FOAK26 Briefing

Welcome

UKRI Innovate UK

Contracts for Innovation: First of a Kind (FOAK) 2026

Applicant Briefing

Date: **20th May 2026**

The webinar will start at 10:00.

- Welcome, we are currently waiting for more people to join.
- This briefing will be recorded. A copy of the slides and the recording link will be made available on IFS.
- Please enter any questions that you may have into the Q&A Box.
- For more information on the competition process, please click here to access our YouTube channel.

Welcome and Introductions

Kevin Blacktop
Innovation Lead for Rail, Innovate UK

Stephanie Armitage
Competition Manager, Innovate UK

Rhianne Lucas
Portfolio Manager, Contracts for Innovation

Ben Cullen
Knowledge Transfer Manager - Rail, Innovate UK Business Connect

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Welcome and Introductions

Jon Kelly (HS2) - Challenge 1 - Safe Concurrent High-Speed Rail Installation in Constrained Environments.

Sean Leahy & Kirsty Duggan (Network Rail) - Challenge 2 - UK Dark Skies - Drone Operations BVLOS

Efi Tzoura (Keolis Amey Docklands 2025) - Challenge 3 - Improving Customer Experience in Isolated Spaces.

Jonathan Holmes (Southern Renewals Enterprise) - Challenge 4 - Digital Hazard Log.

Tom Brodrick (Network Rail) - Challenge 5 - Scour Risks to Structures

Tom Brodrick (Network Rail) - Challenge 6 - Structures: Rapid Behaviour Verification to Support Assessment and Intervention Decisions

Andrew Jones (Southern Renewals Enterprise) - Challenge 7 - Green Engineering Solutions for Earthworks Resilience and Biodiversity Net Gain

Steve Venables (Transport for London) - Challenge 8 - Enhancing Rail Adhesion Through Intelligent Vegetation Management and Biodiversity Net Gain

Agenda

- Key Dates
- Contracts for Innovation
- Competition Summary & Scope
- Eligibility Criteria
- Innovation Funding Service (IFS)
- Use of AI
- Assessment
- Project Set Up
- Additional Support
- Q&A

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Department for Transport

The tenth ‘First of a Kind’ Competition delivered by Innovate UK on behalf of the Department for Transport

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Key Dates

Timeline	Dates
Competition Opens	**11th May 2026**
Submission Deadline	**24th June 2026** at 11am
Applicants informed	**17th July 2026** by 5pm
Contracts awarded	**1st September 2026**
Project start and end dates	Start by **1st September 2026** End by **31st March 2027**

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About Contracts for Innovation

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Innovate UK Contracts for Innovation

Helping government, helping businesses

Helping government:

Contracts for Innovation helps government organisations solve tough challenges by connecting them with innovative organisations.

Helping businesses:

Contracts for Innovation 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%

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Jenny Griffiths, founder, Snap Fashion

What are Contracts for Innovation?

- Procurement of innovation
- Requires a lead customer
- Outcome-driven solutions
- Well-defined challenges
- 100% funded R&D services procurement contracts

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Contracts for Innovation: Key Features

Development Contracts

- 100% funded R&D (procurement contract for R&D Services)
- Payment made on completion of milestones

Contract with Lead Applicant

- Any subcontractors remain accountable to the lead

IP rests with Supplier

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

Eligibility

- Open to all organisations. 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

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Applying to a Contracts for Innovation 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.
- 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.
- Explain the problem your project is looking to solve and who your target customers will be.
- We cannot increase your costs once you've been awarded a contract.
- Familiarise yourself with the contract - our terms and conditions are non-negotiable.

Competition Summary

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Summary

Innovate UK and the Department for Transport (DfT) are collaborating with the rail industry to accelerate and increase the adoption of innovation to improve UK railways. The competition focuses on collaboration with industry and deliver high maturity demonstrations, enabling efficient integration into the railway system.

Organisations can apply for a share of up to £4.3 million, inclusive of VAT, across eight challenges to develop a prototype, conduct field testing and demonstrate their solution. This competition will be managed as a portfolio and each challenge will receive a minimum of 2 projects.

Challenges:

- Challenge 1 - Safe Concurrent High-Speed Rail Installation in Constrained Environments.
- Challenge 2 - UK Dark Skies - Drone Operations BVLOS
- Challenge 3 - Improving Customer Experience in Isolated Spaces.
- Challenge 4 - Digital Hazard Log.
- Challenge 5 - Scour Risks to Structures.
- Challenge 6 - Structures: Rapid Behaviour Verification to Support Assessment and Intervention Decisions.
- Challenge 7 - Green Engineering Solutions for Earthworks Resilience and Biodiversity Net Gain.
- Challenge 8 - Enhancing Rail Adhesion Through Intelligent Vegetation Management and Biodiversity Net Gain

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Summary

Demonstration event and trialling

A key project deliverable, that must be included in your milestones, is a demonstration event and trial.

The demonstration and trialling must take place in an environment representative of where the solution will be deployed, allowing for effective evaluation.

You must invite potential customers from the railway industry, along with other industry representatives, to your demonstration event.

You will be expected to include an integration supporter in your project to help facilitate the demonstration and trialling of your solution. In their role as potential future customers, they will be well placed to propose an appropriately representative environment.

No official ‘letter of support’ is required as part of the application.

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Summary

Evaluation activity

Projects must include an evaluation activity at the end, measuring data to assess the anticipated impact of the solution on the railway network.

This should compare baseline data related to the competition theme and outline the improvement from your solution using data from the demonstration or trial.

This evaluation activity is a key deliverable and must be included as part of your milestones.

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Competition Scope

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Challenge 1 – Safe Concurrent High-Speed Rail Installation in Constrained Environments

Jon Kelly (HS2)

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Why this Challenge

Getting ready for Rail systems

- The type of working environment changes
- The complexities and types of work become more varied
- There are new risks related to safety
- Reducing safety risks will lead to efficiency gains

Main Work Civils

Rail Systems Installation

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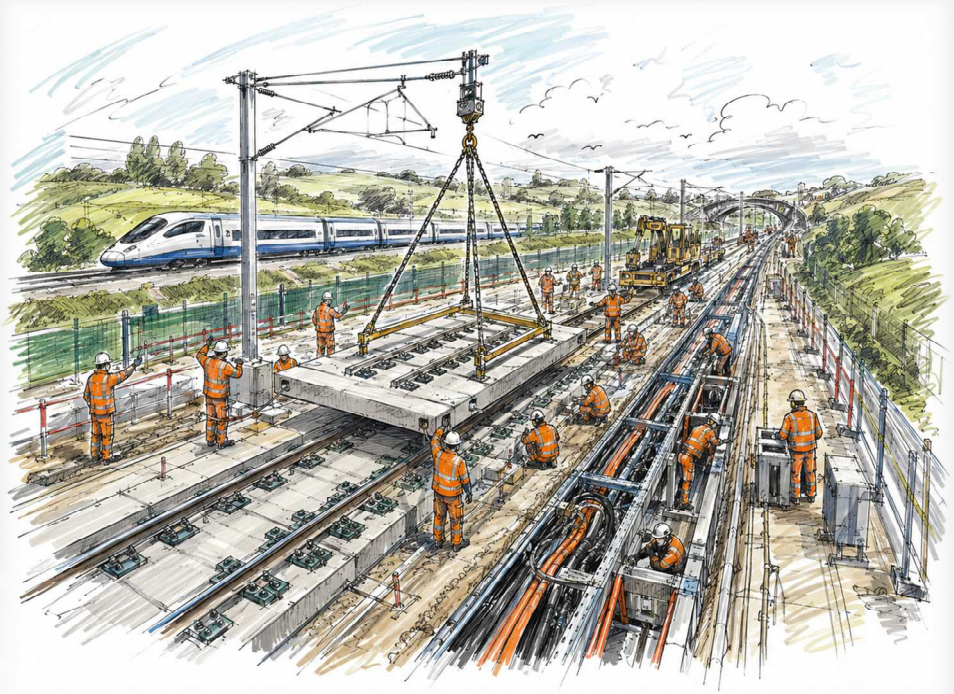
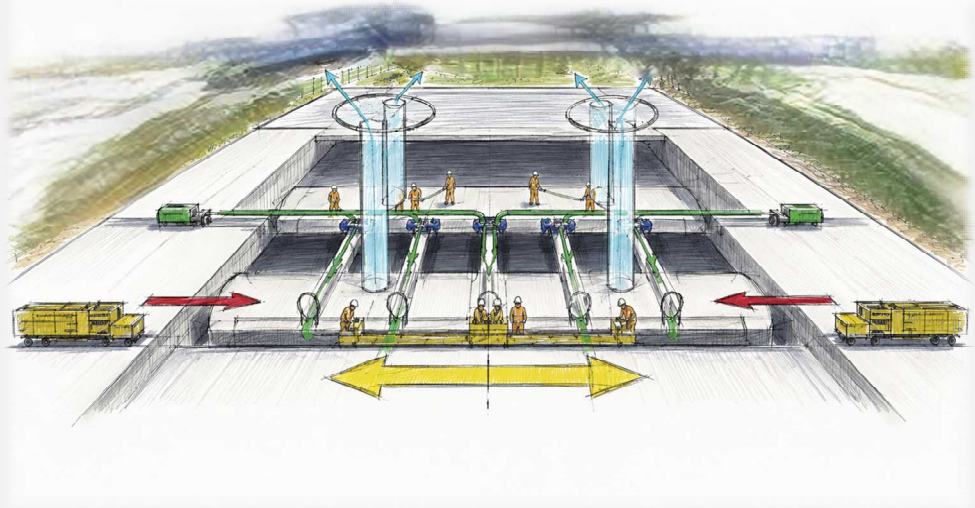
What the Challenge looks like

Rail systems installation can require multiple contractors to work in close proximity.

- Predominantly thinking about track systems and power systems
- Constrained environments – tunnels, viaducts and even standard sites
- Risk of people and plant interaction
- Movement of large assets potential using manual handling
- This is an industrialised process on a scale and in an environment never seen before
- The better we become at working in this environment safely the more productive we become





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What are we looking for

- Removing people from harms way using automation and robotics
- Integrated management of plant, people and lifting operations
- Multi-contractor coordination and competence visibility
- Dynamic control of high-risk energy and systems
- Safe working in confined and restrictive environments
- Workforce behaviour, fatigue and exposure management
- Advanced geo tagging / fencing
- **Define what wider programme benefit could be seen**

Electrical Safety, Energisation and Protection Controls. Competence.

Restrictive nature of installation in tunnels, fire safety and ventilation limitations.

Plant Vehicle Operative Interfaces in a restrictive or confined environment.

Fatigue, driving safety and behavioural risk management.

On site safety in lifting, handling and manual operations.

Stored Energy Hazards, OLE Tension, Hoses, Pump lines, Cables and Batteries.

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Challenge 1 – Safe Concurrent High-Speed Rail Installation in Constrained Environments

Summary of the challenge

High-speed rail installation activities are increasingly required to be delivered within constrained environments, such as tunnels and restricted access corridors, where multiple contractors must operate concurrently to meet programme and productivity demands.

These environments introduce complex, interacting risks particularly where plant operations, lifting activities, energised systems, and workforce interfaces overlap within limited space.

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Challenge 1 – Safe Concurrent High-Speed Rail Installation in Constrained Environments

The challenge is compounded by the need to manage multiple high-risk factors simultaneously, including:

- Plant and vehicle operative interfaces in restrictive environments
- Lifting operations and manual handling in shared work areas
- Multi-contractor competence and coordination
- Stored energy and electrical risks (OLE, cables, temporary systems)
- Confined space constraints, including fire and ventilation risks
- Workforce fatigue, behaviour and exposure

Existing safety controls are typically static, fragmented, and contractor-specific, relying heavily on supervision, segregation, and procedural controls. These approaches limit the ability to safely increase workface density and restrict opportunities for programme efficiency.

We need targeted, innovative solutions that enable multiple contractors to safely work in the same area at the same time. Especially in environments involving heavy plant, lifting operations, and energised systems while actively managing the interaction between these key risk areas.

Proposals must demonstrate how their solution simultaneously manages at least two or more of the identified risk areas in an integrated way.

Challenge 2 – UK Dark Skies (Drone Operations BVLOS)

Sean Leahy & Kirsty Duggan (Network Rail)

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Challenge 2 – UK Dark Skies (Drone Operations BVLOS)

This challenge seeks to resolve one of the most critical challenges facing the UK aviation and infrastructure sectors: the lack of comprehensive situational awareness in low-level airspace. Currently, a significant "blind spot" exists below traditional radar horizons. Aircraft that are transponding at low altitudes, non-transponding General Aviation (GA), and the exponential rise of Uncrewed Aerial Systems (UAS/drones) are frequently invisible to centralised control systems.

Crucially, this hardware layer will be integrated into a sophisticated software ecosystem provided by Drone Cloud's Unified Traffic Management (UTM) as this is the system used by Network Rail. Beyond simple detection, this project proposes the deployment of a "Connectivity Trinity" for drone operations: a dedicated Command & Control (C2) system, a Real-Time Kinematic (RTK) positioning network, and a dedicated LTE spectrum.

This system will not only illuminate the "dark" portions of our airspace but will act as the enabling infrastructure for safe, routine Beyond Visual Line of Sight (BVLOS) operations, delivering centimeter-level precision and high-definition live streaming capabilities that are currently impossible with public networks.

The current UK airspace surveillance infrastructure, primarily relying on Primary and Secondary Surveillance Radar (PSR/SSR) and standard ADS-B receivers, is optimised for high-altitude commercial air transport. Below 3,000ft—and specifically in the "Very Low Level" (VLL) airspace where drones and helicopters operate—coverage is fragmented or non-existent.

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Challenge 2 – UK Dark Skies (Drone Operations BVLOS)

Two distinct threats currently exist:

1. The Transponder Gap: Traditional receivers often fail to pick up transponding aircraft at low levels due to terrain masking (hills, buildings) and lack of receiver density.

