

# Leading 5G Trials to Commercial Reality

- SK Telecom's 5G Field Trials and Achievements



**Sungho Jo**

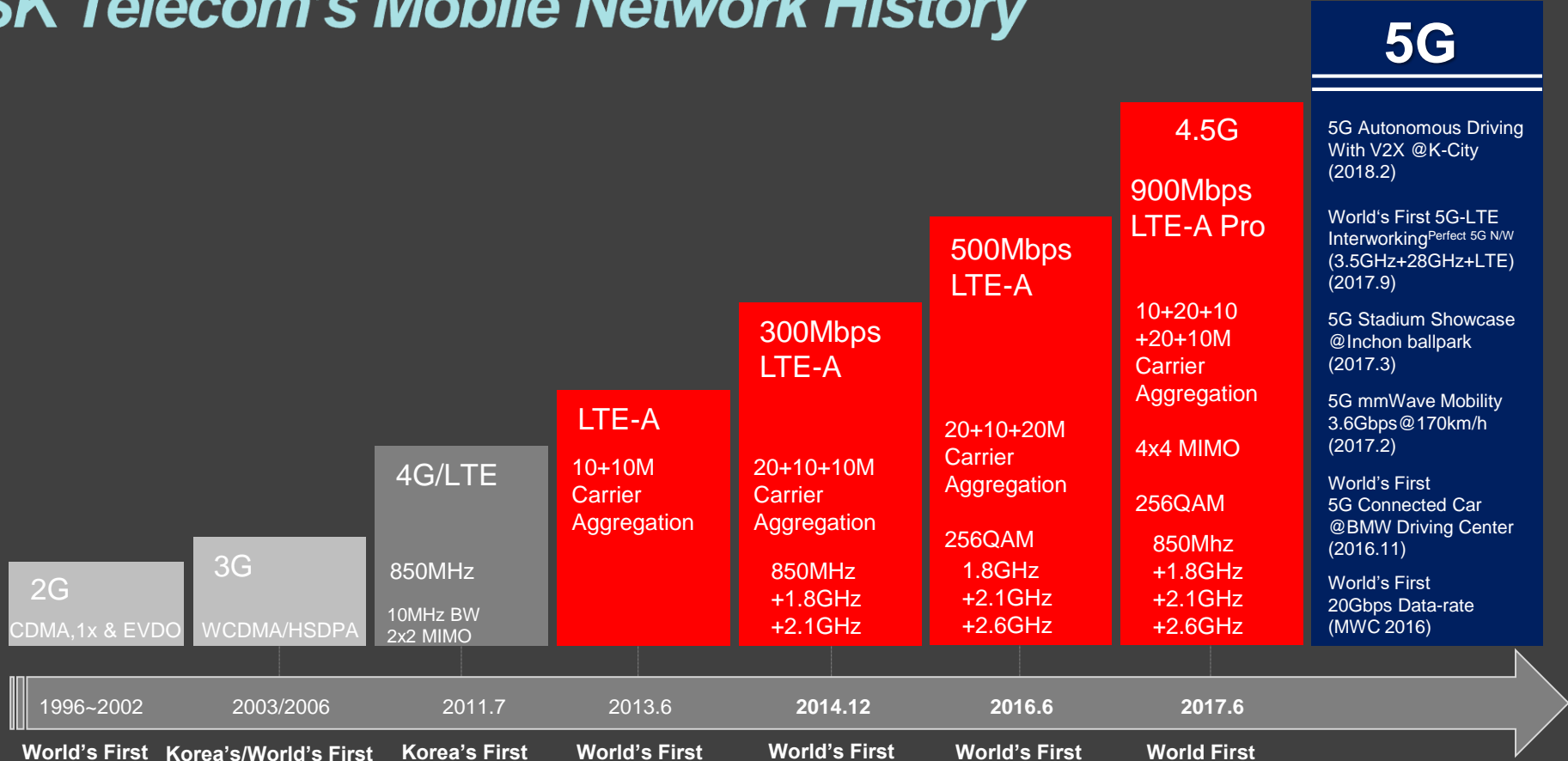
**Senior Director**

**ICT R&D Center, SK Telecom**

An aerial photograph of a city grid, viewed from an elevated angle. The image is heavily stylized with a dark blue, almost black, color palette. The grid lines of the streets are clearly visible, creating a complex pattern of rectangles and squares. The overall effect is that of a high-tech or digital cityscape. The text 'SK Telecom and 5G' is centered in the middle of the image in a bright white, sans-serif font.

