



# Bringing 5G into Reality

- Eivind Mikkelsen
- 14<sup>th</sup> November 2017

# The 3rd Paradigm Shift of Mobile ?

1980s



Mobile Voice Era (1G)



Connectivity as a Service

2000s



Mobile Broadband Era (3G)

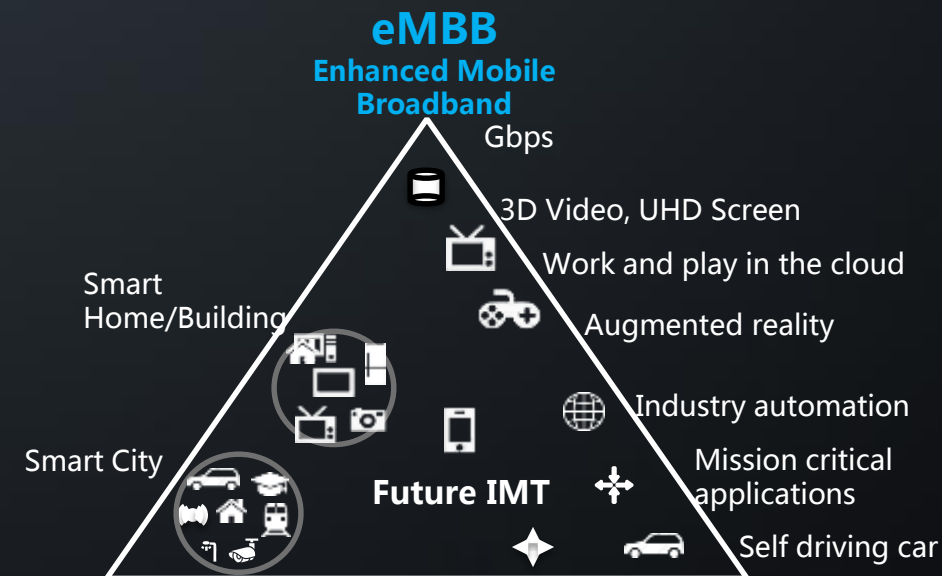


Super Connected World (5G)

