

# Specification for research project

## T1261 - The use of AI in the Context of Spoken Safety Critical Communications

The draft research specification and assessment criteria that follows is subject to change following supplier engagement. It outlines RSSB's current proposed approach to provide an understanding of behaviours that will allow us to simplify the use of audible warnings in all potential warning scenarios.

A pre-tender suppliers meeting has been arranged for 07 February 2022 at 14:00-15:30, to be held remotely on Microsoft Teams. The purpose of this meeting is to:

- Provide an outline of the project proposal
- Provide interested suppliers an opportunity to discuss, understand and inform the research specification
- Provide interested suppliers an opportunity to form partnerships to deliver the research

Suppliers should be prepared to discuss the following:

- What resources and information would suppliers require, to deliver robust outcomes?
- What are the challenges and barriers to delivering this work? What enablers would support successful delivery of the project?
- What is the estimated effort to deliver this work to quality and time?

Please note that following the suppliers meeting, RSSB may amend the document before publishing the invitation to tender.

Suppliers wishing to attend the event must confirm the name and email address of all attendees to [Tanja.Odinsen@rssb.co.uk](mailto:Tanja.Odinsen@rssb.co.uk) by 12:00 on 04 February 2022, you will then be issued with an invite to the meeting.

## 1. RSSB overview

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

- **Understanding safety risk** – Using safety intelligence with the latest risk modelling to inform members and support safe decision making.
- **Guiding standardisation** – Creating, reviewing, and simplifying GB standards; managing the Rule Book and making it easier for the railway to deliver efficiently and safely.
- **Leading the sustainability agenda** - Maintaining and growing rail's position as Britain's leading low-carbon and sustainable transport mode by working to address rail emissions and measuring the benefits rail provides to society.
- **Facilitating cross-industry collaboration** – As an independent, cross-industry body, developing industry strategies, and supporting activities that need collaboration, such as supplier assurance schemes and confidential reporting.
- **Delivering new knowledge and solutions** – Undertaking research that addresses the rail industries needs and opportunities, for now and for the future. Developing the new knowledge and solutions needed to inform the future of standards, drive improvements to the industry's safety performance, and make rapid progress against the rail sustainability agenda.

## 2. Background

Poor communication has the potential to result in serious incidents, posing significant business and safety risks. When operational staff, such as drivers, signallers, and trackworkers, communicate following protocols and reach a clear understanding this risk is meaningfully reduced. However, factors such as fatigue or insufficient training mean a clear understanding is not always reached.

As part of the competence management system for safety critical roles, monitoring of safety critical communications takes place. This is performed manually, usually by an operations manager, and is labour intensive. In addition, the small sample of communications means it is not representative. As a result, monitoring is infrequent (approximately three times a year) and any declines in standards of communication are usually not identified as they happen. Manual assessment can also result in inconsistent scoring between different managers.

Other industries, including the police, armed forces, and aviation, are using AI to monitor and analyse voice communications. This increases the volume of communications that can be monitored and enables a more consistent approach to assessment of quality. An RSSB knowledge search has been commenced to investigate and identify any potential learnings (*S363 – AI in Safety Critical Communication*).

This project will explore the feasibility of using AI within the rail industry, in a similar way to how it is already used in other industries, with the aim of improving the quality of voice communications. This project will benefit any organisation involved in frontline operational safety critical communications and aligns with multiple industry initiatives. LHSBR's (Leading Health and Safety on Britain's Railways) chapter on Train Operations, states that '*Safety critical communications continue to be a significant factor in incidents*' and defines the need to '*Develop, promote, and monitor the uptake of an industry-wide safety critical communications strategy, based on the Safety Critical Communications Manual.*' A key aspect of improving communications is the ability to monitor the current performance of communications to help provide feedback to staff, encourage the use of better communications, and demonstrate an improvement over time.

The risk from inadequate safety critical communications was highlighted in a recent RAIB report into a serious incident at Balham that could have resulted in a collision between a passenger train and a On Track Machine leaving a T3 possession. The report raised several recommendations on Network Rail and other industry parties regarding poor communications protocols. Recognising the need for improvement that this incident and others have highlighted, Network Rail has drafted a Safety Critical Communications strategy to outline 8 Principles to help change behaviour and the culture around Safety Critical Communications. Outputs from this project will feed into Principle 7 –

developing an assurance framework for safety critical employees. The use of AI will focus on three areas:

- 1) Assurance – live monitoring of communications may allow sub-standard communication to be detected and feedback given in real time
- 2) Monitoring – continuous or more frequent monitoring of voice communications may encourage better communication behaviours during operations
- 3) Trend analysis – identifying more quantitative trends in communications performance to better identify areas of improvement

These improvements could lead to a reduction in the risk of serious safety incidents with safety critical communications (SCC) as causes. It will also enable stakeholders across the industry to gain a better understanding of SCC competency profiles across their workforce, allowing them to more efficiently allocate training and development resources.

