

Estonian robots headed for US must master crosswalks

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A six-wheeled robot by Starship Technologies makes its way to deliver food from a restaurant in Tallinn, Estonia

A knee-high, black-and-white buggy rolls down a snowy pavement in Estonia's capital Tallinn and, carefully avoiding pedestrians, stops obediently at the red traffic light of a large road junction.

The six-wheeled [robot](#), on its way to deliver lunch to a client, knows to

cross only when the pedestrian light is green, but, armless, it cannot press the traffic light button.

Inventors Starship Technologies have taught their robots to avoid traffic lights with buttons and are now giving them speakers and microphones to help them navigate pedestrian crossings.

While not quite as talkative as C-3PO, the quick-witted droid of "Star Wars" movies, Starship robots will be able to communicate with humans.

"We'll have predefined sentences that are used in certain situations. Like 'hello' or... 'could you press the button of the traffic light'," Mikk Martmaa, the 26-year-old head of Starship's testing programme in Estonia, told AFP.

Most passers-by smile as the robot resembling a hi-tech icebox roams the streets of Tallinn's Mustamäe district.

"I've seen the Second World War and now I've lived to see robots on the streets of Tallinn!", marvels 80-year-old resident Aleksandra Vaskina.

A prototype of the robot was first designed for a NASA competition seeking bots able to collect rock samples on Mars or the Moon.

While it did not win, the Tallinn-based engineers behind the model thought it was perfect for food deliveries.

To explore the idea, lead engineer Estonian Ahti Heinla and Denmark's Janus Friis, co-founders of the online call service Skype, created Starship Technologies in London in 2014.

The startup's bots are being developed and tested in the Baltic state of Estonia, one of the world's most wired countries and a trailblazer in new

technology.



The robot can communicate with humans when it needs to cross the street or gain access to a building

'Knock-knock'

On a cold February day, 27-year-old TV producer Liisi Molder does not feel like going out but fancies a 12-euro (\$13) portion of squid and celeriac with herring roe and rocket in shellfish sauce from the busy nearby Umami restaurant.

With a few clicks, Molder places her order on an application on her mobile phone and 20 minutes later the robot arrives with her lunch.

It had no trouble climbing a paving stone in front of Molder's block of flats, but unable to press the entry buzzer, it sends a message to her phone.

"Knock-knock! Your Wolt delivery is arriving, please come outside and unlock the robot," reads the message with an access code to open the robot's container.

"I'm sure it's going to make some services more efficient," Molder told AFP.

The robots' top speed is around six kilometres (four miles) per hour but they are far less expensive to build and operate than delivery drones now being tested by online retail giant Amazon and others.

Once on the market, the final product is expected to cost "as much as a laptop or a really expensive phone. A few thousand euros," Martmaa said.

Starship partnered with Finland-based Wolt, a company handling food deliveries for over 120 Tallinn eateries.

The robots are "a good addition to our fleet. We have bikes, cars and scooters but maybe the robots will be the best option for the short deliveries in the future," says Matias Nordstrom, Wolt's interim head in Estonia.

For now, Wolt robot deliveries are available from four Mustamäe area restaurants. But Starship has its sights set on the US.



The robot is currently used to deliver food from more than 120 eateries in Tallinn, Estonia

Similar pilot projects for robotic deliveries of parcels, groceries and prepared foods are being launched in Washington and Redwood City, an IT hub in California.

Social cost?

Humans still follow the bots around during testing for safety, but Martmaa says they will be fully autonomous in a few months.

While its nine cameras and other sensors keep the robots from bumping into humans, exceptions to common traffic rules are tricky.

"The main (concern) are the intersections... In many places in the world

there are roads where cars can turn right even if the [traffic light](#) is red. Our robot can't detect that," Martmaa said.

Deliveries cost 3.5 euros (\$3.7), but Starship wants to slash that to one euro.

Replacing humans with robots on the labour market could however carry a social cost. It runs the "risk of exacerbating the gap between the haves and the have-nots," Peter Stone, who led a 2016 Stanford University study on artificial intelligence, told AFP.

He predicts that over the next 15 years autonomous vehicles and robots will take over unskilled jobs like the transport of people and packages. However, highly-skilled—and paid—jobs developing artificial intelligence devices will emerge.

Microsoft founder Bill Gates has said a "robot tax"—paid by robot makers and users to government—could mitigate the social cost of replacing humans with machines on the labour market.

"I don't think the robot companies are going to be outraged that there might be a tax," he told the Quartz digital news outlet.

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