First of a Kind (FOAK) 2025 competition winners (DfT)

FOAK 2025 – AI for Complex Processes

Application Number	Project Title	Lead	Project Cost
10162372	AERIAL - AI Enabled Reporting for Inputs to Electrification Analysis Lifecycle	FURRER + FREY GB LIMITED	£194,485

Public synopsis

AERIAL (AI-Enabled Reporting for Inputs to Electrification Analysis Lifecycle) uses advanced satellite imagery and AI to automate the detection of railway features, significantly improving planning accuracy, reducing costs, and speeding up railway electrification projects, thereby supporting the UK's transition to sustainable, carbon-free transport.

Public description

AERIAL -- turning satellite pixels into cleaner, quicker rail electrification

Rail is already the UK's greenest mass-transport mode, yet over half the network still runs on diesel. Fitting overhead electric wires to thousands of kilometres of existing track is the single biggest lever for reducing railway carbon emissions, but hidden obstacles, costs, and long delays have plagued past projects. A root cause is simple: before engineers can design a solution, they must know, in detail, what is already on-site---but today that information sits in decades-old drawings and scattered databases that take months to piece together.

The **AERIAL** (AI-Enabled Reporting for Inputs to Electrification Analysis Lifecycle) project removes this bottleneck. Using AI for complex processes, to optimise decision making and improve efficiency. Using Airbus's new Pleiades Neo satellites---capable of seeing the ground in fine detail ---the Furrer+Frey team applies advanced artificial-intelligence models to spot every structure that matters to electrification: bridges, tunnels, platforms, culverts, power-line crossings and more. What once required slow, expensive trackside surveys is delivered instead as a desktop data feed produced in days.

Those data stream straight into E-BOT, Furrer+Frey's award-winning design-optimisation engine. E-BOT can test thousands of wire heights and mast spacing options in hours, comparing cost, carbon and programme for each scenario. With AERIAL supplying a ready-made, high-confidence asset inventory, E-BOT's recommendations become faster and more reliable, allowing Network Rail and other owners to choose the best solution.

Why it matters

* **Lower costs, fewer surprises** -- Early trials indicate costs fall by up to 40% and late-stage design changes by up to a quarter.
* **Faster delivery** -- Automated surveys reduce the time required for each route by several months, helping to bring zero-emission trains into service sooner.
* **Greener construction** -- Replacing survey vehicles with satellites eliminates almost all CO_2 emissions associated with the survey phase.
* **Scalable export potential** -- The cloud-based workflow can be applied to railways worldwide, creating new high-tech export opportunities for the UK.

Who is involved

* **Furrer+Frey GB** -- International leader in rail-electrification engineering and creator of E-BOT.
* **Airbus Defence and Space** -- Provider of the world's highest-resolution commercial satellite imagery and AI land-cover analytics.
* **Network Rail (stakeholder)** -- Supplying ground truth and paving the way for nationwide adoption.

By fusing aerospace-grade imagery, cutting-edge AI and proven engineering tools, AERIAL will accelerate the UK's journey to a net-zero railway--delivering cleaner travel, skilled jobs and better value for taxpayers in one elegant digital leap.

Application Number	Project Title	Lead	Project Cost
10165286	SiteFlow: AI-Powered Access and Workflow Intelligence for Supplier Assurance	ROBOK LIMITED	£103,399

Public synopsis

SiteFlow is an AI-powered platform that monitors supplier access and vehicle flow at rail construction sites. It transforms CCTV footage into structured insights and trend summaries - enabling site managers to reduce delays, improve planning, and support contract assurance across complex, multi-stakeholder environments.

Public description

SiteFlow is a new AI-based insight platform designed to help rail construction teams manage supplier access and improve site operations. Large rail infrastructure projects - such as HS2 - require coordinated entry and oversight of dozens of external contractors, utilities, and delivery partners. SiteFlow turns standard CCTV into an intelligent tool that tracks how these suppliers move through construction sites, providing reliable information about access times, vehicle flow, and logistics processes.

Many suppliers are not booked through standard systems, yet need 24/7 access. Without structured visibility, delays at gates and bottlenecks in internal movement often lead to disputes, inefficiencies, or safety concerns. SiteFlow uses portable cameras and AI to automatically measure key metrics: how long a vehicle waits at the gate, how quickly it moves through check-in and escorting, and how frequently delays or conflicts occur at specific zones.

The platform does not intervene in real time or require any new infrastructure. Instead, it provides dashboards and summaries that give site managers an objective view of what's happening, when, and where. This supports faster planning, better resourcing, and improved contractor relationships.

In the future, the same approach could support other high-complexity rail environments such as depots, intermodal terminals, or national test centres like GCRE. By giving decision-makers structured insight into how sites are operating, SiteFlow helps to reduce risk, increase transparency, and improve the way rail construction and operations are delivered.

Application Number	Project Title	Lead	Project Cost
10162361	IntelliPan Network	JR DYNAMICS LIMITED	£199,662.

Public synopsis

The IntelliPan Network(r) project will demonstrate and evaluate an AI-powered system that prevents overhead line dewirements by enabling trains to detect faults and respond automatically to ensure trains pass safety through affected locations. It aims to reduce delays, damage, and repair costs while improving safety and eliminating dangerous, service-disrupting dewirements.

Public description

The IntelliPan Network(r) project aims to significantly improve the reliability and efficiency of the UK's electrified railway system by reducing the risk of overhead line failures leading to expensive and disruptive dewirements. These incidents cause major delays, high repair costs, and widespread disruption to passengers and freight services.

The project will deliver, demonstrate and evaluate the IntelliPan Network(r) solution. In collaboration with UK rail integration partners, the project will be led by Transmission Dynamics, a multi-award winning UK-based rail technology innovator. This project will finalise and demonstrate a new AI-powered system that uses advanced sensors and machine learning to monitor and respond to emerging problems on the railway in real time.

