AGRICULTURAL ROBOTICS

A European Catalogue

agRO
BO
food

Why AGRICULTURAL ROBOTICS?

In the years to come, the agriculture industry will be facing some major challenges. One factor is the expected growth of the world's population which is expected to grow to more than 9 billion people in 2050. Growing prosperity is the developing economies which is accompanied with diet changes and increased food demand combined with the higher educational expectancy and later job requirements. Labour participation in the agricultural sector has decreased considerably: e.g. the Netherlands in 1900 it was 30%, now it is 2.6% - when GDP increases, labour participation in agriculture decreases (EU, 2021). Therefore, the positioning of human labour is an important issue in the European agricultural sector. Until recently, agricultural technology was mostly based on mechanical engineering. However, this is gradually changing into electronics, sensors, computing hardware and software, the Internet and wireless communications which have entered the agricultural domain. It is expected that this evolution of technology will continue to advance towards sensing, artificial intelligence, advanced mechatronics and with connectivity as key component. These technologies expected to impact on future agricultural production and the food industry - nonetheless the future is now.

Purpose of the Catalogue

The intent with mapping available technologies in the agri-food sector is to promote robot deployment and ultimately, to create better solutions with improved flexibility and effectiveness, better interfacing, standardization, etc., and all for a lower purchase price. The scope of the technology map that we want to build includes robot solutions for all aspects of agri-food from planning and production through processing, packing, and transportation and up to the food being served at the table. It includes technologies that are already commercially available and those expected to become market-ready over the next two years. It does not include lower TRLs.

Definitions

For the purposes of this catalogue we define the following:

Agri-food: anything involved in the processes that result in human food ready to be eaten, from soil preparation through plants (through fodder and animal care) through "harvesting" and raw preparation through cooking and shops to dining table

Robot: a machine programmed by computer, that:

Reliably* performs complex physical action in the real world

Automatically adjusts at some of its actions according to sensor input

* Reliable: can work as intended for as many hours as needed with only vary rare stops for unscheduled maintenance. In practice, this means that robots that are already commercially available or nearly so, e.g. in field trials.

Is your robot not here?

If you have additions or corrections to the catalogue, please fill out this survey (www.survey-xact.dk/LinkCollector?key=6CY3K6XPJ692) to have it included in a later version of the catalogue. For other questions related to this report, contact Rune Hahn Kristensen (rhk@dti.dk).

agRO BO food presents:

European Robotic Systems for Agricultural Application

FarmDroid

"FarmDroid FD20 is an innovative field robot that helps farmers and growers reduce costs of sowing and weeding crops while also doing it in a CO2 neutral and ecological way. FarmDroid is the creator of a remarkable invention for agriculture; an automatic light weight field robot that automates sowing and weed removal on farmland. This means that the soil is cultivated in an ecological and CO2 neutral way and without risk of doing structural damage to the soil because of heavy equipment." - FarmDroid.com

Information

Company: FarmDroid ApS (Vejen, Denmark)
Launch year: 2018
Application area: Plant care
Price: 50,000 euro
EMC certification: Yes
Organic farming: Yes
Sensor input: GPS positioning
Energy input: Renewable energy source (solar, wind)
Carrying capacity: 4x35 kg
Transport capacity: N/A
Fleet management compatibility: No
Maintance: More than once a day
Safety Level: The robot has safety certification for independent tasks in

Key words

Completely autonomous mobile ground robot for seeding and weeding crops, inter-row and intra-row weeding, seeding, solar-powered, ecological farming. Reduction of manual labour in seed and weed process. Screen interface - permanently fixed or by smartphone. Blade(s). Automatically adjusts parameters (via sensor feedback). Customizable.

Learn more at: www.farmdroid.dk/en/product/

Oz

"Oz reduces the risk of loss of production and therefore helps to secure operating income." - Naïo Technologies.com (2021)

"An easy-to-use tool that brings peace of mind to operations management." - Naïo Technologies.com (2021)

Information

Company: Naïo Technologies (Escalquens, France)
Launch year: 2013
Application area: Field maintenance
Price: From € 9,950 excluding annual GPS subscription and tool pack
EMC certification: Yes
Organic farming certification: N/A
Energy source: Batteries
Sensor input: GPS RTK
Communication interfaces: N/A
Carrying capacity: 150 kg
Transport capacity: 300 kg
Fleet management compatibility: N/A
Maintance: N/A
Safety measures: N/A

Key words

Completely autonomousl mobile ground robot. RTK GPS guidance system. Work output; 1000m²/hour. Speed; Up to 1.8 km/h. Traction; 300 kg.

Learn more at: www.naio-technologies.com/en/oz/

AgBot

"Works with existing implements the farmer already has in use today; this will facilitate a smooth transition towards autonomy!
Our AgBot is a universal enabler that can work with any equipment the farmer already has in use today to provide maximum employability leading to short ROI and rapid growth of the autonomy market." - Agxeed (Survey, 2021)

Information

Company: AgXeed (Oirlo, The Netherland)
Launch year: 2022
Application area: Universal enabler for any agricultural arable & vegetable farming
Price: 225.000 euro
EMC certification: Yes
Organic farming certification: Not yet
Energy source: Internal combustion (55 to 115kW)
Sensor input: Combination of Aural, Visual & Tactile
Communication interfaces: 4G communication, WiFi.
Carrying capacity: 3000 in front hitch and 8000 in rear hitch
Pull capacity: 105kW
Fleet management compatibility: Both independently and in teams is targeted
Maintance: N/A
Safety measures: The robot slows and/or stops when humans present

Key words

Mobile robot for stubble cultivation, seeding, drilling, crop protection, ploughing, mowing, swathing, etc. Outdoor and rough terrain capabilities. Tracks maneuvering.. Webbased portal, smartphone app & RC, Conventional tractor applications. 360 degree camera. Cat 2 and 3 hitches, hydraulic auxiliary valves, PTO, ISOBUS & ISOBUS high voltage. Software compability with GEOJSON, CSV, JSON, KML. (Re)programmed on-site by the operator. Human interaction involves: digital task planning in advance, transportation to and from the field, finetuning (if needed) of the pre-planned task, maintenance. Customizable.

Learn more at: www.agxeed.com

NAUST Robotics

"Fully autonomous drone-in-a-box platform. Our autonomous drone platform repels birds from agricultural fields meanwhile collecting data about the health of the crops. WIthout any human intervention" - NAUST Robotics (2021)

Information

Company: NAUST Robotics ApS (Denmark, Odense)
Expected launch year: 2023-2024
Application area: Plant care: Removing pests and weeds; monitoring and dealing with disease, nutrient and water deficiency, etc.
Price: 1000 / month
EMC certification: Yes
Organic farming certification: N/A
Energy source: Batteries
Sensor input: Visual
Communication interfaces: N/A
Carrying capacity: N/A
Transport capacity: N/A
Fleet management compatibility: Independently
Maintance: Less than once a month
Safety measures: The robot has safety certification for independent tasks in the same workspace as humans

Key words

Completely autonoumous arial Robot for Bird scaring, Precision agriculture. Hest camera. Autonomous operation with charging station. Main electrical power from cables or from solar panels/windmill. Controlled by Smartphone app. (Re)programmed on-site by the operator.

