

## Market Consultation

### Autonomous mowing robot near the railways



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# ProRail

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## **ProRail: Connects. Improves. Makes sustainable.**

ProRail B.V. is responsible for the Dutch railway network: its construction, maintenance, management, and safety. ProRail works on the accessibility of the Netherlands by ensuring an optimal rail network. We allocate rail capacity, manage all train traffic, build and maintain stations, and construct new railway lines. Additionally, ProRail maintains existing infrastructure such as tracks, switches, signals, and level crossings.

The railway is one of the most sustainable forms of transport. In 2016, ProRail outlined its sustainability ambitions in the Multi-Year Sustainability Plan 2016–2030. This plan focuses on three pillars: sustainable travel, sustainable living, and sustainable working.

ProRail aims to embed sustainability as a natural component of all our business processes. Therefore, key themes have been designated as focal points: energy, resources, and CO<sub>2</sub>. We intend to make significant progress in these areas in the short term. Several programs are contributing to these goals. By phasing out chemical vegetation management, we are taking another step forward. This document outlines the key principles of our ambitions.

## 1 Autonomous mowing robot for railway maintenance: Do you have the solution?

ProRail is exploring the possibilities of using an autonomous robotic mower to efficiently and sustainably maintain the (inspection) paths alongside the railway. The railway environment is challenging and varied. We are looking for market parties willing to collaborate and share ideas about innovative solutions, technical feasibility, boundary conditions, and ideally provide a short-term solution for testing.

Does your organization have the technology and expertise to contribute to this project? Will you help us shape the future of smart and sustainable railway maintenance?

### 1.1 ProRail: Connects. Improves. Makes sustainable.

ProRail B.V. is responsible for the Dutch railway network: construction, maintenance, management, and safety of the railway network and stations. Our employees ensure that, every day and around the clock, 1,200,000 passengers and 100,000 tons of freight reach their destinations, with 6,550 trains running over more than 7,000 kilometers of track.

The (inspection) paths alongside the railway must remain accessible for inspections, maintenance, and serve as access routes for emergency services. Therefore, vegetation is removed from these paths. In some locations, chemical vegetation management is still being used. ProRail is working to phase out the use of chemical substances, with the ultimate goal of completely eliminating them by 2028. That is why we are looking for alternative (non-chemical) vegetation management methods.

Working together: we share knowledge and collaborate on projects with other European rail infrastructure managers. We also collaborate closely with contractors, vegetation managers, and innovative developers in the field of vegetation management.

Currently, we are actively searching for alternative vegetation management methods for the inspection paths. Demonstrations and trials are being conducted to assess various approaches in real-world settings. One alternative under investigation is mowing the paths. Considering the substantial number of (inspection) paths in the Netherlands, we are exploring the use of autonomous robotic mowers to make the mowing process more efficient and safer.

#### **(Inspection) Paths**

The inspection paths alongside the tracks are made of porphyry and diverse types of weeds grow on them. Excessive vegetation is undesirable, as it impairs safe walking routes and visibility for inspectors, railway staff, passengers, and emergency services during evacuations.

An autonomous mower used for vegetation management must be able to operate in a highly variable environment filled with obstacles. In most places, these paths are 70–100 cm wide, but signage, overhead line portals, and other barriers may reduce the width further. Cables are often located beneath the paths and may surface in specific areas. The mower will also encounter ballast stones on the path. Therefore, the robot must be agile, precise, and equipped with appropriate technology to operate safely and effectively in this diverse terrain.

## 1.2 Ambition

As previously mentioned, our goal is to completely eliminate the use of chemical vegetation management across all ProRail sites by 2028, including the inspection paths along the railway. Therefore, ProRail wants to explore with the market whether deploying an autonomous mowing robot can keep these paths safely accessible.

## 1.3 Scope

The project focuses on the development and implementation of an autonomous mowing robot capable of independently mowing inspection paths. Key focus areas include:

- Navigation and autonomous operation within the railway environment.
- Overseeing various terrain conditions.
- Sustainable propulsion (e.g., electric).
- Mowing without disrupting train operations or compromising railway safety.
- Ready-to-deploy solutions or adaptable existing technologies.

## 1.4 Identifying problems or dilemmas

Vegetation management on inspection paths using an autonomous mowing robot presents several challenges. We are open to all ideas, but understanding these challenges is essential to rigorously evaluate the applicability of proposed solutions.

### Specific environment and interaction with railway assets:

- Cables and other railway assets must not be damaged by the mower.
- It must be guaranteed that the robot cannot enter the tracks or public roads.
- In addition to vegetation, robots will encounter various obstacles such as ballast stones.
- Obstacles like signs, fences, and overhead line structures require a highly maneuverable mower.

