

DRIVERLESS CARS



Big Ideas Forum
Anthem 10.24.2016

What are the issues?

- ◆ Safety
- ◆ Efficiency
- ◆ Convenience

The starting point

USA statistics:

255 million registered vehicles

116 million households

119 million people have registered licenses

CARS: 75% (1)

TRUCKS: 1%

MOTORCYCLES: 3.5%

(1) "Cars:" 183,171,882 were classified as "Light duty vehicle, short wheel base + short wheel base and 6 tires"

The starting point

5.2 m accidents per year

32,000 fatalities/yr in USA (1.2 m globally)

#1 cause of death among young people

#1 cause of permanent disability

25% of all drivers are involved in an accident over a 5 yr period

... and it is

overwhelmingly due to HUMAN error

Solution:



What are the issues

◆ Safety

	Driven cars	Driverless cars
Miles driven	2.5 T*	1.2 M
Accidents per year	5.2 million**	1-2
Accidents per million miles	2	1-2

*) 7 million mi/day

***) 14,200/day

What are the issues

- ◆ Efficiency

50-55 min/day spent in traffic - per person in USA

4 Bn hours/yr in traffic

Parking*

*23 hr/day



55 min on the roads



8-10 hours in a parking lot



13-15 hours in garage at home



What are the issues

- ◆ Convenience

We go

when we want to go,

where ever we want to go to

with whom we want to go

and we go as fast as we want to

LEVELS OF AUTOMATION

0

NO AUTOMATION

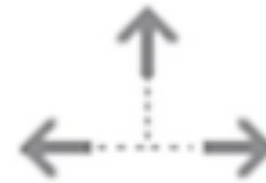
Forward collision warning, lane departure warning, blind spot monitoring



1

FUNCTION SPECIFIC AUTOMATION

Temporarily cedes control of either forward (speed) or lateral (side-to-side) movements, but not at the same time
Dynamic brake support, electronic stability control, adaptive cruise control



2

COMBINED FUNCTION AUTOMATION

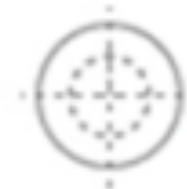
At least two primary control functions designed to work in unison
Adaptive cruise control in combination with lane centering



3

LIMITED SELF-DRIVING AUTOMATION

Enables the driver to cede full control of all safety-critical functions
Designed so that the driver is not expected to constantly monitor the roadway while driving



4

FULL SELF-DRIVING AUTOMATION

Designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip





[http://www.ted.com/talks/
chris_urmson_how_a_driverless_car_sees_the_road](http://www.ted.com/talks/chris_urmson_how_a_driverless_car_sees_the_road)

Driverless Cars

- ◆ Impact on:
 - Hwy capacity (2-3 increase)
 - City planning/re-planning (space, etc.)
 - Ownership/rental
 - Liability/Insurance
 - Connectivity/Security

Questions . . .

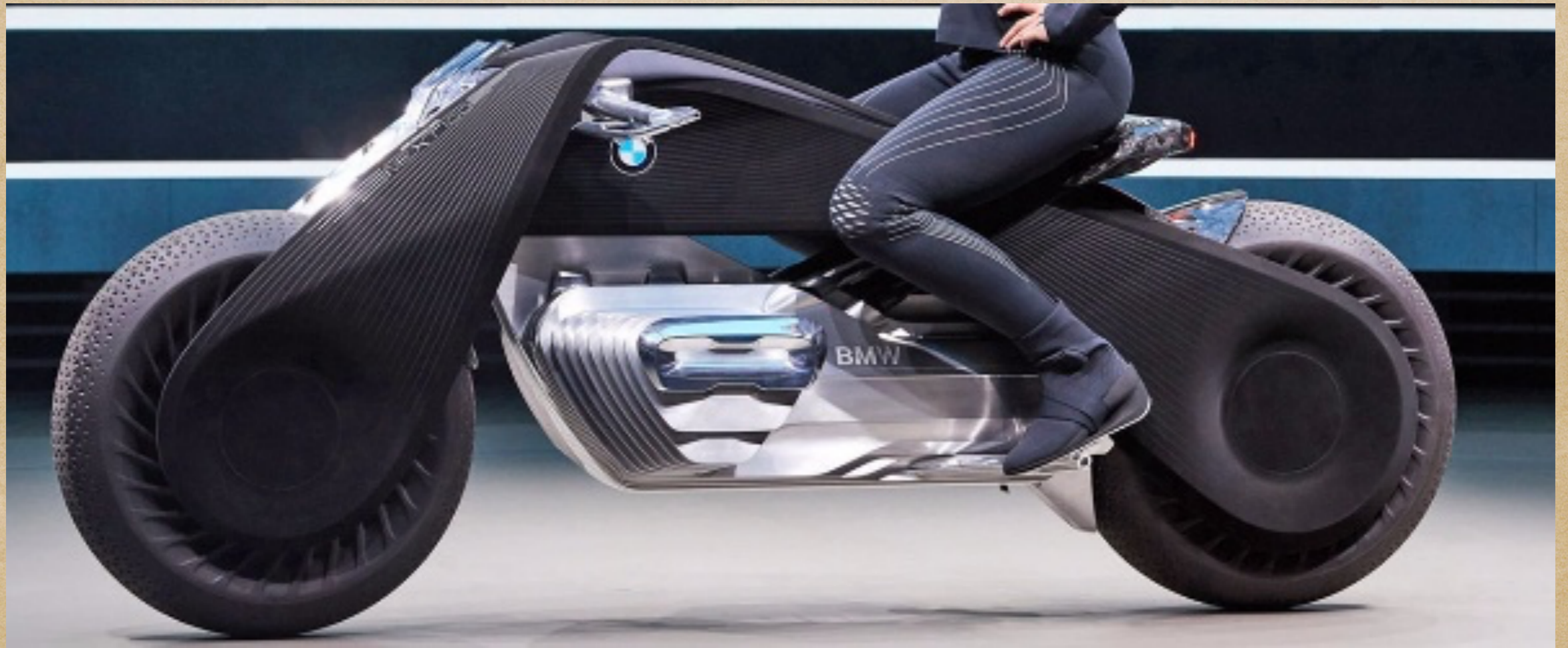
- ◆ With the market getting ready . . .

Oct 19, 2016: "We are excited to announce that, as of today, all [Tesla](#) vehicles produced in our factory — including Model 3* — will have the hardware needed for full self-driving capability."

. . . the questions become:

- ◆ Would you drive in one "today"? Why/why not?
- ◆ If not now, when (on what criteria)?
- ◆ Would you buy one?

Tesla Model 3 costs \$35K



A slight change in the connectivity of a smart car, probably on the road alone, means life and death situation for other road users. A centralized system that manages smart cars on the road is likely to fail one time or another.

That puts lives at risk.

With thousands or millions of nodes, however, the decentralized network of a Blockchain poses little risk of downtime.