

NEW VEHICLES AS OUR REALITY

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Abstract: *The world is changing very fast. The future already arrived in industry. Europe and China expel classic automobiles and replace them with electrical. European Union predicts that till 2020 they will have 3,5 million electric cars and 800.000 stations for its filling. In Serbia according to the Ministry of Internal Affairs from 2011. only 114 vehicles on electric power and 90 hybrids were registered.*

The introduction of vehicles without a driver on the roads of the world will happen faster than lawmakers predicted. Recently, the countries began to discuss laws regulating autonomous vehicles, but only a few of them actually adopted such laws. California, Nevada, Michigan and Florida (USA) allow autonomous cars on the road, while their use on public roads in the states that have not enacted laws is neither illegal, nor specifically allowed.

Experts warn that it could take decades before legislators permit the production of vehicles without manual commands and it is possible that during the transitional period when conventional and vehicles without a driver would share the road, security really could be worse. In order to get a vehicle permit, with robots and electronics in them must also stand the man, as well as the system which in the case of emergency enables taking control by man.

The first passenger drone in the world that can independently carry one person by air got permission for testing in Nevada. In the race entered the Chinese, and the first flying car could have its first drive as soon as next year 2020. The Chinese company "Ehang" still in 2016 presented the model of unmanned aerial vehicle that can carry one person 30 kilometers by speed of 100 km/h. The "Airbus" vision of taxi that solves the problem of traffic jam by throwing away of wheels at a special station and hooking on for the roof the massive drone, to pick it up in the air at the critical moment, was presented.

Expectations are that in this type of traffic the number of accidents would decrease for at least 90%, what would save thousands of human lives, while those who due to some limitations are not able to drive a car would not be discriminated, but could use self-driving vehicles like everybody else.

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Introduction

In the 18th century, on the streets of the metropolis appeared vehicles using steam. The first vehicle driven on this drive in Paris was constructed by the French explorer Nicholas Joseph Kinjo. As the creator of the modern version of the car is considered the inventor Karl Benz from Mannheim, who was the first who sold in 1880 the vehicle that was working by its own power. Not until the last decade of the 19th century the car with four wheels was created.

There is a remarkable technology progres in the world, so it is believed that by 2025 robots will take over more than half of the jobs. The development of technology, automation and artificial intelligence can cause a loss of 75 million jobs by 2022, but also the creation of 133 million new job positions, according to a report titled "The Future of jobs in 2018". The world is changing very fast. The future already arrived in industry. Europe and China expel classic automobiles and replace them with electrical. European Union predicts that till 2020 they will have 3,5 million electric cars and 800.000 stations for its filling. In Serbia according to the Ministry of Internal Affairs from 2011. only 114 vehicles on electric power and 90 hybrids were registered.

Vehicles for the future – World experience

The homeland of the first modern electrical car is Greece. Today in Europe for example, BMW has unveiled a redesigned "series 7" and completely new look of the vehicle was obtained. For a long time, "series 7" is the bestseller on the Chinese market. After versions for Chinese and the US market "Volkswagen" has shown also refreshed "Passat" (B 8), continuing the life of the eighth generation of this popular model. It is planned that from May 2019 it will be offered to drivers, and it will be using the new technology that allows partially autonomous driving up to the speed of 210 kilometer/h. This car was first presented in March on the Salon in Genève. While the production of the new "Skoda" cars began, company "Volvo" has announced a recall of 167,000 of its automobiles. With the "Volvo" there was a long list of producers who will not appear on the Motor Show in Geneva ("Ford", "Opel", "Hyundai", "Land Rover Jaguar").

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road, while their use on public roads in the states that have not enacted laws is neither illegal, nor specifically allowed.

In 1999 Gehring et al. formulated that the autonomous car (car without driver, self-driving car, robot car) is the vehicle that is able to sense its environment and run without contribution of the driver.¹ There are more degrees of autonomy of self-driving vehicles (Wood et al. 2012).

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Since 2018, "Deutsche Bahn" that founded the branch "Joki" dedicated to electric mobility and the transport of the future, intends to test its station wagon in several German cities. Testing was conducted in the spa Bad Birnbach, in Bavaria in southern Germany, and this electric mini bus can carry 12 passengers and this is a new era of public transportation.

For the next year "Mercedes" announces the first self-driving vehicle, so driving licenses will not be required. During last year 1,3 million of these cars were sold in the world.