### 3. Project objectives

The goal of this project is to assess the technical and economic feasibility of using AI to evaluate and monitor SCCs, including identifying the functional requirements likely to be needed to achieve this aim, as well as how this would best be developed. The findings will then enable an implementation plan of this technology across the industry and ultimately contribute to improving the quality of spoken SCCs.

The high-level objectives of this project are to:

- Demonstrate a means of assessing the quality of SCC, by comparing actual practice with good practice
- Demonstrate a means of carrying out this assessment on an ongoing and ideally live basis
- Demonstrate a means of collecting and collating information that can be used for the provision of feedback and the identification of training needs
- Demonstrate a means of collecting and collating information that can be used in the analysis of trend over time, or across different operational scenarios
- Perform a cost-benefit analysis of implementing this technology, considering the various methods in which it could be executed
- Provide supporting guidance for the implementation and change management process of the proposed solution

Delivery of this project has been split into 3 Work Packages (WPs). After each WP there will be a stage gate review to evaluate the project's feasibility, value to industry and determine whether it should progress.

#### **Work Package 1 (T1261-01): Background Research and Specification**

This WP should contain a review of the current state of natural language processing in other industries, identify any commercially available solutions, and review the state of SCCs within rail. Findings from *S363 – AI in Safety Critical Communications* will feed into this. The supplier should define the functional and non-functional requirements of an AI system, based on the needs of frontline operational staff and managers responsible for competency management. The supplier should then recommend whether this capability should be deployed via a commercial acquisition or a developed in-house by the supplier as part of WP3.

#### **Work Package 2 (T1261-02): Pilot Design**

The supplier should create the methodology for a small-scale pilot to be performed on a subsection of the industry. The pilot methodology should be presented to the project steering group for approval.

**Work Package 3 (T1261-03): Development and Pilot**

This WP should either develop an AI algorithm or acquire a suitable commercial solution, based on the functional and non-functional requirements defined in WP1. The pilot should then be carried out by the supplier.

**Work Package 4 (T1261-04): Economic Assessment and Final Recommendations**

Using learnings from WP3, an assessment of the business case for wider industry rollout should be performed. This should include a review of any issues arising during the pilot phase, together with a discussion of how they can or could be resolved. The supplier should then make final recommendations on the implementation of AI in SCC across the industry.

## 4. Project scope

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

### In scope

#### Work Package 1 (T1261-01): Background Research and Specification

Assessments should include all role's where spoken SCCs are involved – e.g., signallers, drivers, PICOPs, shunters etc.

- Review
  - Review the current use of natural language processing techniques to monitor spoken safety critical communications across other sectors / industries, as well as the identification of any relevant commercially available solutions
  - Review the current state of SCC adherence across the rail industry – this could include
    - Quantitative measurement against communications standards (e.g., *RIS-8046-TOM Iss 2 – Spoken Safety Critical Communications*) and feedback from route Communications Review Groups (CRG's)
    - Qualitative cultural aspects such as managerial or training concerns
  - Review of SCC standards and rules currently in place (e.g., Safety Critical Communications: The Manual)
  - Assess the cost of SCC failures and current review process
- Impacts
  - Estimate the safety and business risks arising from issues with SCC
  - Assess current industry data systems, and their potential for interoperability with any AI solution
  - Make recommendations for changes to SCC standards that would facilitate the adoption of AI monitoring, such as the adoption of “key language statements”
  - Assess the potential negative impacts and barriers to implementing any SCC standards change

- System definition
  - Define the functional requirements of the system (e.g., the reporting, analytics and insights that could be expected from a system)
  - Define the non-functional requirements of the system (e.g., speed, security, capacity)
  - Create a technical specification for an AI monitoring system, and recommend whether this capability should be deployed via an existing commercial acquisition or needs to be further developed in WP3

**STAGE GATE 1:** An informed decision to acquire or develop a bespoke AI algorithm for industry use, based on the system definition defined in WP1.