Learn more at: www.naustrobotics.com

Aisprid

"Intelligent and autonomous, our Harvy robot merges cutting-edge technology and in-depth knowledge of the daily life of horticulturalists." - Aisprid.com (2021)

Information

Company: Aisprid (France, Saint-Malo)
Launch year: N/A
Application area: Harvesting/deleafing of tomato and strawberry
Price: N/A
EMC certification: Yes
Organic farming certification: N/A
Energy source: N/A
Sensor input: N/A
Communication interfaces: N/A
Transport capacity: N/A
Fleet management compatibility: N/A
Maintance: N/A
Safety measures: N/A

Key words

Selecting clusters with good ripening, clean and precise, flush with the stem cutting. No tool change necessary to switch the robot to "deleafing" mode. Decision support for horticulturalists: detection of insects and diseases, optimization of yields, predictive models

Learn more at: www.aisprid.com

Thorvald

"Thorvald navigates autonomously using proprietary state of the art software and is operated via an intuitive, easy to use interface. Autonomous navigation has been tested by robot operation over thousands of kilometres in challenging, real-world agricultural environments including polytunnels, open fields and vineyards throughout the world." - sagarobotics.com

Information

Company: Saga Robotics
Launch year: 2016
Application area: N/A
Price: N/A
EMC certification: Yes
Organic farming certification: N/A
Energy source: N/A
Sensor input: N/A
Communication interfaces: N/A
Carrying capacity: N/A
Transport capacity: N/A
Fleet management compatibility: N/A
Maintance: N/A
Safety measures: N/A

Key words

Good for your plants/vines - Powdery mildew is an expensive problem which needs tight control. Thorvald provides that control, protecting your valuable plants/vines through the application of UV-C light, each and every night.

Learn more at: www.sagarobotics.com/thorvald-platform/

Vitirover

"VITIROVER robots are eco-friendly and cost effective.
They preserve the environment and precisely control soil grassing without using glyphosate. Their light weight prevents soil squeezing that will occur with tractors or horses." - Vitirover.com (2020)

Key words

Completely autonomous mobile robot. Separate computer or tablet for control, cameras, meteo, son, radar tools, operates in teams/swarm, on-site programming. Customizable. Modifies the process of pruning vine plantations

Learn more at: www.vitirover.com

Information

Company: VITIROVER SAS (Saint Emilion, France))
Launch year: N/A
Application area: Plant care
Price: 2000 euro
EMC certification: Yes
Organic farming certification: Yes
Energy source: Renewable (20w)
Sensor input: Tactile
Communication interfaces: 2-3-4G, Bluetooth, wifi, et GNSS
Transport capacity: N/A
Fleet management compatibility: Yes
Maintance: More than once a month
Safety measures: The robot has safety certification for independent tasks in the same workspace as humans

SUMMIT-XL

"SUMMIT-XL is a highly versatile Autonomous Mobile Robot (AMR) capable of carrying loads of up to 65 Kg. The mobile robot can navigate autonomously or be teleoperated by means of a Pan-Tilt-Zoom camera that transmits video in real time. The platform allows two types of configurations: with mecanum wheels or with rubber wheels. (...) makes the robot an agile and highly mobile vehicle." - Robotnik.com (2021)

Information

Company: Robotnik Automation S.L.L. (Valencia, Spain)
Launch year: N/A
Application area: Plant care
Price: N/A
EMC certification: Yes
Organic farming certification : N/A
Energy source: Battery
Sensor input: Hokuyo laser scanner and RTK-DGPS kits
Communication interfaces: WiFi 802.11n
Carrying capacity: 65 kg
Transport capacity: 65 kg
Fleet management compatibility: Yes
Maintance: N/A
Safety measures: N/A

Key words

Completely autonomous mobile field robot. Indoor, Outdoor and rough terrain capabilities. Internal and external connectivity to easily connect all kinds of components. Traction motors: 4 x 500 W brushless servomotors. Temperature range: 0º to +50 ºC. . Controller: Open architecture ROS and/or PC with Linux integrated. Autonomy: 10 h

Learn more at: https://robotnik.eu/products/mobile-robots/summit-xl-en-2/

MIXTY

"The system is economically accessible for small and medium farmers, able to enhance the eco-friendly growth and suitable for the steep terrains of the most exquisite European vineyards. MIXTY differs from similar technologies already present on the market thanks to the specific system design and technology implemented, guaranteeing a more precise and accurate farm monitoring (versus the standard based on drones

Key words

Completely autonomous Mobile robot for plant care - specifically vineyard disease prevention monitoring. Controled by Separate computer or tablet. Outdoor with rough terrain capabilities. Automatically adjusts parameters (via sensor feedback). Precise and accurate farm monitoring.

Information

Company: Barbieri srl (Rome, Italy)
Expected launch year: 2022-2023
Application area: Plant care
Price: 15,000 euro
EMC certification: In progress
Organic farming certification: Not yet
Energy source: Batteries
Sensor input: Visual
Communication interfaces: N/A
Transport capacity: N/A
Fleet management compatibility: N/A
Maintance: More than once a week
Safety measures: The robot slows and/or stops when humans present

Ecobotix bio control

Bio-control agents, such as ladybirds, predators and parasitic wasps, provide a strong alternative to the use of chemical insecticides. With the help of our unique drone-based solutions, we are able to ensure an even and rapid spread of useful animals over your fields, which will effectively protect your crops from pests such as aphids and mites." - Ecobotix (2021)

Information

Company: Ecobotix SA (Slagelse, Denmark)
Expected launch year: 2021
Application area: Plant care
Price: 4,000 euro
EMC certification: Yes
Organic farming certification : Yes
Energy source: Batteries
Sensor input: Visual
Communication interfaces: MQTT
Carrying capacity: 200 kg
Fleet management compatibility: N/A
Maintance: Less than once a month
Safety measures:The robot has safety certification for collaborative working

Key words

Autonomous drone bio-control-applicator. Controlled by Smartphone app (remote control). GPS. Can operate in swam teams. Automatically adjusts parameters (via sensor feedback).

Learn more at: www.Ecobotix.com

BugVac

"The Bug Vacuum has a double-fan vacuum system to ensure a uniform airflow over the whole bed width. Optimum vacuum pressure is achieved due to its precise fan-height control, maximizing bugs aspiration. In compliance with food safety standards, fan inlet is made of stainless steel and food-grade silicone" - Agrobot.com (2021)

Key words

Mobile ground for care Strawberries by Lygus and pest prevention. Rough terrain capabilities. Joystick/RC controller. Fans as primary actuator. Automatically adjusts parameters (via sensor feedback). Completely autonomous.

Learn more at: www.agrobot.com/bugvac

Information

Company: Agrobot (La Palma del Condado, Spain)
Launch year: N/A
Application area: Plant Care
Price: N/A
EMC certification: In Progress
Organic farming certification: Yes
Energy source: Internal combustion
Sensor input: Visual
Communication interfaces: N/A
Carrying capacity: 1000 kg
Transport capacity: 1000 kg
Fleet management compatibility: N/A
Maintance: More than once a week
Safety measures: The robot slows and/or stops when humans present

Robot One

"Robot One is designed for chemical free weedcontrol. But it is also suitable for Pixelfarming (mixed cropping) in largescale biodiverse enviroments. Pixelfarming with Robot One is our solution for sustainable agriculture." - PixelFarming (2021)

Information

Company: PixelFarming Robotics (Almkerk, Netherlands)
Expected launch year: 2022/23
Application area: Plant care
Price: 185,000 euro
EMC certification: In progress
Organic farming certification: Not yet
Energy source: Renewable (2-5 kW)
Sensor input: Visual
Communication interfaces: powerful CPU with 4G
Transport capacity: N/A
Fleet management compatibility:N/A
Maintance: N/A
Safety measures: The robot will be provided with obstacle detection

Key words

Autonomous mobile robot for chemical free weedcontrol, specific crop treatment, large scale biodiverse environments. Ourdoor. Various actuators on arms - Possible to apply multiple actuators like grippers, hoes, streamers. Screen on the robot and seperate computer/tablet. Team operated. Software compatibility; Digital Twin, cloud solution, from plant recognition to path planning. Remote controlled. Fully electric, with solar panels, light weight <2500KG, Vision, data collection

Learn more at: pixelfarmingrobotics.com/robot-one#robot-one

Tom

"Farmers can pull together and aggregate multiple layers of farm data and farm management information."