eMBB + uRLLC + mMTC

Network Slice as a Service

2020s



mMTC

Massive Machine Type Communications

uRLLC

Ultra-reliable and Low-latency Communications

# Jointly Pave the Way for 5G



**Construct  
Healthy Ecosystem**



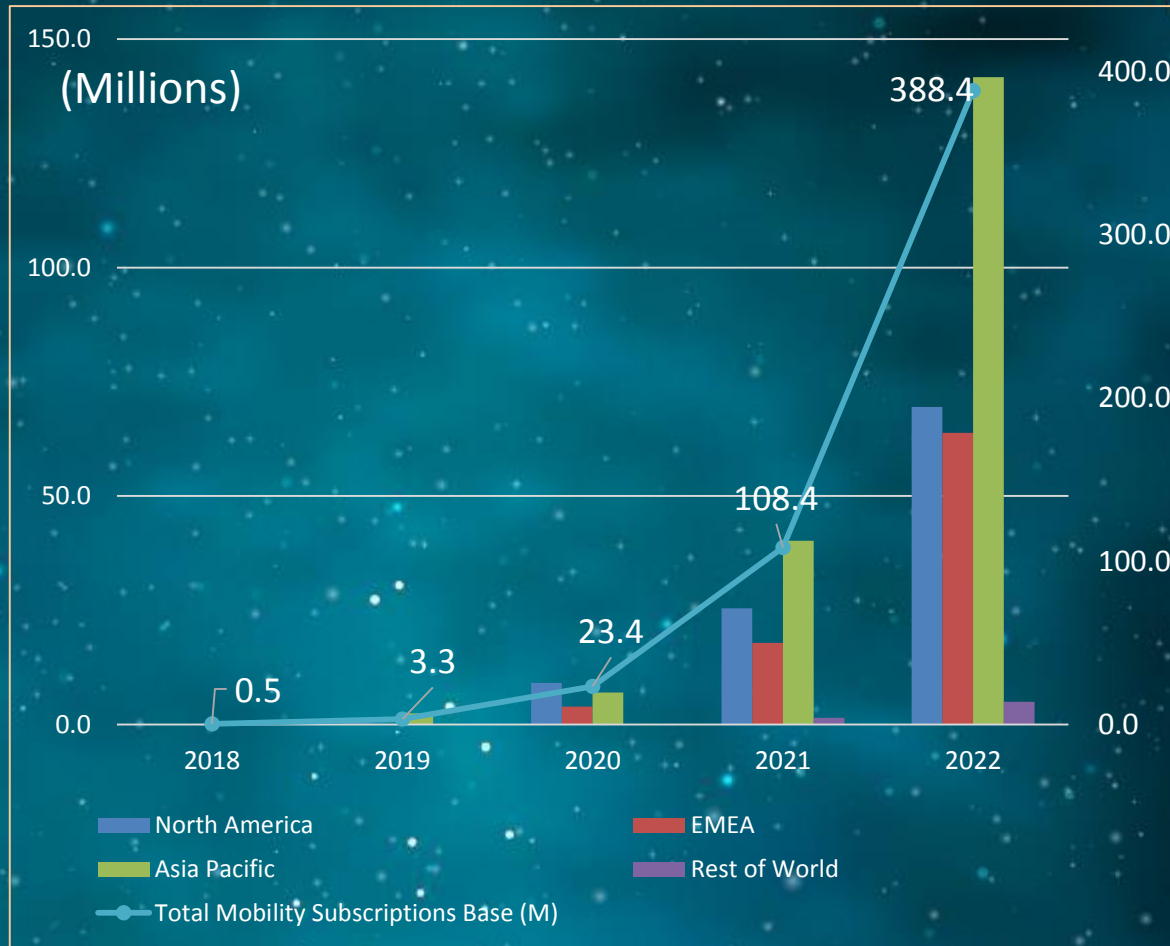
**Boost  
Technology Innovation**



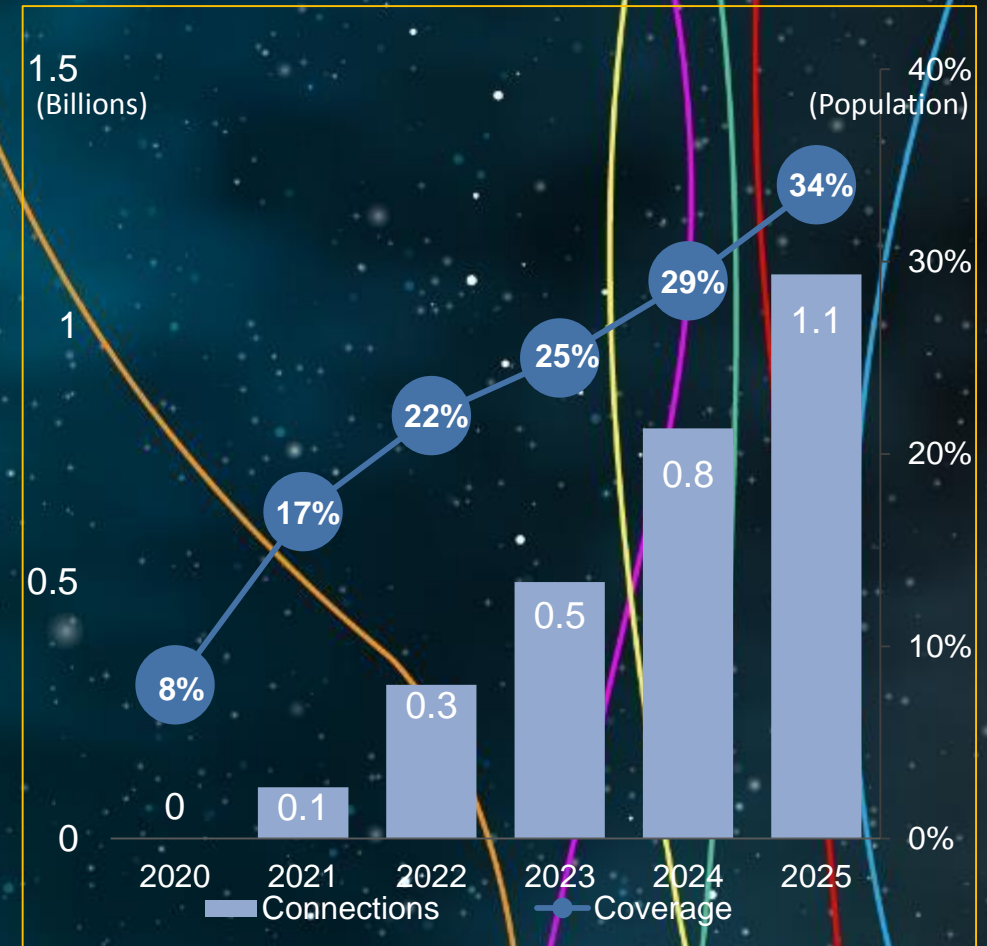
**Enhance  
Industry Collaboration**

# 5G Commercial Connections & Coverage Area Prediction

OVUM



GSMA



- ◆ The prediction of OVUM and GSMA are similar, in 2022, 5G connections will reach **300M~400M**, the population coverage will reach **22%**

