

Slopehelper is the Multipurpose Solution the Farming Industry Needs Now

From tilling the ground to harvesting the crop, PeK Automotive's fully autonomous robot covers the entire agricultural cycle, saving farmers time, labor and a whole lot of money.

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Farming is undoubtedly one of the world's toughest jobs. Aside from being physically demanding and labor intensive, farming requires a high level of knowledge and expertise. Producers must account for various soil types and unpredictable weather conditions, as well as differing crop nutrition requirements, pest management strategies and harvest techniques. Even under the best conditions, this is a lot to manage.

Today's farmers rarely have the benefit of ideal conditions. As they battle rising costs, drought conditions, labor shortages and supply chain issues, producers around the globe are continually challenged to do more with less. Technology companies and equipment manufacturers are determined to help by developing solutions that automate the hardest, most dangerous tasks. [PeK Automotive](#) set out to build one robot to rule them all.

Enter the Slopehelper, a fully autonomous multipurpose machine that uses artificial intelligence and an innovative radar technology to complete tasks across the entire agricultural cycle. The Slopehelper is designed to operate on vineyards, orchards and any plantation that features rows of crops. Built to run on an electric motor without requiring a driver or operator, Slopehelper can be used for tillage, fertilization, pruning, mowing, spraying and harvesting.

"To understand what Slopehelper is, it helps to know what it is not," says Dr. Mikhail Kostkin, CEO and CTO at PeK Automotive. "It's not a director or a platform. It's not a machine that connects other pieces of equipment that are available now. Slopehelper is not just an implement for one part of the agricultural cycle. It is a whole, complete and comprehensive system that includes all the implements necessary to support the agricultural cycle throughout the year."

A Robot that Helps Farmers Multitask



Perhaps one of the most exciting features of the Slopehelper is that it was developed to operate unsupervised in a wide range of harsh conditions, including muddy fields and steep hillsides of up to 42 degrees, all while carrying as much as 2 tons of weight uphill, downhill or on flat land. Farmers can put the autonomous robot to work without worry. The system navigates seamlessly using differential GNSS and adapts to each new situation in real time using sensors, radar and a powerful algorithm based on artificial intelligence.

Farmers who want to be more involved can monitor the Slopehelper at any time and from any place using the TeroAir mobile app. The app alerts users to any challenges that arise. The same notification is also sent to Slopehelper's support team in the event that the user needs additional help to correct the issue. Aside from requesting user assistance, the Slopehelper only stops when it has completed its set task or if the batteries fall below a 5 percent charge. The app alerts the user to these situations and records video of its work, but it also takes things a step further.

"The second advantage of the specialized TeroAir system is that it also provides vast feedback from the field," Kostkin says. "After the machine's custom installation, the user determines the initial starting point and the Slopehelper runs. As it runs, it gets better over time by collecting data that can be used to help customers make changes that maximize efficiency. The information can also be shared with farm analysts and consultants who can make adjustments and improvements throughout the agricultural cycle."

The Slopehelper, which is equipped with special weather stations, collects data on everything from moisture and wind speed to telemetry and vegetation. Armed with this information, users are better able to adjust their spray regimen, mowing schedule and other operations. Over time, farmers become more prepared to handle whatever comes their way.

A System Designed for Agriculture 4.0

As the agriculture industry continues to advance, experts expect that the forthcoming machines, tools and systems will help farmers improve profitability, efficiency, and safety for workers and the environment. The Slopehelper was built on this expectation. Not only was the autonomous robot tested on the worst fields the company could find to ensure their durability, but it was also constructed to be highly reliable, versatile and cost-effective.

"When we developed the Slopehelper, we were very precise in collecting information about the technical requirements that our customers wanted and felt good about," Kostkin says. "This resulted in a machine that is very economically efficient. When we compared our machine to the ordinary agriculture system that is based on a tractor and detachable

equipment for ten years, we found that the Slopehelper is 220 percent lower in cost than the traditional practice. It's a very important machine, especially for modern farmers."

Part of what makes the machine so efficient is that it includes an abundance of implements for nearly every possible task. In addition to the common ones like sprayers and mowers, the Slopehelper has a power weeder, drum mulcher, disc harrow, pre-cutter and more. This wide range of capabilities frees up workers to focus on other tasks. When it comes time to harvest, the Slopehelper transforms into a platform that can assist six manual pickers (two on each of the robot's three height levels) at the same time.

The machine is cost-efficient, too. Because the Slopehelper only features parts and technologies that are designed, developed and manufactured by PeK Automotive, the company can offer its customers a solution that costs nearly three times less than existing agricultural machinery. Kostkin credits the highly skilled engineering team for being able to accomplish something that's incredibly rare within the farming industry.

"When we first started collecting the technical requirements for the Slopehelper, we were surprised that there is almost no difference between agriculture and the military sector," he says. "Both have very high requirements for reliability and cost efficiency. You basically have to use off-the-shelf technologies to realize your machine because you can't ask a farmer to pay half a million dollars for a robot. That was the biggest challenge, as creating a machine with a high level of control generally requires a lot of specialized electronic components. We were only able to pull this off because we have a qualified engineering team that happens to know a lot about complicated system solutions."

Autonomous Solutions for 2022 and Beyond

Farmers eager to get their hands on the Slopehelper are in luck. PeK Automotive began regional production of its machines last season. Happy with the results, the company has delivered machines to customers where it can oversee the machine's use in the field.

By next season, customers who purchase the Slopehelper will be working without the company's experts on site, only through the cloud services that offer technical support should an issue arise. This will continue throughout 2022. The following year, PeK Automotive will have the resources to establish a worldwide distribution network, placing Slopehelper machines on operations near and far.

"The future is bright," Kostkin says. "We have a huge demand for our current product, but we are also working to develop two additional solutions—one for smaller plantations and another for robotic mowing."

The machine for smaller plantations of less than 15 hectares is called AHelper. It will include all the electronic systems developed for the Slopehelper, but in a smaller, more compact robot. The third machine, LHelper is designed for autonomous grass cutting. It will feature an advanced satellite positioning system at a price point that's accessible to landscapers and landowners with expansive properties. PeK Automotive is excited to introduce these products to the market, but in the meantime, Kostin is happy to know that Slopehelper will make one of the world's toughest jobs a lot easier.

"Our target was to change the world," he says. "The Slopehelper has not only changed the rules in the agriculture sector—it has also really helped to make the industry better."

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