



## Robotic telepresence

Technology is evolving at a rapid pace, especially in the field of transportation. Surprisingly, one of the most important breakthroughs in this field involves not moving at all: the field of robotic telepresence - projecting yourself at a distance through a robotic avatar is taking off. But before delving into this subject, let's go back and explore how people projected their presence in the past.

Many centuries ago, kings sent messengers, in human or pigeon form, to inform others of their decisions. Smoke and light signals were also used to send messages quickly over hundreds of kilometres. Usually those means were reserved for the elite. Then, a century or two ago, most countries established a postal service which was fairly quick and inexpensive. The postal service

allowed everyone, even the poor, to communicate with others across town or even around the world.

More recently, the telegraph and then the telephone allowed communication in real time over thousands of kilometres. Huge electronic networks connecting a significant portion of humanity were laid out in the last 150 years. Those networks carried voice, and later e-mails and web pages: the internet/web was born.

Humans are not bits and bytes and sending messages through an electronic medium doesn't carry the non verbal cues that are an integral part of human communication. Teleconferencing tried to bridge that gap but teleconferences were expensive. Skype and similar services managed to bring the costs down

significantly but people still felt that they had to be physically present in order to communicate effectively. In fact, a significant part of the profits of the travel and hospitality industries are based on that very human need to be physically present when doing business.

Some companies went so far as to build expensive teleconference rooms that allowed people to interact both verbally and non verbally. Then, a few years ago, another solution became feasible: robotic telepresence, the possibility of using robot avatars to represent people that are located elsewhere.

Robotic telepresence can simply be a Segway-type base supporting an iPad, the solution that Double Robotic put forward on the market. This solution is

affordable and the Segway-iPad robot avatar seems to be well accepted in the workplace. Of course, the robot can vary from something basic to something more elaborate. One solution is to have the robot map its environment thereby freeing the user from having to navigate it consciously. In fact, the user can simply say "Go to Martin's office". In a few years, the robots should even be able to manipulate objects on verbal command or through thought, your thoughts being read directly through a helmet-like device.

The possibility of tele-manipulating the environment raises an interesting issue. Most of us are familiar with long distance calls going through optic fibres laid down on the ocean floor: there is no significant time lag allowing for calls to occur smoothly. That was not the case a few decades ago when calls were transmitted via satellite. Back then, the lag was quite noticeable making for fairly difficult conversations. That lag was due to the fact that the signal had to travel at the speed of light (around 300,000 km/s) to a satellite in geostationary orbit and then back to Earth, a round trip of about one hundred thousand kilometres. Now, the signal travels through optic fibres and typical distances are usually less than 20,000 kilometres.

This means that even if you can have a smooth teleconference everywhere on Earth through a robot avatar you will not be able to tele-manipulate the robot's environment effectively unless you have some kind of imbedded robotic intelligence to assist you. The reason for this is that typical lags of around one tenth of a second are quite acceptable for a teleconference but when one plays a computer game, for example, time lags of around one hundredth of a second are required.

One can even go one step further. Experiments in Switzerland with robotic avatars have shown that it is possible to have "out of body experiences" if you are allowed to see only through the robot's eyes with the aid of virtual reality goggles: you then feel that the robot's body is really your body, so much so that when someone touches your robotic avatar you have the impression that you are being touched even if there are no pressure sensitive detectors on the robot's "skin"! At that stage, you have projected your own consciousness in the robotic avatar and, therefore, it could be said that "you" are located where your avatar is located! Is it not rather surprising that the speed of light is just fast enough to make this incredible experience possible on a planetary scale?

The possibility that one could project one's presence through a robotic avatar anywhere on Earth raises several issues, not least of which legal ones. In fact, a few months ago, Edward Snowden tested those very boundaries by using a simple robotic avatar to give a TED conference in the US. Imagine that this avatar, instead of the simple device that it was, would have been a sophisticated robot allowing Snowden to travel anywhere in the United States!