By linking multiple trains equipped with a state-of-the-art pantograph monitoring system (PANDAS-V(r)), the IntelliPan Network(r) will detect early signs of critical faults that may cause a dewirement and automatically coordinate a safe, fault avoidance protocol to eliminate the risk.

Application Number	Project Title	Lead	Project Cost
10162462	AI-Powered Contingency Plan Intelligence for Rail Operations	TRACKBASE LTD	£125,584.

Public synopsis

This project uses AI to help GB rail operations respond faster to major service disruptions. By automating complex decision-making and improving recovery, it reduces delays, supports better passenger and freight experiences, and encourages greater rail usage, helping to shift traffic from roads and cut transport-related emissions.

Public description

Public Description

This project will develop an AI-powered platform to improve how the GB rail industry responds to service disruption. When incidents such as signal failures or infrastructure issues occur, control room teams must act quickly to implement contingency plans that reduce delays and minimise impact on passengers and freight customers. Currently, this process is manual, inconsistent, and reliant on static documents, leading to inefficiencies and slow recovery.

Our solution will transform this process using artificial intelligence and automation. It will enable real-time selection of the most appropriate contingency plan based on live conditions, automate parts of the implementation process, and evaluate the success of interventions to support continuous learning and improvement. The system will also convert existing long-form contingency plans into a structured, digital format, making them easier to maintain and apply.

By reducing delays and improving consistency in incident response, the platform will help make rail a more attractive and reliable mode of transport. The project will initially focus on deployment within Network Rail's West Coast Route's ops teams, with wider applicability across the national network. It directly addresses the challenge of applying AI to complex rail industry processes, supporting better decision-making, reducing operational waste, and enhancing performance.

This innovation aligns with UK ambitions for a smarter, greener, and more efficient railway system.

Application Number	Project Title	Lead	Project Cost
10160902	CENELEC Lifecycle Artificial Intelligence Manager (CLAIM)	DIGITAL TRANSIT LIMITED	£87,289.

Public synopsis

The CENELEC Lifecycle Artificial Intelligence Manager (CLAIM) project will develop an AI tool to improve assurance and efficiency of large projects within the UK rail industry. It facilitates EN50126 compliance by identifying risks early to help deliver complex railway projects reliably, on time, and with efficient project handover.

Public description

Pioneering AI for Safer and More Efficient UK Rail Projects: Introducing CLAIM

Digital Transit Ltd, with key support from the University of Huddersfield and Network Rail as an integration partner, is developing the CENELEC Lifecycle Artificial Intelligence Manager (CLAIM) through the DfT's First of a Kind (FOAK) Programme. Project CLAIM is a pioneering AI-driven software tool designed to significantly enhance the quality and efficiency of complex UK railway projects.

Railway systems are governed by rigorous engineering and standards like EN50126, which define critical lifecycle processes. Verifying project compliance with these standards across many documents (including requirements, risk assessments, and designs) is traditionally time-consuming, labour-intensive, and prone to subjective interpretation or oversight. This poses challenges to project schedules, budgets, and overall assurance.

CLAIM applies advanced Artificial Intelligence to this complex process. It helps automate the assessment of project artefacts against the formal expectations of EN50126, particularly focusing on the crucial early lifecycle phases (1-4). For instance, the system is designed to identify potential gaps in documentation or compliance evidence, detect inconsistencies between different project models and specifications, provide early warnings if a project might be diverging from best practice or standard requirements, and generate clear, actionable feedback for project managers and assurance teams.

By providing these capabilities, CLAIM aims to improve the thoroughness and consistency of compliance checking, reduce the risk of late-stage errors and costly rework, and ultimately increase confidence in the integrity of new railway systems, such as those being delivered for the UK's Digital Railway programme and ERTMS rollout.

A key part of this project will be a live demonstration of the CLAIM prototype. Hosted at the University of Huddersfield's Rail Research Innovation Centre, this event will showcase CLAIM processing representative Digital Railway artefacts, allowing stakeholders from across the UK rail industry to witness its capabilities and benefits firsthand.

Project CLAIM directly supports the FOAK programme's goal of accelerating innovation to improve UK railways. By demonstrating how advanced AI can be applied to complex assurance processes, it aims to help reduce costs, increase efficiency, and support the safe and timely deployment of new rail technologies.

FOAK 2025 – Platform Train Interface

Application Number	Project Title	Lead	Project Cost
10163010	Utilising novel AI technology at the platform train interface to reduce dwell times and improve performance for Scotland's Railway	HACK PARTNERS LIMITED	£129,712

Public synopsis

Trialling a smart platform dispersion system with ScotRail and Network Rail to cut delays and improve accessibility. The system detects crowding at doors and prompts passengers to spread out, helping everyone board faster, improving punctuality and enhancing the overall customer experience.

Public description

We are collaborating with ScotRail and Scotland's Railway to trial an innovative real-time platform camera system designed to reduce passenger delays caused by uneven boarding. The project addresses a key contributor to subthreshold delays---longer station dwell times driven by passengers crowding around a limited number of train doors. Our solution uses platform-mounted cameras and AI-powered computer vision to detect passenger clusters in real time. When congestion is identified, the system triggers tailored on-platform screen messages and audio announcements that encourage passengers to spread along the platform and board more evenly. By nudging passenger behaviour dynamically, the system helps reduce boarding time and improve overall train punctuality. This will be the first trial of such a solution in Scotland's rail network and post this project offers a scalable approach to reducing delays, improving passenger experience, and increasing operational efficiency across the wider UK railway.

Application Number	Project Title	Lead	Project Cost
10164535	AlightHear	TRANSPORT DIRECTION LTD	£196,519

Public synopsis

AlightHear is a smart, sensory guidance system trialing at Ryde Pier to improve safety and wayfinding through dynamic lighting and directional sound. Designed for transport hubs and interchange environments, it improves safety at the platform edge, enhances passenger experience and creates a more intuitive journey in multimodal and unfamiliar settings.

