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# Smart Parking Solutions





# Smart Parking Solution

Efficient, Secure, Intelligent

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## ■ Off-street Parking Background

## ■ Off-street Parking Solution

- Solution Overview
- Vehicle Entrance & Exit
- Indoor Parking Guidance
- Outdoor Parking Guidance
- Off-street Parking Management

## ■ Success Cases





# Off-street Parking Scenarios

## Off-street parking

*Wikipedia:* ... in contrast to parking on a street.  
*Parking network:* ... usually parking facilities like garages and lots. ... can be **both indoors and outdoors**.

## End users



Airport parking lot



Shopping mall parking lot



Private parking lot  
(Company, factory, residential hall)

## Scenarios



Vehicle entrances & exit



Indoor parking areas



Outdoor parking areas

# Challenges



**Low efficiency for  
Artificial entrance & exit**



**Hard to find parking  
space**



**Lack of monitoring  
for parking lots**



**Hard to find the car**



**Low usage rate with  
weak revenue growth**



**High labor cost**

# Requirements



# Off-street parking solution



## Entrance & Exit Control

Base on the ANPR technique to replace manual entrance control to enhance the efficiency.



## Indoor & Outdoor Parking Guidance

Automatic calculate the number of available parking spaces in parking areas, and show in the screen. Guide driver to find available spaces.



## Indoor Vehicle Locating

Base on the ANPR technique to locate vehicle indoor position through kiosk to display.



## Comprehensive Surveillance

Provide comprehensive video surveillance as evidence if an accident happen.



## Unified parking management system

Control everything on the e-map of PMS to reduce O&M cost and also provide BI for operator to enhance the revenue.



- Best experience
- Enhanced safety
- Revenue Increased
- Low Cost



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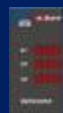




