Smart Transportation Solutions

Making your Journey Safer

UK & IRELAND

CONTENTS

SMART MOTORWAYS – CHALLENGES AND REQUIREMENTS

ELEMENTS

Motorway Infrastructure

Vehicles

Traffic Incidents

CHALLENGES

Manpower Shortages
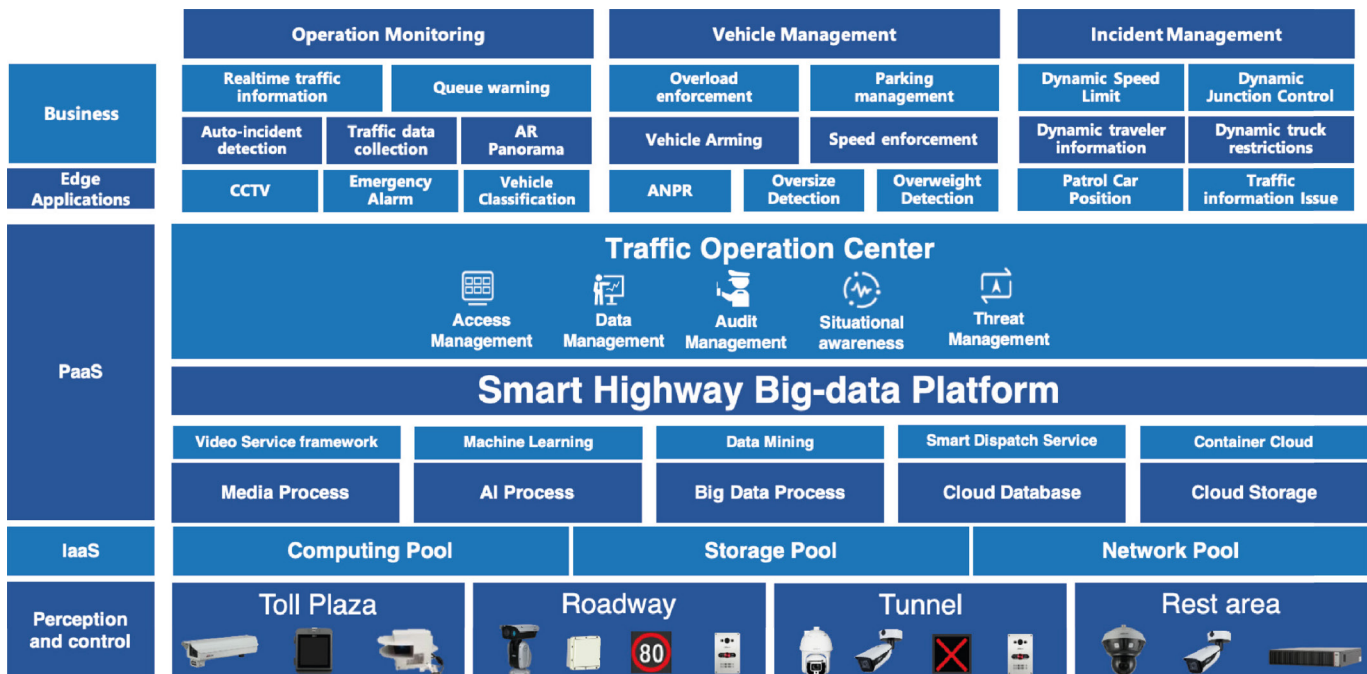

Speeding Vehicles

Traffic Congestion

REQUIREMENTS

Operational Monitoring   **Vehicle Management**   **Incident Management**

SOLUTION OVERVIEW

	Operation Monitoring			Vehicle Management			Incident Management		
Business	Realtime traffic information		Queue warning	Overload enforcement		Parking management	Dynamic Speed Limit		Dynamic Junction Control
	Auto-incident detection	Traffic data collection	AR Panorama	Vehicle Arming		Speed enforcement	Dynamic traveler information		Dynamic truck restrictions
Edge Applications	CCTV	Emergency Alarm	Vehicle Classification	ANPR	Oversize Detection	Overweight Detection	Patrol Car Position		Traffic information Issue

	Traffic Operation Center				
PaaS	Access Management	Data Management	Audit Management	Situational awareness	Threat Management

Smart Highway Big-data Platform

	Video Service framework	Machine Learning	Data Mining	Smart Dispatch Service	Container Cloud
	Media Process	AI Process	Big Data Process	Cloud Database	Cloud Storage

IaaS	Computing Pool	Storage Pool	Network Pool

Perception and control	Toll Plaza	Roadway	Tunnel	Rest area

Tunnel
- ATID
- Information issues
- Traffic data collection

Toll Roads
- ANPR
- Vehicle classification

Platform

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Port

Hong Kong
International
Airport

Shun Long Road

Scenic Hill Tunnel

Tung Chung

Guangdong/Hong Kong Boundary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road

Sha Lo Wan

Tung Chung Wan

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road

Roadway/Bridge
- ATID
- Speed enforcement
- Information issues
- Traffic data collection

Rest Areas
- AR Panorama
- Parking management

Operational Monitoring

How to quickly know the status of the
motorway network?
How to automatically detect incidents
and send alarms?

Vehicle Management

How to manage vehicles on the
motorway?
How to obtain evidence for traffic
violations

Incident Management

How to avoid incidents?
How to respond quickly to traffic
incidents?
How to manage traffic when an
incident occurs?