Public description

AlightHear is an innovative passenger messaging system designed to enhance safety, wayfinding and the overall travel experience in rail and multimodal transport environments. The system uses a combination of projected lighting and directional sound to deliver timely, location-specific messages that guide passengers more effectively than traditional signage or audio announcements.

This trial will see AlightHear deployed at Ryde Pier Head station on the Isle of Wight, with a focus on the platform-train interface for safety and connection between the train and ferry. Through dynamic lighting cues and targeted sound prompts, passengers will receive clear guidance on where and how to board safely, how to transfer between modes of transport and how to navigate the station with greater confidence.

The Ryde Pier Head site offers a unique opportunity to trial the system in a real-world but low-risk environment. With a disused platform available for testing and a naturally self-contained station footprint, the location allows for installation, observation and iteration without interrupting operational services. As a key transition point between rail and ferry travel, it also presents the ideal conditions to test AlightHear's ability to reduce transfer anxiety and improve passenger flow.

Developed through ethnographic research into creating stations of the future, AlightHear is consciously designed to update heritage and constrained sites, offering a lightweight and reversible solution that enhances communication without cluttering the visual environment.

The trial aims to evaluate both the technological performance of AlightHear in a live station context and its impact on passenger behaviour, safety and satisfaction. If successful, the system could be expanded to operational platforms and adapted for use across other transport hubs in the UK.

In partnership with South Western Railway and with consideration of Wightlink's ferry operations, this project aligns with broader goals of creating more inclusive, intuitive and human-centred public transport spaces. By helping passengers navigate with greater ease and reducing the stress of travel, AlightHear aims to show how even small, smart interventions can make a big difference in how people experience everyday journeys.

Application Number	Project Title	Lead	Project Cost
10164064	Mind the Gap+: True Step-Free Access at the Point of Boarding	MOONBILITY LTD	£199,743

Public synopsis

Mind the Gap+ uses AI to show passengers exactly where level or step-free train boarding is possible. Partnering with Avanti West Coast and Northern, the project delivers real-time coach-level access data, helping disabled and pram users board confidently, while supporting staff with clear, actionable information.

Public description

Mind the Gap+: True Step-Free Access at the Point of Boarding is a groundbreaking accessibility innovation that tackles one of the most persistent challenges in UK rail: the uncertainty of boarding for passengers with reduced mobility.

Led by Moonbility, in collaboration with Avanti West Coast and Northern, this project introduces a first-of-its-kind real-time Platform Train Interface (PTI) mapping system. Using a powerful AI engine, the system identifies which train coaches offer the easiest, safest boarding experience---surfacing live information on vertical and horizontal gaps, door widths, and accessible coach positions. This turns vague "step-free" claims into precise, coach-level guidance.

Passengers will be able to see exactly where to board before their journey begins. Control room teams and station staff will have real-time tools to respond to accessibility needs as they arise, even for spontaneous travel or unbooked assistance.

The innovation is delivered through:

* A **PTI Matching API** that integrates train and station data to surface step-free access conditions at coach level;
* A **web-based digital twin** allowing operators to visualise and manage PTI variability across the network;
* A **live field trial** across five major stations to validate accuracy and usability.

What makes Mind the Gap+ unique is its ability to work across different train types, station layouts, and infrastructure ownerships---without any physical changes to platforms or trains. It's designed to be low-cost, interoperable, and instantly useful.

This project answers a growing need: more than 2.3 million passengers requested assistance in 2022--23, with many deterred from travel altogether by uncertainty at the point of boarding. Mind the Gap+ empowers confident, independent journeys, reduces staff strain, and strengthens the entire accessibility ecosystem of Britain's railway.

By the end of the project, the system will be trialled in live rail environments and ready for broader rollout---setting the foundation for a future where every passenger knows exactly where and how they can board, with confidence.

Application Number	Project Title	Lead	Project Cost
10163826	YELLOWLINE AI: Real-Time Behavioural Nudging Through Platform Video Feeds	RINICOM LIMITED	£196,521

Public synopsis

YELLOWLINE is an AI-powered safety system that uses station cameras and smart audio messages to encourage passengers to stand behind the yellow line. By detecting risky behaviour and responding with timely, human-like announcements, the project helps improve platform safety and creates a more reassuring travel experience for everyone.

Public description

YELLOWLINE is a first-of-a-kind safety system that helps improve passenger behaviour on rail platforms by combining existing video monitoring with intelligent, real-time audio announcements. The solution encourages passengers to stand safely behind the yellow line while waiting for trains, helping reduce risks of accidents or delays.

Rather than relying on static signs or repetitive safety messages, YELLOWLINE uses AI to analyse live video feeds from station cameras. When it detects passengers standing too close to the platform edge or crowding during busy periods, it automatically triggers a personalised public announcement through the station's existing loudspeaker system. These messages are context-aware --- meaning they change based on the situation --- and are designed to be more effective at influencing behaviour than traditional alerts.

Passengers benefit from YELLOWLINE through clearer, more responsive guidance that makes platforms feel safer and more professionally managed. The announcements are designed to be engaging and human-like, encouraging passengers to take action without feeling alarmed or overwhelmed. By creating a calmer and more compliant environment, YELLOWLINE also reduces pressure on station staff, who would otherwise need to intervene directly.

From the perspective of rail operators and infrastructure owners, YELLOWLINE provides a practical, scalable enhancement to safety operations. It requires no major changes to infrastructure and works with standard CCTV and PA systems already installed in most stations. The system will be deployed as a demonstration in a live station environment as part of this project, allowing for real-world validation of its safety impact and user experience benefits.

Importantly, the system is designed with strong ethical safeguards. It does not identify or track individuals and processes only anonymised video data in real time. The language used in announcements is generated using the latest AI techniques but is always appropriate, safe, and aligned with passenger communication guidelines.