Key words

Mobile field robot for arable crops, plant count, weed detection, crop health, slug treatment and general soil health. Controlled by separate computer or tablet. Equiped with conveyor. Multi spectral imagery. Soil sensors. Automatically adjusts parameters (via sensor feedback). The robot must be continuously monitored

Learn more at: https://www.smallrobotcompany.com/

Information

Company: Small Robot Company (West Dean, United Kingdom)
Launch year: 2021
Application area: Plant Care
Price: Per hectare subscription (FAAS)
EMC certification: In Progress
Organic farming certification: Yes
Energy source: Batteries (500 W)
Sensor input: Visual
Communication interfaces:
Carrying capacity: N/A
Transport capacity: N/A
Fleet management compatibility: Yes
Maintance: More than once a day
Safety measures: Robot handler is present even when autonomous routing is active

Meropy - SentiV

"SentiV is a scouting robot that highlights the variability within field crops plots and detects potential threats to crops. Being in contact with the ground, we are talking about near sensing.

SentiV is dedicated to agricultural professionals: it is a tool to improve practices for farmers, a farm advisory solution for coops, and an indispensable element to optimize phenotyping on experimental plots." - meropy.com (2021)

Information

Company: Meropy (Meylan, France)
Launch year: 2021
Application area: Plant care
Price: 5.000 euro/y
EMC certification: No
Organic farming certification: Not yet
Energy source: Batteries
Sensor input: Visual
Communication interfaces: LTE
carrying capacity: N/A
Transport capacity: N/A
Fleet management compatibility: No
Maintance: Less than once a month
Safety measures: The robot has safety certification for independent tasks in the same workspace as humans

Key words

Completely autonomous mobile ground robot used for scouting, monitoring, surveillance of maladies, ravageurs, and adventices. Outdoor and rough terrain capabilities. Controlled by separate computer or tablet. Operates in swarm teams. Automatically adjusts parameters (via sensor feedback). Possibility of customization if demanded.

Learn more at: meropy.com/en/robot.html

XDR

"X-drive Robots rover is the first fully automated multi-functional robot. Using the lastest ultra-sound navigation systems and 4x4 wheel drive to maneuver in all types of weather and all environments" - xdriverobots.com

Key words

Autonoumous mobile robot for riding area harrow maintenance. Outdoor and rough terrain capabilities. Controlled by Smartphone app. Equipped with towbar. Pulling of tools attached to rear or beneath robot. Many programming possibilities. Customizable. High capacity and operation time. Extremely robust.

Learn more at: www.xdriverobots.com

Information

Company: X-Drive Robots ApS (Roskilde, Denmark)
Launch year: 2022
Application area: Soil management and maintenance
Price: 70.000 euro
EMC certification: In progress
Organic farming certification: Yes
Energy source: Batteries
Sensor input: Ultrasound and radar
Communication interfaces: Wi-Fi, bluetooth
Carrying capacity: 1000 kg
Transport capacity: 500 kg
Fleet management compatibility: Team/swarm
Maintance: Less than once a month
Safety measures: Several safety features

AVO

"AVO performs autonomous weeding operations in plane fields and row crops. Using cutting-edge machine learning, the robot detects and selectively sprays the weeds with a micro-dose of herbicide. The centimeter-precise detection and spraying reduces the volume of herbicide used by more than 95%, while ensuring crops are not sprayed for yield preservation." - EcoRobotix (2021)

Information

Company: ecoRobotix SA (Yverdon-les-Bains, Suisse)
Expected launch year: N/A
Application area: Plant care
Price: N/A
EMC certification: No
Organic farming certification : No
Energy source: Renewable energy source
Sensor input: Visual
Communication interfaces: industrial BUS-systems; ethernet; ...
Carrying capacity: 200 kg
Fleet management compatibility: WIFI, GSM
Maintance: Manual adjustment or maintenance is needed more than once a day
Safety measures:The robot slows and/or stops when humans present

Key words

Completely autonomous mobile field robot for weeding and spraying. Controlled by separate computer or tablet. Sprayer as primary actuator. Operates by pre-set programs

Learn more at: www.ecorobotix.com/en/avo-autonomous-robot-weeder/

Rovitis

"The Rovitis 4.0 project proposes a highly innovative system for the Veneto wine sector: a robotic management of the vineyard, which is based on the dialogue between a robotic means, sensors and a DSS (Decision Support System) software.
The idea is that of a self-managed company, capable of intervening in the field based on the real risks to which the crop is subject and minimizing the intervention of staff." Roviti.com (2021) (Translated)

Key words

Completely autonomous mobile robot used in vineyards for pesticide control. outdoor rough terrain capabilities. Control by Smartphone app. Sprayer actuator. Includes Lidar and GPS tools, Software compatibilities; ROS, TCP/IP,J1939,CANopen, IEC 61508:2010. Learns its own program. Customizable.

Learn more at: www.rovitis.com

Information

Company: az. agr. Giorgio Pantano (Candiana (pd), Italy)
Expected launch year: 2023
Application area: Plant care
Price: 50,000 euro
EMC certification: No
Organic farming certification : No
Energy source: Hydraulic (28kW)
Sensor input: Visual
Communication interfaces: wifi,Internet
Carrying capacity: 1000 kg
Transport capacity: 2000 kg
Fleet management compatibility: Yes
Maintance: Less than once a month
Safety measures: The robot slows and/or stops when humans present

Robotti150D

"Autonomous machine is capable of carrying out seeding, weeding, harrowing, grass cutting, rotavating, power harrowing and spraying. Autonomously controlled by GPS via an onboard computer, the Robotti 150D follows a pre-programmed planned route in the field without the need for a human driver." Agrointelli (2021)

Information

Company: AgroIntelli (Aarhus, Denmark)
Launch year: 2019
Application area:
Price: 161,000 euro
EMC certification: Yes
Organic farming certification: Yes
Energy source: Internal combustion
Sensor input: Vision
Communication interfaces
Transport capacity: 750 kg
Fleet management compatibility: Yes
Maintance: Manual adjustment or maintenance is needed more than once a day
Safety measures: The robot slows and/or stops when humans present

Key words

Autonomous mobile field robot. Tool carrier. Cultivate and prepare a seedbed. Sowing/ planting. Weeds removal by mechanical /chemical cleaning,. Button-screen user interface. 3 points suspension.. Customizable. High precision.

Learn more at: www.agrointelli.com

agRO BO food

FFRobot

"FFRobotics presents a unique and patented Robotic Fruit Harvester – the FFRobot: A reliable, robust harvesting platform emulating human-hand picking process for efficient, cost-effective and bruise-free fruit harvesting. opportunity for farmers/growers to meet challenges of finding and retaining labor, rising labor costs and potential damage to hand-picked fruit - by reducing, supplementing or replacing human pickers from the dwindling pool of harvesting labor." - FFRobotics.com (2021)

Key words

Completely autonomous mobile ground robot for bloom thinning & pruning. Manipulators. Controlled by buttons or screen permanently attached to the robot. 3-fingergrippers as primary actuator. Automatically adjusts parameters (via sensor feedback). Emulates human mind-eye-hand interaction

Learn more at: www.ffrobotics.com

Information

Company: FFRobotics Ltd. (Isreal)
Expected launch year: 2021 (late)
Application area: Harvesting
Price: A service fee per bin of picked fruit
EMC certification: Yes
Organic farming certification: Not yet
Energy source: Internal combustion (petrol/diesel/biogas/other)
Sensor input: Visual
Communication interfaces: N/A
Carrying capacity: N/A
Transport capacity: N/A
Fleet management compatibility: No
Maintance: More than once a month
Safety measures: Humans are excluded from the robot's working space

EOX 175

"The first electric tractor with a hydrogen stack as its energy source, meaning no CO2 or NOx emissions. The pulling power is better distributed and the soil is less compacted so remains healthier.
EOX 175 can be delivered with a cabin and full GPS-RTK automation and without cabin for full autonomous driving on field." - H2Trac (2021)

Information

Company: H2Trac bv (IJsselstein - Arnhem, The Netherlands)
Launch year: 2021
Application area: Operate as an general tractor
Price: 280.000 euro
EMC certification: Yes
Organic farming certification: Yes
Energy source: Range extender using hydrogen or diesel, biogas
Sensor input: GPS RTK
Communication interfaces: wifi, g3, g4 and g5
Carrying capacity: 7000 kg
Transport capacity: 7000 kg
Fleet management compatibility: Yes
Maintance: More than once a day
Safety measures: Robot is remote controlled by operator

Key words

CTF, Infra, plant care, master slave, autonomous. 175 HP. Controlled by separate computer or tablet. Electric motors within the wheels. Tool interface; iso bus. Operates in swarm teams. Uses AEF ISOBUS certified TIM communication when working in a fleet. Learns its own program. Remote controlled. Customizable

Learn more at: www.e-ox.nl

eTrac

"A first full electric demo model of the unmanned clean tech tractor, called the eTrac. Farmertronics will make a next step in smart and sustainable farming by the development of an unmanned clean tech robot tractor to work the land, not running on diesel but electrically driven. The electricity to drive this tractor will be generated and temporary stored at the farm. With this development a cross-over will be made between the sectors high tech, automotive and agriculture. " farmertronics.com (2021)

Key words

Completely autonomous mobile ground robot/light weight tractor for caretaking of Apples, Pears, Rasberries, Blue berries. Outdoor and rough terrain capabilities. Controlled by separate computer or tablet. Sprayer as primary actuator. Mower as additional tools expansion. Tool interfaces; CANopen, 400VAC, 24VDC. Operates on pre-set programs. Customizable.

