

Above: Flying Taxi—fast, efficient and exciting

FUTURE *Perfect*

A **MORE THAN TESTING** start to the second decade of the 2000s has brought us a time of reflection and re-evaluation.

During our lifetimes, we are constantly reminded of the need to change, to readjust or to adapt. These are laws of nature. Morally, we know that each of us holds a responsibility to leave the Earth a better place for future generations. As a designer, I'm in a creative position to do my part—industrial design touches everyone's lives. Mobility and travel have always been critical to advancing our societies throughout history—all kinds of progress have been intrinsically linked to the way we get around.

In the wake of the disruptive impact of Covid-19, mobility is being seen through a different lens. We are now being advised to avoid unnecessary travel. Transport that we have taken for granted—trains, buses and metros—is

By
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changing dramatically to allow for more passenger spacing. Covid-19 is also having a major health impact on the lives of transit operators around the world, requiring a number of safety measures to be rapidly introduced to reduce driver exposure to the virus. These pressures mean there is an even greater push for autonomous (i.e., driverless) vehicles to enter the public transport system as soon as possible. The introduction of these vehicles will mean greater reliance on artificial intelligence. For example, digitally assisted customer experiences will become commonplace, resulting in reduced staff numbers and less

face-to-face human contact. AI is also likely to be used to monitor passenger temperatures and to optimise the frequency of transport services based on real-time demand.

As lockdown restrictions begin to ease and different modes of travel begin to rebound, certain expectations will become part of our new normal. It's clear that social distancing and cleanliness are critical factors in the effort to regain public confidence in travel. Personal vehicles are seen as low-risk, followed by shared cars or bikes; public transit systems are the least trusted and that's where passenger behaviour will change the most in the long term. To restore faith in our public transport systems and urban mobility it's vital to ensure the health of staff and passengers. The precautions that have been introduced during the pandemic should become standard. There will probably be new

ILLUSTRATION BY FRANK STEPHENSON DESIGN (FLYING TAXI)

pricing schemes to attract customers, because the healthy functioning of public transport is vital to the economic sustainability of every city. Unpleasant as the pandemic is, it's often major catalysts like this that drive improvements and innovations in society.

During lockdown, I have found myself reflecting on the future of mobility and wondering how, and to what extent, people will continue moving around in this "new normal". With companies across the globe forced into adopting a working-from-home policy, and seeing productivity levels increase as a result, it inevitably means that people will be commuting less. This will allow them to spend more time on leisure, travelling around the country they live in to visit places they have never seen before. In the future, we may see different types of driverless vehicles emerge, designed to cover longer distances, offering a personal "clean space" for families within a relaxed, entertaining and spacious interior environment.

It's also likely that the automotive market will shift into a service provider network of smart autonomous vehicles that cater to our professional and leisure needs. The rise of online shopping and ordering will undoubtedly increase the amount of driverless delivery services as well. But I think that private vehicle

ownership will continue, predominantly concentrated on those who have a personal need, or passion, for cars, motorcycles and driving.

The world we live in is evolving at a pace that we could not have imagined in the past. Cities are expanding with ever-growing populations, placing a strain on traditional transport. Before much of its workforce was instructed to work from home, all you had to do was look at London's rail and Tube network on a Monday morning to see that we needed to think of new ways to move around.

The situation is not much better on the roads in cities across the globe. I have spent many hours stuck in traffic jams on the freeway trying to travel into central L.A., a situation that many people will be accustomed to the world over. These mobility issues are not restricted to the more affluent cities, they affect people from every continent. Take Lagos in Nigeria, for example, where people can spend hours traversing just a few miles across the city. In Beijing, China, problems got so bad that the authorities implemented a one-day-a-week driving restriction to try to ease the traffic.

What do these problems mean for the future of mobility? While we have already taken the space underground and on the roads, we are neglecting an obvious solution. The sky.

AIRBORNE TAXIS

When we think about air travel, we tend to think of long journeys, taking us on our holidays or moving to cities far away.



Beyond that, air space above our cities tends to be used only by emergency services and those wealthy enough to travel by helicopter. This is where I believe the future lies: opening up short journeys by air to the many. The obvious attractions of living in the suburbs and countryside could become a reality for many families. Less frequent travel to city offices, yet with easy accessibility, is an aspirational dream that could come true. It would be a shift towards a more sustainable model of mobility.