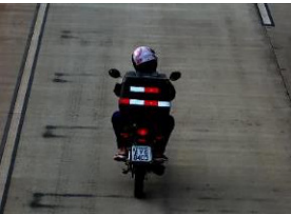# SOLUTION INTRODUCTION

VEHICLE MANAGEMENT

Solution

Speeding Management
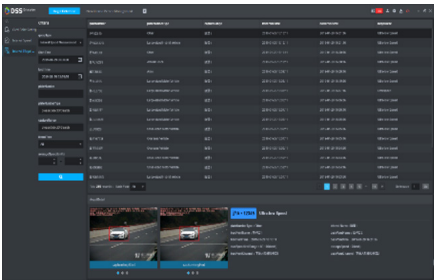
Vehicle Management

Helmet Detection

Speeding

Vehicle Information

- Vehicle make
- Vehicle speed
- Vehicle colour
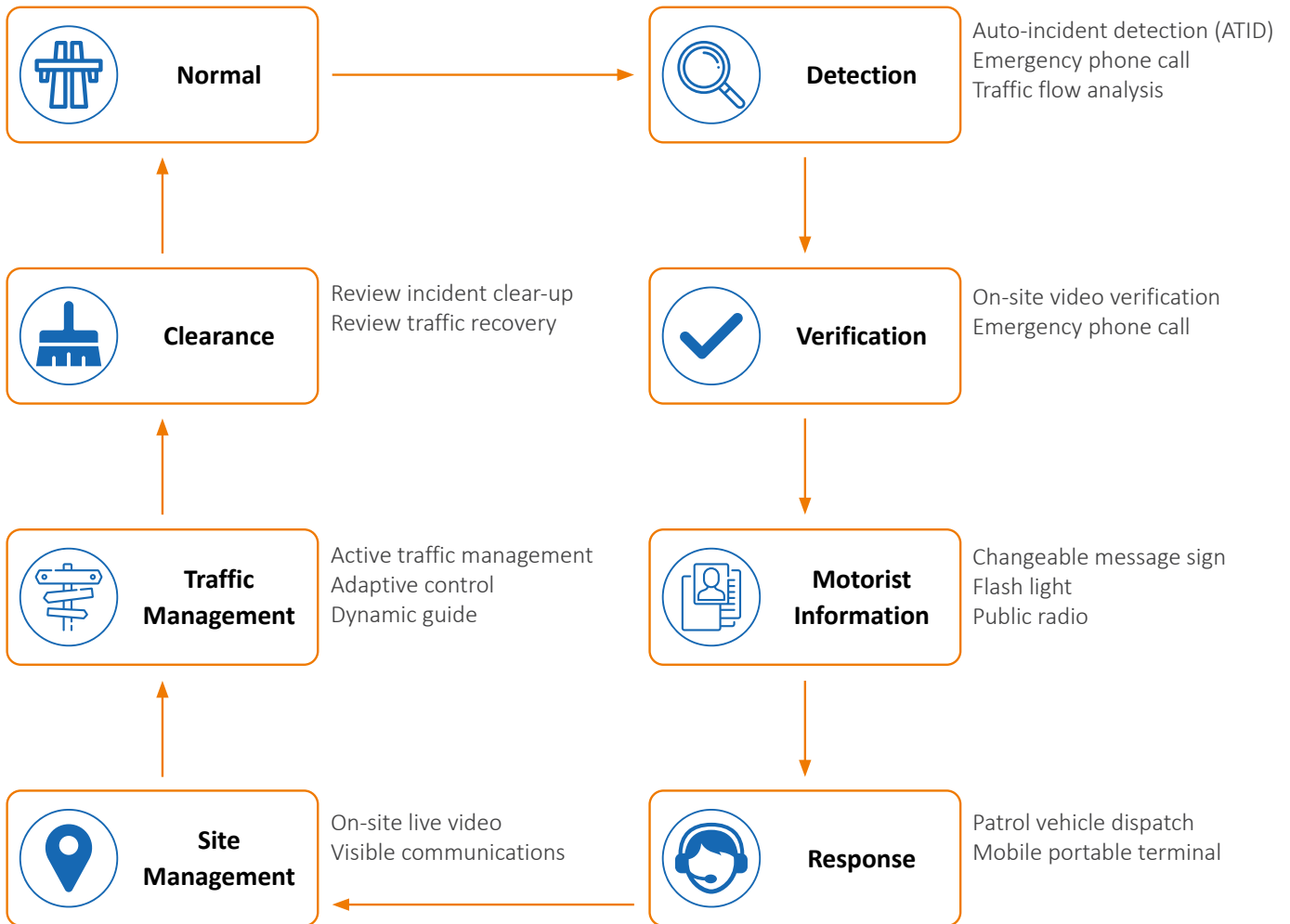- Number plate

Benefits

Vehicle Information Collection:
Number plate, type, speed, colour and helmet detection etc. This information could be used for revenue analysis and administrative enforcement.

Vehicle Speeding Enforcement:
Portable/fixed speed detection, average speed detection, suitable for different scenarios. Highly accurate and can be used for enforcement evidence.

INCIDENT MANAGEMENT

Solution

Normal	**Detection** — Auto-incident detection (ATID), Emergency phone call, Traffic flow analysis
Clearance — Review incident clear-up, Review traffic recovery	**Verification** — On-site video verification, Emergency phone call
Traffic Management — Active traffic management, Adaptive control, Dynamic guide	**Motorist Information** — Changeable message sign, Flash light, Public radio
Site Management — On-site live video, Visible communications	**Response** — Patrol vehicle dispatch, Mobile portable terminal

Benefits

• Incident management reduces congestion and further knock-on effects related to the original incident.

• Incident management also helps with on-site management of emergency services and other rescue teams.

• Using Active Traffic Management sub-systems including Dynamic Speed Limits, Queue Warnings, Dynamic Junction Control, Dynamic Travel Information and Dynamic Lorry Restrictions, it is possible to fully optimise traffic.

INCIDENT MANAGEMENT - ACTIVE TRAFFIC MANAGEMENT

Solution

Dynamic Speed Limits

Queue Warnings

Dynamic Junction Control

Dynamic Travel Information

Dynamic Lorry Restrictions

Benefits

- Dynamic Speed Limits: enforceable speed limits, making traffic flow more smoothly.
- Queue Warnings: Informs drivers of the presence of road works or traffic problems on their route, making traffic flow more smoothly.
- Dynamic Junction Control: Dynamically allocates lane access on carriageways and slip roads at major intersections to reduce the possibility of further incidents/accidents.
- Dynamic Travel Information: Diverts traffic to alternative roads/routes.
- Dynamic Lorry Restrictions: Restricts lorries from using certain lanes to increase road capacity.

