



SpringCloud Company Overview

Make Simple and Better

An AI based autonomous driving solution provider

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SPRINGCLOUD Vision to Autonomous Services

SpringCloud Inc.



We make things to be “Simple” and “Better”

Based on years of best practices of vehicles to make safe and convenient one, Now SPRINGCLOUD is **going forward** another challenge to make things to be more autonomous one. This is **comprehensive solution** to realize autonomous vehicle to your service in the near future **together with cooperation**

: support@aspringcloud.com



From blackberry partner

Company key facts

SpringCloud Inc.

✓ History

- Established : July, 5, 2017
- Globally oriented high-tech company, HQ in South Seoul, Republic of Korea
- Privately held joint stock company with diversified shareholder basis
- More than 10 employees; ~0% engineers
- Majority investment will be in technology and AD service implementation mainly SW
- Certificate of Venture Company(2017)



벤처기업확인서

✓ Partner registration

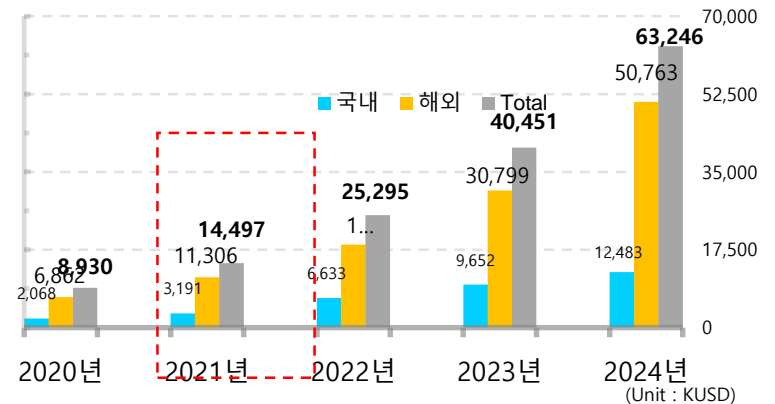
BlackBerry

nexteer
AUTOMOTIVE

SAMSUNG

HYUNDAI
AUTRON

✓ Gross performance plan and IPO



✓ Location



Market trends

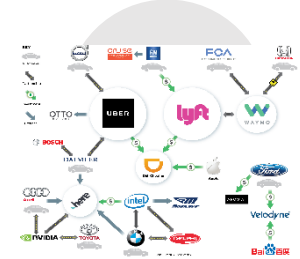
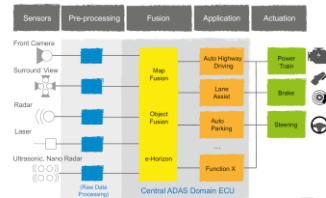
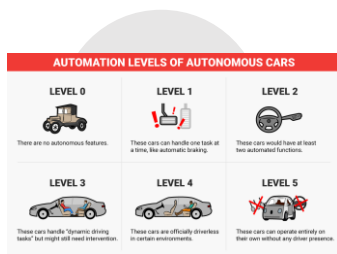
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Requirement

