**Specification for research project**

T1168-02 - Evaluating effectiveness of Trespass Detection and Prevention methodologies

1. RSSB overview

RSSB is a membership organisation that supports the GB rail industry by:

* **Understanding risk** – Using safety intelligence with the latest risk modelling to inform members and support safe decision making.
* **Guiding standards** – Creating, reviewing and simplifying GB standards; managing the Rule Book and making it easier for the railway to deliver efficiently and safely.
* **Facilitating cross-industry collaboration** – As an independent cross-industry body, supporting activities which require collaboration such as supplier assurance schemes, confidential reporting and developing industry strategies.
* **Managing research, development and innovation** – Undertaking, commissioning and managing research and innovation programmes to address current and future needs and providing knowledge for decision making; supporting implementation and promoting step changes to deliver industry strategies.
1. Background

Over the past five years, the number of trespass incidents recorded on the network has grown steadily, reaching an all-time high in 2018. With this has come an increase in delay minutes due to trespass, and injuries and deaths of trespassers. Trespass is also a factor in crimes such as cable theft, vandalism and fare evasion. When the trauma of injuries and deaths to the friends and family of the deceased, staff involved, or witnesses is considered, it can be concluded that trespass damages every part of the rail ecosystem.

People who are trespassing for different reasons could be prevented from doing so with different interventions. For instance, if a certain location sees a lot of trespass because the railway obstructs travel between two popular locations, building a rail bridge could eliminate the problem. A bridge would not eliminate the problem of people trespassing if they intend to vandalise infrastructure.

The industry-wide collaborative [Trespass Improvement Programme](https://www.rssb.co.uk/Pages/trespass-improvement-programme.aspx) was set up in January 2018. The programme includes RSSB, the British Transport Police, Rail Delivery Group, ORR, DfT, passenger and freight train operating companies, and Network Rail. A recent output of this was a Trespass Bowtie Risk Assessment. Another, led by BTP and Network Rail was the [You Vs Train Campaign](https://www.networkrail.co.uk/feeds/life-saving-campaign-launched-as-new-figures-reveal-one-teenager-risks-their-life-on-railway-tracks-every-four-hours/) launched this summer. Other significant work in trespass conducted by RSSB includes an investigation into causal factors for trespass via station platform ends ([T322](https://www.rssb.co.uk/research-development-and-innovation/research-project-catalogue/t322)) which was recently updated. RSSB conducted a knowledge search, [S317 Technologies to Tackle Trespass](https://www.sparkrail.org/Lists/Records/DispForm.aspx?ID=25771), which identified gaps in existing research where further work could be beneficial, specifically:

* There is a lack of understanding surrounding what motivates trespass and how this differs geographically and temporally across the GB network.
* Different strategies and technologies to prevent trespass have not been evaluated in a consistent and reliable manner. Choosing a solution which is effective against trespass, and appropriate to the type of trespass happening at a given location is subsequently difficult.

This project intends to tackle both gaps. The first, by working with Network Rail to gather and analyse data on trespass. The second, by developing guidance on experimental design which could be used to evaluate interventions in the future, and a framework for scoring the success of different interventions in order to compare them.

This work could also generate insight which could contribute to future updates of T322 guidelines and provide empirical data to support the Trespass Bowtie Risk Assessment.

1. Objectives

To improve industry understanding of why trespass occurs and what is effective in preventing it, to inform industry decision making and reduce the incidence of trespass on the network. This research intends to achieve this objective by:

* **Creating a better understanding of what causes people to trespass on the network**. This includes identifying the different reasons for which people trespass, the demographics of those trespassers, and how these changes geographically across the network.
* Using this information to enable industry to **select the best approaches to preventing trespass at specific locations**.
* Developing a means of **validating different trespass prevention strategies** so decision makers can choose an approach which is effective at targeting the type of trespass they are dealing with. This will involve writing **guidelines for good experimental design** for measuring the effectiveness of different strategies will be developed, along with **a framework that allows side-by-side comparison of these strategies**.
* Making this information and these tools available to industry so they can be widely implemented. Encouraging information sharing to further industry understanding of trespass.