2. The Non-Cooperative Target: Many light aircraft, gliders, and legacy platforms do not carry transponders. Furthermore, unauthorised or "rogue" drones do not broadcast Remote ID, rendering them invisible until a visual sighting or an incident occurs.

For infrastructure owners like Network Rail, this lack of visibility prevents the scaling of drone operations. To inspect track assets via drone today often requires line-of-sight operations, which are labour-intensive and inefficient. True automation (BVLOS) is currently stifled because operators cannot guarantee they can "see and avoid" other low-flying traffic.

Furthermore, relying on public 4G/5G networks for drone control is insufficient for critical national infrastructure. Public networks suffer from:

- Contention: Bandwidth drops in busy areas, causing video lag.
- Latency: High latency makes precise manual control or emergency intervention dangerous.
- Inaccuracy: Standard GPS is accurate to 3-5 meters—insufficient for a drone landing autonomously on a charging box next to an electrified rail line.

Challenge 3 – Improving Customer Experience in Isolated Spaces

Efi Tzoura (Keolis Amey Docklands 2025)

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Challenge 3 – Improving Customer Experience in Isolated Spaces

The majority of stations on the UK rail network are unstaffed. This can lead to anti-social behaviour, such as graffiti, vandalism and other crimes. Areas such as bike storage, lifts, platform shelters, underpasses and around ticket machines are areas of concern, not just on platforms. Station users can often feel intimidated, particularly if it is late at night or if they feel other individuals or groups are behaving inappropriately.

This challenge is aimed at making unstaffed stations feel safer for users and to improve the level of oversight by the operators. This includes monitoring, active communications to deter inappropriate activity and updating / expanding help point areas.

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Challenge 3 – Improving Customer Experience in Isolated Spaces

We need Solutions that:

- Enable prompt support to be provided.
- Provide reassurance that the unstaffed station is being actively managed.
- Work with existing legacy systems, such as analogue CCTV.

Solutions must be practical to install on live railways, maintainable, standards-compliant, has strong obsolescence management, and demonstrably scalable across a large, diverse portfolio of railway assets.

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Challenge 4 – Digital Hazard Log

Jonathan Holmes (Southern Renewals Enterprise)

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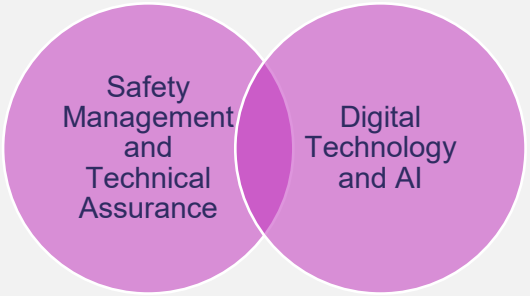
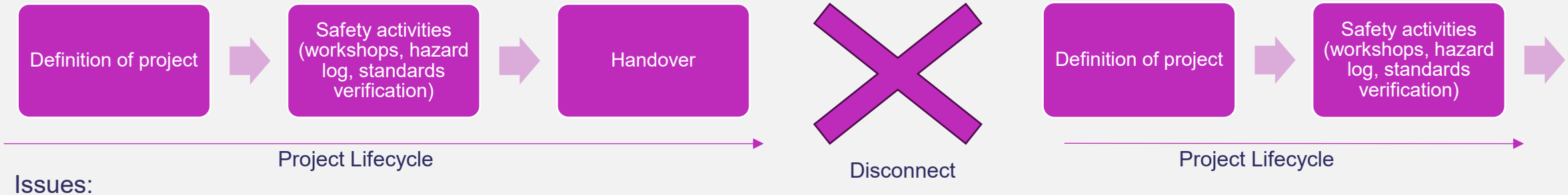
Challenge 4 – Digital Hazard Log

Introduction and Context

- Idea genesis:



- Safety Management and Technical Assurance = Closed Loop



- Issues:
  - Closed loop, project focused only
  - Process can be laborious and dry
  - Archaic data capture
  - Lost knowledge across rail lifespan

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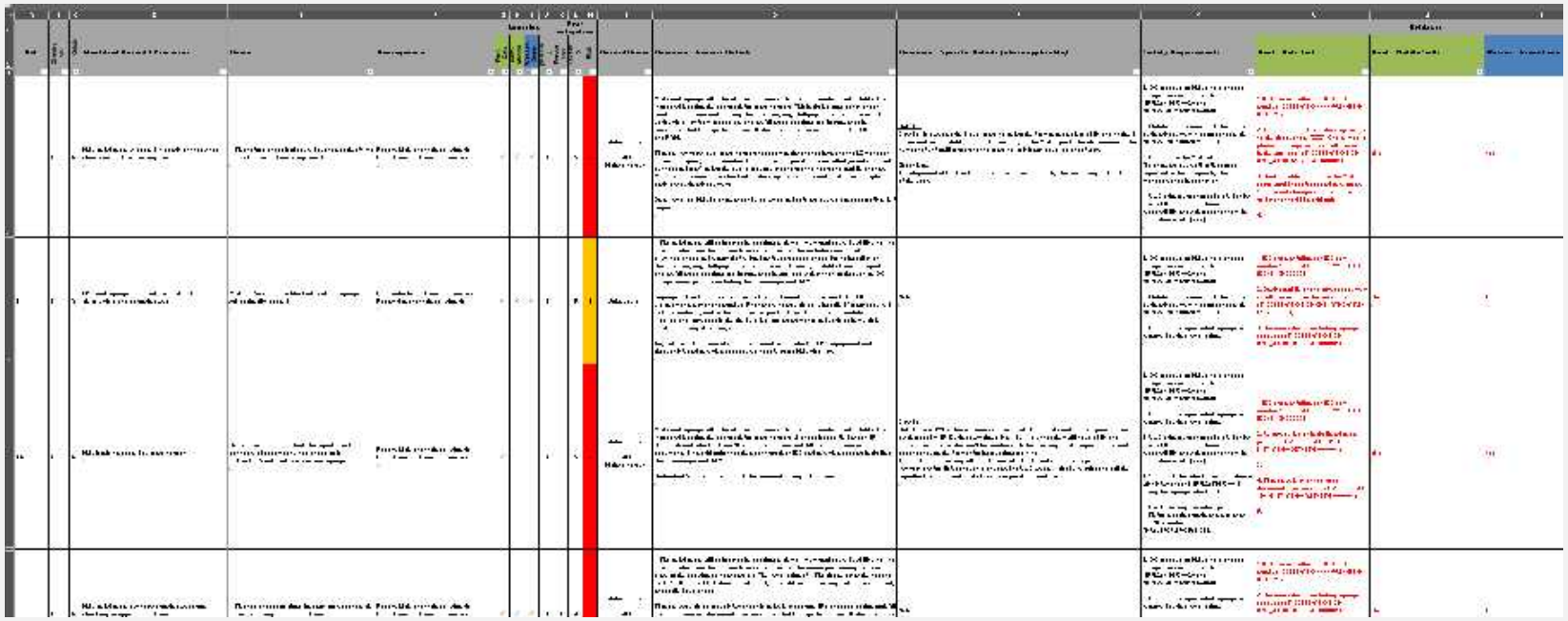
Challenge 4 – Digital Hazard Log

The Challenge Statement – Current Situation



Project Specific Hazard Management Activities

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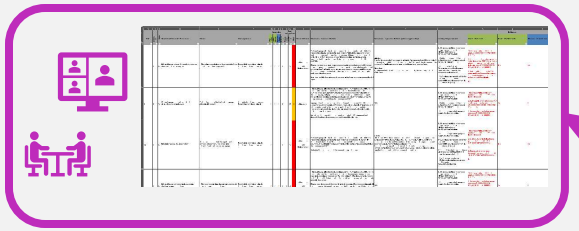
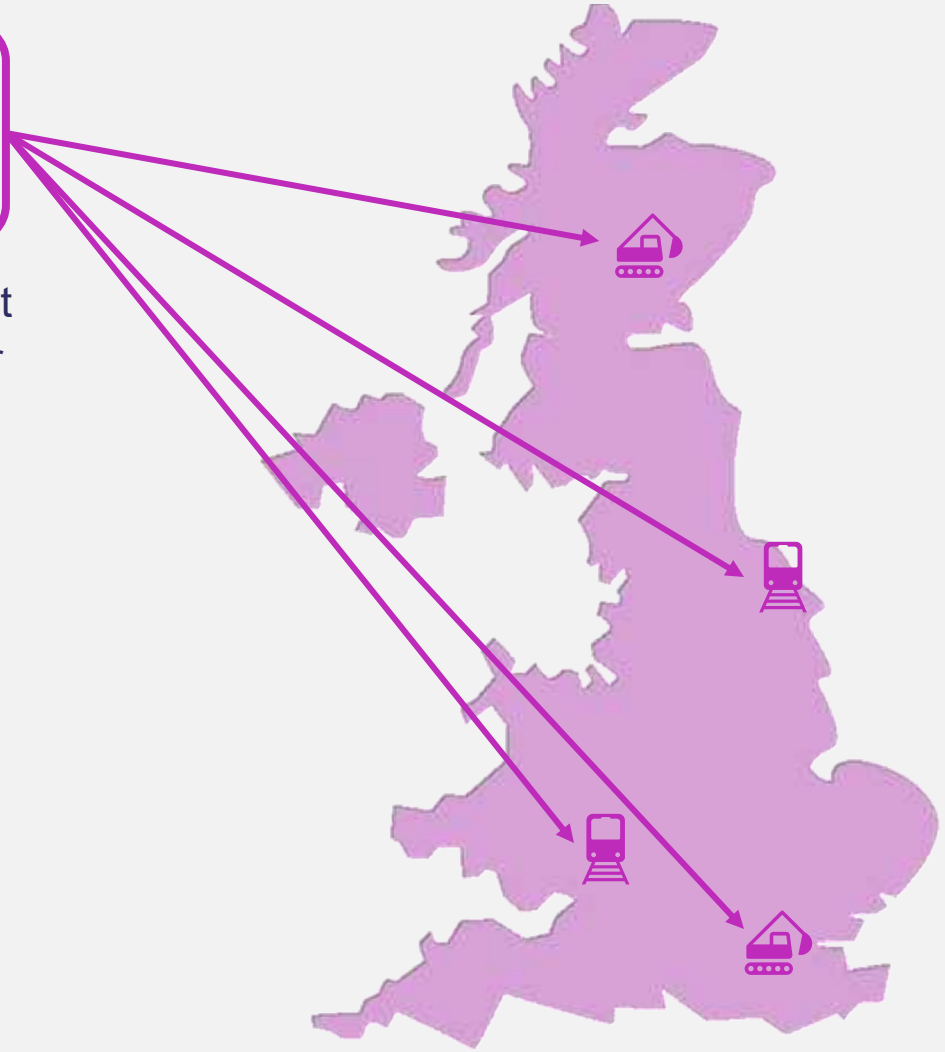
Challenge 4 – Digital Hazard Log

The Challenge Statement – Current Situation



Disparate safety management activities on related or similar projects across the UK



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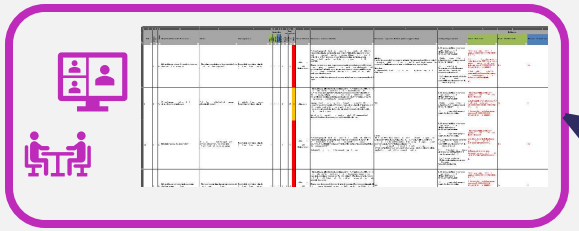
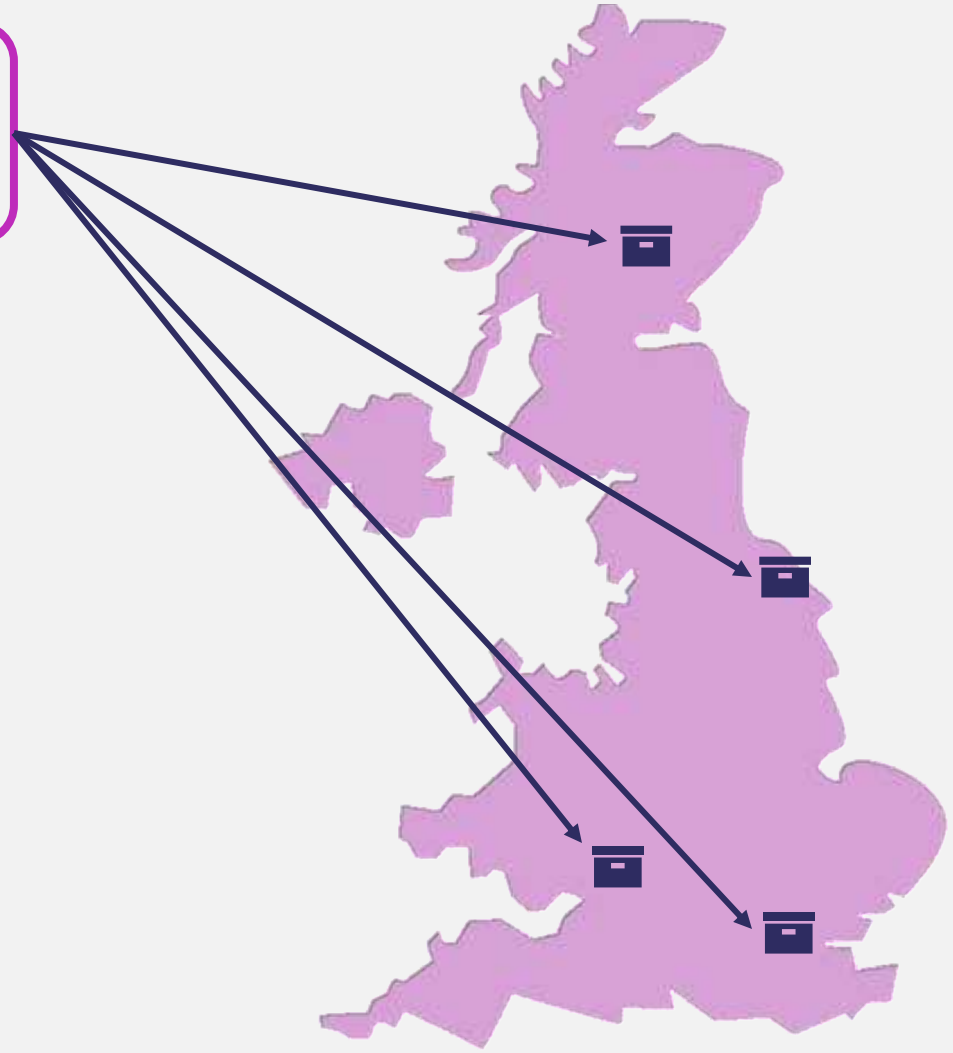
Challenge 4 – Digital Hazard Log