OPERATIONAL MONITORING - DASHBOARD

Solution

Benefits

- Visible Management: Traffic flow, traffic incident alarms, services (rest areas) and route analysis data.
- GIS-based information display: Real-time traffic data and equipment location.

OPERATIONAL MONITORING - AUTOMATIC INCIDENT DETECTION

Solution

Parking Detection
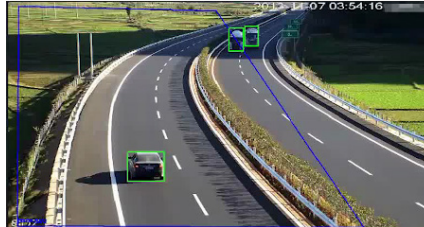
Obstacle Detection

Traffic Flow Data Collection

Fire/Smoke Detection
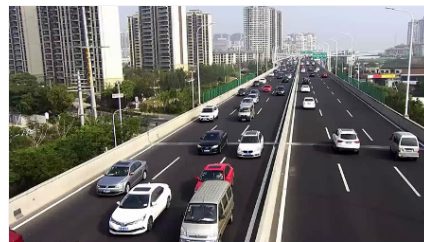
Congestion Detection
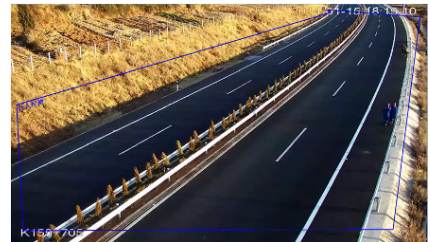
Pedestrian Detection

Benefits

• Time to detect an incident is less than 1 minute.
• The ATID system provides motorway coverage of the individual lanes and has the capability to immediately and accurately detect and report an incident at any location on the motorway.

OPERATIONAL MONITORING – ALL-IN-ONE PLATFORM

Solution
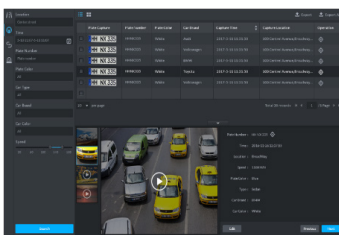
Toll Lane Management
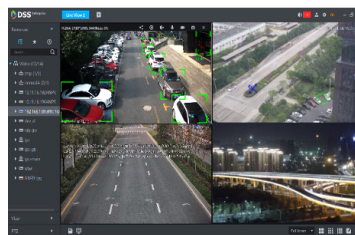
Video Surveillance

Changeable Message Signs
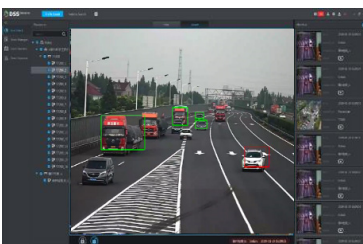
Auto-Incident Detection
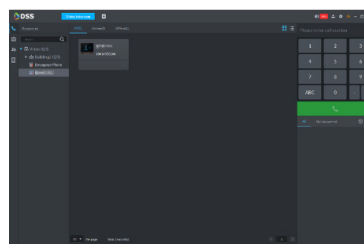
Emergency Alarms
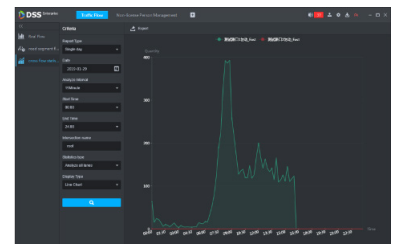
Traffic Data

Benefits

• One platform integrates CCTV, ATID, Toll Lane ANPR, VMS, Emergency Alarms and Multiple Traffic Data systems.

SOLUTION BENEFITS
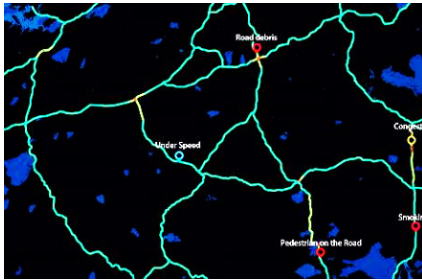
Operational Monitoring

• Reduces manpower costs
• Visible traffic management
• Quick to detect incidents

Vehicle Management

• Collects vehicle information
• Reduces speeding vehicles

Incident Management

• Reduces traffic congestion
• Reduces accident rates
• Reduces fatality rates
• Optimises motorist information

SMART MOTORWAY CASE STUDIES
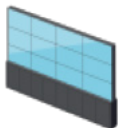
THE SOLUTIONS WE PROVIDED

In 2018

Video
707

Positional Cameras
707

Tianjin is one of nine national central cities in Mainland China with a total population in 2016 estimated at 15 million.

Variable Message Signs
110

Road
- Event Detection
- Information Release
- Traffic Flow

Tunnel
- Event Detection
- Information Release

Automatic Incident Detection
40

Platform
2

Storage
5

Toll Road
- ANPR
- Emergency Alarm

SMART TRANSPORTATION SOLUTIONS
UK & IRELAND

BENEFITS

Since 2016 a motorway has been using the Motorway Management System – traffic accident detection and the information release system. The overall results are a significant reduction in motorway accidents and improved levels of security.