By proactively nudging passengers toward safer behaviours through intelligent audio messaging, YELLOWLINE offers a new model for how AI can be used responsibly in public spaces. The system supports the UK's goals of improving rail safety, reducing operational disruptions, and providing a more inclusive and reassuring experience for all passengers.

Application Number	Project Title	Lead	Project Cost
10163268	KLOS-R: Kinetic Language Operating system for platform safety and access	ANUMA INTELLIGENCE LTD	£198,199

Public synopsis

KLOS-R is an advanced kinetic language operating system using symbolic motion to enhance real-time platform safety and access. Developed by ANUMA Intelligence Ltd, it redefines how humans and systems communicate through movement, enabling safer, faster, and more intelligent interaction in dynamic transport environments

Public description

ANUMA Intelligence Ltd is developing KLOS-R, a gesture-based AI system designed to enhance platform safety, access, and emergency communication through real-time motion recognition. KLOS-R builds on our patent-pending Kinetic Language Operating System (KLOS) to enable passengers, staff, and vulnerable individuals to interact with smart transport environments using intuitive body gestures and motion sequences.

The system uses a motion-to-symbol translation engine to recognize kinetic signals (e.g., arm waves, directional gestures, falls) and trigger appropriate safety responses---such as audio alerts, lighting changes, or emergency override protocols. Unlike camera-only or button-based systems, KLOS-R allows motion interaction even during panic, noise, or accessibility barriers.

KLOS-R will be installed at the edge of train platforms, entrances, and ramps to prevent accidents, aid visually impaired users, and improve accessibility for all. It supports multilingual signage through symbolic output, integrates with station AI or control centers, and offers a human-centric alternative to voice commands in loud or chaotic environments.

We will prototype and test KLOS-R in a transport facility to evaluate response speed, gesture accuracy, and real-time safety interventions. The final product will serve transport operators, platform engineers, and mobility access designers seeking to embed AI with ethical motion design, accessibility, and cross-cultural usability.

Application Number	Project Title	Lead	Project Cost
10166231	Calyo – 3D Sound+AI Platform Safety System	CALYO LIMITED	£174,761

Public synopsis

Calyo is developing a compact safety system that uses sound and artificial intelligence to detect people entering dangerous areas at railway stations. The project will demonstrate how this technology can reduce accidents and delays by improving real-time awareness at the platform edge/end and track zones.

Public description

Calyo is developing a safety system that uses ultrasound and AI to detect when people enter hazardous areas near the platform edge or track. It works in all weather and lighting conditions, without using cameras, and can be installed quickly at staffed or unstaffed stations. The project will trial the technology in a live railway environment, aiming to reduce incidents and improve passenger safety.

Application Number	Project Title	Lead	Project Cost
10163312	Deformable SMA platform train interface	BIOFOUNDRY ENERGY LIMITED	£199,922

Public synopsis

The project includes novel material to build a deformable and low-cost platform train interface. The solution addresses the key challenges with the current system by providing a low-cost, easy-to-handle, and suitable solution for unmanned or remote train stations.

Public description

The project will develop, fabricate, and deploy a highly innovative Platform Train Interface (PTI) technology offers significant benefits to HS2, TfL, and other UK rail operators by enhancing **passenger safety, accessibility, and operational efficiency**. For HS2, which aims to deliver a high-speed, future-ready railway, the proposed PTI solutions like level boarding, smart platform edge doors, and precision alignment are essential to ensuring seamless, safe, and fast boarding---especially at high frequencies and speeds.

For TfL, which serves a highly diverse and densely populated commuter base, PTI technology supports better crowd management, reduced dwell times, and full compliance with accessibility standards like the PRM-TSI and Equality Act 2010\. Across the wider UK rail network, PTI investments contribute to fewer platform accidents, greater independence for disabled passengers, and improved customer satisfaction. Additionally, by enabling integration with automated systems and real-time data monitoring, PTI solutions future-proof rail infrastructure, reduce long-term maintenance costs, and support sustainable growth across both urban and intercity networks.

The proposed technology will enhance the passenger experience by increasing the confidence and comfort, especially for PRM passengers who can travel independently, deliver consistent boarding experience across different train models and station designs, and deliver modern perception that improves public image of transport systems, encouraging public transport usage.

Application Number	Project Title	Lead	Project Cost
10163058	Edge-AI Guardian™: Rapid-fit Intelligent Platform-Train Interface Safety System	FRONTIERMIND AI LTD	£164,625

Public synopsis

Developed by FrontierMind AI, Edge-AI Guardian(tm) makes train boarding safer and faster by projecting coloured signals at the platform edge and automating wheelchair ramps, with a six-month live UK station trial.

Public description

Edge-AI Guardian(tm) is a rapid-fit safety system that uses advanced, on-device artificial intelligence to make the platform--train interface safer and more accessible for every rail passenger. Developed by UK-based FrontierMind AI Ltd, the solution combines a compact vision-processing camera adaptor with a slim LED/laser projector that paints a dynamic boarding zone on the platform edge. When the AI detects an unsafe step, gap or obstruction, the projector instantly switches from green to flashing red, providing an unambiguous warning to passengers and staff.

A secure wireless link can also pre-arm lightweight boarding ramps for wheelchair users, reducing manual handling time and helping trains depart on schedule. All components are IP-rated, 12 V DC and weigh less than two kilograms, allowing a two-person night team to equip a typical station stop-marker in a single shift---without track possessions or civil works.

During a six-month first-of-a-kind (FOAK) programme the technology will be installed at a live UK station, where its impact on dwell time, incident rates and passenger experience will be independently evaluated. The project's goal is to demonstrate at least a 30 % reduction in PTI safety events and a 15-second average saving on assisted-boarding dwell time, paving the way for nationwide adoption.