#### **Work Package 2 (T1261-02): Pilot Design**

- Design a small-scale pilot to demonstrate the feasibility of AI deployment to monitor and assure safety critical communications
  - The pilot should demonstrate monitoring and trend analysis for a subset of communications, and provide recommendations for how feedback could be delivered to drive assurance in this area
- Agree and define the pilot, to be implemented on a subsection of SCCs, with the steering group – Data collection methods could include:
  - Recordings/short download clips
    - These could be data gathered for the purpose of the pilot or historical data from current processes such as *NR/L2/OPS/033 – Recording Spoken Safety Critical Communications between Possession Management and Engineering Trains/On-Track Plant Drivers when Working in Possessions and Worksites*
  - Live monitoring

**STAGE GATE 2:** A viable plan for achieving an AI voice communication monitoring pilot.

#### **Work Package 3 (T1261-03): Development and Pilot**

Work Package content will depend on the decision made at Stage Gate 1.

- Acquire a suitable commercial AI system to execute the pilot



- **OR** develop a prototype AI algorithm, to monitor safety critical communications, and package it into a demo system to:
  - Identify quantitative trends in communication performance
  - Include a user interface to analyse and drill down into gathered data
  - Utilise an open-source solution, accessible for further use and development by industry
- Execute the pilot to:
  - Provide suitable quantitative measure(s) of the accuracy of the AI algorithm for monitoring safety critical communications, and outline any limitations and potential improvements
  - Develop recommendations on the most cost-effective approach for deploying the solution e.g., real time vs batch monitoring
  - Demonstrate the feasibility, accuracy, and reliability of the solution
  - Develop an outline architecture for full deployment of the AI monitoring solution
  - Undertake any refinement or retesting where necessary

**STAGE GATE 3:** A successfully demonstrated approach to achieving automated assessment of Voice communications and a viable delivery option.

#### **Work Package 4 (T1261-04): Economic Assessment and Final Recommendations**

- Identify the potential change management routes and processes that would need to be followed to integrate the preferred AI solution(s) within individual organisations, and across the industry as a whole
  - Recommendations on ownership/development responsibilities for the technology going forward
- Perform a cost-benefit analysis of the implementation of an AI solution against the quantified safety benefit
  - Consideration of the different deployment options for the solution (i.e., the benefits analysis of live monitoring versus short download clips)
  - Consideration of any potential iterative approaches to rollout
  - Consideration of the cost of training associated with changing SCC standards
- Identify the technical restrictions of legacy IT systems

## On-going requirements

In addition to the above, the supplier will be required to undertake the following tasks during delivery:

- Attendance at project kick-off meeting at RSSB's offices or virtually via Teams (London, May 2022)
- Attendance at four project steering group meetings at RSSB's offices or virtually via Teams
- Presentation at two governance group meetings at RSSB's offices, or virtually via Teams
- Attendance at project closure meeting at RSSB's offices, or virtually via Teams
- Creation and maintenance of project management plan
- Creation and maintenance of project risk register
- Provision of monthly progress reports or brief video-call catchups with the RSSB project manager – RSSB technical and professional leads may also be in attendance

RSSB's facilities can be provided to the supplier for meetings and/or workshops without cost (subject to RSSB meeting room availability). Where appropriate, meetings can be held elsewhere if RSSB considers this beneficial.

## Out of scope

- Written SCCs
- Implementation of the change management process identified in WP3
- Adjusting SCC standards
- Development of an operational and deployed system

## 5. Project structure

This project is structured in 4 work packages, **of which all are subject to this tender**. All dates are indicative, and the supplier must include their own proposed dates in their bid.

Work Package T1261-01	
<b>Title</b>	The Use of AI in Safety Critical Communications – Background Research and Specification
<b>Delivery</b>	Supplier (competitive tender)
<b>Start</b>	June 2022
<b>Completion</b>	September 2022

Work Package T1261-02	
<b>Title</b>	The Use of AI in Safety Critical Communications – Pilot Design
<b>Delivery</b>	Supplier (competitive tender)
<b>Start</b>	September 2022
<b>Completion</b>	November 2023

Work Package T1261-03	
<b>Title</b>	The Use of AI in Safety Critical Communications – Development and Pilot
<b>Delivery</b>	Supplier (competitive tender)
<b>Start</b>	November 2022
<b>Completion</b>	March 2023

Work Package T1261-04	
<b>Title</b>	The Use of AI in Safety Critical Communications – Economic Assessment and Final Recommendations
<b>Delivery</b>	Supplier (competitive tender)
<b>Start</b>	March 2023
<b>Completion</b>	June 2023

## 6. Deliverables

### Work Package 1 – Background Research and Specification

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Current State of AI and Safety Critical Communications
<b>Deliverable Type</b>	Report
<b>Description</b>	This report should provide the background to the project. It should present a clear understanding of the current state of safety critical communications and the current issues with quality and/or monitoring. This should include an initial assessment of the cost to industry resulting from SCC failures and current review processes. It should also investigate the use of AI in other industries for analysing spoken communications.
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Pilot Specification
<b>Deliverable Type</b>	Specification
<b>Description</b>	This should be a technical specification listing the technical and functional requirements of the prototype expected to be used in WP3. The specific use case(s) should be outlined here ahead of preparation for the pilot.
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Current State of Safety Critical Communications
<b>Deliverable Type</b>	Presentation
<b>Description</b>	This should summarise the work and findings carried out for WP1. It should include expected next steps for WP2 and the expected use cases that will be trialled in the pilot.