# Solution Overview

## Vehicle Entrance & Exit

Available  
Spaces Display



Outdoor LED  
Screen

ANPR  
Open Boom-gate  
Info. Display



ANPR  
Camera &  
Screen

High speed  
Boom-gate



Anti-  
smashing  
& Radar

Intercom  
Cardswiping



VTO Kit

## Operation Center

Parking  
Management



Platform

Central Storage



EVS

## Outdoor Parking Area

Parking  
Space  
Detection



Outdoor  
Detection  
Camera

Vacant Space  
Guidance



Outdoor  
Guidance  
Sign

## Indoor Parking Area

Parking  
Detection  
Recognition



Indoor  
Guidance  
Camera

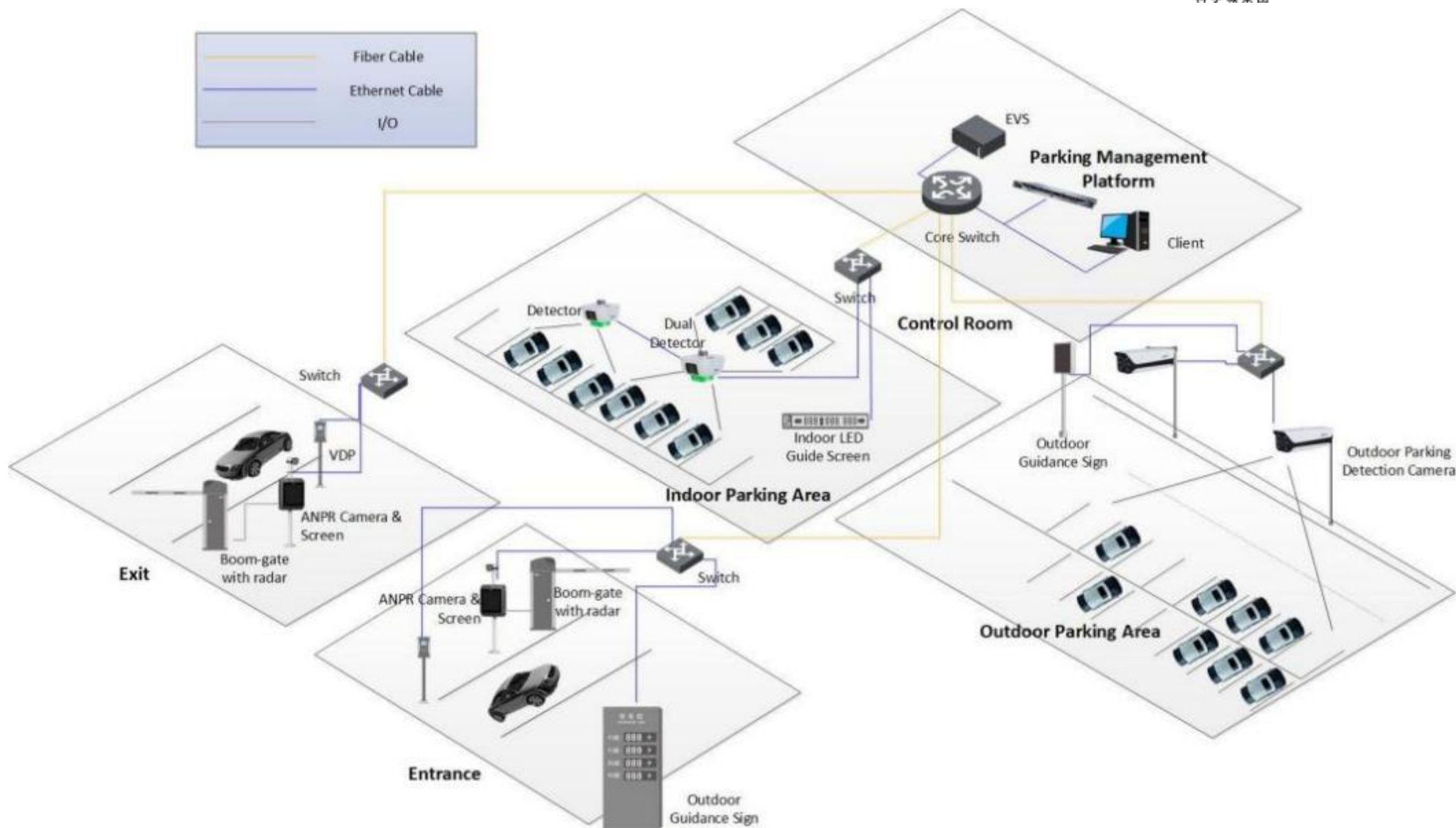
Vacant Space  
Guidance



Indoor  
Guidance  
Sign



# Solution Topology



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# Attract Vehicle Parking



