

# FLYING AIR'CAR

## Fasten your seatbelts!

A flying car has completed its first inter-city flight in Slovakia on the 28th of June 2021; a milestone its creators claim is "turning science fiction into a reality."



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BBC News Flying car completes test flight between airports

bne IntelliNews Slovakia's flying car makes history

Silicon Republic Could this flying car be the future of intercity travel?

traveldailymedia.com Flying car completes 35-minute flight between Slovakian airports



Image: Klein Vision BBC news

**T**he flying "AirCar" designed by visionary Slovak designer Stefan Klein has completed an 80 km flight from Nitra to Bratislava in thirty-five minutes. Professor Stefan Klein, who is also the founder of Klein Vision - the company behind this technological advance - has driven it straight off the runway and into town upon arrival, watched by invited reporters as he was slowing down into the streets of Bratislava, the capital of Slovakia.

This university professor of transportation design has been working on this concept of flying cars since the regime in 1989. He completed the flying prototype of AirCar that was already tested successfully at Nitra airport in October 2019.

This flight was the first even performed between two international airports, imitating a ride carried out by a common car. It is also the longest flight in the distance and the 142nd landing performed by this engine.

After the flight, the vehicle underwent a mandatory after-flight check then was transformed into a sports car in two minutes and 15 seconds as its narrow wings folded down along the sides of the car. It continued to the city center on the ground to demonstrate all of its modes.

When he arrived at his final destination, Stefan Klein described his experience, early in the morning, as "very pleasant." Its flying car, "the AirCar prototype One," had flown at an average speed of 170 km/h during the flight. It boasts a 160 horsepower BMW engine with a fixed propeller and a ballistic

parachute. Before the flight, this model had already completed more than forty hours of test flights, in which it has flown at 8,200 ft. (or 2500 kilometers).

"With today's flight, we wanted to demonstrate the capabilities of this experimental prototype as well as prove that idea behind this means of transportation is realistic", Klein said to astonished local media.

In some aspects, this AirCar is not indeed that different from our cars: It runs on regular petrol-pump fuel and can fly about 1,000 km. It can carry two people, with a combined weight limit of 200 kg (or 31 stones). When parked in a parking place, its volume is comparable to a classic car.

Likewise, it is similar to private planes: Dr. Stephen Wright, senior research fellow in avionics and aircraft at the University of the West of England, described the AirCar as "the lovechild of a Bugatti Veyron and a Cessna 172". For him, the vehicle would not be "particularly loud or uneconomical in terms of fuel costs, compared with other aircraft." He adds: "Anyone can make an airplane, but the trick is making one that flies and flies and flies for the thick end of a million hours, with a person on board, without having an incident."

Anton Zajac, the co-founder of Klein Vision, emphasizes the positive features of this flying car and particularly on its convenient aspects: "with AirCar, you will arrive at your destination without the hassle of getting a ride to [the] airport and passing through commercial security [...] you can drive your AirCar

to the golf course, the office, the mall or your hotel and park it in a normal parking space".

This is not the only advantage this new AirCar might have compared to its rivals, cars and planes alike: flying cars has indeed been a long-term aspiration for people. Such vehicles can play a key role in reducing congestion globally. But it also offers an alternative to the old model people are used to driving and how they do it. As Stefan Klein says, his flight "starts a new era of dual transportation vehicles. It opens a new category of transportation and returns the freedom originally attributed to cars back to the individual". Besides, AirCar's investment cost (£1,7m) is not exorbitant, and it does not kick it out of the competition.

For these reasons, the AirCar Prototype One's future seems to be promising: according to Anton Zajac, adviser and investor in Klein Vision, the company "could attract a small percentage of global airline or taxi sales, and they are already about 40,000 orders of aircraft in the US alone". The company's development is also promising in technological advances. They plan to develop a second-generation vehicle called the AirCar Prototype Two to double the AirCar Prototype One's horsepower. It will also have a range of 1,000 km at 300 kph. But before being marketed, the AirCar One will have to show that it is perfectly safe for customers. Let us hope that this will be guaranteed in a short time!