# Keep Exploring & Incubating New Services with Partners

**X**Labs  
Wireless

**186+** Industry Partners

## HD Video



## AR&VR



## Remote Driving



## Drones

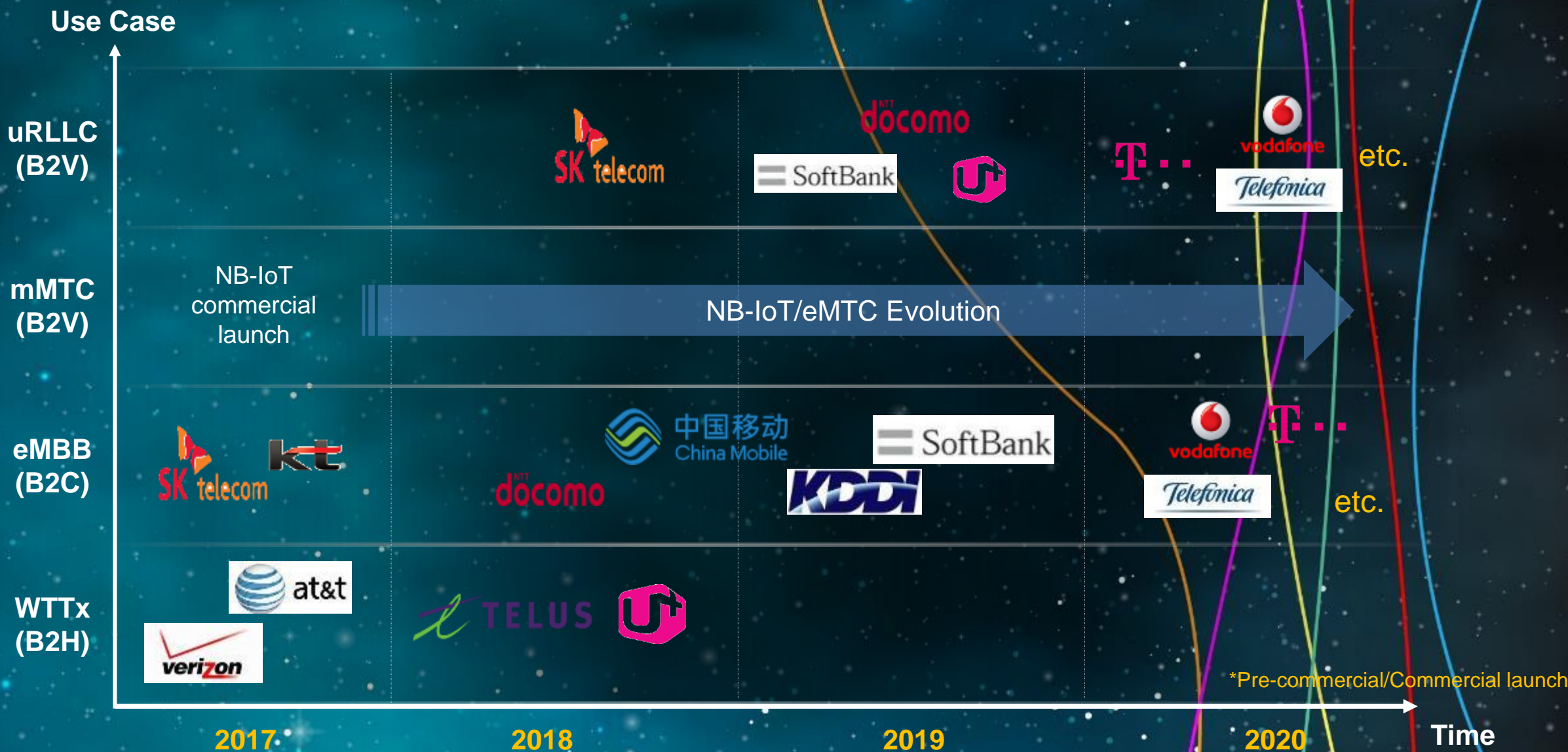


## Smart Factory



**5G helps Operators explore vertical industries**

# 5G use case priorities: first-wave applications (WTTx & eMBB)



# EU Release 5G Action Plan Supported by Government

## Europe Broadband 2020 target:

- At least one major city covered by 5G
- 100% home broadband speed exceed 30Mbps

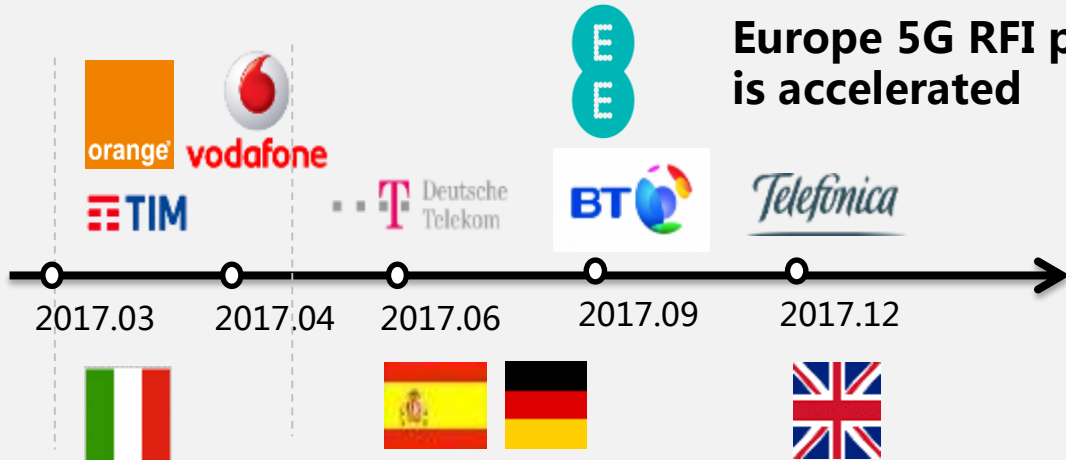
## 5G Action Plan

2018  
Trial