By achieving these goals, this research could improve the effectiveness of trespass prevention activities on the network and so reduce trespass rates. The result of this would be an accompanying **reduction in delay minutes due to trespass, crime facilitated by trespass, and injury or death of trespassers on the network**. A 1% reduction in trespass, if the rates otherwise stayed at the current level, could equate to a saving of **£5.7M if sustained over ten years**. An intangible benefit of improved passenger experience would accompany this.

1. Scope

This section defines the tasks to be tendered against, and the technical content against which the submissions will be assessed.

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| In scopeThe following aspects are to be addressed in the tenderers’ response | Out of scope |
| In generation/gathering of data relating to the numbers and reasons of people trespass on the mainline railway. NR will share data they are planning to collect which could include:* Demographics of trespassers
* Times of trespass events
* Locations of trespass events
* Significant features of the environments where trespass occurred, e.g. whether station is manned, whether there are platform end gates, lineside fencing, etc

The tenderer will collect and share additional relevant data from other sources. Such as:* Details of specific events from reports (SMIS+, Close Call, etc)
* Geographic data from trespass hotspots such as the locations of nearby schools and playing fields, available via gvt data sources
* Input from focus groups of those with experience dealing with trespassers.
 | Trialling trespass prevention  |
| Research on suicide and suicide prevention |
| Funding the introduction of new trespass prevention measures, such as new signage or modifying train/station design  |
| Tackling socio-economic factors which are associated with trespass  |
|  |
| Analysis of data collected:* Statistical or thematic analysis of data to create groupings and categories of trespassers
* Creation of profiles of different trespass scenarios to create an understanding of:
	+ The different motivations for trespass
	+ How socioeconomic, geographic, environmental or temporal factors contribute to the reasons people trespass at a given location
 |  |
| Create guidance to allow robust quantified analysis of the results of new trespass mitigation strategies to be performed.The RESTRAIL Practical Guide provides high-level guidance which could form the basis of this: <http://restrail.eu/spip.php?article10> |
| Create a framework for scoring trespass mitigation strategies, so that different approaches can be compared. This will contain data on trespass mitigation strategies which have been evaluated in a way which complies with the guidelines for good experimental practise. Use-test the framework and create initial value by populating it with data from trials being supported by NR.  |

1. Project structure

This project is structured in two packages, **of which Work Package T1168-02 is subject to tender**.

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| Work Package T1168-01 |
| **Title** | Evaluating effectiveness of Trespass Detection and Prevention methodologies - RSSB development |
| **Delivery**  | RSSB |
| **Start** | October 2018 |
| **Completion** | May 2019 |

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| Work Package T1168-02 |
| **Title** | **Evaluating effectiveness of Trespass Detection and Prevention methodologies - Delivery** |
| **Delivery** | Competitive tender |
| **Start** | May 2019 |
| **Completion**  | March 2020 |

1. Deliverables

This work package will provide the following deliverables:

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| **Deliverable Title** | Evaluating effectiveness of Trespass Detection and Prevention methodologies – 01: Trespass Factor Dataset |
| **Deliverable Type** | Dataset |
| **Description** | Data on the current incidence of trespass, and related factors on the rail network. This will complement the data being collected by Network Rail, which will also contribute to the project. Network Rail’s role will be to collect data specific to trespass incidents on the network (numbers of events, time, anti-trespass features at site). The tenderer will conduct desk-based research in parallel focussing on trespass motivation. This should include reports from SMIS+ as well as other relevant sources identified by the tenderer, such as geographic data about trespass hotspots, BTP data, information about trespasser psychology and motivations from academic literature.  |
| **Publication** | The tenderer will have access to data collected by Network Rail using an online platform, and will also contribute data they acquire. Should the tenderer provide data with protected characteristics, appropriate measures should be taken to comply with GDPR.  |