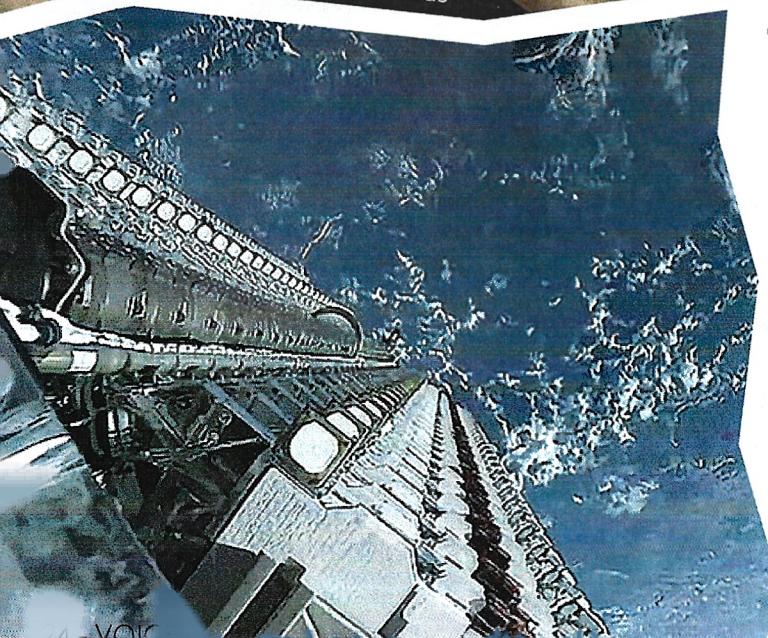
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Yvan Barbeau

# Starlink is about to bind everyone together



Photo: Daniel Oberhaus



**H**ave you ever heard about Starlink? It is the name of the project, conceived by Elon Musk a few years ago only, which consists of providing global satellite internet service across the globe in the long term. Next month, this aim will be nearly achieved, for the first time in human history, according to the South African entrepreneur. Let's take a closer look at this.

**E**lon Musk has got us accustomed to making us many promises, some of which we did not eventually realize, but we have to recognize few people in the world have achieved so many important challenges in their lifetime so far.

During a Tuesday keynote on the 29th of June at the Mobile World Congress, an annual trade show dedicated primarily to

the mobile communications industry, Elon Musk officially announced another of his brilliant achievements that is the providing of global satellite internet service coverage of the world by the project Starlink in the course of next month. This achievement consists in the scattering of hundreds of satellites that supply internet service for people who live in remote or rural areas and who do not yet possess high-speed broadband. It

Because of the large “spot size” of the satellite beams, Starlink is “really meant for sparsely populated regions,” Musk said. “In high-density areas, we will be able to serve a limited number of customers.”

Musk and Starlink executives have never pretended at anything else. But the mystique around Musk and his companies has led to a widespread misunderstanding of Starlink’s capacity, some people believing that the service was destined to all human beings on the Earth, which is far beyond Space X’s current capabilities. Besides, if Starlink’s high-speed broadband will be operational worldwide in the next weeks, regulators in individual countries must approve Starlink before people there can use it. Starlink broadband won’t also be immediately available in the north and south poles, but it will normally take another six months for these poles to be connected (according to a tweet Elon Musk wrote on the 25th of June).

So far, Starlink’s story has been a short and successful one as the first two prototype test-flight satellites were launched only three years ago, in 2018. Then, additional test satellites and sixty operational satellites were deployed in May 2019 for an implementation that took place as soon as 2020. To achieve its business objectives, Space X plans to maintain 12,000 operational minisatellites in low Earth orbit in the long term, towards 2025. Starlink is also characterized by a reduced latency compared to current offers supplied by internet satellite providers, which rely on big satellites located in geostationary orbit. The envisioned latency would be between 25 and 35 milliseconds, to compare with 600 ms for satellites in geostationary orbit, but according to Elon Musk, it could be inferior to 20 ms or even faster.

The satellite internet field is, however, littered with companies that have been through bankruptcy

or changes in ownership, and “step number one for Starlink is, don’t go bankrupt,” Musk said. The cost of the decade-long project to design, build and deploy the constellation had been estimated by Space X in May 2018 to be at least US\$10 billion. Newer satellite and launch vehicle technology will help costs, with Starlink’s upcoming “version 1.5” satellites able to network to each other to extend coverage across the Poles, and its starship vehicles able to bring more satellites into orbit at once. Musk also intends to sink \$5 to \$10 billion into the company even before it hits positive cash flow.

### Satellites have never been so numerous as today, and with the progressive privatization of space, space traffic is likely to intensify.

Getting there will involve bringing equipment and launch prices down. Starlink loses money on its \$499 user terminals, each of which cost the company more than \$1,000. Musk’s proposition to remedy this is the following: “selling terminals for half price being not super compelling at scale [so] we would like overtime to reduce the terminal cost from \$500 to \$300 or \$250”.

Among the challenges that Starlink might face in the future is the argument that maintaining such a high number of satellites in low Earth orbit increases the risks of collisions. Satellites have never been so numerous as today, and with the progressive privatization of space, space traffic is likely to intensify.