## Europe Broadband 2025 target :

- All the urban and major road and railway covered by 5G
- All public institutions provide up to 1Gbps connection
- All home broadband speed exceed 100Mbps, w/ 1Gbps availability

## Europe 5G RFI plan is accelerated



## 5G Action Plan of each Government



### Start 5G Trial

- Announce 5G trial from end of 2017 in 5 cities of three regions, based on 100MHz C-Band spectrum
- TI (Teamed with Huawei) has been selected to conduct 5G trial by the Government in 2017.8



### Release national 5G plans

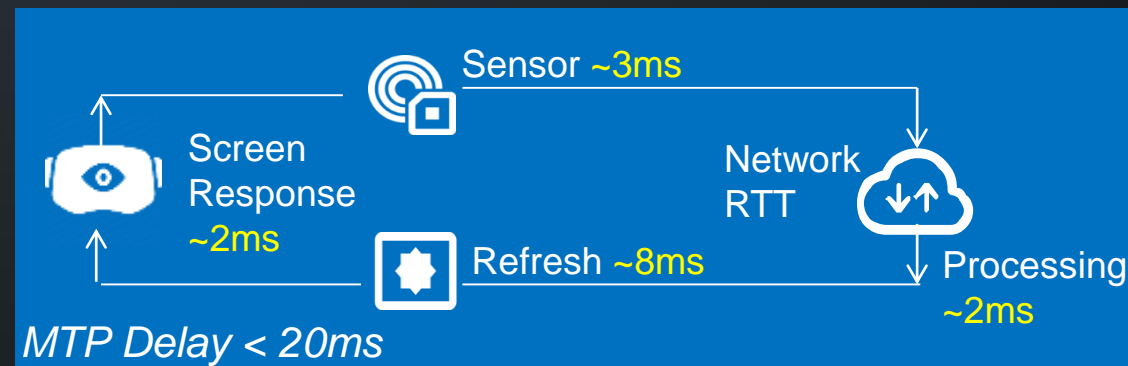
- From 2017, to invest € 50~60 million for "National 5G plans".