# SK Telecom and 5G

# SK Telecom's Mobile Network History



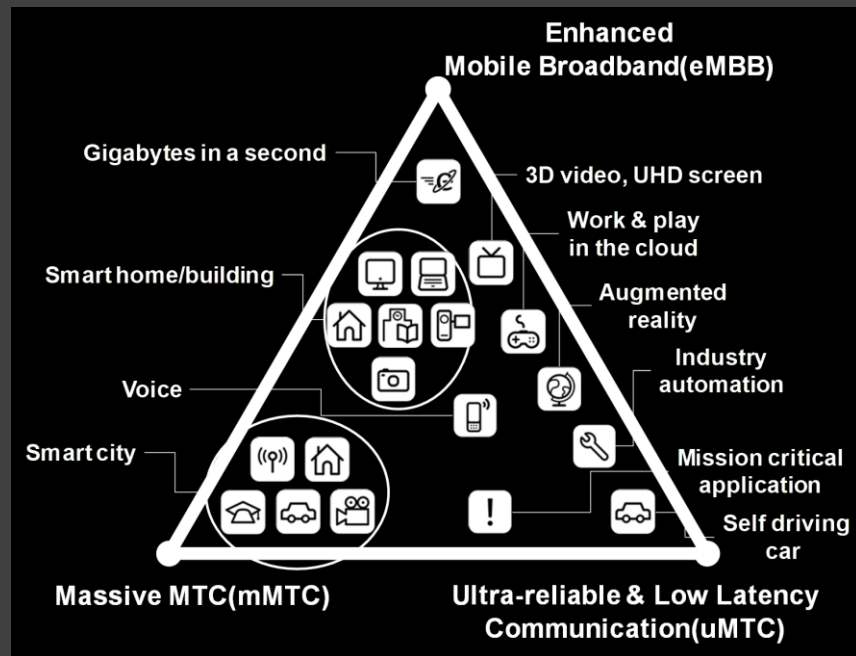
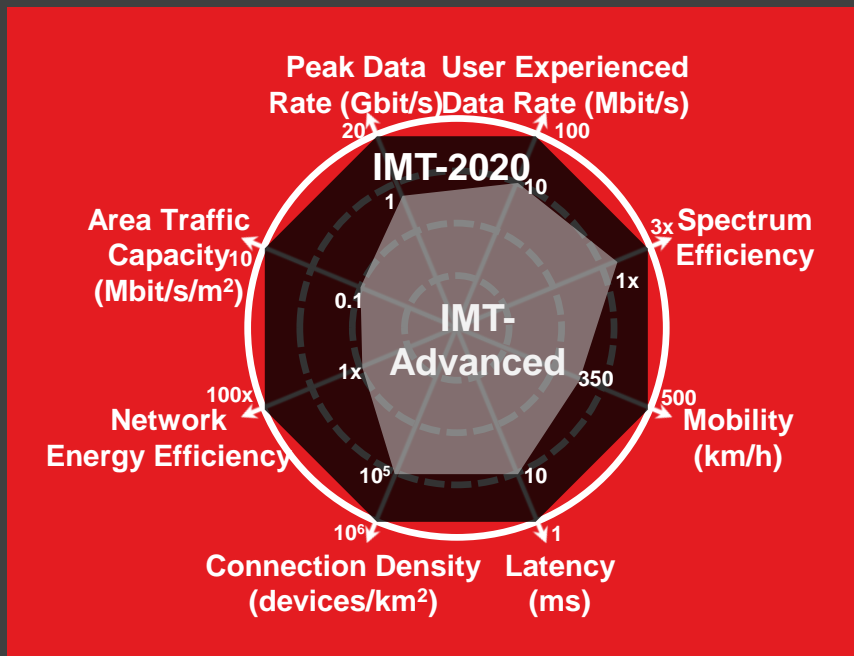
## 5G

- 5G Autonomous Driving With V2X @K-City (2018.2)
- World's First 5G-LTE Interworking<sup>Perfect 5G NW</sup> (3.5GHz+28GHz+LTE) (2017.9)
- 5G Stadium Showcase @Inchon ballpark (2017.3)
- 5G mmWave Mobility 3.6Gbps@170km/h (2017.2)
- World's First 5G Connected Car @BMW Driving Center (2016.11)
- World's First 20Gbps Data-rate (MWC 2016)

An aerial photograph of a city grid, viewed from an elevated perspective. The image is heavily stylized with a dark blue, semi-transparent overlay that obscures the natural colors of the buildings and streets. The grid pattern of the streets is clearly visible, creating a sense of depth and perspective. The text is centered in the middle of the image.

