environment health monitoring, for real / near-time assessment of lifts, escalators, doors, HVAC, utilities etc.

Challenge 4 – Predictive and preventative maintenance
Provide solutions to automate analysis of existing remote condition monitoring in the built environment to predict asset failures and identify preventative maintenance requirements. Includes collection and integration of inspection data from a range of sources and intelligent analytics to codify unstructured data, and modelling of environmental impacts and design change effectiveness.

Theme 3 – Optimised Train Operations

Network Rail Challenges

Research and Development **Innovation** is in our nature

Challenge 1 – Flexible and reliable train planning

Provide solutions to develop knowledge and tools for more reliable, efficient, and adaptive train planning which reduces the risk of errors and optimises network capacity.

Challenge 2 – More consistent operations

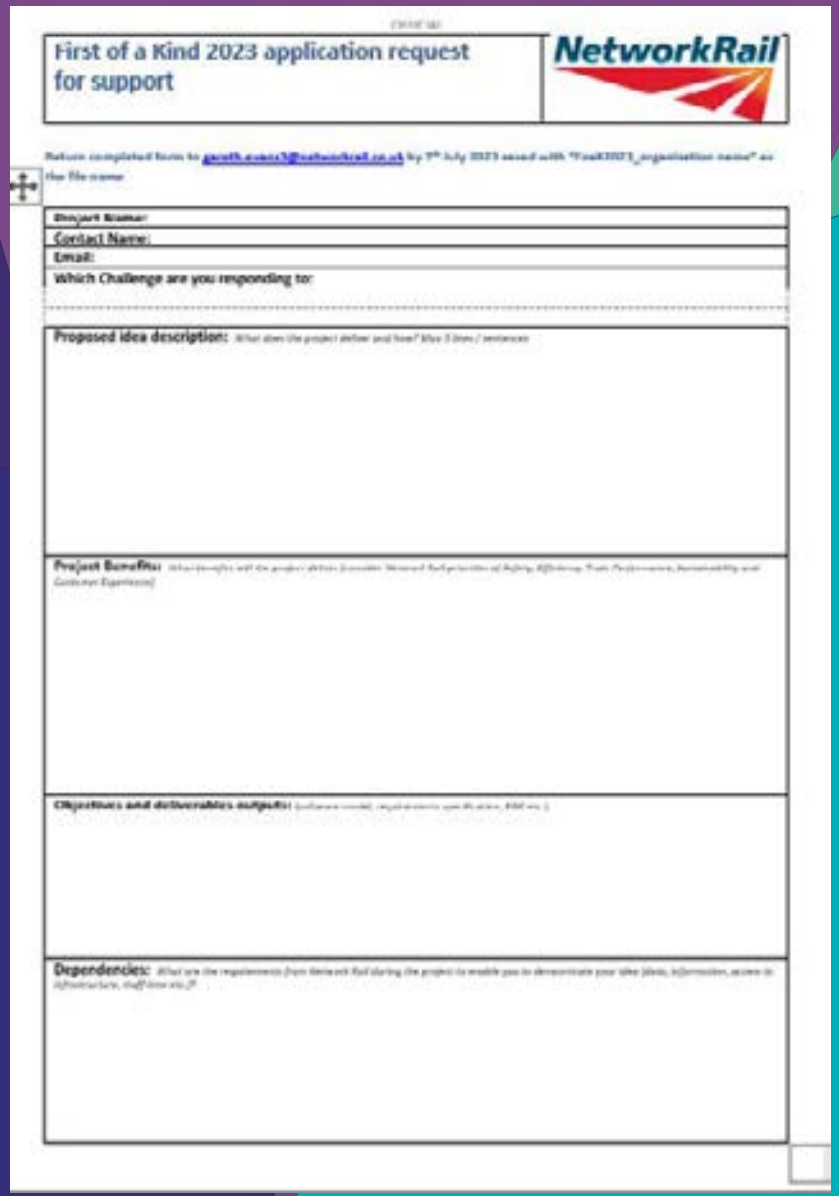
Provide solutions that deliver improved incident management and service recovery, embedding learning and enhancing systems.

Challenge 3 – Operational staff development and competency

Provide solutions that support improved skills acquisition, management and retention for operational staff.

Request for support form

Research and Development innovation is in our nature



First of a Kind 2023 application request for support

NetworkRail

Project Name:

Contact Name:

Email:

Which Challenge are you responding to:

Proposed idea description:

Project Benefits:

Objectives and deliverables outputs:

Dependencies:

Available from: gareth.evans3@networkrail.co.uk

One page
Deadline 7th July 2023

Proposed idea description: What does the project deliver and how? Max 5 lines / sentences.

Project Benefits: What benefits will the project deliver (safety, efficiency, train performance, sustainability, customer experience)?

Objectives and deliverables outputs: e.g. software model, requirements specification, POC etc.?

Dependencies: What are the requirements from Network Rail during the project to enable you to demonstrate your idea (data, information, access to infrastructure, staff time etc.)?

Request for support - time line

Research and Development is in our nature

Competition launch 14th June

Request for Support deadline 7th July

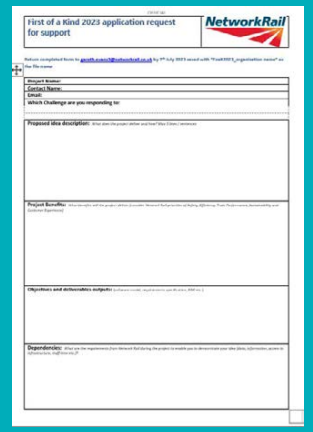
14th July

Competition closes 26th July

Submit requests for support

NR review RfS

NR issues LoS


First of a Kind 2023 application request for support

NetworkRail

First of a Kind 2023

Industry Challenges and Opportunities

John Edgley- Chair Industry Executive TLG
June 2023

UK Governments 5 strategic objectives for rail

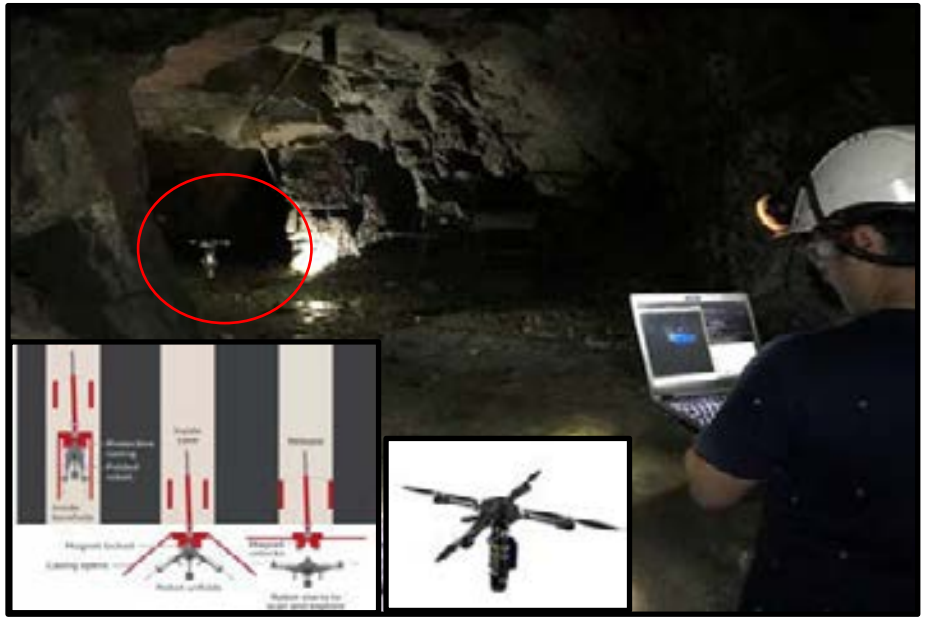
Objective	Description
Meeting customer needs	**Meeting the needs of future passengers and freight customers by:** a) Increasing value for money and improving the performance, reliability and convenience of rail, b) Meeting multi-modal expectations and reducing end to end journey time, and c) Maintaining a safe railway as part of a safe transport system and widening accessibility.
Delivering financial sustainability	**Ensuring rail is financially sustainable, efficient and value for money by:** a) Reducing costs to government, b) Ensuring a sustainable balance of fare/fee and government funding, and c) Increasing the efficiency of operations, asset management and capital investment – delivering on time and budget.
Contributing to long term economic growth	**Catalysing long term economic growth by:** a) Reducing total journey time and costs for transport users, b) Connecting labour markets and realising agglomeration benefits, and c) Connecting places to markets, directly investing in skills, innovation and digital infrastructure, crowding-in foreign investment and facilitating the housebuilding and place-making agenda.
Levelling-up and connectivity	**Reducing regional inequalities and improving connectivity between communities by:** a) Contributing to long term economic growth in areas in support of levelling up. b) Contributing to social benefits from improved connectivity, and c) Improving rail passenger and freight connectivity across the union.
Delivering environmental sustainability	**Supporting government's environmental sustainability objectives by:** a) Encouraging modal shift by increasing the attractiveness of rail, b) Delivering rail net-zero (traction and infrastructure), protecting biodiversity and addressing air pollution, and c) Protecting transport links by investing climate adaption.

FOAK 2023:

Cost Efficiency and Increasing Value for Money

Excellence- products

Excellence- tools



To conclude:

Link up with the end users

Keep in mind the strategic goals

Check out the Network Rail Challenge Statements

Great British Railways Transition Team

First of a Kind Rail Competition

June 2023

Who are we?

***Great British Railways* will be the new "guiding mind for Britain's railways"**

GBR Transition Team launched in October 2021, tasked with…

- Designing the future GBR – simpler, better
- Bringing the industry together to deliver meaningful change now

Andrew Haines
Leader

Anit Chandarana
Lead Director

What difference does a guiding-mind make?

- Too slow
- Too siloed
- Too prescriptive

- Strategic direction
- Coordinated, coherent approach
- Imperative to act commercially
- Long-term thinking
- Whole-system consequences
- Competitive conditions

Long Term Strategy objectives specified by DfT

	Strategic Objectives	Ambition for rail
I	**Meeting customers' needs**	Meeting the needs of future passengers and freight customers by: a. Increasing value for money and improving the performance, reliability and convenience of rail, b. Meeting multi-modal expectations and reducing end-to-end journey time, c. Maintaining a safe railway as part of a safe transport system and widening accessibility.
II	**Delivering financial sustainability**	Ensuring rail is financially sustainable, efficient and value for money by: a. Reducing costs to government, b. Ensuring a sustainable balance of fare/fee and government funding, and c. Increasing the efficiency of operations, asset management and capital investment – delivering on time and on budget.
III	**Contributing to long-term economic growth**	Catalysing long term economic growth by: a. Reducing total journey time and cost for transport users, b. Connecting labour markets and realising agglomeration benefits, and c. Connecting places to markets, directly investing in skills, innovation and digital infrastructure, crowding-in foreign investment and facilitating the housebuilding & place-making agenda.
IV	**Levelling up & connectivity**	Reducing regional inequalities and improving connectivity between communities by: a. Contributing to long-term economic growth in areas in support of levelling up, b. Contributing to social benefits from improved connectivity, and c. Improving rail passenger and freight connectivity across the union.
V	**Delivering environmental sustainability**	Supporting government's environmental sustainability objectives by: a. Encouraging modal shift by increasing the attractiveness of rail, b. Delivering rail net-zero (traction and infrastructure), protecting biodiversity and addressing air pollution, and c. Protecting transport links by investing in climate adaptation.

Working with existing players

GBR needs to influence the existing landscape

Public funders, Train Operators and the supply chain

Network Rail

RAIL SAFETY AND STANDARDS BOARD

UKRI Innovate UK

Railway Industry Association

The voice of the UK rail supply community

East West Rail and First of a Kind

Will Reddaway, Head of Innovation

Our Purpose

To increase prosperity and improve well-being for communities between Oxford and Cambridge, by transforming their everyday journeys

Our Outcomes

We will deliver a railway that is:

Better for customers

Cheaper for the taxpayer

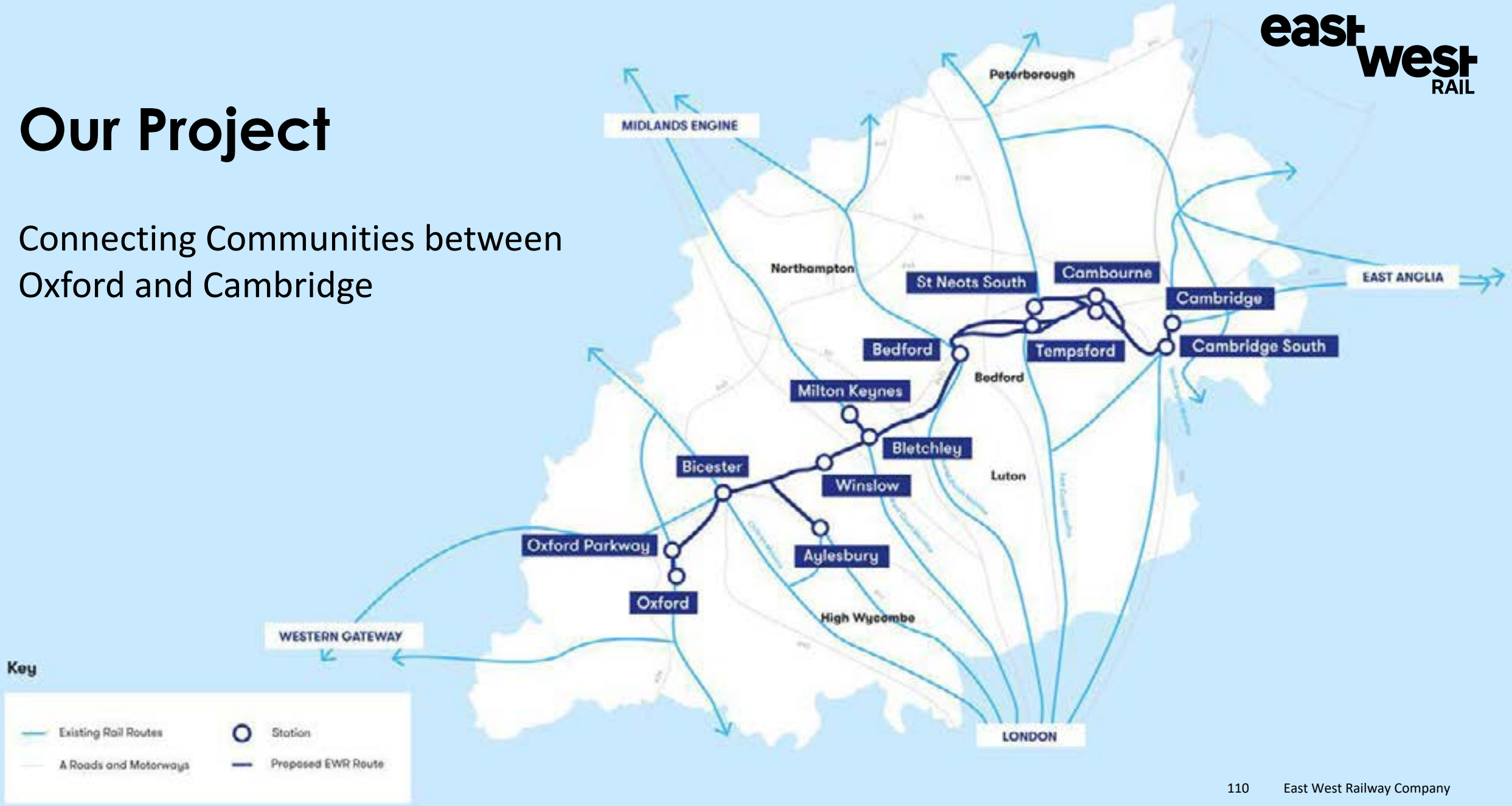
Greener for the environment

Delivered quicker than before

Safe & secure

Our Project

Connecting Communities between Oxford and Cambridge



Our Challenges – Safety Focus

A major priority for EWR is safety on site. With this in mind, we are seeking solutions to ensure and enable active safety for all workers (and visitors) on construction sites.

