

## Digital Summit: Chancellor Scholz chooses Phoenix agricultural robot as his favorite

**Very Important Robot: German Chancellor Olaf Scholz brought the University of Hohenheim's agricultural robot "Phoenix" into the spotlight at the Digital Summit as the Chancellor's Exhibit. In a discussion with Hohenheim agricultural scientists, the Chancellor had the researchers explain how the Swabian multi-talent is using its artificial intelligence and robotics to reconcile the agriculture needs of the future with environmental protection and species conservation.**

The meeting between the Chancellor and the machine was one of the highlights at the end of the Digital Summit 2022 in Berlin. For two days, members of the federal cabinet met with representatives from business, science, and society. As a platform for shaping the digital transformation, the German federal government's Digital Summit aims to be an initiator, driver, and showcase for digitalization in Germany and beyond.

Phoenix made its first appearance on the world political stage in May 2022: As the star of the accompanying scientific program, it impressed the agriculture ministers of the G7 countries who met for the conference at the University of Hohenheim.

Apparently, its reputation has now preceded the robot all the way to Berlin: In the run-up to the Digital Summit, the University of Hohenheim learned that German Chancellor Olaf Scholz wanted to meet Phoenix in person. And that's how the small multi-talented robot from Swabia became the so-called Chancellor's Exhibit.

### Agriculture 4.0: Precise field work for more environmental protection and species conservation

In the experimental fields of the University of Hohenheim, the multifunctional robot is already drastically reducing the use of fertilizers and pesticides. As a lightweight robot with a belt drive that is gentle on the soil, Phoenix protects the soil from compaction. Used in a targeted manner, it can further reconcile agriculture with environmental, climate, and species protection.

This is made possible by the Internet of Things, in which robots and other machines also communicate with each other via the Internet. Artificial intelligence also plays a role, evaluating large amounts of data from agriculture and the food industry, as Prof. Dr. Hans W. Griepentrog explained to the Federal Chancellor.

"In Agriculture 4.0, drones record the condition of fields with cameras and laser sensors. Artificial intelligence assesses where water, fertilizer, or crop protection is needed. Digital technology also controls the robots that work the fields with highly precise accuracy. Farmers save operating resources - the climate, environment, and biodiversity are protected," explained the agricultural scientist from the University of Hohenheim.

### Current experiments aim to dispense with synthetic pesticides

Some research projects at the University of Hohenheim also use Phoenix to completely dispense with pesticides. Phoenix brought suitable equipment with it to the Digital Summit.

"Here in the front of the robot is intelligent sensor technology that can distinguish crops from weeds," stated Prof. Dr. Griepentrog. To do this, the robot detects plants using a camera and laser sensors and then evaluates the data in real time using artificial intelligence methods.

At the back are the tools that remove weeds mechanically and without the use of pesticides. "This spares the cultivated plants and, to a large extent, the accompanying flora, which promotes the growth of the crop and provides a habitat for insects,"

stated Alexander Stana, a doctoral candidate in agricultural engineering at Hohenheim.

## Soil-friendly use for planting white cabbage

More jobs for Phoenix: Sowing cereal grains with precision seeding or planting white cabbage in a particularly energy-saving and soil-conserving manner.

To plant cabbage seedlings, heavy tractors with wide plows still tear up the soil. "Superfluous," was the verdict of Nils Lüling, who is currently working on his doctorate under Prof. Dr. Griepentrog. Instead of a rigid coulter, Lüling equipped the Phoenix with a hinged coulter.

When folded, the device makes only a thin furrow in the ground. The coulter opens to full width only every 60 cm. The soil is therefore opened only where necessary. This also means that the device requires less force to pull, which saves energy.

Through a plexiglass tube, Phoenix drops one seedling at a time right into the open ground. A camera controls the distance and position of the plantings.

## Test application for tree pruning in orchards

In another research project, the researchers trained the multifunctional robot to recognize structures of tree crowns in typical Swabian orchards and to assess their condition. In many places, this ecologically valuable cultural landscape is disappearing due to lack of care.

To do this, the scientists equipped Phoenix with a scanner that captures its surroundings as three-dimensional point clouds. Artificial intelligence creates the digital image of the tree, also called the digital twin. With its help, Phoenix should be able to decide where it or untrained personnel should apply the saw.

## Cost-effective lightweight robot with electricity from solar systems and biogas

However, Prof. Dr. Griepentrog still sees the main application in the fields. His vision: Swarms of small Phoenix robots that leisurely and autonomously navigate the fields to work more gently and accurately than large and heavy agricultural machinery ever could.

"The devices are lightweight and inexpensive. Farmers can produce the electricity themselves using solar systems or in a combined heat and power plant with biogas," said the agricultural scientist from the University of Hohenheim.

His main goal at the Digital Summit: "We want to show that agricultural science is particularly innovative when it comes to digitalization." German Chancellor Olaf Scholz has already gotten this message.

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### Press release

09-Dec-2022

Source: Universität Hohenheim

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### Further information

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