It is interesting that in 2018 /in April / US giant "Ford" ceased to produce passenger cars in its plants in North America. US factory produces only one old model, and it is focused on trucks and SUVs. There is no sentimentality in business! However one model maintained its position (while these models are not: "Fiesta", "Taurus", "Galaxy", "Fairline", etc.) ... that is the famous "Mustang"². It survived all the cuts, the oil crisis of the seventies, the transition to the SUV. It's been 54 years since the first "Mustang" came from the production line - then this model was presented as an alternative to expensive European sports cars. They say "Mustang" represents freedom.

¹ It is a motor vehicle that uses artificial intelligence, coordinates and sensors of the global positioning system GPS /Global Positioning System/ for driving without active intervention of the driver.

² At various tests this car is still passes better than "Porsche" 911. During the year 2017, "Ford" has sold 126,000 in even 146 countries. That was the best-selling sports car in the world.

At the Paris Motor Show opened on the 5th of October 2018, the 120 years of its existence was marked³, and all domestic producers were present ("Renault", "Citroen", "Peugeot") as well as "Mercedes-Benz", "BMW", while many important manufacturers were absent. The French are planning to present 8 new electric cars (record holder is the model "zoe" 13, and soon the EV version of the "Quid", a small SUV that is sold on developing markets should join) before year 2022.

Japanese "Nissan" decided made a decision to abandon production new generation of its model "X-Trail" in England, due to the uncertainty related to Bregzit. New model will be produced only in Japan.

In early 2019, at the Consumer Electronics Show in Las Vegas "Mercedes" introduced a new generation of models, "CLA". This small limousine the German manufacturer is now longer, wider and lower than the previous one.⁴ This new generation of the "CLA" model inherited all the best from the A and B class (new digital instrument panel with two touch screen, and the drivers are also offered seats with massage and cooling functions). At the fair "CLA 250" is exposed, while the top version should be "Mercedes CLA 45". The price has not yet been announced to the public.

It is significant that more and more manufacturers are turning to modern technology and that the end of 2018 was marked by hybrids. "Subaru" represented "kroster plug-in hybrid," and "Honda" hybrid version of the model CR-V.⁵ Legend says that every seven days somewhere in the world appears new SUV, popular urban SUV. At the Fair in Los Angeles at the end of November 2018 was presented a hybrid version of the "krostrek", which will use innovative technology "Stardrive" that integrates an electric motor, all-wheel drive, built-in lithium ion battery that offers a range of only 27 kilometers (braking is regenerative, so the braking energy is used for charging the battery, as well as on other models).

Smart Mobility in the World

Currently, at least 19 companies are working on the flying cars, especially big ones like "Boeing" and "Airbus". We hope that this idea will become a reality.

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On the Fair in Las Vegas, in January 2019, the drone "Ehang 184" was presented. The most notable at the show in Las Vegas was "Bel nexus" with the hybrid system as the futuristic vehicle. The drone at the fair in Las Vegas thrilled the representatives of one biotechnological company, which announced the collaboration with "Ehang" in order to adapt the vehicle for transportation of organs for transplantation. "Ehang" is hoping to start testing this year.⁶

State of Nevada was one of the first states to permit testing of driverless cars. Last five years, Nevada has become the testing

ground for advanced means of transport. It is one of the first American states which have allowed test driving of cars without a driver on public roads.

"Google" car does that running on the roads - with no driver at the wheel. The idea is that the passenger simply enters the destination on the screen (diagonal of 30 cm), a drone does everything else, from navigation to communication with flight control. It would fly at the altitudes of up to 3.5 kilometers, at speed up to 100 kilometers per hour, using eight propellers on four knobs. The maximum flight length is currently 23 minutes.

However, since the completely autonomous land vehicles probably will not be widely available until the middle of next decade, we should not expect in the near future a taxi drones. "EHang" is hoping the testing of their taxi drone will be the first step in making the technology available to the masses. It's an innovative jump in drone technology.

At the time of law of obligations codification, special rules were set out concerning the responsibility of the state. Rules are also regulating causes of damage and compensation. The question is how long will it take to get a report on the accident and what will be the costs if the investigation takes months?

The "flying car" was produced in "Boing" to ensure that passengers can fly over the street jam, successfully passed all the tests, but the question is whether this will be the mean of transport of the future. Fully autonomous prototype successfully passed testing in the State of Virginia. For only one year, from concept to flying model was passed the right way. In just one year the road from concept to flying model was covered. The vehicle is electric, and the idea is to fly on its own, without a pilot. The length of the route for transportation of passengers will amount to 80 kilometers. Almost all aviation companies compete in this production and by the newest information the flying car should start with transportation of passengers already from 2020.

