

certhon



How a high-tech company as Denso and an Ag-tech company as Certhon collaborate on robotic solutions and novel growing systems.

18. March. 2025 Akinori Kuwayama, Certhon, CSO



The perfect mix



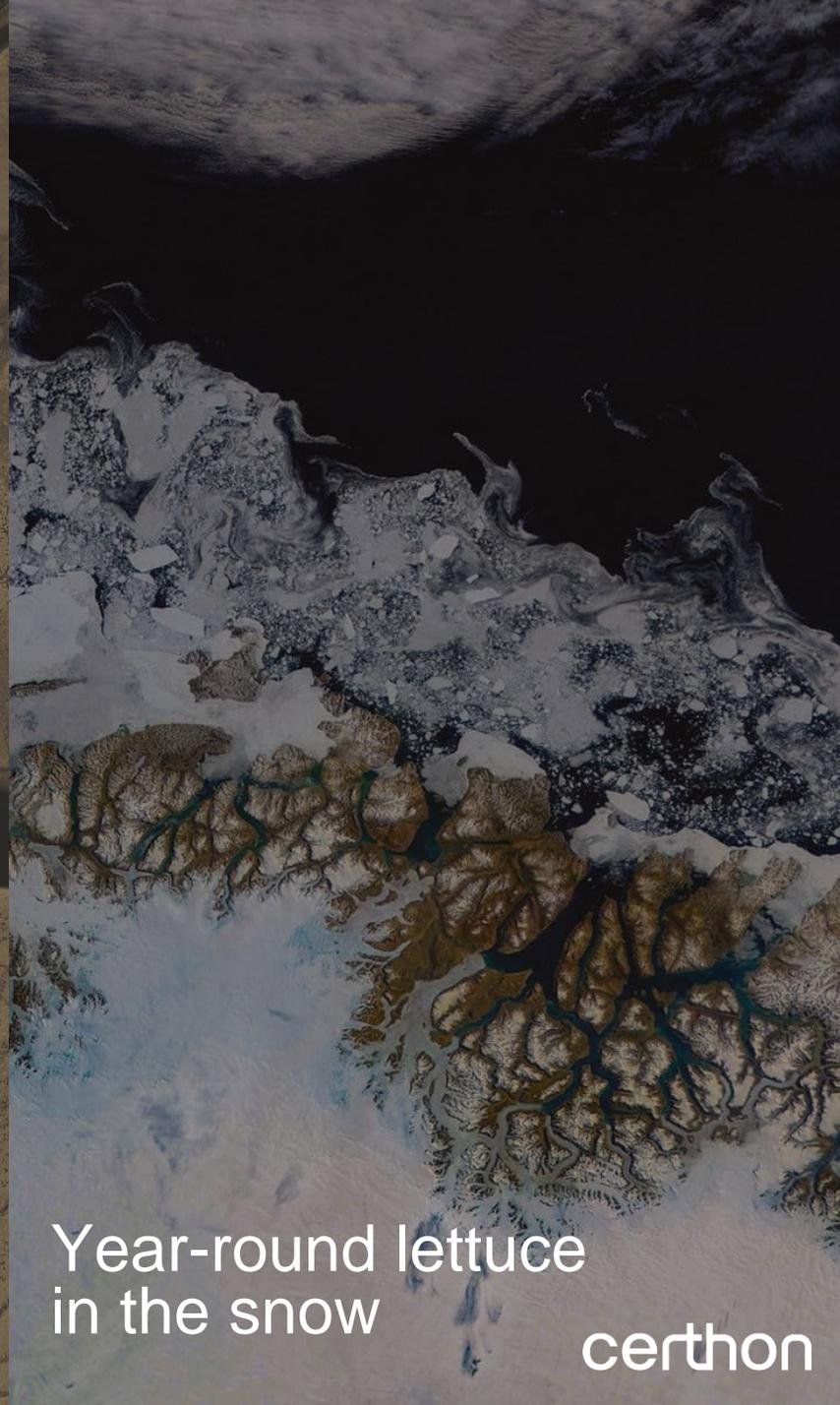


Growing anything,
anywhere.
For everyone.