- Wearable tech for geofencing / monitoring / reporting - creating heatmaps

- On-the-spot reporting (reducing delays, increasing safety)

- Digital rehearsals / digital twin and digital railway aspirations

(Please note, we are not currently engaging with partners for FOAK who are working outside the safety space. This is the area of the scope we are engaging with at this time).

Letters of Support

We are happy to provide ‘a letter of support’ to applicants, provided the proposal aligns with our aims and timescales.

To apply for a letter of support, please concisely outline your proposed project, timescales and costs, (no more than 300 words), to Will Reddaway and Daisy Chapman-Chamberlain:
will.reddaway@eastwestrail.co.uk
daisy.chapman-chamberlain@eastwestrail.co.uk
We will then invite you for an initial call to discuss. Following discussion/s, we will make the decision to offer a letter of support if this aligns with our aims.

Final date to approach us: 19 July – but we recommend approaching ASAP, as we may not have time to provide letters if we have multiple applicants close to this deadline.

TRAIN OPERATOR CHALLENGES + PROCESS TO GAIN SUPPORT

Ross Welham
London North Eastern Railway

Dan Piner
South Western Railway

TOC Innovation Community

Bringing together innovation champions and leads from across the industry

We have 4 key objectives:

1. Create a space to **share innovation learnings** including successes and failures, and to **inspire ideas**

2. Build a **network of contacts** which can be used to progress innovations as well as other **cross-industry collaboration**

3. Encourage a collaborative culture and **reduce unknown duplication** within the industry, resulting in **cost efficiencies**

4. Showcase rail as an innovative industry in which there are opportunities for innovation

Train Operator
FOAK Partners

TRANSPENNINE EXPRESS

LNER LONDON NORTH EASTERN RAILWAY

TRAFNIDIAETH CYMRU TRANSPORT FOR WALES

NORTHERN

AVANTI WEST COAST

South Western Railway

east west RAIL

arriva rail london

Customer Experience Challenges

How might we manage disruption better by:

providing reassurance to customers that their ticket is valid for the journey they are taking, and provides information on the next best action?

improving the information we provide to customers?

ensuring the provision of information meets needs and expectations?

improving the boarding experience for all customers who require assistance?

improving our ability to efficiently muster alternative transport means?

improving our ability to pre-empt the need to contact a customer post disruptive incident?

working quicker across the industry to establish an industry-wide response? e.g. ticket acceptance policies

How might we manage conflicting commercial and capacity objectives by:

always providing luggage capacity that matches customer expectations?

increasing staff visibility onboard to meet customer needs?

reducing crowding on busy services?

enhancing ticket sales including upgrades and enhancements during the journey?

rewarding and recognise customers for moving from the car to public transport?

How might we improve customer experience by:

increasing security and safety on-board and in stations?

distributing manual and automated station announcements direct to customers?

remotely open and close assets such as waiting rooms, toilets and First Class lounges?

return to and optimise a catering offer for long distance services?

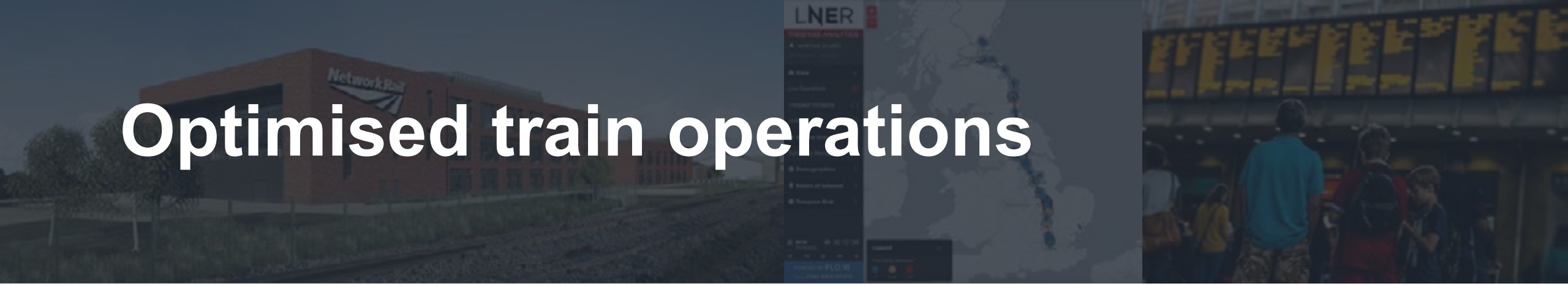
developing ways to manage extremes of heat at stations?

developing new approaches to staff uniform that accounts for weather extremes?

Reliable and easy to maintain assets

How might we:

- optimise on-board up-keep and cleanliness?
- incentivise customers to report defects, on-board and in stations, that can be diagnosed at system-level?
- remotely detect the locations of water leaks in stations?
- use existing and emerging technology to improve the operational efficiency of our Traincare Centres?
- make our stations welcoming to guests for minimal costs, considering the initial change and how the new look will be maintained to a consistently high standard?



Optimised train operations

How might we:

- achieve scheduled train dwell times, every time?
- be able to improve train location accuracy to help achieve on-time performance?
- remove human-related risks through technical or automated solutions?
- optimise depot operations to ensure the right train leaves at the right time?
- optimise onward travel during disruption to make better use of alternative transport provisions e.g. coaches, taxis?
- better use existing and new data sets, to reduce the use of Temporary Speed Restrictions?
- use existing and emerging technology to improve the operational efficiency of our Traincare Centres?
- easily understand where driving technique is impacting performance?
- standardise driving techniques to enable us to achieve the timetable and reduce our environmental impact?

How to Engage with us?

Complete a simple form and tell us:

1. Who you are
2. What theme and, if applicable, which challenge statement you are solving
3. In 200 words describe your proposal

How will it work?

Form opens 14th June @10:00

The TOCs will review submissions and invite applicants to meet with those interested in the proposal.

Form closes 16th July @23:45

1 x final week to organise letters of support

Competition Closes 26th July @11:00

First of a Kind 2023: Train Operating Company application form

https://forms.office.com/e/tFf4j56LGU

arriva rail london

Arriva Rail London Innovation Opportunities

First of a Kind Briefing
14th June 2023

a DB company

We are proud to provide passenger transport services in 10 countries across Europe.

We harness the scale and size of Arriva to constantly improve our vital services and deliver them in a better way every day.

- We operate in 10 countries
- We provide around 1.5 billion passenger journeys
- We run 12,898 buses and 4 waterbuses
- We run 565 trains, including trams
- We have around 35,500 employees focussed on delivering for our customers

You can find out more about our businesses by selecting countries on the map.

Arriva Rail London

- We took over operation of London Overground Network 13th November 2016 from LOROL (50% owned by Arriva).

The London Overgound network:

- Links 23 of London's 33 boroughs
- Managers 82 of 113 stations served by London Overground
- Covers 7 routes covering 104 miles of rail network
- Pre-Covid carried 660,000 passengers on a typical weekday, seven times more than in 2007 Delivered by a workforce of 1500

a DB company

arriva rail london

#1 - How can we use AI, overlayed on DOO CCTV, to improve or reduce PTI incidents?

What's the situation?

Since the introduction of Class 710 the fleet have suffered with passengers trapped in door incidents some of which the interlock has been gained which means the train can move. In a few circumstances this has led to passengers being dragged along the platform. Fortunately, only minor injuries have been suffered, but could easily have led to fatalities.

What are the causes?

The Class 710 fleet operate in Driver Only Operation (DOO) with CCTV equipment provided to enable the Driver to view the passengers boarding and alighting from the train aid their decision making when the doors can be closed. On crowded platforms the distinction between a passenger *trapped* or simple stood in the dispatch corridor can be hard to differentiate.

The scope and our priorities

ARL have undertaken a piece of work looking at PTI issues with Class 710 focusing on the trains themselves, but also the environment the fleet operate in, especially around pedestrian flows at stations with some mitigating actions implemented (improved signage and passenger information). This exercise is to focus on the CCTV image that the Driver can view of the dispatch corridor and explore the use of artificial intelligence to identify vulnerable passengers that may/may not be in danger from a moving train.

How will solving this challenge help our customers and our people?

The object of the project is to improve the PTI risk of DOO trains and improve the information provided to Drivers of the risk of vulnerable passengers trapped in doors. The intent of this project is to use artificial intelligence to identify and highlight at risk passenger to the Driver and to aid decision making when self dispatching a train from a platform.

#2 - How can we clean hard to access areas on our trains?

What's the situation?

We clean all of our trains every night before they go back into service and carry out a deeper clean once a month. Certain areas of the train (e.g. heater grilles, panel edges, inside light fittings) show a build up of dirt that cannot be readily accessed without opening panels or dismantling parts of the train interior.

The scope and our priorities

We cannot plan to dismantle train interiors during our access time on trains which is often no more than four hours per night. What tools, devices, products, approaches are available that could help improve the cleanliness of these hard to clean areas?

What are the causes?

Our cleaning teams are not trained or competent, and we do not have access time to the trains, to dismantle interiors to access behind grilles, etc. We currently do not have suitable tools or devices that can allow us to clean in these hard to access areas.

How will solving this challenge help our customers and our people?

The expected benefits of being able to clean these hard to clean areas are:

- Improved environment for our passengers
- Pride in the product for our people
- Happy client

#3 - Customer information challenges

- How can we improve our digital offering at stations to reduce requirement for posters?
- How can we improve our customer's experience of Help points?

How to get in touch in with your ideas

1. Email innovation@arrivarl.co.uk

2. Submit your idea using the TOC Innovation Community Form

HS2 insights on DfT challenge themes

As a Rail Organisation

Bringing Ingenuity to Life.
paconsulting.com

1- Customer Experience Rail Demonstrations (DfT)

3 Main points are particularly relevant to HS2 on this challenge:

- **making independent rail travel accessible for all**	*HS2's EDI policies + inclusive access to trains for all passengers*
- **local community hubs at stations**	*Giving back to the local communities through social hubs, something we are already doing at HS2*
- **increase public confidence in the rail and to encourage customers to make greater use of the railway**	*HS2's 360km/h reducing the journey time + HS2 service frequency*

2 - Reliable and Maintainable Assets Rail Demonstrations (DfT)

2 Main points are particularly relevant to HS2 on this challenge:

- **non-destructive testing and predictive maintenance**

Changing weather conditions in the UK warrant a focus on design for weather resilience.

Predictive maintenance to reduce the amount of time trains are not running on the network will also be a consideration for HS2.

- **future proof design of trains and station environment with a focus on upkeep and repairs**

HS2 trains must be compatible with both HS2, and CRN, stations so future proof design is important for the network's success.

3 - Optimised Train Operations Rail Demonstrations (DfT)

2 Main points are particularly relevant to HS2 on this challenge:

- **innovation to prevent and help mitigate disruptions or aid service recovery after incidents (including new technology, such as drones)**	*Changing weather conditions in the UK warrant a focus on design for weather resilience.* *Predictive maintenance to reduce the amount of time trains are not running on the network will also be a consideration for HS2.*
- **innovation to allow Automation Train Regulation (ATR) to provide an enhanced regularly spaced service.**	*Aligns with HS2's goal of achieving 16 trains per hour.* *Achieving a regular and reliable service will require the use of automation in some form to remove the time lags of human input.*

Bringing Ingenuity to Life.

Elevator pitches: running order

Chair: Peter Holland, Innovate UK KTN

Neil Fulton, BCIMO
David Shipman, GCRE
Sona Khalifeh, Taziker
Evan Jones, Complete Cyber
Anne Laleman, WhatsInIt.tech
James Simester, Unipart
Steve Mills, University of Birmingham
Kailash Manohara Selvan, SpatialCortex Technology
Andreas Zachariah, TravelAI Ltd
Emily Kent, One Big Circle
Mike Lloyd, Jnction
Huw Gibson, Trimetis
Lawrence Archard, Factoree
Wang Mingfeng, Brunel University
David Brown, Interactive Machine Lab Ltd
Peter Allen, Swinburne University of Technology
Lovely Chavan and Azhair Qualyoom, Qsustain

UKRI Innovate UK KTN

BCIMO™

BCIMO™

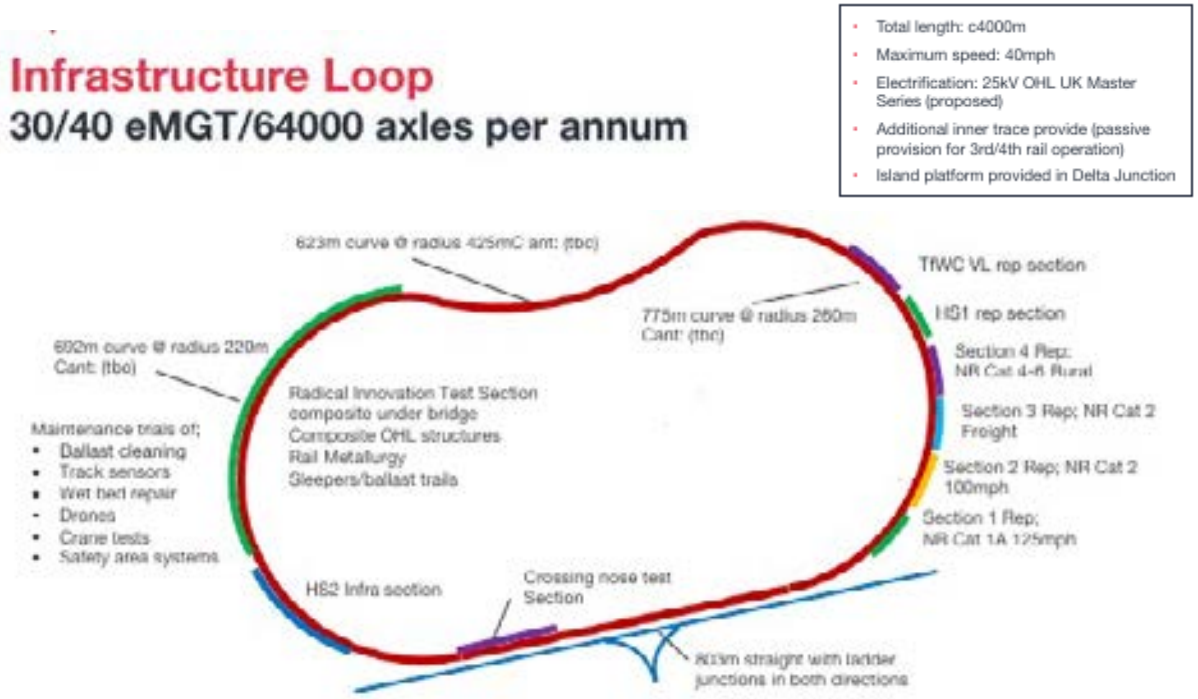
- www.bcimo.co.uk

- neil.fulton@bcimo.co.uk
- 07775 585575
- naomi.arblaster@bcimo.co.uk
- 07780 510695

BCIMO™

Global Centre of Rail Excellence

A unique construction opportunity?