Relative value of accident

Highway Information issued and death rate
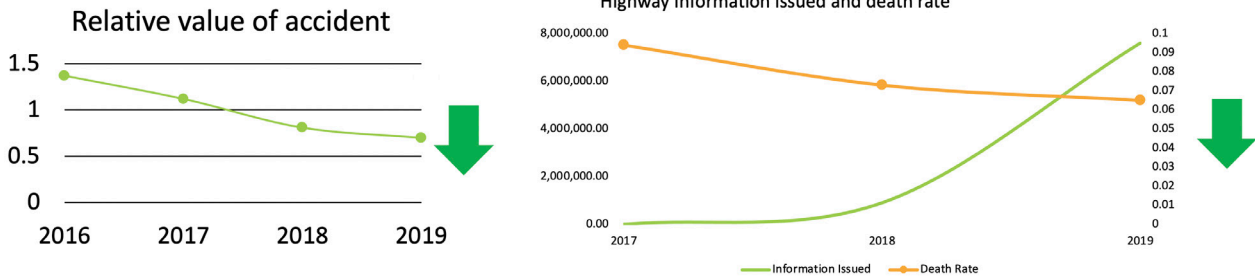
2016 - 2019 Achievements

31% Reduction in Fatalities

Traffic Incident Management
• Accident prevention
• Quick response to vehicle accidents

49% Reduction in Accidents

Increased Customer Satisfaction
• Feels safer and more secure

MOTORWAY CASES

N-5 National Highway in Pakistan
Dahua provided the total CCTV solution including cameras, NVRs, EVS and DSS video management software. In total, there were nearly 100 Dahua HD network cameras and speed domes from the Pro Camera Series installed.

Da-Li Expressway in China
Dahua provided the video surveillance system and ITS system. The system contains four parts, including the Toll Barriers, Tunnel, Road Side and TOC with more than 20 millions RMB invested.

Guizhou Duyun Xingfu Tunnel CCTV & Incident Detection System
Dahua provided full-HD video surveillance equipment for real-time monitoring in the tunnel and traffic incident detection using the incident detection server.

Fujian Highway HD CCTV Unified Platform
Dahua actively cooperated with Fujian Expressway in the development of interconnected platform standards and successfully won the bid for the Fujian Highway HD CCTV Unified Platform Project.

RELATED PRODUCTS

ATID PRODUCTS

SD8A240WA-HNF

- 1/1.8" 2MP CMOS
- 40x optical zoom, EIS
- IR distance up to 500m
- Supports face recognition
- Supports Hi-PoE
- Smart Wiper, IP67
- Deep-learning-based Auto-Traffic Incident Detection

IPC-MFW8442-Z4-D87

- 2x 1/1.8" CMOS, 8MP+4MP
- 25/30 fps@4K (3840×2160)
- 8 – 56 mm motorised lens
- 7/3 Alarm in/out, 2/1 audio in/out
- Max. IR LEDs Length 150 m
- 1000M Eth + 1000M SFP
- Micro SD memory, IP67
- Deep-learning-based Auto-Traffic Incident Detection

PTZ85260-HNF-WA-FL

- 1/1.8" 2MP CMOS
- 60x optical zoom, EIS
- Laser distance up to 1000m
- Deep-learning-based perimeter protection
- IP67
- Deep-learning-based Auto-Traffic Incident Detection

SDT5X225-2F-WA-0600

- Dual-PTZ system
- 1/2.8" 2Megapixel CMOS
- Powerful 25x optical zoom
- Starlight technology
- Deep-learning-based auto tracking and perimeter protection
- Supports Hi-PoE
- H.265 Encoding
- IP67

TOLL LANE PRODUCTS

IPMECS-2201C-IR

- 2MP, 1920 (H)×1080 (V) @30fps
- 2.7-12mm len cover up to 1 lanes
- ANPR distance: Up to 12m
- Build-in IR LEDs light
- All-in-one integrated design (ANPR, vehicle classified, traffic data collection, speed enforcement, radar intergration)
- Capture speed up to 60km/h

DHI-ITC352-AU3F-IR8

- 3MP, 2048 (H)×1536 (V) @30fps
- 16-40mm len cover up to 1 lanes
- ANPR distance: 18 ~ 25 m
- Build-in IR LEDs light
- All-in-one integrated design (ANPR, vehicle classified, traffic data collection, speed enforcement, radar integration)
- Capture speed up to 200km/h
- Extended GPS (Optional)

ANPR PRODUCTS FOR ROADS

DHI-ITC952-AU3F-IR

- 12MP, 4096 (H)×2820 (V) @25fps
- 16-40mm lens covers up to 3 lanes
- ANPR distance: 18 ~ 25 m
- Build-in IR LED lights
- All-in-one integrated design (ANPR, vehicle classified, traffic data collection, speed enforcement, radar integration)
- Capture speed up to 200km/h
- Extended GPS (Optional)

DHI-ITC431-RW1F-IR

- 4MP, 2688 (H)×1520 (V) @25fps
- 10.5-42mm Len cover up to 2 lanes
- ANPR distance: 15 ~ 30 m
- Build-in IR LED lights
- All-in-one integrated design (ANPR, vehicle classified, traffic data collection, speed enforcement, radar integration)
- Capture speed up to 120km/h
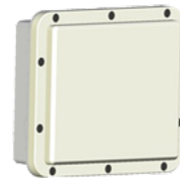
ITARD-024MA-H

- Amount of lanes: 1-4 lanes
- Speed detection range: (5-350) km/h
- Speed measuring accuracy: (-4-0) km/h
- Detection range: 2-100 m
- Working frequency: 24.150GHz±45MHz
- IP67

EMERGENCY ALARM PRODUCTS

Emergency Alarm Tower

- HD CMOS camera
- Video and audio communication
- Remote monitor and broadcast
- Alarm integration
- Vandal-resistant: IP65, IK10

Emergency Box

- SIP intercom with 720P video
- Digital noise reduction and echo suppression
- Supports alarm by pressing call button
- Supports alarm input output
- IK10, IP65

Master Station

- SIP intercom master station
- 10" TFT capacitive touch screen, 1024×600
- Alarm integration
- Video intercom

KEY PRODUCTS

Traffic Incident Detector

- Adopts deep learning algorithms
- Traffic Incident Detection: Parking, pedestrian, congestion, wrong-way detection, obstacles, smoke, fire, speeding, driving too slow (for motor vehicles).
- Traffic flow detection: average speed, time occupancy rate, space occupancy rate, space headway, time headway and queue length

Converged Communication

- SIP server
- Supports 200 call channels, 200 recording channels, 5,000 VoIP channels
- Supports digital phones: 2 × E1
- Supports analogue phones: 8 × FXS, 16 × FXO
- Supports radio intercom