Design Concept
Architecture

System
Implementation

Vehicles &
Service



Autonomous driving Services

Fleet services



Shuttle



Valet Parking



Highway driving
assistance

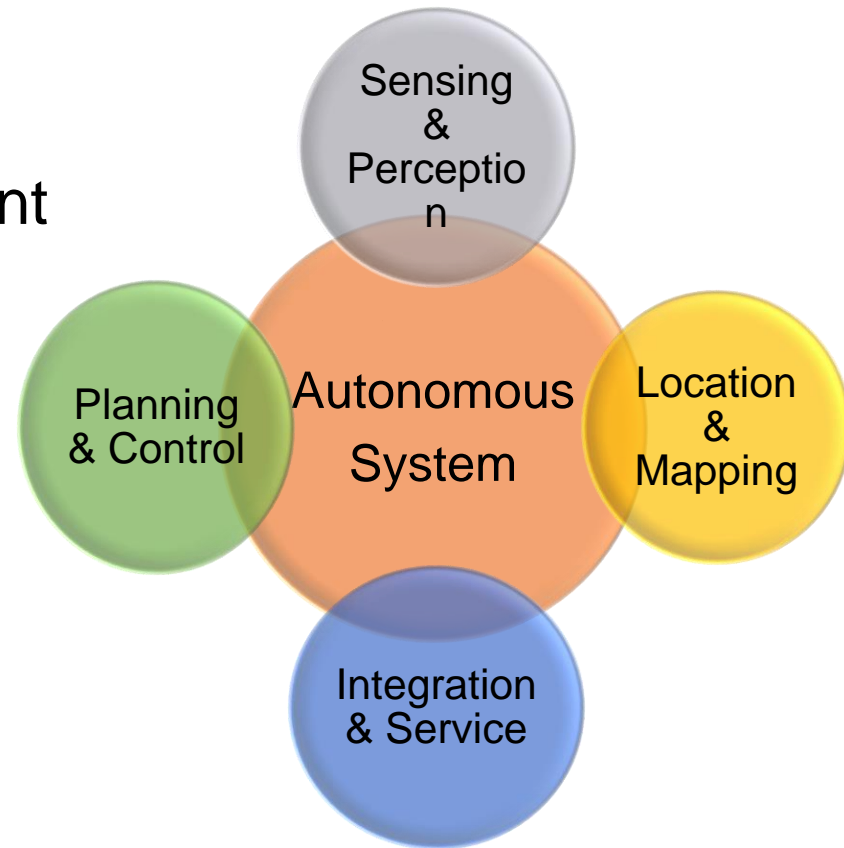


Industry needs from SpringCloud

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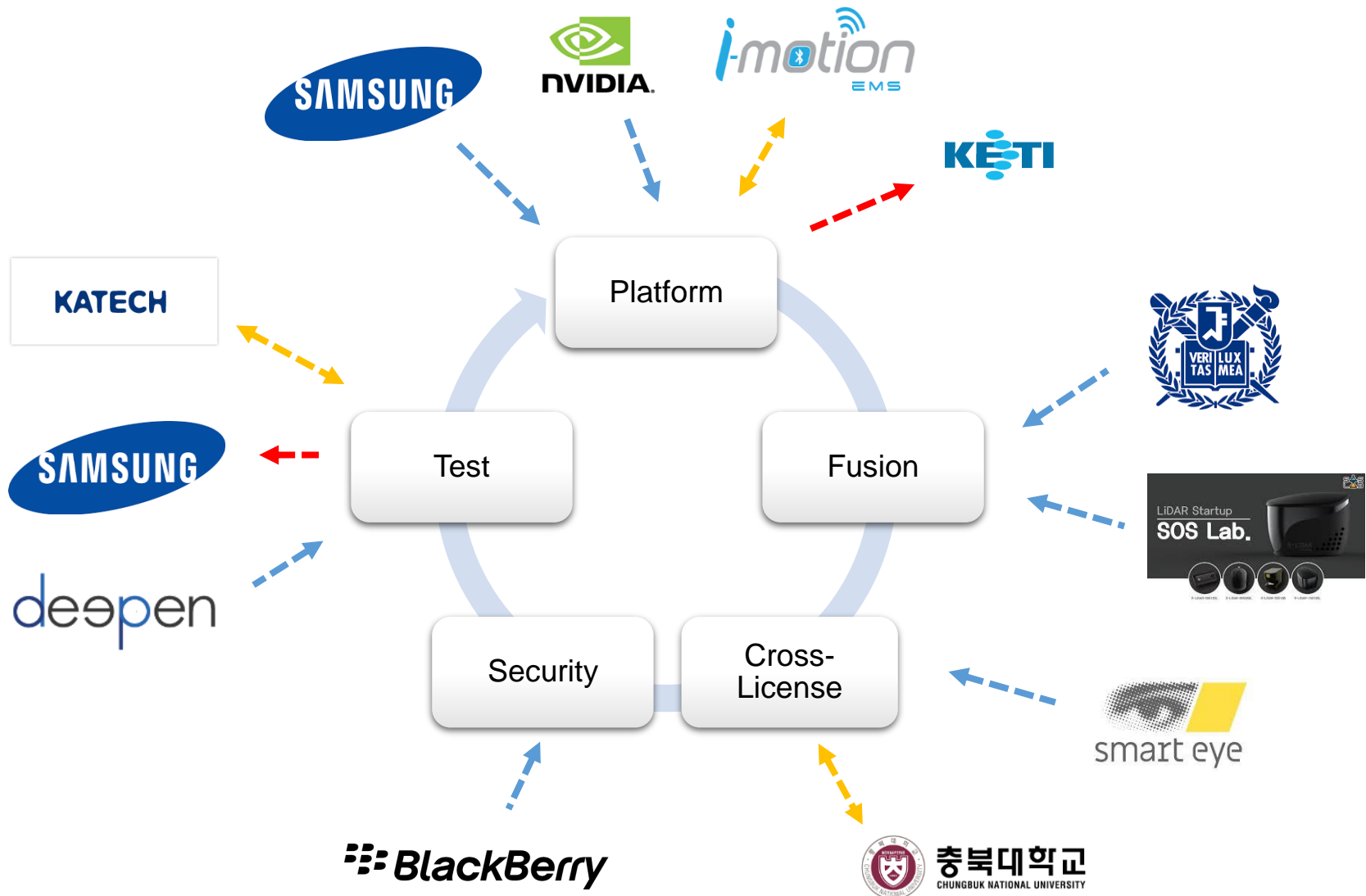
Focus on realization on Autonomous driving system and its services
“Solution Provider”

- Platform design and development
- Test and Validation
- Sensor fusion
- Security
- Service system implementation
- Cross licensing business



Solution Landscape

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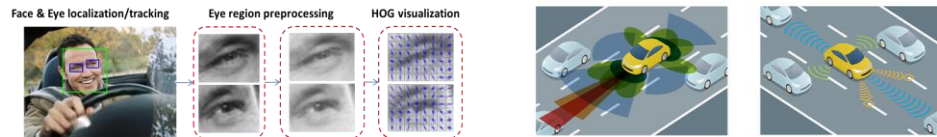
SpringCloud Solutions

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P1

- *SpringGO*
M1

L2/L3 target DSM + Front sensing system



P2

- *SpringGO*
X1

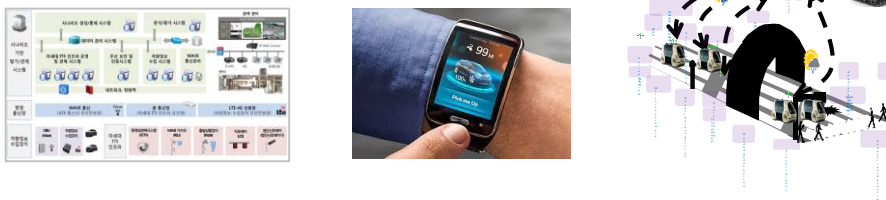
AD Platform with 6 cameras, Lidar and radar Integration



P3

- *SpringGO*
S1

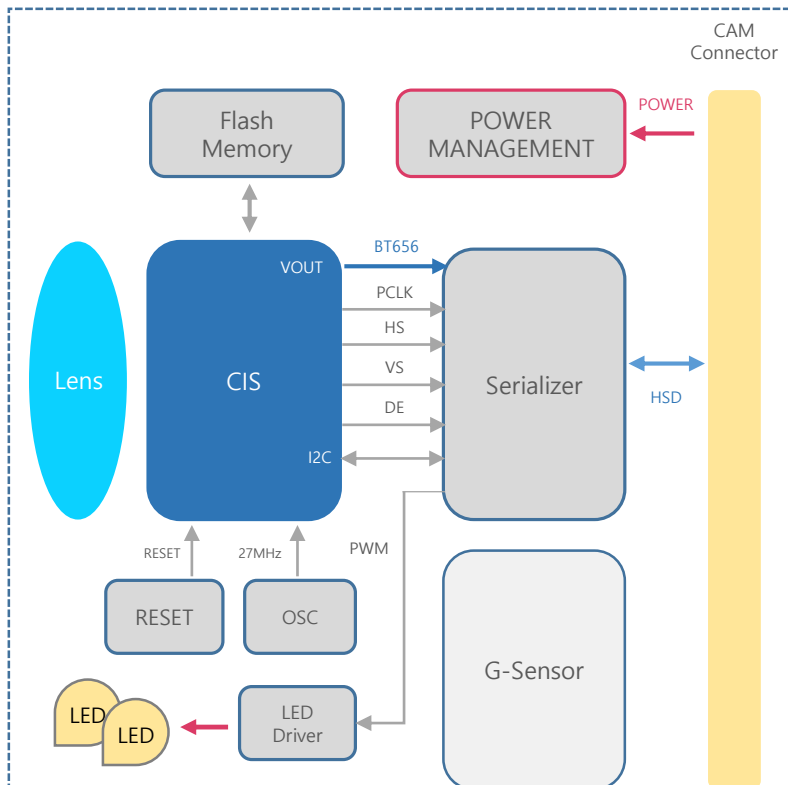
AD service application server



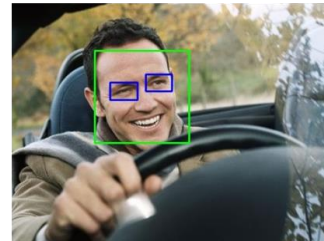
M1. Platform - DSM (Driver Status Monitoring)