The GCRE Offer: Infrastructure Innovation

The infrastructure testing and innovation facilities offered at the Global Centre of Rail Excellence will be unlike anything currently available in Europe. GCRE will offer:

- An electrified, 4km low-speed infrastructure testing loop for high quality testing of infrastructure, offerings speeds of 40mph
- Accelerated and endurance testing of long-life railway infrastructure assets
- In-depth data understanding of how assets will perform in-service, on the live railway
- Anticipation of faults before they occur and optimisation of asset life

Opportunity for application of an applied known load featuring:

- A 1000 tonne freight train with 30 tonne axle loads
- A Class 360 passenger train loaded crush plus 10%
- Operational 16 hours a day, five days a week in 10-week cycles
- 20 MGT (30/40 eMGT) and 600,000 axles per annum
- Two-week downtime to set up / tear down experiments
- Automatic Train Operation
- Vehicle and system integration testing in spare night shifts and downtimes
- Automated train with no risk from testing that explores asset degradation and failure
- Parity with sectors such as aerospace and automotive that all test to failure

GCRE Is Not Just a Testing Site

The 700-hectare GCRE site is the same size as Gibraltar and with world class innovation facilities on site has the potential for:

- Energy: Renewable energy generation and innovation
- Communications Innovation: Opportunities for 5/6G and Spectrum Testing / DRONE ‘out of sight’ testing
- Environmental Contribution: Space for up to half a million native species trees
- Commercial Opportunities: Technology Park supporting innovation space in other areas
- Digital Twin: Embedded sensing and fibre across the site opportunities e.g. Hydrogen and battery adaptable for other innovations

What can you add to the list?!

Tell us at enquiries@gcre.wales with subject line FOAK23

THE NEED

CURRENT UNDERBRIDGES

- **Major** maintenance intervention
- **Complete replacement** required for many underbridges
- **Disproportionate** site set-up cost with **a large impact** on local stakeholders
- Vulnerable to **corrosion**
- **Difficult** to achieve 120-year life cycle without maintenance
- **High** carbon footprint

ADDED VALUE & WIDER IMPACT

LEGACY FRP UNDERBRIDGES

- Cost-effective
- Zero maintenance
- Integrated waterproofing system
- Low carbon footprint
- Lightweight
- Quick to install
- Retain existing clearance
- Retain existing substructure integrity
- 120-year life cycle

THANK YOU

TAZIKER
Infrastructure | Access | Engineering | Industrial

For more information, please contact:

sona.khalifeh@taziker.com

matt.greenhalgh@taziker.com

0344 8800 385

2022 CN AWARDS

Best Innovation

Taziker

FRP Legacy Footbridge

2022 CN SPECIALISTS AWARDS

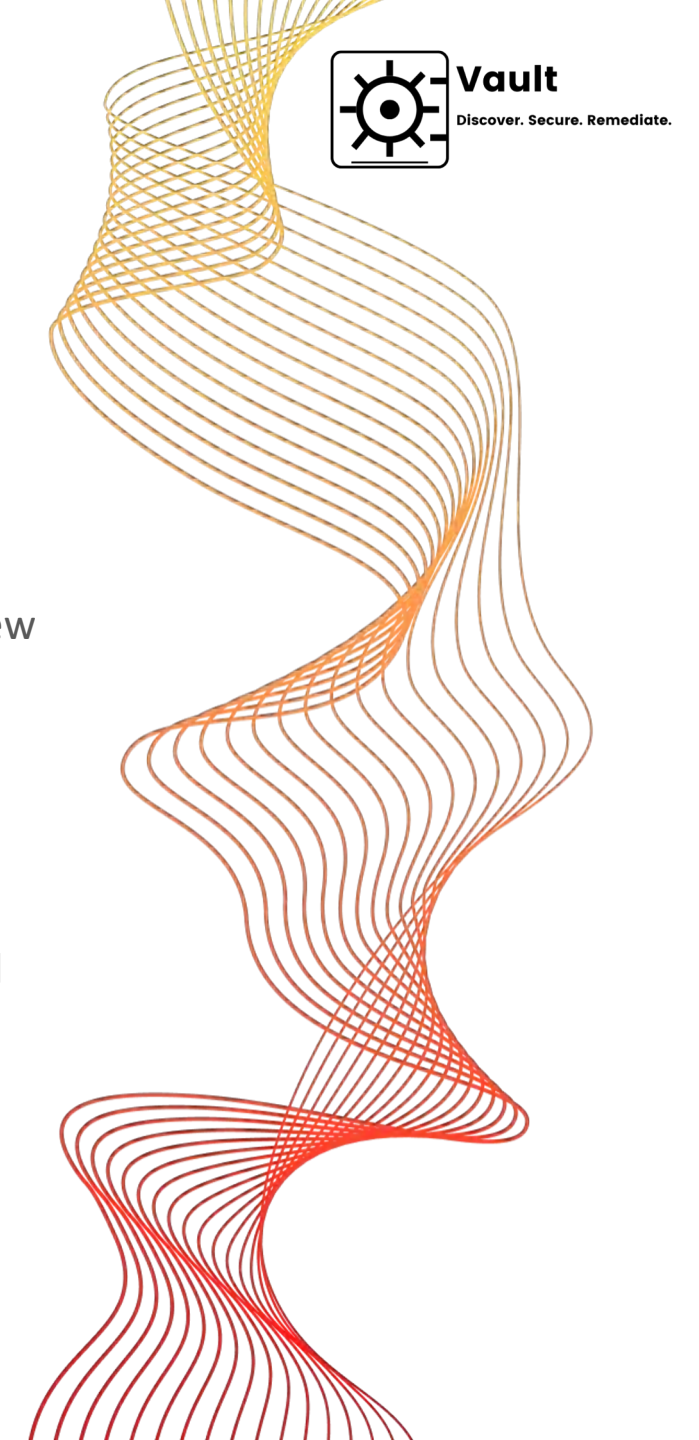
FINALIST

SBRI FOAK: Problem Statement

- Compliance with NIS-D and the need to protect Railway Assets against Cybersecurity threats is a top priority for Asset Owner/Operators
- Asset discovery and inventory for Assets geographically distributed is challenging, and often costly to implement real-time monitoring of these Assets
- Idea born from Complete Cyber who specialise in Railway Cybersecurity with a view to address a Gap in the Railway Industry markets

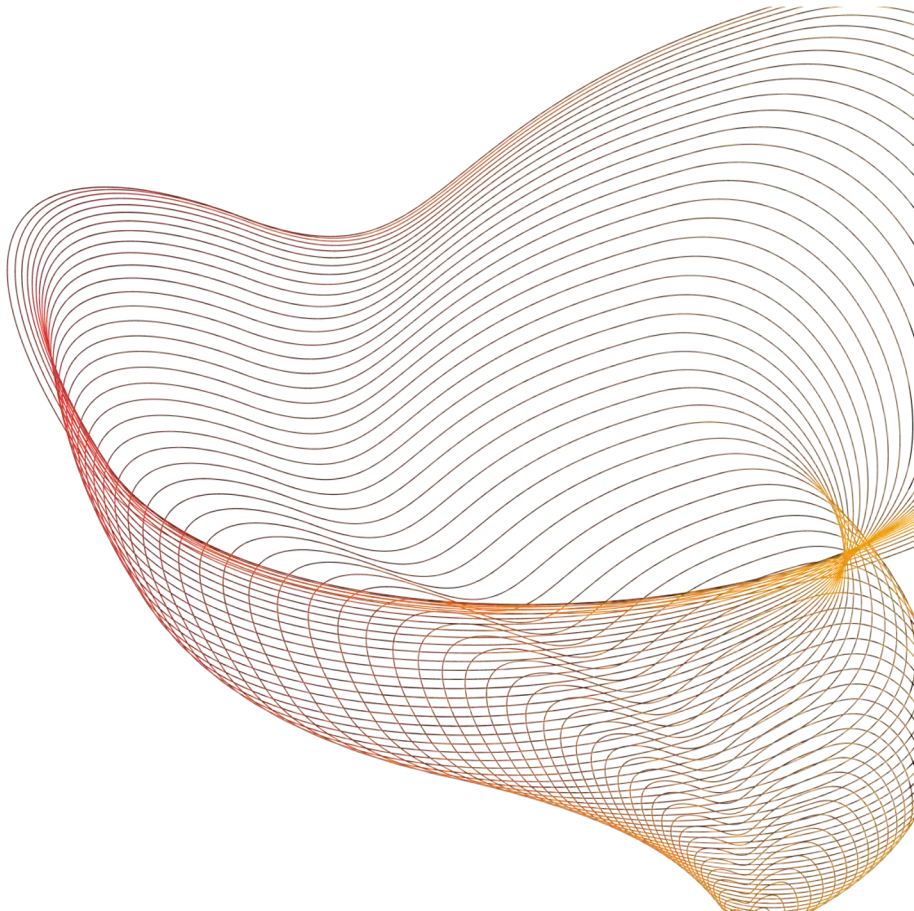
Why Vault IoT?

- Vault IoT addresses these gaps by providing a low-tech, highly functioning device with a simple intuitive mechanisms for conducting Asset Discovery, Reporting and Vulnerability assessments
- Vault leverages 4G/Satellite connectivity to empower Operators/Maintainers the ability to scan and collect data centrally using Cloud capabilities



SBRI FOAK: Vault IoT Outline

- Grant funding will be used to convert Proof of Concept into an MVP with trials with a potential array of Commercial engagements (TOCs/FOCs/Infrastructure Owners)
- An innovative product with a roadmap for expanded functionality to support wider security & network predictive maintenance aspects to support holistic Asset Management and Cybersecurity Risk
- Significant export capability with use of the product(s) to be used in other Industrial fields (Oil & Gas, Maritime, Highways and Utilities)
- The product will provide significant cost benefits in reduced specialist testing and provide greater insights into Asset condition information



Dr. Tauseef Ali
CTO

Anne Laleman
CEO

WhatsInIt.tech

Anne.Laleman@WhatsInIt.tech

Tauseef.Ali@WhatsInIt.tech

WhatsInIt.tech

PREDICTIVE MAINTENANCE on RAILWAY TRACKS

AI / Computer Vision and sensors

- Digital Product Passports
- Health and Safety
- Compliance
- ?

Join us on our journey towards..

Visionary AI based predictive maintenance for railway tracks management…

Who we are

UNIPART GROUP

UNIPART RAIL

UK

UNIPART RAIL

Samuel James ENGINEERING
a Unipart Rail Company

UNIPART DORMAN

Overseas

WESTCODE
a Unipart Rail Company

UNIPART GROUP AUSTRALIA

UNIPART

UNIPART SERVICES CANADA Inc

UNIPART TECHNOLOGIES GROUP

instrumentel
MEASURING SUCCESS

MetLase
A JOINT VENTURE BETWEEN ROLLS-ROYCE AND UNIPART

PS PARK SIGNALLING

comms design

UNIPART CONSTRUCTION TECHNOLOGIES

We operate across

- Signalling
- Infrastructure
- Rolling stock

Strong lead in delivering technologies, innovation and supply chain services

UNIPART GROUP
MANUFACTURING · LOGISTICS · CONSULTANCY

What we are looking for

Customers with **asset challenges** and **Suppliers** that need **support**

We have **technology and supply chain capabilities** across a number of **themes**

DfT competition strand	High speed rail partner
Customer Experience ✓	Slab Track Installation Processes
Reliable and Easy to Maintain Assets ✓	Cable Troughing and Cable Laying
Optimised Train Operations ✓	Installation of ERTMS
	Tunnel Fit Out Installations
	Electric Multi-Purpose Vehicles Deployment ✓
Contact: Dr. Colin Smith McGloin **colin.smithmcgloin@unipartrail.com**	**Contact: Henry Bradshaw** **henry.bradshaw@unipartrail.com**

UNIPART GROUP
MANUFACTURING · LOGISTICS · CONSULTANCY

University of Birmingham Centre for Railway Research & Education

Richard Jones

Richard Jones
07961 565970
r.jones.11@bham.ac.uk

Steve Mills

Steve Mills
07732264046
S.A.Mills@Bham.ac.uk

SpatialCortex Technology

MOVA

A wearable manual-handling injury risk reduction solution

SETsquared Bristol
Part of the SETsquared Partnership

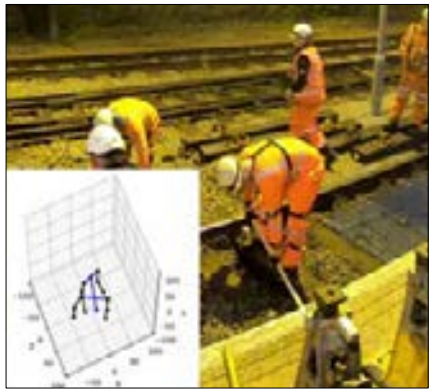
MOVA status

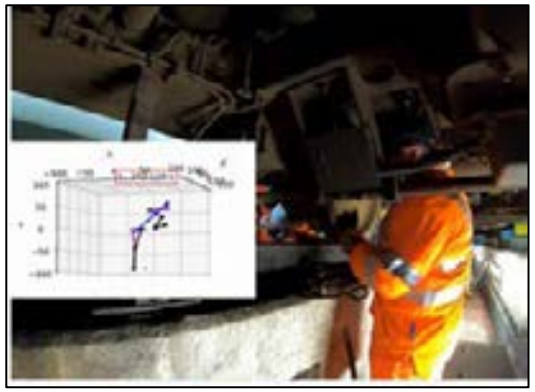
Technology Readiness Level: 5+

Proof of Concept validation

- Track maintenance, Train maintenance and Depot

Recently accepted into LNER FUTURE LABS






How can MOVA help rail industry?