### Release 5G Strategic investment plan

- Release 5G strategy on Mar. 8<sup>th</sup> in 2017, plan to start E2E 5G Trial in early 2018,
- £ 16 million will be invested in Phase I

# Use Case #1: Cloud Based AR/VR



Acceptable  
Experience

**125Mbps**

RTT Latency

Ultra Retina  
Experience

**3.2Gbps**

**< 5ms**

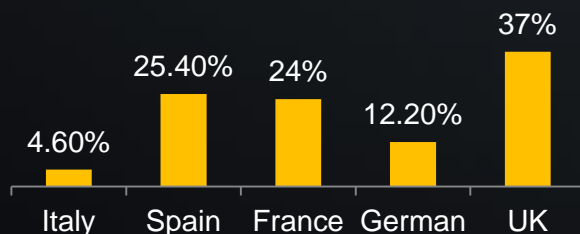
# Use Case #2: Fixed Wireless Access for Home Broadband

## Target & Existing Gap



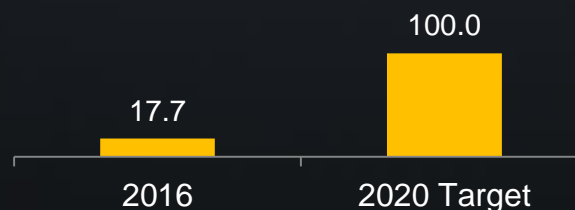
**Target:** By 2020 **50%**  
Households > **100Mbps**

Households > 30Mbps(%)



**Target:** By 2020 **100M**  
Households > **100Mbps**

Households > 100Mbps(million)



## 5G Home Access

**X Gbps** Throughput

**Fast** TTM & ROI

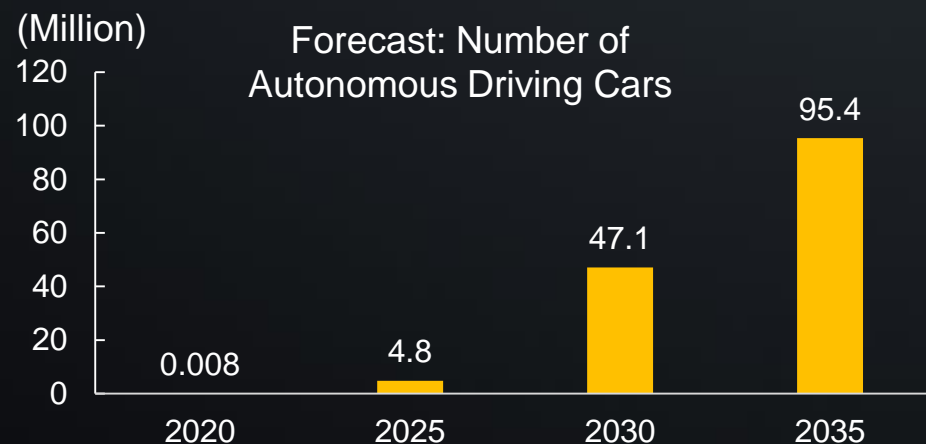
**Major** use case for 5G early deployment

