



# 5G IN THE DRIVING SEAT

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# AGENDA



1. MEGATREND: TELECOMMUNICATION AND AUTOMOTIVE
2. ADDRESSABLE MARKET: DRIVE BY WIRE CARS
3. TECHNOLOGY IN THE CARS OF FUTURE
- 4. AUTOMOTIVE AND 5G INTERSECTION**
5. MAKING COMMUTES SAFER
6. HARMAN'S ROLE

# TELECOMMUNICATION EMBRACES MEGATRENDS

Computers

Desk/  
Laptops

Internet

Smart  
Phone

Drive  
Autonomy



**1960s**  
**T-GRAM**  
REMOTE  
COMMN.

**1980s**  
**FIXED**  
DISTANCE CALLING



**1990**  
**GSM**  
INTERNET  
ON MOVE



**2000**  
**3G**  
INTERNET  
ON MOVE



**2010**  
**4G**  
CLOUD ON  
MOVE



**2020**  
**5G**  
MAINSTREAM



# DRIVE BY ELECTRIC WIRE CARS

Future cars will be differentiated by the intelligence embedded inside.

**2**  
**Million**  
TODAY

**65**  
**Million**  
2025

# TECHNOLOGY IN THE CAR OF THE FUTURE



6



**Experience**

2



**Autonomous Drive**

3



**Multifunctional Cockpit**

4



**Control & Management**

5



**Energy & Propulsion**

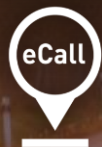
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**Backbone**

**Connectivity**

# EXPONENTIAL GROWTH OF CONNECTIVITY NEEDS IN THE CAR



Safety and  
Location Data  
**0.50Mbps**  
2015



Vehicle  
Diagnostics  
**10 Mbps**  
2017



Camera  
LIDAR  
**1 Gbps**  
2020



Autonomous  
Compute  
**5 Gbps**  
2025

## TELEMATICS

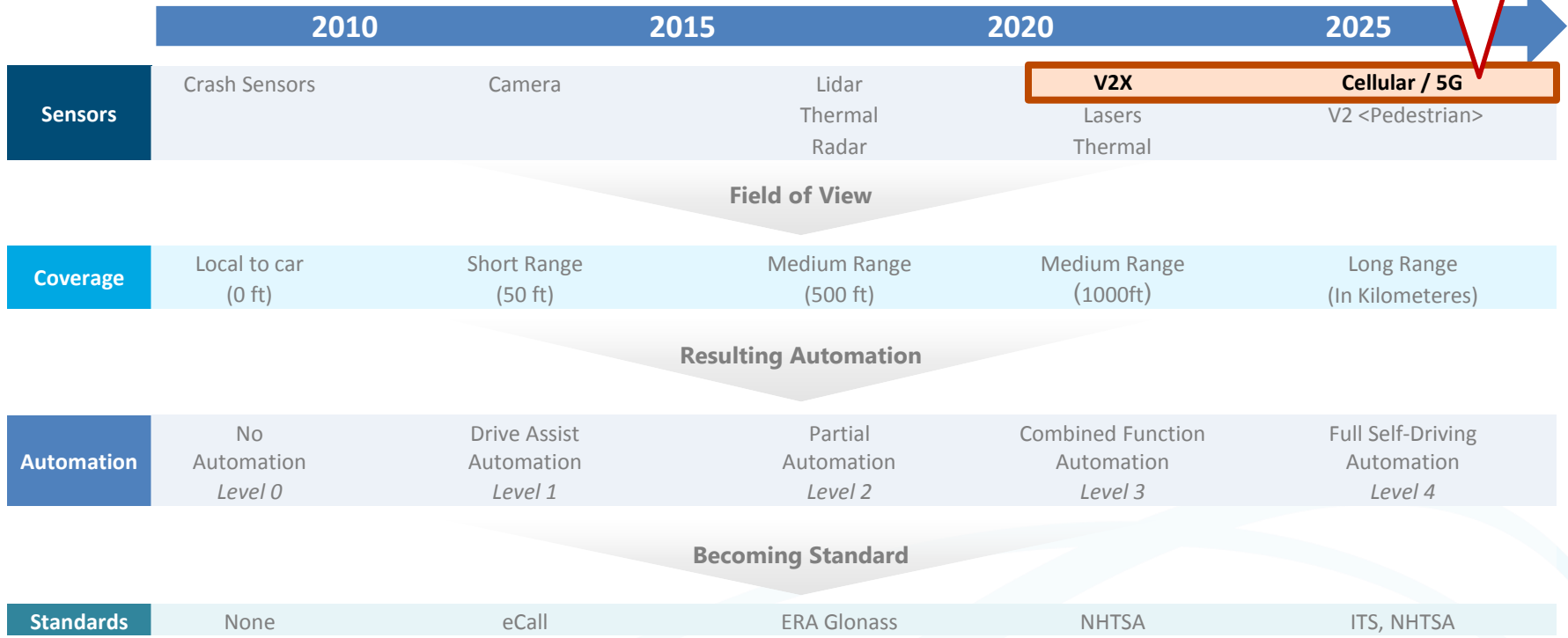
# AUTOMOTIVE AND 5G INTERSECTION

<b>Use-cases</b> (Underserved - Current - Future)	<b>Control</b>	<b>VR Gadgets</b>	<b>Remote Computing</b>
		<b>Road Infra Devices</b>	<b>Fog Computing</b>
	<b>Pedestrian Safety</b>	<b>Connected Accessories</b>	<b>Video Remoting</b>
	<b>Safety Messaging</b>	<b>Toll Applications</b>	<b>Infotainment</b>
	<b>1ms</b> Latency	<b>1M Devices/Cell</b> nB IoT	<b>10Gbps</b> Bandwidth

**5G Technology Elements**

# MAKING COMMUTES SAFER

5G will play a key part





# REALITY IN THE MAKING



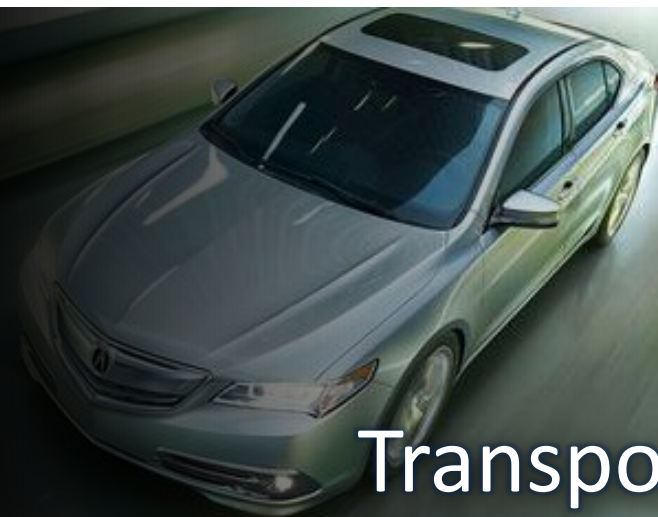
## Strong Industry Support

- Technology Developers
- Academic Organizations
- Mobile Operators
- Internet Giants

## Market Investment

## Clear Cooperation

- Technology Alliances
- Government Support



Transportation  
revolution  
is here to stay

# HARMAN'S ROLE

**First 5G (based on NSA) plug-in test schedule  
by 2018**

**Samsung support in \$300m fund to invest  
in autonomous driving technologies**

**Key participation in 5GAA in the  
board, treasury, marketing**

**C-V2X Framework and Application  
Development**

**Products in the roadmap to address unconnected  
and under connected cars**



**THANK YOU**

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