<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.
--------------------	---

## Work Package 2 – Pilot Design

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Pilot Methodology
<b>Deliverable Type</b>	Project Plan
<b>Description</b>	<p>This deliverable should contain a description of the proposed methodology to carry out the pilot. The project management documents submitted to RSSB (outlined in Section 11) should all be updated:</p> <ul style="list-style-type: none"> <li>• Gantt Chart</li> <li>• Resource Table</li> <li>• Stakeholder Engagement Plan</li> </ul>
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

## Work Package 3 – Development and Pilot

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Prototype
<b>Deliverable Type</b>	Program
<b>Description</b>	This should be an AI program developed for to monitor and analyse voice communications. RSSB is open to any methodology proposed by the supplier. It is however critical that the developed program can be reproduced and developed further by RSSB.
<b>Publication</b>	The deliverable shall be reviewed by RSSB and the project steering group, to allow for comment. Version control should be maintained using best practice techniques. The deliverable is to be made widely available.

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Prototype Guidance
--------------------------	--

<b>Deliverable Type</b>	Guidance
<b>Description</b>	This should provide guidance on the use case for the prototype developed. The method and algorithms used to generate the pilot program should be transparent, well documented, and not require commercial software to be implemented.
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Pilot Results and Findings
<b>Deliverable Type</b>	Report
<b>Description</b>	This should be a brief report summarising the analytics and metrics extracted from the pilot. It should include any shortcomings or learnings of the pilot and prototype model.
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Pilot Results and Findings
<b>Deliverable Type</b>	Dataset(s)
<b>Description</b>	Any data retrieved from the pilot, such as recordings or subsequent analytics and metrics.
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Development and Pilot Summary
<b>Deliverable Type</b>	Presentation
<b>Description</b>	This presentation should briefly summarise the work done in WP3. It should include an infographic summarising the analytics and insights from the pilot.

<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.
--------------------	---

## Work Package 4 – Economic Assessment and Final Recommendations

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Final Report
<b>Deliverable Type</b>	Report
<b>Description</b>	This deliverable should be a detailed economic assessment of the business case for implementation. It should assess the potential cost of different solutions and make recommendations on the scale of implementation. It should also contain formal/standalone guidance for how AI may be implemented to monitor voice communications across the wider industry. The guidance can be included as an appendix or as an entirely separate document to be circulated.
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Final Specification
<b>Deliverable Type</b>	Specification
<b>Description</b>	This deliverable should propose a specification and implementation plan for a program that has the potential to be rolled out across the industry. This should be an update of the technical specification created in WP1. Any learnings from WP3 should be used to iterate and produce a more comprehensive specification.
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

<b>Deliverable Title</b>	The Use of AI in Safety Critical Communications – Final Presentation
<b>Deliverable Type</b>	Presentation

<b>Description</b>	This presentation should summarise the work done and findings across the entire project. It should include examples of the metric and analytics retrieved by the pilot and how these benefits can be realised across the whole industry.
<b>Publication</b>	The deliverable is to be produced in the standard RSSB format and shall be reviewed by RSSB and the project steering group, to allow for comment. The deliverable is to be made widely available.

Where a deliverable is submitted that closely meets the requirements, it is anticipated that RSSB shall provide a single consolidated feedback on a complete deliverable from the project steering group, followed by a single consolidated review from an executive panel. Within the schedule the supplier should allow for two weeks for each review to return comments



