



AGRI-FOOD COMPETITION FOR ROBOT EVALUATION (ACRE)

In ACRE, robots and smart implements compete to demonstrate their ability to perform agricultural tasks requiring autonomous capabilities. These abilities are crucial for the transition of traditional agricultural practices to Agriculture 4.0, where Artificial Intelligence and Robotics support Precision Agriculture.

- ⊗ ACRE is a European project open to teams from all around the world.
- ⊗ Focus on autonomous weeding robots to reduce or eliminate the use of pesticides.
- ⊗ Large potential for environmental, societal, and economic benefits.
- ⊗ Performance evaluation is based on objective benchmarks.
- ⊗ For detailed information on the benchmarks' execution, check the Evaluation Plan at metricsproject.eu/agri-food.

ACRE DRY-RUN FIELD CAMPAIGN 2021 - JUNE 14-18, "AGROTECHNOPÔLE" SITE OF INRAE, MONTOLDRE, FRANCE

Functionality Benchmarks (FBMs)

- focused on specific capabilities of a robot

- ⊗ Plant discrimination FBM
- ⊗ Weed destruction FBM
- ⊗ Field navigation FBM

Task Benchmarks (TBMs)

- evaluating the execution of complex tasks involving multiple functionalities

- ⊗ Intra-row weeding TBM
- ⊗ Crop mapping TBM

Registered participants will have the possibility of executing their own choice of FBMs and TBMs.

To join the 2021 Dry-Run Field Campaign, fill the registration form at forms.gle/TbnhkN2np9Z1bz17A or use QR code.



Contact us: [acre\(a\)metricsproject.eu](https://acre(a)metricsproject.eu)

www.metricsproject.eu

ACRE competition is organised by:
Politecnico di Milano (POLIMI, Italy), ACRE leader
Università degli Studi di Milano (UNIMI, Italy)
French National Research Institute for Agriculture,
Food and the Environment (INRAE, France).

H2020-ICT-09-2019-2020

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ACRE FUNCTIONALITY BENCHMARKS

PLANT DISCRIMINATION FBM :

Goal:

Detect which plants of an intra-row are weeds and which are crops.

Evaluation:

Performance metrics compare plant classification produced by the robot with ground truth or reference labelled images.



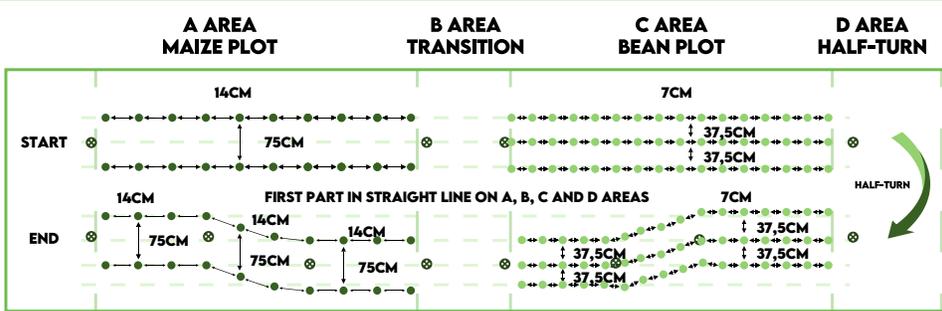
WEED DESTRUCTION FBM :

Goal:

Destroy in intra-row the unwanted plants (weeds) while not damaging the wanted plants (crops).

Evaluation:

- ⊗ Crops and weeds count before and after the weeding action.
- ⊗ Assessment of the weed destruction's effectiveness.



SECOND PART IN STRAIGHT LINE, CHANGE OF DIRECTION, SECOND PART IN STRAIGHT LINE ON A, B, C AND D AREAS

FIELD NAVIGATION FBM :

Goal:

Being able to navigate through field rows without causing damage to the crop.

Evaluation:

Performance metrics consider the amount of damage caused by the robot to the crops and the time to complete the task.

ACRE TASK BENCHMARKS

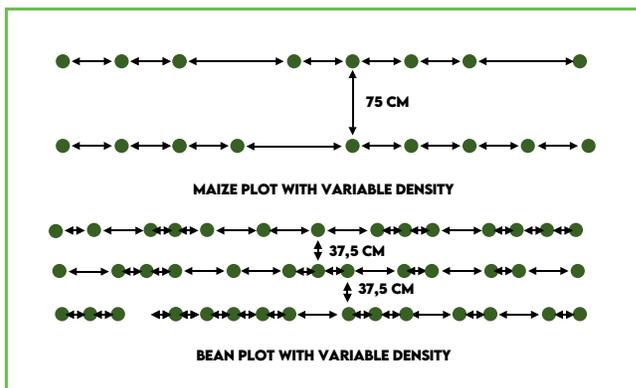
INTRA-ROW WEEDING TBM :

Goal:

Perform fully autonomous intra-row weeding of an intra-row to eliminate the weeds located among the crop plants of a row while not damaging the crop.

Evaluation:

Number of weeds destroyed and crops plants damaged after weeding.



CROP MAPPING TBM :

Goal:

Autonomously produce a map of a multi-row cultivated plot with variable plant density.

Evaluation:

- ⊗ Participants are asked to produce a map containing plant positions in terms of absolute coordinates (like UTM).
- ⊗ Accuracy of plant positions is evaluated by comparing the participant map with the ground truth.