MOVA: proactive & preventative approach to MSD reduction

Risk assessments

- Objective & Insightful
- Develop targeted mitigations
- Track leading indicators

Risk prevention

- Impactful training
- Manage return-to-work
- Protect vulnerable staff

Travel ai — Digitising multimodal transit - One Tech stack, many uses cases

Multi-modal | Battery optimised | Multi-country | Transport Specific AI | ODM + Routes | Automatic = No user input | Android + iOS support | Places & purpose TBC

Software Development Kit(SDK) for app embed

- Drop into any native iOS or Android app
- No maintenance burden
- Frictionless for user
- Edge Computing
- Leverage your existing user base
- App store approved

MyWays- Automatic digital travel diary

- Quantitative travel data + qualitative surveys
- Allows for longitudinal travel studies
- Capture interventions active travel and seasonality
- End-to-end multimodal data capture
- Automatically trigger customer satisfaction surveys after a rail trip (alternative NRPS)

- Automatic Digital Travel Diary
- Travel demand management tool
- Carbon footprinting Scope3, tools for NetZero
- Biz Intelligence data for MaaS bundle design
- Transport insight tool for events management
- Creating a transport data commons

Over 15m Kms of multi-modal user data >50 countries

Led over £3.8m projects with 5 Cities

Transport consultants

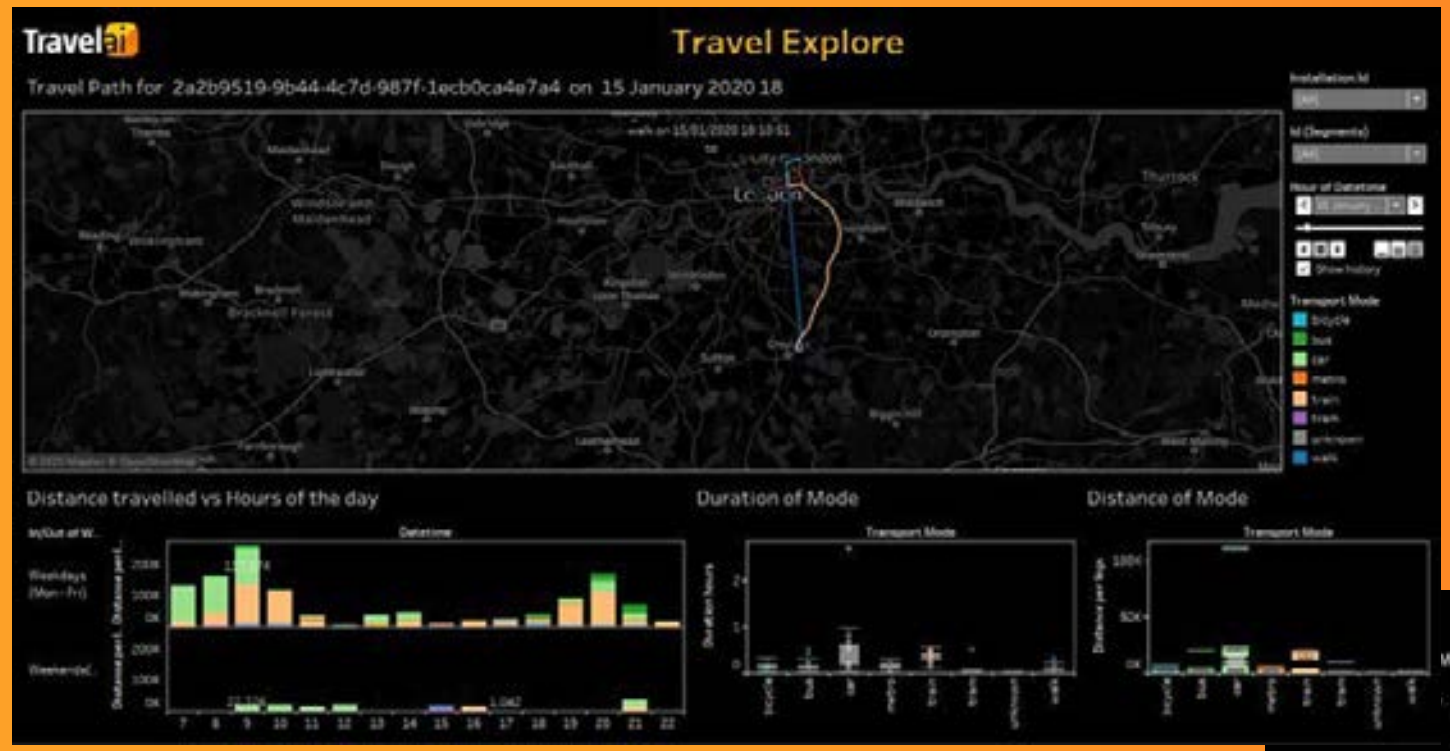
Transport providers

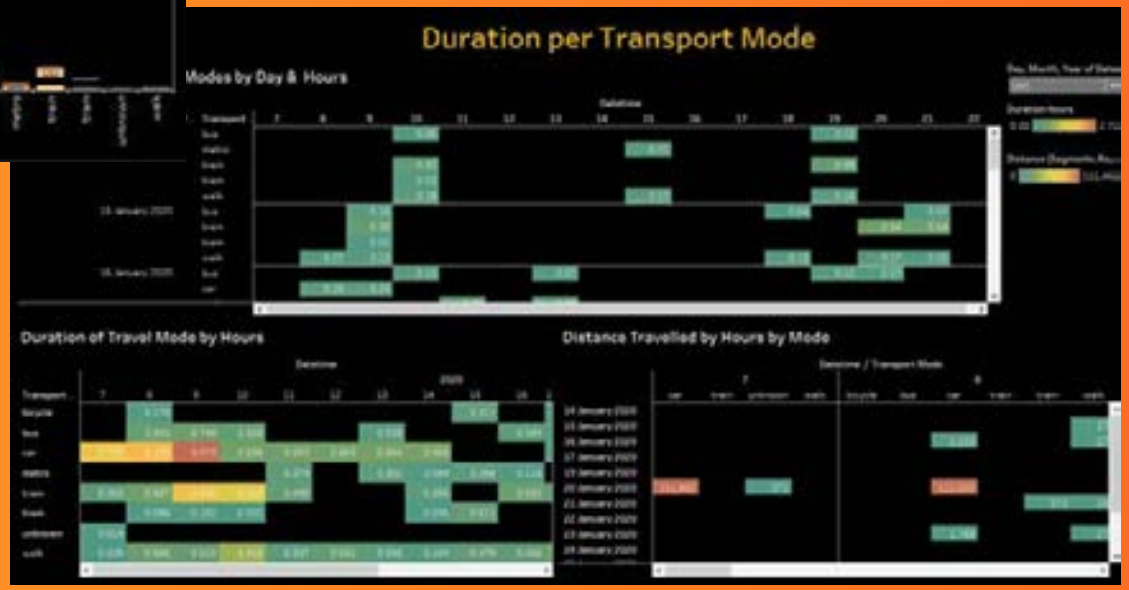
Transport Infrastructure

Clients & Partners

Urban Big Data Centre
Consumer Data Research Centre
IPSWICH BOROUGH COUNCIL
Coventry City Council
national highways
Hertfordshire
Newcastle City Council
TfWM Part of the WEST MIDLANDS COMBINED AUTHORITY
Leeds
OXFORDSHIRE COUNTY COUNCIL
LNER LONDON NORTH EASTERN RAILWAY
CARDIFF UNIVERSITY PRIFYSGOL CAERDYDD
University of Glasgow
Go-Ahead
CATAPULT Transport Systems
UNIVERSITY OF LEEDS

TravelAI – Automatic end-to-end GDPR compliant multi-modal consumer data





Revealing insights in mobility behaviour:

- Weekday vs weekend
- Mode use by time of day
- Trip duration + distances
- Entire trip histories
- Seasonality impacts
- Plus privacy/obfuscation capability

Customer Relationship Management tools for mobility:

- Learn how customers substitute modes
- Track active travel + cross-modal public transit
- Solves problem of data/digital silos
- Campaign tool using longitudinal timeseries data
- Generate personalised transport carbon footprints

One Big Circle

Emily Kent emily@onebigcircle.co.uk

- Bristol-based SME with 120+ years combined experience in video system design and installation.
- Specialists in Intelligent Video, Computer Vision and System Integration. Creators of AiVR
- Hardware and software expertise ‘under one roof’.
- Working closely with multiple organisations across infrastructure, operations and supply chain from Tier 1 to SMEs.

NETWORK RAIL AWARDS 2022 WINNER

NETWORK RAIL AWARDS 2021 WINNER

NetworkRail

TRAFNIDIAETH CYMRU TRANSPORT FOR WALES

COLAS

porterbrook

angel

MOTT MACDONALD

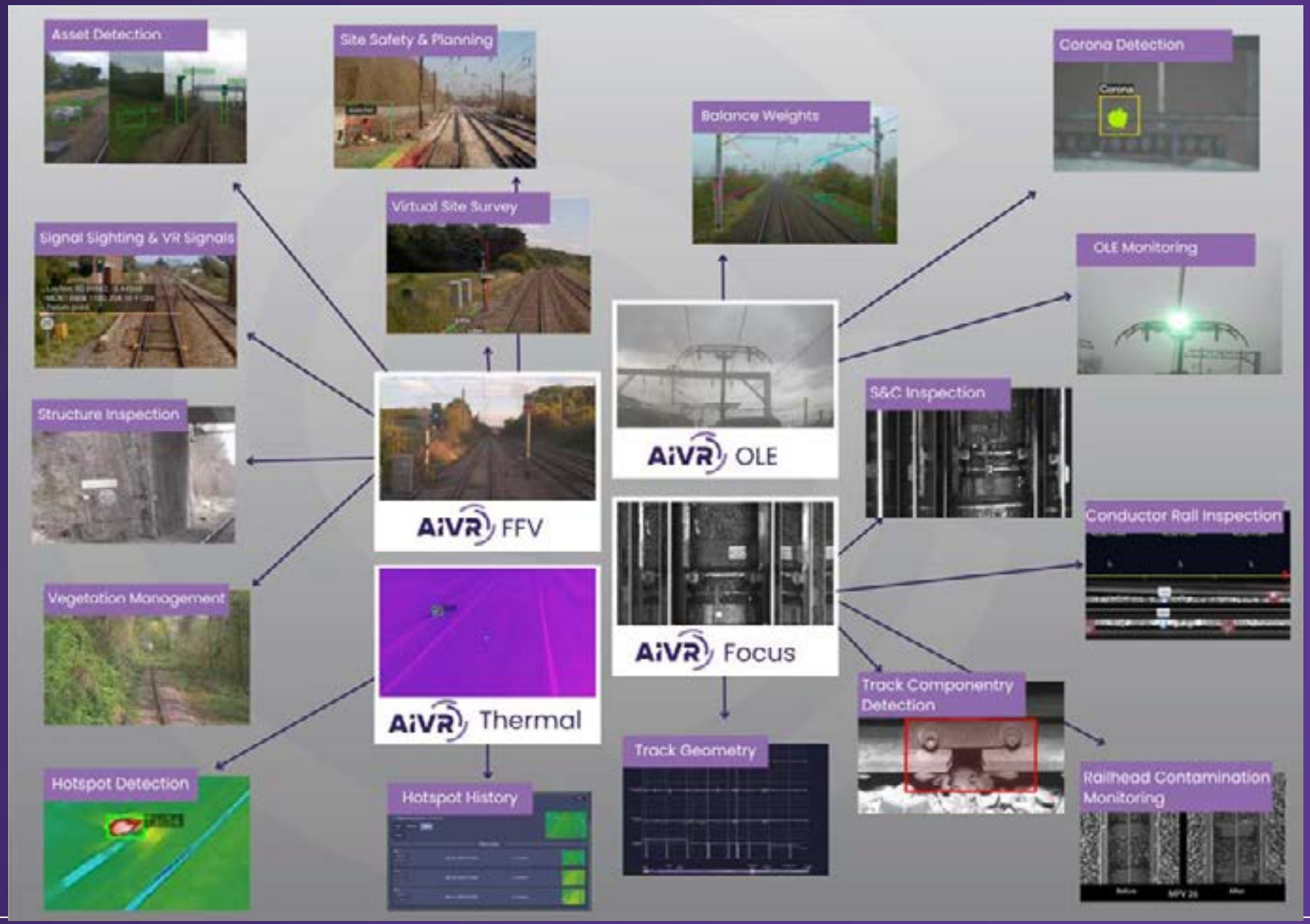
amey

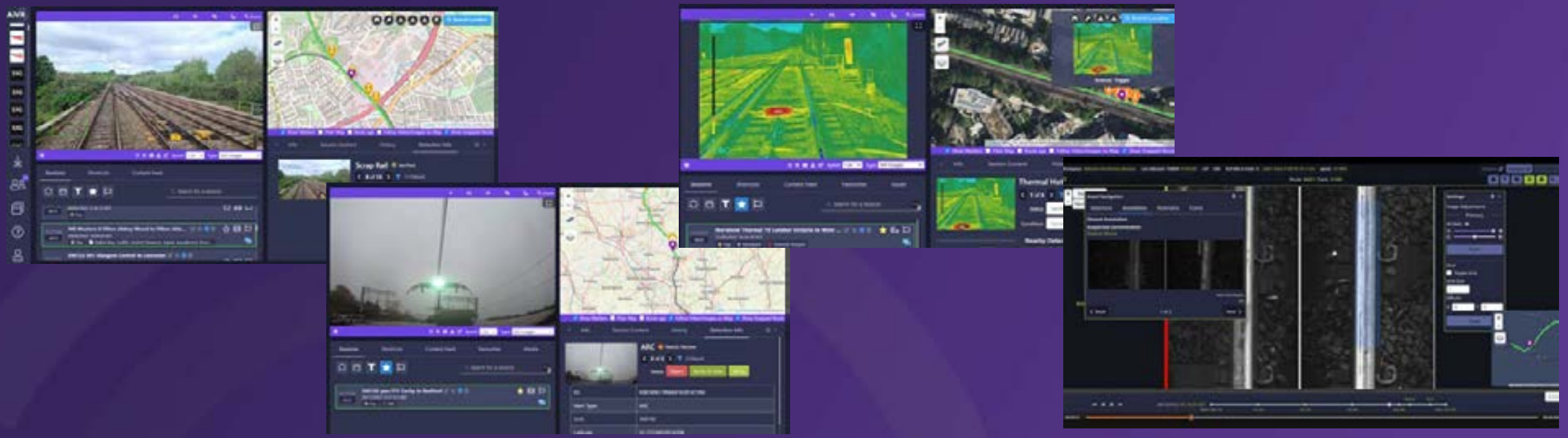
SIEMENS

AVANTI WEST COAST

southeastern

AIVR Snapshot





AIVR System has captured hundreds of thousands of hours of data from across the rail network – refined by location and intelligent insight. What do you need to know about your **assets?**

Multipurpose data with **open** approach – collect once and use multiple times (ie infrastructure **and** operations **and** more) Provides efficiencies and value for money.