This new technology also opens up numerous possibilities. We could travel virtually to distant places. Already Marriott Hotels allow you to step in a booth in New-York City and feel as if you were physically located somewhere in Hawaii. They even take care of the smell of the ocean! Of course, virtual telepresence could have a huge impact on the travel industry: airlines, restaurants and hotels might see a drop in travel and revenues. The insurance industry also might be impacted: what is the risk of being injured if you only project yourself in distant places? Will our avatars require cyber liability risk coverage? Finally, we could imagine a mix of genres where one's avatar is an autonomous vehicle. You could "be" a car going down route 66...

## SPEAKING AT THE FOLLOWING EVENTS

C. Kargas and P. Ducharme speaking at **Electric Mobility Canada's EV2014VÉ**, October 27th to 30th, Vancouver | C. Kargas et P. Ducharme seront des conférenciers à **EV2014VÉ** (organisé par **Mobilité électrique Canada**), du 27 au 30 octobre 2014, à Vancouver

JP Arcoragi présentera une conférence intitulée *Les défis des technologies exponentielles*, **Réseau des femmes d'affaires du QC**, 11 novembre à Montréal

P. Ducharme speaking at **Canadian Urban Transit Association Conference**, November

15-19th, Niagara Falls | P. Ducharme sera conférencier à la conférence de l'**ACTU**, à Niagara Fall, du 15 au 19 novembre

C. Kargas sera conférencière à l'**événement organisé conjointement par les regroupements sectoriels de recherche industrielle, Prompt et Consortium Inno-VÉ**, 18 novembre à Montréal

C. Kargas speaking at the **Smart and Healthy Municipal Public Transport International Conference**, April 21-22nd, Pilsen, Czech Republic

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# In the news | Les nouvelles

## ► **Canadians will waste 330 Billion\$ on traffic by 2030**

Yes, you read it correctly. A [recent report](#) undertaken in the US concludes that Americans will waste \$2.8 Trillion on traffic if gridlock continues. If time is money, then we're wasting an enormous amount of it sitting in traffic. We are also wasting fuel needlessly. Our governments are announcing cost cutting measures instead of expenditures to expand highway and road networks. Isn't it time we started to look at more sustainable transportation solutions?

MARCON's **SEAMless mobility™** model of **Shared**, **Electric**, **Autonomous**, **Multimodal** integrated mobility will be key to a sustainable transportation system.



## ► **Will today's auto manufacturers be the mobility service providers of tomorrow?**

[Catherine Kargas' article](#) discusses the SEAMless Mobility model and the facts, reasons and trends leading up to this necessary change in mobility of people and goods.

In this article, she also discusses the link between electric vehicles and driverless technology and explains why the latter is a facilitator for the former.

## ► **Meet Bobby: Audi's driverless race car**

Racing at 190 MPH and "beating" the human competitor, Bobby is proving that driverless technology can be used in yet another area reserved until now only for human drivers ([Video](#)).



## ► **Will tomorrow's auto industry look like today's PC industry?**

The value in a computer today (and the accompanying revenues & profits) resides in the software. Tomorrow's mobility industry will be increasingly shared and driverless. Shared vehicles means no attachment to the vehicle (like using a taxi today). Mobility on demand will be based on technology and the ability of the vehicle to get the user from point A to point B will be software driven. The shell will be of relatively little value. Will the Bosch, Continentals and Googles of this world grow in importance as the relative value of their contributions increases? Will Ford, GM provide the "shell" and become fleet service mobility providers? The [acquisitions, mergers and deals](#) being announced by some of the key players in the automotive space would indicate that in ten years, the transportation industry and the stakeholders will likely be very different from those who play in that sandbox today.

No longer will a major player in the auto industry need to be geographically located near Detroit as software can be developed and delivered anywhere.

