

**Service ID** S00110

**Location** Italy



## Preparation of physical test environment

### Provider service

Politecnico di Milano (POLIMI)

### Link to content

<https://agrifoodtef.eu/services/preparation-physical-test-environment>

### Type of Sector

Arable farming, Greenhouse, Horticulture, Tree Crops, Viticulture

### Accepted type of products

Design / Documentation

### 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. This service supports the customer in the execution of the tests by taking care of such preparation and setup. The service involves: - agronomic preparation: e.g., providing the required soil conditions, making sure that a given in-field configuration of specific plants at a given growth stage is available at the time of testing, and so on; - Technical preparation: e.g., setting up infrastructure elements such as RTK GPS base stations, environmental sensors, power and networking, as well as the computational environment required to interface with the system under test to acquire and possibly pre-process experimental data. If AgrifoodTEF facilities are involved in the experimental activities, the service also includes configuring the testing facility accordingly. Environment preparation is done according to an environment design provided by the customer. If needed, such a design can be done by AgrifoodTEF for the customer via Service S00106. Interested customers can get support from AgrifoodTEF for the entire pipeline involved in experimental testing, from the design of its other elements beside the environment (namely, the testing protocol via service S00107 and the evaluation metrics via service S00108) to test execution (service S00113), data collection (service S00113), and evaluation (S00114). The output of Service S00110 is the environment ready for the execution of the testing campaign at the time requested by the customer.

## How can the service help you

Setting up a previously designed test environment to test an AI- or robotics-based system in a meaningful way is not an easy task. It requires, in fact, a comprehensive expertise covering many aspects, both agronomy- and engineering-related. If not executed correctly, preparation undermines the relevance, or even the feasibility, of the tests. Additionally, environment preparation often requires access to infrastructure and test systems (e.g., sensors) that are not part of the system under test.

Many companies, though advanced in their know-how about product design, do not possess internally the expertise and resources to cover all the aspects of the preparation of the environments needed to test them. This service offers such customers the possibility of preparing a state-of-the-art test environment by leveraging AgrifoodTEF's expertise and 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 asks for the preparation of a testing environment for a weeding robot. According to the design by the customer, the test environment is an open field where a specific configuration of crops and weeds must be prepared. Following the design, AgrifoodTEF provides (at a specified date) the testing environment. Crops are planted along 3 10-metre-long rows, considering that they must provide different levels of exposure to sunlight. Matricaria Chamomilla weeds are planted following, again, 3 controlled levels of density along the rows. Manual weeding is performed to remove all weed types different from Matricaria.

A local base station with an associated wireless network (WLAN) is installed and configured in order to provide an RTK GPS correction signal to the machines under test. Sunlight and ground humidity sensors are installed at the head of each row, and their output is made available via the WLAN.

## Service customisation

The first phase of execution of this service involves discussing with the customer the specific details of the design (provided by the customer) of the test environment. During this phase, the service providers will define – together with the customer – the activities and infrastructure required to prepare the environment and the timing of the activities, also considering their relationship with the life cycle of any involved plants.

The output of this initial phase (which may take 2-4 weeks and proceeds via meetings, either in person or remote) is a plan of activities, including also the definition of when the completed environment will be ready for use.

The final output of the service will be the testing environment itself, complete with the needed support infrastructure and any personnel required to operate it, ready for the execution of the tests by the customer. If required, the customer can ask AgrifoodTEF to support such execution via service S00112 (Execution of physical testing) and/or service S00111 (Support in interconnecting system under test to AgrifoodTEF's physical infrastructure).