Video Management Platform

- CCTV, ATID, ASE, EAS, VMS etc, sub-system management
- Video aggregation, video docking, device docking
- Video live-view, Video playback, Alarm management

NETWORK PRODUCTS

Core Switch S7606

- Providing multiple high availability technologies such as non-stop forwarding, non-stop upgrade, graceful restart, and ring network protection.
- Supports 40GE and 100GE
- Supporting technologies required by cloud data centers, for example, TRILL, EVB, and FCoE

Aggregation Switch PFS5936

- 24 x 100/1000 Mbps Base-X, 8 x 10/100/1000 Mbps Base-T, 4 x 1/10 Gbps SFP+
- Supports 24 100/1000 Mbps and 4 1/10 Gbps fibre ports, 8 10/100/1000 Mbps Ethernet ports
- Supports VLAN and port aggregation
- Supports STP, RSTP, MSTP and ERPS
- Supports Web, CLI and SNMP management

Access Switch PFS4204

- Supports 2 × 10/100/1000 Mbps Base-T and 2 × 100/1000 Mbps Base-X
- Supports POE, VLAN and port aggregation
- Supports STP, RSTP, MSTP and ERPS
- Supports WEB, CLI and SNMP management
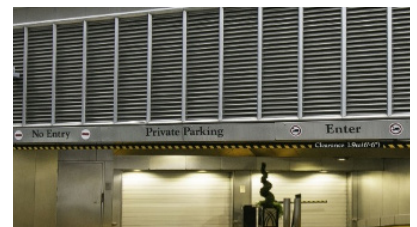
SMART CAR PARKS – CHALLENGES AND REQUIREMENTS

ELEMENTS

Airport Car Parks

Shopping Centre Car Parks

Private Car Parks

CHALLENGES

Difficulty Finding a Space

Parking Revenue Issues

Accidents & Thefts from Vehicles

Costs too High

REQUIREMENTS

Improve Experience   **Increase Revenue**   **Improve Safety**   **Save Cost**

SOLUTION OVERVIEW

Highly Convenient

High Efficiency

Low Cost

Parking Management

PMS Pro

Available Spaces Display

Outdoor LED Screen

Intercom Card Swiping

VTO Kit

ANPR Open Barrier info. Display

AI Access ANPR Kit

High Speed Barrier

Barrier with radar

Dispense and Validate Ticket

Ticket Dispenser Ticket Validator

Entrance & Exit

Control Centre

Pedestrian Entrance

Car Park Space

Corner

Parking Space Detection

Spot Detect Camera

Vacant Space Guidance

Parking Guidance Sign

Find my Car

Car Locating Kiosk

Parking Fee Payment

Auto Payment Machine

Car Park Surveillance

Surveillance Camera

SOLUTION INTRODUCTION

ENTRANCE

Scenario

At Entrance

Entrance Process
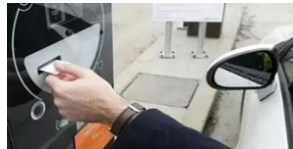
Get Ticket

Entry Problems

Solution
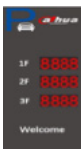
Outdoor LED Screen

Available Spaces Displayed
Software works out the available number of spaces and displays this number on an external screen.

Barrier

High-speed Barrier with Radar
Anti-fall feature enabled using radar.

AI Access ANPR Kit

ANPR & Flexible Access Control
Vehicle access is controlled by ANPR cameras, without the need for any tickets. Supports black and white list access authorisation.

Ticket Dispenser

Self-service with Ticket Dispenser
Ticket dispensed by machine.

VTO Kit

Call to Administration Centre using VTO
For any entry problems or when visitors arrive, the driver can call the administration centre using the VTO.

Benefit
Save up to 75% on entry & exit times using ANPR cameras.

CAR PARKING

Scenario

Guidance to free areas

Guide to free spaces

Parking

Records vehicle status

Benefit

Reduces time to park by 44% by using VPGS based on AI.

Solution

Parking Guidance Sign
Vacant space guidance
Indoor screen shows the numbers of available parking spaces in every direction.

Spot Detection Cameras
Parking space indication
Spot cameras can automatically identify the current status of a parking space and provide the car number plate information to the management centre.

Spot Detection Cameras
Parking contravention warning
When a parking contravention occurs a warning/alert will happen.

Real-time monitoring
Provides a real-time video stream to the administration centre for monitoring and evidential purposes.

LOCATING CAR & EXIT

Scenario

Locating Car

Payment

Exit

Benefit

52% of drivers forget where they have parked and FMC solves this problem perfectly.

Solution

Car Locating Kiosk
Help to find your car quickly

Input Number Plate

Show the best route

Parking Fee Payment
Auto Payment
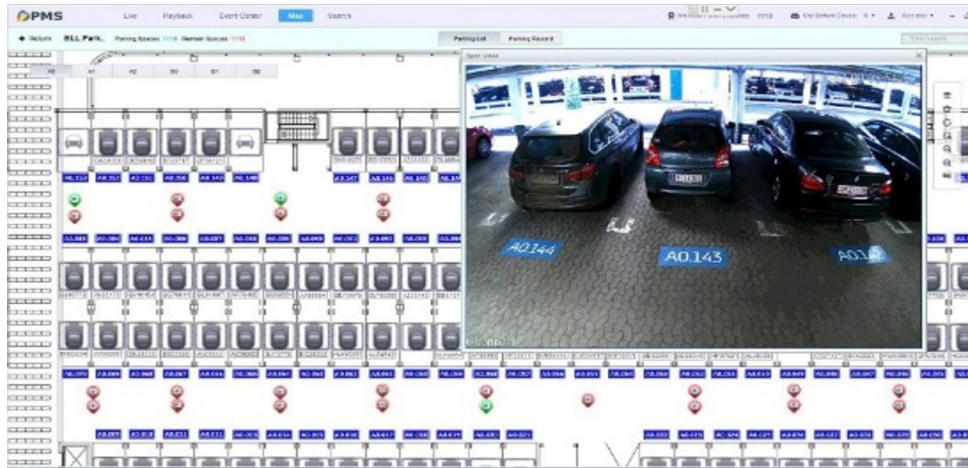With an automatic payment machine, the driver can scan the ticket or input the vehicle number plate to easily pay.