## 8. Stakeholder roles and responsibilities

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

Role	High level description	Specific responsibilities are to:
RSSB Project Manager	The RSSB Project Manager is the first point of contact for the suppliers once the contract has been put into place. The RSSB Project Manager is responsible for ensuring that the supplier delivers the project as agreed in their proposal.	<ul style="list-style-type: none"> <li>• Organisation, co-ordination and chair of project meetings.</li> <li>• Monitoring and tracking of project progress and spend</li> <li>• Point of contact for escalation for enquiries from supplier, steering group, or project sponsor.</li> <li>• Dissemination of deliverables to project steering group and governance group.</li> <li>• Authorisation of payment within agreed project spend.</li> </ul>
RSSB Technical Lead	Throughout the project, the RSSB Technical Lead, generally a RSSB employee, ensures that technical aspects are considered and reflected accurately.	<ul style="list-style-type: none"> <li>• Provide input to the specification, either by writing it or reviewing its content, and assure it is technically sound and appropriately scoped</li> <li>• Assess tenders</li> <li>• Review and provide input to draft deliverables</li> <li>• Review final deliverables to ensure that they are technically sound and the conclusions defensible</li> </ul>
RSSB Sponsor	The RSSB Sponsor is a senior RSSB employee that is best placed to actively monitor the project through development and delivery, keeping the project aligned with and informed by industry's expectations and initiatives; and steers implementation facilitation activities.	<ul style="list-style-type: none"> <li>• Sponsors the RSSB business case and implementation plan, focusing on how RSSB can support industry benefiting from the findings</li> <li>• Advises the Project Steering Group on shaping the project and its deliverables to most effectively support industry take up and to get most value out of it</li> <li>• Actively monitor the project through delivery working with the Industry Sponsor to successfully navigate the project through any points of conflict between stakeholders, and decision points relating to emerging findings</li> <li>• Keep active awareness of the emerging findings and, as appropriate, bring them (and any related decision points) to the attention of the Industry Sponsor to jointly provide advice to the steering group</li> <li>• Provide advice and steer on activities required to facilitate implementation</li> </ul>
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 Industry	<ul style="list-style-type: none"> <li>• Advises the Project Steering Group on shaping the project and its deliverables to most effectively support industry take up</li> <li>• If required, facilitate access to industry data, people and equipment needed to deliver the project</li> </ul>

	Sponsor is to provide steer to the research as it progresses and to influence industry to make use of its findings.	<ul style="list-style-type: none"> <li>• Oversees the project through delivery working with the RSSB sponsor to successfully navigate the project through any points of conflict between stakeholders, and decision points relating to emerging findings</li> <li>• Promote industry take up and implementation of the research beyond completion of the R&amp;D project</li> <li>• Provide feedback to RSSB during project delivery and after completion</li> </ul>
Industry Project Supporters	The two Industry Project Supporters represent parts of industry complementary to the Industry Sponsor's organisation.	<ul style="list-style-type: none"> <li>• Offer expertise during project development and delivery</li> <li>• If required, facilitate access to industry data, people and equipment needed to deliver the project</li> <li>• Support the implementation of findings</li> </ul>
Project Steering Group	The Project Steering Group ensures the project is specified and delivered to take into account different stakeholders' needs. The group is made up of representatives from within the rail industry and other industries where appropriate.	<ul style="list-style-type: none"> <li>• Provides input to and reviews the 'case for research' (i.e., the business case, specification, and implementation plan)</li> <li>• Monitors and steers the project through delivery</li> <li>• If required, facilitates access to industry data, people and equipment needed to deliver the project</li> <li>• Attends meetings with Project Team and suppliers</li> <li>• Reviews draft and final output(s)</li> </ul>
Primary Governance Group	The Primary Governance Group is an established industry group that has responsibility to steer and oversee activities in a specific topic area.	<ul style="list-style-type: none"> <li>• Comment on research ideas and consider outcomes from idea review activities that RSSB undertakes</li> <li>• Review and endorses the 'case for research' before it goes for budget authority</li> <li>• Endorse the findings and support their implementation</li> </ul>

## 9. Budget, timescales, and responsibilities

The budget for this work is up to £190k, encompassing all work packages. If, whilst compiling a response, tenderers determine that it is not feasible to submit a quote to this budget but still wish to provide a response, they shall:

- Provide a quote for all work as requested, even if this exceeds the budget. This allows RSSB to conduct a like-for-like comparison as required by the evaluation criteria. Those who price within RSSB's budget will score more highly in line with the pricing calculation, however, higher bids will not be automatically disqualified.
- Provide a supporting explanation as to why an increase in budget is required to deliver the work to a good standard.

RSSB expects the work to start in May 2022, we envisage this research to take less than 12 months to complete. 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.

## 10. 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:

- **Early union engagement and support** will be vital for the wider implementation of AI monitoring technology – this must be taken into account when considering recommendations for the change management process
  - **Quantified safety and business benefits** will strengthen the argument for implementation considerably
- Project outputs/recommendations must consider the enabling principles outlined in **Network Rail's Safety Critical Communications Strategy**
  - The business process, *NR/L2/OPS/033 – Recording Spoken Safety Critical Communications between Possession Management and Engineering Trains/On-Track Plant Drivers when Working in Possessions and Worksites*, has recently been implemented, which may be a suitable source of data and/or connection.
  - **Identification of clear analytics and metrics** that the AI program will provide, and are visibly linked to an assurance framework
- **Demonstrated capability** of an AI approach to assess, monitor, and collate information on SCC quality, **without the need for substantial human oversight**
- **Demonstrated capability** of an AI approach to **be integrated into existing operations and operational systems** in a seamless manner.