Source: Broadband Europe Strategy 2015/ FCC 2016

# Use Case #3: Connected Car is a Strategic Focus

## 2020 Opens Autonomous Driving Era

Policy is Making for Connected Cars



Source: NAVIGANT RESEARCH, Autonomous Vehicles

## Connected Car Benefits Whole World



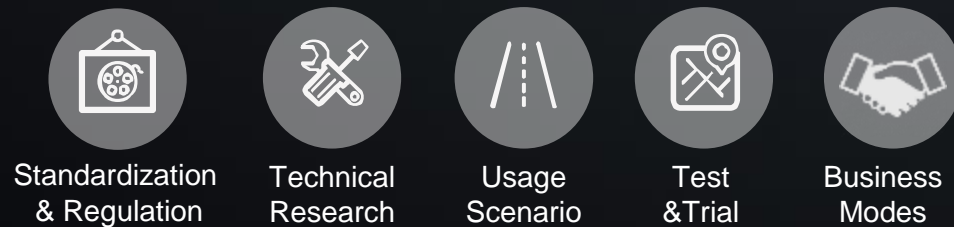
Save  
**1.2M**  
people  
annually

Save  
**3.1bn**  
gallon oil  
annually

Source:  
Global Status Report on Road Safety,  
World Health Organization, 2015

Source:  
Texas Transportation Institute Urban  
Mobility Report, 2015

# First Concrete Step of Cross Industry Collaboration



## 5G Cooperative Emergency Brake



## Remote driving via 5G network



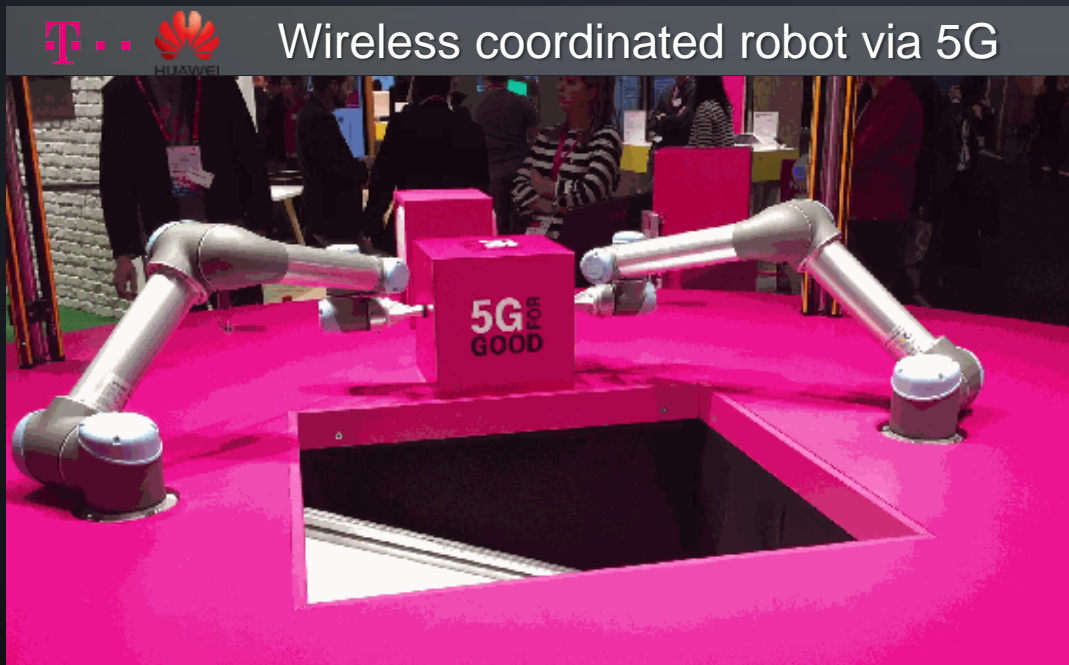
## Network E2E Latency

**< 10ms**

## Reliability

**99.999%**

# Use Case #4: 5G will Make Factories Smarter and More Efficient



E2E Network  
Latency

5~100ms

5G Enabled Output in Manufacturing by 2035:

**\$3.4 Trillion**

Source: IHS The 5G Economy Report, 2017

# Cross Industry Collaboration on Smart Manufacturing

## 5G-ACIA

## 5

Working Groups

## 28+

Members



5G Alliance for Connected Industry & Automation  
*Founded in Oct, 2017, Frankfurt*