**Key Driver for 5G? Service?**

# 5G Capabilities & Services



**Technical Enhancement From 4G to 5G**

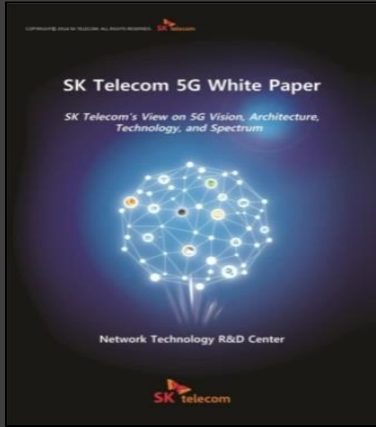
**5G Services**



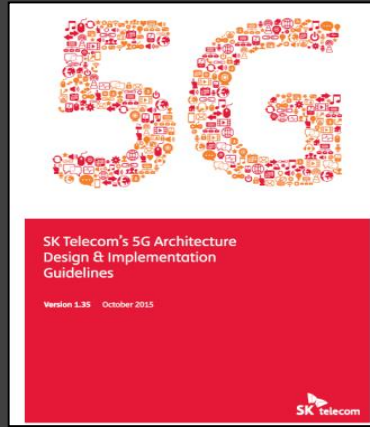
# **SK Telecom's 5G R&D status**

## **1. Tech. Leadership in 5G Industry**

# SK Telecom's 5G Vision - Whitepapers



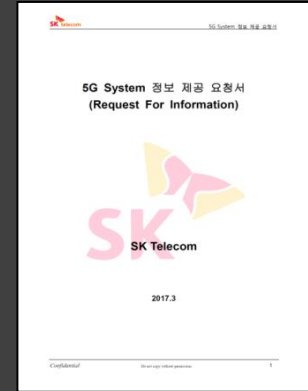
**2014.10:**  
**5G Whitepaper**



**2015.10:**  
**5G Arch. Design  
& Implementation Guidelines**



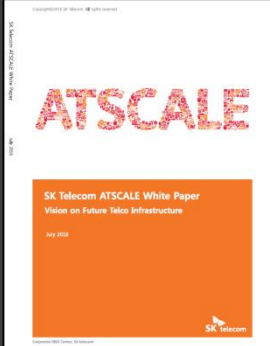
**2016.7:**  
**ATSCALE & COSMOS  
Arch. Whitepaper**