FOAK 2025 – Personal Safety

Application Number	Project Title	Lead	Project Cost
10163257	RAISE: Realistic AI Simulations for Employee personal safety	SIXTY LEARN LTD	£117,997

Public synopsis

This project pioneers AI-powered safety training for rail staff, blending lifelike simulations with TikTok-style microlearning - accessed via mobile. Staff practice handling real-world personal safety crises with instant, personalised feedback. Our trial will showcase a bold, scalable innovation set to transform frontline safety and boost confidence across the rail industry.

Public description

This project will develop an AI-powered personal safety training platform to help frontline rail staff handle difficult and potentially dangerous situations more confidently. Staff will be able to practice dealing with scenarios like verbal abuse, mental health crises, and conflict resolution through interactive, lifelike simulations on their phones or computers - with no app downloads required. The system gives immediate, personalised feedback to help staff improve their responses and stay safe.

Alongside these simulations, the platform delivers short 'TikTok style' microlearning modules to reinforce key skills and support staff wellbeing, including after an incident. The tool will also help rail operators better understand how confident staff feel, where support is needed, and what training is making the biggest difference.

The project includes a live trial with rail staff across the Central Route, and a demonstration event at Birmingham New Street Station. The aim is to give the rail industry a scalable, affordable, and modern training solution that keeps staff and passengers safe.

Application Number	Project Title	Lead	Project Cost
10164831	WATCH (Wide area Aerial Tracking for Crowd and Hazard Detection)	SKYBOUND INNOVATIONS LTD	£199,253

Public synopsis

WATCH (Wide-Area Tracking for Crowd and Hazard detection) will trial automated drone technology at Cardiff Central Station to improve rail safety and explores how drones with AI can integrate to detect trespassers, track obstructions, and monitor passenger flow, helping rail personnel respond quickly to incidents and improve public safety.

Public description

WATCH (Wide area Aerial Tracking for Crowd and Hazard Detection) is a safety-focused trial to explore how drones and artificial intelligence can help make railway stations safer for passengers and staff.

The project will install and test an Automated Drone Station (ADS) at Cardiff Central Station, where an autonomous drone will carry out regular short flights over the station environment. These flights are designed to monitor areas that are difficult to cover with fixed CCTV or where it is important to quickly detect changes. The drone will capture live video footage, which will be processed using advanced computer vision models.

The aim of the project is to test three main safety applications:

1. Trespass detection -- identifying people who may have entered areas they should not be in, such as near the tracks.
2. Track obstruction detection -- spotting objects or individuals on or near the track that could pose a hazard.
3. Crowd movement analysis -- understanding how people move through the station to support emergency planning and improve passenger flow.

The systems will be operated remotely by Skybound Rescuer, a UK-based robotics company. Network Rail Wales & Borders will support the trial by providing access to Cardiff Central Station and offering operational feedback on the technical and operational performance in a live railway environment.

Application Number	Project Title	Lead	Project Cost
10166131	Falcon Outpost – Autonomous, rapidly deployable drone-in-a-box for public safety overwatch across the rail network	British Transport Police	£199,819

Public synopsis

Falcon Outpost provides a rapidly deployable drone-in-a-box capability to support public safety on the railway. Operated remotely, it enables BTP to respond swiftly to planned events or incidents with enhanced situational awareness, supporting their mission to protect the rail community through targeted, intelligence-led deployments without requiring permanent infrastructure.

Public description

The Falcon Outpost proposal seeks to rapidly deployable 'Drone In a Box' solution for public safety at fixed sites seeks to build upon the success of the 'Drone In a Box' technology currently being rolled out to target disruption across the railway, by configuring the technology to be deployable by vehicle -- the box or vehicle can be left at a secure location and the drone flown from the BTP Drone Flight Operations Room. This will enable the BTP to better manage public safety using the very latest drone technology flown Beyond Visual line Of Sight (BVLOS), using established processes to connect to the Force Communications Room and other key decision makers. The force currently has a substantial drone capability, deployable from vehicles largely in response to incidents. Working with railway partners, the 'Drone In a Box' capability is located at key disruption hotspots across the railway network.

BTP has procured the very latest DJI Dock 3 technology, which is now marketed as being a mobile solution. It is this capability we seek to unlock through FOAK funding to meet public safety challenges across the railway, whether as a result of pre-planned events (music or sporting events for example, where crowds are an issue), or as a result of intelligence/reporting that highlights a specific public safety issue, such as anti-social behaviour, where there is no CCTV coverage. Drones can be used to provide situational awareness to assist decision makers, but also to identify suspects and gather evidence to assist with a prosecution.

The proposal is for a DJI Dock 3, vehicle/trailer and technology needed to mitigate any air/ground risks. The proposal also uses experts to configure the technology and ensure its safe operation. For all of these elements, there is an existing route to market.

Subject matter experts (Falcon Advisory Board) were previously contracted to BTP to develop BVLOS and DIAB and would provide a technical service to develop the solution. They would build on and develop our risk modelling which would be incorporated into operations.

BTP works in partnership with Network Rail and the rail industry to target disruption, working closely as part of the wider Falcon Programme. On completion of contract with BTP, FAB have been funded by Network Rail to work on joint drone operations, which is currently in progress and ties the two organisations together to ensure the Falcon Outpost proposal is both effective and necessary.

Application Number	Project Title	Lead	Project Cost
10165532	Improving personal safety on the railway with an integrated and real-time platform-end trespass detection and rapid response system	HACK PARTNERS LIMITED	£130,460

Public synopsis

Trialling an automated safety system with TfL that uses AI and drones to prevent platform-end trespass. The system detects people approaching restricted areas, issues live warnings, and deploys a drone to track those who enter unsafe zones---helping reduce harm, improve response and keep the railway running safely.