Tasty strawberries
in Hongkong



Fresh tomatoes
in the desert



Year-round lettuce
in the snow

certhon

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We design, engineer, and build tailor-made climate systems, greenhouses and indoor farms

125 years

Award-winning leadership in horticulture

5 offices

Dutch HQ with local expertise

>100M turnover

Yearly growing business

>10%

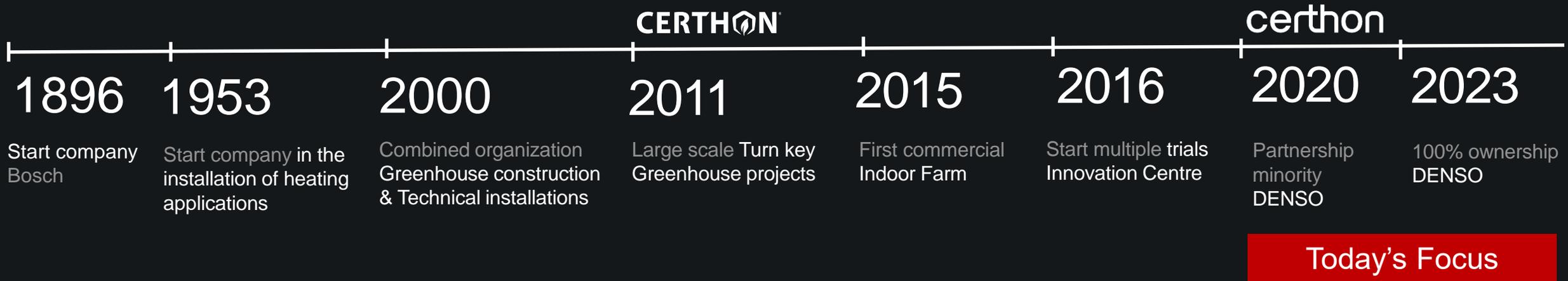
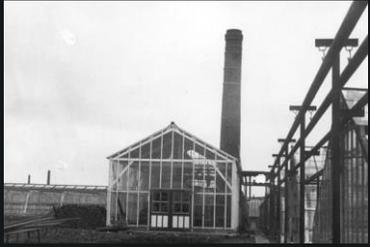
Investment in R&D

>100

Projects
worldwide



History of Certhon



Company Profile *DENSO*



Company Name	DENSO Corporation
Establishment	December 16, 1949
Head Office	Kariya, Aichi, Japan
Business Field	Automotive parts manufacturing
Capital	¥187.5 Billion
Revenue * 1	Consolidated basis : ¥7,145 Billion (US\$ 47.2 Billion)
Operating Profit	Consolidated basis : ¥381 Billion (US\$ 2.5 Billion)
Employees * 2	Consolidated basis : 162,029 (Non-consolidated basis) 45,152
Consolidated subsidiaries	193 (Japan 57, North America 23, Europe 36, Asia 72, Others 5)
Affiliates under Equity Method	70 (Japan 22, North America 8, Europe 7, Asia 29, Others 4)

Four Core Business Domains (2030 Long-term Policy) **DENSO**

Agriculture is positioned as one of the focus business area within non-automotive business

Electrification

Achieving highly efficient transportation while reducing environmental impact



Advanced safety /automated driving

Enable both accident-free safe society and comfortable and free driving



Connected driving

Realization of new mobility society where cars, people and things are connected



Non-automotive business (FA / **Agriculture**)

Contribute to productivity improvement of society and industry



Agriculture Business Scope -Food Value chain-

Providing solutions that leverage Denso's strengths(industrialize tech/robotics) to solve social issues related to food



Social issues

Labor shortage,
Climate Change

Lack of drivers
Diversification of logistics

Foodloss
Food safety

Creating an agriculture that attracts all regions and people through profitable and sustainable agriculture

Leveraging industrial thinking and technology
Providing agricultural solutions that enable sustainable growth



With a variety of freezer variations
Contributing to new forms of logistics

Using Car Air Conditioning Technology
Providing Optimal Refrigerators for a Variety of Transport Methods



System connects distribution information
Contributing to sustainable food distribution

Making use of car production technology
Providing IT systems that connect information from production to consumption



Value provided

The perfect mix

certhon

DENSO



▼
Growing anything, anywhere. For everyone.

