BoniRob App-concept

Phenotyping-App   Penetrometer-App   Precision-Spraying-App
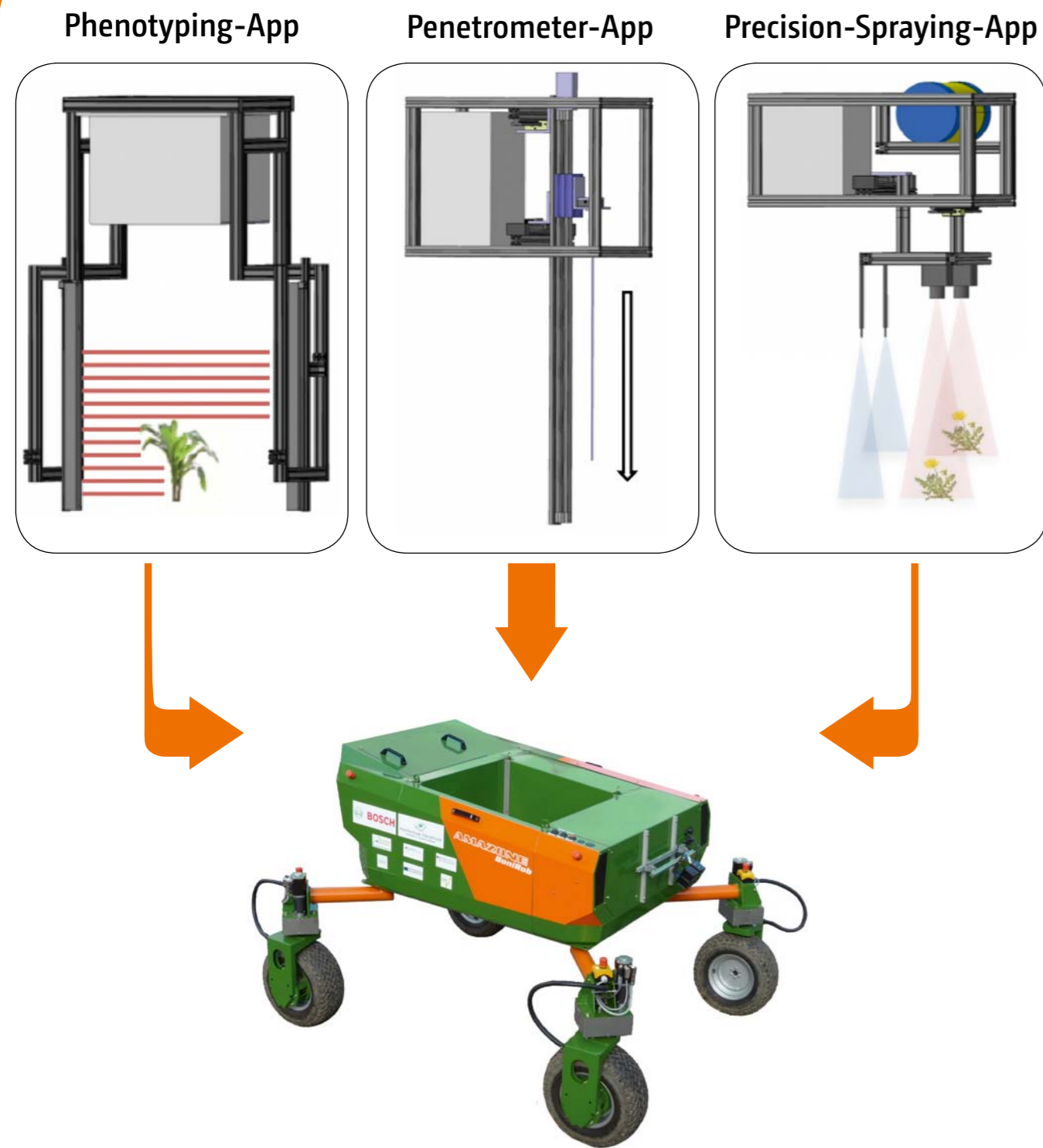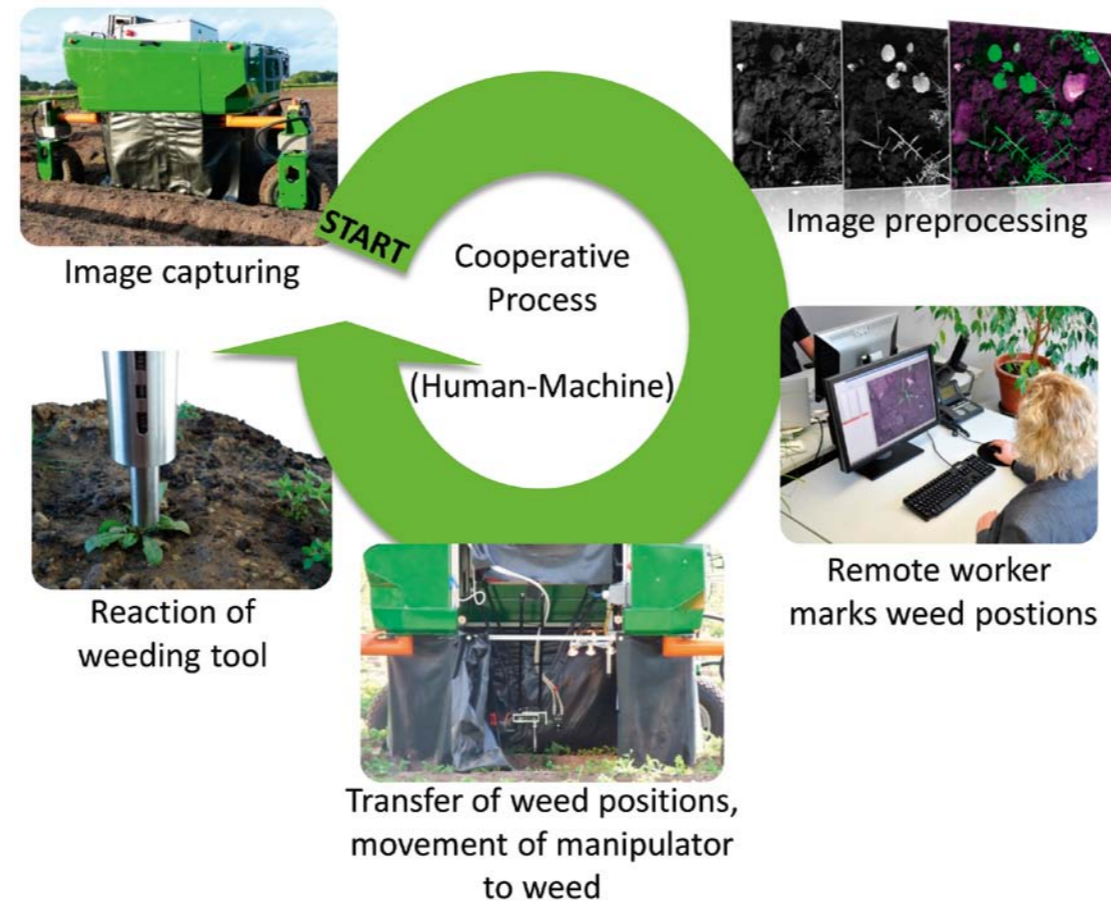