Public description

CrossTech (a trading name of Hack Partners Limited), in collaboration with Transport for London (TfL), is trialling an innovative safety system to reduce platform-end trespass and improve incident response on the railway. The project will be tested at TfL's Cockfosters Depot and focuses on individuals who approach or attempt to cross restricted platform boundaries---whether due to distress, intent to trespass, or other reasons.

The system combines smart AI detection and real-time intervention to enhance safety. The technology aims to prevent harm by intervening early, improving response time and reducing service disruption. It is designed to operate autonomously and can be deployed at other high-risk sites across the underground or rail network. This project supports industry goals around personal safety, suicide prevention and smarter railway operations.

Application Number	Project Title	Lead	Project Cost
10166215	SafeRide5G: Enhancing Rail Safety with AI and Ultra-Fast 5G	INTEGRATED SYSTEMS ENGINEERING LTD	£198,000

Public synopsis

SafeRide5G is a cutting-edge rail safety project using AI and 5G to detect incidents, support real-time alerts, and improve passenger safety---especially for women and vulnerable individuals. It combines smart hardware and software to discreetly report issues and help staff respond faster on UK trains.

Public description

SafeRide 5G is a pioneering safety solution designed to tackle pressing personal security challenges across the UK rail network, particularly addressing issues like Violence Against Women and Girls (VAWG), antisocial behaviour, and support for vulnerable passengers. This project integrates smart hardware, artificial intelligence (AI), and advanced 5G connectivity into a single, rail-optimised platform to deliver real-time incident detection, reporting, and predictive safety analytics.

At the core of the project is the **CrownComm Gateway**, a custom-developed onboard system equipped with vendor-agnostic 5G routing, edge AI processing, and privacy-focused data capture capabilities. Unlike generic commercial routers, CrownComm is uniquely engineered for the rail environment and supports real-time intervention by train staff through discrete alerts and on-the-fly evidence collection.

The system empowers passengers to safely and privately report incidents using their own devices via onboard Wi-Fi, improving response speed and removing key barriers to reporting. Simultaneously, onboard AI continuously monitors live video and audio data for signs of distress or aggression. All incident data is processed locally, anonymised, and securely cached, with automatic syncing when the train enters coverage zones.

In addition to real-time response, the platform delivers **predictive safety insights**. Using anonymised patterns from historical incidents, Wi-Fi activity, and staff feedback, the system provides operators with dynamic risk maps---highlighting when and where additional resources or interventions may be needed. This allows railway companies to proactively improve the passenger experience and reduce future incidents.

The project will be delivered in collaboration with advocacy and industry bodies such as **Women in Rail** and **South Western Railway (SWR)**, ensuring that safety requirements are grounded in real-world operational and user needs. It also engages with **Transport for London (TfL)** to validate the solution's applicability across urban rail services.

SafeRide 5G represents a new benchmark in intelligent transport safety solutions. It will be trialled in a live railway environment, demonstrating the feasibility, usability, and benefits of integrated AI, connectivity, and safety technologies for passengers and rail staff alike.

This project supports the UK's wider transport goals around digital innovation, passenger safety, and inclusive design---ensuring public transport remains accessible, trustworthy, and secure for all.

Application Number	Project Title	Lead	Project Cost
10163557	EMBODY: Immersive VR Training to Tackle Violence Against Women and Girls on the UK Rail Network	JUICE IMMERSIVE LTD	£199,734

Public synopsis

EMBODY is a groundbreaking VR (virtual reality) training project empowering UK rail staff to recognise, respond to, and report Violence Against Women and Girls. Co-created with experts and lived experience voices, it uses immersive, interactive scenarios to build confidence, empathy and safer journeys for everyone on the rail network.

Public description

EMBODY Project (First of a Kind 2025)

The **EMBODY Project** is a pioneering initiative that brings together a powerful national consortium of rail, policing, health, and technology partners to address the urgent and growing challenge of **Violence Against Women and Girls (VAWG)** on the UK rail network.

Funded through the Department for Transport's First of a Kind (FOAK) 2025 competition, EMBODY will develop an **immersive Virtual Reality (VR) training tool** designed to help frontline rail staff detect, respond to, and report VAWG-related incidents. The experience will combine **first-person perspective 360° video**, interactive decision-making, and trauma-informed scenario design -- all grounded in real-world experiences from both victims and rail workers.

Led by **Juice Immersive**, a UK leader in AppliedXR technologies, the project brings together an exceptional team of delivery and impact partners including the **British Transport Police**, **Rail Delivery Group**, **Chiltern Railways**, the **Rail North Partnership**, **Oxfordshire Community Rail Partnership**, and NHS training specialists **Maudsley Learning**. Together, these organisations represent key voices from across the rail industry, public safety, community engagement and mental health training.

The training content will be informed by direct consultation with lived experience groups, youth networks, women's organisations, and rail employees. This inclusive and co-designed approach ensures the final product reflects the complexities, sensitivities, and realities of VAWG incidents on the network.

Using innovative VR learning platforms such as WarpVR and Juice's proprietary **EmbodyCam** technology, EMBODY will simulate real-life scenarios to help staff safely intervene, support victims, and de-escalate and report incidents appropriately. By building empathy, awareness and practical confidence, the training aims to embed lasting behavioural change in frontline staff interactions.

The project aligns with national commitments to improve passenger safety, support rail workers, and promote a zero-tolerance culture around harassment and violence. EMBODY also directly supports the future goals of **Great British Railways**, ensuring the public rail system is not only efficient and inclusive, but also **safe and accountable for everyone**.

Scheduled for completion in **March 2026**, the project will culminate in a national demonstration event showcasing the VR training in action to rail leaders, policymakers, frontline rail staff, individuals with personal experience of VAWG and the travelling public.