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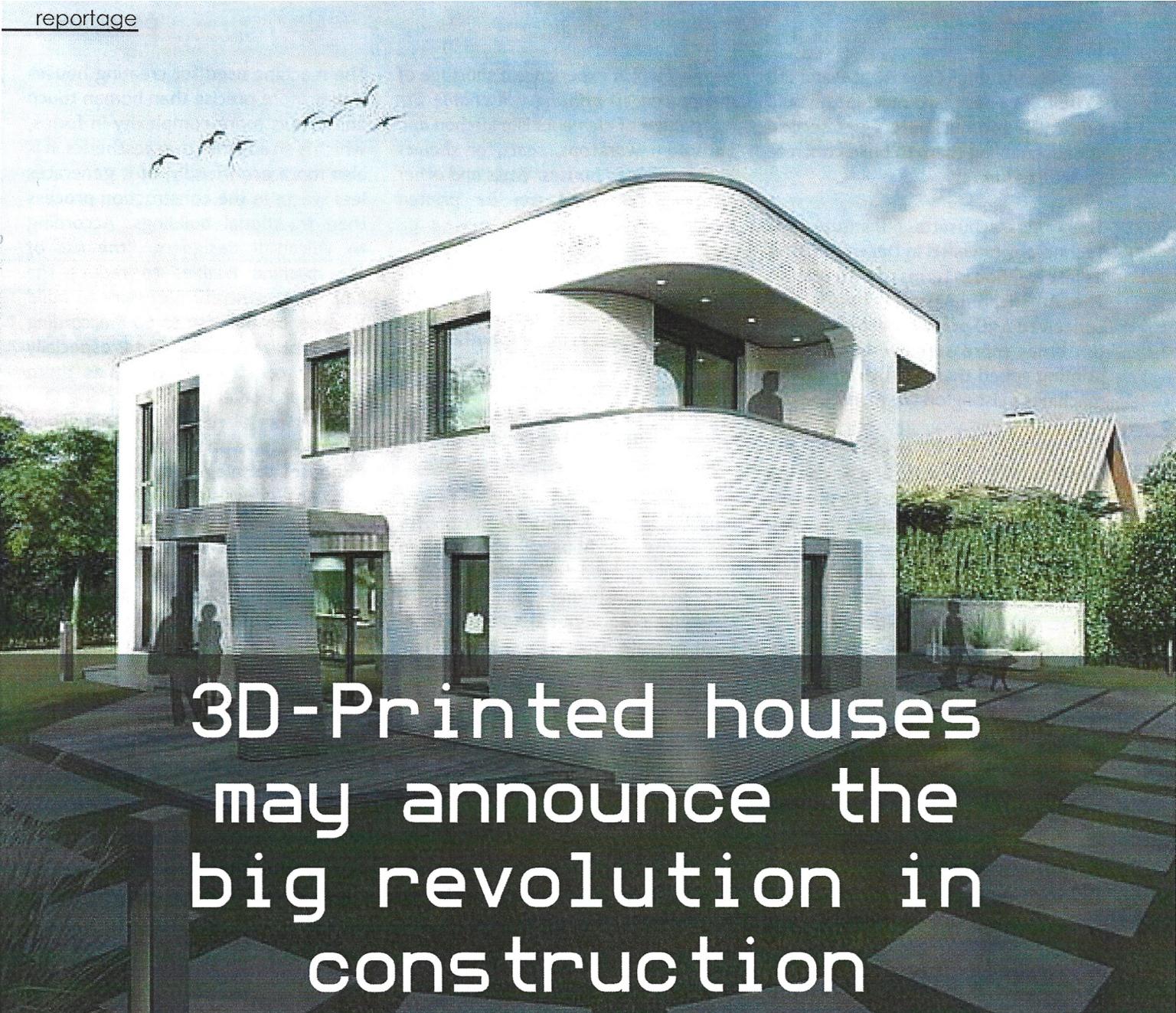
Sources:

**Medium.com** Elon Musk targets august for global starlink coverage  
**Business insider** Elon Musk suggests Starlink will be available worldwide from August — a month earlier than planned

Photo: EarthSky

also meets needs for broader and more varied uses of the internet worldwide, such as networked video games or video conference calls.

So far, Space X - the name of the society in charge of this project - has launched more than 1,500 satellites in low Earth orbit and provides internet to about twelve countries. That’s low, but according to Elon Musk, “We’re on our way to having possibly over 500.000 users within 12 months”. For the moment, there are only around 69.000 people who use Starlink broadband service, but Starlink is getting operational in “more added countries every month,” he said. Asked about the aim of his project during the Mobile World Congress, Musk underlined the difficulties associated with it as well as its tremendous potential: “We target the most difficult-to-reach three percent, possibly five percent of the global population. Think of Starlink as filling in the gaps between 5G and fiber. We’re really getting to the parts of the world that are the hardest to reach”.