Use cases  
& requirements



Spectrum  
& Operator models



Architecture  
& Technology

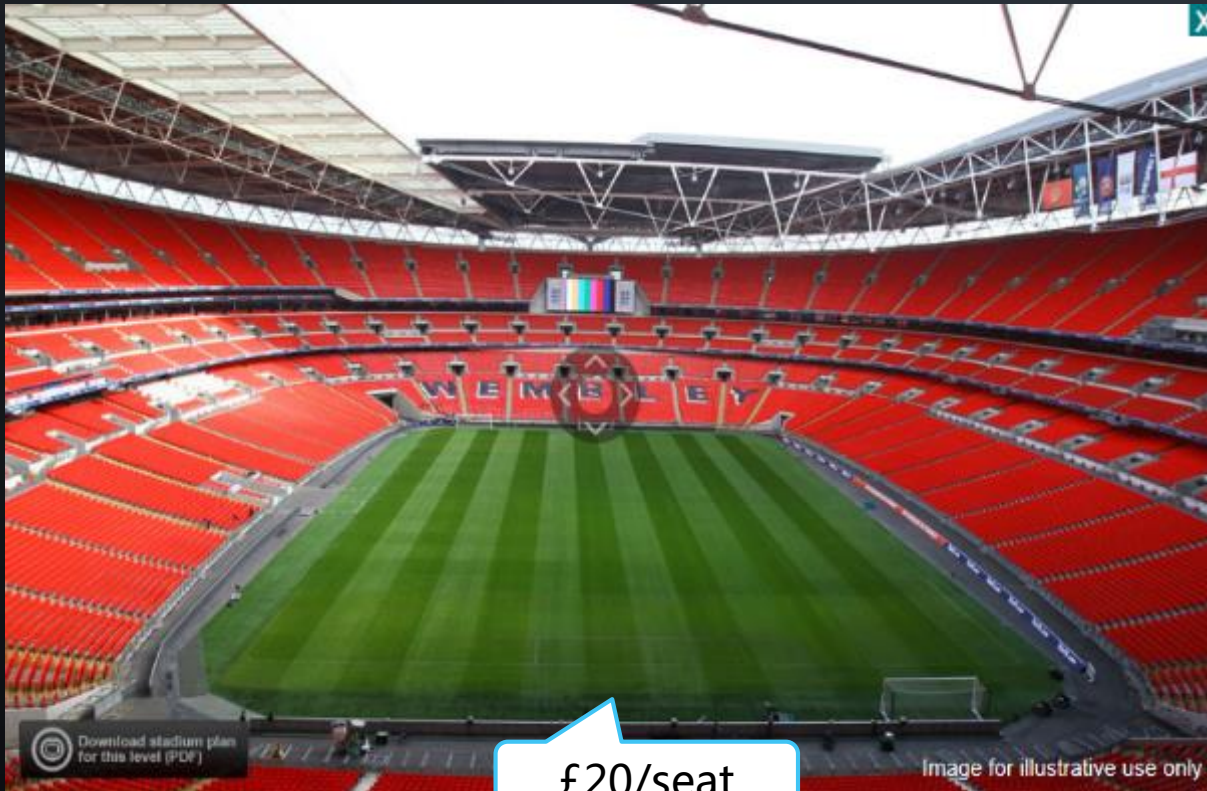


Dissemination

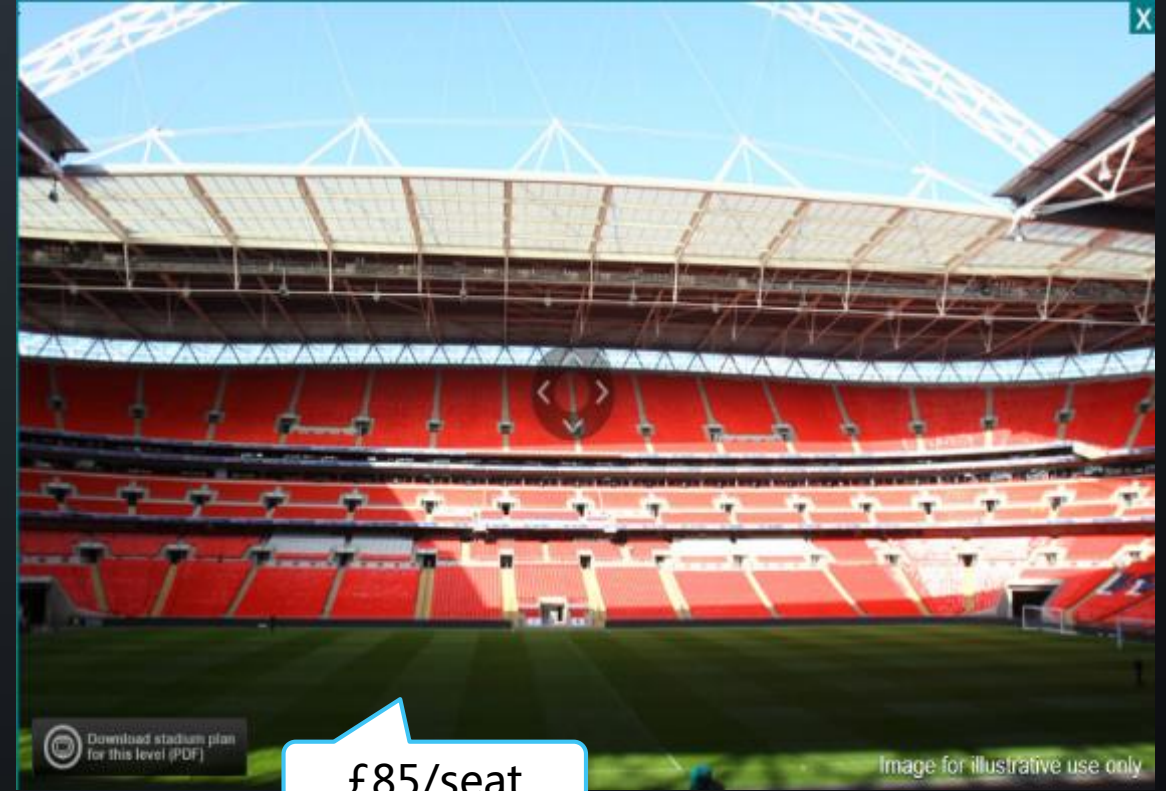


Validation  
& Test





£20/seat



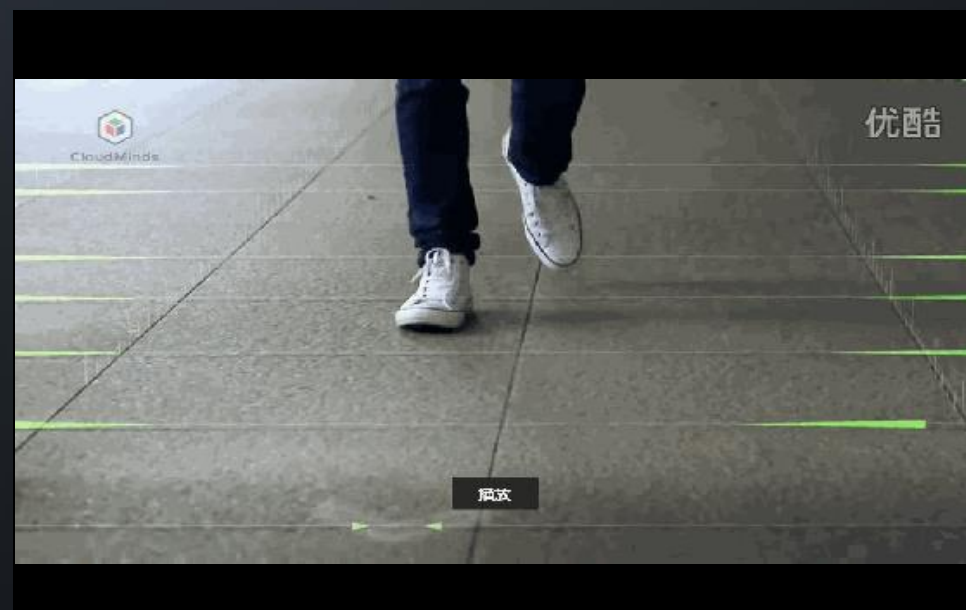
£85/seat

# Huawei will Continue to Explore 5G Use Cases in Emerging Verticals

## Remote Drones



## Service Robot: 'Seeing Eye' Helmet





# Thank You.

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# Huawei Cooperate with Industry to Bring 5G into Reality

## Leading in Technology



**3000+**  
Experts in 5G

## Leading in Cooperation



**4Bil RMB**  
for R&D in 2017

## Leading in Ecology Build



**11**  
Global Huawei 5G  
Center