FOAK 2025 – Bridge Strikes

Application Number	Project Title	Lead	Project Cost
10165497	Low Power Distributed Multi-Sensor Mesh for Long-Term Remote Monitoring of Rail Bridge Strike Events	PEAK TO PEAK MEASUREMENT SOLUTIONS LTD	£193,831

Public synopsis

Peak to Peak Measurement Solutions low-power wireless sensor mesh provides real-time, automated bridge strike detection for rail bridges. It uses multi-sensors and edge processing for rapid alerts, reducing costly delays and enhancing safety across the UK network.

Public description

Peak to Peak Measurement Solutions is developing an innovative Low Power Wireless Sensor Mesh (LPWSM) system for real-time bridge strike detection on UK rail infrastructure. This cost-effective solution deploys ultra-low power sensors that continuously monitor bridges for impacts. Using advanced real-time processing, the system instantly detects strikes, triggering immediate alerts.

The LPWSM provides precise data, enabling rapid response, minimising train service disruption, and enhancing public safety. Its long battery life and low maintenance make it scalable and sustainable for widespread adoption across the UK's critical transport network. This innovation will significantly reduce costly delays and safety risks from bridge incidents.

Application Number	Project Title	Lead	Project Cost
10163262	BridgeGuard	SENSING FEELING LIMITED	£197,078

Public synopsis

BridgeGuard is a power-autonomous sensing system using 3D visual-AI to detect potentially-overheight vehicles approaching low railway bridges. It warns drivers before impact and alerts rail asset managers if strikes occur, reducing disruption, damage and costs without needing to carry out expensive civil engineering works for gantries, power-cabling and complex calibration.

Public description

BridgeGuard is a new sensing technology developed to help reduce the number of road vehicles crashing into low railway bridges; a serious and costly problem that affects the UK rail network over 1,500 times each year.

The BridgeGuard system is designed to prevent these bridge strikes before they happen and to quickly notify railway asset managers when they do. By making bridge strike prevention smarter, quicker to install, and easier to maintain, BridgeGuard offers a novel, 'First of a Kind' way to improve the safety and reliability of the UK's rail and road networks.

BridgeGuard is being developed by Sensing Feeling, a UK company with experience delivering safety technologies for rail, road and public transport.

Application Number	Project Title	Lead	Project Cost
10165100	Bridge Bouncer	RASIC LTD	£180,121

Public synopsis

BridgeBouncer is a smart roadside warning system that helps stop tall vehicles from crashing into low railway bridges. Using sensors, and messaging it warns drivers in real time. This project will trial the system at the Global Centre of Rail Excellence.

Public description

BridgeBouncer: Smarter Warnings to Prevent Bridge Strikes

BridgeBouncer is an intelligent roadside warning system designed to prevent collisions between over-height vehicles and low-clearance bridges or tunnels, a problem that causes daily disruption, safety risk and financial cost across the UK's road and rail networks.

This project will pilot BridgeBouncer at a designated bridge on the Global Centre of Rail Excellence (GCRE) site in South Wales, enabling real-world testing in a controlled, transport-focused environment.

The system combines high-precision sensors with dynamic messaging to prevent bridge strikes.

Bridge strikes remain a serious issue across the UK, with over 1,800 incidents per year and tens of millions of pounds in resulting costs. While signage and education have improved awareness, static infrastructure often fails to interrupt a driver's routine or capture attention in time. BridgeBouncer offers an active, real-time intervention designed to change that.

The trial at GCRE will demonstrate how this integrated technology can reduce strike risk by influencing driver behaviour at the critical moment. It will also allow data to be collected on system performance, detection accuracy, and response patterns, laying the groundwork for wider deployment across the UK's most vulnerable infrastructure points.

This trial is intended to demonstrate a first-of-a-kind solution for a well-known national challenge, showcasing how emerging technologies can be used in smarter, human-centred ways to make the UK's transport networks safer and more resilient.

Application Number	Project Title	Lead	Project Cost
10166154	BridgeAlert: Low Cost Scalable BLE Beacon Technology For Bridge Clearance Driver Alert System	SPACE DATA CENTRES LTD	£112,473

Public synopsis

BridgeAlert is a low bridge early warning system leveraging cost-effective, low-power Bluetooth beacon technology with accompanying mobile device App to deliver a scalable, any location system for direct-to-driver alerts on low-bridge routes. System hardware requires no active internet connectivity, GPS, grid power supply, in-cab hardware/systems investment or gantry infrastructure.

Public description

This project will demonstrate a cost-effective low-bridge warning system for HGV and other large vehicle operators to support the prevention of vehicle bridge strikes. The project will develop and demonstrate an infrastructure-mounted low-cost bridge warning system which provides direct-to-driver bridge clearance warnings on the approach/es to a low-bridge. BridgeAlert provides a practical alternative to high-cost early warning systems which require camera or laser-based technologies to assess on-coming vehicle size and provide targeted driver alerts.

BridgeAlert uses highly cost-effective, low-power Bluetooth beacon technology with an accompanying mobile device App to deliver a scalable, any location system. The BLE beacon requires no active internet connectivity, GPS, grid power supply, in-vehicle hardware/systems investment or gantry infrastructure.

When in range, a bluetooth enabled mobile device automatically detects the beacon signal which activates the BridgeAlert app to access stored bridge clearance data and issue a on-screen direct-to-driver early warning alert of the upcoming bridge clearance in time for the driver to take action.

Application Number	Project Title	Lead	Project Cost
10164525	Immersive Bridge Strike Awareness (IBSA)	CGA SIMULATION LIMITED	£156,000

Public synopsis

Immersive Bridge Strike Awareness is a project led by CGA Simulation in collaboration with partners including DriveSense and Merseyrail. IBSA uses immersive virtual reality training to help HGV drivers and operators avoid bridge strikes, understand the consequences if they occur, and embed safe practices like GOAL (Get Out And Look).

Public description

Immersive Bridge Strike Awareness (IBSA) is an innovative project designed to tackle the ongoing issue of bridge strikes caused by heavy goods vehicles (HGVs) on the UK's rail and road networks. These incidents cause widespread disruption, cost millions of pounds in repairs and delays each year, and pose significant safety risks to both road users and rail passengers.