# 3D-Printed houses may announce the big revolution in construction

**According to its semi-annual report published by the IDC (International Data Corporation) on the 8th of January 2019, the 3D printing (or three-dimensional printing) industry has steadily developed over the past few years. It has gradually opened up new fields of application. What are the different 3D printers that exist today? What can these technologies offer compared to the traditional way of building houses?**

There are today numerous 3D printing machines existing today on the market across the globe. If most of them have proved their efficiency, they offer characteristics that distinguish them from one another.

The tallest printing machine, called Big Delta, was developed by the Italian firm Wasp, currently, the tallest in the market as it measures up to twelve meters high. It can extrude concrete with different modular arms, which, once assembled, measure up to six meters. It would be able to move a 200 kilograms load.

The Russian firm Apis Cor managed to develop a 3D printing machine capable of building a house within 24 hours only in extreme climatic conditions. It can be set on site within thirty minutes only. The firm has developed its software and a monitoring program to facilitate construction work. This printing

technology conceived the walls of the biggest administrative building ever built in Dubai. This latter's surface area totals 640 m<sup>2</sup> while the machine's height reaches ten meters, and the building process requires seventeen days for printing.

The first social housing printed with this technology was built in Nantes, France, with a machine called Batiprint 3D, developed by a team of researchers from the University of Nantes in association with a laboratory – called LS2N - dedicated to the study of sciences and digital. Batiprint 3D lays three successive layers of materials to one another: two layers of foam and a third layer constituted of concrete material. This industrial robot is mobile and polyarticulated, which enables it to operate directly on-site.

Cybe Construction is a Dutch company that launched two 3D printers in

concrete material, Cybe RC 3DP and the CYBE RDP. These two machines would print at a 200 millimeters per second speed, enabling them to build concrete structures fast.

The Massachusetts Institute of Technology unveiled in December 2018 its last creation in terms of a 3D printer. The American university has indeed conceived a 3D printer that was judged ten times more superior in terms of printing speed than the other printing machines existing on the market.

The interest in 3D printing in the world is thus obvious, and it can be explained by many factors. First of all, it would reduce inadequate housing in the world by offering solutions in Third World countries, where a vast number of people are homeless or live in precarious conditions. This is the common aim of Icon, a technology construction company, and News Story, a nonprofit international organization. Both of them completed the first 3D-printed house in the world.

This 350-m<sup>2</sup> house was printed by a device appliance called Vulcan I in less than 48 hours. The cost of the printed portion was about \$10,000, which is far below the average cost of a house of similar quality and size (the roof was not printed). In May 2019, Icon founders announced the construction of the first entirely 3D printed village in the world, in Tabasco, Mexico, which was completed at the end of the year. These houses are given to families whose monthly income is inferior to \$200 per month below and who do not have safe housing sheltering them from environmental and physical hazards. Vulnerable people are generally the last ones to benefit from innovation: "We are convinced that technological creators, builders, and innovators can provide the poorest populations of the world with new housings that would improve their living conditions in an unprecedented speed and scale," said one of the Icon founders. He adds: "the device is designed to operate in

regions, which experience a shortage of manpower. 3D printing will enable the integration of elements like kitchen and bathroom worktops, seats, or shelves in the designed houses. Walls and other structural elements can be printed within only 24 hours [for a 152,4 m<sup>2</sup> surface] with nearly zero waste."

**We are convinced that technological creators, builders, and innovators can provide the poorest populations of the world with new housings that would improve their living conditions in an unprecedented speed and scale.**

Icon uses a new giant 3D printer for conceiving its houses called Vulcan II, with improved technology, as it is less time-consuming than Vulcan I. It would cost about 4,500€ and can both operate in case of a breakdown or for night printing (it is equipped with a light-emitting diode bulb). Vulcan II is performed by means of intuitive handling with a tablet. As a result, only a handful of workers are necessary for printing a house. Vulcan II has extended the printing capacity on the ground to about 185 square meters. It has adjustable width to adapt different sizes of slabs and can be transported thanks to a tailored trailer without any prior assembly, and only four to six people are needed to operate it. The reason behind this is due to several improvements brought to the automation, mechatronics, and software parts. Vulcan II also has remote surveillance and possesses a series of sensors permitting fast, reliable, and precise printing. Icon's Vulcan II printer can be described as an automatic material delivery system.