## Highlights



Vacant number display before enter

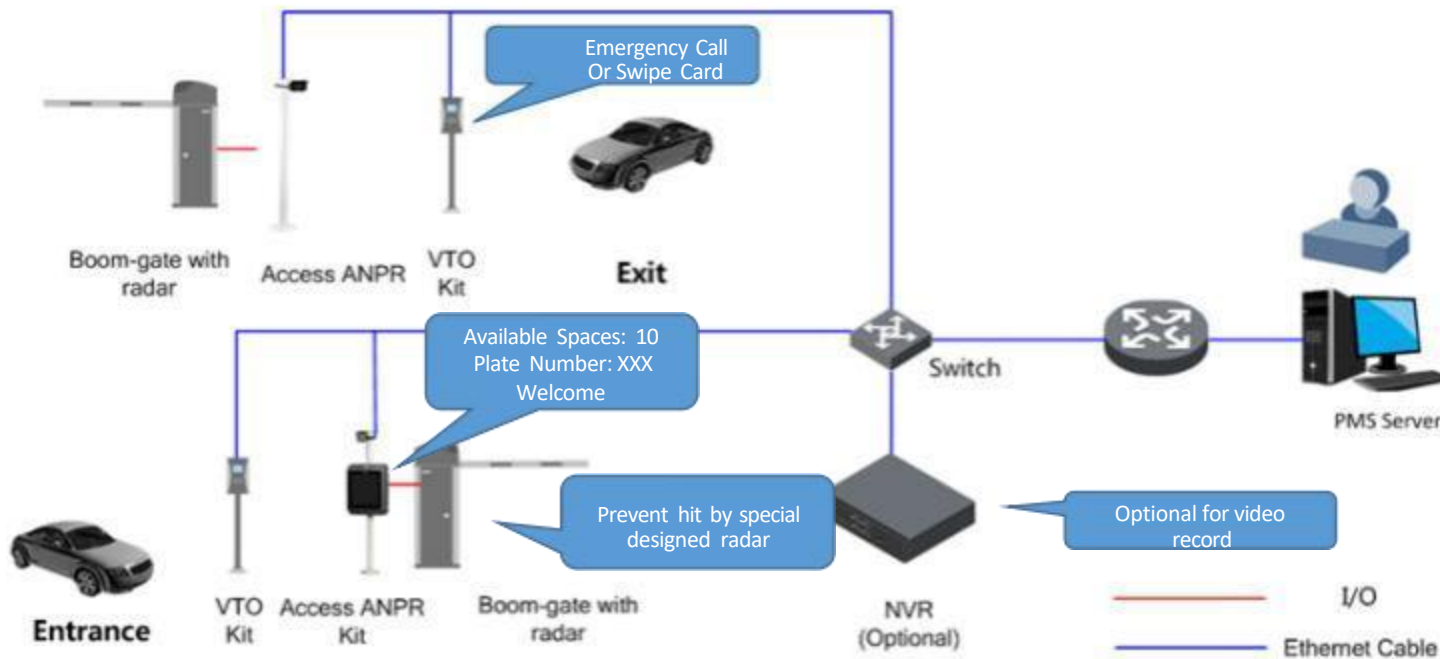


Attract drivers to park



# Vehicle Entrance & Exit

## Solution



## Highlights

- ✓ **Improve Efficiency & Experience :** detection vehicle from video: 98%. Control boom-gate by ANPR. No need stop.
- ✓ **Information display:** Integrated LED screen will show notice information for drivers.
- ✓ **Exception handling:** Press VTO button once needed; Swipe card to pass.
- ✓ **Enhance safety:** Capture and record every passing vehicle. Search the records by plate.
- ✓ **Easy installation to save time and cost:**
  - 1, Integrated design ANPR Kit with screen
  - 2, No need to close access for burying loops