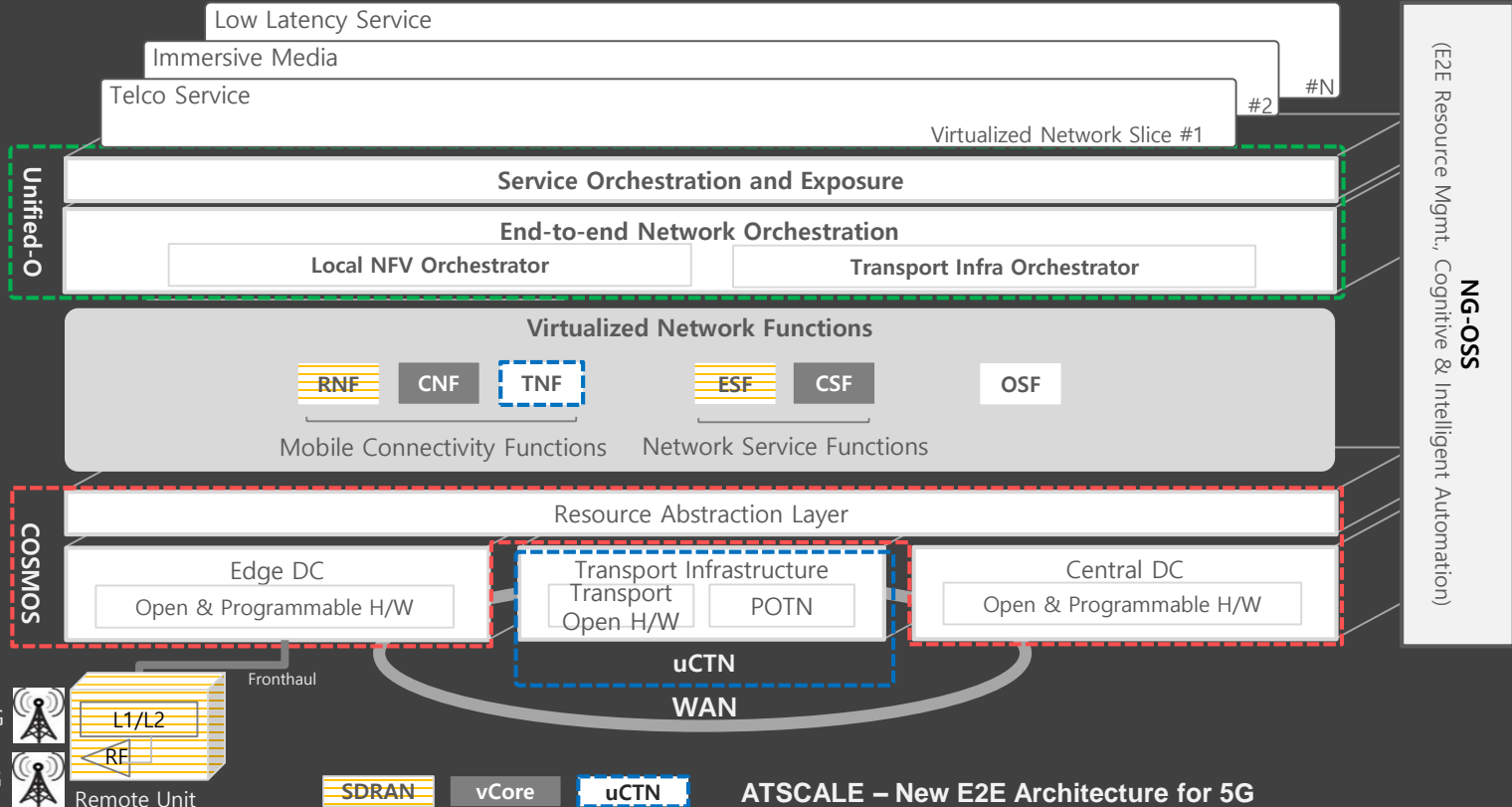
**2017.3 / 7:**  
**5G System  
RFI / RFP**

All white papers are publically available to download at <https://developers.sktelecom.com/resource/document/>

# 5G Architecture



## ATSCALE Whitepaper



**ATSCALE – New E2E Architecture for 5G**  
**COSMOS – Architecture for All-IT telco infrastructure**



# SK Telecom's 5G R&D status

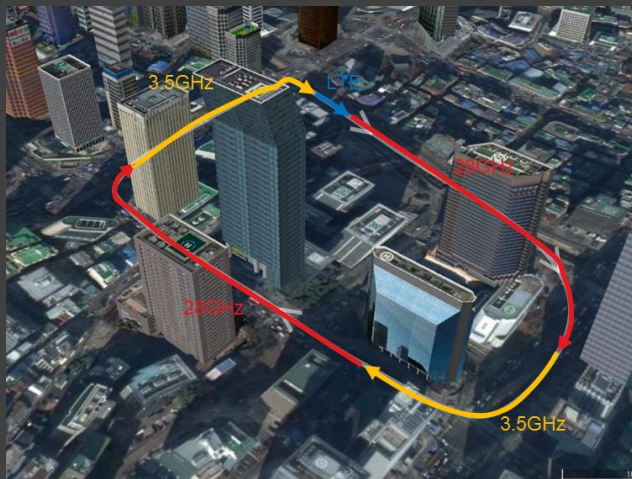
## 2. World First 5G-LTE Interworking Field Trial

- Perfect 5G Network(3.5GHz + 28GHz + LTE)

