

Operating Motorways in a Connected World: Opportunities and Threats

General Session: The Impact of IoT and CAV on Motorway Operations

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Connected & Automated Vehicles

Mobility's new Era...

The new "Era" which scares citizens
and excites the Road Transportation Industry



Is something that has happened in the past
(Long Time Ago!)

Mobility in the first decades of the 20th century:

A look at the start of the 20th Century...



Mobility in the first decades of the 20th century:

The transition to the "Horseless Age"

The transition period was so short
(just one decade) because:
(according to automobile advocates)

- Cars were faster than horses
- Did not tire
- Carried more passengers and loads
- Consumed less "fuel" (feeding cost)
- Were cleaner (each horse produced 11.8 tones of waste /year)
- Eliminated traffic congestion
(an automobile only took up half the space of a horse and car)
- Were safer (avoiding frightful accidents due to unpredicted animal behavior)



Mobility in the first decades of the 21st century:

The transition to the Connected & Automated Vehicles

Nowadays Connected & Automated Vehicles appear as the solution for congestion, safety and environmental issues, due to:

- **Reduction of Travel Time (Faster)**
- **Truck platooning / Reduced costs of transporting goods (More loads)**
- **Reduction of Crashes / Fatalities / Injuries (Safer)**
- **Fewer emissions (Cleaner)**
- **Reduction of Traffic Congestion because of Better traffic control and Incident Management (Congestion)**
- **Ease in Toll Collection (ok....that's a new issue!!!!)**

Mobility in the first decades of the 21st century: The transition to the "Driverless Age"

**Is the introduction of Connected & Automated Vehicles
a similar Historical Situation
as the Horseless Age?**

YES!

And we have already entered to the transition period for the
"Driverless Age"

Mobility in the first decades of the 21st century: The transition to the "Driverless Age"

**History tells us that we have the experience
to handle this transition to the
"Driverless Age"**

**But...some things remain
uncertain and undefined...**



Mobility in the first decades of the 21st century: The transition to the "Driverless Age": How long it will last?

When are we going to experience this new age?

A possible answer is given in the following table (*)

Dozens different answers are given by other stakeholders.... (What's yours?)

	Level 1 Adaptive Cruise Control (ACC)	Level 2 ACC+ Lane Keeping Assist (ACC+LKA)	Level 3 Conditional Automation	Level 4 High Automation	Level 5 Full Automation
Everywhere	~2020s	~2025s			~2075s
General Urban Streets, some cities	Now	~2025s	~2030s	~2030s	
Campus or Pedestrian zones	Now	~2020s	~2020s	~2020s	
Limited-Access Higways	Now	Now	~2020s	~2025s	
Fully Segregated Guideway	Now	Now	Now	Now	

Color Key: Now ~2020s ~2025s ~2030s ~2075s

(*)Dr. Steve Shladover, California PATH Program

Mobility in the first decades of the 21st century:

The transition to the "Driverless Age": Significant Concerns

- **Need for huge Investments in Motorway, Telecom and Automobile infrastructures**
- **Reluctance/resistance to release control of vehicle to a computer (Acceptance of CAV's)**
- **Vulnerability of systems and lack of protection against any possible cyber attack**
- **Uncertain results regarding the safety of the CAV's**



Mobility in the first decades of the 21st century:

Safety and Acceptance issues during the "Horseless" and the "Driverless" Age transition



Mobility in the first decades of the 20st century: The transition to the "Horseless Age": Motorway Infrastructures



The first "Coast to Coast" highway (Lincoln Highway) developed with funds from the private automobile sector, within a period of more than ten years.

As the financing needs grew, the "Lincoln Highway" Association redirected to a new goal: to educate the country for the need for good roads made of concrete.



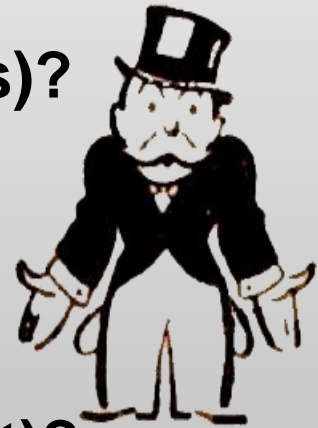
Americans' enthusiasm for good roads led to the involvement of the federal government in building roads & the creation of numerous U.S. routes in the 1920s.