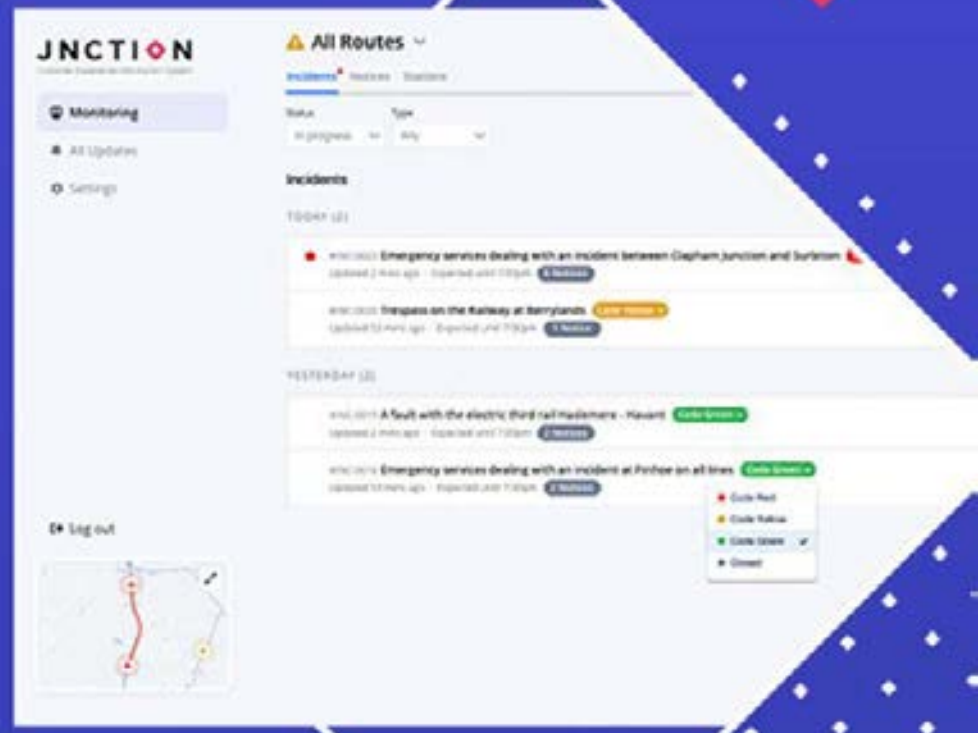
Aggregation & **Collaboration** – Combined data sources provide a holistic picture of what you need to know.

OneBigCircle

Emily Kent emily@onebigcircle.co.uk

First of a Kind 2023:

The Customer Experience & Operations challenges



UKRI Innovate UK

JNCTION

Innovate UK First of a Kind

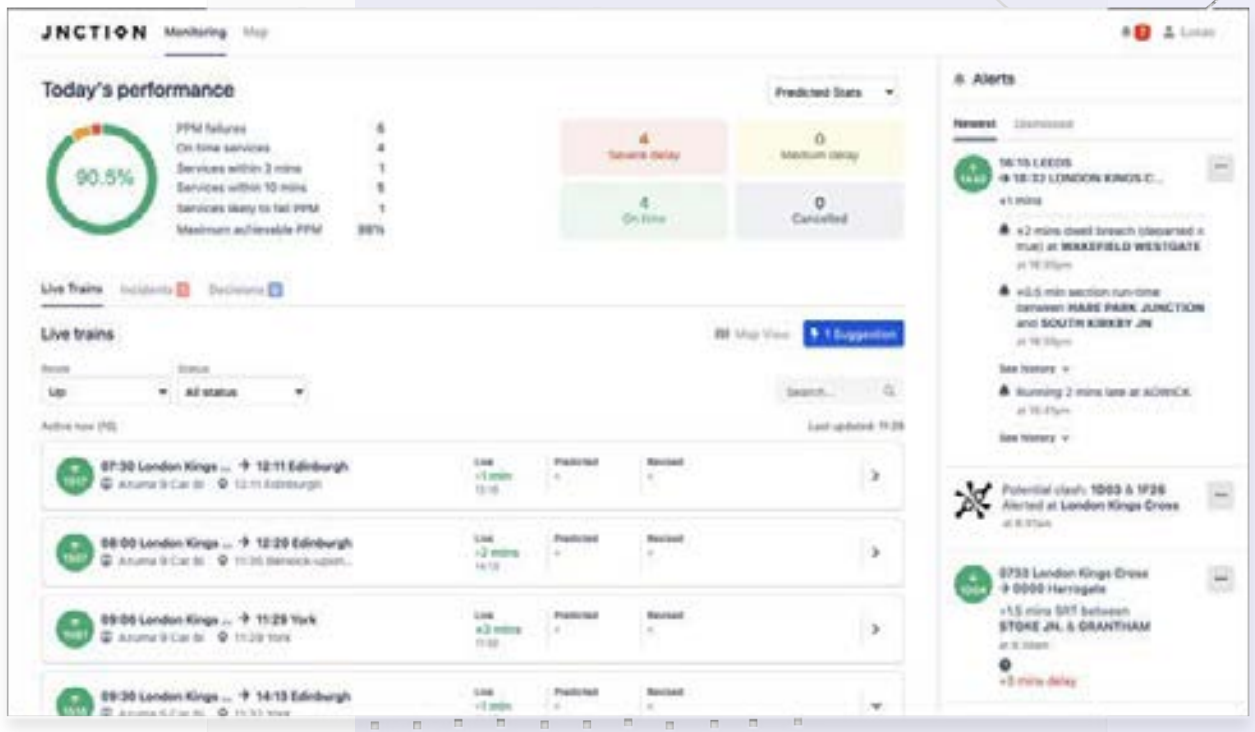
- Jnction 3 x FOAK winners:
  - 2019 Decision Support
  - 2021 Customer Information
  - 2022 NextGen TPS Analysis

- 2023 seeking problems to solve & partners

JNCTION

Decision Support Tool

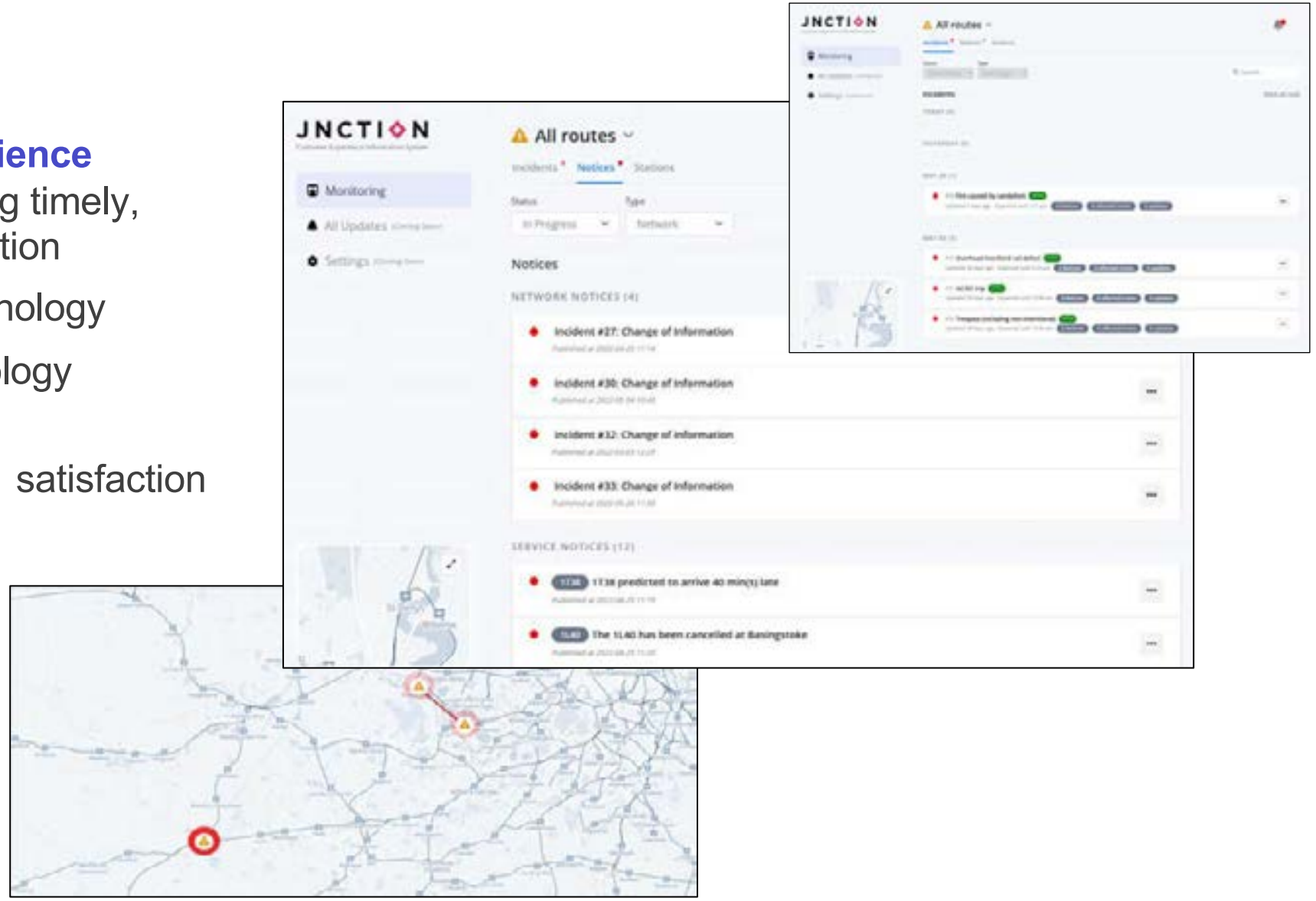
- **Real-time** tool for Operations and Service Delivery teams to **improve performance**.
- **Improve staff competency**
- Faster, more consistent and more informed decisions during disruption.
- Faster recovery to timetable
- **Improve customer experience** - with fewer and less impactful delays
- In use on **East Coast Mainline LNER**



JNCTION

Customer Experience & Information System

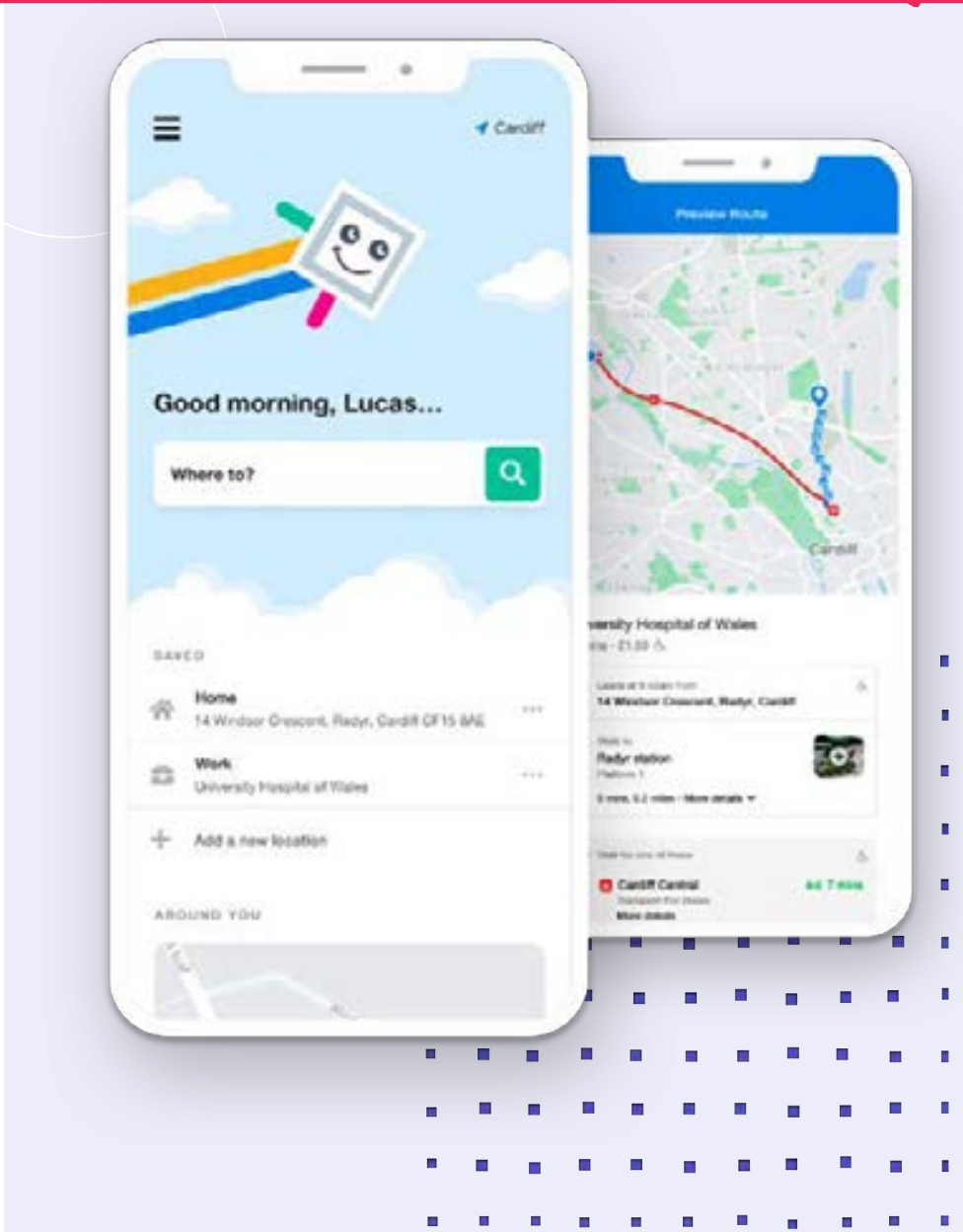
- **Improved customer experience during disruption**, providing timely, accurate and useful information
- Uses AI expert system technology
- Uses DST predictive technology
- Goal **Increase quality of customer information** and satisfaction ratings
- Partner TOC SWR



JNCTION

Needs based Passenger Assistant

- Unique journey planner and passenger assistant app
- **Minimise stress** during all stages of the journey
- Plan journeys based on **need or preference**
- Avoid aspects of a journey that causes stress
- Multimodal journeys - more **accessible** and **inclusive**
- Continually improve the customer proposition - with better data



JNCTION

Get in touch

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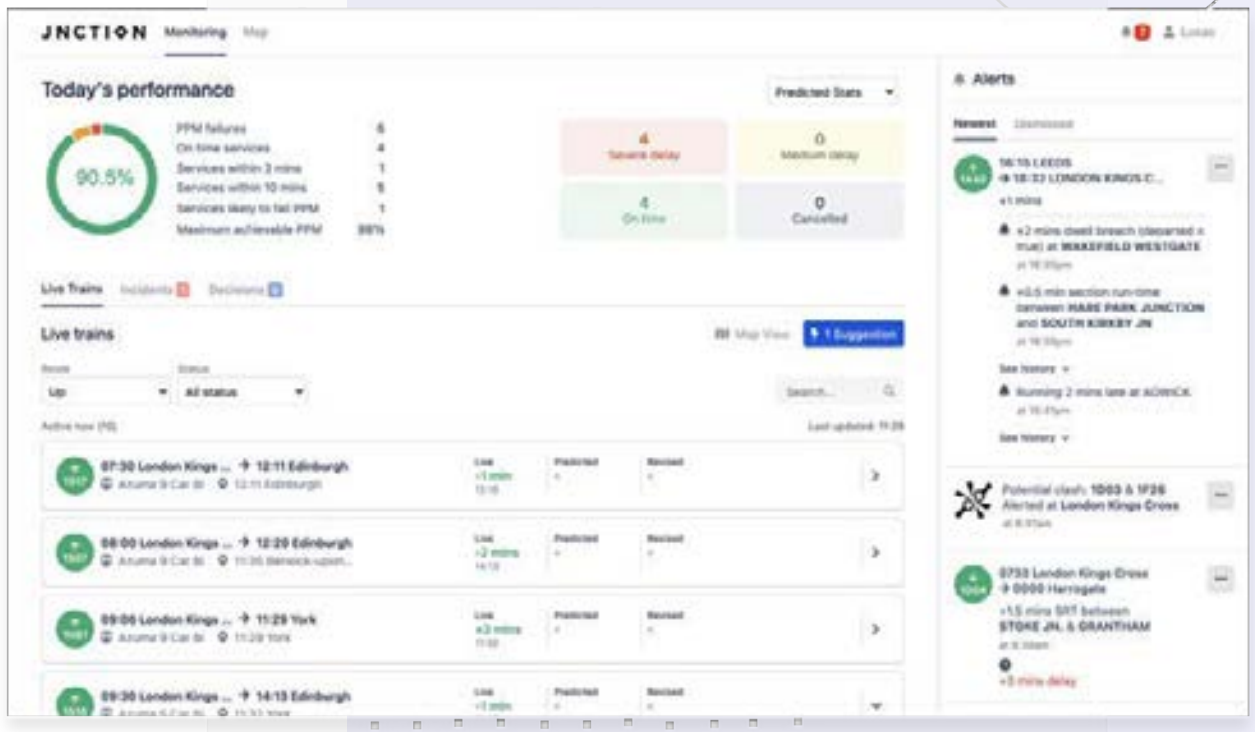


We are Trimetis and we don’t have a demonstrator

- **But** does your demonstrator involve users or have user inputs ?
- If so, we can help you to measure the benefits of YOUR demonstrator by applying human factors

- We can do this because:
  - Designing and evaluating systems and technology that involve people is what we do
  - We have 25 years experience in railway human factors
  - We also have experience of working in challenging defence, cyber and security environments

How can we add value?