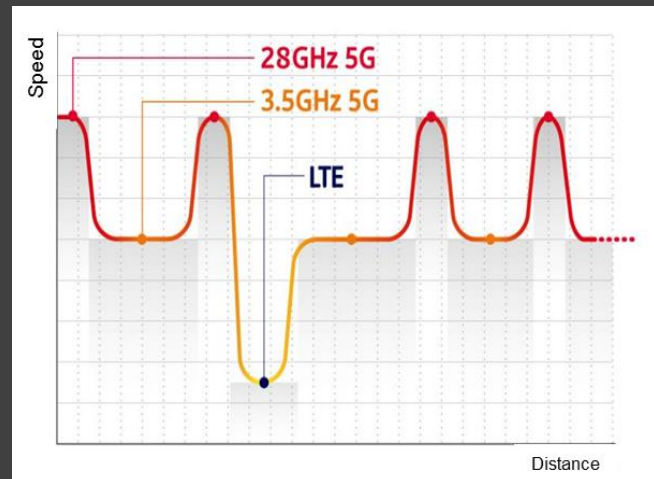
# 5G-LTE Interworking Field Trial('17.9) **W** World 1st

## “Perfect 5G” based on 28GHz 5G - 3.5GHz 5G - LTE Interworking

5G test driving route around SK Telecom T-Tower



28GHz/3.5GHz 5G-LTE Seamless Interworking



# 5G – LTE Interworking Network, 5G Mobile

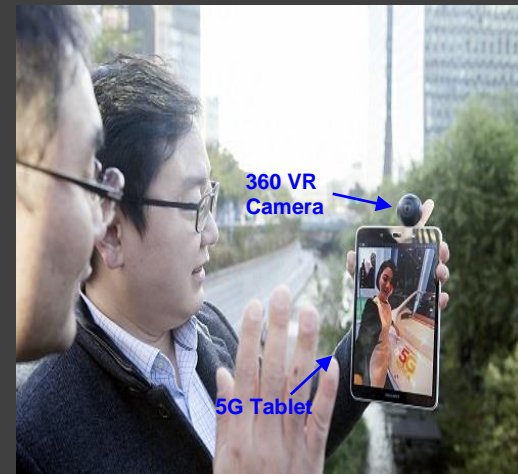
SK Telecom – Samsung 5G Trials



5G Experience Bus



5G Mobile\_360VR Call('17.10)





# **SK Telecom's 5G R&D status**

**3. 5G Connected Car Trial**  
**- First Step to 5G Autonomous Car -**

# 5G Connected Car('16.11.15)



TechXR8 Award(5G World) 2017- 'Best 5G Trial',  
AMO(MWC Shanghai) 2017 - 'Best Innovative LTE to 5G Evolution'  
Telecom ASIA Award 2017 - 'The Most Innovative Partnership Strategy'



**World First  
5G Connected Car**



**Various Services for  
Connected Car**

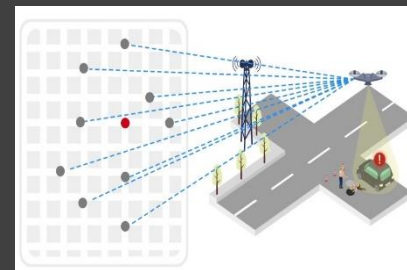
# Infra & Services for 5G Connected Car



**mmWave Radio**  
**Mobile Edge-Computing**



**Remote Eye(V2X)**  
**Video Recognition**



**Drone Helper**



**True Live Streaming**  
**4K 360 Live VR**

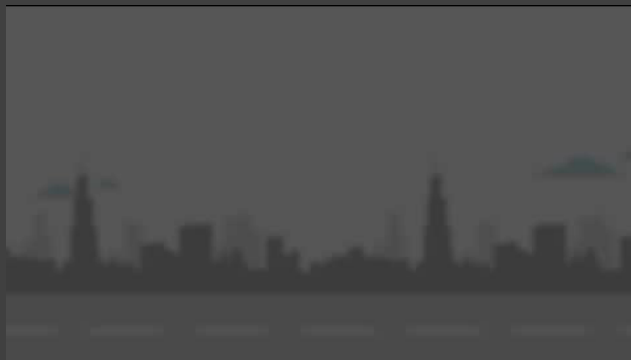


**UHD Live Conference**



**5G Experience Bus**

# Demo Video



[5G Infra : 5G 28GHz Radio, N/W Slicing Core]



[V2X Connected Car : V2X, Drone, Video Recognition]