AI Access ANPR Kit & Ticket Validator
ANPR & Self-service with ticket validator
With ANPR cameras there's no stopping as you exit.

PARKING MANAGEMENT

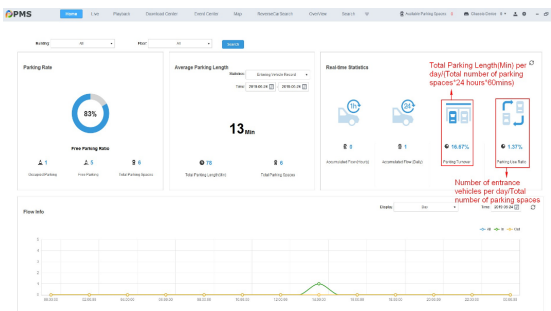## Solution

Unified PMS with Full E-map Control

Benefit

• 90% reduction in operational costs based on an unmanned operation – one car park, one operator.
• 70% reduction in vehicle emissions due to less time needed to find vacant spaces.
• 80% reduction in overall costs.

BI ANALYSIS

Solution

Parking Rate Statistics
• Occupied parking spaces
• Total parking spaces
• Rate

Average Parking Length
• Two statistical methods
• Total duration of parking
• Total parking spaces

Real-time Statistics
• Accumulated vehicle flow within 1 hour or 1 day
• Car park space turnover
• Car park occupancy rate

Entrance & Exit Information

Benefit

More ways to increase revenue using BI

Differentiated Pricing

VIP Services Provided

Parking Coupons

SOLUTION BENEFITS

Increased Usage

- Entry without needing to stop
- Reduces access time from 16s to 4s
- Half of drivers benefit from locating their cars more easily

Much Safer

- Easy to find related video evidence after an incident

Increased Revenues

- Unoccupied rate decreases
- 44% of time saved parking and exiting car park
- Premium prices help operators increase revenue

Decreased Costs

- At least one member of staff is needed in every car park
- Most car parks are unmanned

RELATED PRODUCTS

ANPR Cameras: ITC215 Serials

- 2Megapixel
- WDR, Day/Night(ICR), 3DNR,BLC, HLC H.265 & H.265
- IP67
- ANPR
- Vehicle data structuring

Access ANPR kit: DH-IPMECS-2201C serials

- 2 Megapixel
- High vehicle capture rate: >= 99%
- Vehicle data structuring
- Embedded White List
- IP54

DHI-IPMECD-3011 Serials Barriers with Radar

- Anti-fall using connected radar, coil or IR sensor
- Supports remote control with a 50m distance
- Operating temperature: −40°C to +70°C
- Operating voltage: 220V AC±15%
- Protection grade: IP55

Indoor LED Sign: DHI-IPMPG1 serials

- DHI-IPMPGI-110AC: One way
- DHI-IPMPGI-120AC: Two way
- DHI-IPMPGI-130AC: Three way

Parking detection: ITC214 serials

- 2MP
- Simultaneously detects up to 2 spaces
- Indicator supports at least 7 colours
- Supports WDR
- Supports PvE (Power via Ethernet)

Parking detection: ITC314 serials

- 3 MP
- Dual-Lens design, simultaneously detects up to 6 spaces
- Indicator supports at least 7 colours
- Supports WDR
- Supports PvE (Power via Ethernet)
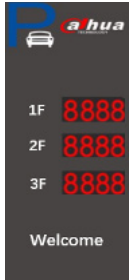
Outdoor Totem LED Sign

- DHI-IPMPGI-211AA (Single layer)
- DHI-IPMPGI-221AB (Double Layer)
- DHI-IPMPGI-231AB (Three Layer)
- DHI-IPMPGI-241AB (Four layer)
- DHI-IPMPGI-251AB (Five Layer)
- DHI-IPMPGI-261AB (Six Layer)

Car locator | DHI-IPMPGS-221A

- Supports locating vehicle using number plate
- 1x 1000Mb Ethernet port and 2x USB ports
- 21.5-inch touchscreen

PMS Pro

- Supports 200 online users
- Supports 10 Entrance/Exit ANPR channel inputs
- Devices supported: NVR, IPC, VTO, EVS, Access ANPR, Spot Detector, Car Locator, Barrier, LED Screen, IVS-T, Car Locator, etc.
- Platform SDK available for third-party device integration

SMART PARKING CASE STUDIES

AIRPORT IN SCANDINAVIA

In 2018 - 2019

Spot Detectors
1,000+

Guidance Screens
85

Car Locator
15

Platform
2

Storage
4

One of the top ten airports in Europe and one of the biggest in Scandinavia. About 30 million passengers in 2018. A total of 6,500 indoor parking spaces.

Parking Area
• Parking space detection
• Vacant space navigation
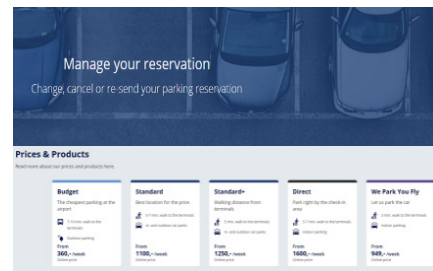
Parking Operation
• BI provides parking data for operational decisions.
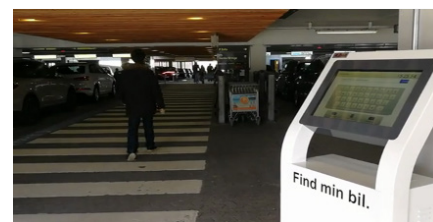
Pedestrian Entrances
• Helps drivers to locate their vehicles.

