

Service ID S00071

Location France



ARPA 4 - Qualification of safety systems for human detection and collision avoidance

Provider service

INRAE

Link to content

<https://agrifoodtef.eu/catalogue-of-services/arpa-4-qualification-safety-systems-human-detection-and-collision-avoidance>

Type of Sector

Arable farming, Greenhouse, Horticulture, Livestock farming, Tree Crops, Viticulture

Accepted type of products

Design / Documentation, Physical system, Other

Type of service

Collection of test data, Performance evaluation, Provision of datasets, Test design, Test execution, Test setup

Description

The ARPA 4 test thoroughly evaluates the safety systems of agricultural robots, focusing on their ability to detect human-like obstacles and automatically stop to prevent accidents. It simulates real-world scenarios by positioning mannequins in front of the robot as it moves through artificial crop rows. Using a high-precision laser tracking system, the test measures the robot's trajectory and speed at our Montoldre site in France. This ensures the robot can safely operate in environments like vineyards or orchards, providing valuable insights into its emergency stop functions and compliance with safety standards. A manufacturer's representative must oversee the process.

How can the service help you

This service is designed for manufacturers of agricultural robots and safety systems. It evaluates how well these robots can detect and respond to human-like obstacles safely and efficiently. Prior to testing, there may be concerns about the robot's ability to handle critical safety situations in real-world environments such as vineyards or fields. Once the test is completed, the robot's safety system performance is verified, demonstrating its capacity to detect obstacles and halt in time efficiently.

This process addresses the need for safety validation, reducing the risk of accidents and increasing trust in the robot's ability to operate reliably and securely.

The final test report is prepared and reviewed by the test operator. This document belongs exclusively to the customer, satisfying the need for verified safety compliance and unbiased operational confidence.

How the service will be delivered

The ARPA4 test can be customised to focus on specific safety features manufacturers wish to evaluate. These features are jointly established before testing. However, the tests mainly determine the robot's ability to detect and stop when encountering human-shaped obstacles in its working area.

Some limitations exist, such as the need for a manufacturer's technical representative to be present during the test and the requirement to provide technical manuals in advance.

In addition, conducting the tests during the winter may not be possible, so customers should plan accordingly.

Service customisation

ARPA 4 uses a laser-based tracking system to precisely measure the robot's movements. The test involves running several tests with mannequins placed in the robot's path to simulate real-world risks.

Testing is available year-round, with possible restrictions during the winter season due to soil and weather conditions. Each test lasts approximately five days, depending on the conditions established during the technical meeting, and is carried out on the premises of INRAE - Montoldre - AgroTechnoPôle in France (just two hours from Lyon).

The manufacturer's representative will be involved throughout the process to ensure accurate testing and validation. The robot's technical and user manuals must be submitted in advance. Customers will receive a detailed technical report on the test.