certhon

The world is changing

*"Companies worry about plans **labor migration**"*

*"**Labor** and energy, the biggest challenges for British greenhouse horticulture"*

*"... campaigns point to scaling back the arrival of labor migrants to the Netherlands. For horticulture, this would be **"a life-size problem"**"*

*"Westland heeft ruimtegebrek en een **personeelsgebrek**"*

*"UK growers stop planting and put nurseries on sale amidst energy crisis and **labor shortage**"*

Source:
NOS, Algemeen Dagblad, Horti Daily

UK growers stop planting and put nurseries on sale amidst energy crisis and labor shortage

Another sign of UK growers struggling came up last week when the Lea Valley Growers Association shared that they were putting a few nurseries on sale. "We have five nurseries for sale at the moment," says Lee Stiles, secretary of the association. "The energy crisis has hit growers hard, making them unable to make a living based on produce retail price. Even though the UK government has put a price cap on the gas until April 1st, it won't be enough to encourage growers to plant."

Among the nurseries on sale, there is one of 7-acre site that used to grow peppers; another 7-acre one where cucumbers were grown, and two other small ones with cucumbers as well. "And we also have another 10+ acre grower that is planting just half of their area."



▲ © Hollandse Hoopje / Thierry Schut Fotografie

Rem op komst arbeidsmigranten bedreigt toekomst van de tuinbouw: 'Ze zien het totaal niet onder ogen'

Grote politieke veranderingen kunnen de tuinbouw hard raken. Zoals de dreigende rem op arbeidsmigranten, die in de verkiezingscampagnes wordt bepleit door onder meer Pieter Omtzigt, Geert Wilders, Forum voor Democratie, de SP en in een milde vorm zelfs door de VVD. Als dit doorgaat heeft de sector een 'levensgroot probleem,' zeggen experts. „Ik weet niet of hier over 25 jaar nog kassen staan.“

Carel van der Velden 19-11-23, 07:00

"Labor and energy, the biggest challenges for British greenhouse horticulture"

In March 2009, Thanet Earth harvested its first cucumbers, tomatoes, and bell peppers in the UK. That was done by Kaaji, A&A, and Rainbow Growers. We asked Pleun van Malkenhorst, Rainbow UK Trading & Growing Ltd, and Thanet Growers' Managing Director about the British market's developments. How has the greenhouse vegetable season gone? What has changed since Brexit? How much has the gas crisis affected British growers? And are there still growth opportunities in the UK?

And we look at the future of tomato cultivation in two ways:
Bring the robot to the plants, or bring the plants to the robot