The Challenge Statement – Current Situation



Projects are closed out and archived



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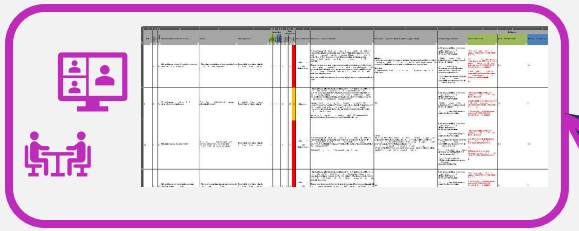
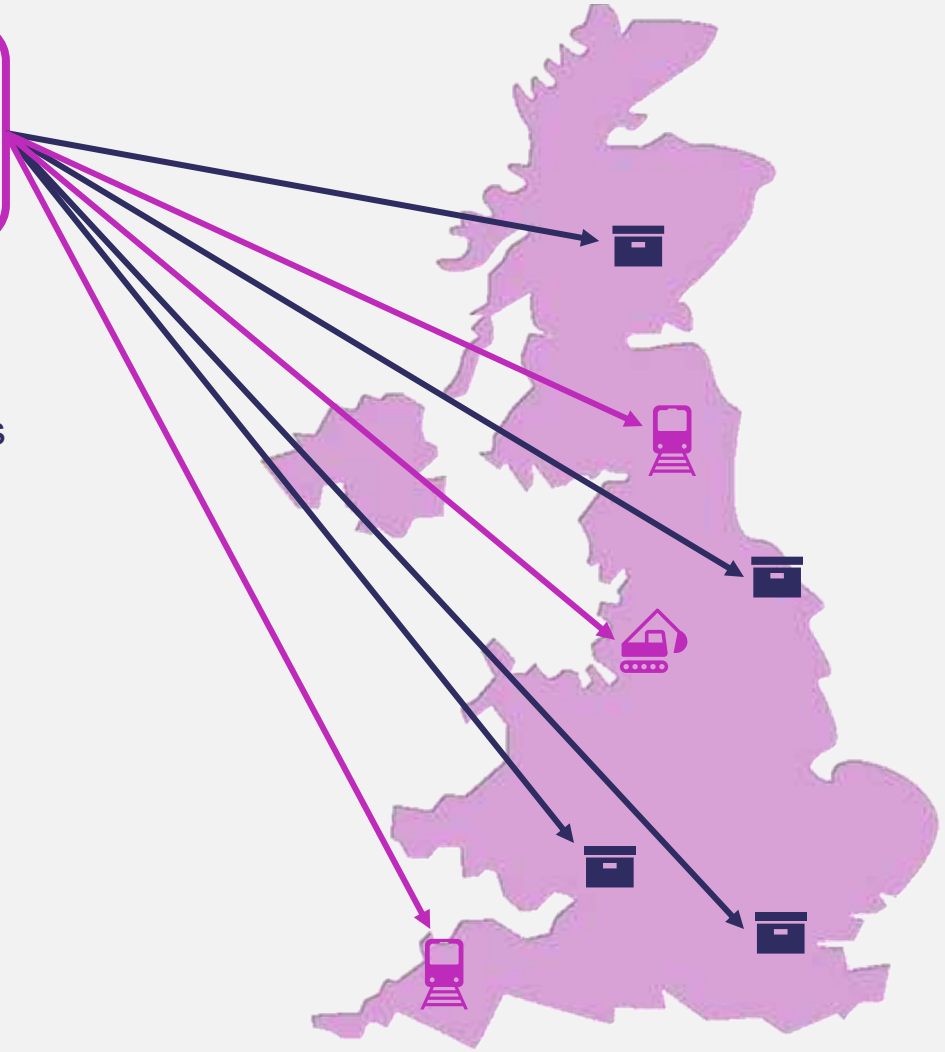
Challenge 4 – Digital Hazard Log

The Challenge Statement – Current Situation



Projects are closed out and archived

New, related / similar projects are started elsewhere with minimal crossover



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Challenge 4 – Digital Hazard Log

The Challenge Statement

- How do we lift Hazard Logs and Risk Assessments ‘off the page’ and into an interactive and live format that promotes engagement and quality?
    - Theme 1: Transform hazard logs and risk assessments into an interactive object-driven data system which can be managed and interacted with, in much the same way Asset Management Systems are used.
- How do we open up the closed loop, project-centric nature of safety management, so that the industry can extract further benefit beyond project delivery?
    - Theme 2: Utilise digital AI technologies to enhance the identification and management of hazards.

This compendium of safety analysis is a hidden powerhouse for railway operators—an asset whose true value remains unrealised.

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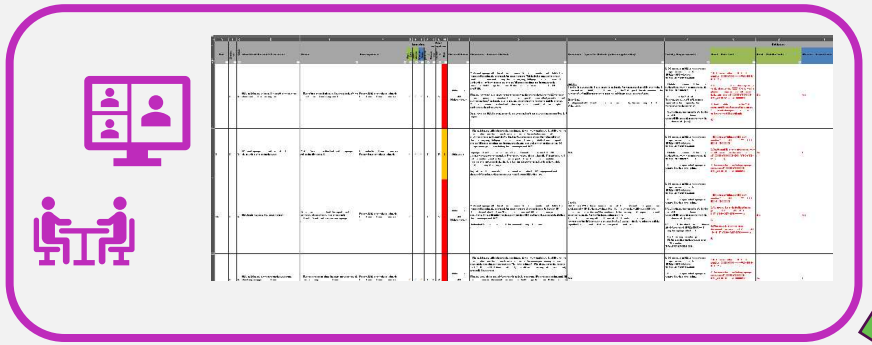
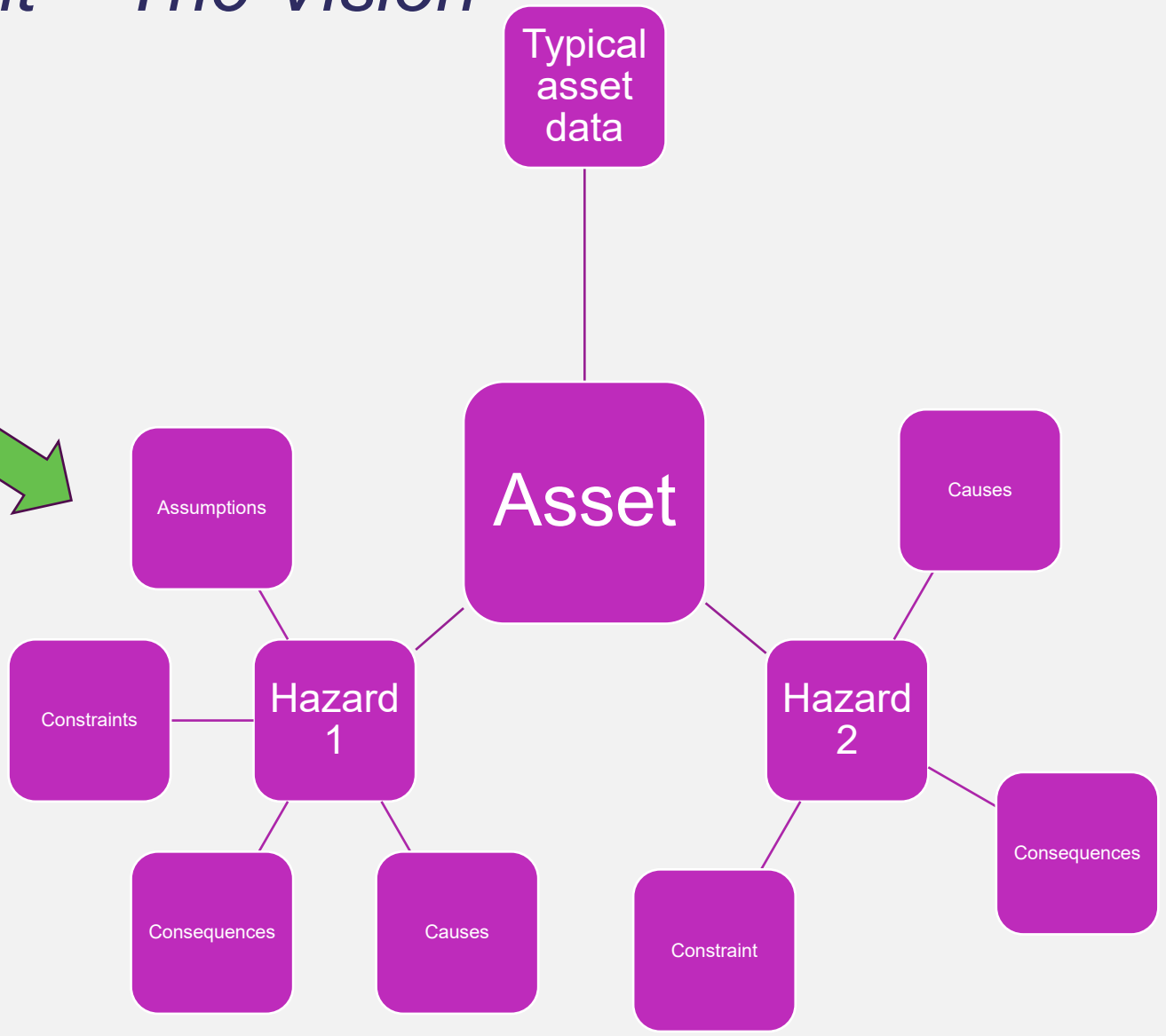
Challenge 4 – Digital Hazard Log

The Challenge Statement – The Vision





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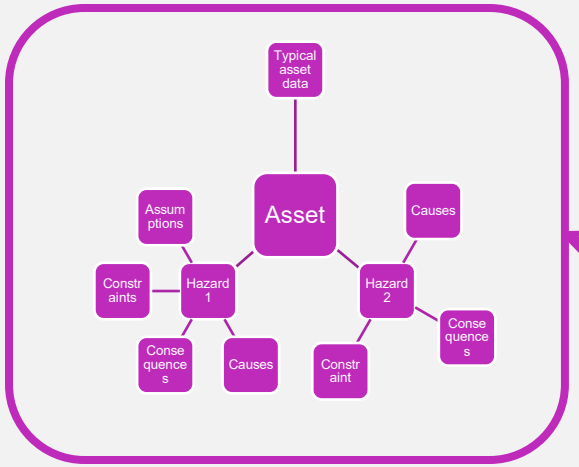
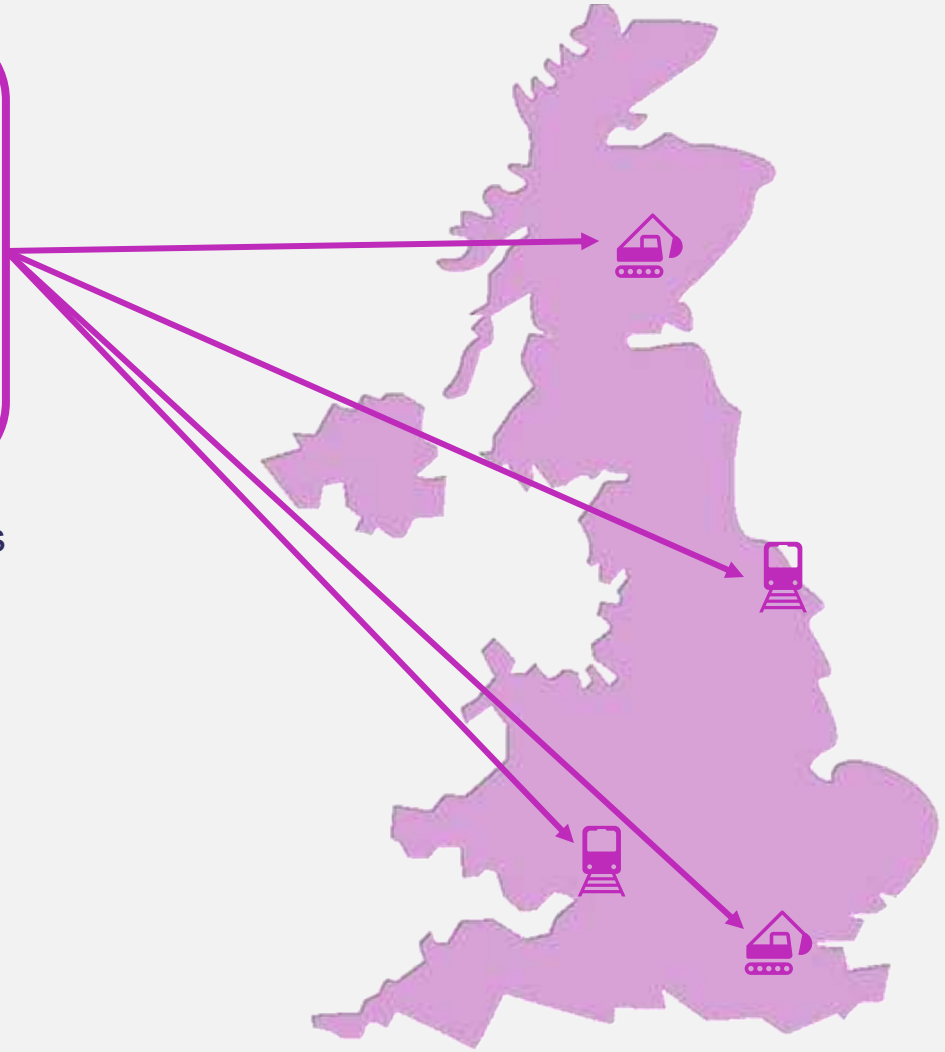
Challenge 4 – Digital Hazard Log

