

Machinery

Background 13 May 2020 [1 comment](#)

California dreamin': a French weeding robot in America

Naïo Technologies is currently running its Dino autonomous vegetable weeding robot in California. Naïo's local representative Simon Belin shares his experiences with Dino in the USA.

The Dino autonomous vegetable weeding robot by French company [Naïo Technologies](#) has actually been on American soil for over a year now. Currently, Dino is being deployed on farms in the Salinas Valley, San Juan Batista and Hollister, all in California.

Identify Dino's limitations

In 2019 [Dino](#) made its debut in the USA. "The first season in Salinas introduced local farmers to Dino – our bed straddling robot used for weeding salad crops. Thanks to our partners' trust (such as Top Flavor Farm, Bonipak and Church Brothers Farms), we were able to weed many acres on their farms and gather precious feedback. We were thus able to identify Dino's few limitations, and correct them immediately," says Simon Belin, Naïo's local representative, who is responsible for operating the robots on the various farms.

Text continues underneath video

"Several of my French colleagues regularly travelled to California and Arizona to conduct other tests and adapt our robot according to the needs expressed by American farms. Indeed, there are notable differences between European and American practices – which led us to modify certain aspects of the machine," said Simon Belin.

Improve camera guidance

"We started by adjusting Dino's guiding system over the crop beds. Its itinerary is now perfectly straight and accurate, in compliance with the

map it is instructed to follow. A second team came to improve the tool's camera guidance – which was another significant advancement for Dino. The third and final team went to Yuma in Arizona, to implement the active tool developed at the end of last year.”

Fully autonomous robots

“Other aspects were also adjusted, making the mechanics more reliable, ensuring more compact batteries, making it possible to use new weeding tools, and lastly providing operators with a reliable and secure remote control. All these improvements mean we now have fully autonomous robots, and we can consider operating several machines at the same time within the same plot of land.”

Last season, Dino operated across dozens of hectares of farmland in the United States. This year, Naïo Technologies has scheduled hundreds more thanks to the arrival of other Dino machines throughout the USA.

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Dino is the first entirely autonomous electric robot to mechanically weed vegetable crops. The robot is designed by Naïo Technologies and has been on the market since early 2017. - Photos: Naïo Technologies

7 acres per day for one machine

In the past three weeks the Dino weeding robots have covered 100 acres, approximately 7 acres per day for one machine. The Dino robots are being deployed in cabbage (4 rows), romaine lettuce (5, 6 and 8 rows), leek (4 rows) and baby lettuce (10 rows).

What does a day's work with Dino look like? "Well, first I need to know what the farmer wants Dino to do, so I can equip the robot with the appropriate tools for the job," says Simon. "Next I create a GPS map of the plot, using a manual GPS tag. The map is processed using a computer, and then the file can be uploaded to the Dino robot. The map tells the robot the number of rows and what the plot looks like."

Text continues underneath images



Dino running in pak choi.



An aerial view of Dino. The robot can run for 6 to 9 hours and covers approximately 1 acre per hour.

U-turns

The Dino robot then sets off to work in the plots, says Simon. “The entire process of mechanical weeding is being done fully autonomous. With the help of the map and the camera system on the tool carrier Dino finds its way and is able to make U-turns. I just watch the robot work from a distance, and make sure the area is secure, so I keep an eye out for look for moving objects like vehicles, or people walking around the plots.”

The robot runs for between 6 and 9 hours, depending on soil conditions and the number of weeding knives that ure used. Approximately 1 acre per hour can be done. Once the robot has completed its task, or when the battery is low, it sends a text message to the operator. “Then it is time to take Dino back to the farm for recharging, which takes around 6 hours before it’s ready for another day of weeding.”

“Once the map is created and the right tools are implemented, all I have to do is watch the robot work from my car

According to Simon, the whole process is fairly simple from an operator's point of view. "Once the map is created and the right tools are implemented, all I have to do is watch the robot work from my car."

Waas – Weeding As A Service

At the moment, Naïo Technologies is running the robots for the farmers in California, as part of its Waas programme (Waas stands for weeding as a service, see the box below for more information). "We want to show them what Dino can do, and how it works. The farmers we're working with are quite impressed. I get comments like: "We're not able to a job that good with our cultivator". Or: "We've never been able to cultivate our leek like that before". Right now, we have enough work to run two robots for six days a week, so the growers we're working with really like it."

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'Farmers have accepted robots'

Earlier this year Future Farming spoke with Gaëtan Séverac, co-founder and COO of Naïo Technologies, about adoption of robots by farmers. According to Séverac, the turning point came a year and a half ago. “Until that point, we foremost had to convince growers of the usefulness of an autonomous weeding robot like Dino. That’s no longer necessary; growers now see the advantages, and many of them want a robot. The challenge is now to convince them they have to invest in one made by us.”

A good dealer network is vital. Naïo Technologies has around 20 dealers worldwide. Gaëtan Séverac says expanding the dealer network with the right dealers is a learning process. “A dealer has to be willing to learn about the technology, and has to be willing to invest in the future.” Naïo Technologies can already (partially) perform remote diagnostics on their robots, said Séverac, so problems can be diagnosed by its specialists in France. Software updates are not yet possible.

Recently, the company did introduce **Waas – weeding as a service**. According to Naïo Technologies, many growers requested a service like this, where the company supplies the robot along with an operator. The farmer basically rents the robot and operator, and doesn’t have to worry about anything. With Waas, growers have a guarantee that the job will be done correctly and don’t have to invest in machinery or staff to operate it.

According to Séverac, in the coming years it will be interesting to see what the big companies in agricultural equipment will do. “Will they wait until the market matures and then launch their own robots? Or will they wait which companies who are now taking the lead will come out on top, and take those over?”

Also read: [How to \(effectively\) prepare for the arrival of a robot on your farm](#)



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One comment

JIM BOAK

Report

15 May 13:31

Dino is weeding out more than plants - It will weed out family farms too. We will look back and wish we had taken "The Path Not Taken" You can write this down.

<https://www.futurefarming.com/Machinery/Articles/2020/5/California-dreamin-a-French-weeding-robot-in-America-581602E/>