Learn more at: www.farmertronics.com/

Information

Company: Farmertronics Engineering BV (Deurne, The Netherlands)
Expected launch year: 2022
Application area: Plant care
Price: 80.000 euro
EMC certification: In progress
Organic farming certification: No yet
Energy source: Batteries
Sensor input: Visual
Communication interfaces: CANopen, Wifi, 4G
Carrying capacity: 2000 kg
Transport capacity: N/A
Fleet management compatibility: No
Maintance: Less than once a month
Safety measures: The robot slows and/or stops when humans present

TREKTOR

"Trektor is hybrid, autonomous and it uses the farmer's existing tools" - SITIA (2021)

"(...) Trektor is a tractor, it makes it possible to fill the shortage of personnel, to reduce the arduousness of the work and to help the farmer on a daily basis. TREKTOR can change it width (wheelbase) or his height (adjustable ground clearance) to adapt himself to the crop." - SITIA (2021)

Information

Company: SITIA (Bouguenais, France)
Launch year: N/A
Application area: Harvesting (of livestock)
Price: N/A
EMC certification: Yes
Organic farming certification : Not yet
Energy source: Hybride Rechargeable Diesel/électrique
Sensor input: Visual
Communication interfaces: N/A
Carrying capacity: 700 kg
Transport capacity: 1000 kg
Fleet management compatibility: Yes
Maintance: More than once a month
Safety measures: Humans are excluded from the robot's working space

Key words

Fully autonomous mobile field robot. Indoor, Outdoor and rough terrain capabilities. Control proposed options; buttons, tablet, app and remote control. Blade actuator, hydraulic, electrical, mechanical interfaces as well as a CAN network allowing the addition of inputs / outputs. Operates in swam teams. On-site programming by operator. Customizable

Learn more at: www.sitia.fr/en/innovation-2/trektor/

Acrobat

"Acrobat is the newest transportation vehicle for greenhouses, agriculture and logistics management. Like Ants it can work as one peace of a big system connect with more robots to allow a eficient and simple management in production site. It is able to follow workers and drive in tight spaces deu to his optmized ackerman steering system." - ANTRobotics (2021)

Key words

Completely autonomous mobile robot for fruits transportation. Outdoor and Indoor (greenhouses). Rough terrain capabilities. Precise RTK localization. Autonomy to 8h. Person following capabilities. 48V batteries supply. Wi-Fi. CANopen. Pre-set programs. Controlled by separate computer or tablet. On site programming by specialist. Customizable

Learn more at: www.antrobotics.pt

Information

Company: Amorins, LDA (Póvoa de Varzim, Portugal)
Expected launch year: 2022-2023
Application area: Transport, operator following and sorting
Price: N/A
EMC certification: In progress
Organic farming certification: Not yet
Energy source: Batteries
Sensor input: GPS RTK
Communication interfaces: USB, CANopen, Wi-Fi
Carrying capacity: 250 kg
Transport capacity: N/A
Fleet management compatibility: Team/Swarm
Maintance: Less than once a month
Safety measures: The robot slows and/or stops when humans present

RB-VOGUI

"RB-VOGUI is a general purpose mobile platform designed to target logistics tasks.

The robot has a relevant mobility and is able to follow a human operator autonomously and to navigate autonomously indoor and outdoor. In this sense, RB-VOGUI is suitable for logistics tasks in warehouses or pick & transport & place application" Robotnik.com (2021)

Information

Company: Robotnik Automation S.L.L (Valencia, Spain)
Launch year: N/A
Application area: Plant Care/General
Price: N/A
EMC certification: N/A
Organic farming certification: N/A
Energy source: Batteries
Sensor input: Visual
Communication interfaces: WiFi 802.11n
Carrying capacity: Up to 150 kg
Transport capacity: N/A
Fleet management compatibility: N/A
Maintance: N/A
Safety measures: N/A

Key words

Completely autonomous mobile robot. Indoor and outdoor capabilities. Autonomy: Up to 8h. Temperature range: -10°C a +45°C. Connectivity: Internal: USB, RS232, RJ45 / External: 2x USB, 2x RJ45, 1X hdmi + USD, 5, 12 VDC and 48v power supplies

Learn more at: https://robotnik.eu/products/mobile-robots/rb-vogui-en/

MiR

"User-friendliness and safety of mobile robots help companies addressing workforce challenges.
(...) AMRs actually offers a way of collaborating with people in a safe way. The mobile robots don't take over jobs but injury-prone and monotonous tasks that are related to internal transportation. In this way, the employees get more time to focus on higher-value tasks. Moreover, the mobile robots from MiR are extremely user-friendly and can be programmed without prior programming experience." mobile-industrial-robots.com (2021)

Key words

Completely autonomous mobile ground robot for internal logistics of e.g. sparepart, goods, ingredients etc. Controlled by separate computer or tablet. Several equiqment options like conveyor belt, rack, grip etc. Can be connected to e.g. ERP- and WMS systems. Can be reprogrammed on-site by the operator

Learn more at: www.mobile-industrial-robots.com

Information

Company: Mobile Industrial Robots A/S (Odense, Denmark)
Launch year: 2015
Application area: Internal logistics
Price: from 33.000 euro
EMC certification: Yes
Organic farming certification: Not yet
Energy source: Batteries (100-230V)
Sensor input: Visual
Communication interfaces: REST API, Modbus
Carrying capacity: 1350 kg
Transport capacity: 500 kg
Fleet management compatibility: Team/Swarm
Maintance: Less than once a month
Safety measures: The robot has safety certification for collaborative working

Ŝharko10

"The indoor pallet AGV Ŝharko10 is especially designed to support the transport of goods and materials in production environments. It will operate on the factory floor, where it will replace the use of manual pallet trucks or pallet jacks to support a regular supply or discharge of pallets or racks" - Movigorobotics.com (2021)

Information

Company: Movigo Robotics (Haarlem, The Netherlands)
Launch year: 2018
Application area: Internal Logistics
Price: N/A
EMC certification: Yes
Organic farming certification: N/A
Energy source: Batteries
Sensor input: N/A
Communication interfaces: WiFi
Carrying capacity: 1000 kg
Transport capacity: N/A
Fleet management compatibility: Team/Swarm
Maintance: N/A
Safety measures: N/A

Key words

Completely autonomous mobile ground robot for minimizing manual pallet management. 9 hours operating time on full battery Charging time >95% in 50 minutes (opportunity charging possible).
Can transport more than just pallets.
Easy integration with back office systems like ERP & WMS
Flexible adding and removing of pick up & drop off points

Learn more at: www.movigorobotics.com/sharko10-agv/

RB-CAR

"The mobile robot RB-CAR has RWD Ackermann kinematics. (...)
(...) mechanical structure and the rear drawer, this mobile platform can carry heavy loads. With the configuration of suitable sensors, the robot can be programmed to navigate autonomously or teleoperated with a joystick or a steering wheel." - Robotnik.com (2021)