Dahua provided a parking solution for the airport for all of their car parking spaces between 2018 and 2019, which significantly improved the parking experience for users and increased parking revenues.
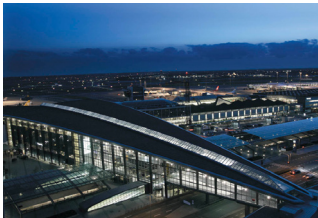
Profit Increase Rate

Satisfaction Rate
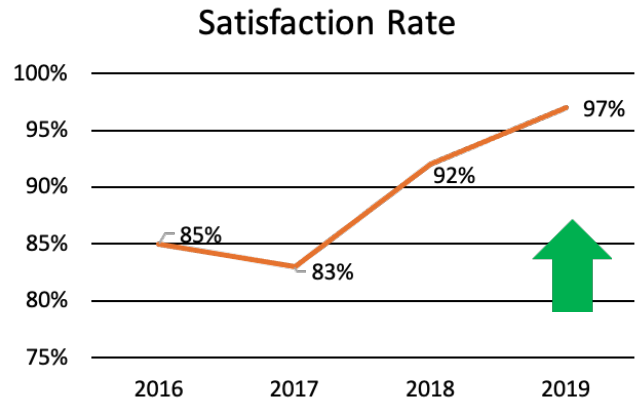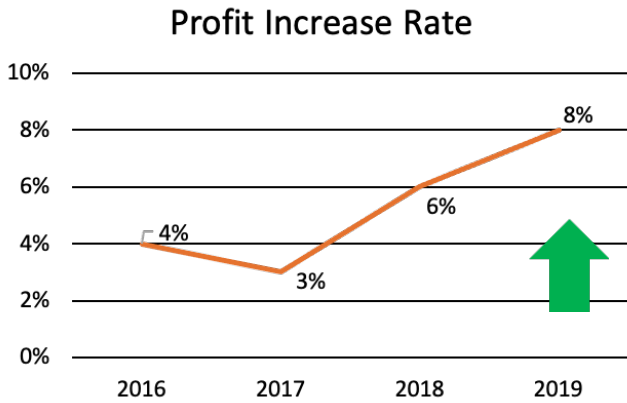
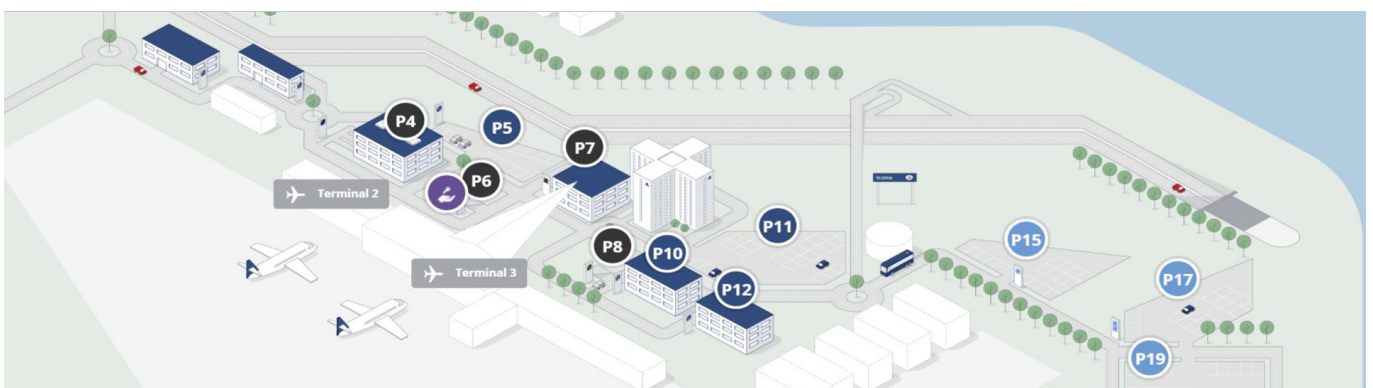
Solution

31%
Saving on Labour

52%
of Drivers Helped Finding Vehicle

44%
Saved Time Parking

COPENHAGEN AIRPORT

- The biggest airport in Scandinavia
- One of the oldest international airports in Europe
- One of the top ten airports in Europe
- 30 million passengers in 2018
- A total of 6,000 indoor parking spaces

Benefits

P Budget   **P** Standard   **P** Standard +   **P** Direct   We Park You Fly   **P** Campaign offer

Improved Experience: 2 level navigation of VPGS and FMCS using ANPR to significantly improve the parking experience.
Increased Revenue: The car park operator can use vehicle parking information based on BI to setup a premium price policy to create more revenue.
Enhanced Safety: Each detector can provide video surveillance services to customers, which will provide evidence in the event of an incident and will deter criminals.
Low cost: Unmanned operations using AI and ANPR reduces labour and operational costs by 70%.
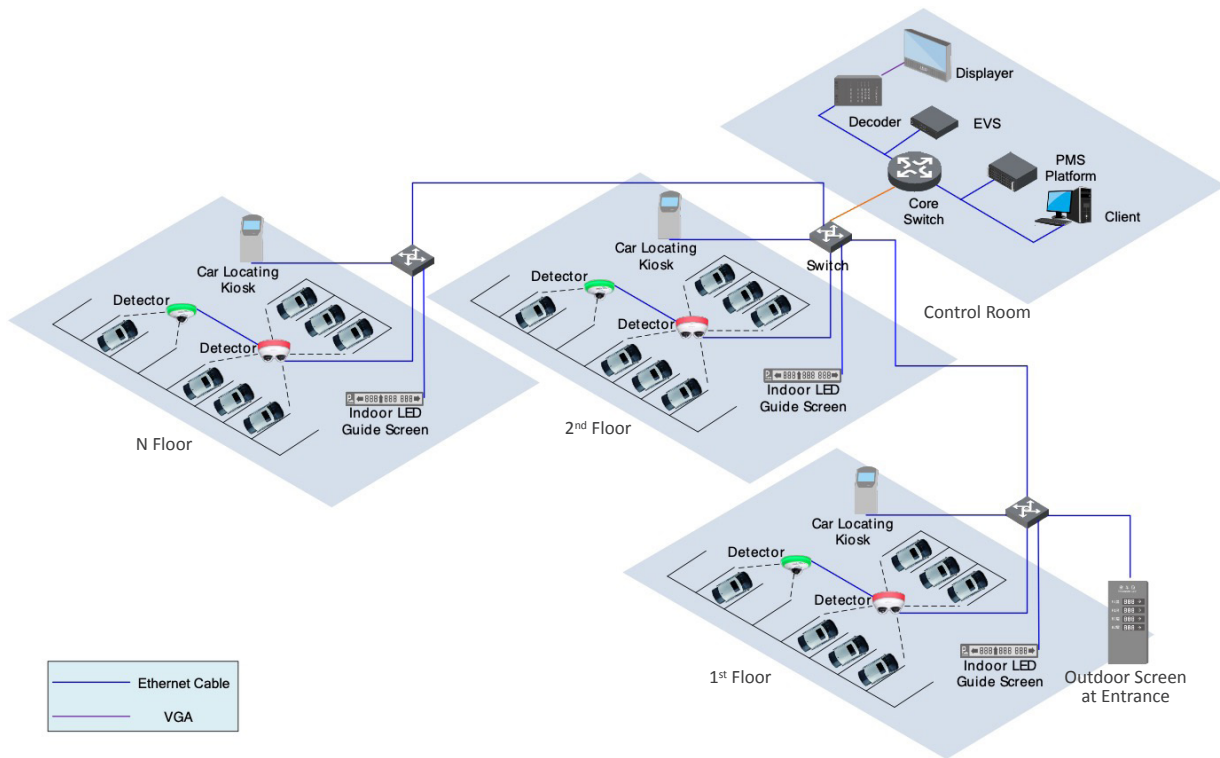
High Accuracy