These characteristics are not the only advantages that Vulcan II and 3D printing for houses, in general, can provide in opposition to the old traditional construction of buildings: according to the Icon website, Vulcan II "has been conceived to build structures with more design freedom."

The machine used for creating houses is way more precise than human touch and allows more complexity in forms, which is an advantage in aesthetics. It is also more eco-friendly, as it generates less waste in the construction process than traditional buildings. According to Vulcan II designers, "the use of the machine enables to reduce the amount of concrete necessary to build a house, between 50 to 60 % according to the realized piece." But it especially reduces construction costs, as there are fewer workers on the working site, thus fewer salaries to be paid. Then this will have an impact on the costs of houses to sale, which -if 3D printing becomes generalized worldwide- are likely to be much more affordable for the less well off. At last, Icon's proven 3D-printing technology provides «safer, more resilient homes that are designed to withstand fire, flood, wind and other natural disasters better than conventionally built homes,» according to its concepts.

For all that, is the old traditional way of building homes going to disappear? "Not for the moment," according to Stephen King, a real estate agent in the U.S who promotes a printed house developed by a firm called SQ4D. "Although this system enables to eliminate numerous traditional steps in the building of a house, such as carpentry, coating or cladding and though 3D printing is responsible for 41 % of the construction work, people like plumbers, electricians or artisans will still be needed", assures King.

Yvan Barbeau

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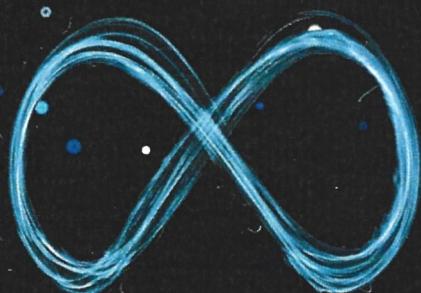
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Le premier village au monde imprimé en 3D arrive en Amérique latine cet été, les murs de chaque maison peuvent être imprimés en seulement 24 heures (developpez.com)  
Etats-Unis: des maisons en 3D qui font forte impression | LCI





# Be ready for Ready Player One!

The term “metaverse” was coined and described for the first time in 1992 by Neal Stephenson, an American sci-fi writer, in his novel “Snow Crash.” Decades later, this concept has been translated into reality, so much so that it applies to different applications such as video games, musical events, or professional meetings. How is the state of the metaverse now, and what is its potential?



In his novel “Snow Crash,” the American writer Neal Stephenson describes an apocalyptic futuristic world that characters can escape by discovering a virtual reality universe. Everyone can evolve by choosing an avatar previously. At that time, it was already described by the author as a computer-generated universe. After a few years later, as personal computers gradually invaded homes, it became no longer a sci-fi concept to be qualified and understood as a “highly immersive, shared virtual world where people gather to play games, to socialize and to work”. It is thus also tied to the development of Web 3.0, which some believe will be the next chapter of the internet’s existence – one built on blockchains that, theoretically, will democratize access and power and weaken up the grip of the biggest tech companies.

Of course, this is not what web giants want, as they are going all guns blazing on the metaverse. Mark Zuckerberg is all in and even changed the name of his firm on the 28th of October this year for “Meta”, acknowledging the abandonment of the original name for a reorientation of his enterprise’s projects towards developing the metaverse. He announced the creation in Europe of 10,000 new jobs dedicated to this new large-scale project, particularly to manufacturing virtual and augmented reality devices to access this future metaverse. As for Microsoft, they also announced to have plans to build the enterprise metaverse.

The concept is not, however, really new. Back in the early 2000s, there were a lot of forerunners to the metaverse, including Second Life, which Linden Lab launched in 2003, and Habbo Hotel, made by Finland’s Sulake. They have dropped off a lot of people’s radars since then, but both are still going (Second Life, for example, still has 200,000 daily active users).

Meanwhile, online multiplayer games like Fortnite, Minecraft (owned by Microsoft), and Roblox have already made social gaming a mainstream

platforms that can be the building blocks for developing the metaverse. Minecraft, for example, runs on Hadean cloud software, which can scale up to thousands of users per world.

Besides, the computing power to scale virtual reality to a massive scale is only now emerging. Companies like Hadean and Improbable, which specialize in creating large-scale distributed companies, can simultaneously get 10,000 players on the same server. Many metaverse companies are talking about hosting concerts and sporting events for 50,000 people simultaneously – something that would have been unthinkable only a few years ago.