Key words

Completely autonomous mobile robot. Indoor and outdoor capabilities. Autonomy: Up to 8h. Temperature range: -10ºC a +45ºC. Connectivity: Internal: USB, RS232, RJ45 / External: 2x USB, 2x RJ45, 1X hdmi + USD, 5, 12 VDC and 48v power supplies

Learn more at: robotnik.eu/products/mobile-robots/rb-car-en/

Information

Company: Robotnik Automation S.L.L (Valencia, Spain)
Launch year: N/A
Application area: Plant Care/General
Price: N/A
EMC certification: N/A
Organic farming certification: N/A
Energy source: Batteries
Sensor input: Visual
Communication interfaces: WiFi 802.11n
Carrying capacity: Up to 150 kg
Transport capacity: N/A
Fleet management compatibility: N/A
Maintance: N/A
Safety measures: N/A

EGAPacker

"EGApacker is a fully automated packaging robot that can be customized to all
needs. The product tool can use either gripping, vacuum or a combination to
gentle handle the product.
At the same time it stores, opens, folds and tapes or glues all foldable carton
boxes suitable for automatic machinery handling eg. all FEFCO types of Fefco
0200 and 0201." - EGATEC.dk (2021)

Information

Company: EgaTec AS (Odense, Denmark)
Launch year: 2017
Application area: Packaging
Price: N/A
EMC certification: N/A
Organic farming certification : N/A
Energy source: N/A
Sensor input: N/A
Communication interfaces: N/A
Carrying capacity: N/A
Fleet management compatibility: N/A
Maintance: N/A
Safety measures: N/A

Key words

Learn more at:
https://egatec.dk/pakkelosninger/pakkemaskiner/egapacker/

RB-EKEN

"RB-EKEN is a powerful mobile manipulator (4.800W of nominal power) designed to work in indoor and outdoor environments and adverse ambients.
GPS system, lasers and remote safety stop, among others.
The autonomy available is another of its main characteristics (2.880Wh of energy on board).
RB-EKEN is based on an omnidirectional platform that uses 4 high-power motorized wheels" - Robotnik.com (2021)

Key words

Completely autonomous mobile robot. Outdoor rough terrain capabilities. Autonomy: 4 h. Controller: Open architecture ROS / PC with Linux integrated. Maximum slope: 60 % (with outdoor wheels). Speed: 2 m/s

Learn more at: robotnik.eu/products/mobile-manipulators/rb-eken-en/

Information

Company: Robotnik Automation S.L.L (Valencia, Spain)
Launch year: N/A
Application area: Plant Care/General
Price: N/A
EMC certification: N/A
Organic farming certification: N/A
Energy source: Batteries
Sensor input: Visual
Communication interfaces: WiFi 802.11n
Carrying capacity: 300 kg
Transport capacity: N/A
Fleet management compatibility: N/A
Maintance: N/A
Safety measures: N/A

ChickenBoy

"The ChickenBoy is the world's first ceiling-suspended robot that autonomously monitors broiler welfare and helps farmers improve the productivity of their farms. The patented robot monitors thermal comfort, air quality, health and welfare of animals and proper farm equipment function. Farmers, vets and stock persons interact with the robot through mobile alerts or through our cloud platform." - Faromatics.com (2021)

Information

Company: Farm Robotics and Automation SL (Vilanova i la Geltru, Spain)
Launch year: 2021
Application area: Monitoring of animal welfare related measures
Price: N/A
EMC certification: Yes
Organic farming certification: Yes
Energy source: Batteries
Sensor input: Visual
Communication interfaces: HTTPS
Carrying capacity: N/A
Transport capacity: N/A
Fleet management compatibility: No
Maintance: Less than once a month
Safety measures: The robot slows and/or stops when humans present

Key words

Completely autonomous system used for broiler chickens, animal welfare, productivity. Suspended from ceiling. Minimal user interface on robot, cloud system to interact. Learns its own program. Possibility of customization if demanded. Animal welfare, productivity, precision livestock farming

Learn more at: www.faromatics.com

agRO BO food

Tibot - Spoutnic

"Spoutnic is the first born of our product range. It walks the floor to move your birds and to reduce the floor-egg rate. You are more at peace regarding the start and success of each flock. Spoutnic is plug & play. It starts with three buttons and does not require any technical installation. And yet, it adapts to your operaion whether you are in commercial turkeys, broiler breeders or layers thanks to its customization controller!
Spoutnic moves randomly and independently on any type of litter." Tibot.com (2021)

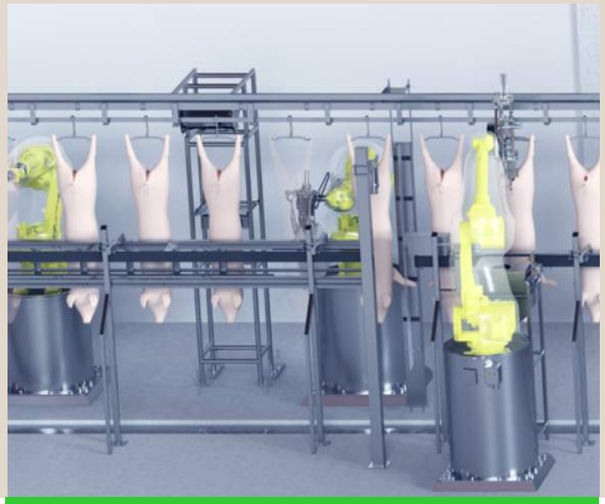
Key words

Fully autonomous Indoor Mobile ground robot for Poultry care. Joystick/RC controlled. Offers software compatibility e.g. with different forms of data analysis system or fleet. Can be customized by demand. Accessorization according to breeding conditions

Learn more at: tibot.fr/fiche-technique-spoutnic-388.php

Information

Company: Tibot (Cesson-Sévigné, France)
Launch year: 2016
Application area: Animal care
Price: N/A
EMC certification: Yes
Organic farming certification: Not yet
Energy input: Batteries
Sensor input: Tactile
Communication interfaces: N/A
Transport capacity: 750 kg
Fleet management compatibility: Yes
Maintance: Less than once a month
Safety measure: The robot has safety certification for collaborative working



AiRA

"Frontmatec offers a complete program of AiRA dressing-line robots. The AiRA robots is a concept based on more than 20 years of R&D in engineering of automated processing and is regarded as the world's unrivaled leader in dressing-line robotics. The AiRA robot program ensures continuous uniform processing, accuracy and high-quality products in every step" - Frontmatec (2021)

Key words

Autonomous slaughtering production line. Homogeneous processing. High quality carcasses. Pork / beef processing Fleet operated. High hygiene level. Automatic cleaning and disinfection. Easy operation. User-friendly operator panels on the Frontmatec AiRA robots. Minimum noise emission.

Learn more at: frontmatec.com/en/pork-solutions/clean-line-chill-room/aira-robots#

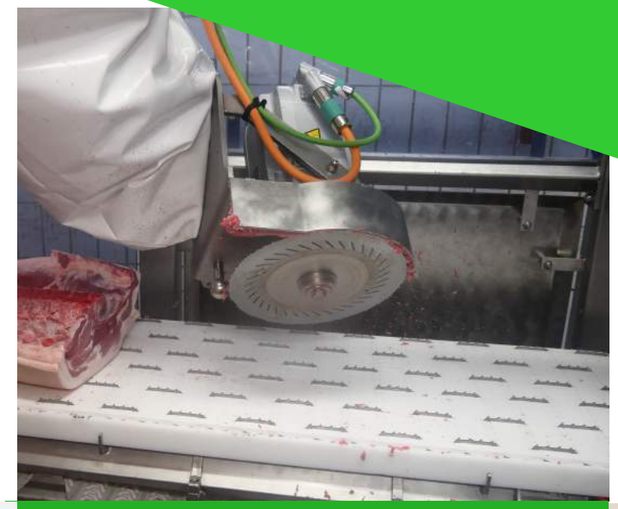
Information

Company: Frontmatic (Cardona, Spain)
Launch year: 2006
Application area: Harvesting (of livestock)
Price: 400,000-600,000 euro
EMC certification: Yes
Organic farming certification : No
Energy source: Mains
Sensor input: Visual
Communication interfaces: industrial BUS-systems; ethernet; ...
Transport capacity: 300 kg
Fleet management compatibility: Yes
Maintance: Manual adjustment or maintenance is needed more than once a day
Safety measures: Humans are excluded from the robot's working space