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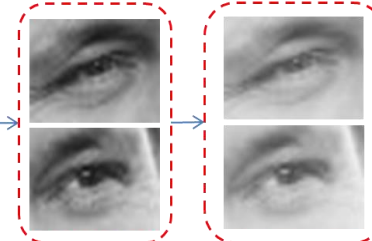
- **System & camera module development which can be monitoring driver status on low light level.**
 - ✓ **IR LED(940nm)** applications for operating on low light level.
 - ✓ **Designed angle of view (HFOV : 40degrees, VFOV : under 25degrees)** for obtain driver's face information
 - ✓ **Apply global Shutter on image sensor** for minimize distortion of the image



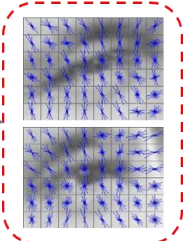
Face & Eye localization/tracking



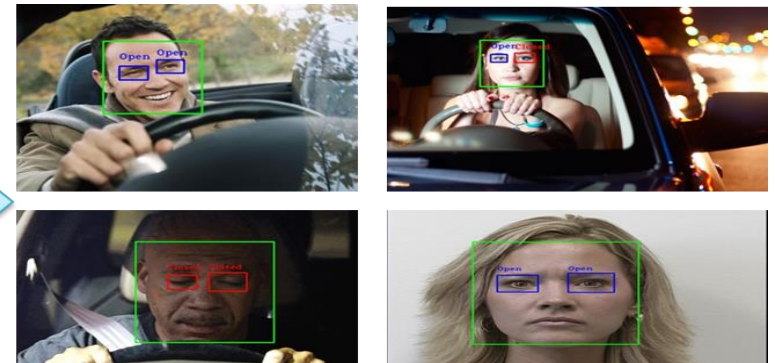
Eye region preprocessing



HOG visualization



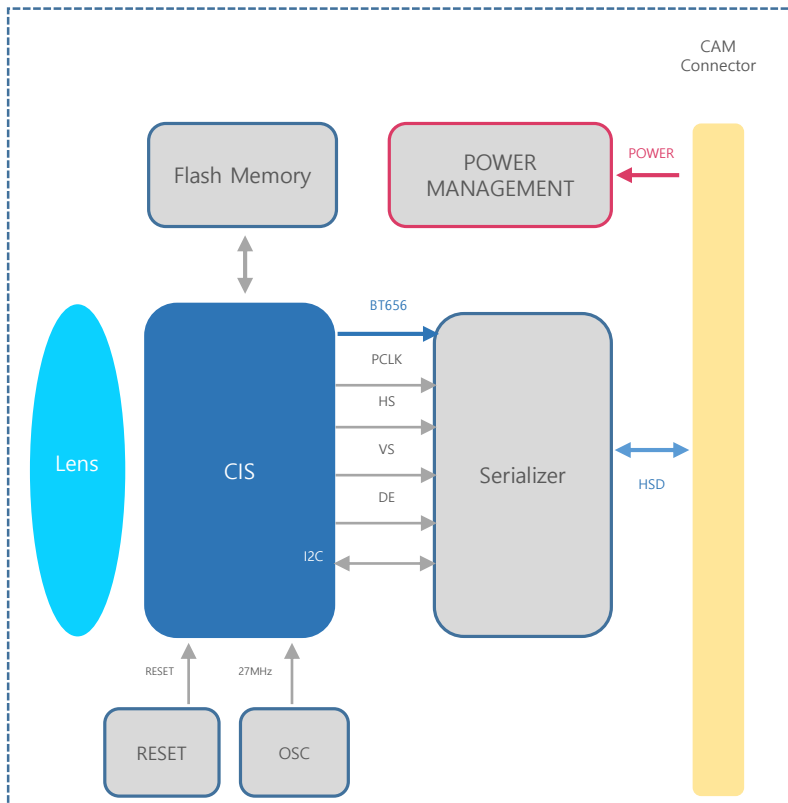
Results



M1. Platform - Intelligence Front Sensing

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- **Wide Angle front camera module with system development**
 - ✓ Apply image sensor **over grade HD(720p)**
 - ✓ Designed angle of view for obtain car and lane information
(HFOV : about 130 degrees, Cross over into the left, right lane)
 - ✓ **smallest camera model development** for easy installation, reducing cost.



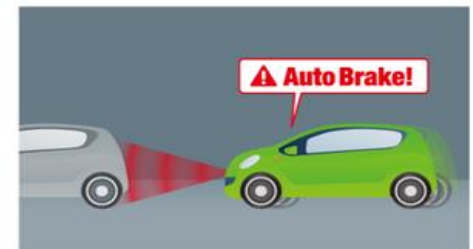
LDW
(Lane Departure Warning)



LKAS
(Lane Keeping Assist System)



FCW
(Forward Collision Warning)



AEB
(Autonomous Emergency Braking)