Using the multipurpose field robot platform BoniRob as a carrier, supplier and base for multiple BoniRob-Apps can be compared to the traditional combination of a single tractor with multiple implements. The BoniRob-Apps can be integrated into the platform using defined mechanical, electrical and logical interfaces.

RemoteFarming.1

Web-based interactive crop farming at the example of robotic weed control in vegetables

Image capturing

START

Cooperative Process

(Human-Machine)

Image preprocessing

Remote worker marks weed postions

Reaction of weeding tool

Transfer of weed positions, movement of manipulator to weed

In the research project RemoteFarming.1 BoniRob and an application for mechanical weed control in carrots are developed. But RemoteFarming.1 is much more than the development of a single App for a field robot.
It is the integration of BoniRob and App in a complex environment including web-based communication, server, web-client and a human working at a remote interface.

The system incorporates mechanical weed control. Image-based sensor data is transferred via internet to a remote workplace. A human worker identifies the weed by human "image processing" and the data are transferred to the field for action (RemoteFarming.1a). Based on these data image processing algorithms are developed for automatic weed control options (RemoteFarming.1b).
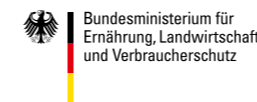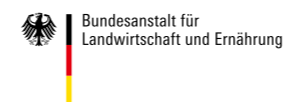
BoniRob