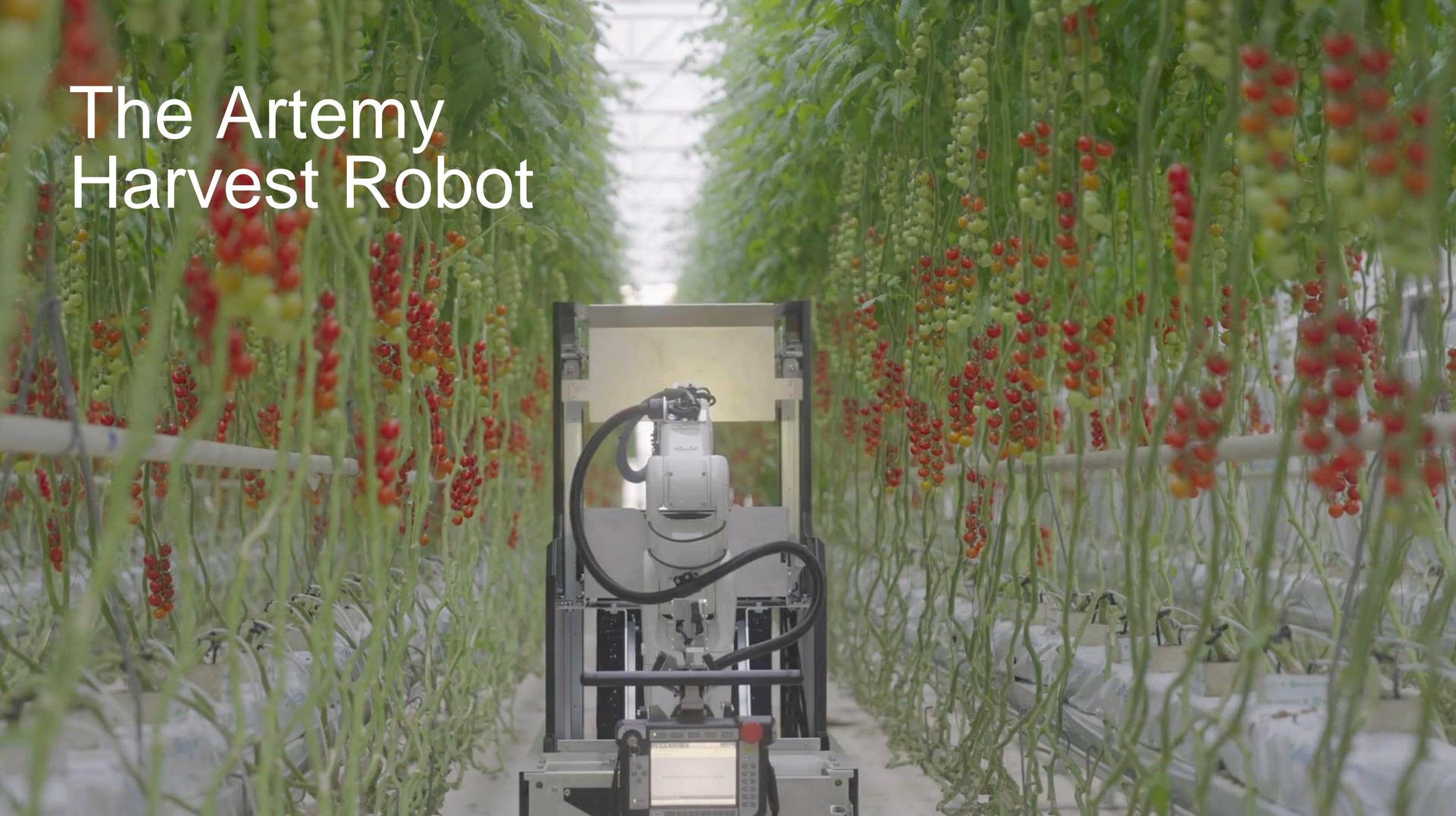


Harvesting Robot



Gronos

The Artemy Harvest Robot



Benefits of using Artemy

A proven innovation



24/7

Can operate day and night



Safe and clean

Robot self-disinfects its scissors



Quick and easy charge

Battery switch done in seconds



Reduces labour

in an industry where there is scarcity



Excellent detection

98% of all tomatoes on the plant



Continuous data collection

kg harvested, time per lane, etc.

Development with DENSO

DENSO Robotics is a pioneer in terms of reliability, flexibility and functionality. With approximately 120,000 DENSO robots worldwide