[Immersive Experience : Live Conference, 4k 360 Live VR, 4k Multi-View, 5G Experience Bus]

# Autonomous Car Trial (“18.2)

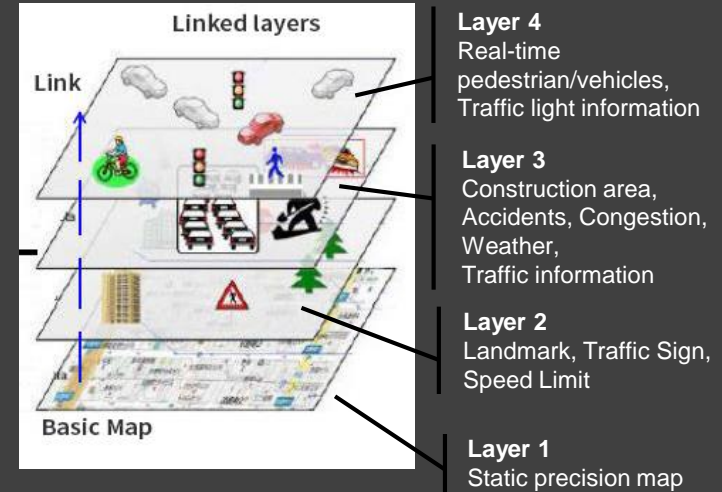
“ 5G + HD Map Tech. were embedded in autonomous car ”

K-City Autonomous Driving Track with 5G Connectivity



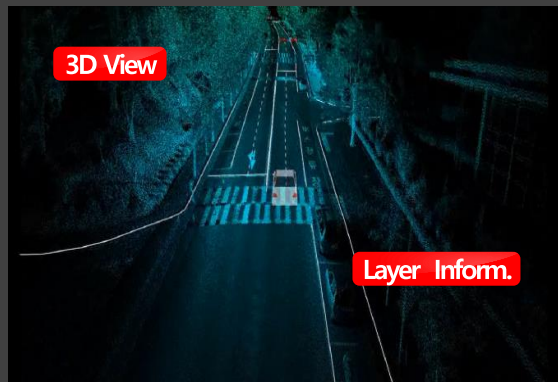
K-City Track

Autonomous Driving Control Center

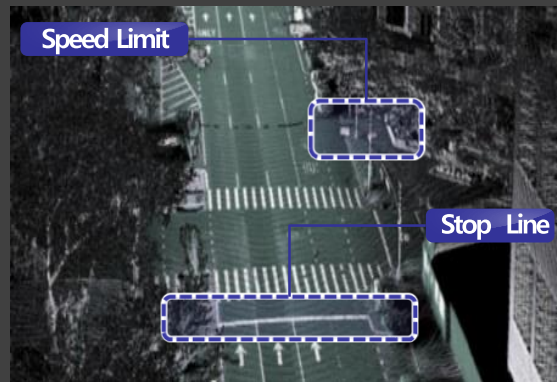


HD-Map Structure

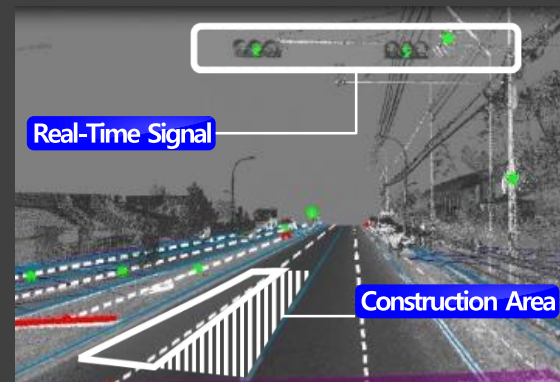
# Use Cases of 5G Autonomous Car



**Real-Time 3D Visualization  
with HD-Map**



**Cognition & Decision  
(Stop Line, Speed Limit)**



**Dynamic Information  
(Real-Time Signal, Construction Area)**

# Demo Video



An aerial photograph of a city grid, likely Seoul, with a dark blue and purple color overlay. The text is centered on the image.