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# Indoor Parking Guidance

## Solution



## Highlights



### Guidance to Free Area

- Show the number of available parking space in each direction.



### Indicate to Free Spot

- Integrated indicate light of detection camera will show if the parking spot is occupied or not.
- Seven colors light could show different kinds of parking space

ANPR

### ANPR

- Identify the current license plate of the parking space

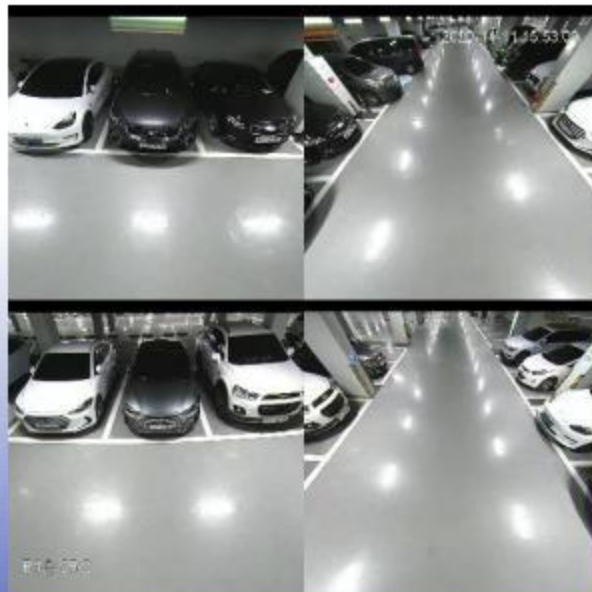


# Indoor Parking Guidance - Fisheye Parking Guidance Camera I



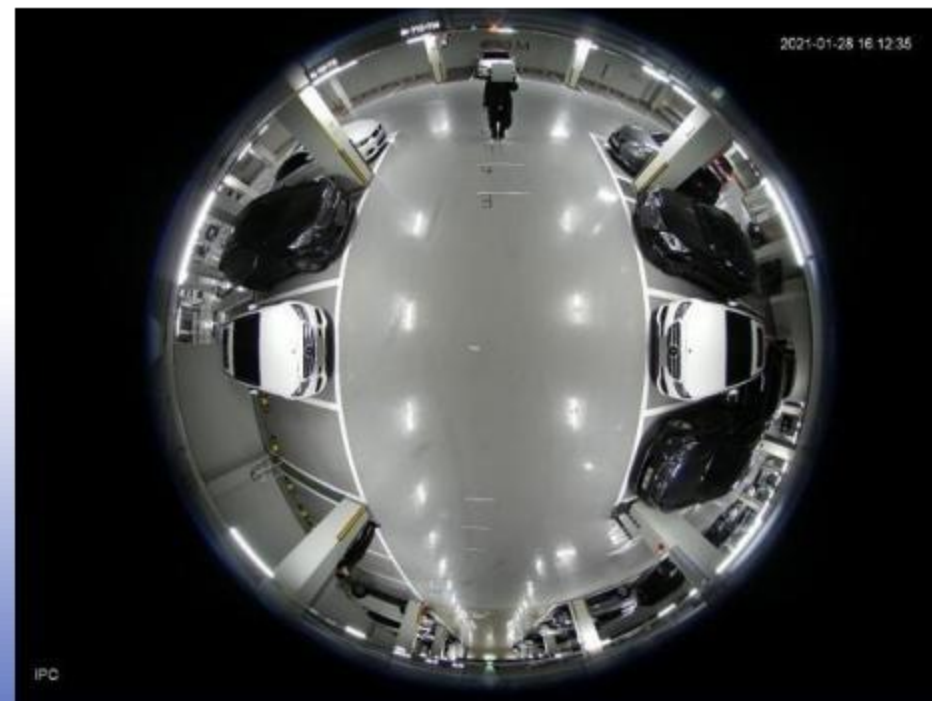
## Clear Guidance

Six (6) parking spaces coverage  
Seven (7) colors available



## AI Algorithm 1+1

Parking spaces detection (up to 6 vehicles)  
License plate recognition (up to 6 vehicles)  
Multiple dewarp display modes