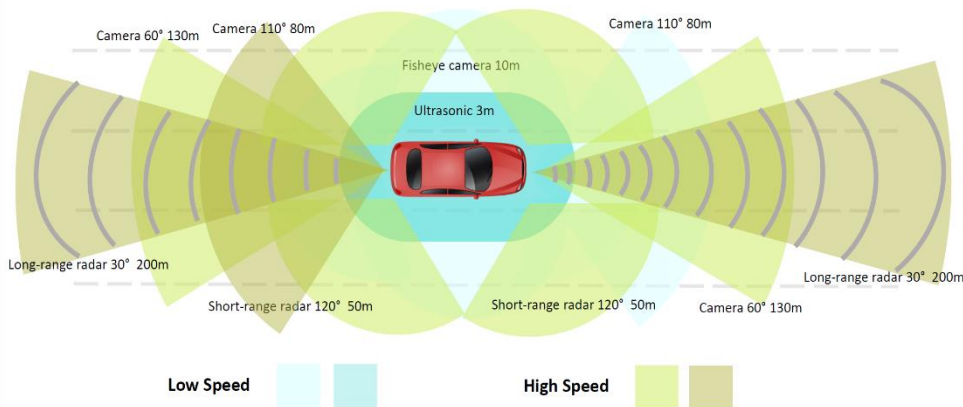
X1. Sensor Fusion

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Sensors	ACC	FCW	AEB(V)	AEB(P)	TSR	LDW	NV/PD	BSD	RCTA	APA
77GHz Radar	√	√	√							
24Ghz Radar	√	√	√					√	√	
Mono camera★	√	√	√	√	√	√				
Stereo camera	√	√	√	√	√	√				
Rear view camera						√		√	√	
Near IR							√			
Far IR							√			
SR Lidar		√	√							
LR Lidar	√	√	√							
USS								√		√
77Ghz+24Ghz Radar	√	√	√					√	√	
Radar + Mono camera★	√	√	√	√	√	√				
Radar + Stereo	√	√	√	√	√	√				
Radar+Mono+USS	√	√	√	√	√	√		√	√	
Near+Far IR							√			
Radar + Map Data	√									
Camera + Map data	√				√	√				
Radar + Camera + Map data	√	√	√	√	√	√		√	√	√

X1. SpringGO Overview

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Components	Specification	Function	Q'ty
Radar	Front LRR ESR2.5	AEB, FCWS, PD	1
Camera	30, 60, 120, 180	LDWS, LKS, SVM, TSR, PD	6
Lidar	16ch VLP	Object Dection	3
IMU/GPS	Xsens	Path Planning	1
Main ECU	-	Vehicle Control	1
Ultrasonic		BSD, SPAS	12
Cloud Server		Data logging	

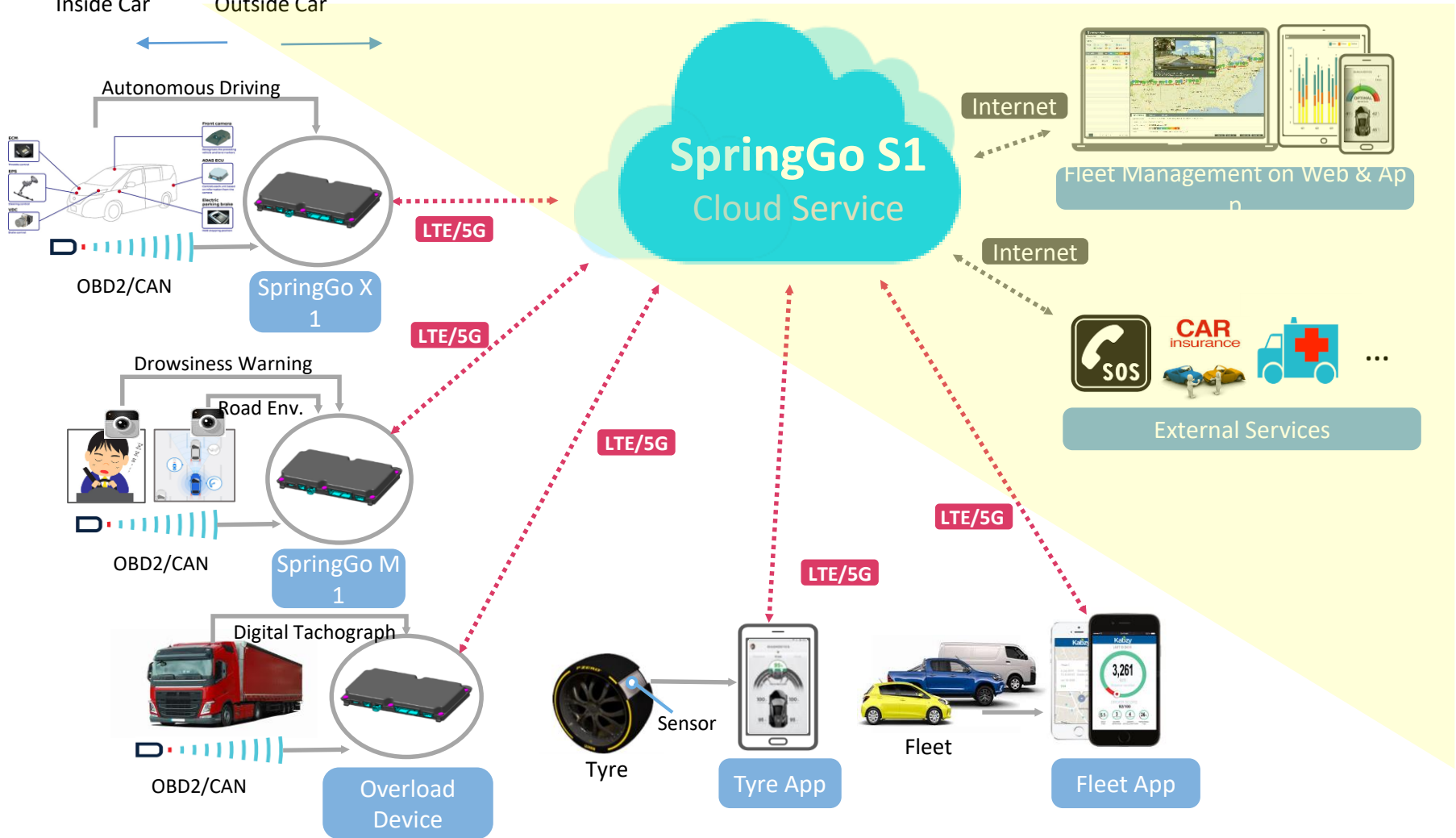
S1. SpringGo Concept

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Using SpringGo X1 for Autonomous Shuttle Bus, all the autonomous driving status and information of Shuttle bus can be monitored with the Fleet Management features.