News from Serbia

Serbia has made great progress in the area of digitalization⁷, which is a great chance to be more efficient, with the motto "Proudly made in Serbia". New chance could be a new model "Fiat Gardiniera"⁸ that will be produced in the factory in Kragujevac in Serbia. Along with the classic version of this car in Kragujevac will also begin the production of hybrid version of "Fiat 500".

New industrial politics, the 4th industrial revolution which meant development of the new technologies, digitalization, production automation, smart factories and buildings, the development of energy storage systems and advanced IT technologies the future development of Serbia is based on. These are our strategic aims and especially the development of the infrastructural network (railway infra-structure and development of the new railroad tracks Belgrade, Serbia – Budapest, Hungary) is of the great importance. This fast railroad tracks should be open by 2023, with 60 road crossings what will significantly increase the level of security and the maximal speed of train will be determined by the computer at every moment.

We know that fulfilling the promises is difficult, but in these conditions possible.

On the highway from the capital town Belgrade to Niš were placed 56 cameras⁹ for those who escape from paying the toll or exceed the prescribed speed. Public Enterprise "Roads of Serbia" wants to increase the scope of toll payment from 99.92 to 100% and so prevent arrogant drivers to break down fences and exit the

³ In 1898. the first Motor Show was organized in Paris and it is held every two years.

⁴ The distance between axis was increased for 30 millimeters and it now amounts 2.729 mm. Trunk volume is 460 liters.

⁵ Hybrid CR-V can already be ordered, and delivery are planned to begin in February 2019.

⁶ The Chinese company will have to prove to the US Federal Aviation Agency that drones are safe for utilization in the air space, before they start to use them in the larger capacity,

⁷ Programming was introduced as a compulsory subject in schools in Serbia.

⁸ An extended version of the "Fiat 500" with places for 5 passengers and a slightly larger luggage compartment..

⁹ The cameras will be placed at the 28 existing portals in both directions.

highway without authorization on so-called "wild exits", as well as the trucks that are overloaded more than it is allowed. The new method of control on the highway will have the subsystem for notification of drivers on the situation on the highway, toll stations, border crossings, stoppages, as well as meteorological conditions.

"Fiat"¹⁰ remains in Serbia and is preparing the new model of automobile "601". The future of this company will be insured in Serbia. In the sections of the factory in Kragujevac are already ready for serial production of the model "550-L" with hybrid power. The capacity of the factory in Kragujevac is more than 185.000 automobiles yearly. Till September 2018, only 2% of "Fiat's 500 L" quota was sold in Serbia and the rest in Europe and the United States.

With improved infrastructure and transport means Serbia would be able to compete with the traffic of European countries. It is a hybrid model with an electric motor. The new "B-SUV" would be produced in Kragujevac in parallel with the existing model "500 L". And in this 2019 year Belgrade, our capital will be a candidate for the green capital of Europe.

The World arrived in Belgrade in the period from 22 to 31st of March 2019 at the International Car Salon. It was one of the most attractive fairs in the last ten or more years. The market of new cars in Serbia is recovering, however, the number of premieres depends on the Salon in Geneva, and more novelties of hybrid and electric vehicles were confirmed. The main theme were electric vehicles and hybrids, and the scientific meeting on electromobility was organized too. There were 400 exhibitors from 30 countries, and 48 premieres at the exhibition.

Conclusion

Autonomous vehicles are considered to be the technology that will change the city, public and private transportation, as well as the concept of mobility in general. Besides the undisputed safer driving, autonomous vehicles would be lighter than the existing and would contribute to the reduction of average fuel consumption (if the petroleum products would still be used to drive these cars).

Automobile Association of the Journalists of Serbia proclaimed the " **Peugeot 508**" as the "Car of the year 2019". The best-selling car in the competition of hybrids during 2018 was the "Toyota", and the best-selling electric car "model Wolkswagen AP".

The expansion of autonomous vehicles will depend on the belief of the public that are selfdriving cars are considerably safer than those manually-controlled. Expectations are that in this type of traffic the number of accidents would decrease for at least 90%, what would save thousands of human lives, while those who due to some limitations are not able to drive a car would not be discriminated, but could use self-driving vehicles like everybody else.

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¹⁰ Today we have the museum for old timers, in which among other exhibits there is also the one with motor of "Fiat" popular "Fića" constructed by domestic intellect in Rakovica (it did not achieve to make a way through serial production, but on tests it showed excellent performances, better than "Fiat's" original). Many years ago our engineers M. Davidović, M.Popović and D. Koprivica completed bolide, little motor of 850 cubic meters that will reach speed of 160 km/h. Even to-day it is in excellent condition and they made it as a hobby. The whole Museum was made with love, old timers are today fixed up and all drivable. This Museum is today interesting and valuable place in the center of Belgrade.