The Challenge Statement – The Vision



Object orientated hazard logs with defined relationships between nodes



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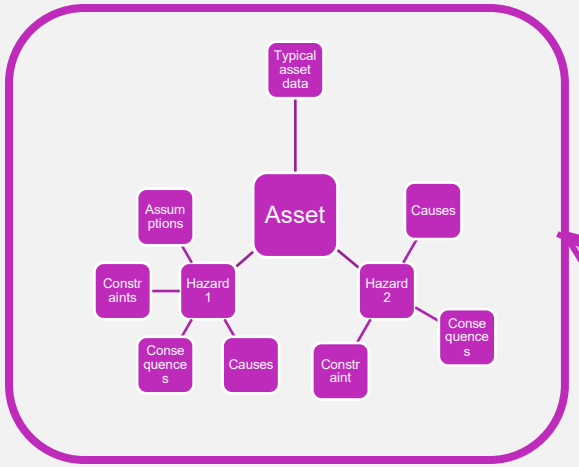
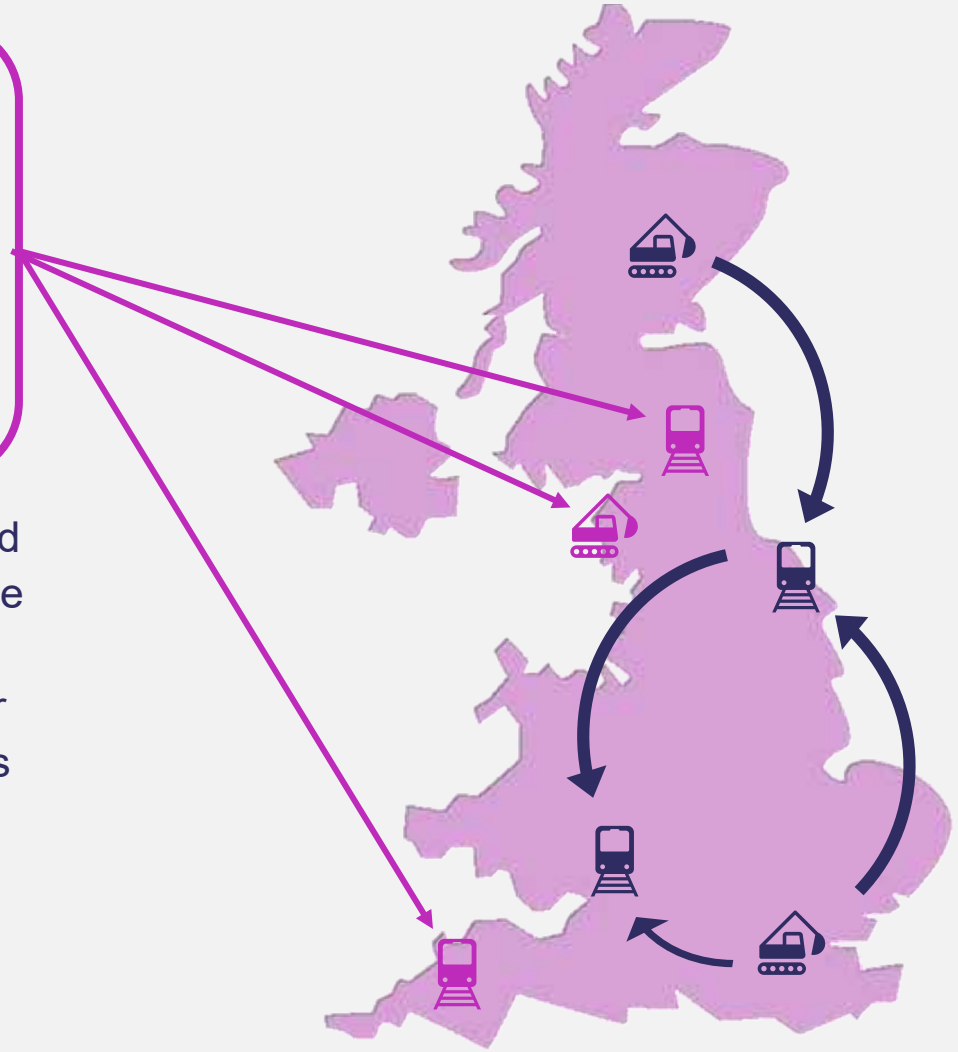
Challenge 4 – Digital Hazard Log

The Challenge Statement – The Vision



Hazard log information stored in a central repository with the ability to identify, share and build on learnings for similar hazards and systems across the network



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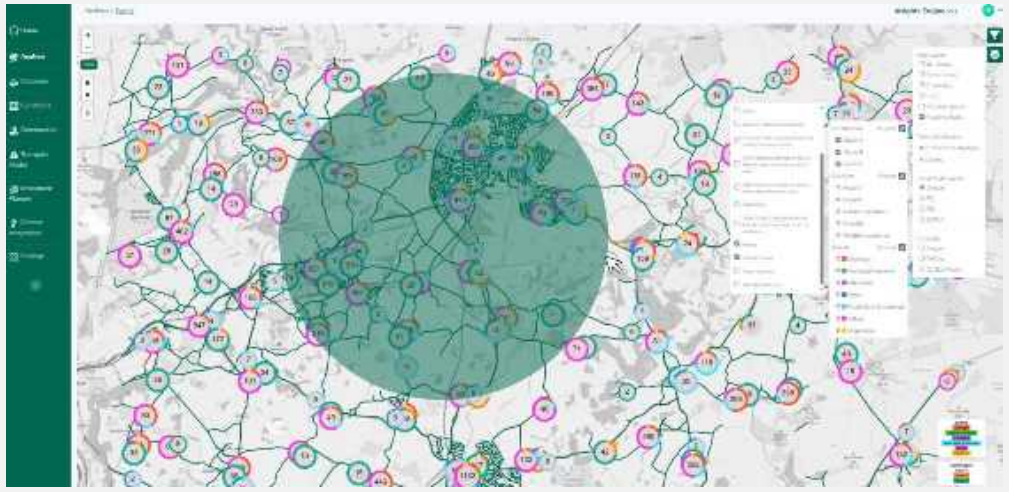
Challenge 4 – Digital Hazard Log

The Challenge Statement – The Vision



Opportunity to build GIS layers (and bring in other data sources) on top of this information and enable hazards, conditions and constraints to be searched in a more user-friendly way.

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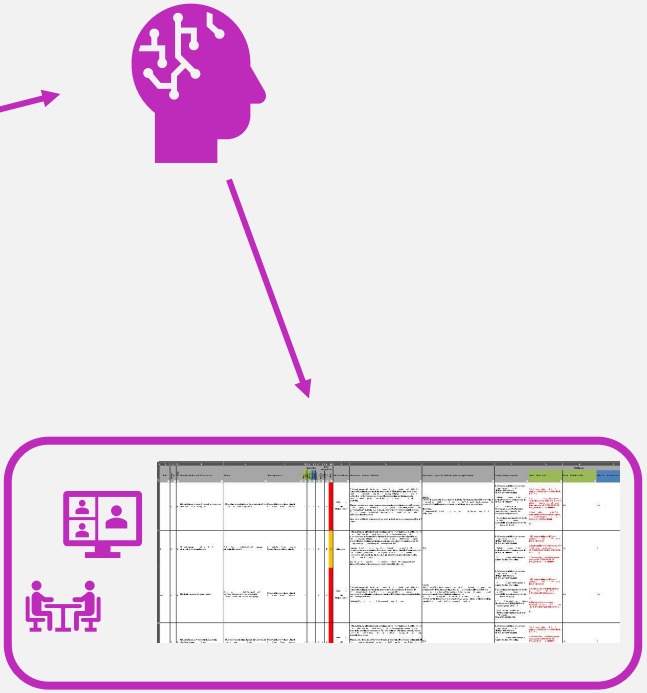
Challenge 4 – Digital Hazard Log

The Challenge Statement – The Vision

Inform AI models for future hazard identification



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Challenge 4 – Digital Hazard Log

Summary

- Vast amounts of engineering knowledge is currently trapped within Excel spreadsheets
- Opportunity is there to better leverage this data and to join it up as a foundation for layering on additional technologies
- Multiple benefits to target:
  - Multiple time-saving efficiencies
  - Cost savings through avoiding duplication
  - Step-change in quality and consistency
  - Improve the safety of the railway
  - Enhanced collaboration between rail duty holders
- PoC demonstration would require a focus on specific use cases and scenarios, for example:
  - Hazard identification and management
  - Hazard information searches
  - Interactions between related project Hazard Log
  - Future railway states

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Challenge 5 – Scour Risks to Structures

Tom Brodrick (Network Rail)

Innovate UK

Challenge 5 – Scour Risks to Structures

Network Rail has approximately 5,000 bridges over or adjacent to flowing water. 3,000 are deemed adequately protected but 2,000 require continued assessment to understand scour risk. When assessments deem a structure to be of higher priority, Network Rail standards now mandate that foundation depths must be confirmed. This challenge seeks innovating, non-invasive, cost effective, and accurate methods to determine the foundation depths of masonry and brick structures, particularly those built on timber piles.

Scour is the removal of material from the bed and banks of a channel and from around structure foundations by the action of water, leading to structural damage or failure. Scour is the leading cause of bridge failures in the last 100 years in the UK. The risk is increasing due to climate change.

Establishing Foundation Depths

One of the key factors in determining whether a structure is at risk of scour is foundation depth. The deeper the foundations, the less chance there is of the structure failing. Once foundation depths are known a much more accurate assessment of true scour risk can be made.

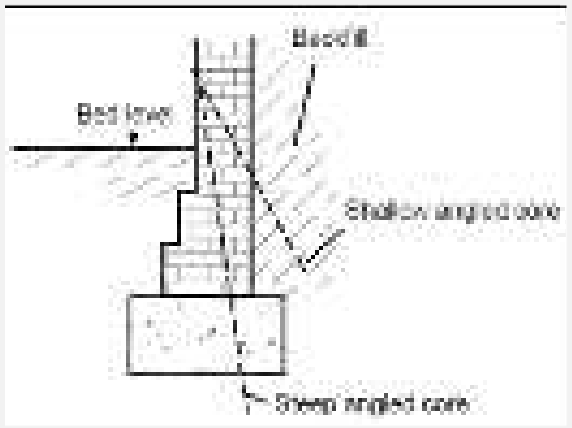
Challenge 5 – Scour Risks to Structures

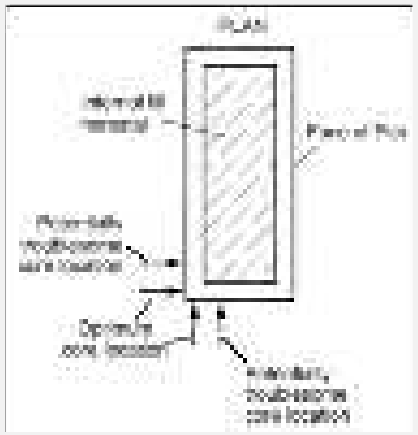
The current method of establishing the foundation depths of brick and masonry structures is via core drilling. This is expensive, detrimental to the structure and in some cases not particularly accurate. A significant number of masonry and brick railway bridges were originally built on timber piles but have no reliable construction drawings. Core drilling of these bridges only establishes the depth of the pile cap or timber raft on the top of these piles:

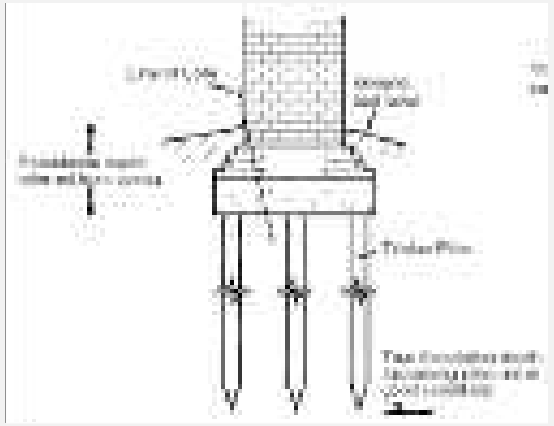
Another problem is the potential to core through the back of abutments and misinterpret the change form masonry or brick to natural ground as being the base of the foundation. This can be caused by coring at too shallow an angle or by coring within thinly faced abutments

To address these challenges, it is expected that R&D actions will need to address the following issues:

- Difficult to measure existing foundation type/depths.
- Intrusive, on-site works requiring access are expensive







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Challenge 6 – Structures: Rapid Behaviour Verification to Support Assessment and Intervention Decisions

Tom Brodrick (Network Rail)

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Challenge 6 – Structures: Rapid Behaviour Verification to Support Assessment and Intervention Decisions

Network Rail manages a large population of metallic bridges and structures that are formally assessed as substandard under current standards (e.g. NR/L2/CIV/035), frequently exceeding published intervention timescales. In many cases, these assessments are highly conservative, driven by uncertain material properties, load assumptions, idealised boundary conditions, or incomplete knowledge of load paths.

At the same time, real-terms capital budgets for strengthening and renewal are constrained, and reliance on additional bespoke examinations or long-term monitoring is often costly, asset-specific, and operationally disruptive.

The specific challenge is therefore:

- How can we rapidly and affordably demonstrate whether a structure that appears substandard on paper is actually behaving adequately under representative loading, using short-duration, deployable techniques that support engineering judgement rather than replacing it?