Inside Car

Outside Car


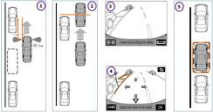



S1. SpringGO (Application #1 SPAS)

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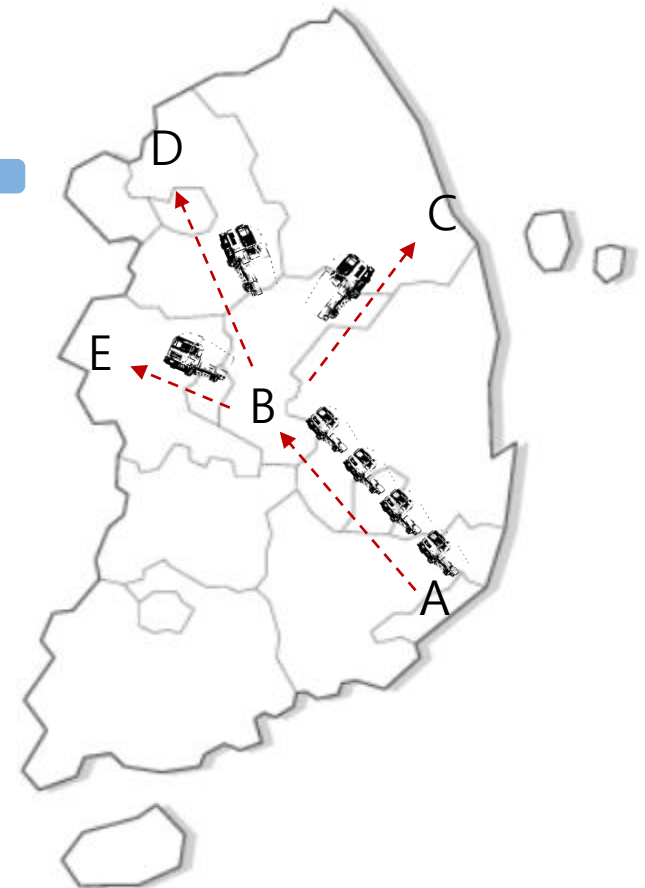
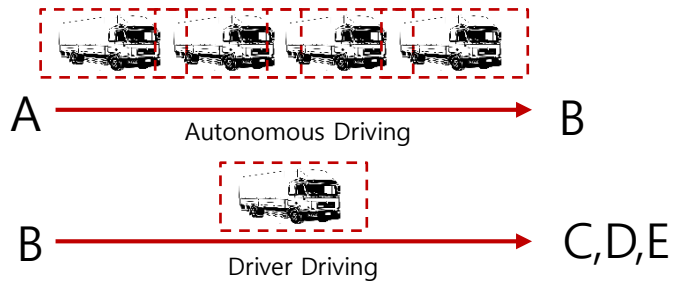
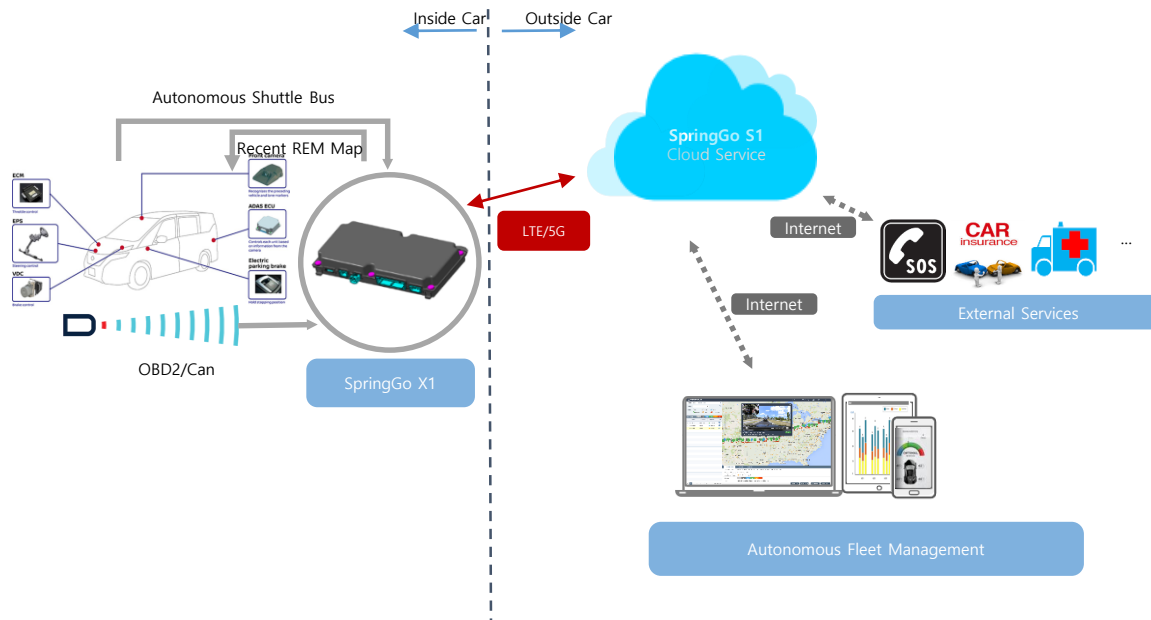
- Smart PAS
- “Parking In and out” of parking place (Target area)
- Level-1 : Semi-Auto / Level -2 : Full-Auto with remote control



Level	Concept	Sensor	Applications	Remark
I		<ul style="list-style-type: none"> ✓ USS (Long/Short) ✓ Camera (AVM) 	<ul style="list-style-type: none"> ✓ T Shape ✓ Parallel Parking ✓ Open Space ✓ Line Alignment 	
II		<ul style="list-style-type: none"> ✓ USS (Long/Short) ✓ Radar ✓ Camera(AVM) 	<ul style="list-style-type: none"> ✓ Garage IN/OUT ✓ Line Alignment ✓ Slanted Parking ✓ Remote ✓ Charging Station 	Wireless Communication *GPS

