

**Service ID** S00107



**Location** Italy, Remote

## **Design of testing protocols for physical testing**

### **Provider service**

Politecnico di Milano (POLIMI)

### **Link to content**

<https://agrifoodtef.eu/services/design-testing-protocols-physical-testing>

### **Type of Sector**

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

### **Accepted type of products**

Design / Documentation

### **Type of service**

Test design

### **Description**

Any physical testing activity comprises three main components: the environment (where the tests are conducted), the protocol (which defines the tests to be executed and their methodology), and the evaluation metrics (used to assess the test results). This service focuses on the protocol, while the environment and metrics can be designed as needed through services S00106 and S00108. In the context of testing customer solutions within physical facilities, this service aims to create a suitable testing protocol based on the use cases specified by the customer. The components of the testing protocol defined in this phase may include: Defining the different phases of the protocol and their duration; Outlining the operations to be executed in each phase; Quantifying the effort required for each phase, including the number and qualifications of personnel involved; Distributing testing operations over time, considering seasonal and daily variations, as well as weather conditions; Establishing acceptable and desired variation ranges for each configurable element in the testing environment; Determining the number of test repetitions required and their distribution across the variation ranges. To ensure a comprehensive approach to protocol design, this service involves a collaborative team of both engineers and agronomists.

## How can the service help you

Building a system (such as a machine) to solve a problem and designing an experimental protocol to evaluate its performance are distinct activities that require different skill sets. This service assists customers who have developed a solution by designing the experimental activities necessary to validate its efficacy and demonstrate its performance to potential users. At the conclusion of the service, customers receive a comprehensive protocol design that they can immediately implement for testing.

If needed, agrifoodTEF can also support the customer with test setup and execution through additional services S00110, S00111, and S00112.

## How the service will be delivered

**Example Service:** The customer requests a testing protocol for evaluating the performance of a weeding robot. The protocol designed by AgrifoodTEF leverages a testing environment developed through service S0016.

The provided protocol outlines all phases and elements of the testing process, including the following details:

- (1) The tests will be conducted twice during different periods of the year (in May and September), with each test covering the entire day.
- (2) The specific test dates will be selected to represent typical seasonal conditions, avoiding rainy days.
- (3) During each test, the robot will perform weeding across all prepared rows. Weeding operations for each row will be divided into three distinct phases, executed at different times of the day (10:00, 14:00, and 18:00).
- (4) Each test will involve a minimum of three agrifoodTEF personnel: one agronomist, one engineer, and one technician.

## Service customisation

The duration of this service typically ranges from 3 to 6 weeks. The first phase includes one or more interviews in which the customer provides detailed information about the protocol to be designed, including the features of the system to be tested and which specific aspects need evaluation. Additional documentation (such as machine dimensions and specifications) may be requested (under NDA if confidential) to ensure that the designed protocol aligns precisely with the system's features.

At the end of the service, the customer receives a fully developed test protocol that they can immediately implement to set up and conduct the tests.