This challenge explicitly does not seek permanent or large-scale Structural Health Monitoring (SHM) solutions. Instead, it focuses on targeted, examiner-led behaviour verification, deployed during planned access such as a Detailed Examination.

Challenge 6 – Structures: Rapid Behaviour Verification to Support Assessment and Intervention Decisions

Substandard does not equal Unsafe, but We Lack Confidence. A growing number of metallic structures fall beyond formal intervention timescales, yet:

- Show no visible distress
- Have performed satisfactorily in service for decades
- Are often governed by uncertain rather than deficient capacity

Current options to resolve this uncertainty are limited to:

- Further intrusive examinations
- Bespoke testing
- Conservative assumptions that trigger strengthening or renewal

All of these carry cost, access, safety, and possession impacts. Desktop Assessment Often Cannot Capture Real Behaviour. Existing assessments typically struggle to represent:

- Load sharing and redundancy
- Beneficial fixity and restraint
- Real stiffness, damping, and boundary conditions
- Actual load effects under traffic

Engineers often believe the structure is behaving better than the model suggests, but lack defensible evidence to demonstrate this.

Challenge 6 – Structures: Rapid Behaviour Verification to Support Assessment and Intervention Decisions

Full SHM Is Disproportionate for This Decision. Long-term, permanently installed SHM systems can be valuable on a small number of complex or high-risk assets, but across the wider portfolio they are typically:

- Too expensive
- Too slow to deploy
- Over-engineered for the decision being asked

For most assets, we are not trying to predict failure or monitor deterioration continuously; we are trying to answer a much narrower question:

- Is this structure behaving in a way that justifies confidence in its continued safe operation, and can that confidence be used to calibrate or refine the assessment?

Challenge 7 – Green Engineering Solutions for Earthworks Resilience and Biodiversity Net Gain

Andrew Jones (Southern Renewals Enterprise)

Innovate UK

Challenge 7 – Green Engineering Solutions for Earthworks Resilience and Biodiversity Net Gain

Rail earthworks (embankments, cuttings and associated drainage) across Britain are ageing and increasingly exposed to climate-driven stresses—more intense rainfall, hotter, drier summers, and extreme weather. Failures such as slips, erosion, and saturation-related instability are rising, driving emergency restrictions, service disruption, and unplanned cost.

At the same time, statutory Biodiversity Net Gain (BNG) now requires that schemes maintain or improve habitats, not simply avoid loss. Treating resilience and biodiversity as separate goals has led to inefficient ‘bolt--ons,’ missed synergies, and avoidable lifecycle carbon and cost.

We need Green Engineering Solutions that:

- Marry up BNG with earthworks resilience.
- Embed habitat creation and ecological function directly into the engineering fabric of slopes and drainage.
- Accelerate circular-economy practices through recycled and repurposed materials.

Solutions must be practical to install on live railways, maintainable, standards compliant, and demonstrably scalable across a large, diverse portfolio of railway earthworks assets. Clear success criteria must be established and measurable post installation.

UKRI Innovate UK

Challenge 7 – Green Engineering Solutions for Earthworks Resilience and Biodiversity Net Gain

Solutions we do want - Innovative, integrated approaches that simultaneously deliver BNG and reduce earthwork failure risk, with whole life value and scalable deployment:

- Nature based engineering for slope stability and habitat uplift.
- Vegetated reinforced soil, bioengineered facings and live staking.
- Habitat integrated drainage (swales, wetland cells, leaky barriers) that attenuate flows and create biodiversity corridors.
- Circular materials and low carbon construction
- Recycled aggregates, crushed concrete, and screened spoil.
- Repurposed components (e.g., reclaimed timber, modular concrete units from decommissioned assets).
- Biodegradable erosion control mats, coir products, compost blankets.
- Digital optimisation and monitoring
- GIS/BIM to co-map ecological corridors and geotechnical risk.
- AI enabled predictive models for rainfall triggered failures.
- IoT sensors and drone surveys to track slope performance and ecological metrics.
- Standardised, modular specifications
- Pattern books and details that minimise sites specific redesign.
- Installation sequences tailored for short possessions and off-track access.
- Assured deliverability and routes to scale
- Solutions aligned to Network Rail earthworks technical practice.
- Clear business cases, material supply chain plans, and training packages.

Challenge 7 – Green Engineering Solutions for Earthworks Resilience and Biodiversity Net Gain

Solutions we do not want

- Cosmetic planting or ecological ‘add-ons’ that do not measurably reduce failure likelihood or consequence.
- High-cost, bespoke designs unsuited to portfolio roll-out or that require long possessions/complex access.
- Approaches that increase operational risk or compromise compliance.
- Concepts lacking credible plans for demonstration on live railway assets or pathways to scale.

Summary of specific themes

- Prevention: Integrate bioengineering, habitat forming drainage and circular materials to reduce triggers for instability.
- Mitigation: Design features that limit consequence when extreme events occur.
- Response: Embed sensor ready details and modular elements for rapid recovery.
- Scalability: Create standard detail libraries and procurement frameworks for recycled/repurposed materials.
- Commercial viability: Evidence whole life savings and ROI; show how digital monitoring reduces inspection cost.
- Multi-sector alignment: Demonstrate collaboration between rail asset owners, ecologists, materials recovery partners, and digital providers.

Challenge 7 – Green Engineering Solutions for Earthworks Resilience and Biodiversity Net Gain

Useful reference information for applicants

- National Engineering Policy Centre report on ageing infrastructure and resilience priorities.
- Network Rail Earthworks Technical Strategy and BNG compliance guidance.
- Circular economy standards for recycled and repurposed materials in civil engineering.

Examples of existing solutions

- Vegetated reinforced soil and bioengineered facings combining geosynthetics or biodegradable meshes with live planting.
- Habitat integrated drainage (SuDSinrail): shallow swales, wetland cells, and planted channels.
- Circular material use: crushed concrete and screened spoil as engineered fill, reclaimed timber/concrete for toe protections, biodegradable mats/coir for erosion control.
- Digital monitoring and adaptive management: drones/LiDAR for rapid condition and habitat mapping; IoT soil moisture/pore pressure arrays for trigger-based maintenance.

Challenge 8 – Enhancing Rail Adhesion Through Intelligent Vegetation Management and Biodiversity-Positive Interventions

Steve Venables (Transport for London)

Innovate UK

Challenge 8 – Enhancing Rail Adhesion Through Intelligent Vegetation Management and Biodiversity-Positive Interventions

Low rail adhesion—particularly during leaf-fall season—continues to present a significant safety, performance, and cost challenge to the UK rail network. Existing mitigation methods (such as Rail Head Treatment Trains, sanding, and manual vegetation clearance) are effective but often reactive, resource-intensive, and environmentally intrusive. At the same time, the railway must comply with biodiversity net gain (BNG) requirements, improve ecological stewardship, and manage vegetation sustainably.

This FOAK challenge seeks innovative, scalable solutions that transform how the industry understands, predicts, and manages vegetation-driven adhesion risks while enhancing biodiversity outcomes.

Challenge Statement

How can we radically improve rail adhesion performance by developing intelligent vegetation management solutions that:

1. Develop a predictive Decision Support Tool to evaluate across a rail network, the risk presented by lineside vegetation and other physical factors that affect low-adhesion risks and how that changes with time. Solutions should include (but are not limited to):

- Model the Risk presented by lineside vegetation Develop a predictive model that identifies how vegetation and topography influence low-adhesion risk.

Challenge 8 – Enhancing Rail Adhesion Through Intelligent Vegetation Management and Biodiversity-Positive Interventions

- Provide Geospatial Risk Estimates at Multiple Resolutions Generate vegetation risk predictions for spatial units such as 10 m, 50 m, or 100 m track cells, enabling precise localisation of both current and emerging risk hotspots.
- Integrate Diverse Data Sources, propose methods to capture, fuse, or simulate data demonstrating when and where vegetation issues which influence low-adhesion risk are likely to develop. This may include:
- Forecast Risk Over Multiple Time Horizons, produce predictions that are useful for:
    - Short-term operations (hours to days)
    - Seasonal planning (e.g., autumn schedules)
    - Asset management (1–3 years ahead)
    - Strategic planning (5–10 years ahead)

The solution should support proactive decision making such as treatment train scheduling, sanding strategies, vegetation clearance, and targeted inspections.

2. Enable smarter, less disruptive, and more sustainable vegetation interventions. This challenge encourages:

Challenge 8 – Enhancing Rail Adhesion Through Intelligent Vegetation Management and Biodiversity-Positive Interventions

- Data-driven intervention planning that reduces unnecessary clearance
- Identification of high-risk tree species (e.g., oak) and decision frameworks for replacement
- Development of operationally efficient methods to intervene before leaves become a contaminant
- Integration with maintenance workflows to optimise resource allocation and reduce manual inspections

3. Facilitate the replacement of problematic species with railway-compatible, biodiversity-positive alternatives. Innovators are invited to propose:

- Species substitution programmes that maintain or enhance lineside ecological value
- Fast-growing, resilient tree and shrub species that minimise leaf-fall adhesion risk
- Approaches to landscape design that maintain screening, reduce future hazards, and improve long-term sustainability
- Decision support tools that evaluate both safety risk and ecological benefit

Challenge 8 – Enhancing Rail Adhesion Through Intelligent Vegetation Management and Biodiversity-Positive Interventions

4. Deliver biodiversity net gain while improving adhesion outcomes. Solutions should demonstrate how they will:

- Achieve BNG compliance through habitat creation, corridors, or enhanced species diversity
- Measure and quantify biodiversity uplift alongside operational benefits
- Integrate ecological science with operational railway constraints
- Balance safety, performance, and environmental responsibilities

Eligibility criteria

Innovate UK

Eligibility Criteria – Your Project

Your project must:

- start by 1st September 2026
- end by 31st March 2027
- last between three to seven months
- have total costs of no more than £210,000, inclusive of VAT

Projects must always start on the first of the month, even if this is a non-working day. You must not start your project until your Contract has been approved by Innovate UK.

Innovate UK

Eligibility Criteria – Lead Organisation

Lead organisation:
To lead a project your organisation must:

- be an organisation of any size, including those based in the EU, EEA or internationally
- work alone or with the subcontracted skills and expertise of others from businesses, research organisations, research and technology organisations or the third sector (charities, social enterprises and voluntary groups)

Contracts will be awarded to a single legal entity only.

The majority of the project work and key deliverables must be completed by the lead applicant and be carried out in the UK.

Subcontractors can be used, but only for specialist skills.

UKRI Innovate UK

Eligibility Criteria

Subcontractors

- Subcontractors are allowed in this competition, but **only** for specialist skills.
- Subcontracting outside of the UK is permitted, but you must fully explain the specific skills the subcontractor brings to the project.
- If you're subcontracting to a parent or sister company, please ensure you list at cost and do not include profit.
- All subcontractor costs must be justified and appropriate to the total project costs.

Eligibility Criteria – Number of applications

Number of applications

You can lead in any number of applications, but if successful you will need to demonstrate your organisation has capacity and necessary resources to fulfil the projects.

Innovate UK

Previously submitted applications

This competition **does** allow you to submit a previously submitted application.

Previously submitted application	Not a Previously submitted application
A previously submitted application is an application Innovate UK judges as **not** materially different from one you have submitted before (but it can be updated based on the assessors' feedback). If you have previously submitted an application that reached our assessment stage, you can re-apply once more with the same proposal.	A brand-new application, project or idea that you have not previously submitted into an Innovate UK competition. or A previously submitted or ineligible application which: • has been updated based on assessor feedback • and is materially different from the application submitted before • and fits with the scope of this competition

Innovate UK

Innovation Funding Service (IFS)

How to apply

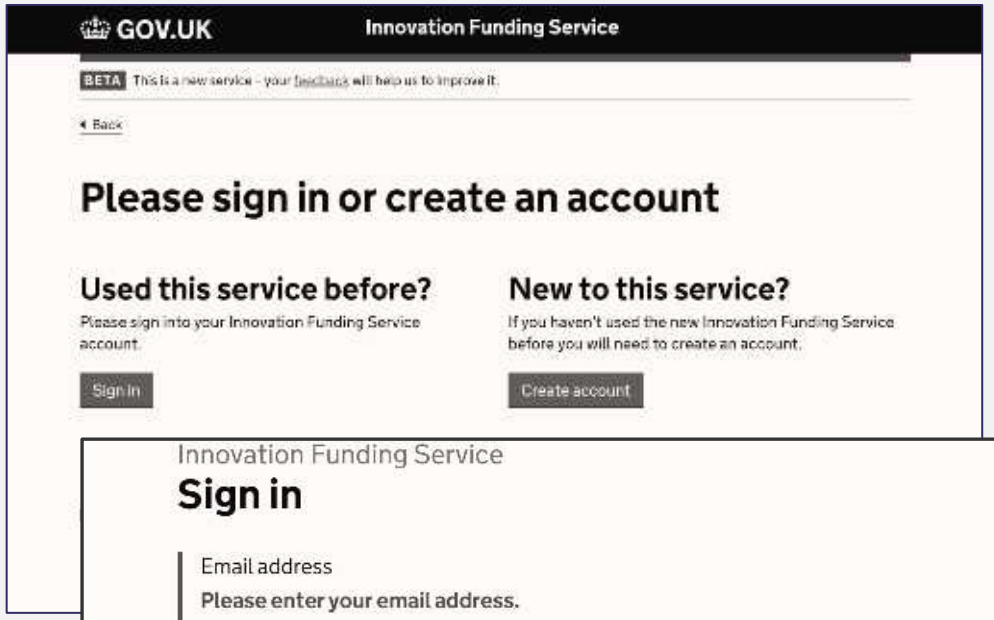
You must create an account:

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

To avoid being listed as a business and to ensure you receive the correct funding, enter your information manually on IFS



Innovate UK

Application Questions

Detailed guidance available on IFS

Application Form		Word Count	Appendix inc. number of pages
Question 1	Challenge (not scored)	400	No
Question 2	Animal testing (not scored)	Multiple choice	No
Question 3	Permits and licences (not scored)	Multiple choice	No
Question 4	International Collaboration	100	No
Question 5	Export Licence	Multiple choice	No
Question 6	Trusted research and collaboration	400	No
Question 7	**Public synopsis (not scored)**	50	No
Question 8	Previous applications	400	No
Question 9	Current state of the art and intellectual property	400	No
Question 10	Project plan and methodology	400	Yes – mandatory 2x A4 PDF
Question 11	Technical team and expertise	400	No
Question 12	Costs and value for money	400	Yes – Optional – 2x A4 PDF
Question 13	Commercial potential	400	No

National Security and Investment Act - overview

Subject to certain criteria, UK applicants are legally required to tell the government about acquisitions of certain entities in 17 sensitive areas of the economy (called 'notifiable acquisitions').
https://www.gov.uk/government/publications/national-security-and-investment-act-guidance-on-notifiable-acquisitions/national-security-and-investment-act-guidance-on-notifiable-acquisitions

These 17 areas are:

- Advanced Materials
- Advanced Robotics
- Artificial Intelligence
- Civil Nuclear
- Communications
- Computing Hardware
- Critical Suppliers to Government
- Cryptographic Authentication
- Data Infrastructure
- Defence
- Energy
- Military and Dual-Use
- Quantum Technologies
- Satellite and Space Technologies
- Suppliers to the Emergency Services
- Synthetic Biology
- Transport

If there is significant uncertainty about whether an acquisition is notifiable, you may contact the government on **investment.screening@cabinetoffice.gov.uk** to seek a view or get legal advice from your own sources.