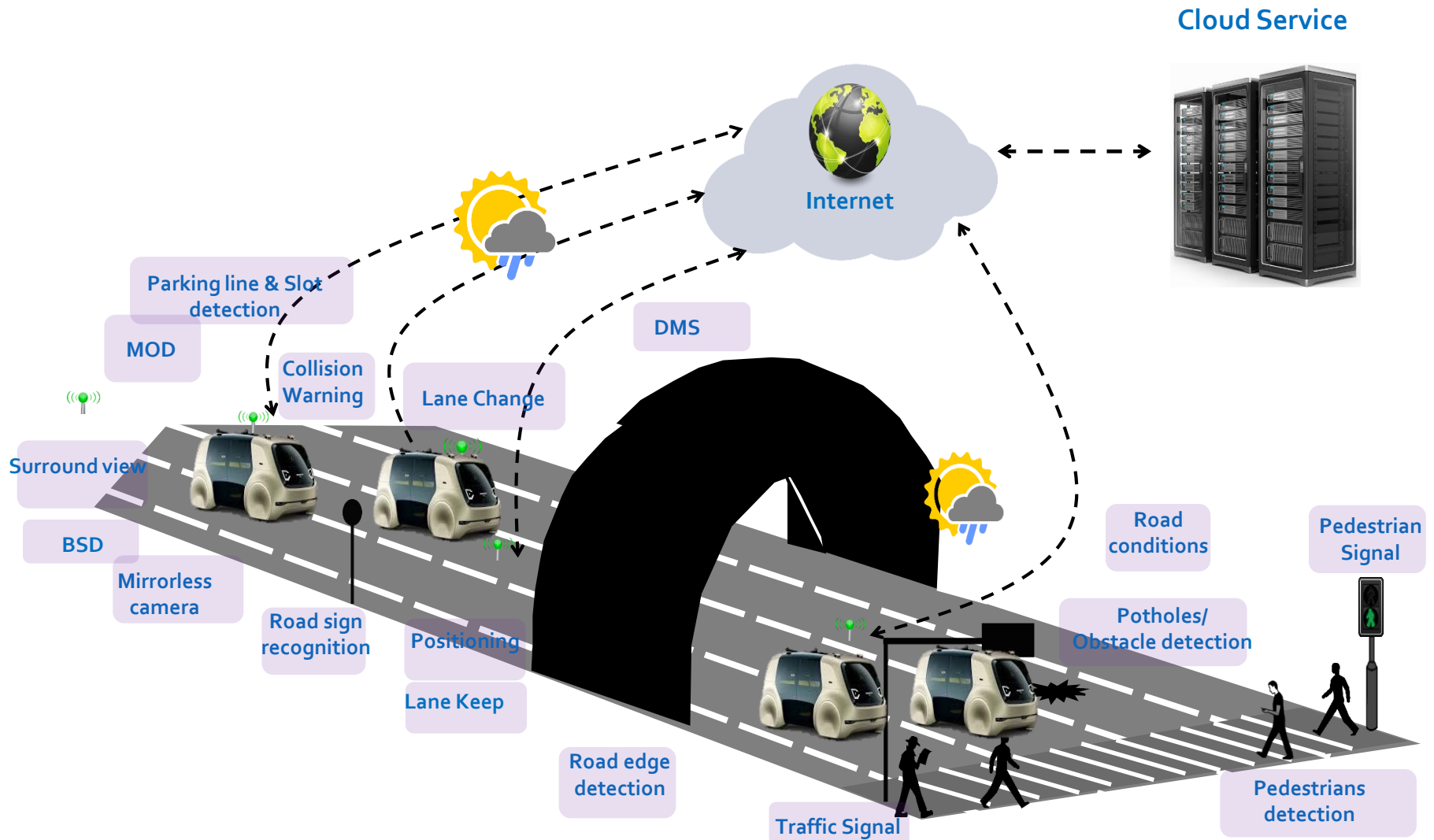
S1. SpringGO (Application #2 Fleet Management)

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S1. SpringGO (Application #3 Cloud Service)

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S1. Test & Validation

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- Pattern Generation Test

Input [left, right] images



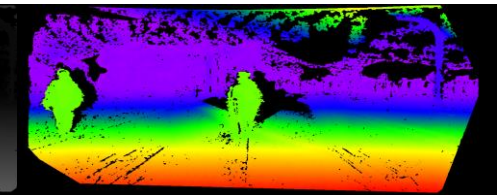
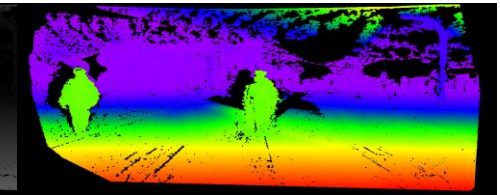
Calibration & rectification



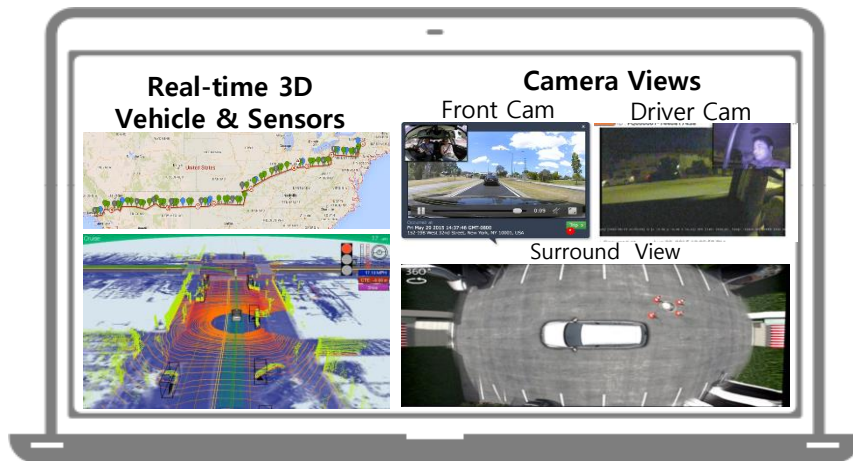
Disparity calculation



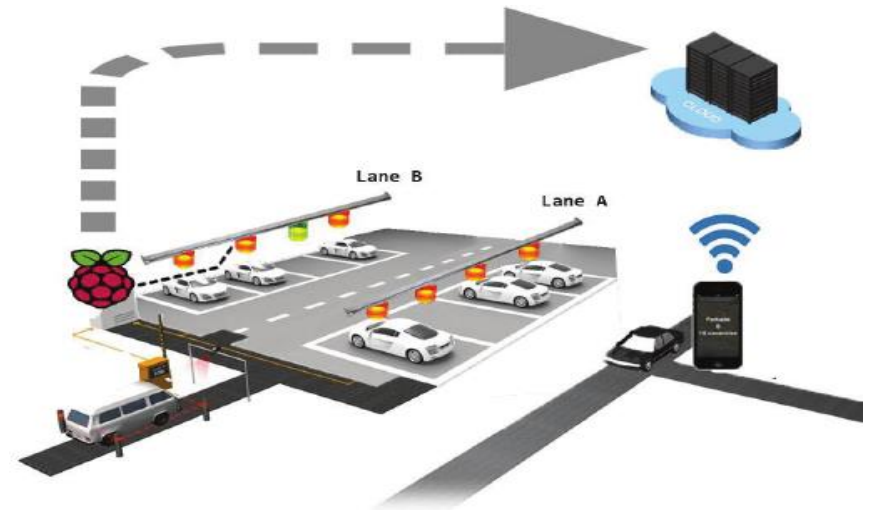
Disparity map [color version]