- As human factors specialists we can help you to measure the costs and benefits of your demonstrator, understand the context of use and support usability

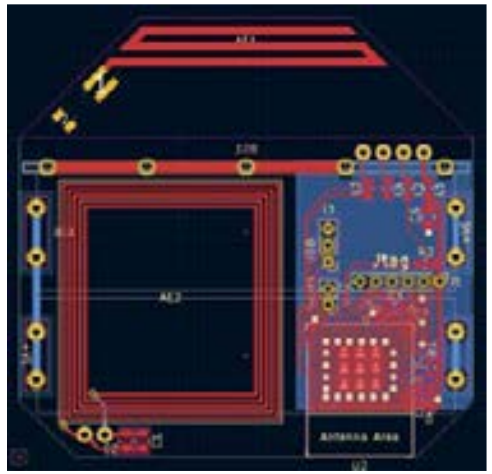
- Help you to use the design and risk assessment elements of the Rail Industry Guidance Note on Human Factors (GEGN8613)

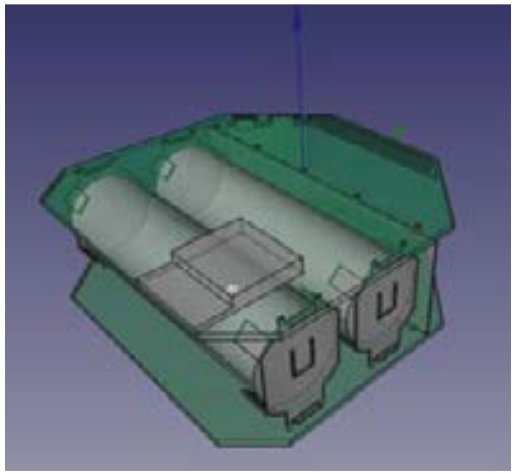
- Our evaluation solutions are scalable depending on your needs

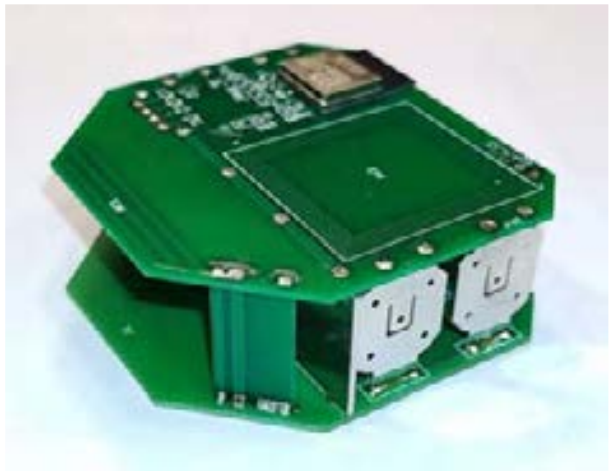
What we do

factoree

Hardware & IoT Development







What we will do

OliTool

factoree

Hardware & IoT Development

Easy-Adaptive and Cost-Effective Robotic Train Fluid Service

(CyberFluids+)

Dr. Mingfeng Wang

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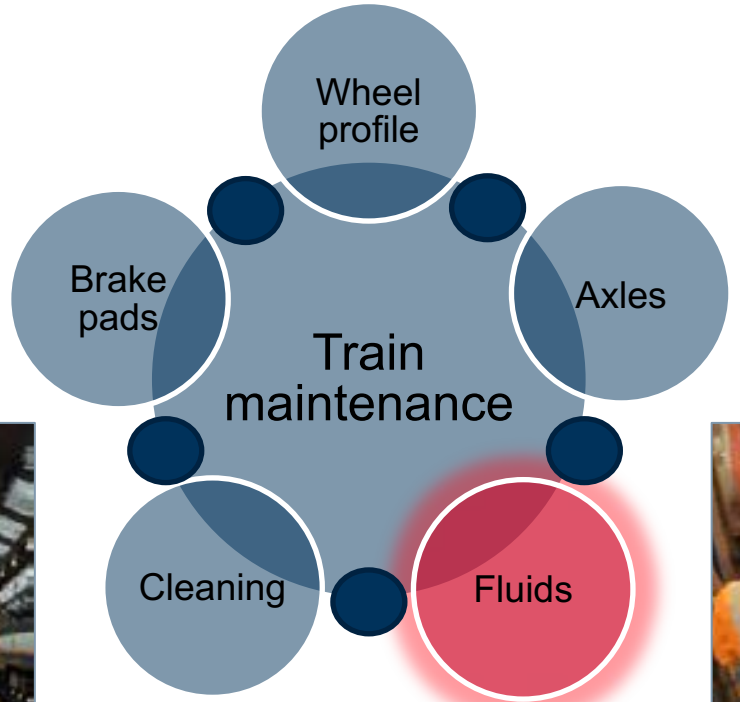
Train Maintenance Challenge



CyberFluids robot at Brunel University London

What's CyberFluids (2019-2021)?

Innovate UK

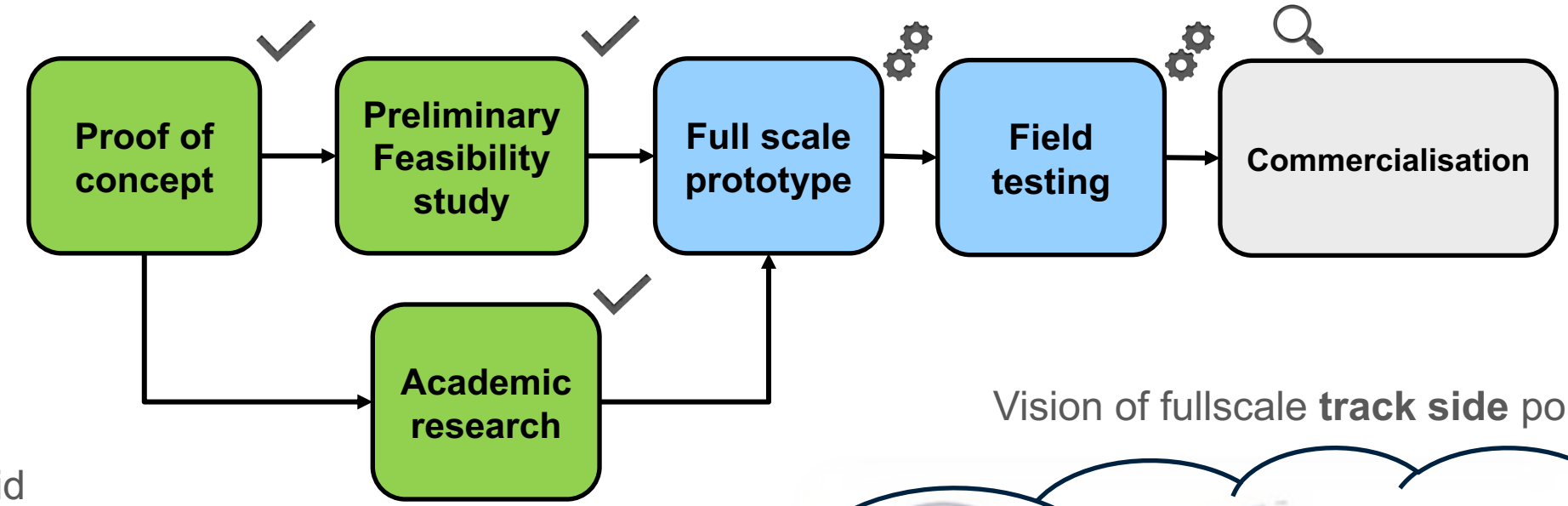
TBG solutions

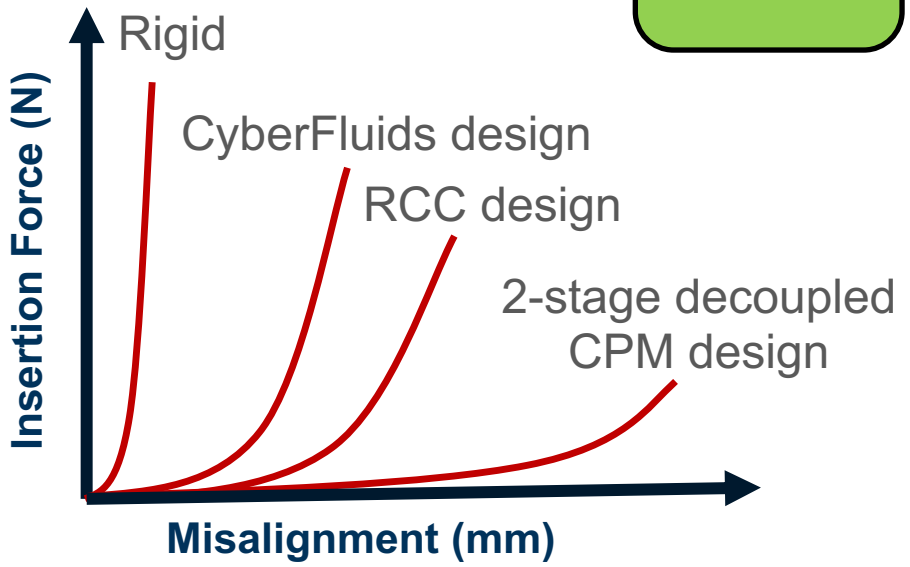
RSSB

Chilternrailways by arriva

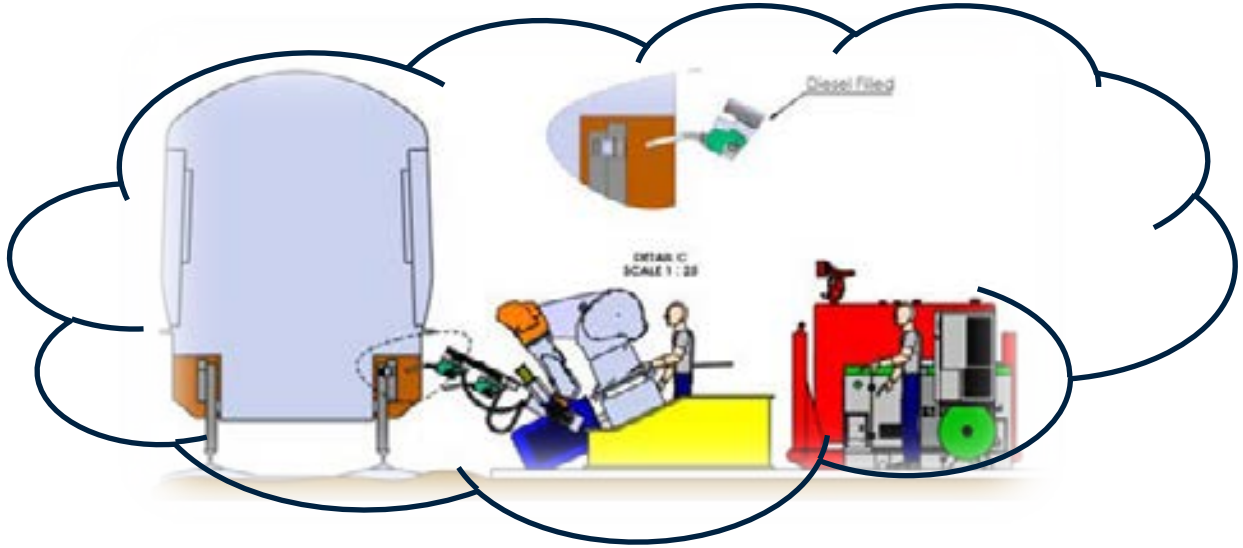
Source: https://www.youtube.com/watch?v=INBbHBc1Phw

Future Plan





Vision of fullscale **track side** porotype



Interactive Machines

Safe, efficient, and smooth train travel.

Date 14.06.2023

The Product: The Virtual Engineer (TVE) is a new innovative product in development

Summary

The innovation: Autonomous Prediction of Railway Line Damage – We will develop an Artificial Intelligence (AI) solution using audio recognition in a diagnostic system for 24/7 monitoring of rail line oscillations. It acts as a Virtual Engineer (TVE) to inform the human engineer of early signs of rail track weakness, potentially leading to complete breakage. There are no restrictions on train movement or speed as the audio sensor will record motion without contacting to the rail.