And all these changes will have an impact on what shares you want to own and for how long. [Wall Street is already picking winners and losers.](#)

Interested in daily updates on future mobility? Check out the following:

Intéressé par des mises à jours quotidiennes sur la mobilité du futur ? Visitez le site suivant :

<http://www.scoop.it/t/evolution-of-transportation>

# In the news | Les nouvelles

## ► The drones are coming!

The commercial use of drones or unmanned aerial vehicles is going to literally take off. The US FAA has allocated over \$60 Billion to modernize the country's air traffic control systems and expand airspace to accommodate the commercial use of these aircraft. Congress has mandated the FAA to come up with regulations in 2015. From Amazon and Google to Dominos Pizza, the interest in this technology is huge (decrease delivery speed and decrease costs: how do you compete with that?). In fact, it is estimated that drones will produce approximately \$90 Billion in economic activity between 2015 and 2025, creating about 100,000 jobs. To expedite the process of commercial introduction of these vehicles and shape the commercial regulatory environment, Amazon, Google and others formed a [UAV coalition](#) to lobby Washington.

The [insurance industry](#) is likely to be a user of such technology - both for claims adjusting and underwriting of certain risks. In fact, [USAA](#), one of the largest insurance companies in the US, petitioned the FAA on October 2nd for permission to use drone aircraft as a way to speed up claim processing. In addition, insurance coverage of drones represents another revenue source for insurers.

## ► Auto manufacturer nightmare: shared, driverless vehicles

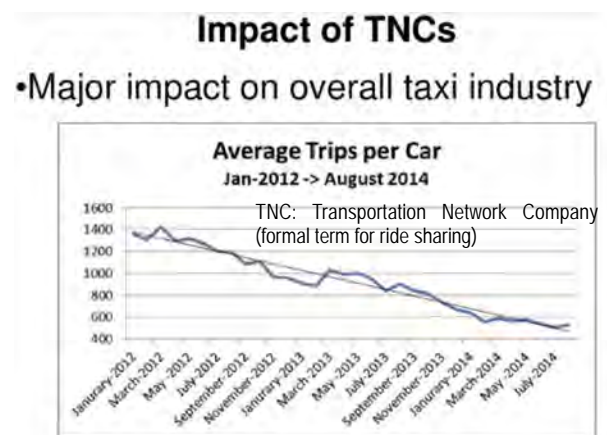
University of Texas researchers published a [report](#) concluding that if we moved to a system of shared driverless vehicles, we would eliminate 9 out of 10 cars. While this is a hypothetical cab-like service based in Austin, Texas, it is not difficult to believe that such of a fleet of on-demand mobility services, ideally integrated within a multimodal system, could eliminate most cars on the road. Don't forget, the average utilization rate of personally owned vehicles stands at about 4%.

If we eliminate our home expenses (don't forget, your house is an investment that increases in value over time), the car is often our greatest expense: very high for such a low utilization rate.

## ► Sharing boom

On the ride sharing front, what a year it has been for Uber! It is now available in 200 cities around the world, expanding into new services, including [UberPool](#), and getting involved in pilot projects to test penetration in other areas including courier.

Taxi companies are up in arms because of the [impact](#) of sharing on taxi business. In [San Francisco](#), the taxi industry is claiming a 65% decline in revenues.



On the car sharing front, Canadian membership is growing at a frantic pace. Car2Go's Calgary membership exceeded 65,000 - 2nd only to Vancouver!

And on the fleet side, the US government is entering into a [1-year pilot project in 4 cities](#) to assess impact of replacing the entire fleet by car sharing.

## ► Off-road autonomous applications

[Farming](#) and [mining](#) are but two activities that are going "driverless". Both present advantages of lower costs and increased productivity.

With declining demand and prices for numerous commodities, including iron ore, mining companies are turning to autonomous vehicle technologies to decrease costs. It is estimated that Rio Tinto is saving approximately one million \$ annually with every autonomous vehicle in service.

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