The metaverse today is so, obviously, not just about playing video games: as regards the event industry, Fortnite has hosted concerts by Ariana Grande and Travis Scott, while Lil Nas X’s Roblox concert last year got 33m views. The metaverse also attracts creatives, such as designers, with London-based Gravity Sketch, which recently launched a virtual collaboration room where designers can work remotely on the same 3D design project. On the more business-focused side, there is the potential for meetings, education, and healthcare. Swedish startup Warpin, for example, is building VR training videos for companies and did a pilot project with digital doctor service Kry, where socially anxious patients were able to work through their fears by going into immersive virtual social scenarios with a therapist.

The generalization of the metaverse is something that, according to some people like Mike Allender, chief executive and co-founder at Tailwind Studios, cannot be reversed. This latter indeed said, “Every company has a 2D website right now. In the metaverse, it will have a 3D version of that”.

However, its development is likely to be accompanied by risks that can already be defined: firstly, disputes over intellectual property and ownership, data protection, content

licensing as well as risks around crypto-assets. Many lawsuits will have to be fought to establish the rules – in September, for example, Roblox settled a case with the US National Music Publishers Association, which paves the way for artists to debut their music in the metaverse. Another risk, says Ted Persson at EQT, is that the metaverse remains too fragmented, and people can’t take their virtual identities across different platforms. “Multiple businesses are fighting to become the glue between the different virtual worlds, but the risk I see is that no strong winner emerges leading to fragmented communities.”

A battle is brewing over whether the metaverse will be ruled by one company like Facebook or have multiple companies that collaborate. “What Facebook is proposing in the metaverse is very much centralized control over an entire ecosystem. The alternative model is embodied by what we are seeing in the blockchain space where multiple digital currencies will coexist, and multiple companies collaborate”, says Jean-Philippe Vergne, associate professor at the UCL School of Management and author of a recent paper on the metaverse’s prospects. But most metaverse-watchers doubt that Facebook will be able to dominate the metaverse: “I believe it’s unlikely this will happen,” says Persson. “Most individuals building on the metaverse seem to agree on a collective desire of openness and decentralization; to make this a reality, a diverse community and competition are crucial. So, unless those large players find a way to crack distribution of digital worlds and products, I don’t believe they will emerge as winners”.

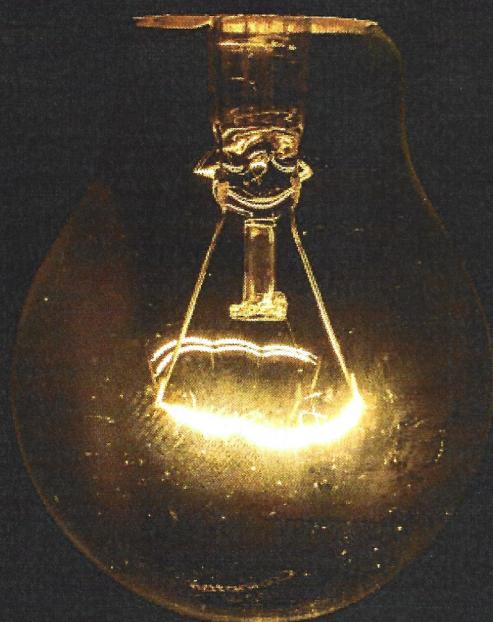
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# IS SMART MANUFACTURING



# REALLY SMART?

The notion of Industry 4.0 or smart manufacturing is a natural step of the ongoing “numerical convergence” with information technology (IT) on the one hand and operational technology (OT) on the other hand. It has appeared at the beginning of the 2010s. It has undergone incredible development since, so much so that the main question to this transition relies more on how industries will adapt instead of why.

Smart factory can be described today as a mix of technologies such as the Internet of Things, the digital twin, AI (Artificial intelligence), augmented reality, or Robotics. It can, however, be distinguished by four essential characteristics.

**F**irst of all, it is connected and data-driven. Smart factory relies on data and IIOT (Industrial Internet of Things connectivity) to facilitate adaptation and control over all the sites on every aspect of the operations in near real-time and with virtual automation. With the Internet of Things, firms can think and react independently as their exploitation, maintenance, and innovation have become proactive. Machines rely on reliable real-time informatics and connectivity, and they are equipped with sensors and interoperable open systems. All products, raw materials, equipment, hardware, and monitoring systems have sufficient potential to collect and share data. This latter can be analyzed in their context and in real-time to deliver workers usable information about machinery health monitoring, manufacturing process, and the state of the output.

Smart factory also functions as autonomous and self-managed system of systems, in other words, as a network of individually interconnected systems, each of which has a high degree of flexibility, efficiency, and autonomy. Eventually, firms will be similar to a vast system, including hundreds of subsystems operating independently, but turned towards the same goal. Each system and subsystem in the firm will use AI (Artificial Intelligence), machine vision, deep learning, and edge analytics to control and communicate with everything that factory floors encompass, whether it is about factory production, maintenance, its supply chain, or security.