### Operations and safety:

The mowing robot must operate autonomously. This raises challenges such as:

- Risk of theft or vandalism.
- Remote operation and emergency stop mechanisms.
- Communication with remote operators and procedures in case of signal loss.

## **1.5 Intended contracting approach**

### **Contract Structure**

Partly based on the outcome of this market consultation, ProRail will determine how and in what way the submitted proposals will be marketed and contracted.

ProRail plans to conduct tests with potentially suitable mowing robots in 2025 and 2026.

### **Tendering Procedure**

ProRail wishes to first conduct this market consultation to determine the next steps based on the insights gathered. As this involves a request for an innovative solution, there is a preference for setting up a testing ground or another form of innovative partnership.

## 2 Questions

ProRail would like to collaborate with the market to find solutions to the aforementioned problem and its related challenges. The following themes are central to our inquiry:

### 2.1 General company information

- Name of the organization  
Organization address  
Contact person (name, role, email, and phone number)
- Do you have experience in the railway sector? If yes, what kind?
- What is the objective of your organization?
- How does your organization implement Corporate Social Responsibility (CSR)?
- Do you represent an independent company or operate within a broader entity?
- What is your area of expertise?
- What distinguishes your company from other providers in the market?

### 2.2 Experience with similar challenges

- Are you familiar with (existing) (partial) solutions that could potentially be used for deploying an autonomous mowing robot on railway inspection paths? If yes, can you explain the system and how it works?
- What products or services do you offer that could be of added value for the challenge described?
- Are there any solutions (or directions) that are at a lower TRL (technology readiness level) but show potential? If so, which directions do you consider promising?

### 2.3 Feasibility

- What risks do you foresee in deploying an autonomous mowing robot on railway inspection paths? And how can these risks best be mitigated?

### 2.4 Technology

- Do you have technical specifications, photos, or sketches of your solution? If so, we would be happy to receive them. (e.g., dimensions, safety and localization technologies, drive and range, power supply method, etc.)

### 2.5 Costs

- Can you provide a rough cost estimate for the proposed solution(s)? Please break this down into investment and operational costs.

### 2.6 Future

- When do you expect a working solution could realistically be delivered?

## 2.7 Innovation

- Do you have any suggestions for ProRail regarding this market consultation? If yes, what are they?

## 2.8 Other questions

- What should ProRail consider when launching a procurement request for the broader scope? Do you have any tips? What approach would you recommend?
- Are there any questions, design issues, risks, or opportunities you consider important but are not mentioned in this section? Why do you consider them relevant?
- If there are any questions essential for your response based on this market consultation, could you list them concisely and clearly? Please include not only the question but also an explanation of why it is necessary for your response.

**Note: We kindly request that you submit your responses using the attached Excel document.**

## 3 Market consultation procedure

### 3.1 We are looking forward to your ideas!

ProRail wishes to engage with market parties to explore the feasibility of an autonomous mowing robot. With this market consultation, we aim to gain insight into available machines and suppliers, market developments, and the extent to which solutions are available—or could become available—that meet our needs.

### 3.2 Procedure

This market consultation is published as an open market consultation. This means all market parties are invited to participate.

The market consultation consists of two steps:

1. We kindly request your responses to the questions outlined in Chapter 2 (note: answering all questions is not mandatory).  
We kindly ask you to submit responses by e-mail by **Wednesday, June 11, 2025**.
2. Based on the responses received, ProRail may invite parties for a follow-up conversation. These conversations aim to gain a better understanding of the solutions proposed and how they may help achieve our ambitions. During such meetings, market parties can also elaborate on their specific solutions.

### 3.3 Contact

If you have questions about this market consultation or wish to register your interest, we prefer you to do so via TenderNed. Alternatively, you can send an email directly to: Andre Gosens, Tender Manager Asset Management: [andre.gosens@prorail.nl](mailto:andre.gosens@prorail.nl)

### 3.4 Open and Honest

Participation in this market consultation is entirely voluntary and does not provide any advantage in a potential procurement process. Likewise, choosing not to participate does not result in exclusion from a future tender.

By participating, you agree that the information you provide may be used by ProRail in preparation for possible procurement. Any commercial (numerical) information you provide will be treated confidentially by ProRail.

ProRail values a transparent process. The intent is not to favor participants of the market consultation, nor to disadvantage non-participants. Therefore, all relevant information derived from the consultation will be made available to all potential bidders either through the tender publication or as part of the procurement documentation.