Led by CGA Simulation, a Liverpool-based technology company specialising in simulation and digital training tools, and in collaboration with driver training experts DriveSense, this project will develop an immersive training module that teaches commercial drivers how to prevent bridge strikes through the use of behavioural safety techniques -- most notably the well-established G.O.A.L. method: _Get Out And Look._

Unlike current approaches, which rely heavily on static classroom instruction and video content, IBSA will use Driving Simulation and Extended Reality (XR) technology to create an interactive, realistic simulation environment. Drivers will be placed in high-risk driving scenarios where they must assess hazards, make decisions, and apply safe driving behaviours in real-time. The training will be delivered using portable VR headsets and integrated into portable driving simulators, making it flexible and scalable across different training settings.

The final product will be piloted with UK rail operator Merseyrail and rolled out through DriveSense's commercial driver training programmes. CGA will also integrate the IBSA module into its existing Virtual Driving School platform, used by clients including Octopus Energy and the Scottish Police.

The goal is to produce a nationally scalable training solution that complements existing certification schemes such as FORS and DVSA standards, while providing drivers with more engaging and effective preparation for avoiding costly and dangerous bridge collisions. In addition to UK deployment, the project team will explore international opportunities where bridge and infrastructure strikes remain a widespread challenge.

By combining immersive technology with real-world behavioural training, IBSA aims to reduce bridge strikes, minimise disruption, and improve road-rail safety for everyone.

Application Number	Project Title	Lead	Project Cost
10161166	Bridge Strikes Guardian	JR DYNAMICS LIMITED	£199,681

Public synopsis

Bridge Strike Guardian is a solar-powered, AI-driven multi-sensor system that autonomously detects, structurally analyses and reports on bridge strikes in real time. Requiring no civil works, it delivers instant alerts and diagnostic insights enabling rapid, data-led responses by Network Rail's Bridge Strike Champions and infrastructure managers.

Public description

Bridge Strike Guardian (BSG) is an innovative, solar-powered monitoring, assessment and alert system designed to reduce the impact of railway bridge strikes across the UK's transport network.

Developed by award-winning engineering SME Transmission Dynamics, the system uses a combination of sensor solutions and edge-based artificial intelligence to detect bridge strikes in real time to assess and report on potential structural damage instantly. BSG enables faster, safer decisions by sending automated alerts and diagnostics directly to rail operators via a secure cloud platform. With decades of experience in Rail asset and infrastructure monitoring and structural analysis analytics, Transmission Dynamics has delivered technology used by rail and infrastructure operators worldwide. BSG builds on that track record to address one of the UK's most costly and persistent rail safety challenges.

Unlike conventional systems, Bridge Strike Guardian requires no mains power, network cabling, or civil engineering work. Its off-grid, solar-powered design allows for rapid installation across a wide range of bridge types, including remote or logistically challenging locations, making it a truly scalable solution for the UK's 9,000+ at-risk railway bridges.

This system doesn't just detect incidents, it transforms how the rail industry responds to them. By combining real-time data capture with intelligent event filtering, BSG reduces false alarms, accelerates recovery times, and helps operators make evidence-based decisions. It supports faster clearance of track restrictions and improves the collection of incident data to aid root cause analysis and efficient recovery.

By trialing the prototype system at two bridge sites in partnership with Network Rail's Bridge Strike Champions, BSG is expected to demonstrate its ability to reduce delays, limit further infrastructure damage, and support national rail resilience. The trials will also help refine BSG's onboard machine learning models and prove its readiness for wide-scale rollout post project.

If funded through Innovate UK's First of a Kind (FOAK) programme, BSG can support the UK's wider strategy to build a smarter, safer, and more efficient rail network by using AI-enabled technology to mitigate risk, reduce disruption, and enhance public safety.

Application Number	Project Title	Lead	Project Cost
10161194	Bridge Aware - Real-Time Prevention, Detection and Mitigation of Bridge Strikes on Rail Bridges.	University of Birmingham	£194,749

Public synopsis

A two-part system to reduce bridge strikes on the UK rail network. Prevention uses LiDAR and image recognition to detect out of gauge vehicles and trigger traffic warnings. Detection uses vibration sensors and structural-modelling to assess post-strike safety. Demonstrated with support from NetworkRail, this integrated-solution addresses strike prevention and mitigation.

Public description

This project delivers a new approach to tackling bridge strikes, one of the most persistent safety and disruption risks on Britain's railways. Each year, over 1,800 incidents involving road vehicles striking railway bridges cause millions of pounds in damage and thousands of hours of train delays. Our project provides both a method to prevent these incidents and a way to respond rapidly when they do occur.

We will develop and demonstrate a two-part system. First, we will trial a LiDAR and camera-based detection unit that can identify out of gauge vehicles approaching a bridge in real time. If a risk is detected, the system will activate a tailored warning strategy using visual or audio alerts, signs or lights, helping drivers avoid the strike before it happens. We will work with traffic authorities to ensure these warnings are effective and safely delivered.

Second, we will install low-power vibration sensors directly on bridge structures to detect when a strike has occurred. These sensors will wirelessly transmit data to a central system, allowing for immediate notification and follow-up. We will also use this data to feed a simple digital model of the bridge structure, helping assess whether it is safe to resume services and whether repairs are needed.

We will also explore how existing on-train monitoring systems can help spot hidden damage by analysing how trains behave as they pass over a struck bridge. This will provide an added layer of safety and support early maintenance decisions.

The project brings together experts in transport sensing, structural engineering and rail operations. It will be delivered over 7 months, with a live demonstration supported by Network Rail. By combining prevention, detection and structural analysis, this project offers a joined-up solution to reduce risk, cut disruption and support faster recovery when incidents occur. It is designed to be scalable and cost-effective, helping improve resilience across the wider rail network.