## Complete Surveillance

Parking space monitoring  
Drive lane monitoring  
360-degree monitoring



# Indoor Parking Guidance - Fisheye Parking Guidance Camera II



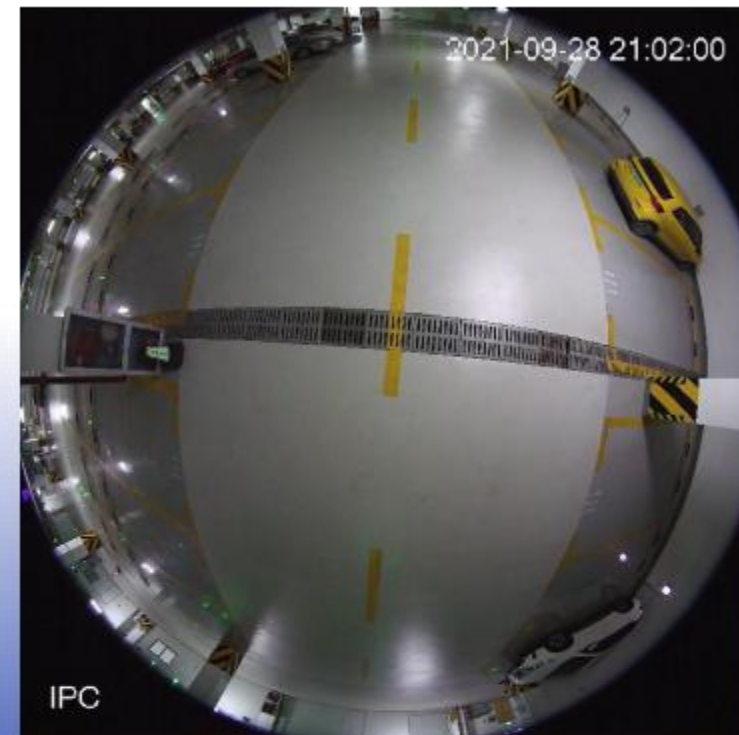
## Clear Guidance

Twelve (12) parking spaces coverage  
Seven (7) colors available



## AI Algorithm

Parking spaces detection (up to 12 vehicles)  
Multiple dewarp display modes



## Complete Surveillance

Parking space monitoring  
Drive lane monitoring

360-degree monitoring

Special PMS version required

2.7.01.02.02727  
General\_PMS\_Eng\_Basic\_V1.005.9700006.0  
.R.20210908.zip

# Indoor Parking Guidance - Scene Recommendation

## Recommended

Completely indoor and no affected elements



## OK

Semi-outdoor, all space is indoor, not much affected elements

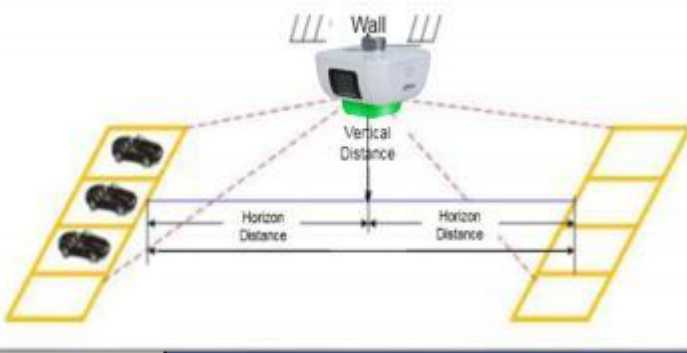


## Not Recommended

Most space is outdoor, green plants / sunshine shadow / water stains cause complicated background which affects vehicle detection and license plate recognition



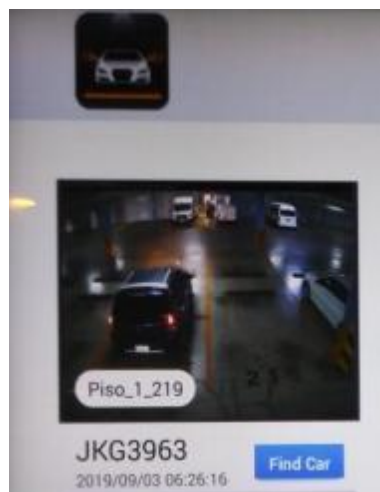
Model	Lens	Horizon Distance	Vertical Height	Monitor Range
ITC214-PH5B-F3/ F6 Single lens for 2 spaces	3.6mm	3.0~4.7m	2.1~2.6m	Cover 2 parking space width is 5m
	6mm	4.8~6.5m		
ITC414-PH5B-F2/ F3 Single lens for 3 spaces	2.8mm	2.7~4.5m	2.1~2.6m	Cover 3 parking space width is 7.5m
	3.6mm	3.5~5.5m		
ITC414-PH5B-TF2/TF3 Dual lens for 6 spaces	2.8mm	2.7~4.5m		Each side cover 3 parking space width is 7.5m
	3.6mm	3.5~5.5m		