UK Strategic Export Controls - overview

UK strategic export controls - GOV.UK

The UK government has put together this guidance for those who export or transfer goods, software or technology (including data, information and technical assistance) which might be subject to strategic export controls.

It explains what control lists are, as well as who they apply to and when, so that exporters can make sure they comply with the law.

Applicants should assess how these controls may impact the project and confirm if they will need a licence (see question 5).

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Q4 International Collaboration (not scored)

Does your proposed work involve any international collaboration or engagement?

You must provide details of any expected international collaboration or engagement. You must include a list of the names and the countries any international project co-leads, project partners, visiting researchers, or other collaborators are based in. You must also include details of any subcontractors or service providers.

If your proposed work does not involve international collaboration or engagement, your answer must confirm this.

Q5 Trusted Research and Innovation (not scored)

You must explain if your proposed project work relates to UKRI's Trusted Research and Innovation Principles, including:

- a list of any dual-use (both military and non-military) applications to your research
- a list of the areas where your project is relevant to one or more of the 17 areas of the UK National Security and Investment (NSI) Act)
- whether an export control license is required for this project under the *academic export control guidance* and the status of any applications
- a list of any items or substances on the UK Strategic Export Control List

We may ask you to provide additional TR&I information at a later date, in line with UKRI TR&I Principles and funding terms and conditions

Innovate UK

Project Impact questions

- Each organisation in your application will complete the Project Impact questions within the ‘Supporting information’ section
- The Project Impact questions ask for data about your business and innovation and its contribution to the UK economy, society, and the environment
- Visit the Project Impact guidance page for more information, the types of questions you will be asked and how to get further support
- By providing this data, you are enabling us to better understand the impact of our support. It will help us identify success stories and provide evidence to government and the public of the value of supporting innovative businesses

For more information:

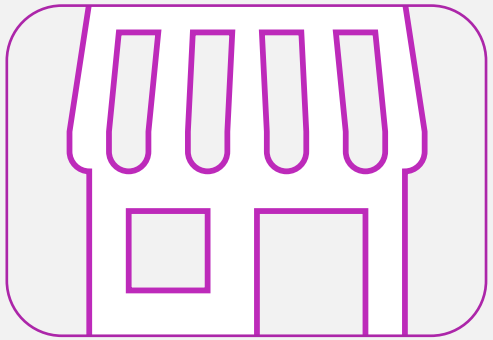
- Watch Our Impact Management Framework video
- How is the Project Impact data collected? video

UKRI Innovate UK

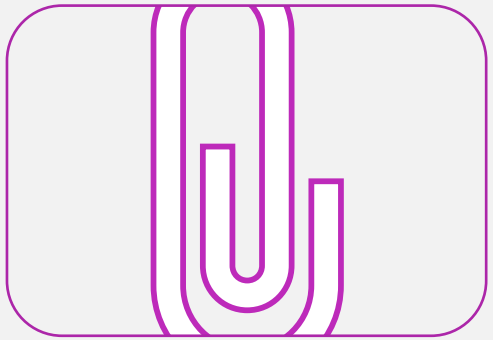
Your Project Cost Categories

View our Application Finances Instructional Video

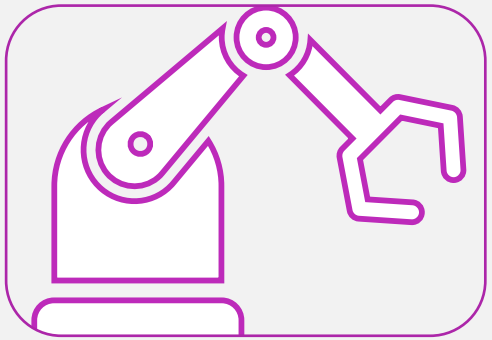
Labour



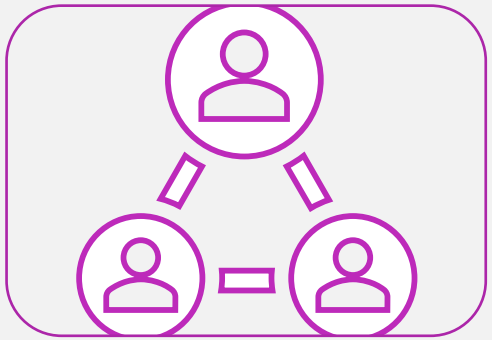
Overheads



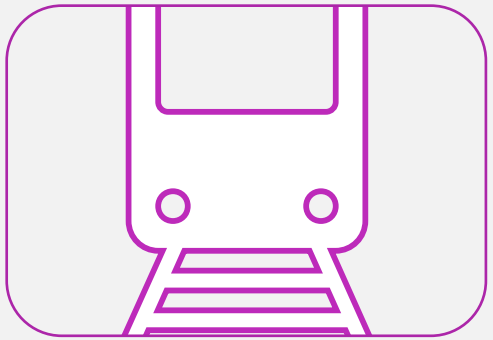
Materials



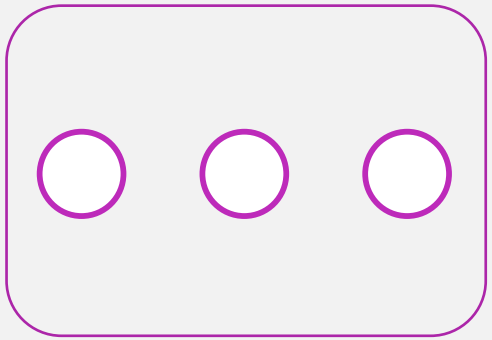
Capital Usage



Subcontractors

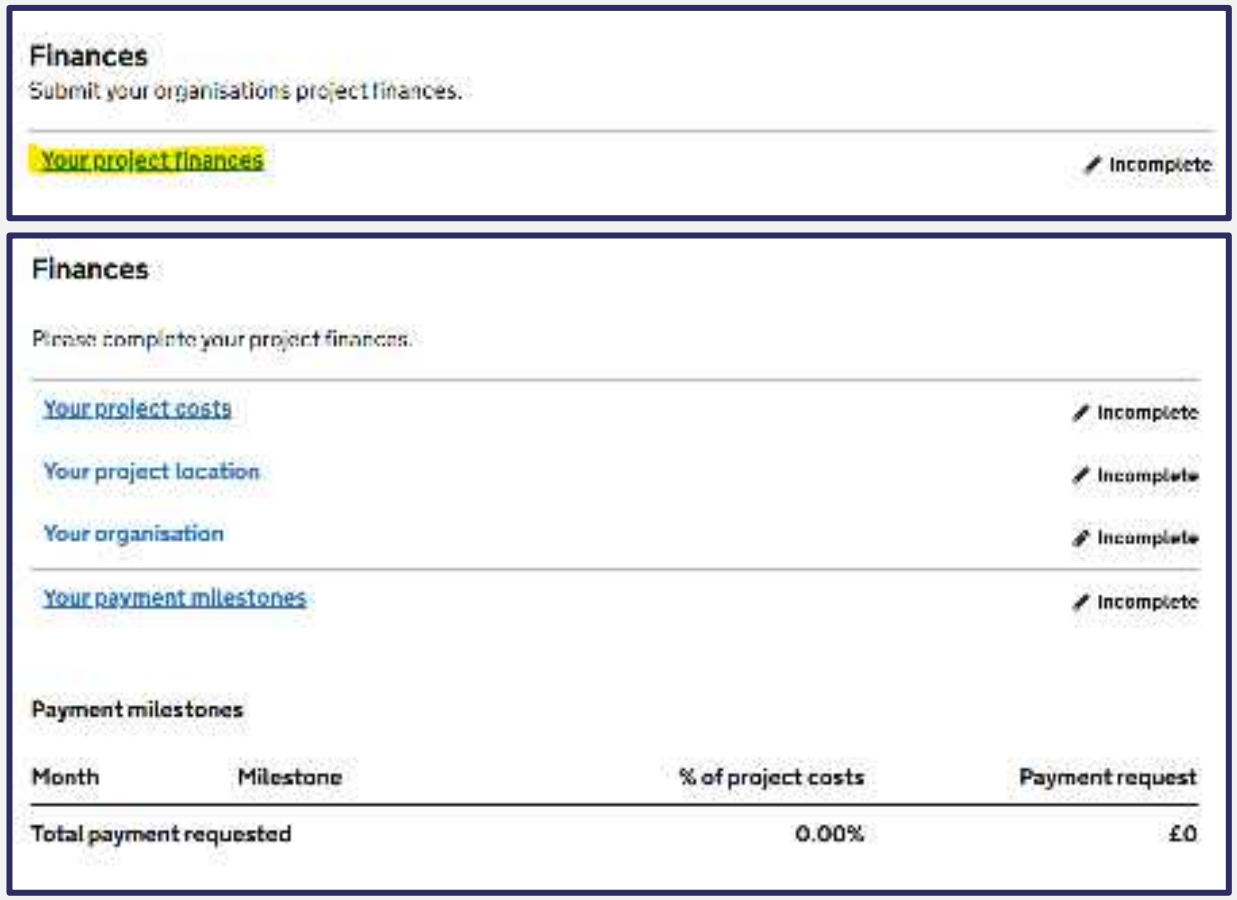


Travel & Subsistence



Other

Your project finances



Your project costs
Add your project costs by category – refer to previous slide for link to instructional video

Your project location
Enter postcode for where most of the project work will take place.

Your organisation
Add details of your organisation including size, turnover and number of employees

Your payment milestones
Enter each milestone and deliverable information. Where appropriate, link the milestone with a payment request.

Innovate UK

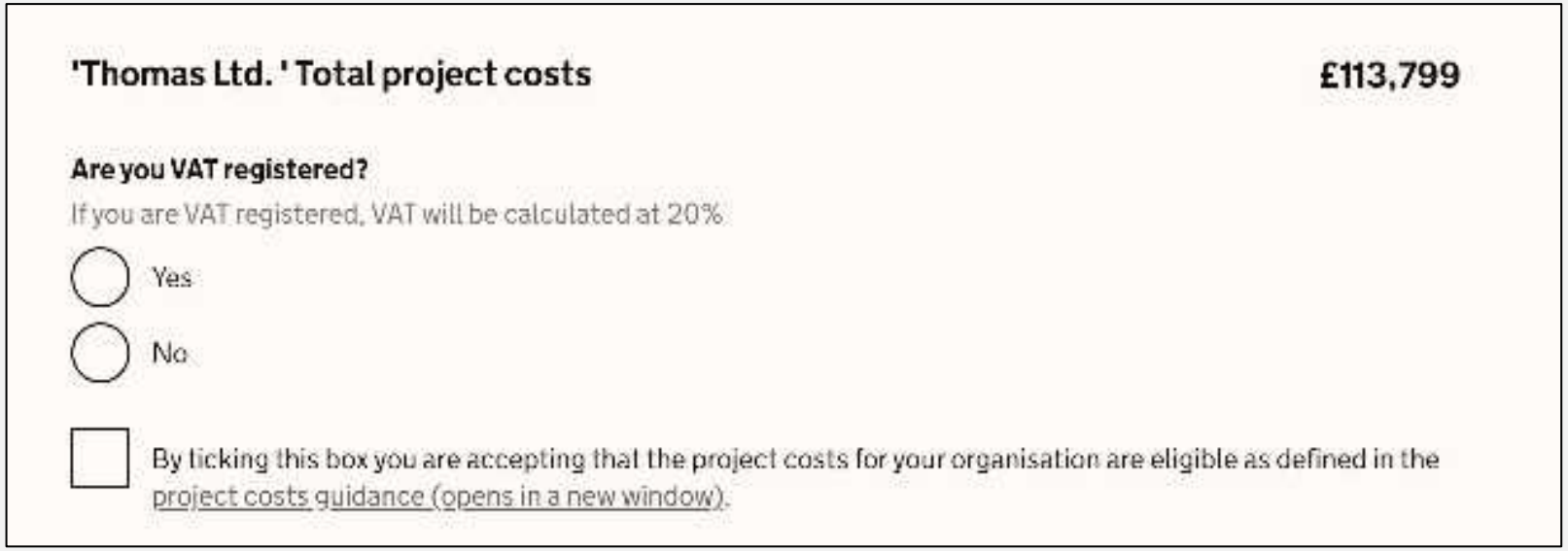
VAT

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 your VAT as it may increase your project costs and make you ineligible.



Innovate UK

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 fit the criteria for this competition.

