



# GEARBODIES

Innovative Technologies  
for Inspecting Carbodies  
and for Development  
of Running Gear



# Project Objectives

The success of the European rail system to foster the modal shift towards rail requires cost-efficient and reliable long-lasting trains. **GEARBODIES** contributes to this effort by improving the efficiency of rolling stock maintenance in close collaboration with the ongoing Shift2Rail Call for Member (CFM) project called PIVOT2.

To achieve the above, **GEARBODIES** follows a twofold approach: extending overhaul periods and improving maintenance processes. The extension of overhaul periods will be facilitated by developing high-performance and long-lifetime components for running gear. The improvement of maintenance processes will be boosted by developing innovative Non-Destructive Testing (NDT) technologies to optimise inspection processes for lightweight carbody shells.

**GEARBODIES** will design and prototype several elastomer-metal running gear components, suitable for serial production, based on high-performance new elastomer formulations and existing elastomers not yet applied in rolling stock elements. In addition, the project will also explore innovative technologies for the development of low LCC bearings. New lubrication solutions, new materials for races and rollers, novel polymers for cages and the effects of new bearing geometries will be researched, among which the most feasible ones will be integrated in a new bearing design and prototyped.

**GEARBODIES** will develop an innovative modular platform to reduce the inspection time of lightweight carbody shells. The platform will incorporate tailored thermography and ultrasonic inspection systems and will facilitate the automated detection and assessment of defects throughout the thickness of the shell by using a customised software module.



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# Project Concept

The GEARBODIES project will work towards the development of cost-efficient and reliable trains by contributing with specific innovations identified by the call to Technology Demonstrators (TD) of Innovation Programme 1 (IP1) within Shift2Rail, through two dedicated work streams:

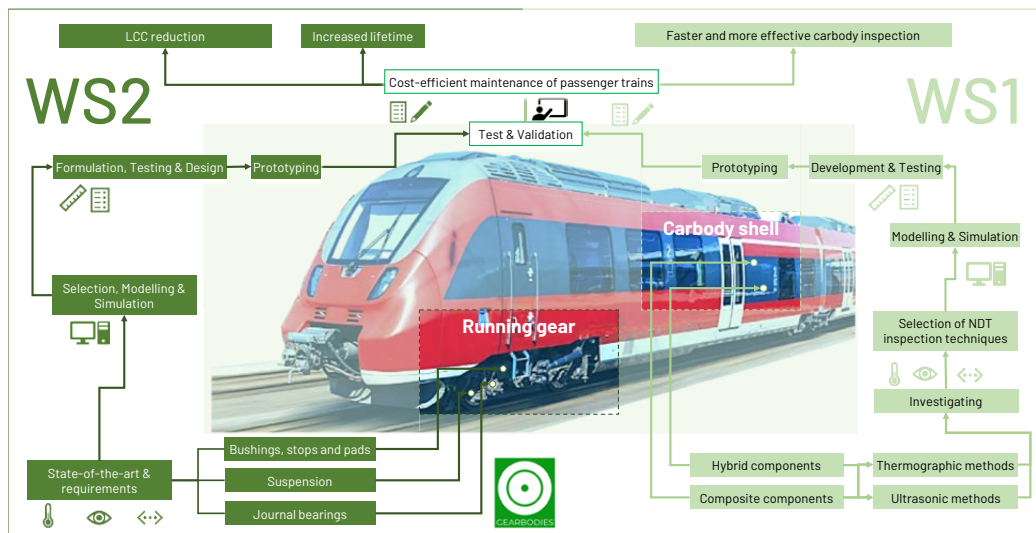
- Work Stream 1 (WS1): Inspection methods for carbodies using new materials (TD1.3) which aims to develop effective and affordable solutions for inspecting carbodies that are using new lightweight materials;
- Work Stream 2 (WS2): Innovative approaches for developing running gear components (TD1.4) which aims to employ innovative approaches, tools and methods for developing novel concept designs of running gear components with extended lifetime, and low LCC, whilst maintaining or reducing current levels of reliability, noise emissions, and track damage.

In addition, the GEARBODIES consortium will liaise and work together with Shift2Rail members to allow for correlating and/or implementing their innovations into the final technological demonstrators (TDs) namely: TD1.3 “Carbody Shell Demonstrator” for WS1 and TD 1.4 “Running Gear Demonstrator” for WS2, contributing thus to the overall Shift2Rail IP1 strategy.

The two Work Streams of GEARBODIES will actively contribute to improving the efficiency, safety and competitiveness of the European railway sector by supporting the implementation and exploitation of innovative materials and practices, with profound impacts on the cost-efficiency and reliability of the sector, as well as on its energy consumption and infrastructure maintenance. Inspection time will be significantly reduced, while the use of new materials and systems will enable an increase in the lifetime of components and lower maintenance costs.

The common element of WS1 and WS2 is the contribution towards the improvement of rolling stock maintenance processes through 1) the use of better inspection techniques (WS1) and 2) development of running gear components with enhanced performance (WS2).