Multipurpose field robot platform for agricultural applications

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AMAZONE

BOSCH

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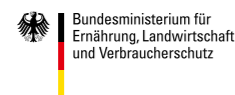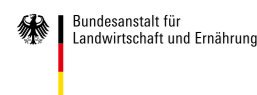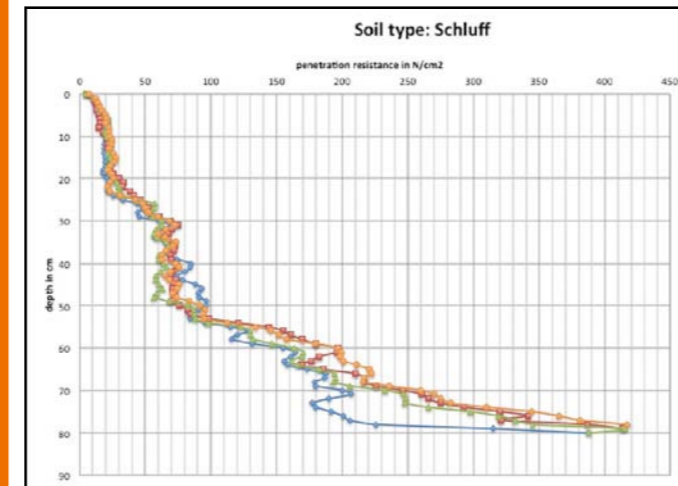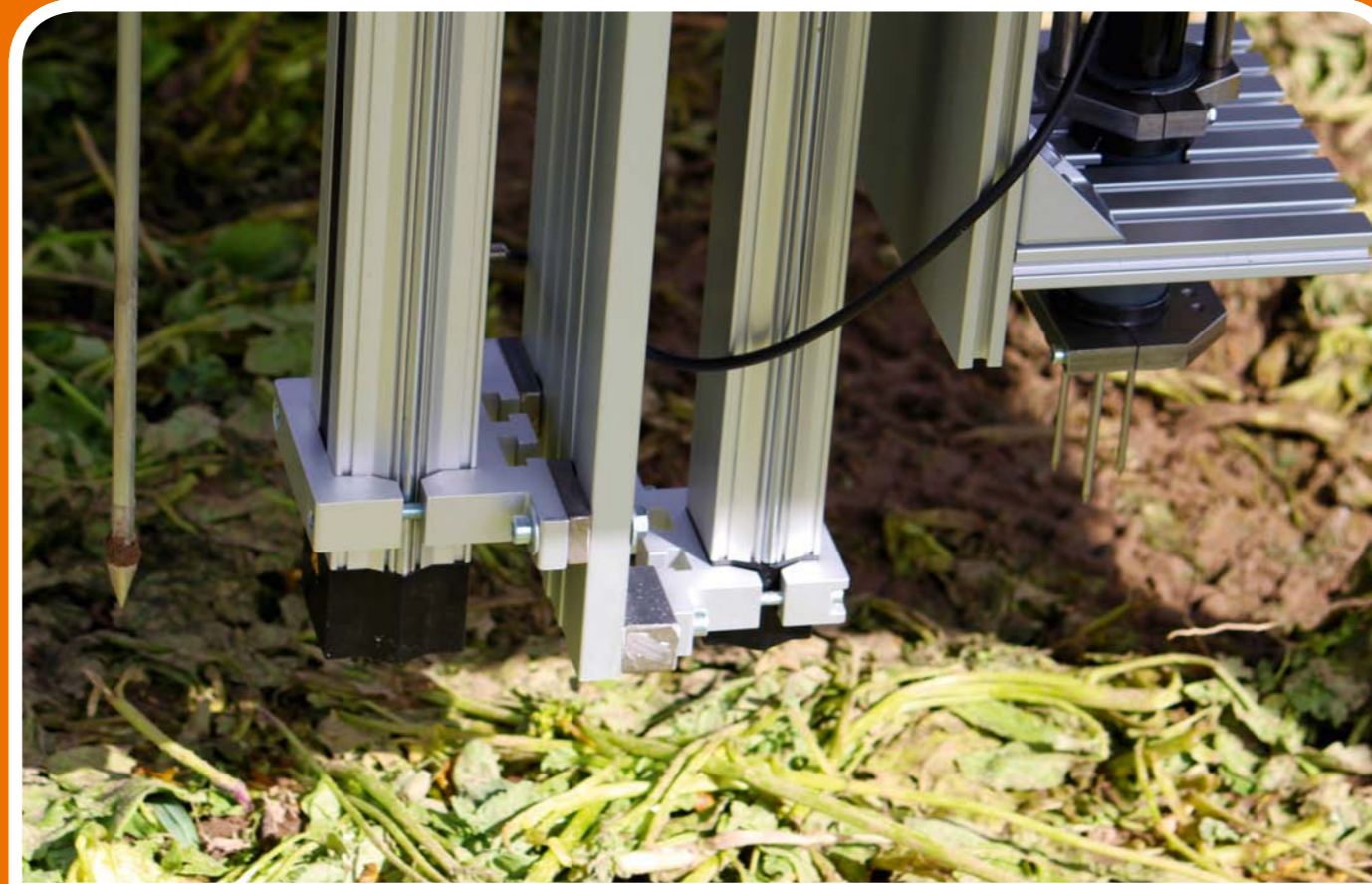