Robotic Chine Bone Saw

"The Autoline concept ensures uniform processing, accuracy and high-quality products.
With Autoline, continuous operation on the primal cutting and deboning line is maintained, as the Autoline robots are synchronized with the line movement (...)" - Frontmatic.com (2021)

"(...)The Autoline robots are all "plug and play", and can operate in any type of new or existing deboning lines." - Frontmatic.com (2021)



Information

Company: Frontmatec Kolding A/S (Denmark, Kolding)
Launch year: 2021
Application area: Harvesting (of livestock)
Price: 750.000 euro
EMC certification: Yes
Organic farming certification : No
Energy source: Mains
Sensor input: Visual
Communication interfaces: industrial BUS-systems; ethernet; ...
Transport capacity: 300 kg
Fleet management compatibility: Yes
Maintance: Manual adjustment or maintenance is needed more than once a day
Safety measures: Humans are excluded from the robot's working space

Key words

Fixed robot with cutting tool and using vision technology for meat processing, cutting and deboning. High capacity: 1,200 middles/hour. High yield due to consistent operation performance. Saw left and right middles in a mix. Compact unit, small foot print. Few parts to maintain. Easy setup of machine parameters at operator panel. Possibility of establishing of recipes

Learn more at: frontmatec.com/en/pork-solutions/deboning-trimming/automatic-deboning-trimming/autoline-chine-bone-saw

BORS Robotic cell

"Custom made cells integrated with special machines and standard equipment operated with robot" - borsautomation.com (2021)

Information

Company: Bors Automation & Tool AB (Drömminge Eklunden, Sweden)
Launch year: 2022
Application area: N/A
Price: N/A
EMC certification: N/A
Organic farming certification: N/A
Energy source: N/A
Sensor input: N/A
Communication interfaces: N/A
Transport capacity: N/A
Fleet management compatibility: N/A
Maintance: N/A
Safety measures: N/A

Key words

Highly customizable, can be adapted to most production lines and connectered to BORS transfer lines

Learn more about the system: https://www.borsautomation.se/en/automation/

	Name: Agrobot E-serie **Company:** Agrobot (Spain) **Application:** Autonomous strawberry harvestor **Link:** https://www.agrobot.com/e-series
	Name: AgroFly **Company:** AgroFly (Switzerland) **Application:** Drone-based spraying (for vineyards) **Link:** http://www.agrofly.aero/en/
	Name: Alstef AGV **Company:** Alstef Group (France) **Application:** Completely automatic production line system (potential for food production) incl. Transport AGVs **Link:** https://alstefgroup.com/intralogistics-solutions/our-solutions/production-flow/
	Name: Anatis **Company:** Carré (France) **Application:** AGV tractor for field tasks **Link:**https://www.carre.fr/entretien-des-cultures-et-prairies/anatis/?lang=en

	Name: Ara **Company:** ecoRobotix (Switzerland) **Application:** Precision sprayer for crops **Link:** www.ecorobotix.com/en/ara_mounted_sprayer/
	Name: Astronaut A5 **Company:** Lely (The Netherlands) **Application:** Automonous machine for cow wellfare **Link:** https://www.lely.com/dk/losninger/malkning/astronaut-a5/
	Name: **Company:** Automato Robotics **Application:** Tomato harvesting **Link:** automatorobotics.com
	Name: AVL Compact S9000 **Company:** AvL motion (The Netherlands) **Application:** Asparagus harvester **Link:** https://www.avlmotion.com/nl/

Chapter 2

European Agricultural robotic systems

A brief overview

This chapter of the catalogue adds to the previously presented Robotics systems and provides a brief overview of available European solutions within the agricultural and food processing sector.

The tech developers have been contacted for further information.

The solution is presented by alphabetical order based on the name of the systems

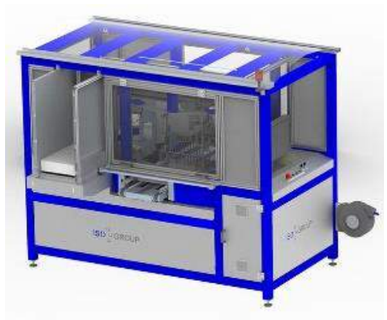
	Name: Agilox OCF **Company:** Agilox **Application:** Intern logistic in production **Link:** AGILOX OCF
	Name: **Company:** AgriCirle **Application:** Drone-based harvest optimization and hazard decetion **Link:** Harvest optimization – AgriCircle
	Name: **Company: AgriFac** **Application:** Drone-assisted solutions for mapping **Link:** Sustainable Farming - Agrifac United Kingdom
	Name: Agro **Company:** Airboard **Application:** Drone for crop spraying **Link:** AIRBOARD AGRO – WORLD'S MOST POWERFUL AGRICULTURE CROP SPRAYING DRONE - YouTube

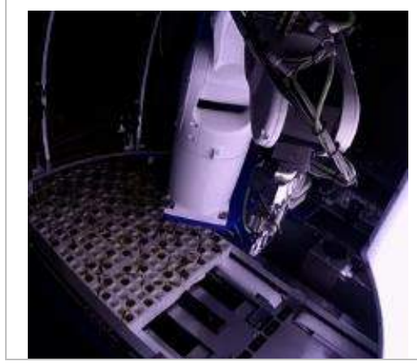
	Name: AX-1 **Company:** Kilter (Norway) **Application:** Weeding for crops **Link:** www.kiltersystems.com
	Name: Bakus **Company:** VitiBot (France) **Application:** Mechanical Weedling for vine yards **Link:** https://vitibot.fr/vineyards-robots-bakus/vineyard-robot-bakus-l/?lang=en
	Name: Bot Handy **Company:** Samsung (Germany) **Application:** Food preperation at consumer **Link:** https://news.samsung.com/us/samsung-ces-2021-latest-innovations-for-a-better-normal/
	Name: Bowmover line **Company:** Asti mobile robotics (Germany) **Application:** Internal logistics (potentially in food production) **Link:** https://www.astimobilerobotics.com/boxmover

	Name: Case IH autonomous tractor **Company:** Case IH (European division) **Application:** Field tasks **Link:** https://www.caseih.com/emea/en-me/News/Pages/2018-07-09-Case-IH-Defines-Categories-of-Autonomy-and-Announces-Pilot-Program.aspx
	Name: Cobot palletizing solution **Company:** Sealing Systems (Denmark) **Application:** Re-placing/picking product/boxes (potential for food production application) **Link:** https://sealing-system.dk/da/pakkelinjer/palletering/robotpalletering
	Name: CORI **Company:** Lab2Fab (US/DK collaboration) **Application:** Autonomous solution for food preperation **Link:** https://www.l2finc.com/kitchen-automation
	Name: CowToilet **Company:** Hanskamp (Germany) **Application:** Livestock welfare **Link:** https://hanskamp.nl/en/cowtoilet

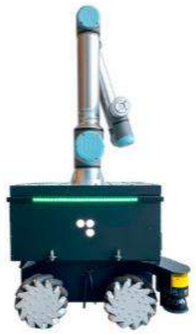
	Name: Deepfield Weeding robot **Company:** Farming revolution GmbH (Germany) **Application:** Mechanical weeding **Link:** https://www.farming-revolution.com/
	Name: Dick **Company:** Small Robot Company (UK) **Application:** Mechanical weeding **Link:**
	Name: DINO **Company:** Naio Technologies (France) **Application:** Mechanical weeding **Link:** https://www.naio-technologies.com/en/dino/
	Name: Discovery collector **Company:** Lely (The Netherlands) **Application:** Livestock welfare – cleaning cow stables **Link:** https://www.lely.com/solutions/housing-and-caring/discovery-collector/