Smart factory can also be described as a collaborative human-machine hub as it involves humans, machines, and production systems altogether. It reduces human presence on factory floors: in return, they are helped by collaborative robots ("cobots") for carrying out complex tasks, whereas robots have to perform repetitive tasks that are generally harmful to humans.

Smart factory is, at last, a system that shows the capacity for adaptation as it enables manufacturers to extend and develop applications as well as improve IIOT value to accompany the evolution of entrepreneurial strategies. This is, for example, the strategy developed by ALTEN, a French consultancy company created in 1988, which tackles technological challenges of the Industry 4.0 transformation. According to François Portier, program research Smart Factory 4.0 director for the company, "the more it is triggered at an early stage, the more transformation will be effective in the factory. The hardest part is to get down to it and ensure the change will take place". That is why ALTEN bets on new technologies' adaptation to what is existing to avoid investing large amounts and facilitate a progressive appropriation: "Step by step, we are moving forward; at the beginning, on a defined perimeter which enables to measure the impact and gains earned before broadening this perimeter gradually." Artificial Intelligence and deep learning create numerical patterns, which are increasingly detailed, accurate and relevant, both for equipment and processes, which in turn facilitates decision making and planification. The latter becomes, as a result, more focused on data. The consequence is that devices react to events at a higher cognitive level and get smarter as time goes by. Production monitoring becomes more autonomous, and new entrepreneurial approaches emerge.

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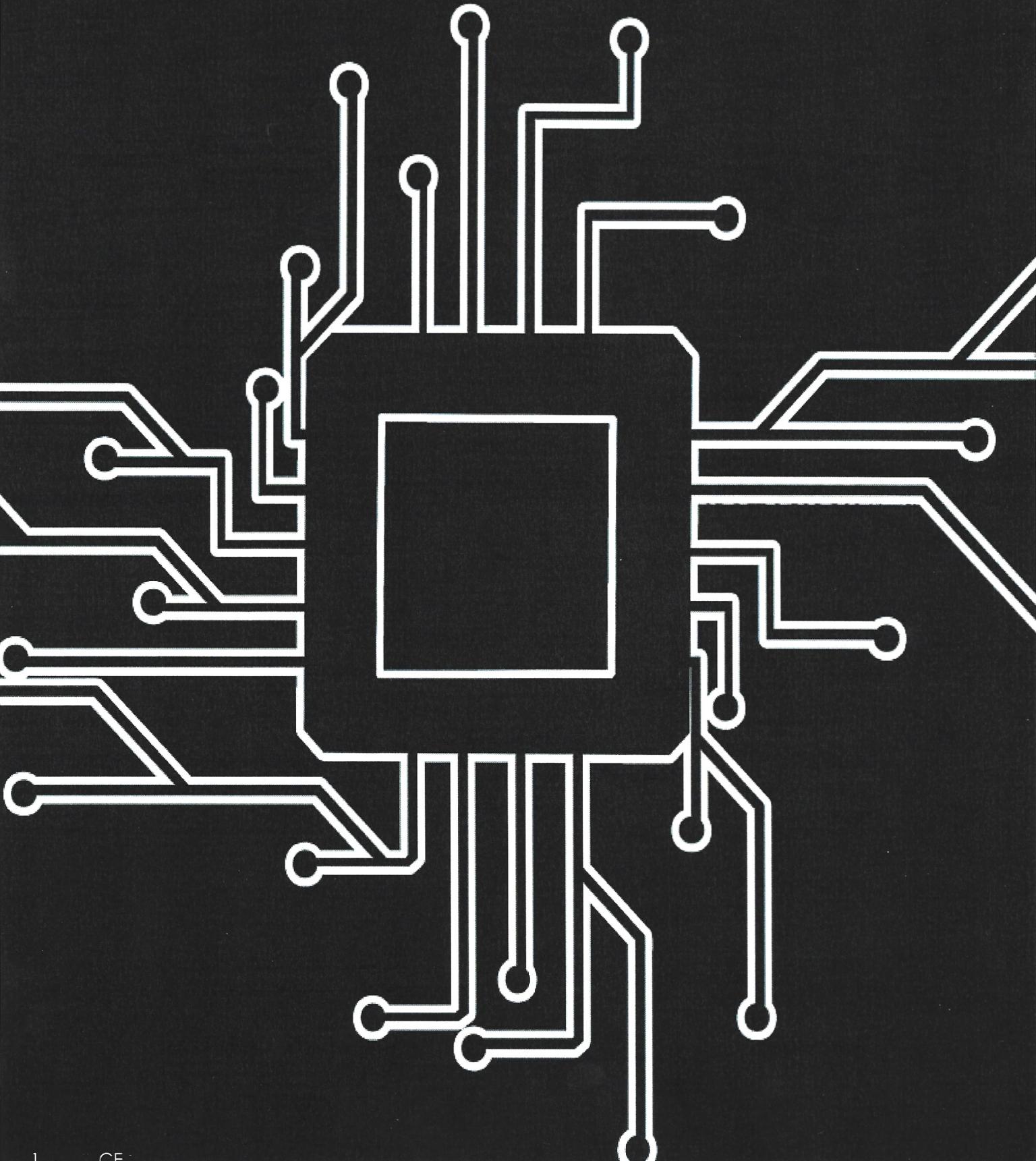
Yvan Barbeau