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| **Deliverable Title** | Evaluating effectiveness of Trespass Detection and Prevention methodologies – 02: Report on motivations and contributing factors to trespass |
| **Deliverable Type** | Report |
| **Description** | A report which analyses existing literature on trespass and data collected in collaboration with Network Rail to describe what motivates people to trespass on the rail network. Data collected by NR and the tenderer will be critically evaluated for its quality, significance and reliability as part of this analysis. The report should identify distinct categories of trespass. The primary factor separating these categories will be the motivation of the trespasser (such as convenience, entertainment, and crime). The report will make recommendations about which existing trespass prevention activities would work best against the different groups. The RESTRAIL toolbox already provides some information on what is available and what might be effective in different situations.  |
| **Publication** | All documentation to be produced in the standard RSSB format and to be made widely available. |

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| **Deliverable Title** | Evaluating effectiveness of Trespass Detection and Prevention methodologies – 03: Guidance for evaluating newly implemented trespass interventions |
| **Deliverable Type** | Guidance and implementation support |
| **Description** | This guidance document will serve to advise how to ensure good experimental design is used to evaluate new trespass interventions. While high level recommendations are made in the RESTRAIL toolkit, this guidance should advise on how approaches to control sites, baseline measures and accurate data collection should be utilised to reliably measure the impact of an intervention. The guidance will be tested by applying it retroactively to data from previous trespass interventions. Data for this assessment is expected to be limited, but available from Network Rail should be used to demonstrate the approach and outcomes to as full an extent as possible.Implementation support will be provided to equip industry to understand the significance of this guidance, and when to use it. |
| **Publication** | All documentation to be produced in the standard RSSB format and to be made widely available. |

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| **Deliverable Title** | Evaluating effectiveness of Trespass Detection and Prevention methodologies – 04: Evaluative framework for trespass prevention methods |
| **Deliverable Type** | Framework/guidance |
| **Description** | A framework for assessing trespass prevention methods to compare different interventions. This will be targeted at decision makers to help them chose the most appropriate trespass prevention strategy (or strategies) for the site they need to protect. Guidance explaining the need for the framework and how it should be used will be produced. The framework should be designed to be easily updatable, without requiring bespoke software or programming ability. In the first instance, the framework will contain information from NR trials being carried out in 2019. Clear requirements should be set out for data submitted by users: what the data should be, how it should be presented, and evidence that trials which generated this data followed good experimental practise from the guidelines in Deliverable 3. The framework should be designed for easy use by industry stakeholders, to identify what mitigation strategies have been used under what conditions, with what costs and what results.  |
| **Publication** | All documentation to be produced in the standard RSSB format and to be made widely available. |

1. Methodology

Suppliers are expected to develop a methodology to successfully meet the **work package requirements** of this work package. The work package requirements are detailed within the following sections:

* Objectives
* Scope
* Deliverables

While the work package requirements are set in context by:

* Background
* Project structure

The supplier is expected to put in due consideration to how the approach will ensure access to the appropriate information from existing resources as well as from industry stakeholders and then integrate the information into a set of resources that support the industry in selecting and assessing trespass strategies.

1. Stakeholder roles and responsibilities

The key stakeholders and their responsibilities are detailed in the table below.