The following initial risks have been identified to highlight where the project may encounter issues during delivery, the supplier will be expected to propose approaches to mitigate these risks and any others they perceive:

- **Industry or union opposition** to increased monitoring and/or automation
- **Lack of interoperability** with legacy data systems
- **Detailed information** on the use of AI in other industries **may not be available**

## 11. Selection and award criteria

**Tenderers must carefully read the selection criteria in order to address EACH requirement. Tenderers shall fail the selection criteria unless they address EACH requirement, tenderers that fail the selection criteria will not have their award criteria evaluated.**

**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	Detail and Evaluation Criteria
<b>S1</b> Tenderer's expertise in AI solution development [Total 1 page for all examples]	<p>The tenderer shall provide a short description of at least 2 completed examples<sup>1</sup> within the past 5 years that involved development of AI solutions. At least one of these solutions should be in the context of audio processing. Tenderers must state the completion date of the examples provided and any transferrable lessons that apply to RSSB's project.</p> <p>In order to <b>pass</b> the selection criteria, the tenderer's response must address the following within their example(s):</p> <ul style="list-style-type: none"> <li>• Demonstrate a track record of successfully deploying AI solutions to implementation via a pilot</li> <li>• Give RSSB full confidence in the tenderer's ability to develop AI algorithms of a type that are applicable to this challenge</li> </ul> <p>The tenderer shall <b>fail</b> the selection criteria if it either fails to provide a short description of at least 2 completed examples within the past 5 years that involved development of AI solutions, or fails to address the points above.</p>
<b>S2</b> Tenderer's expertise in railway operations, communications [Total 1 page for all examples]	<p>The tenderer shall provide a short description of at least 1 completed example within the past 5 years that involved rail operations and communications. Tenderers must state the completion date of the examples provided and any transferrable lessons that apply to RSSB's project.</p> <p>In order to <b>pass</b> the selection criteria, the tenderer's response must address the following within their example(s):</p> <ul style="list-style-type: none"> <li>• Give RSSB full confidence in the tenderer's understanding of operations</li> <li>• Have undertaken work involving railway safety critical communications</li> </ul> <p>The tenderer shall <b>fail</b> the selection criteria if it either fails to provide a short description of at least 1 completed example within the past 5 years that involved development of AI solutions or fails to address the points above.</p>

<sup>1</sup> For clarification, a 'completed example' refers to work specifically completed by the tenderer. If the completed work forms part of a larger activity (involving other organisations), the overall activity does not need to have been completed.

<p><b>S3</b> Tenderer's expertise in performing economic assessments and cost benefits analyses to enable industry change</p> <p>[Total 1 page for all examples]</p>	<p>The tenderer shall provide a short description of at least 2 completed examples within the past 5 years that has included an economic assessment of implementing a new technology or operational change. Tenderers must state the completion date of the examples provided and any transferrable lessons that apply to RSSB's project.</p> <p>In order to <b>pass</b> the selection criteria, the tenderer's response must address the following within their example(s):</p> <ul style="list-style-type: none"> <li>• Demonstrate a track record of successfully delivering comprehensive cost-benefit analyses</li> <li>• Give RSSB full confidence in the tenderer's ability to make change management recommendations</li> <li>• State the outcomes or resulting undertakings of the recommendations made</li> </ul> <p>The tenderer shall <b>fail</b> the selection criteria if it either fails to provide a short description of at least 2 completed examples within the past 5 years that involved development of AI solutions, or fails to address the points above.</p>
--	--

## Award criteria scoring

Each of the criteria set out in the weighted award criteria are scored 0-5. The below gives an explanation of the scoring system used:

