Service ID S00111

Location Italy

Support in interconnecting systems to physical infrastructure

Provider service

Politecnico di Milano (POLIMI), Università degli Studi di Milano (UMIL)

Link to content

https://agrifoodtef.eu/catalogue-of-services/support-interconnecting-systems-physical-infrastructure

Type of Sector

Arable farming, Greenhouse, Horticulture, Tree Crops, Viticulture

Accepted type of products

Design / Documentation, Physical system

Type of service

Test setup

Description

Testing a system in a physical environment requires an environment that has been prepared and set up to support the specific testing activities to be executed. Such an environment usually involves both agronomy-related elements (machines, fields, greenhouses, cultivations...) and technical infrastructure (sensors, networks, software, logging systems...). In order to execute the testing, the physical system under test (e.g., an agricultural robot) must correctly interface with all these elements; this service takes care of ensuring this.For instance, it is crucial to ensure that the communication between the system under test and the technical infrastructure supporting the testing activities is correct, smooth and uninterrupted.Wherever needed, the service also includes the development of custom components needed to ensure a successful two-way integration between the system and the testing infrastructure (e.g., a software component to format data or perform transcoding).While available separately, this service is often used in association with service S00110 (Preparation of physical test environment).

How can the service help you

Interconnecting a complex system with an external infrastructure is a difficult task, especially when the infrastructure has not been developed by the system developer and is not dedicated specifically to that system.

However, for companies developing advanced AI- and robotics-based products, having their system interact with an external infrastructure is often indispensable to perform testing; for many companies it is impossible, in fact, to have such an infrastructure internally available.This service helps customers to make use of agrifoodTEF's advanced infrastructure without forcing them to perform themselves all the necessary activities and therefore strongly reduces the time needed to arrive at an effective interaction between the system under test and the testing infrastructure.

How the service will be delivered

This service description is intentionally generic. Every instance of this service is, in fact, customised to adapt it to the needs and requirements of the specific customer. The following is an example of a service instance.Example service: the customer has developed a mobile robot to continuously monitor the hydric stress of grapevines.

To do that, the system under test (i.e., the robot) must visit all plant rows in a test vineyard provided by agrifoodTEF. The vineyard is fitted with a network of IoT sensors used to provide environmental data. To ensure smooth data logging during navigation, the robot is set up to interface with the IoT network located at the testing facility via a locally available wireless network. Repeaters are also configured in parts of the testing field where the network signal is particularly low.

The service supports the customer in interconnecting their system with the IoT network and successfully exploiting the available sensor data; additionally, a custom software module for data collection compatible with the Robot Operating System (ROS) is developed to enable proper logging of the IoT data along with the streams generated internally by the robot under test (based on ROS).

Service customisation

The first phase of this service involves discussing with the customer what elements of the agrifoodTEF infrastructure they need to be integrated with and what activities will be performed after integration. Often, but not necessarily, the customer of this service will also be using service S00110 (Preparation of physical test environment).

The output of this initial phase (which may take 2-4 weeks and proceeds via meetings, either in person or remote) is an integration plan, defining the activities to be performed by agrifoodTEF (and possibly by the customer) to enable integration and any missing element that agrifoodTEF may need to generate (e.g., communication or data transcoding software). AgrifoodTEF will subsequently proceed to prepare its infrastructure to be ready to interface with the customer's systems at the chosen time, also implementing the specified missing elements.

The time distance between service initiation and the execution of the tests (when the integration will be needed) heavily depends on the complexity of the operations to be executed and will be specified in the integration plan after being agreed upon between agrifoodTEF and the customer.

The final and most important part of the service takes place at the time chosen for the execution of the tests, when the customer will move the systems to be tested to the location of the agrifoodTEF infrastructure and will integrate the systems