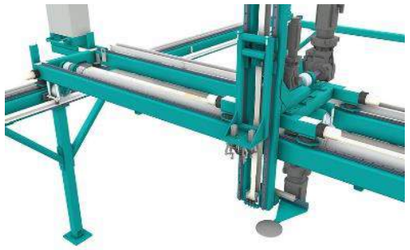
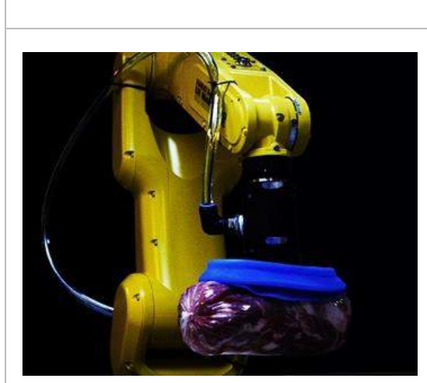
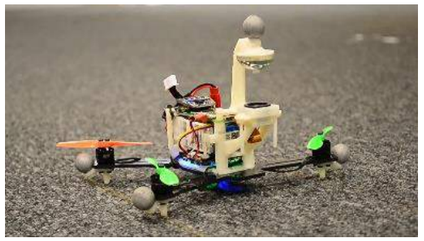
	Name: Disinfection line **Company:** Zenzoe (Spain) **Application:** Disinfection of areas (potential for food production) **Link:** https://zenzoe.tech/robot/
	Name: EvoCleaner **Company:** Envirologic (Sweden) **Application:** Livestock welfare Autonomous stable cleaner **Link:** https://www.envirologic.se/da/vaskeroboter/evo-cleaner/
	Name: GARotics **Company:** Strauss/University of Bremen (Germany) **Application:** Green asparagus harvesting robotic system **Link:**
	Name: Greenbot **Company:** Presision Makers (The Netherlands) **Application:** Autonomous tractor **Link:** precisionmakers.com

	Name: GRoW **Company:** Metomotion **Application:** Automatic tomato harvestor **Link:** metomotion.com/
	Name: Heat, Breeder **Company:** Moocall (Ireland) **Application:** Autonomous tracking of herd **Link:** **https://moocall.com/**
	**Name:** ISO 3D sorter **Company:** ISO-Group (The Netherlands) **Application:** Plant care; Sorting of plants **Link:** www.iso-group.nl/en/machines/iso-3d-sorter
	Name: ISO cutting and Transplanter **Company:** ISO-Group (The Netherlands) **Application:** Plant care: transplant of rooted plants and sticking cuttings. **Link:** www.iso-group.nl/en/machines/iso-cutting-and-transplanter

	Name: ISO Cutting Planter v. 1800, 2500 and 4000 **Company:** ISO-Group (The Netherlands) **Application:** Plant care: automatic cutting planter **Link:** https://www.iso-group.nl/en/machines/iso-cutting-planter-2500
	Name: ISO grade **Company:** ISO-Group (The Netherlands) **Application:** Automatic sorting of young plants **Link:** www.iso-group.nl/en/machines/iso-grade-7000
	Name: ISO graft **Company:** ISO-Group (The Netherlands) **Application:** Plant care; blade change over function and the ability to disinfect with steam **Link:** www.iso-group.nl/en/machines/iso-graft-1200
	**Name:** ISO Plantsampler **Company:** ISO-Group **Application:** Automates the gathering of DNA material from plants **Link:** www.iso-group.nl/en/machines/iso-plantsampler

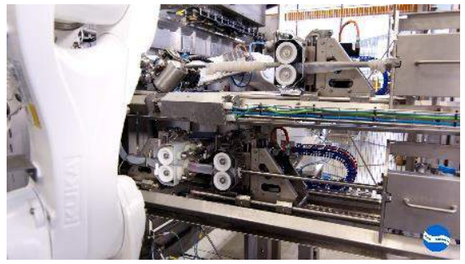
	Name: Iso Robot plut planting **Company:** ISO-Group (The Netherlands) **Application:** Automatic planting of small plant plugs from out seedling tray into ground **Link:** www.iso-group.nl/en/machines/iso-robot-plug-planting-machine
	Name: ISO Vision **Company:** ISO-Group (The netherlands) **Application:** Plant care; Transplant and fixation **Link:** www.iso-group.nl/en/machines/iso-visionplanter
	Name: Itraldon Titan 4HSE **Company:** Italdron (Italy) **Application:** Drone for spraying and monitoring to precision farmning **Link:** www.italdron.com/professional-drones-application/precision-farming
	Name: Itraldon Titan 4HSE EVO **Company:** Italdron (Italy) **Application:** Drone for spraying and monitoring to precision farmning **Link:** www.italdron.com/professional-drones-application/precision-farming

	Name: Itraldon Bigone 4HSE **Company:** Italdron (Italy) **Application:** Drone for spraying and monitoring to precision farmning **Link:** www.italdron.com/professional-drones-application/precision-farming
	Name: Juno **Company:** Lely (The Netherlands **Application:** Livestock welfare: Feed pusher **Link:** www.lely.com/solutions/feeding/juno/
	**Name:** Kairos **Company:** Robotnik (Spain) **Application:** Internal Logistics (potential for food production or stable automation) **Link:** robotnik.eu/products/mobile-manipulators/rb-kairos/
	Name: Mariner **Company:** Maritime Robotics (Sweden) **Application:** Automatic boat USV (fish monitoring) **Link:** www.maritimerobotics.com/mariner

	Name: MATE-XT **Company:** Comau (Italy) **Application:** Exoskeleton for upper limb support (Harvesting/ stable work support) **Link:** mate.comau.com
	**Name:** **Company:** Robot gantry (Denmark) **Application:** Three axis gantry robot for production **Link:** robotgantry.com/gantry-robot-3-axis/
	**Name: Meat mover** **Company:** Danish crown/DMRI (Denmark) **Application:** Moving/packing of meat products **Link:** dti.dk/specialists/generic-meat-moving-robot/39317
	**Name:** MiniBee VI **Company:** BrainOnbroad (UK) **Application:** Artificial bee for pollination of crops **Link:** brainsonboard.co.uk/2018/10/26/introducing-the-minibee-v1/

	Name: Moley Kitchen **Company:** Moley (UK) **Application:** Autonomous food preperation **Link:** moley.com/
	Name: Moov 2.0 **Company:** Joz (The Netherlands) **Application:** Livestock welfare: Feed pusher **Link:** joz.nl/en_uk/solutions/feed-pusher-robot-moov/
	Name: Mouse line **Company:** Asti Mobile Robotics (Germany) **Application:** Internal logistics (Potential for Food production) **Link:**
	Name: Neo 2 **Company:** Avidbots **Application:** Indoor production; Floor cleaner **Link:** avidbots.com

	Name: OPS XO **Company:** Octopus Robots (France) **Application:** Livestock welfare; poultry littering sanitation **Link:** octopusbiosafety.com/en/animal-welfare/xo/
	Name: Optimum **Company:** Pellenc (France) **Application:** Semi-automatic tractor for vinyards **Link:** pellenc.com/agri/produits/optimum-new-generation/?lang=en
	Name: Palletzing system **Company:** Smart Robotics (The Netherlands) **Application:** Packaging in production in food productions **Link:** smart-robotics.nl/en/palletizing/
	Name: Pig Feeder Robot **Company:** Pellon (Finland) **Application:** Livestock welfare; Autonomous feeding pig unit **Link:** pellon.fi/en/pig_husbandry/feeding/pig_robot/

	Name: **Company:** PotchaFacilie (Italy) **Application:** Plant care; cutting and collecting young plants in indoor production **Link:** potarefacile.com
	**Name:** P1 SelectiCa Sorter **Company:** Proxmia (Denmark) **Application:** Production system for pork casings **Link:** http://proxima-centauri.dk/selectica-sorter-p1/
	Name: Rabbit tractors Robot **Company:** Rabbit Tractors (Ireland) **Application:** Field monitoring and mapping **Link:**
	Name: RoboCrop **Company:** Garford (UK) **Application:** Mechanical Weeding and soil maintenance **Link:** garford.com/products/robocrop-inrow-weeder/