Grade	Definition of grade
5	<p>An Excellent Tender Response that (where applicable):</p> <ul style="list-style-type: none"> <li>• Addresses all aspects of the question in an informed and comprehensive manner.</li> <li>• Demonstrates a thorough understanding of what is being asked for.</li> <li>• Provides evidence of how that understanding can be applied in practice;</li> <li>• Offers full confidence that the Tenderer will deliver the service in full;</li> <li>• Addresses the majority of areas of doubt and uncertainty; and</li> <li>• Provides certain, unambiguous commitments or statements of intent that permit reliance through translation into contractual terms</li> </ul>
4	<p>A Good Tender Response that (where applicable):</p> <ul style="list-style-type: none"> <li>• Addresses all aspects of the question and is generally of a good standard;</li> <li>• Demonstrates a good understanding of what is being asked for;</li> <li>• Provides a worked-up methodical approach;</li> <li>• Offers confidence that the Tenderer will deliver the service in full, with limited areas of doubt or uncertainty;</li> <li>• Addresses key areas of doubt and uncertainty; and</li> <li>• Provides commitments that can be translated well into contractual terms</li> </ul>
3	<p>A Satisfactory Tender Response that (where applicable):</p> <ul style="list-style-type: none"> <li>• Addresses the majority of the question and is generally of a good standard but lacks substance or detail in some areas;</li> <li>• Demonstrates an understanding of what is being asked for;</li> <li>• Provides a satisfactory approach;</li> <li>• Offers a general level of confidence that the Tenderer will deliver the service (but with room for doubt in some areas);</li> <li>• Address some areas of doubt and uncertainty; and</li> <li>• Provides some commitments that can be translated well into contractual terms.</li> </ul>
2	<p>A Poor Tender Response that (where applicable):</p> <ul style="list-style-type: none"> <li>• Addresses some of the question but either lacks relevant information and detail or lacks substance in a manner that would suggest the response is a “model answer”;</li> <li>• Demonstrates some understanding but with a lack of clarity in key areas;</li> <li>• Provides an approach which is not wholly appropriate or viable or lacks evidence;</li> <li>• Shows that the level of confidence that the supplier can deliver does not outweigh the doubt;</li> <li>• Does not address many areas of doubt and uncertainty; and</li> <li>• Does not offer sufficient commitment (with doubt as to the extent to which would translate into contractual terms).</li> </ul>
1	<p>An Unsatisfactory Tenderer response that (where applicable):</p> <ul style="list-style-type: none"> <li>• Does not address the question or has omissions;</li> <li>• Lacks understanding in significant areas:</li> <li>• Provides an approach which has gaps or creates concerns;</li> <li>• Shows that the level of confidence that the supplier can deliver is low;</li> <li>• Creates uncertainty; and</li> </ul>



	<ul style="list-style-type: none"> <li>Displays significant lack of commitment (with doubt as to the extent to which would translate into contractual terms)</li> </ul>
0	<p>An Unacceptable Tenderer response that (where applicable):</p> <ul style="list-style-type: none"> <li>Provides no response or omissions/oversights that prevent scoring;</li> <li>Refuses to deliver the requirement; and</li> <li>Creates concerns so significant that the response would be detrimental to the interests of RSSB</li> </ul>

Award criteria	Detail and Evaluation Criteria	Weighting
<b>W1</b> Summary of proposal [Max 1 page]	<p>Tenderers should concisely summarise key aspects of their proposal. The information will be used by RSSB to contextualise the tenderer's response.</p> <p>The tenderer's response shall be evaluated on the following criteria within the maximum stated page limit:</p> <ul style="list-style-type: none"> <li>• The tenderer has clearly outlined their understanding of the project's objectives and outputs;</li> <li>• The tenderer has summarised their proposal (excluding any pricing information), outlining how it shall clearly address the project's objectives and outputs.</li> </ul>	N/A (For information only)
<b>W2</b> Supplier's understanding and methodology [Max 6 pages]	<p>Tenderers should clearly outline their understanding and methodology to carry out the required works defined in the project specification.</p> <p>The tenderer's response shall be evaluated on the following criteria within the maximum stated page limit:</p> <ul style="list-style-type: none"> <li>• The tenderer clearly demonstrates their understanding of each of the project objectives and outputs;</li> <li>• The tenderer establishes and presents a clear and appropriate methodology to address each of the project objectives and to deliver each of the project outputs, detailing how it shall commit to ensuring the project and outputs are delivered to a sufficient quality;</li> <li>• The tenderer presents a viable and practical approach to: <ul style="list-style-type: none"> <li>○ Gathering the background information required</li> <li>○ Evaluating the current state of SCCs and the subsequent business and safety risks</li> </ul> </li> </ul>	30%