Mobility in the first decades of the 21st century: The transition to the "Driverless Age": Motorway Infrastructures

In our "Driverless Age" the transition period, remains unclear.

Who and why should fund the demanded Motorway Infrastructure?

- **The State (to improve the safety, mobility and the environment)?**
- **The Motorway industry (to decrease the operating expenses)?**
- **The Automobile industry (to sell the new generation of vehicles)?**
- **The Telecom industry (to sell more xG services)?**
- **The Content providers (to sell "contents" to users)?**
- **The Users (to travel quickly, safely and protect the environment)?**



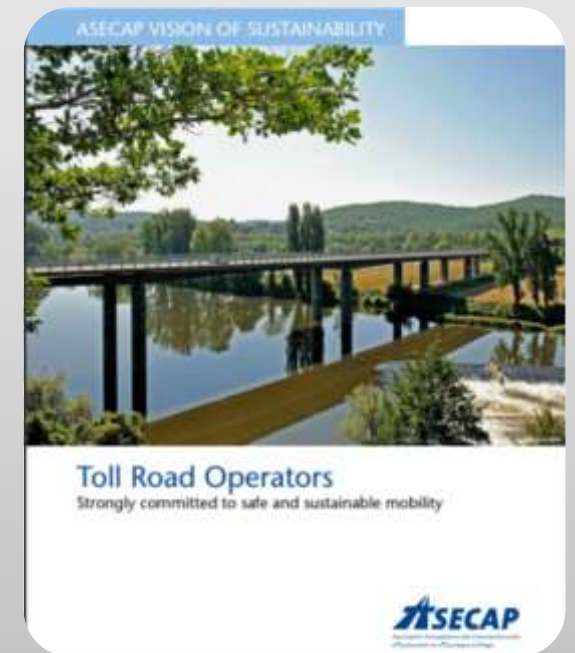
Mobility in the first decades of the 21st century:

The transition to the "Driverless Age": The role of the Motorway Operators

According to ASECAP's "Vision of Sustainability", the Toll Road Operators highlight their engagement and commitment to improve the transport sector by making it more efficient, socially equitable and more sustainable from the standpoints of:

- Safety
- Environment
- Mobility
- Finance

These are all the values
the new
"Driverless Age"
stands for!



Mobility in the first decades of the 21st century:

The transition to the "Driverless Age": The role of the Motorway Operators

Despite the rapid development of the automobile, telecom, ITS and content provider industries, motorway operators should be considered as the coach who combines the skills of his players and decides how to set up the team for the best possible result.

"Without players there is no team
without the coach the team can not play"

**That's a Great Opportunity
but not last forever...**



Didier Deschamps
French Football Coach, World Cup 2018

Mobility in the first decades of the 21st century:

The transition to the "Driverless Age": The role of the Motorway Operators

The Motorway Operators will have:

- To collaborate with other industries so that the products produced are convenient for the motorway operations
- To cooperate with the other stakeholders to ensure the funding for this transition
- To define and establish alternative sources of revenues to counterbalance the potential revenue loss from reduced traffic (in the case of shared CAV's)



Mobility in the first decades of the 21st century: The transition to the "Driverless Age": The role of the Motorway Operators