3,5 years

Development started

30 engineers

With extensive experience in
robotisation within the car industry

Extensive testing

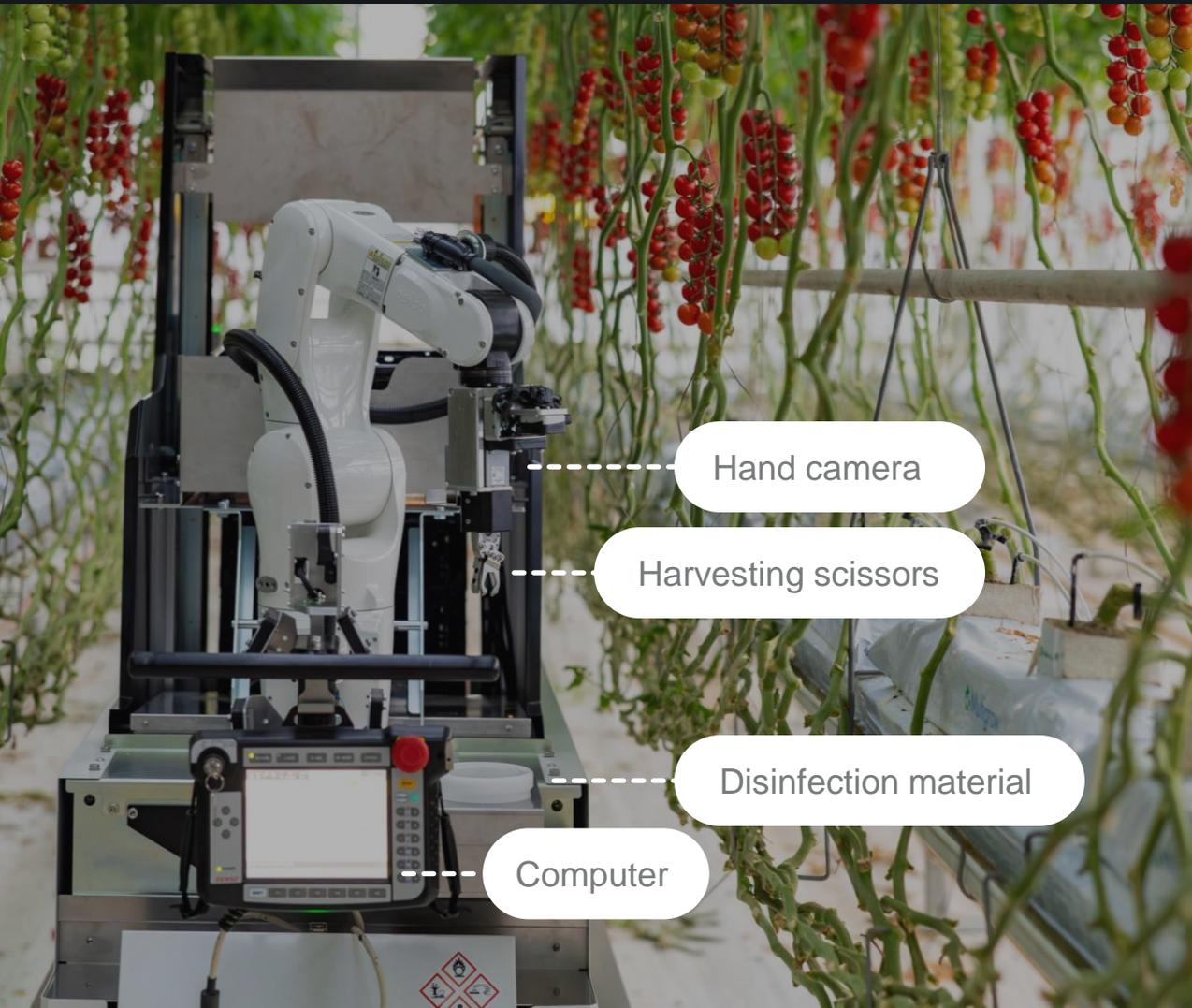
In AGRID (tomato greenhouse in Japan, built by
Certhon) and at De Ruiters Experience Centre in NL

2024

Launch



Artemy at a glance



Function of Artemy

Auto Harvest



Detect target vine's position and maturity level by AI

Auto Lane Change



Can drive automatically from lane to lane.
Sensor detects obstacles and Pipe rail

Auto Crate Change



Crates are set at fixed position using sensor and conveyor

Auto Crate Transfer



Can drive to a point to discharge the filled crates and put new crates on the robot

Auto Dis-infection



Can disinfect itself after every harvest or at the end of every path.

Harvest under LED lighting



With advanced technology, the robot can detect tomatoes under difficult conditions