- Driving Test



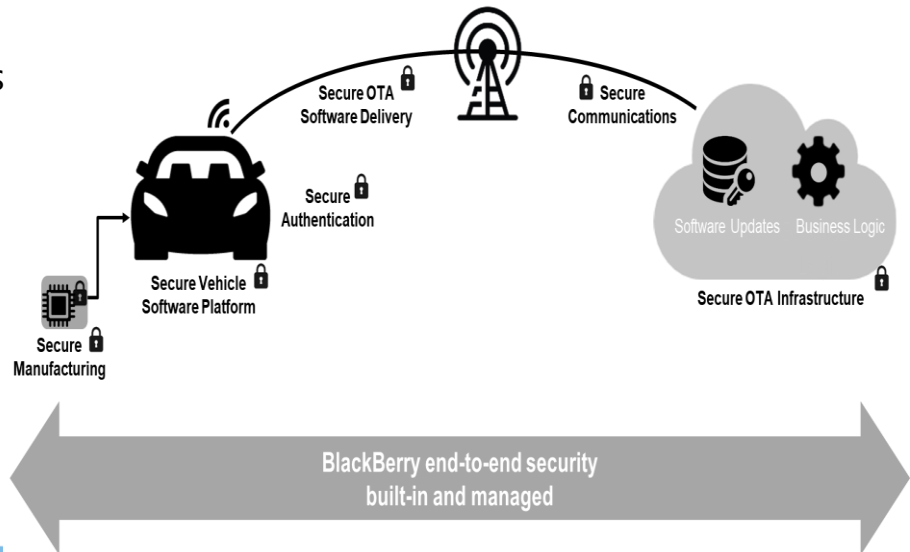
Autonomous Driving Test Ground



Auto-parking Test Ground

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We have the people, experience and track record to bring "BlackBerry Secure" to market.



The diagram illustrates a vehicle's communication architecture, centered around a car model. It is divided into two main sections: External and Internal.

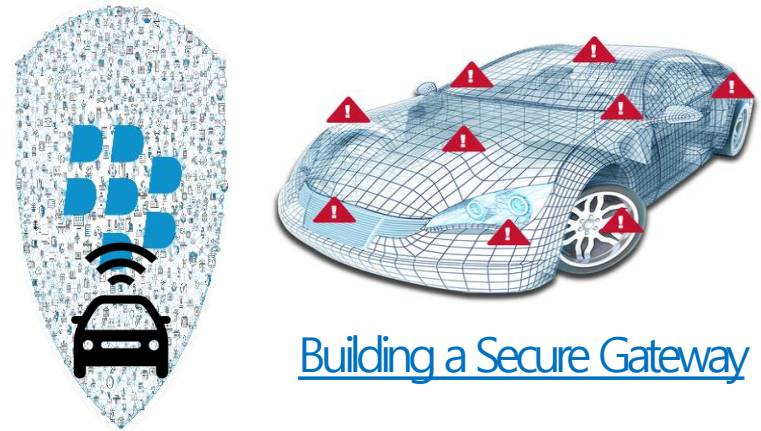
External Network (Top): This section lists various external communication technologies in a dark blue bar with white text:

- Cellular
- Bluetooth
- GNSS
- Sat Radio
- FM Radio
- Sensors
- WiFi
- TPMS
- DSRC
- DAB
- Keyless
- ...

Internal Network (Bottom): This section lists various internal vehicle communication protocols in a dark blue bar with white text:

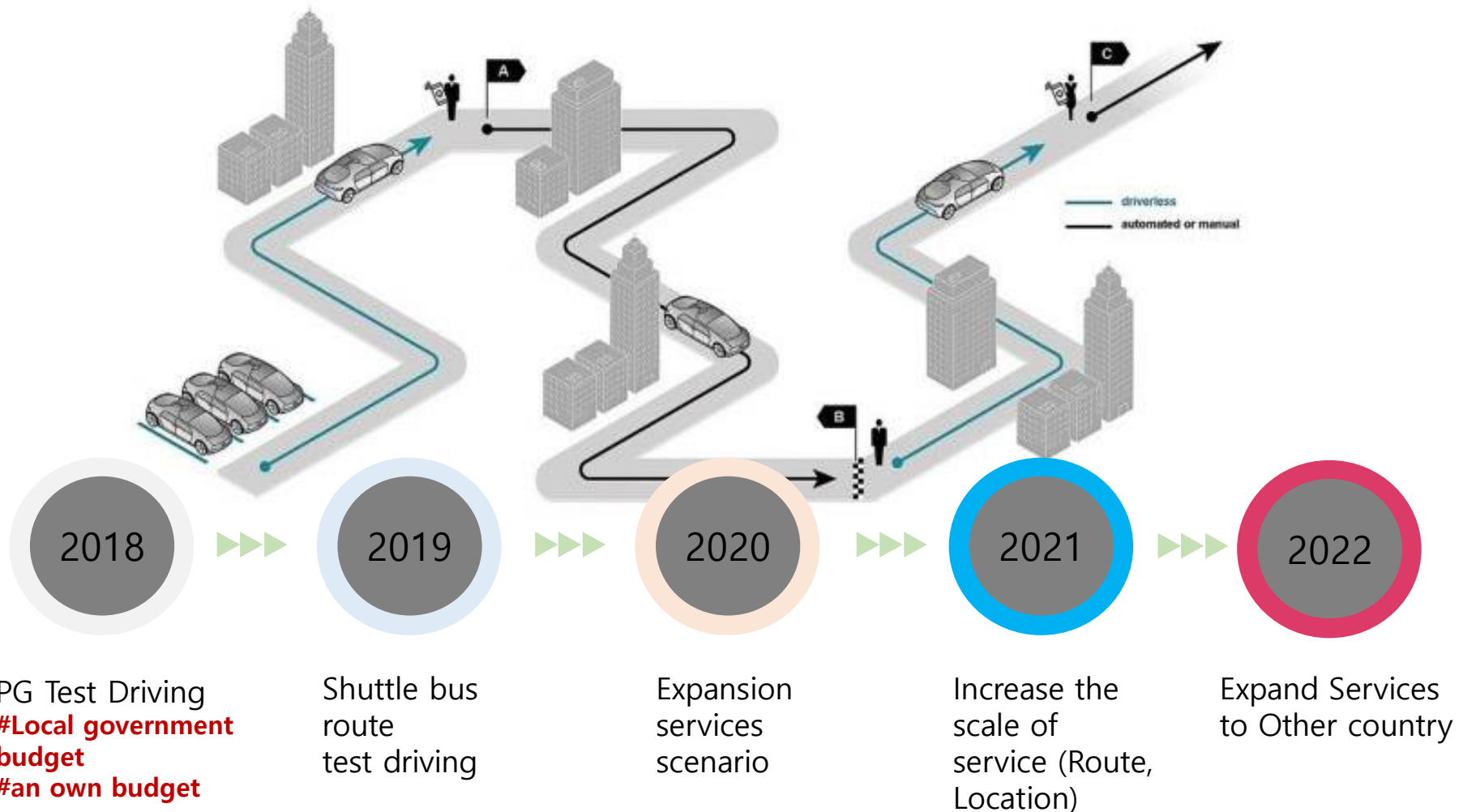
- IVI
- Cluster
- CAN
- Ethernet
- MOST
- LVDS
- TCU
- CD
- USB
- LIN
- OBDII
- ...