# **SK Telecom's 5G R&D status**

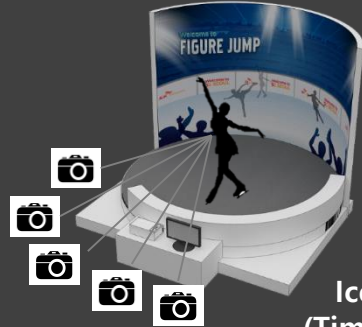
## **4. 5G Igloo in Seoul Plaza**

# 5G Igloo in Seoul Plaza ("18.1~2)

5G infra and media technologies provided immersive experiences to the citizens in Seoul Plaza



5G Igloo in Seoul Plaza



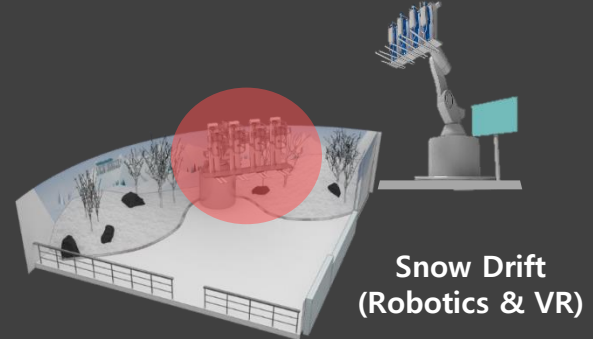
Ice Jump  
(Time Slicing)



360 Dome VR  
(No-Glasses VR)



Snowball Fight  
(VR)



Snow Drift  
(Robotics & VR)

An aerial photograph of a city grid, viewed from an elevated perspective. The image is overlaid with a dark, semi-transparent blue filter. The grid lines of the streets are clearly visible, creating a pattern of squares and rectangles. The colors of the buildings and streets are muted due to the overlay, appearing in shades of blue, green, and brown.

# **SK Telecom's 5G R&D status**

## **5. 5G Showcase in Baseball Park**

# 5G Stadium Showcase ('17.3)

5G infra and T5 provided immersive experiences to 20K audiences in Incheon Baseball Park



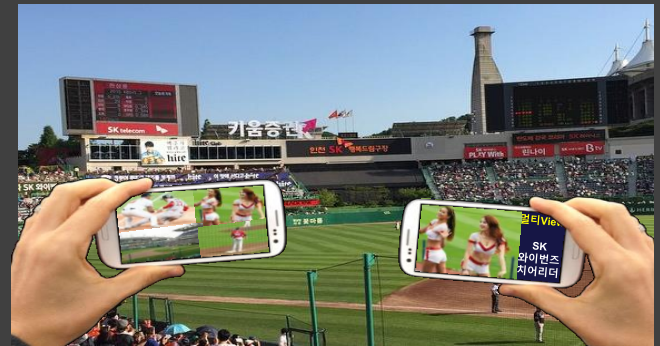
5G Connected Car – T5



AR



Multi-View, 360 VR



# 5G Award and Tech Leadership

SKTelecom won 9 5G awards in 2016~17, was selected as No1. promising 5G Operator by Juniper research in London



**ASIA MOBILE AWARDS 2017**  
**Best Innovation for LTE to 5G Evolution**

**SK Telecom and Ericsson for World-First 5G Connected Car**

SK Telecom has been working on the development of 5G technologies and services for the past few years and remained committed to becoming a leader in the 5G era. In November 2016, SK Telecom has established the world's largest 5G testbed of the BMW Driving Center in Incheon and successfully demonstrated world's first 5G-based Connected Car T5 in partnership with Ericsson. The most noticeable efforts are: providing a very large-scale 28GHz 5G coverage to all tracks within the BMW driving center; integrating 5G device prototype inside BMW vehicles; developing and showcasing 5G connected car services.



**SK Telecom, NTT DoCoMo Beat AT&T in 'Most Promising' 5G Operator List**



Sue Marek  
July 5, 2017  
10:23 am PT

SK Telecom is the No. 1 operator on the list, according to Juniper, because of its extensive 5G trials that tested technologies such as millimeter wave (mmWave) spectrum; massive input, massive output (MIMO) transmission; and network slicing. The last technology capitalizes on the capabilities of software-defined networking (SDN), network functions virtualization (NFV), orchestration, and analytics, to support a variety of vertical industries such as automotive, healthcare, and media.

**SK Telecom and Samsung Win "Infrastructure Innovation Award" at Global Telecoms Business(GTB) Telecoms Innovation Summit**

United Kingdom on May 24, 2017

SK Telecom and Samsung Electronics join Award" at the Global Telecoms Business for their successful verification of 5G mo environment – a world first.