License plate pixels 100~180

# Find My Car for Indoor Parking

## Solution



## Highlights



### Locate Vehicle

Touchscreen kiosks for self-help searching

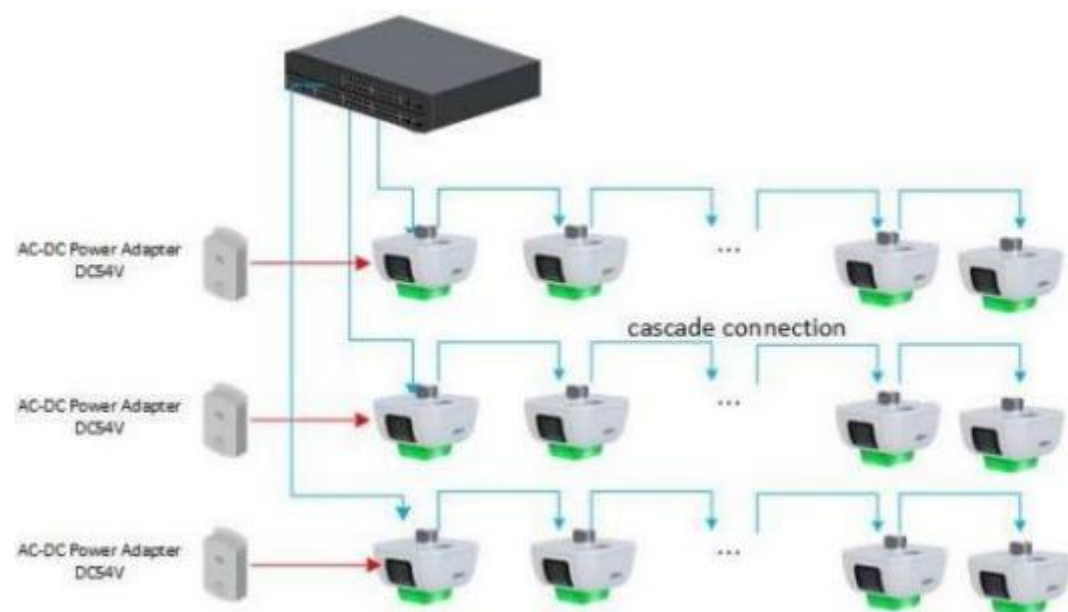


### Fuzzy search by plate number

Search vehicle with plate, provide plate cutout for confirmation



# Special Design Device to Save The Deployment Cost



PON Design



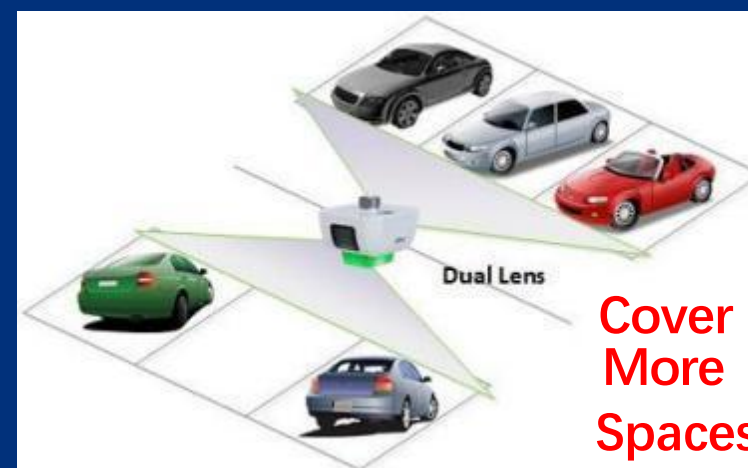
PoE Design (Support via -PoE model)

## PON (Power on Ethernet) Cascade Connection:

- Reduce UTP cable deployment and cost (83%)
- Reduce the quantities of switches
- Reduce the cost of cable tray (63%)
- Reduce the power cable

## Parking Cameras Connection Limit:

- Single lens parking camera, no more than 6pcs cameras in one line
- Dual lens parking camera, no more 4pcs cameras in one line