Phenotyping-App
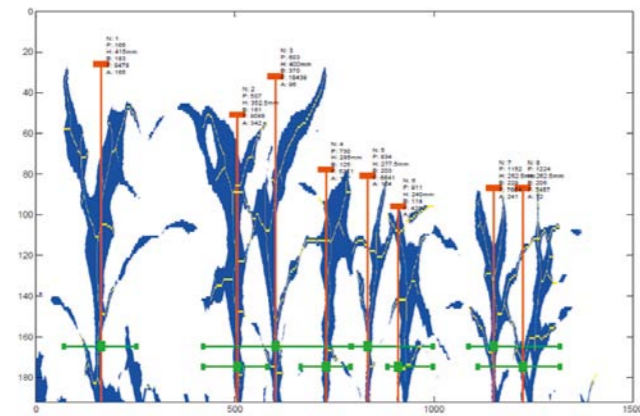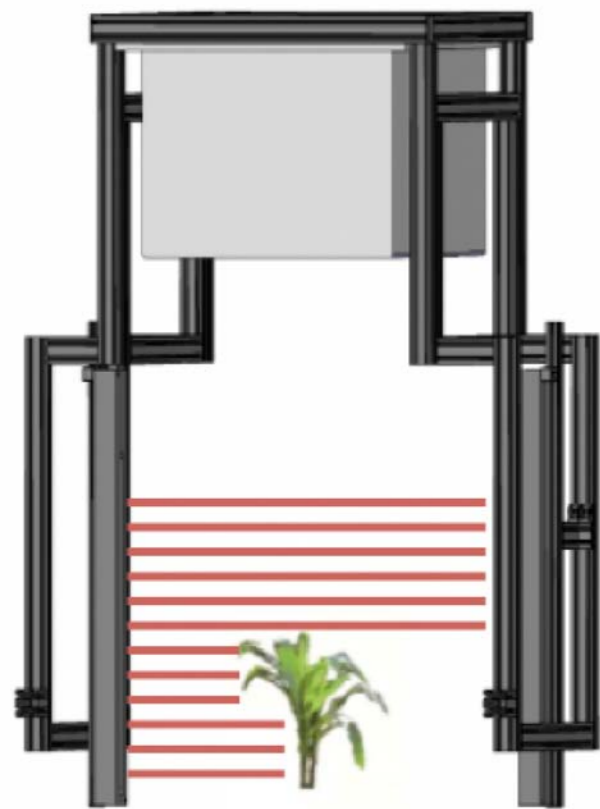
This app consists of a special high-resolution, imaging light curtain, a triangulation sensor and a digital camera. The data from these sensors can be used for interpretation of morphological traits.

