



ANT ROBOTICS

# VALERA

## Transport Robot for Agriculture

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Autonomous transport of fruits and vegetables from pickers in the field to central collection points using state-of-the-art optical recognition technologies for ecological and efficient logistics in row and hill crops.



VALERA



### **COOPERATIVE HUMAN-MACHINE INTERACTION**

Real-time human recognition for collaboration in the field



### **PATH PLANNING & NAVIGATION**

Autonomous navigation over fields and along rows, without GPS and maps



### **MOBILE ROBOTICS PLATFORM**

Designed for continuous & reliable operation under the most severe conditions

## **INTRODUCING VALERA, THE FULLY AUTONOMOUS TRANSPORT ROBOT FOR THE HARVEST**

**VALERA** supports autonomous transport in flat fields and along plant rows by. For many years, farms in this area have had difficulty finding enough labor, especially seasonal labor, for these activities. Autonomous transport increases productivity in harvesting by 30-40%, giving farms a way to address labor shortages.

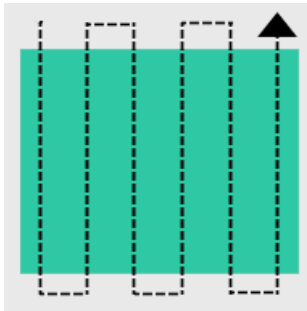
**VALERA** represents a low entry barrier for farms to the topic of field robotics. No infrastructure needs to be built, existing processes can remain in place, and personnel can be quickly trained in its operation. The robot is simply integrated into the existing harvesting process and increases productivity from the first minute.

**VALERA** operates completely independently of any external infrastructure requirements or data sources. The two electric drive wheels are driven independently by means of anti-slip control and electronic differential function, resulting in high maneuverability and an extremely short turning radius. The built-in solar power system ensures continuous operation throughout the entire season without further recharging.

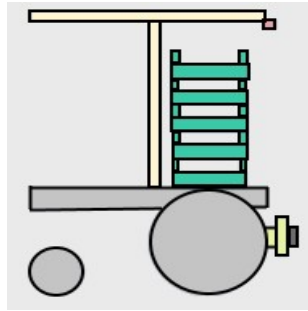
**VALERA** generates a navigation path at start-up and adapts accordingly during operation to follow the pickers and stop at the end of the row to unload the collected crop. Via the advanced optical sensors for visual navi-

gation, the robot operates fully independently and with a high level of precision to ensure minimal over-rolling and damage to the crop.

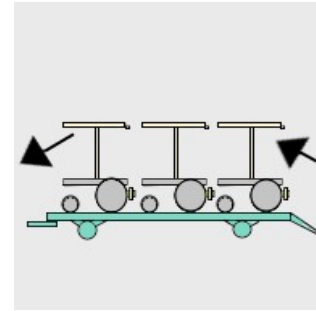
## FUNCTIONALITY



Systematic coverage of the whole field via autonomous navigation with obstacle detection



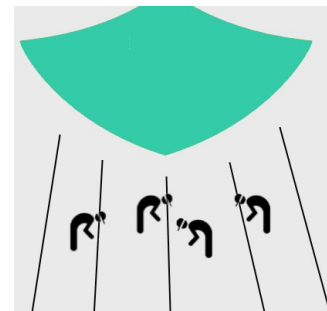
Transport of the crop during the picking process & unloading at the end of each row respectively



Fast removal via large transport trailer (up to 5 robots simultaneously) to other fields

## PRECISE NAVIGATION & SAFETY

**VALERA** relies on a range of intelligent industrial cameras & sensors to ensure maximum safety in operation. While traveling across the row, obstacles are detected and multiple warning and hazardous areas are monitored. In addition, the robot operates precisely over various row crops and dams, as well as in tunnels & scaffolding (on request).



<b>Stereo Camera</b>	Intelligent optical detection system for locating obstacles and people in the field
<b>Nearfield Sensors</b>	Hazardous area monitoring & automatic shutdown during loading of harvest boxes on the platform.
<b>Mechanical Emergency Stop</b>	Mechanical tilt sensors in the direction of travel and easily accessible emergency stop switches in all other directions

## OPERATING CONCEPT & PROCEDURE

**VALERA** is brought into position via a joystick at the beginning of each row and autonomous row navigation is initiated by means of a start button. During travel along the crop rows, the pickers stay in front of the robot and collect the crop in crates. The robot keeps a distance of a few meters and continuously follows behind at this distance. Once a harvest box has been filled, a picker can simply turn around and the robot comes directly to a stop. The full crate can be placed on the transport platform and a new empty crate can be taken from the depot for the next picking process. This process is repeated until the end of the row is reached and the transport robot can be unloaded.

## VALERA TECHNICAL SPECIFICATION\*



1 Row following Cameras

2 Dual Drive System

3 Nearfield Sensors

4 Solar Panel

*\*Specifications are for illustrative purposes only and are subject to change in the course of final development*

<b>Size</b>	2.0 m x 3.5 m x 2.0 m (L x B x H)
<b>Weight</b>	~ 250 kg
<b>Speed</b>	3 km/h max.
<b>Range</b>	Unlimited during the harvest season (solar)
<b>Drive</b>	2-wheel electric drive for maximum traction and interchangeable tires for different field conditions
<b>Navigation</b>	Fully autonomous navigation within fields based on optical row & obstacle detection
<b>Payload</b>	Carrying capacity 168 boxes (40 x 30 x 15 cm) or 650 kg
<b>Track Width</b>	1.5 to 2.2 m (on request)
<b>User Interface</b>	Simple operating concept via joystick & start/stop button
<b>Battery</b>	24 V battery system incl. charger
<b>Sensors</b>	Stereo cameras for navigation & obstacle detection, near-field sensors for obstacle detection, safety shutdown



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