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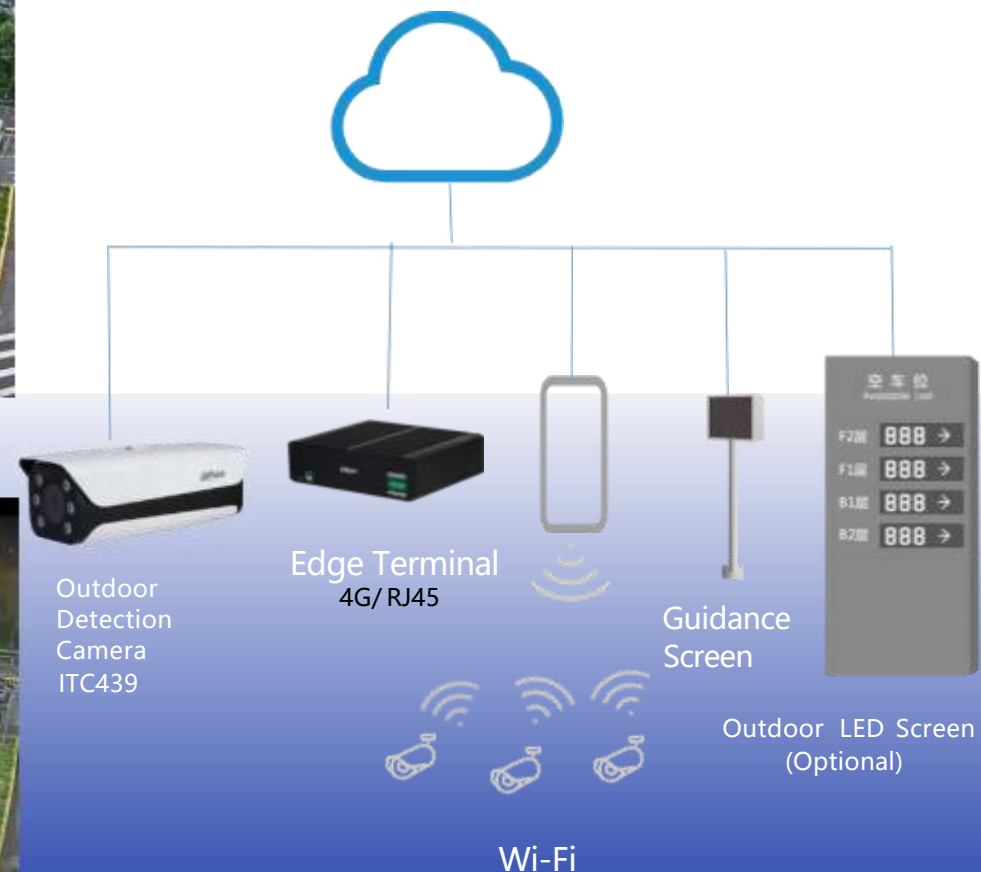
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# Outdoor Parking





# Outdoor Parking



Installation Height 4m

50

## Large Coverage

Detect up to 50 parking spaces

Lo

## Low Bandwidth

AI embedded inside camera, no back-end server required

C

## Availability Auto-counting

Use for data analysis  
Precise Guidance (Optional)

24\*7

## 24\*7 Working Design

Temperature -30. C – 65. C  
\* Min Environment light 10lux





# Outdoor Parking



Outdoor Parking **Detection & Recognition**  
Camera

Model III, **ITC439** in **LPR mode**

Real Project Site

Installation Height 3m, Distance 7m (Reference Only)

Coverage 2-3 parking spaces

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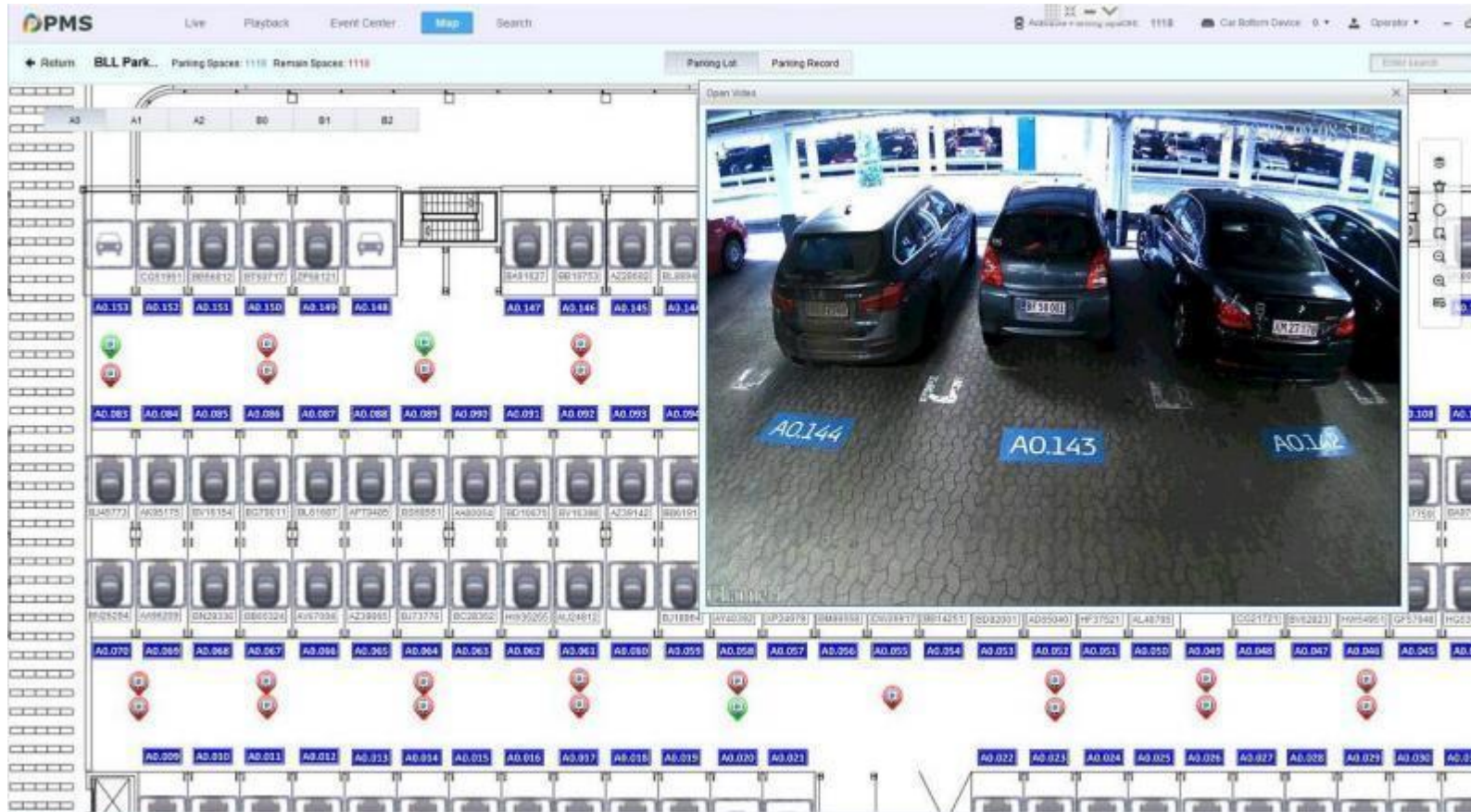
## ■ Success Cases