The figure „ light curtain measurement data", represents the data of the light curtain as silhouettes of plants.

Penetrometer-App


Soil type: Schluff

This App integrates a mechanical actuator into BoniRob. A penetrometer is included for soil property measurements down to depths of about 80 cm furthermore a soil moisture- and temperature-sensor is mounted. The amount and the positions of the measurement points can be defined prior to an automatic run, thereby using linear motors within the module and GPS. As compared to (typical) manual applications of a penetrometer, soil moisture and temperature, the automatic system shows constant characteristics and allows replications for a large number of measurements.

Precision-Spraying-App
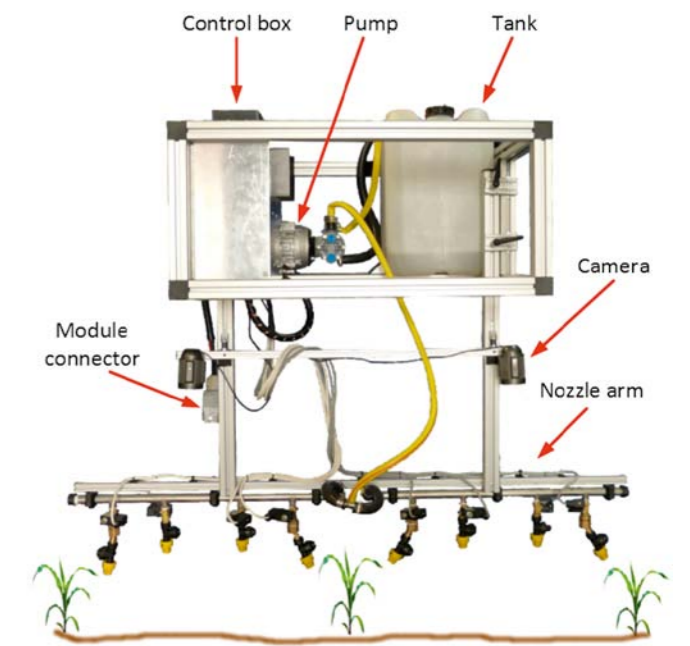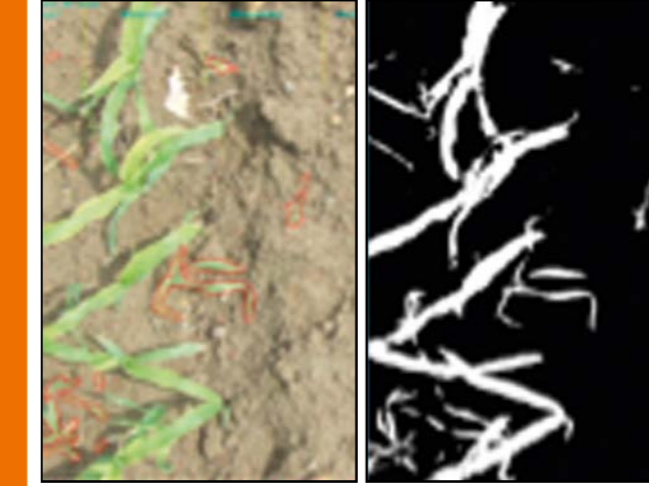
This App is a camera-based application module for selective weed control. By selected herbicides spraying, both ecological as economic advantages are achieved. The following figure shows the composition of the application module. All 75cm, a low-cost camera is mounted. With the help of image processing, Plants are detected and the according valves of the nozzle arm are opened.