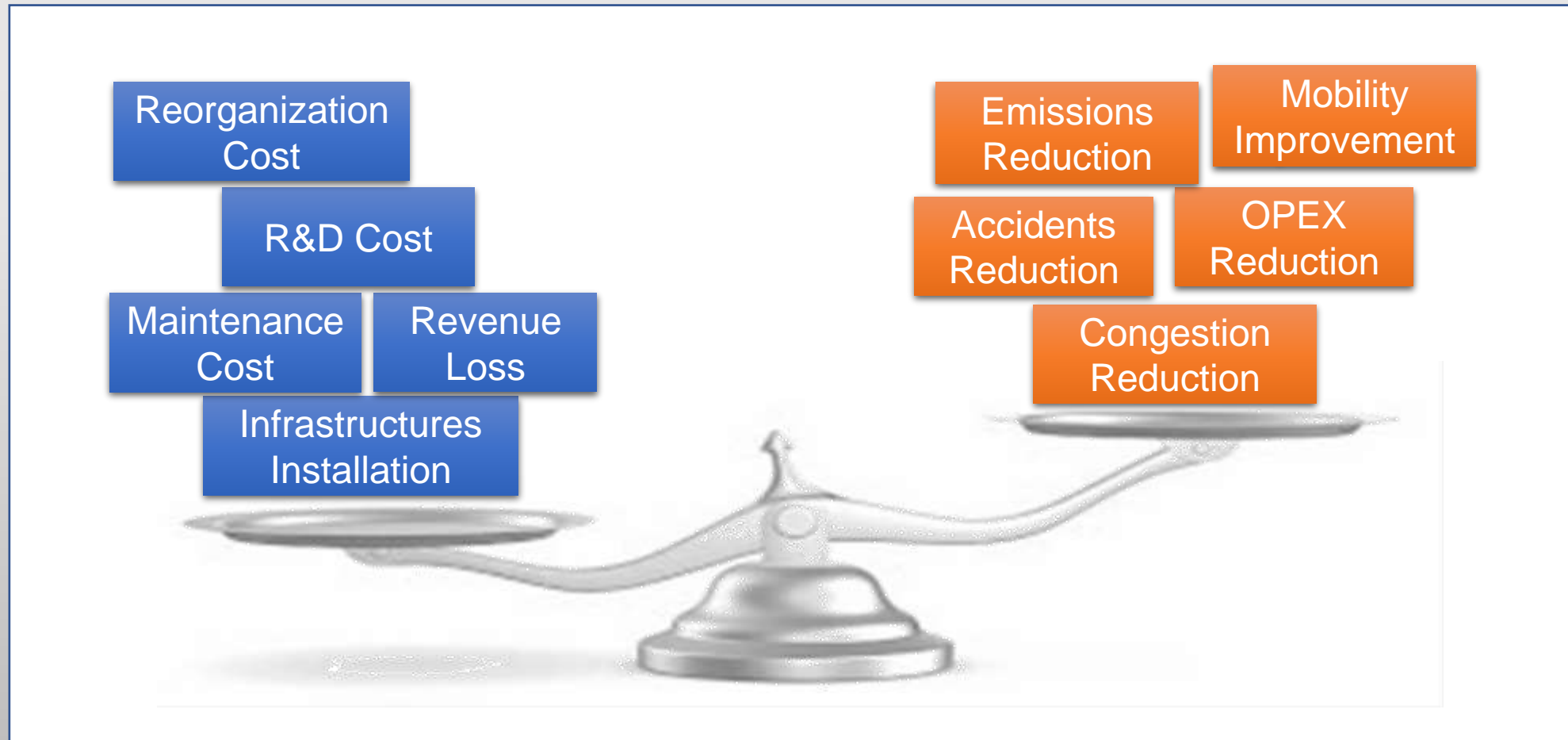
The Motorway Operators will also have to:

- Deal with the increased maintenance costs for the new on-road equipment
- Change the way of thinking and operational philosophy
- Deal with the simultaneous existence of conventional vehicles and CAV's
- Educate the other stakeholders (society, state, etc.)
- Collaborate for the development of the legal and regulative framework



Mobility in the first decades of the 21st century: The transition to the "Driverless Age": The role of the Motorway Operators

Is there any Reasonable Balance in this Equation? (as a Motorway Operator)



Mobility in the first decades of the 21st century: The transition to the "Driverless Age": The role of the Motorway Operators

Finally, the transition to the "Driverless Age"
for the Motorway Operators is the way...

... to Heaven?

or

...to Hell?



Mobility in the first decades of the 21st century: The transition to the "Driverless Age": The role of the Motorway Operators

**The majority of the operators – worldwide –
are still thinking how to "Setup the Team“,
while many players want to join and others are thinking to leave.**



**Now is the time for the Toll Road Industry
to define a clear approach for this transition period.**

THANK YOU!



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