The maximum project costs for this competition are **£210,000**

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

Innovate UK

Subcontractors

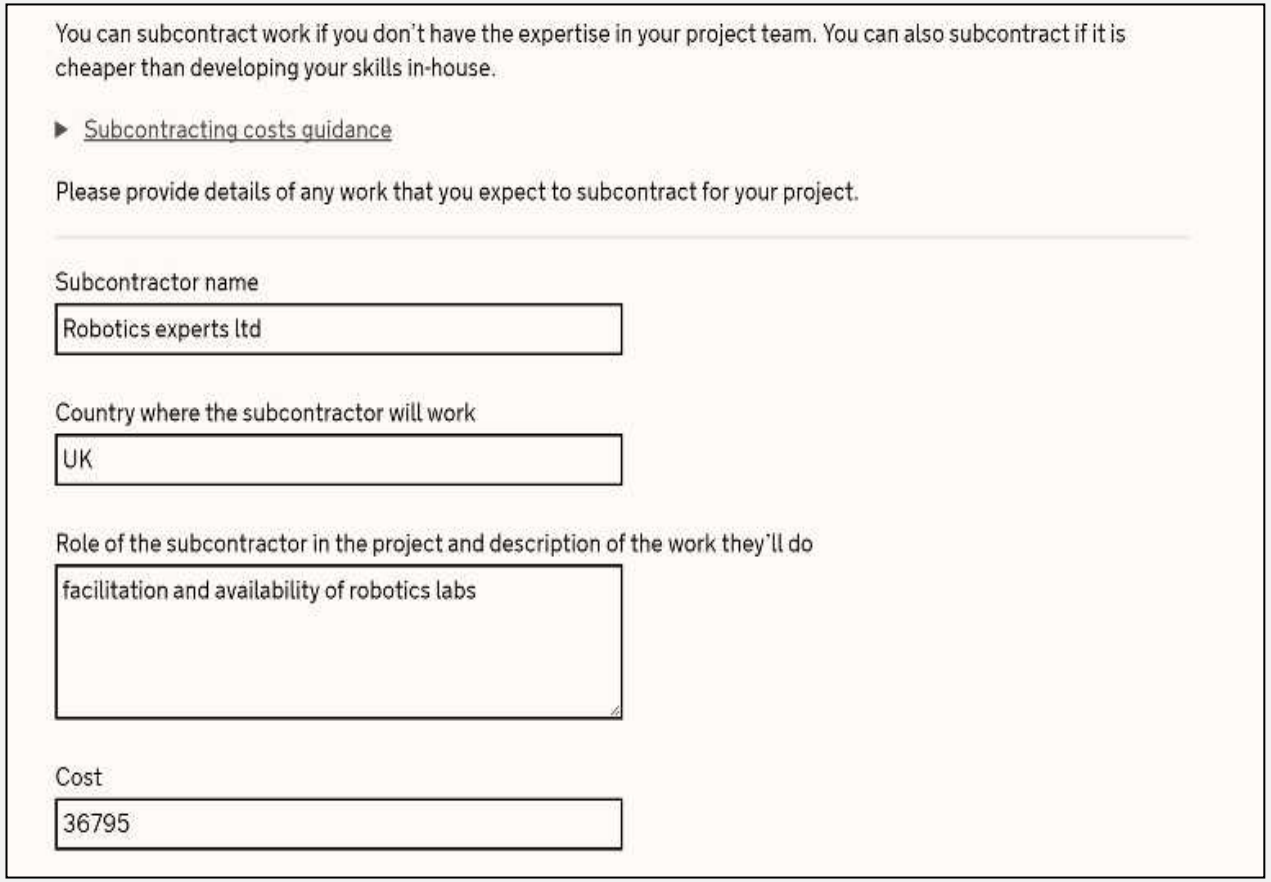
Eligible:

Subcontracting outside of the UK is permitted.

You should fully explain the specific skills the subcontractor brings to the project.

If you're subcontracting to a parent or sister company, please ensure you list at cost and do not include profit.

All costs must be justified and quantified.


You can subcontract work if you don't have the expertise in your project team. You can also subcontract if it is cheaper than developing your skills in-house.

▶ Subcontracting costs guidance

Please provide details of any work that you expect to subcontract for your project.

Subcontractor name

Robotics experts ltd

Country where the subcontractor will work

UK

Role of the subcontractor in the project and description of the work they'll do

facilitation and availability of robotics labs

Cost

36795

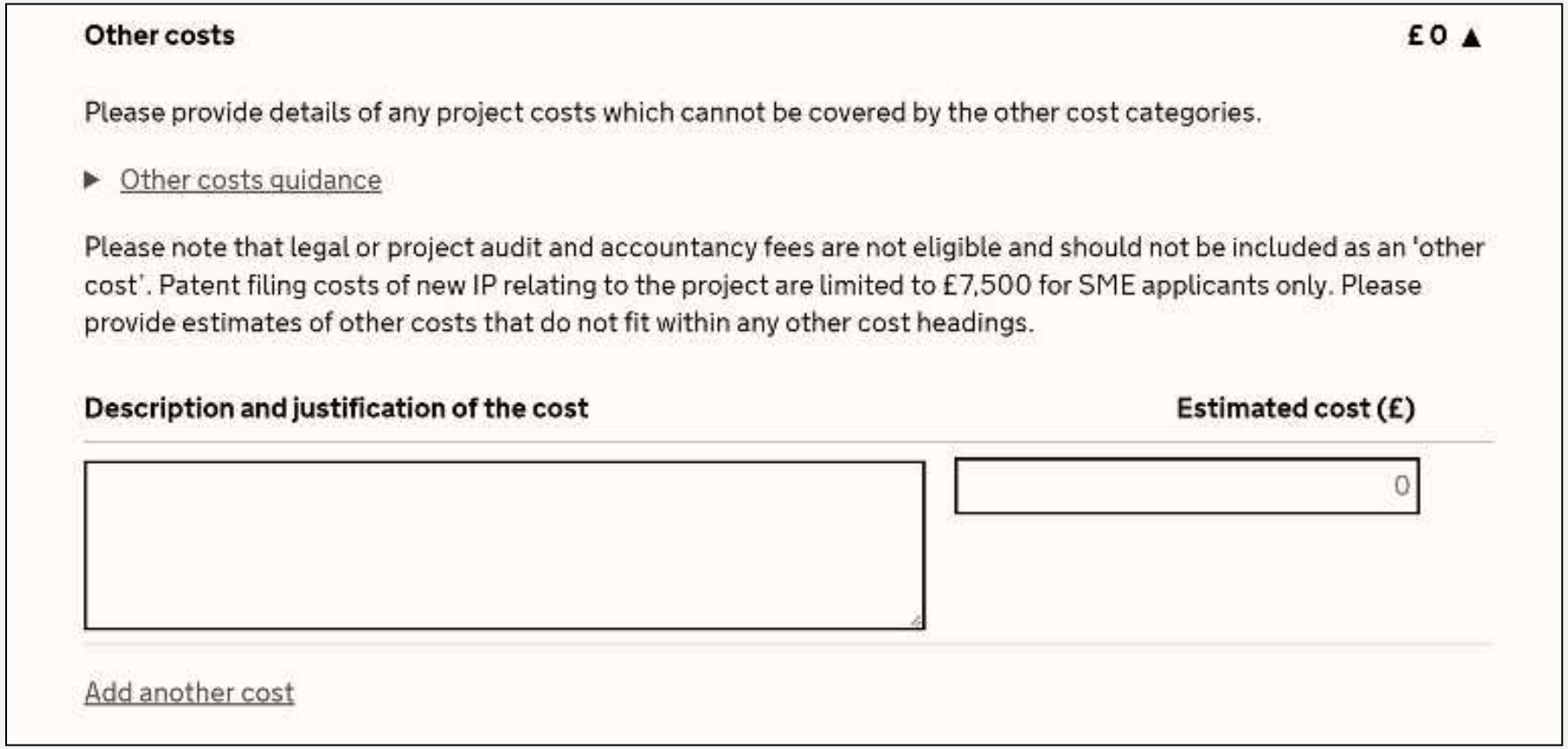
Innovate UK

Other costs

Costs that could not be added under previous headings.

Do not double count.

All costs will be reviewed by the finance team during contract award



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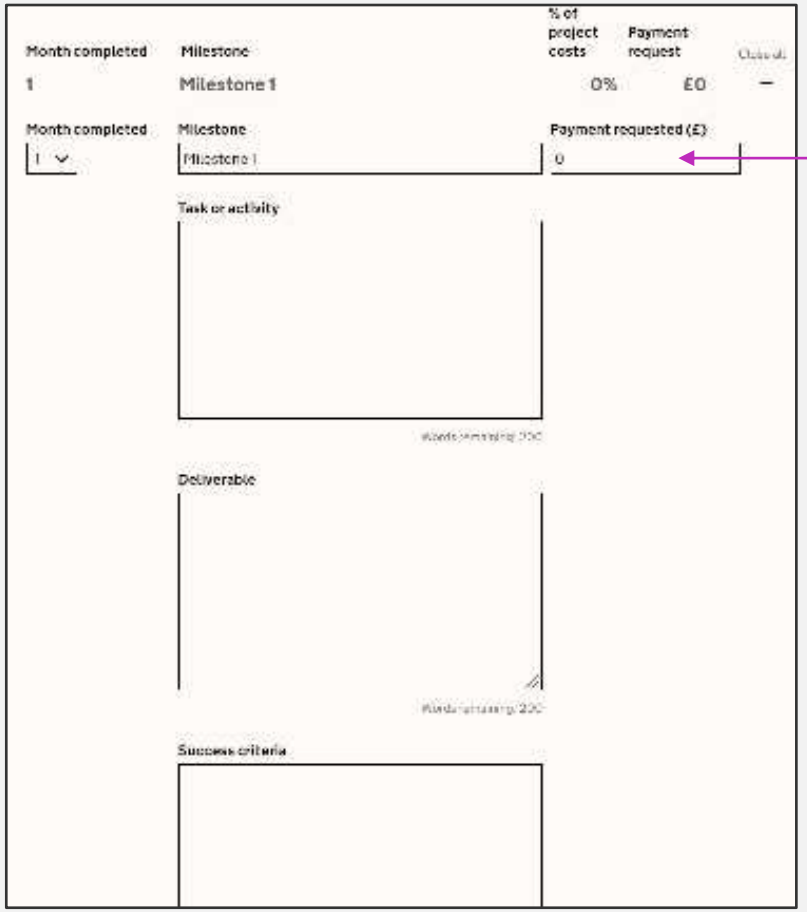
Payment milestones



Enter each milestone and any associated payments

Month completed	Milestone	% of project costs	Payment request	Open all
1	Milestone 1	33.33%	£50,000	+
2	Milestone 2	33.33%	£50,000	+
3	Milestone 3	33.33%	£50,000	+

Add another project milestone

Total payment requested 100% £150,000

Mark as complete

Save and return to project finances

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

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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 within reason.
- 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.