	<ul style="list-style-type: none"> <li>○ Developing the functional and non-functional requirements of the prototype specification</li> <li>○ Performing the pilot study and securing the necessary industry resources/engagement</li> <li>○ Performing the cost-benefit analyses</li> <li>● The tenderer addresses the success criteria in order to ensure successful project delivery and increased likelihood of industry implementation</li> </ul>	
<b>W3</b> Tenderer's experience and individual expertise  [Max 6 pages – does not include CVs]	<p>Tenderers should clearly outline how their experience and individual expertise can directly address the required works defined in the project specification.</p> <p>The tenderer's response shall be evaluated on the following criteria within the maximum stated page limit:</p> <ul style="list-style-type: none"> <li>● The tenderer outlines relevant activities undertaken by their organisation, that demonstrates suitable experience to meet the project requirements;</li> <li>● The tenderer demonstrates what capabilities individual project team members will bring and how this shall contribute to successfully meeting the project's objectives and outputs. To support RSSB's evaluation, the tenderer shall provide a one-page CV for each key project member within an appendix. <ul style="list-style-type: none"> <li>○ <b>The tenderer must not provide any team members or CVs unless that person is expected to have a role in the project</b></li> </ul> </li> </ul>	35%
<b>W4</b> Project management: Planning and engagement  [Max 4 pages]	<p>Tenderers should outline the processes and resources it proposes to use in order to fulfil RSSB's requirements.</p> <p>The tender's response shall be evaluated on the following criteria:</p>	10%

	<ul style="list-style-type: none"> <li>The tenderer provides adequate allocation of resource to successfully deliver outcomes to time, cost, and quality<sup>2</sup>.</li> <li>The tenderer provides a clear engagement plan. To support RSSB's evaluation, the tenderer shall:</li> </ul> <p>To support RSSB's evaluation, the tenderer shall submit a response that utilises:</p> <ul style="list-style-type: none"> <li>The RSSB supplied 'Gantt Chart' template, detailing key tasks and timeframes (in months<sup>3</sup>)</li> <li>The RSSB supplied 'Resource Table' template, detailing tasks, resources, roles, and effort (in days).</li> <li>The RSSB supplied 'Stakeholder engagement' template to: <ul style="list-style-type: none"> <li>Detail which stakeholders / stakeholder groups it intends to engage with (this should be as specific as possible)</li> <li>Detail when and how engagement will be undertaken</li> <li>Detail what input it shall seek from stakeholders</li> </ul> </li> </ul> <p><b>Please note: Tenderers must not use their own templates for this section.</b></p>	
<b>W5</b> Risks and opportunities	<p>Using the RSSB supplied 'Risk and Opportunity Register' template, tenderers should detail what risks and opportunities<sup>4</sup> are foreseen in the delivery of the project.</p> <p>The tenderer's response shall be evaluated on the following criteria within the maximum stated page limit:</p>	5%

<sup>2</sup> For clarity, 'quality' is defined as the delivery of robust outputs that successfully meet the project's objectives

<sup>3</sup> If the proposed timescales are under four months, the Gantt chart should be presented in weeks to provide sufficient granularity

<sup>4</sup> For clarity, 'opportunities' is defined as an upside, beneficial source of risk

	<ul style="list-style-type: none"> <li>For each risk, the tenderer shall: <ul style="list-style-type: none"> <li>Assign a unique reference number</li> <li>Provide a description of the risk</li> <li>Provide actions to address the probability and impact of the risk</li> <li>Provide a rating (1 – 5) of the impact of the mitigated risk on Time, Quality and Cost</li> <li>Provide a rating (1 – 5) of the likelihood of the mitigated risk occurring</li> <li>Provide the calculated mitigated risk rating (impact multiplied by probability)</li> <li>List actions to be taken should the risk be realised</li> <li>List the specific individual ultimately responsible for the risk control</li> </ul> </li> <li>For each opportunity, the tenderer shall: <ul style="list-style-type: none"> <li>Assign a unique reference number</li> <li>Provide a description of the opportunity</li> <li>Detail the benefits of realising the opportunity on project Time, Quality and Cost</li> <li>List actions to be taken to support the opportunity being realised</li> <li>List the specific individual ultimately responsible for the opportunity</li> </ul> </li> </ul> <p><b>Please note: Tenderers must not use their own template for this section.</b></p>	
<b>W6</b> Cost of project	<p>Tenderers should provide a fixed cost for the project and the associated cost break down.</p> <p>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:</p>	30%

	<ul style="list-style-type: none"><li>• Score of other tender = lowest tender total cost / other tender total cost x 100%.</li></ul>	
--	--	--

## 12. Procurement timeline

	Start Date
Supplier engagement meeting (if applicable)	N/A
Request for proposal issued on Delta eSourcing	04/04/2022
Supplier clarification questions deadline	13/05/2022; 17:00 hours
<b>Deadline for Submitting tenders</b>	<b>20/05/2022; 17:00 hours</b>
Evaluation and moderation	w/c 23/05/2022
Estimated notification of award decision	w/c 30/05/2022
Target contract commencement date	13/06/2022

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