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| **Stakeholder(s)** | **General role in project** | **Specific role in acceptance of deliverables** |
| RSSB Project Manager | The RSSB Project Manager is the first point of contact during project delivery and is responsible for the detailed project management including project schedules, cost reporting and other relevant project management tasks. The Project Manager leads the project in organising meetings, etc and ensures timely and effective delivery towards project objectives. | Facilitates technical review and acceptance processes, identifies and monitors corrective actions where needed, including facilitating decision making. |
| RSSB Technical Lead | Throughout the project, the RSSB Technical Lead ensures that technical aspects are reflected accurately. Technical aspects can refer to specific issues around railway signalling, track engineering, safety relevant operations or any other specialist field. | Reviews emerging outputs from a technical perspective. |
| Industry sponsor  | The Industry Sponsor acts as figurehead for the research, championing its importance and its outputs. The Industry Sponsor forms part of the project steering group, however, their key role as sponsor is to provide steer to the research as it progresses and to exert pressure on industry to make use of its findings. | Reviews emerging outputs from a technical perspective. |
| Project steering group | The project steering group ensures the project delivers to industry needs. As such, it helps formulate specifications, assesses tenders, reviews draft and final outputs and other relevant tasks. | Reviews emerging outputs from a technical perspective. |
| Primary client group  | The primary client group is made up of RSSB members and other stakeholders across industry. | Informed of deliverables. |

1. Budget, timescales and responsibilities

The budget for this work is up to £65,000. If the fixed cost is above the budgeted amount, then a detailed explanation as to why any proposed increase is necessary, and what added value it may provide. In such cases, RSSB strongly encourages suppliers to provide costed options for consideration.

RSSB expects the work to start in May 2019 and conclude by March 2020. However, these are indicative dates and RSSB will consider bids that cannot meet these expectations if the supplier includes a robust project plan and an explanation as to why they cannot meet the preferred start and end dates, while still meeting the project objectives.

1. Critical success criteria and risk management

The following critical success criteria have been identified to help ensure successful delivery and to increase likelihood of industry acceptance/implementation:

* The outputs are clear and easy to digest
* The benefits of undertaking a more robust approach to assessing performance of trespass schemes is demonstrated
* Relevant stakeholders are engaged in the process and the benefits of the work are seen by the rail community

A detailed risk and mitigations register should be provided as part of the submission illustrating required actions to support the success of the work package.

The following risks have been identified by RSSB that the supplier should mitigate through their delivery approach:

* Securing appropriate data is challenging or more time consuming than the project can support
* Limited engagement with Network Rail results in overlap or lack of integration between workstreams
* Incidence rates of trespass are too low to enable robust evaluations to be made
* Robust evaluation of new mitigations are (too) hard to apply on the live railway that has running a safe and reliable service as a top priority
* Stakeholders do not engage in the project
1. Selection and award criteria

**The stated limit on the length of each response must be adhered to. Responses will only be evaluated within the stated length limit, any response exceeding the stated limit will be disregarded beyond that limit.**

Selection criteria

| **Selection criteria** | **Detail** | **Evaluation Criteria** |
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| **S1** Tenderer’s organisational expertise on trespass [Max 1 page] | The tenderer should provide a short description of at least two projects completed within the past five years that relate to understanding or tackling trespass.  | Pass: The tenderer provides a short description of at least two project(s) completed within the past five years that involved understanding or tackling trespass. Further, the tenderer gives RSSB a strong degree of confidence in its expertise. Fail: The tenderer either fails to provide evidence of at least two example(s) of where the tenderer has completed projects in the past five years that involved understanding or tackling trespass; or fails to provide RSSB with a strong degree of confidence in its expertise in these fields on the basis of that work. |
| **S2** Tenderer’s organisational expertise on data analysis and experimental design[Max 1 page] | The tender should provide a short description of at least two projects they have experience in data analysis and experimental design. Experience in a rail context is desirable. | Pass: The tenderer provides at least two examples to show their experience and competence with statistics and data analysis from the past five years. Fail: The tenderer does not provide evidence of two projects completed within the last five years that show sufficient capability to handle the type of data this project will generate. |
| S3 Summary of the Proposal[Max 1 page] | The Tenderer must provide a concise summary highlighting the key aspects of the proposal and will be used to contextualise the Supplier’s response. | Pass: The Tenderer has provided a concise summary highlighting the key aspects of the proposal of the supplier.Fail: The Tenderer has not provided a concise summary or has not provided a summary highlighting the key aspects of the proposal of the supplier. |