**FIGURE 1**  
Overview of GEARBODIES concept





# Project structure

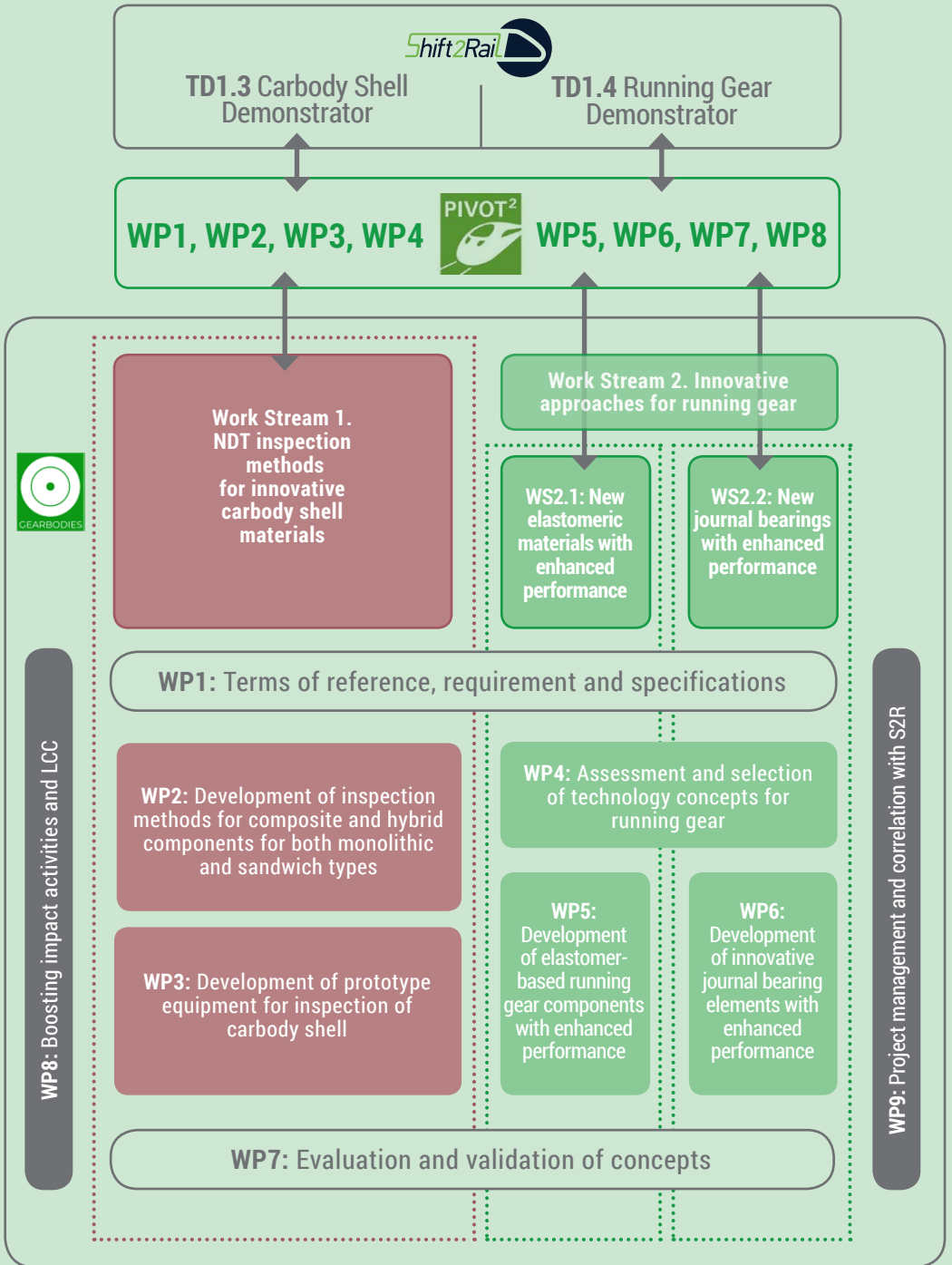
GEARBODIES has been structured in 3 functional Work Streams (WS1, WS2.1 and WS2.2). WS1 focuses on the development of a prototype to inspect carbody shells. To facilitate the work, WS2 has been divided into 2 different Work Streams, each one centred on specific elements of the running gear:

WS2.1 will work on the innovations related to elastomer-based components and WS2.2 will work on the innovations for journal bearings. The three WSs will start and finish with two cross-cutting WPs (WP1 and WP7), which will contribute to harmonise the results and provide coherence to the project development. Finally, two transversal WPs (WP8 and WP9) complete the structure of the project. WP8 comprises a set of activities to increase the impact of the project and to perform the LCC assessment. WP9 will facilitate the project management and the relationship with S2R.



**FIGURE 2**  
GEARBODIES project  
structure





# FACTS AND FIGURES



Budget  
**2.4M**



Duration  
**25 Months**



**13**  
Partners from  
8 EU countries



Starting Date  
**01.12.2020**



Grant Agreement  
No: **101013296**



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