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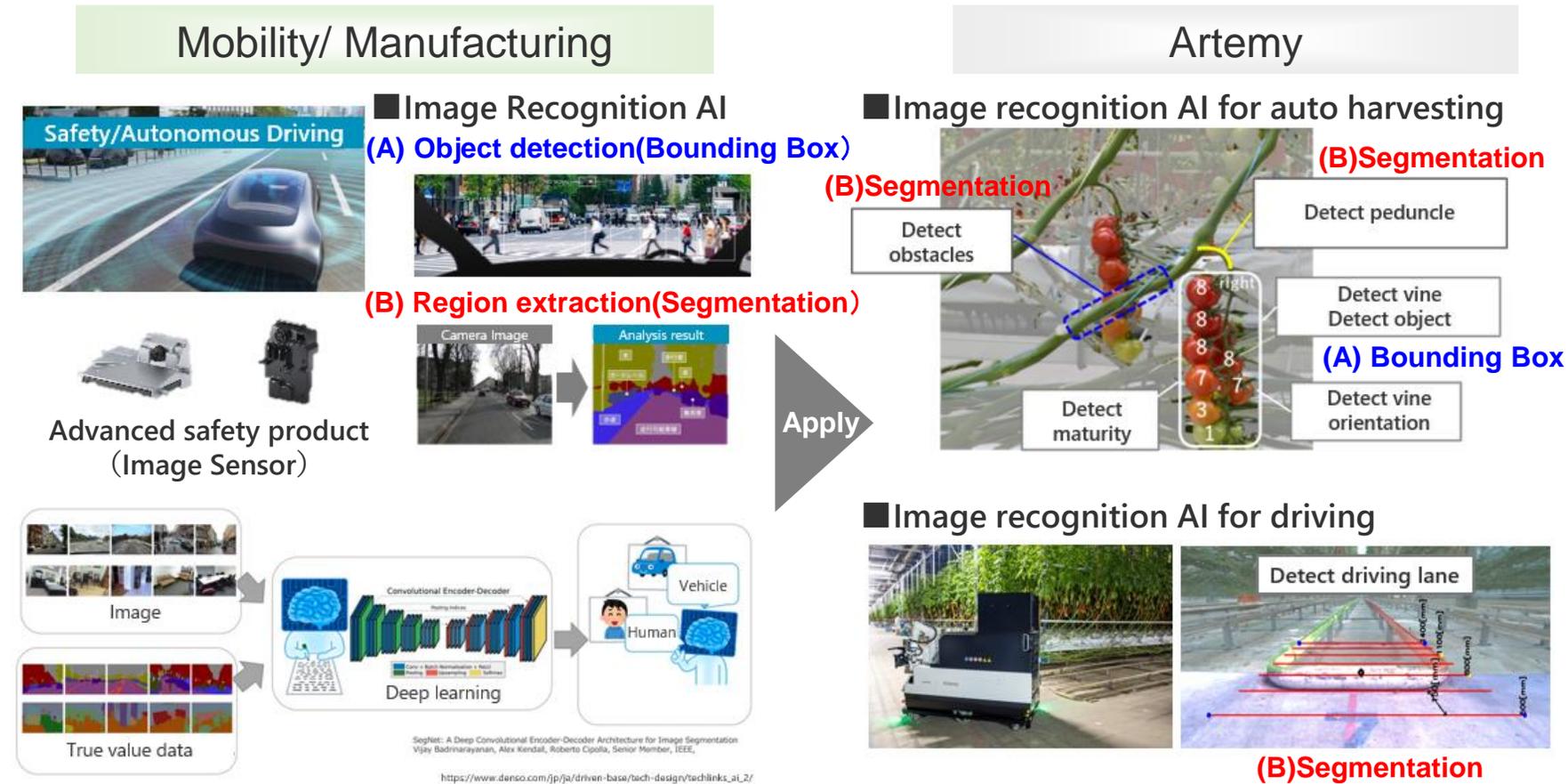
Challenge for autonomous function

Difficulty of recognition

- Actual cultivation conditions
- Varieties of Crop
- GH structure



Mobility technologies introduced in Artemy



Power of collaboration

Development of core technology

Agrid *JV of Asai nurseries and Denso*



X
DENSO Software design
Hardware design



Validate technology in Dutch condition

De Ruiter Experience Center



X
certhon Plant characteristics
Communication Hub
Validation/new insight
X
DENSO

Confirmation of capability, Real Trial

The Valley Growers, part of Growers United



X
certhon Voice as grower
Communication Hub
Validation/new insight
X
DENSO

Conclusion

- *Having common vision for future goal*
- *Fusion of hardware and software engineering*
- *Forming good collaboration network within High-tech x Agtech x Grower*





Thank you for your attention.

In order to contribute to a society full of smiles, we will innovate agriculture by combining the Dutch horticulture technology with Japanese industrial technologies.

2 ZERO HUNGER 	6 CLEAN WATER AND SANITATION 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	13 CLIMATE ACTION 
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