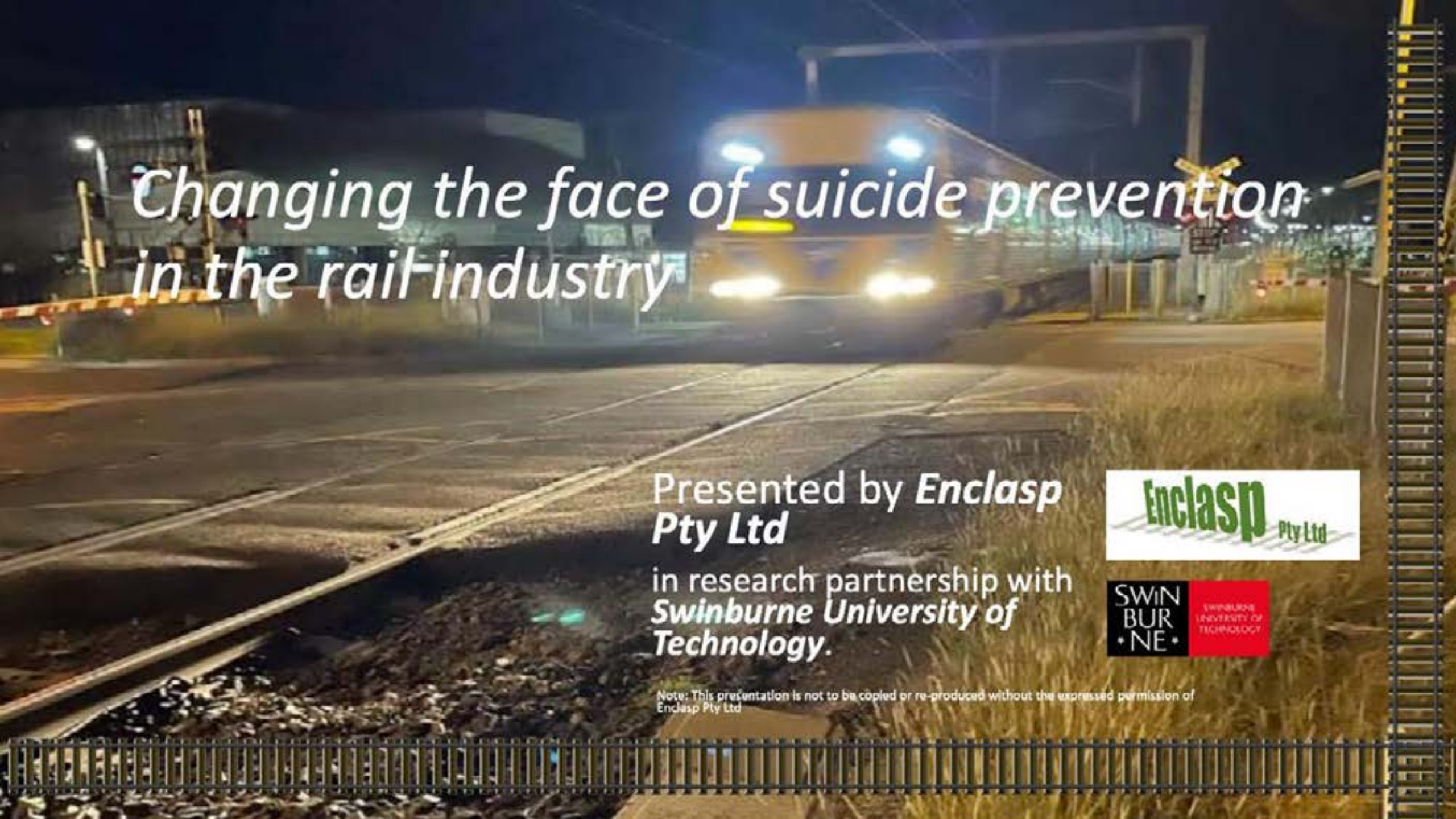
It will supply 'around the clock' safe, efficient, and smooth train travel. It will be housed in a weatherproof package, which will be distributed in pairs along every length of rail.

Home market: It will provide the UK with its own track diagnostics ability. The AI algorithms will reduce data volume by extracting relevant features and then classify the data to compute a ‘rail healthiness’ score, e.g., turning raw data into knowledge.

Initial stage: Our concept initially investigated, with automatic computer data collection and human analysis on a private railway line, under Portsmouth City Council’s 'Outset Start & Grow' funding programme. This manual detection found a dangerous section of rail with a high level of vibration, on the first day of operation.

Next stage: We would like to perform data collection beside a commercial railway line listening to oscillations of lines and identifying frequencies that might mean trouble. The data will be used to test the robustness of AI diagnostics, assigning health scores to railway lines for future exploration.

Photo below: Conventional Railway Line showing retaining clips, sleepers, and ballast.



Changing the face of suicide prevention in the rail industry

Presented by ***Enclasp Pty Ltd***

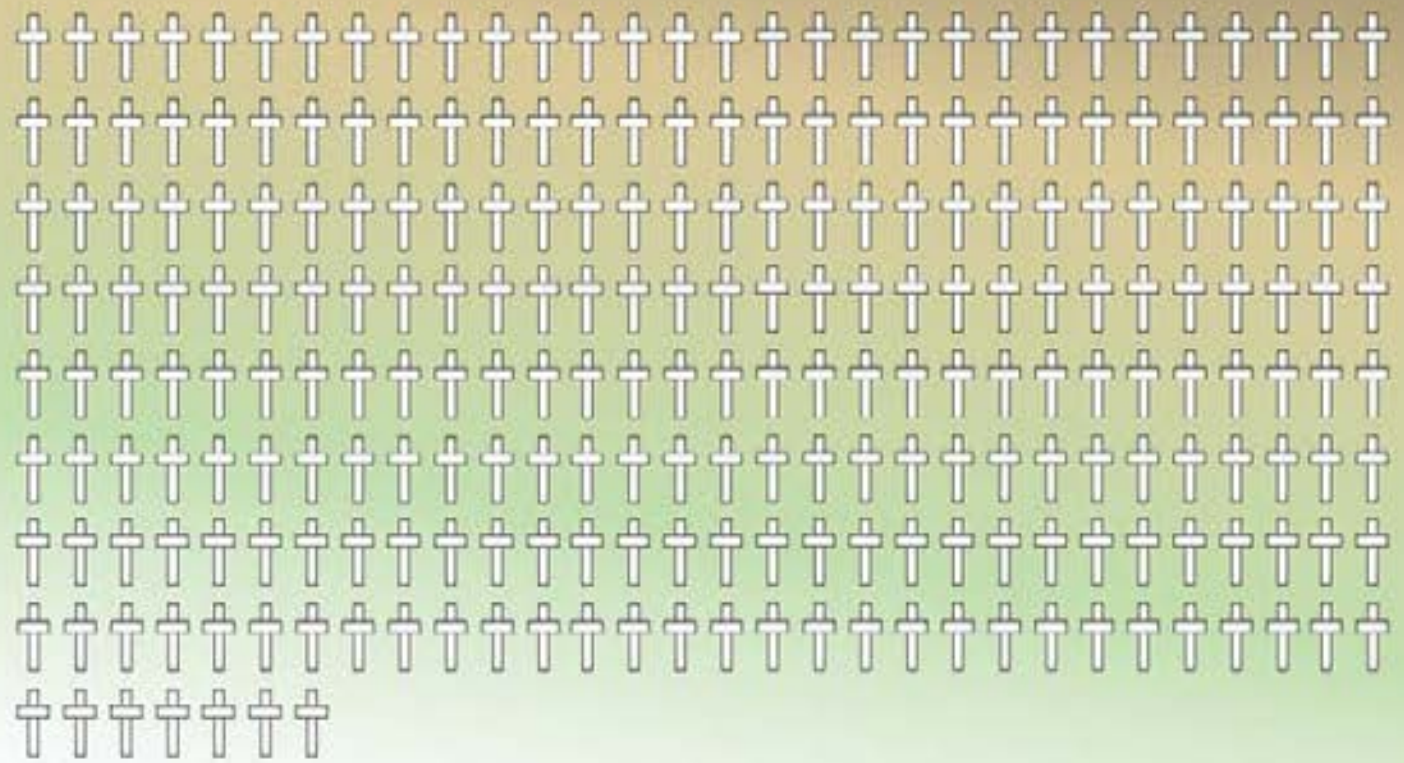
in research partnership with ***Swinburne University of Technology.***

An all too familiar scenario in the rail industry.....

What happens next?

What is an acceptable number of rail fatalities?

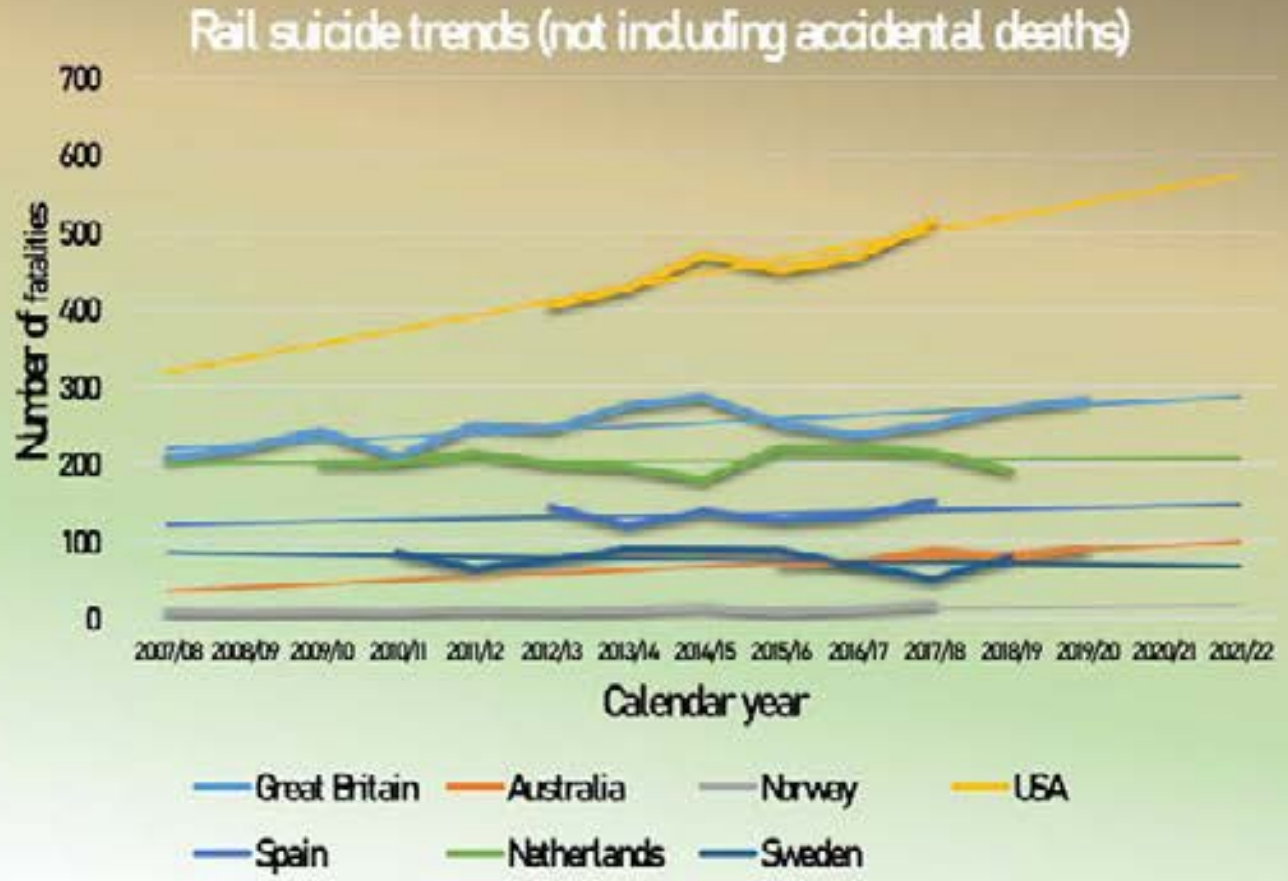
Answer ZERO

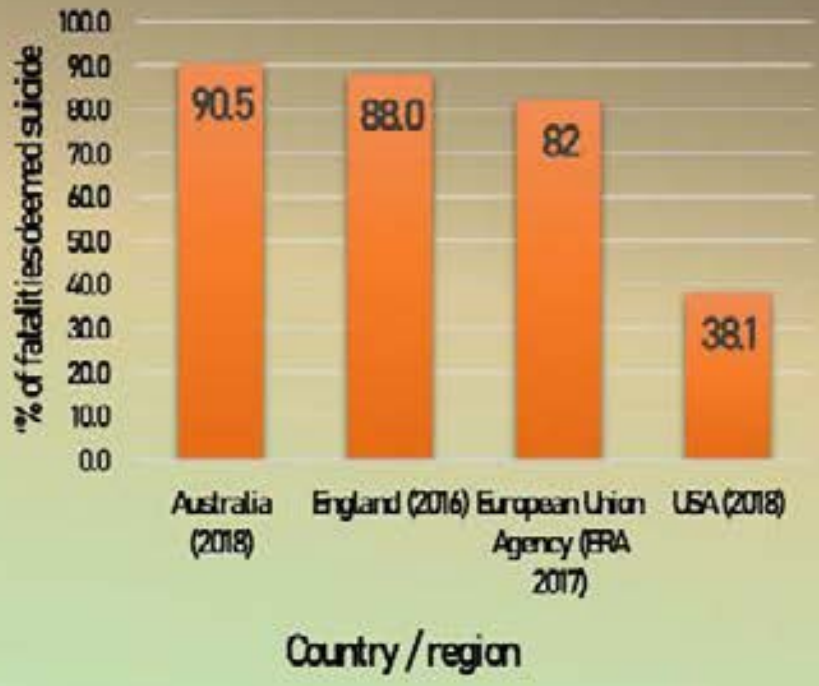


247

people committed suicide on the UK rail network in 2020-2021

Suicide trends





How can the rail industry protect their open network from those looking to self harm?

Standard impact positions (no abatement system)

New technology development

Enclasp in research partnership with Swinburne University of technology have developed a new impact abatement system for the rail industry, that not only absorbs front on impacts with the train, but captures the incumbent bringing them safely to a stop. The device has the potential to save thousands of lives each year.