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# TRANSHUMANISM

IS ON ITS WAY WITH  
NEURALINK



## NEURALINK IS A STARTUP FOUNDED IN 2016 BY ELON MUSK WORKING ON BRAIN-MACHINE INTERFACES, WHICH CAN BE DEFINED AS A DIRECT LIAISON BRAIN-COMPUTER ENABLING PARALYZED PEOPLE TO PERFORM DAILY LIFE TASKS WITHOUT MOVING MUSCLES AND PERIPHERAL NERVES. NEXT YEAR, THIS DREAM MAY COME TRUE AS ITS CREATOR ANNOUNCED NEURALINK WOULD START IMPLANTING ITS BRAIN CHIPS IN HUMANS' BRAINS.

**M**usk has a history of overpromising and under-delivering on project timelines. Neuralink's narrative makes no exception: in 2019, Tesla's boss said that Neuralink hoped to begin human testing by the end of 2020. So what makes this announcement more credible than the previous one? In the meantime, lots of progress has been made.

At this stage, Neuralink has only created prototypes on pigs. The last one was presented in late August 2020 in a live video: the shown implant was 23 millimeters wide and 8 millimeters thick. Inserted under the skull, a few millimeters deep inside the brain, it is composed of 1024 extremely thin threads. The device can be reloaded daily by induction. These threads detect the activity of the neurons or emit electrical signals in order to stimulate them. Their activity can be recorded by means of a mobile phone application. The implant is connected to a smartphone thanks to a Bluetooth Low Energy connection.

This new version of the Neuralink prototype (called N1 link) enables to read pigs' brain activity when they move or sniff food in a more discreet way than the previous brain implant developed by Neuralink, as well as offering more advanced functionality. The demonstration of this prototype was performed on a pig called Gertrude, and it was possible to read and predict Gertrude's brain activity related to its legs' muscles. Two other pigs were also present to perform the experience correctly: Joyce, which was not given any implants, and Dorothy, which had one implant for a two-month period before it was withdrawn from its brain. Other pigs were given several implants simultaneously, connected to different parts of their brains. According to Musk, the aim was to show that animals are "happy and in good health," no matter how many implants

they have had or if they were given any, which seemed to be the case. That being said, this demonstration does not prove in itself that the operation is without danger. Brain damage sometimes has inner consequences on human beings (difficulties to talk, mood change, disappearance of some skills, loss of sensation), and it is all the more difficult to notice on a pig.

This implant has been called a "breakthrough device" by the Food and Drug Administration, the American agency in charge of regulating medication and medical equipment. This program enables the marketing authorization on the American territory, which is the next major step of Neuralink. Before being commercialized, Neuralink's implant will have to be tested on humans to certify that it is both an efficient and harmless device.

Elon Musk seems to be rather confident about the outcome of the process, as bespeak his words: "We are planning to implant this device next year into human beings who suffer from serious spinal cord injuries, for example, tetraplegics or quadriplegics," before adding confidently "our norms related to the implantation of the device are far more numerous than the FDA rules. So are our security norms with Tesla more numerous than what the American government requires". In the short term, the company aims to offer a solution for all people who suffer from neurological diseases or spinal cord injuries, for example, to enable people with physical disabilities to recover their movement capacity by controlling digital

devices with their minds. Later, Neuralink hopes to help blind people regain their eyesight with a device more deeply connected to their brains. Neuralink is not the only firm to be interested in brain-machine interfaces. Still, it is the only one to promote the idea of minimally invasive surgery in the absence of any "medical need" to the general public: Facebook, for example, is working on a device enabling people to type letters without a keyboard. But its device consists of a wristband capable of detecting electrical signals sent by the brain to the arms' muscles, which therefore does not require any medical intervention.

Yvan Barbeau

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