**SK Telecom's 5G Connected Car 'T5' Wins Telecom Asia Awards 2017**

By Shreemata (TheBigDataInsights)

In conjunction with 20<sup>th</sup> Annual Telecom Asia Awards



**SK Telecom Wins 'Best 5G Trial between an Operator and Vendor' at TechXLR8 Awards 2017**

Products & Technologies



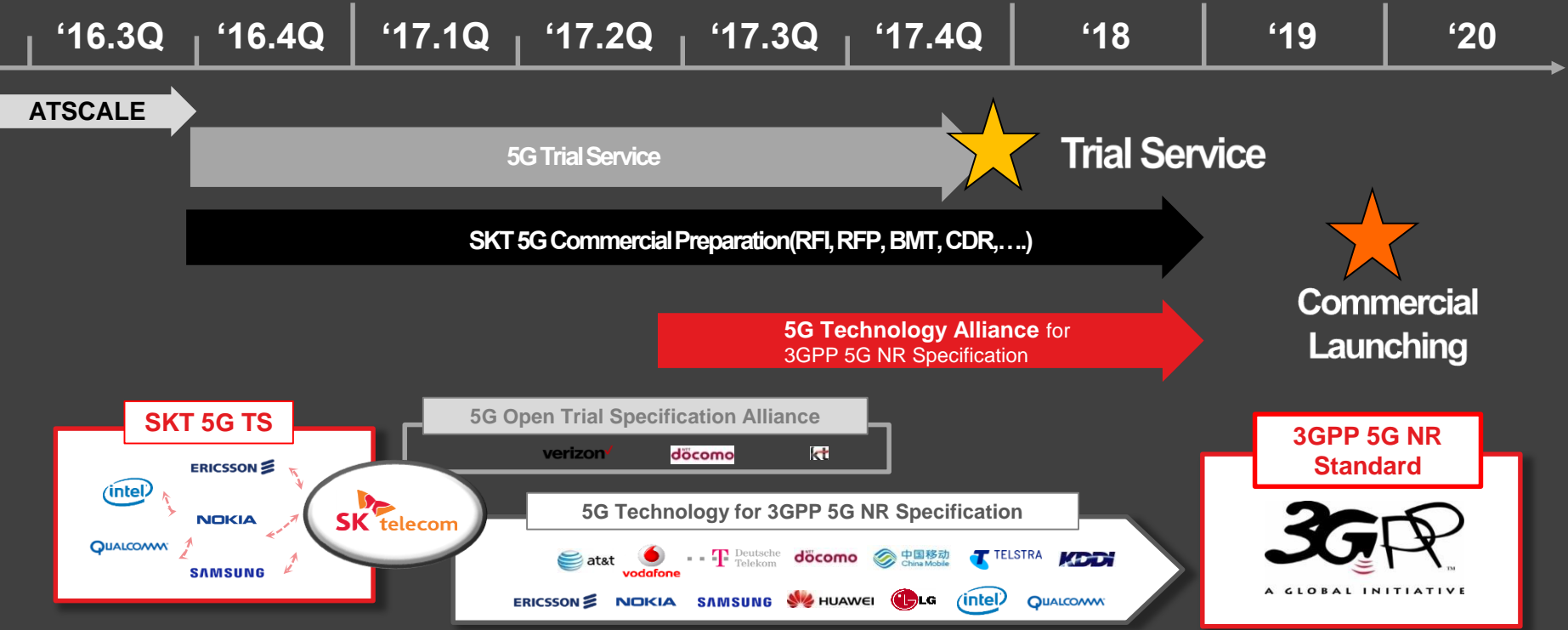
**SK텔레콤, 해외서 인정받은 세계 1위 5G 사업자**



An aerial photograph of a city grid, viewed from an elevated perspective. The image is heavily stylized with a dark blue, almost black, color overlay that is semi-transparent, allowing the underlying city streets and buildings to be visible. The grid pattern of the streets is a dominant visual element, creating a sense of order and structure. The overall mood is technological and futuristic, consistent with the 5G theme of the text.

# SK Telecom 5G Timeline

# SK Telecom 5G Timeline



Welcome to  
**5G** KOREA |  **SK** telecom