Service ID NEW (S00287_2)

Location Poland

Testing and validation of autonomous agricultural vehicle trajectory cont

Provider service

Lukasiewicz Poznanski Instytut Technologiczny (L-PIT)

Link to content

https://agrifoodtef.eu/catalogue-of-services/testing-and-validation-autonomous-agricultural-vehicle-trajectory-control

Type of Sector

Arable farming, Horticulture, Livestock farming, Tree Crops

Accepted type of products

Design / Documentation, Physical system, Software or AI model

Type of service

Collection of test data, Conformity assessment, Data analysis, Data augmentation, Desk assessment, ELSA assessment, Pe

Description

The service evaluates how a self-moving autonomous robot or vehicle maintains a predefined and AI-controlled trajectory, providing specialised support for this assessment. As a core part of this service, devices and control systems are verified for their adherence to work safety principles. This verification includes analysing the correctness of maintaining the preset trajectory and stopping before the defined limits of the work surface. To achieve this, an advanced testing methodology based on ISO 18497 provisions is utilised, along with specialised equipment to control the vehicle's track maintenance. The support provided is tailored to the customer's specific needs, including preparing the test site according to requirements and providing necessary control equipment and components for proper testing. These activities ultimately lead to increased automation efficiency and precision of controlled objects, particularly in agricultural applications.

How can the service help you

• Before using the service:Customers own robotic, autonomous devices for fieldwork, technological processes, or other applications within the agriculture and agri-food domains. However, they need support to confirm that these autonomous vehicles maintain current safety standards regarding their driving path and stopping behaviour within designated areas. Without this verification, there's a risk that autonomous operations could lead to collisions with obstacles (such as other objects or trees outside the plot boundary) or even falls off steep plot boundaries.

This uncertainty can hinder the safe and efficient deployment of autonomous vehicles in real-world conditions.• After using the service: Our service assesses the maintenance of safety procedures for the operation of self-driving robots and autonomous vehicles. The service provider offers to prepare and perform safety tests of these vehicles under conditions similar to their expected real-world operation, adhering to a methodology based on ISO 18497 requirements.

The customer will obtain a qualitative assessment indicating whether their vehicle meets current safety standards in terms of maintaining its set driving path and stopping before the boundary of the tested area.

How the service will be delivered

Our service is inherently flexible and always tailored to the specific needs of the customer. It is important to emphasise that we focus on testing and evaluating the compliance of autonomous vehicles with existing standards and safety assumptions, rather than on developing new solutions or methodologies from scratch, which aligns with the purpose of agrifoodTEF.

Aspects that are customisable to the customer's needs include:

• Testing methodology: We develop and adapt testing methodologies for autonomous vehicle trajectories. This methodology adheres to the guidelines of the ISO 18497 standard for agricultural robotics and AI, while also incorporating the individual technical and operational parameters of the customer's vehicle, as well as the specifics of the field operations, technological processes, and plants for which it is intended.

• Scope and size of test areas: These are precisely determined based on the vehicle description provided by the customer to reflect real working conditions and ensure appropriate testing environments. The customer's description should include

Service customisation

It is important to note that the service focuses on testing and evaluating compliance with existing standards and assumptions, rather than on developing new solutions or methodologies from scratch, which aligns with the purpose of agrifoodTEF.

Our service is based on a structured course of its implementation, involving the provision of support to ensure testing conditions for the safe movement of autonomous vehicles under conditions in which they perform specific agrotechnical work. The testing conditions will be tailored to the customer's needs in terms of field operations, technological processes, and plants.

The stages of its implementation are as follows:

• Initial consultation: The customer provides a description of the vehicle (test object), the technical and operational parameters of its operation, and its equipment in the form of the machinery or tools it uses in order to determine the scope of the tests and the size of the test areas needed to carry them out. The description should also include the relevant parameters, indicators, and limit ranges to unify the range of input data and their configuration. This stage typically takes from 1 to 5 working days, depending on the complexity of the information provided and the client's requirements.