Arrows indicate the flow of data between the external and internal networks through the vehicle.



SpringGO Service Strategy

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Schedule

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Feb.2018

Oct.2018

May.2019

A-sample(20sets)

- 2 Cameras
- USS Integration
- LD,VD
- DSM
- Semi-Parking
- ACC,AEB, R-AEB
- Standalone
- Test car integration



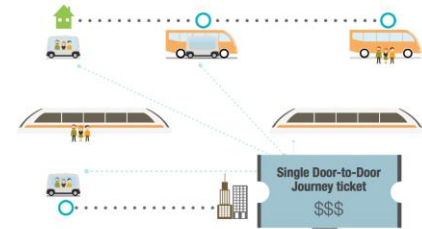
B-sample (100sets)

- 8 Cameras
- USS Integration
- Lidar+Radar
- 4G/GPS
- TSR, PD
- Valet-Parking
- HDA
- LKS, LCC, TJA
- Vehicle Integration
- Commercial Vehicle



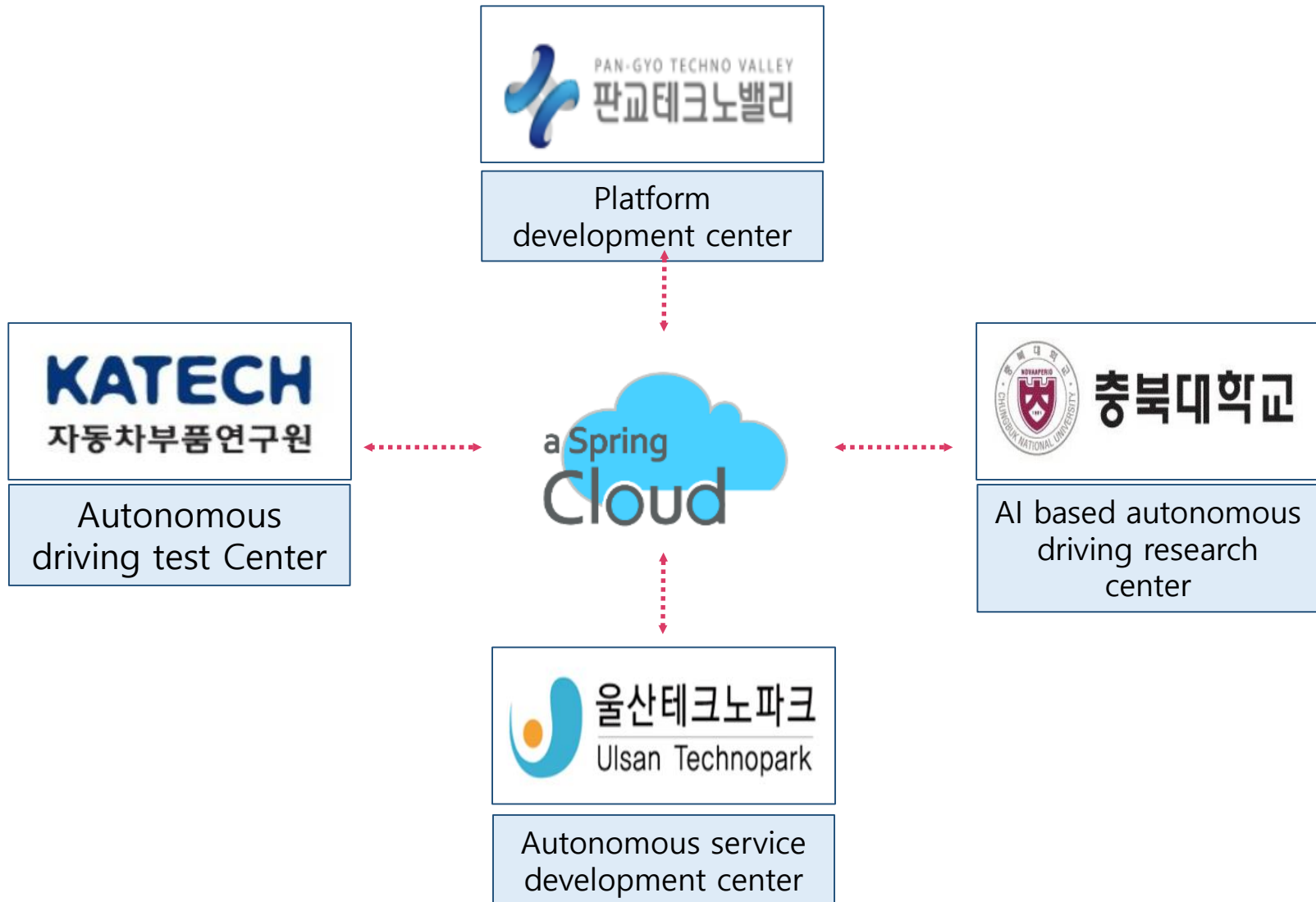
C-sample(1,000sets)

- Shuttle
- Valet parking
- Fleet
- Rental etc



Network

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Thank you 

Passion : Value : Innovation

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