# Unified Parking Management Platform

## Solution



Controlling Everything on the E-map

## Highlights

- ✓ **Comprehensive Surveillance:** Real-time video, image preview and playback
- ✓ **Parking Space Info:** Space status, vehicle plate and picture, parking video record
- ✓ **Entrance & Exit Info:** Enter & exit history log, videos record
- ✓ **Smart Search:** Search the video and image by date/time/license plate.



# BI analysis | Solution Detail

## Solution

## Highlights

### Parking rate statistics

- Occupied parking space
- Total parking spaces
- Rate

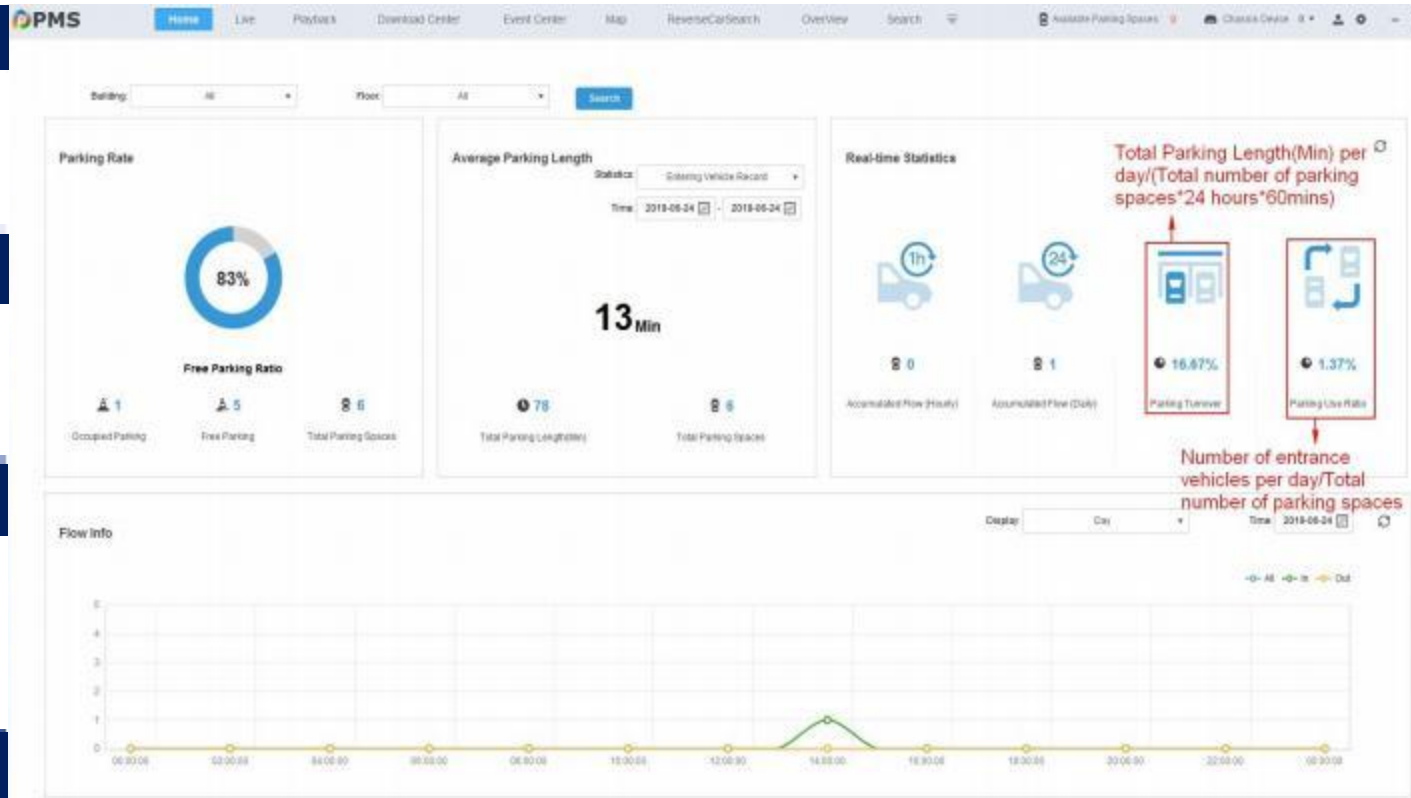
### Average parking length

- Two statistical methods
- Total length of parking
- Total parking space

### Real-time statistics

- accumulative vehicle flow within 1 hour or 1 day
- Berth turnover
- Utilization rate of parking lot

### Entrance/exit information



Make differentiated price



Provide VIP services



Make coupon policy

Increase Revenue by more ways based on BI

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## rl Success Cases





# Success Cases - Meskel Square Underground Parking Project, Ethiopia

## New & Bright, Secure & Convenient, Open & Transparent

### Project Overview

Project is located at the Meskel Square, Addis Ababa, capital of Ethiopia. The parking lot has two floors with 1,400 parking spaces which can provide large-scale parking needs for major events and commercial parking services during regular time.

### Pain Points

**Few Parking Spaces:** Limited number of on-site parking spaces and frequent occurrence of illegal parking resulting in congestion.

**Low Pass Efficiency:** A lot security personnel are required to place roadblocks, paper registration and inspection before release to entry resulting in long queues.

**Poor Revenue:** Parking only charge per entry because lack of charging system. And it only operates during daytime, resulting in low revenue.

**Serious Corruption:** There is no effective record and supervision of manual charges, and security personnel often collect car fares privately and unfairly, which leads to loss of income and complaints from visitors.

### Solution Highlights

**Improved Parking Efficiency:** Complete security check, vehicle entry, parking guidance, payment, vehicle location search, and exit quickly and automatically, parking efficiency and drivers' experience are improved.

**Convenient Reconciliation Management:** Accurate and reliable parking toll system guarantees the parking income and helps to check the statements. Corruption of collecting fees privately no longer exists. The commercial operation level is improved.

**Integrated System and Value-added:** One-stop solution includes parking management, video surveillance, security inspection, parking toll system, control center, and operates 24\*7. During the delivery the system helps to retrieve one lost government vehicle through license plate recognition and capture two theft incidents through video surveillance.





# Success Cases



## Airport Parking Project Denmark

### ■ Project Overview

- 6500 Parking spaces/1100 Dual-lens Detection Camera
- PMS

### ■ Project Requirement

- Parking Guidance System
- Providing indispensable data to third-part platform, base on the premise that define the parking price policies
- Business Intelligent Analysis
- Double-parking Detection



## Shopping Mall Parking Project Czech Republic

### ■ Project Overview

- 2500 Parking spaces/925 Detection Camera
- 20 Guidance Screen
- 5 kiosk

### ■ Project Requirement

- Parking Guidance System
- Find My Car System
- 24\*7 hours Video record in the Parking Lot to protect the customers' property

# Success Cases



## Nantes Media Center Parking Project France

**Clear and accurate guidance system :** Redesign the parking guidance system, using more than 20 guide screens to effectively guide different types of parking spaces.

**Powerful AI algorithm :** Car search system, remaining space detection, license plate recognition

**Improve user experience and operational efficiency :** Binding the license plate of reserved parking spaces effectively solves the problem of random parking. Using the video of the car detector and cooperating with ordinary video monitoring, customers can monitor the parking lot without blind spots under one management interface, which greatly improves parking operational efficiency of the farm.



## Commercial Parking Garage Project Mexico

### ■ Project Overview

- 5+1 floors, 1000 Parking spaces
- 500 Parking Guidance Cameras, 20 Guidance Screen
- 2 Commercial Kiosks

### ■ Project Requirement

- Parking Guidance System
- Find My Car System & Advertising
- 24\*7 hours Video record in the Parking Lot to protect the customers' property

# Thank You!!!