Projected reduction in injury severity based on simulated results

AIS Code	Description
1	Minor
2	Moderate
3	Serious
4	Severe
5	Critical
6	Maximal

Abbreviated injury scale (AIS), blunt force trauma severity levels

C1	Facing away from train 80km/h			Walking 80km/hr		
	Predicted injury severity and average number of injuries (no absorption)	Predicted number of injuries with C1	Variance (reduction)	Predicted injury severity and average number of injuries (no absorption)	Predicted number of injuries with C1	Variance (reduction)
Head	AIS3+ 2.28 AIS4+ 1.384 AIS5+ 0.696	AIS3+ 1.219, AIS4+ 0.661 AIS5+ 0.17	46.54% 52.24% 75.57%	AIS3+ 2.28 AIS4+ 1.384 AIS5+ 0.696	AIS3+ 1.219, AIS4+ 0.661 AIS5+ 0.17	46.54% 52.24% 75.57%
Chest	AIS3+ 3.16 AIS4+ 1.331 AIS5+ 0.408	AIS3+ 1.635 AIS4+ 0.498 AIS5+ 0.003	48.26% 62.58% 99.26%	AIS3+ 3.16 AIS4+ 1.331 AIS5+ 0.408	AIS3+ 1.77 AIS4+ 0.548 AIS5+ 0.0132	43.99% 58.83% 96.76%
Abdomen	AIS3+ 1.016 AIS4+ 0.72 AIS5+ 0.36	AIS3+ 0.391 AIS4+ 0.196 AIS5+ 0.03	61.52% 72.78% 91.67%	AIS3+ 1.016 AIS4+ 0.72 AIS5+ 0.36	AIS3+ 0.391 AIS4+ 0.196 AIS5+ 0.03	61.52% 72.78% 91.67%

C1	Facing away from train 120km/h			Walking 120km/hr		
	Predicted injury severity and average number of injuries (no absorption)	Predicted number of injuries with C1	Variance (reduction)	Predicted injury severity and average number of injuries (no absorption)	Predicted number of injuries with C1	Variance (reduction)
Head	AIS3+ 2.46 AIS4+ 1.74 AIS5+ 1.38 AIS6 0.912	AIS3+ 1.700 AIS4+ 0.954 AIS5+ 0.320 AIS6 0.024	30.89% 45.17% 76.81% 97.37%	AIS3+ 2.46 AIS4+ 1.74 AIS5+ 1.38 AIS6 0.912	AIS3+ 1.700 AIS4+ 0.954 AIS5+ 0.320 AIS6 0.024	30.89% 45.17% 76.81% 97.37%
Chest	AIS3+ 3.3 AIS4+ 2.00 AIS5+ 1.092 AIS6 0.576	AIS3+ 2.585 AIS4+ 0.914 AIS5+ 0.143 AIS6 0.085	21.67% 54.30% 86.90% 85.24%	AIS3+ 3.3 AIS4+ 2.00 AIS5+ 1.092 AIS6 0.576	AIS3+ 2.554 AIS4+ 0.898 AIS5+ 0.135 AIS6 0.081	22.60% 55.10% 87.64% 85.94%
Abdomen	AIS3+ 1.572 AIS4+ 1.368 AIS5+ 0.876 AIS6 0.48	AIS3+ 0.724 AIS4+ 0.445 AIS5+ 0.172 AIS6 0.016	53.94% 67.47% 80.37% 96.67%	AIS3+ 1.572 AIS4+ 1.368 AIS5+ 0.876 AIS6 0.48	AIS3+ 0.62 AIS4+ 0.36 AIS5+ 0.12 AIS6 0.0	60.56% 73.68% 86.30% 99.9%

To find out more about this technology contact Enclasp

Enclasp Pty Ltd

Website: www.enclasp.com.au

Email: pallen@enclasp.com.au

Qsustain

Specialist Consultants to the Built Environment

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- Engineering
- ICT & Smart Stations
- Technical Studies
- Project Management
- Sustainability
- Low Carbon Technology
- Air Quality

RAIL PARTNERSHIP AWARDS Highly commended 2018

CELEBRATING CONSTRUCTION 2016 WINNER

INTEGRATED MANAGEMENT SYSTEM ISO ISO ISO

BREEAM ACCREDITED PROFESSIONAL

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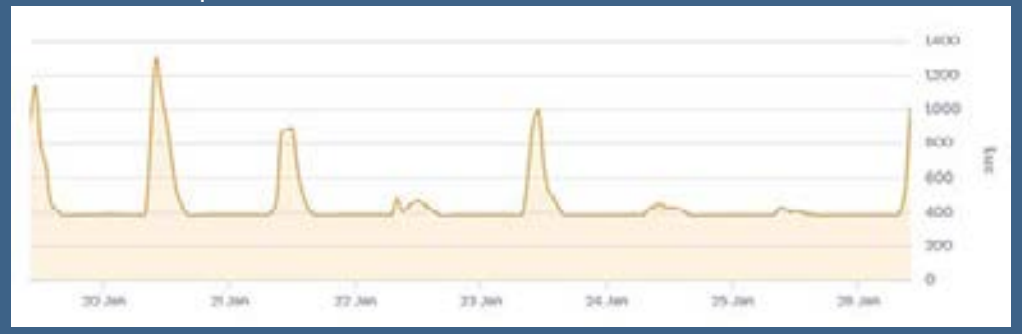
Theme 2: Reliable and Maintainable Assets

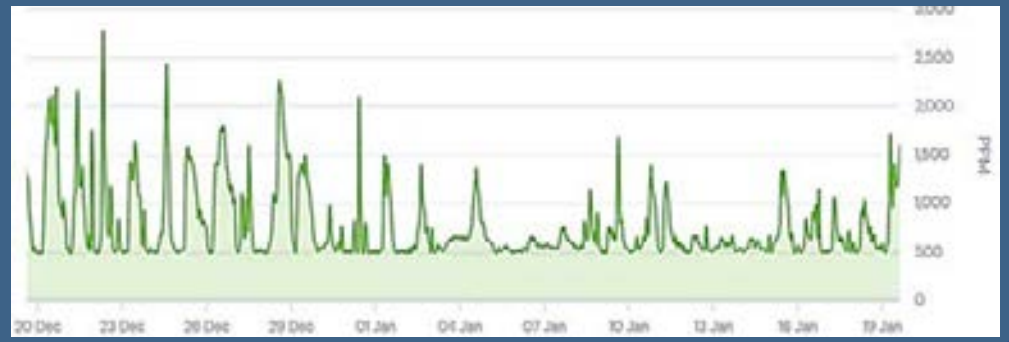
Buxton Train Station

- Smart remote monitored sub-metering identified the lighting in ticket office left ON 24/7.
- Identified lighting high lighti levels above standard in places leading in inefficiencies.
- Identify energy hot spots to reduce energy consumption.



Wilmslow Station

- Platform 4 Waiting Room identified levels of CO2 & NOx correlate with diesel engines
- Results indicate ventilation system in this vicinity (waiting rooms) should be reviewed and potentially improved,
- Can create Health & Wellbeing score from the system for areas like ticket office and waiting rooms.



Case study

To monitor station energy, well-being, temperature, lighting, noise and air quality, a unique set of smart non intrusive sensors have been installed at 4 stations – **Buxton, Wilmslow, Hazel Grove, and Deansgate.** The pioneering technology provides analysis on a user-friendly platform accessible remotely, giving insights on how to better maintain the assets and reduce energy costs and carbon.

Q Connect.

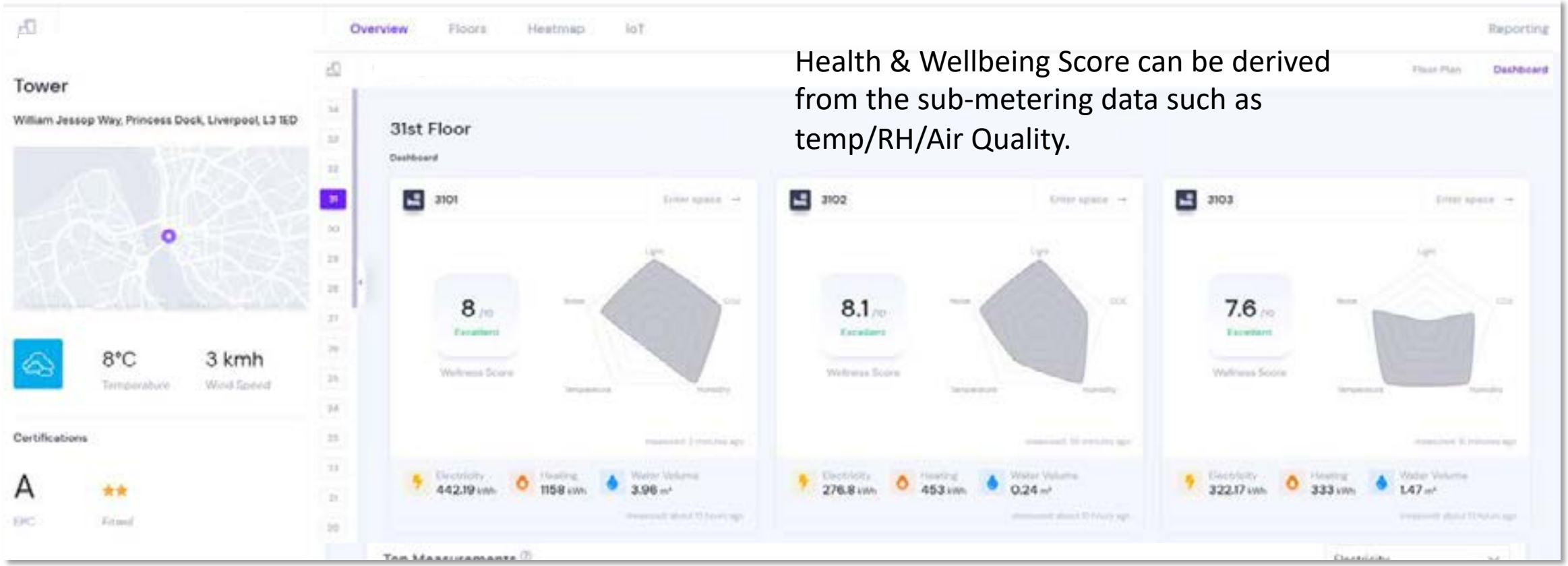
Utopi Multisensor

Utility Meters

People Counting Cameras

LoRa Gateway

Qsustain



Health & Wellbeing Score can be derived from the sub-metering data such as temp/RH/Air Quality.

CAPTURING WHOLE LIFE CARBON

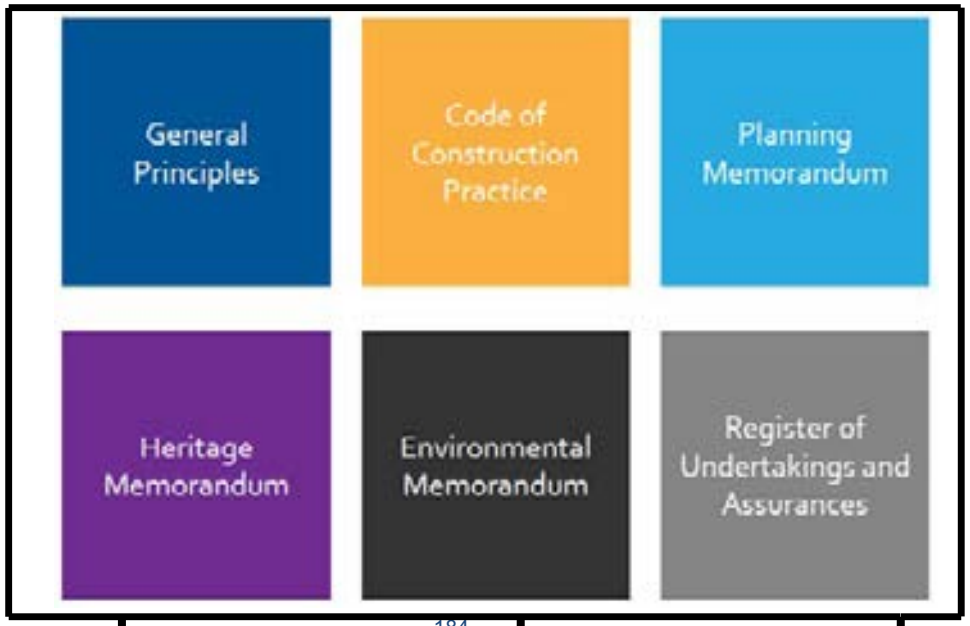
Many construction sites today are crudely using vast spreadsheets to capture and monitor carbon data

Embodied carbon from the construction and refurbishment of buildings makes up **20% of UK built environment emissions**. The embodied carbon footprint of projects remains far from being mainstream practice.

Objective: Provide all data using our portal to comply with the EMRs, to comply with requirements in the High Speed Rail (London - West Midlands) Act and the Undertakings given by the Secretary of State

Qsustain

HS2 Environmental Minimum Requirements (EMRs)
Data required more than past schemes to track Performance



Network Rail will be a named HS2 contractor

The Nominated Undertaker and its contractors will be contractually bound to comply with the controls set out in the EMRs

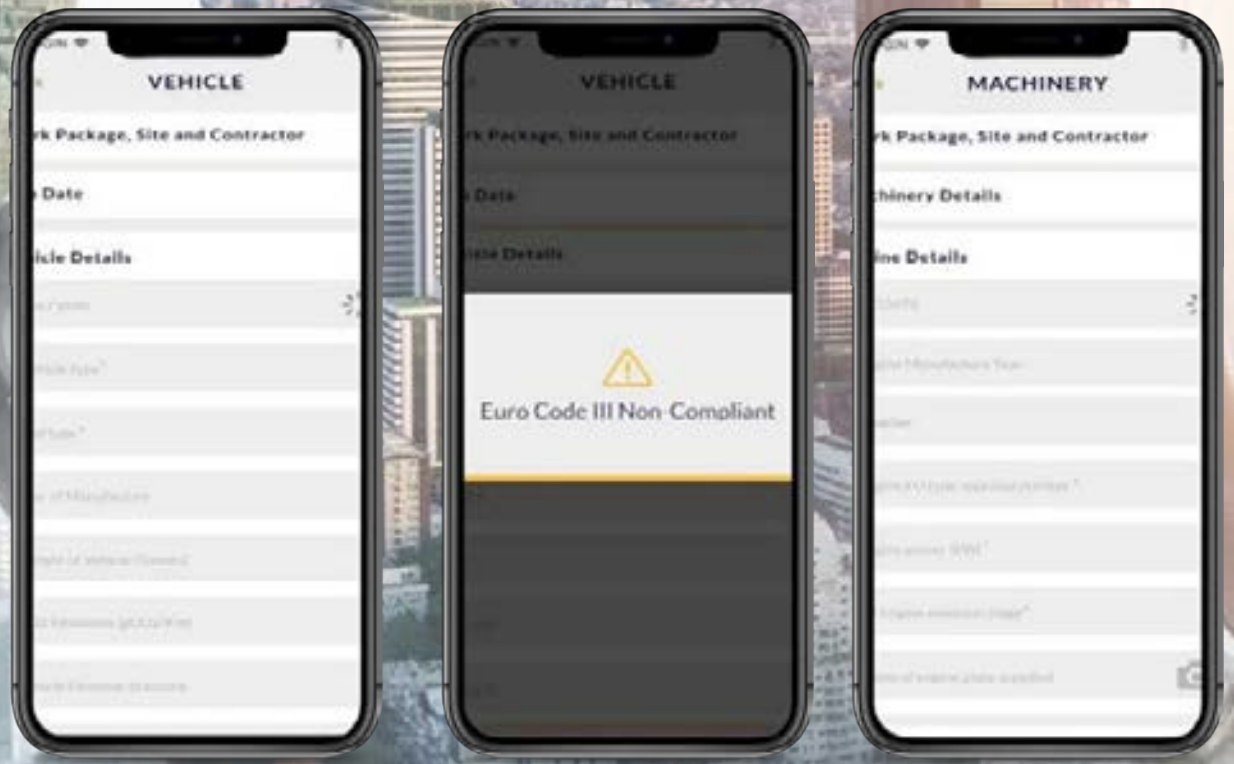
The controls contained in the EMRs, will ensure that impacts which have been assessed in the ES will not be exceeded

The NU will use reasonable endeavours to adopt mitigation measures to further reduce any adverse impacts.

This needs agreement between Network Rail and HS2

INTRODUCING

Q CARBON TRACE APP



- **Vehicle emission standards – very latest Euro Standards and increased reporting required. Details of vehicles shall be required to submit to HS2.**
- **Engine emission stage requirements for Non-Road Mobile Machinery (NRMM) of engine power between 37kW and 560kW.**
- **Assist Traffic Management**
- **Auto Vehicle Booking and ID system**
- **Capture carbon content for all;**
  - **Materials arriving to site**
  - **Waste leaving**
  - **Vehicle journeys**

Wrap up

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On behalf of the Department for Transport

Rail Innovation Exhibition 2023

National Conference Centre,
Coventry Road, Solihull, B92 0EJ

18 October | 10:00-17:00

UKRI Innovate UK

Department for Transport

Thank you for attending

SBRI Competition Rail Demonstration: First of a Kind 2023

14 June 2023

Department for Transport

HS2

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