	Name: **Company:** IGS (Intelligent Growth Solutions) (UK) **Application:** Autonomous Vertical farmning systems **Link:** intelligentgrowthsolutions.com
	Name: **Company:** Ferrari Costruzioni Meccaniche (Italy) **Application:** Automated transplanter **Link:** ferraricostruzioni.com/en/tray-transplanters/41-futura-twin-automated-transplanter.html
	Name: RoboEVO **Company:** Energreen (Italy) **Application:** **Link:** energreen.it/prodotti-manutenzione-verde-energreen/robo-porta-attrezzi-radiocomandati/roboevo-trinciatrice-cingolata-radiocomandata/
	Name: RoboMAX **Company:** Energreen (Italy) **Link:** energreen.it/prodotti-manutenzione-verde-energreen/robo-porta-attrezzi-radiocomandati/robomax-trinciatrice-forestale-porta-attrezzi/

	Name: RoBoPlant **Company:** ISO-Group (The Netherlands) **Application:** Autonomous planting **Link:** iso-group.nl/en/machines/roboplant
	Name: Robout **Company:** Robotnik (Spain) **Application:** Internal logistics (potential for food production) **Link:** robotnik.eu/products/customization/rb-robout/
	Name: Roestelmash agrotonics **Company:** Roestelmash **Application:** Smart farming **Link:** en.rostselmash.com/agrotronic/
	Name: Rubion **Company:** Octinion (Belgium) **Application:** Strawberry harvesting **Link:** octinion.com/products/agricultural-robotics/rubion

	Name: Salmon production system **Company:** Marel/DTI (Iceland) **Application:** Preperation of salmon **Link:** teknologisk.dk/ydelser/3d-printet-laksegriber/39452
	Name: Spoutnic NAV **Company:** Tibot (France) **Application:** Livestock welfare; Stimulate the movement of the birds and to aerate the litter **Link:** tibot.fr/technical-data-spoutnic-nav-333.php
	Name: **Company:** Ecorobotics **Application:** Autonomous weeding **Link:**
	Name: Stan **Company:** Stanley Robotics (UK) **Application:** Other domain **Link:** stanley-robotics.com/tech-new/

	Name: TED **Company:** Naio Technologies (France) **Application:** Autonomous weeding in vinyards **Link:** www.naio-technologies.com/en/agricultural-equipment/vineyard-weeding-robot/
	Name: Titanion **Company:** Octinion (Belgium) **Application:** AGV for outdoor transport/monitoring **Link:** Octinion.com/products/agricultural-robotics/titanion
	Name: Tractor Line **Company:** Asti mobile robotics (Germany) **Application:** Internal Logistics **Link:** astimobilerobotics.com/tractor
	Name: Vector **Company:** Lely (The Netherlands) **Application:** Livestock welfare; Mixing and feeding robot **Link:** lely.com/solutions/feeding/vector/

	Name: Vertical farming **Company:** Codema (The Netherlands) **Application:** Vertical system including robotic arms and high-tech monitoring **Link:** codema.nl/products/vertical-farming/
	Name: Volcano_Pro **Company:** Robotnik (Spain) **Application:** **Link:** robotnik.eu/products/customization/rb-vulcano-pro/
	Name: Weed Whacker **Company:** Odd.bot (The Netherlands) **Application:** Mechanical weeding **Link:** www.odd.bot
	Name: Xaver **Company:** Fendt (now AGCO (US)) **Application:** swarm seeding **Link:** fendt.com/int/fendt-xaver

	Name: Xenion/Fluxion **Company:** Octinion (Belgium) **Application:** indoor AGV for transport of harvested crops **Link:** octinion.com/products/agricultural-robotics/
	Name: Ztove **Company:** Ztove (UK) **Application:** Food preperation; automated frypan **Link:** ztove.com/en/front-page/
	Name: **Company:** Christiaenagro (The Netherlands) **Application:** Visiongrading of harvested asparagus **Link:** christiaensagro.com/en/products/asparagus#product-video-6
	Name: **Company:** Christiaenagro (The Netherlands) **Application:** Automatic peelling of asparagus **Link:** christiaensagro.com/en/products/asparagus#product-video-6

	Name: **Company:** Christiaenagro (The Netherlands) **Application:** Automatic grading (and packing) of mini cucumbers **Link:** christiaensagro.com/en/products/mini-cucumbers#product-video-11
	Name: **Company:** Hepro (Germany) **Application:** Peeling of fruit ang vegetable **Link:** **hepro-gmbh.de/en**

To be continuedly updated....

agRO
BO
food

Additional robotic technologies

agRO BO food

Universal robots (UR)

"The UR10e is an extraordinarily versatile collaborative industrial robot, delivering both high payload (12.5 kg) lift and long reach (1300mm) which makes it well suited for a wide range of applications in machine tending, palletizing, and packaging" - Universal Robots (2021)

Key words

Completely autonomous robotic arm. Robots that are fixed when in use. Includes manipulators Controlled by Buttons or screen permanently attached to the robot. Parallel gribber as primary actuator. Other tools includes; Vacuum, electric grippers, cameras connected by Ethernet up, modbus, profinet, I/O. Opeaters in swarm teams. Operated on pre-set programs. Customizable.

Learn more at: www.universal-robots.com/es/productos/robot-ur10/

Information

Company: Universal Robots (Odense, Denmark)
Launch year: 2018
Application area: Packaging, data and labelling
Price: 35.000 euro
EMC certification: Yes
Organic farming certification: Not yet
Energy source: Electrical (220v)
Sensor input: Program
Communication interfaces: Internet ip, modbus rtu, profinet, I/O
Carrying capacity: 12.5 kg
Transport capacity: N/A
Fleet management compatibility: Yes
Maintance: Less than once a month
Safety measures: The robot has safety certification for collaborative working

STÄUBLI HE Hygienic & Humid Environment

Information

Company: Stäubli (Madrid, Sabadell, Bilbao - Spain)
Launch year: 1984
Application area: Food and drink preparation
Price: N/A
EMC certification: Yes
Organic farming certification: Not yet
Sensor input: Visual
Carrying capacity: N/A
Transport capacity: 150 kg
Fleet management compatibility: no
Communication Interfaces: EtherCat, Ethernet/IP, Profinet, Devicenet, Sercos III, Powerlink...
Maintance: More than once a month
Safety measure: The robot has safety certification for collaborative working

Key words

Completely autonomous Collaborative industrial robot, washable and without covers for Food and drink preparation, Quality control of packaging, dairy processing, meat, vegetables and cleaning. Fixture is permament, nonetheless possibility of mobility, placement on ceiling and walls in addition to the floor. Possibility of remote management from PC, mobile or similar. Also portable independent control. Own software, internal solenoid valves, safety PLC in the controller, touch control. low energy consumption, precision and reliability. product specialized in the food sector Can be customized on demand. AEF ISOBUS certified (TIM) communication

Learn more at: www.staubli.com/es-es/robotics/

FANUC CRX

Key words

Autonomous selection, handling, boxing, palletizing robot. Fixed when in use. Controlled by separate computer or tablet. Equiped with suction, parallel and 3 fingers Grippers as primary actuators. Operates in swarm teams. open software via Fieldbus. On-site programming by the operator. Completely autonomous when operating. Customizable. High flexibility

Learn more at: www.fanuc.eu

Information

Company: FANUC (Barcelona, Spain)
Launch year: 2018
Application area: Harvesting
Price: 30,000 euro
EMC certification: Yes
Organic farming certification: Yes
Energy source: Electrical (200 VAC)
Sensor input: Visual
Communication interfaces: Ethernet IP
Carrying capacity: 15 kg
Transport capacity: N/A
Fleet management compatibility:
Maintance: Less than once a month
Safety measures: The robot has safety certification for collaborative working