Milestone example

Milestone

Build test environment for prototype

Task or activity

Complete physical hardware build

Software integration finalised

Deliverable

Prototype test environment built in accordance with associated designs

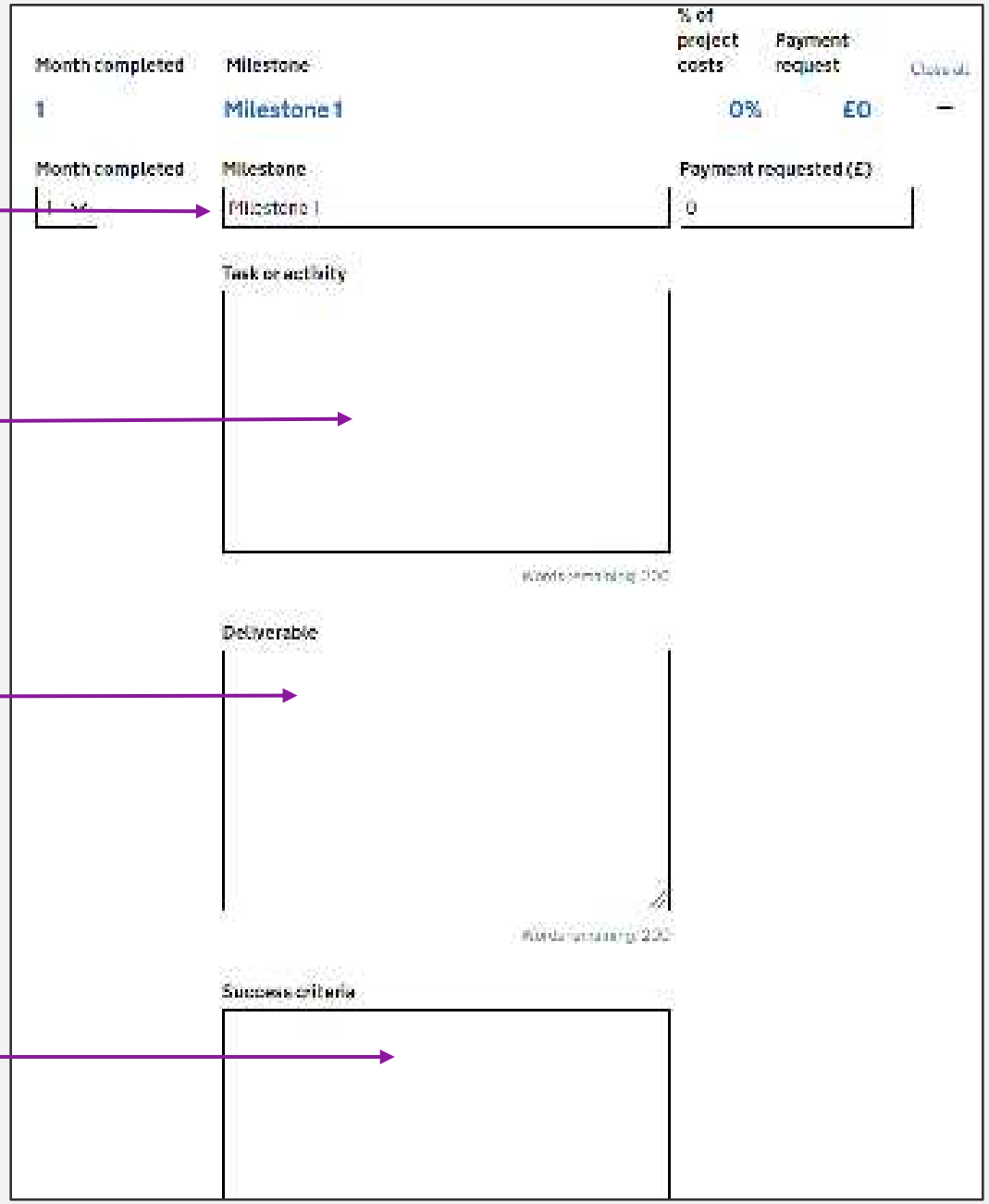
Operating instruction manual completed

Success Criteria

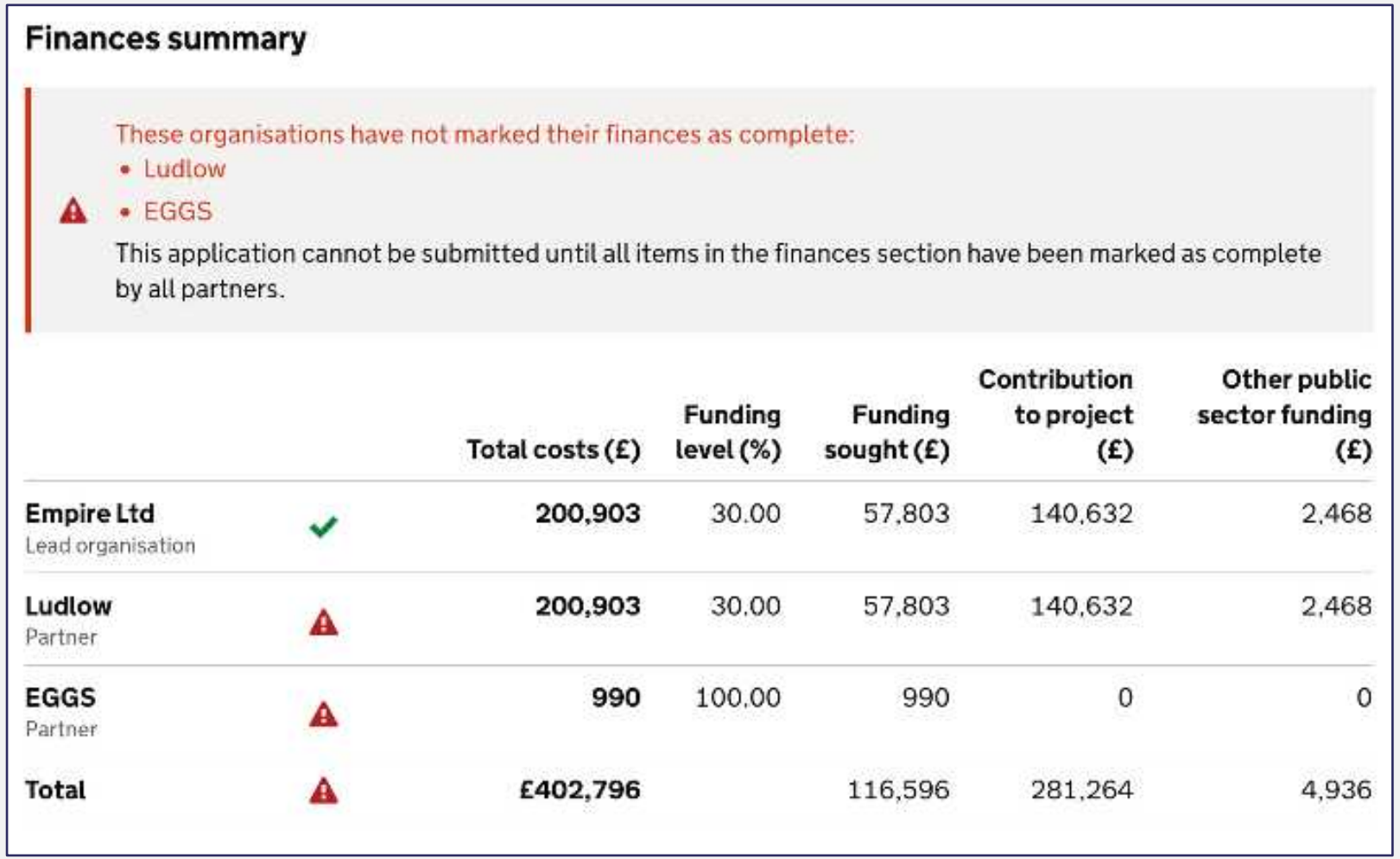
Fully operational test environment.

Successful integration of prototype and test environment software.

0.5% error rate



Checking your finances are complete



Finances summary

These organisations have not marked their finances as complete:

- Ludlow
- EGGS

This application cannot be submitted until all items in the finances section have been marked as complete by all partners.

		Total costs (£)	Funding level (%)	Funding sought (£)	Contribution to project (£)	Other public sector funding (£)
Empire Ltd Lead organisation	✔	**200,903**	30.00	57,803	140,632	2,468
Ludlow Partner	⚠	**200,903**	30.00	57,803	140,632	2,468
EGGS Partner	⚠	**990**	100.00	990	0	0
Total	⚠	**£402,796**		116,596	281,264	4,936

Check your finances have been correctly inputted, with the correct costs, funding level at 100% and funding sought figure, as per the eligibility criteria of the competition.

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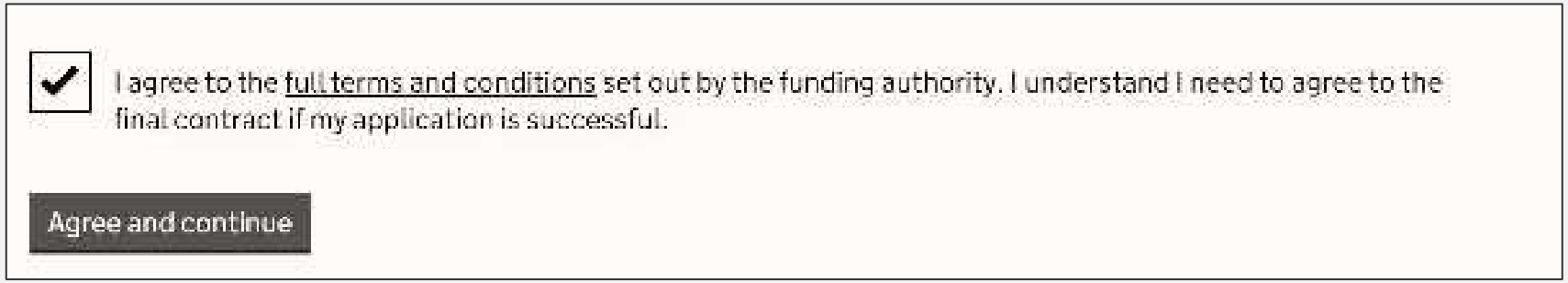
Terms and Conditions

Before you can submit your application, **you must** agree to the draft terms and conditions for this competition. Please ensure you share the T&Cs with your legal team at the earliest possible opportunity.

Note that for procurement, they may differ from any you have agreed to before. These terms are set and are non-negotiable.

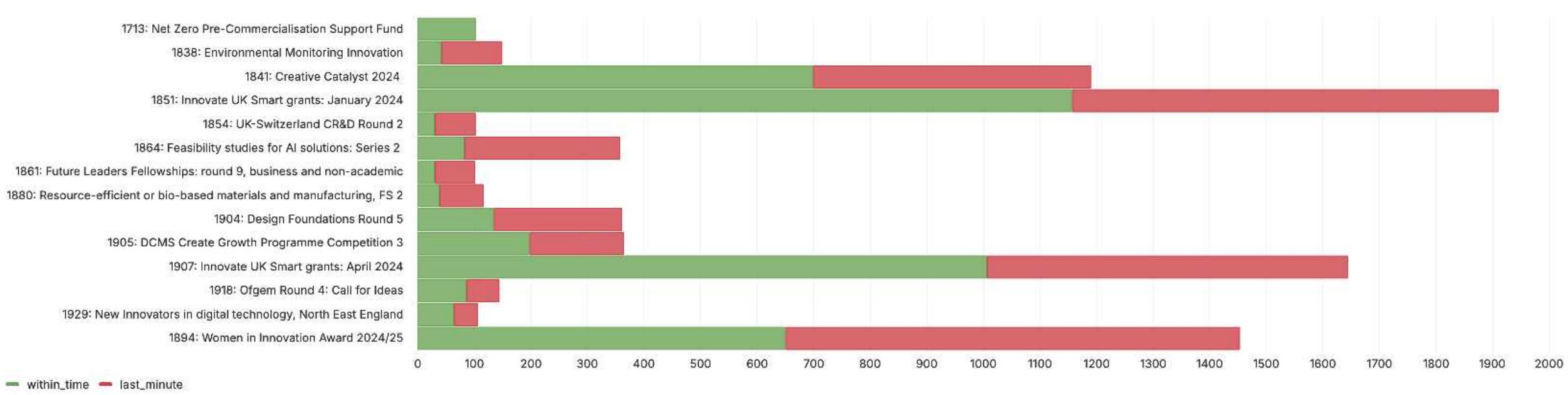


Innovate UK

Submitting your application

Customer Support can help resolve any issues you might have when submitting **but only if they are contacted before the deadline**.

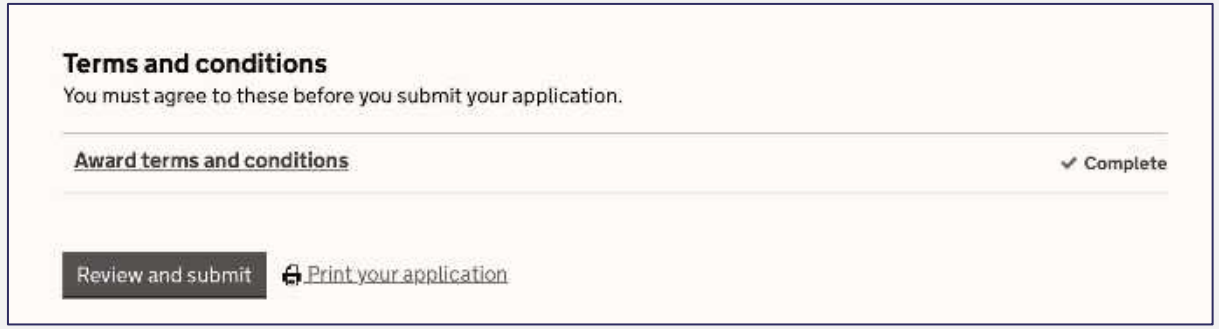
Once the deadline has passed, your application cannot be submitted.



Innovate UK

Editing a submitted application

Reopen by clicking here



Remember to press ‘Submit application’

Innovate UK

Pros & Cons of using AI to support you

With the advances in AI technology, it is only natural to use technology to support you in applying to our competitions. Whilst we don't recommend or advise against it, we would like to make you aware of the following which could potentially impact your project.

Pros

- Removes barriers for people with disabilities and non-English speakers
- Allows you to rephrase your content to meet the word count in a question
- Ensures all aspects of a question are answered
- Can aid a better understanding of:
  - intended/wider market
  - best practice in project management
  - complementary technologies and advances in the industry
  - expected project impacts

Cons

- It is not always accurate in its assumptions and can get things wrong
- AI learns from the information you give it as well as what it has already learnt
- May provide a generic response meaning your application could use similar phrasing to others
- AI can be detected as non-human as it lacks expression and insight because it relies on logic to summarise information based on the question asked

Whilst AI offers many benefits, it is important you are aware that **you are potentially sharing your idea with the world,** so be careful what you share as you have no control over how it is shared on once you do.

UKRI Innovate UK

Assessment

Innovate
UK

Assessment

[YouTube Playlist]

Innovate UK

Project setup

If you pass the technical assessment, you will have a further eight steps detailed in your notification to complete in Project Setup before being able to start your project.

These are:

- Project details
- Project team
- Documents
- You will be allocated a Monitoring Service Provider (MSP)
- Bank details
- Finance checks
- Milestones
- Contract

Please share the T&Cs with your legal team at the earliest possible opportunity to avoid any delays.

You are expected to complete all the steps above within 30 calendar days of receiving your notification. Failure to do so may result in funding being withdrawn.

Work can only commence on your project once you have received your Go Live email.

Additional Support

Innovate
UK

Useful Information

- UKRI's General Guidance
- Innovate UK Business Connect's Good Application Guide
- Who we fund
- Collaboration Agreement Guidance: Lambert Toolkit
- Innovate UK: Shaping the Future

Funding opportunities

To find out more about the competitions currently available you can visit either the **Innovation Funding Service (IFS)** or the **funding finder** on the UKRI website. Through these links, you can review the competitions available and decide which ones may be right for you.

You can **sign up to our newsletter** to receive all the latest information on our competitions straight to your inbox or **register for email alerts** to get page updates from Innovate UK.

The government also offers **other opportunities for businesses to get finance and support**.
Innovate UK reserves the rights to host competitions on a needs basis and will adjust each competition criteria and scope accordingly. We may occasionally run closed competitions that are for invited applicants only. These are run based on the challenge requirement or need.

UKRI Innovate UK

Q&A

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UK

Contact

Customer Support Services

0300 321 4357 (Monday - Friday 9am-12pm and 2pm-5pm)

support@iuk.ukri.org

Innovate UK
ukri.org/councils/innovate-uk

Innovate UK Business Connect
iuk.ktn-uk.org

Innovate UK Business Growth
www.iukbg.ukri.org

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Thank You

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