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| Weighted award criteria |
| **Award criteria** | **Detail** | **Evaluation Criteria** | **Weighting**  |
| **W1** Independence, knowledge and expertise in subject area[Max 3 pages] | The tenderer should detail the knowledge and expertise of the team who will be undertaking each aspect of this work, relevant to evaluating trespass motivations and mitigationHow will the tenderer apply their knowledge, expertise and skills to meet the objectives of this work? | The tenderer’s response:* Provides evidence of their knowledge and expertise in trespass
* Provides evidence of their knowledge and expertise in data collection and analysis
* Explains how they will apply their knowledge, expertise and technical competence to deliver the objectives of this research
* Provides evidence of team independence and impartiality
 | 25% |
| **W2** Robust methodology and ability to apply it to the client’s needs[Max 4 pages] | The tenderer provides a method statement of how it is intended to deliver against all aspects of the objectives of this work. This should include:* How will the tenderer gather data
* How will the tenderer analyse that data to generate insight on factors and motivations contributing to trespass
* How will the tenderer create practical guidelines for introducing new trespass mitigations?
* How will the tenderer define and evaluate a framework for comparing different trespass prevention strategies, and validate that with data from existing interventions?
* How will the tenderer elicit information and validate outputs with industry stakeholders in an efficient and effective way?
 | The tenderer’s response:* Demonstrates their understanding of the objectives and provides a coherent and systematic approach to meeting all the objectives, scope and deliverables
* Proposes a sound, impartial and credible methodology to achieve the objectives of the project
* Demonstrates an efficient and effective methodology to elicit information and validate outputs with industry stakeholders.
 | 30% |
| **W3** Project management: resource, quality and time[Max 3 pages]  | Tenderers should outline the processes and resources it proposes to use in order to fulfil RSSB requirements. Tenderers should:* Clearly identify each team member’s role (additionally providing one-page CVs for key project members within an appendix) and demonstrate that team members are appropriate to the assigned tasks;
* Provide a sound schedule to successfully deliver to time, quality and cost;
* Demonstrate how they would work with RSSB and communicate and engage with relevant industry stakeholders to ensure that the quality and content of the deliverables are fit for purpose.
 | The tenderer’s response shows that it:* Has identified relevant individuals to deliver the work and that the mix of skills is covered;
* Has provided a credible plan for delivering successful outcomes to time, quality and cost;
* Has identified appropriate ways to engage with RSSB and relevant stakeholders to provide deliverables that are fit for purpose.
 | 15% |
| **W4** Risk and mitigations[Max 2 pages] | Tenderers should detail what risks and opportunities are foreseen in the delivery of the project. The tenderer should detail mitigating actions in relation to these risks, and how opportunities can be maximised.  | The tenderer’s response:* Identifies appropriate risks and opportunities through the use of a risk register
* Identifies what mitigation actions will be taken with specific regard to each risk or challenge identified
* Identifies approaches to maximising any opportunities through effective management.
 | 10% |
| **W5** Cost of project | Tenderers should:* Provide a fixed cost for the project and the associated cost break down. If the fixed cost is above the budgeted amount of £65,000 then a detailed explanation as to why any proposed increase is necessary, and what added value it may provide.
 | * The tender with the lowest total cost will receive 100% of the available weighted score (20%).
* Other tenderers will receive a pro-rated score relative to the lowest cost according to the following formula:
	+ Score of other tender = lowest tender total cost / other tender total cost x 100%.
 | 20% |

1. Procurement timeline

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|  | **Start Date** |
| Expression of interest meeting (if applicable) | 08/04/19 |
| Request for proposal issued on ContractsFinder | 28/03/19 30/04/19 |
| Supplier clarification questions deadline  | 30/04/19; 17:00 hours |
| **Deadline for Submitting tenders** | **30/04/19** |
| Estimated notification of award decision | 15/04/19 |
| Target contract commencement date | 10/05/19 |

Note: RSSB reserves the right to amend these dates as business requirements demand and will communicate any changes to tenderers.