ELECTRIC VERTICAL TAKE-OFF and landing aircraft (EVTOL) can fill this void, allowing us to ease transport congestion and travel to places further away in much less time. What exactly would an EVTOL taxi look like? Much like a futuristic small aircraft, with or without a pilot, running on zero-local-emission electric power. The consumer would book their EVTOL taxi to the nearest skyport located on the top of city buildings. Once in the taxi, the experience would be calm, fast and traffic-free, as they glide quietly above the city.

Where EVTOLs will really come into their own is on medium-length journeys, where current modes of transport can take up to a few hours or more. If someone working in the City of London wanted to take their clients to a restaurant in Oxford (around 50 miles away), they could get there in 20 minutes or so, have their lunch, and travel back to

DRIVING THE CHANGE

Below: autonomous postal delivery vehicle.
Above, from top: Lagos' choked mobility arteries; crowds at Waterloo Underground station



ILLUSTRATION BY FRANK STEPHENSON DESIGN (AUTONOMOUS DELIVERY); JEFFREY GREENBERG/UNIVERSAL IMAGES GROUP VIA GETTY IMAGES (WATERLOO); PIUS UTOMI ERPE/APP VIA GETTY IMAGES (LAGOS TRAFFIC)

be in the office for the afternoon. A trip to the Midlands currently takes two hours by train, which may be delayed and cramped. By booking an EVTOL taxi, you could be home in 30 minutes while working comfortably in your own private space. This is where designers can get really creative. Throughout the EVTOL projects that I have been fortunate enough to work on, we really sought to create something that not only made sense aerodynamically, but also added emotional value to the whole experience.

B IOMIMICRY—THE IDEA of design being inspired by nature—has been an ever-present inspiration throughout my career. The first step in my creative process is to look at which animals move most efficiently and aerodynamically, leading me to draw heavily upon marine life rather than birds in the sky. Looking to the sky for inspiration may seem like the obvious thing to do but water is much denser than air, meaning that sea creatures have, over time, adapted to move in a manner that uses as little energy as possible. We call this the study of hydrodynamics. Implementing this philosophy within the design of one of these aircrafts, we added wings at the front of the vehicle, similar to that of the hammerhead shark, because we learnt that they allow the shark to turn adeptly and also prevent the nose from dropping or dipping.

This approach to aircraft design has not been explored in depth. But the gliding efficiency and high speeds achieved by sea creatures hold many secrets towards improving aircraft design. If we reimagined the idea of a traditional fuselage with conventionally attached wings and instead blended that bold head of the hammerhead shark with the body of the elegant manta ray, you can envision the beauty of marine life successfully melding with aviation design. Not only does this create an aircraft that is eye-catching, efficient and aerodynamic, but it also improves the experience of travel for passengers, who will feel as if they are magically gliding through the air.

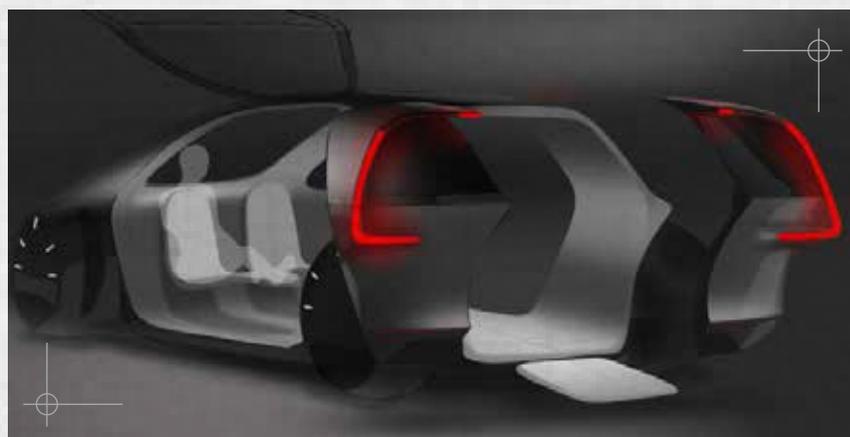
So when will EVTOLs become a viable mode of transport in our society?

In the next year or two, there will be a lot of press coverage on these new aircraft. There is a great deal of testing going on, and because it's early days, nobody wants to put their cards on the table just yet. The technology to go from a vertical lift-off to horizontal flight and back to a vertical landing is complex. We may be seeing propulsion solutions ranging from types of drones to ducted fans.

