

## Project Partners



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**Rail Inspection by Flexible  
Electromagnetic Acoustic  
Transducer**



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## Challenge

*Improving the speed and effectiveness of rail inspection using a flexible electromagnetic acoustic transducer.*

As the number of European rail passenger journeys increases so too does the demand on the availability of supporting assets.

Infrastructure maintenance is underpinned by various non-destructive evaluation mechanisms and subsequently there is a growing need for an efficient and effective routine inspection solution.

The majority of inspection is currently delivered manually using time consuming techniques such as ultrasound or eddy current testing. Where inspection is carried out using mobile automated ultrasound this too creates the challenges of loss of coupling and wear of the coupling mechanisms.

## Project aim

To develop a pre-production prototype integrated ultrasonic inspection system capable of testing railway steels for typical fatigue defects. The project will demonstrate the capabilities of the equipment and techniques to detect common defects of concern to railway infrastructure stakeholders.

## Technical objectives

The project will deliver an inspection solution that offers a significant increase in the speed of travel during inspection by:

- demonstrating the fundamental capability of EMATS devices to perform effective inspection of rail steels
- demonstrating the application of field programmable gate array (FPGA) components to enable rapid signal processing of measured signals
- developing an optically driven actuator assembly able to independently control transducer elements and thus maintain the proximity of the transducer to the rail head
- demonstrating the functionality of an integrated software driven NDT system

## Solution

RIFLEX will deliver an integrated solution that overcomes these challenges through the development of more rapid and reliable automated inspection for rail. The solution will involve arrays of flexible electromagnetic acoustic transducers (EMAT) devices to dry couple to the rail to overcome the limitations of wet coupled probes.

The project supports automated inspection to overcome the limitations of manual inspection while maintaining or improving on the existing levels of reliability.

The main components that make up the RIFLEX solution are bespoke EMAT probes, purpose-built pulser-receiver hardware, advanced signal processing and integrating software displaying and storing ultrasound inspection results for the user.