Companies have already had successful EVTOL test flights, but much of the design and development phase is centred around safety. We must ensure that there is no chance of catastrophic failure before they can be confidently flown over our cities. Challenges to overcome include bird strikes and poor visibility, but intelligent minds are working towards achieving a new and higher level of safety certification than currently exists.

Legislation is the elephant in the room where autonomous vehicles are concerned. The technology is already there. Tesla has done it, and we have seen trials of autonomous delivery services. So the main issue now lies with litigation and safety. Who is at fault in the event of a crash? How do you claim on your insurance if you have been hit by an autonomous vehicle? Who is at fault if someone has been injured by one?

In its favour, self-driving technology is seen by many of its advocates as a way to eliminate many of the fatalities caused by automobiles. Careless driving has always been a major cause of road deaths and autonomous vehicles could prevent most of those accidents. Another positive outcome would be decongestion of traffic in high-flow areas. Traffic contributes to wasted time on the road and this, in turn, has an



ILLUSTRATIONS BY FRANK STEPHENSON DESIGN

INNOVATION, INNOVATION, INNOVATION

Clockwise from top: Moonracer, a developing innovative technology for future mobility in space; autonomous family vehicle interior; and exterior

AUTONOMOUS CARS

Despite the fact that I firmly believe that the future of mobility lies in the skies, I also think that driverless autonomous vehicles will be the next major change in mobility. Once the legislative issues have been resolved, the way that we move around on the road will significantly change. Smart connected cars will interact with traffic lights and satellites to allow us to move around efficiently, reducing the traffic-density levels that we see across the globe.





*Dick, formerly **GEEKY** and ill at ease, seems to be actively willing the **HANDSOME** good looks he is growing into.*

enormous economic impact. Driverless cars could be safely positioned closer together at motorway speeds and, for the passenger, the journey to work would be productive and relaxing.

Autonomous vehicles will bring easier mobility to the disabled, those too old or too young to drive and those who don't want to own or operate their own vehicle. Getting to places will become much

less of an obstacle than ever before. As with any introduction of innovative technology, it won't happen overnight, but throughout this decade we can expect the development of driverless vehicles to progress rapidly. I believe we will see the start of fully autonomous vehicles operating safely on the world's major road networks by the 2030s.

THE MOST LIKELY and appropriate first application of autonomous vehicles will be the driverless taxi, which will result in a significant reduction in cab fares. Personal vehicle ownership will decrease, meaning fewer cars occupying road space—and the beginning of a kind of “detox” for our inner cities. Nonetheless, exciting technology will mean some people will still want to own their own vehicles. Imagine your car dropping you off at your destination and then parking itself. Imagine it being able to recharge and repair itself. And what if your multipurpose car could also serve as a mobile office space?



From a creative point of view, designers can start afresh, crafting an aesthetic language that reshapes what a car looks like. You can expect to see vehicles with one open internal space and swivelling chairs, allowing you to transform it into a meeting place or lounge. Driving long distances will not be an arduous task, but rather something to look forward to, allowing you to relax, socialise or work while you travel.

Based on how quickly cars have changed our lifestyles since their introduction into society over the past century, it's daunting to realise that, in 2020, we have reached choking point—it's only taken 60 years for them to saturate our roads. The next generation of vehicle designers and engineers will need to address these issues.

LUNAR RESEARCH

Pushing even further forward into the future, designers have already started to research advanced mobility in space. Space commercialisation will bring many advantages that accelerate mobility developments on Earth. Earlier this year, two teams of high school students on opposite sides of the world created very different vehicles that were certified for space-worthiness by Intuitive Machines, a company that specializes in autonomous systems for drones and spacecraft. It has contracted SpaceX to carry these two vehicles to the lunar surface in October 2021. These will be the first vehicles to race each other on a professionally designed circuit over the lunar surface.

Why is this relevant? The aim of Moon Mark, which is working in partnership with Intuitive Machines, is to accelerate technology development in communications, laser geo-mapping and low-cost mobility. By creating this competition as streamed entertainment (we Earthlings will be able to follow it live), Moon Mark has delivered an ultra-fast manufacturing process and cutting-edge technology at a fraction of the cost. Its research and innovations are sure to influence the development of Earth-bound vehicles. Tackling the mobility issues of the future is an irresistible challenge and I can't wait to see the beautiful creations of the next generation of passionate designers. ■