The camera has multiple built-in AI algorithms to provide a highly accurate way to detect whether a space is free or not. ANPR and being able to identify parking contraventions are also available using video analysis technology.

High Reliability

The platform supports hot standby and supports deployment in a virtualised environment. Low equipment failure rate and easy to maintain.

Total Solution

Provides a complete solution for customers, including VPGS, FMCS, Parking Management, BI analysis, video storage, control display and more.

Helps find empty parking spaces quickly using LED Signage and Spot Detection Camera, the camera supports ANPR and the detection of available parking spaces using the built-in AI algorithm.
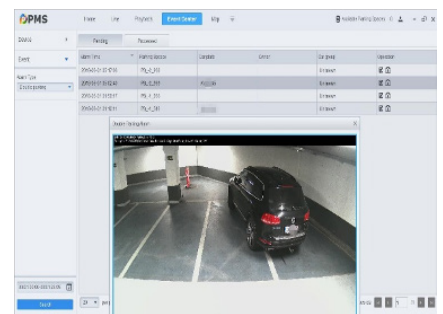

The FMC system uses ANPR technology to help drivers locate their vehicle and shows a simple route to follow in order to find it.

The cameras built-in AI algorithm also detects parking contraventions, for example straddling two bays.

Improves the driver experience, reduces vehicle emissions and reduces costs.

Enhanced user experience by helping drivers to find their cars more easily.

Detects vehicles straddling two bays, unauthorised parking, improves parking space occupancy and reduces car park operator revenue losses.

Each detector can provide video surveillance for customers.
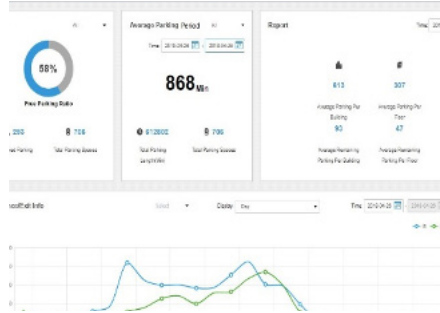
Analyse parking patterns: average parking times, vacancy rates, most popular parking floor, etc.
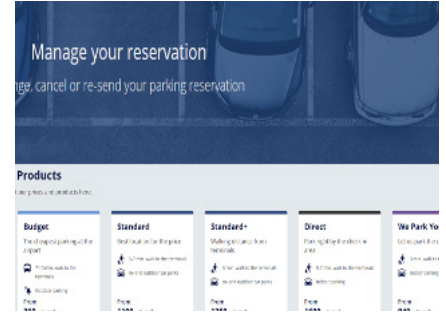
Sends vehicle ID and location data to payment system, which can set a premium and conditional pricing policy for different parking spaces.

Provides evidence of an incident and deters criminal activity.

Gives operators more insight into the behaviour of people using the car park. Provides data to help with decisions regarding future parking spaces.

The car park operator can use vehicle parking information to set up a premium price policy, creating more revenue.

OTHER CASES

Denmark Billund Airport

Billund airport is the second largest airport in Denmark. The headquarters of LEGO is located in this city. The car park has around 1,217 parking spaces.

Dahua installed VPGS & FMCS for the car park operator. Dahua's solution helps users quickly find vacant parking spaces. Meanwhile, video monitoring and a reverse search function are also provided.

Czech Novy Smichov Shopping Centre

Novy Smichov is a large shopping centre owned by the French Klepierre group. It is one of the most prestigious shopping centres in Prague with a total of 2,240 parking spaces.

Dahua installed VPGS & FMCS for the customer. This has improved the parking experience for customers and has helped the shopping centre attract more customers.

Turkey Ispark Parking

Ispark is the biggest parking operator in Istanbul. The car park has over 1,000 parking spaces.

Dahua provided over 600 detection devices and a complete parking solution, helping to improve the experience for customers.

Netherland Jaarbeurs Utrecht Exhibition Centre

Jaarbeurs Exhibition Centre is one of the most important exhibition centres in The Netherlands. Previously visitors complained about not being able to find a vacant parking space, but with Dahua's parking solution the whole experience has been significantly improved.

SMART BUSES – CHALLENGES AND REQUIREMENTS

ELEMENTS

Inside of the Bus

Driving Along a Street

Getting on or off a Bus

CHALLENGES

On-board Safety Threats

High Bus Accident Rate
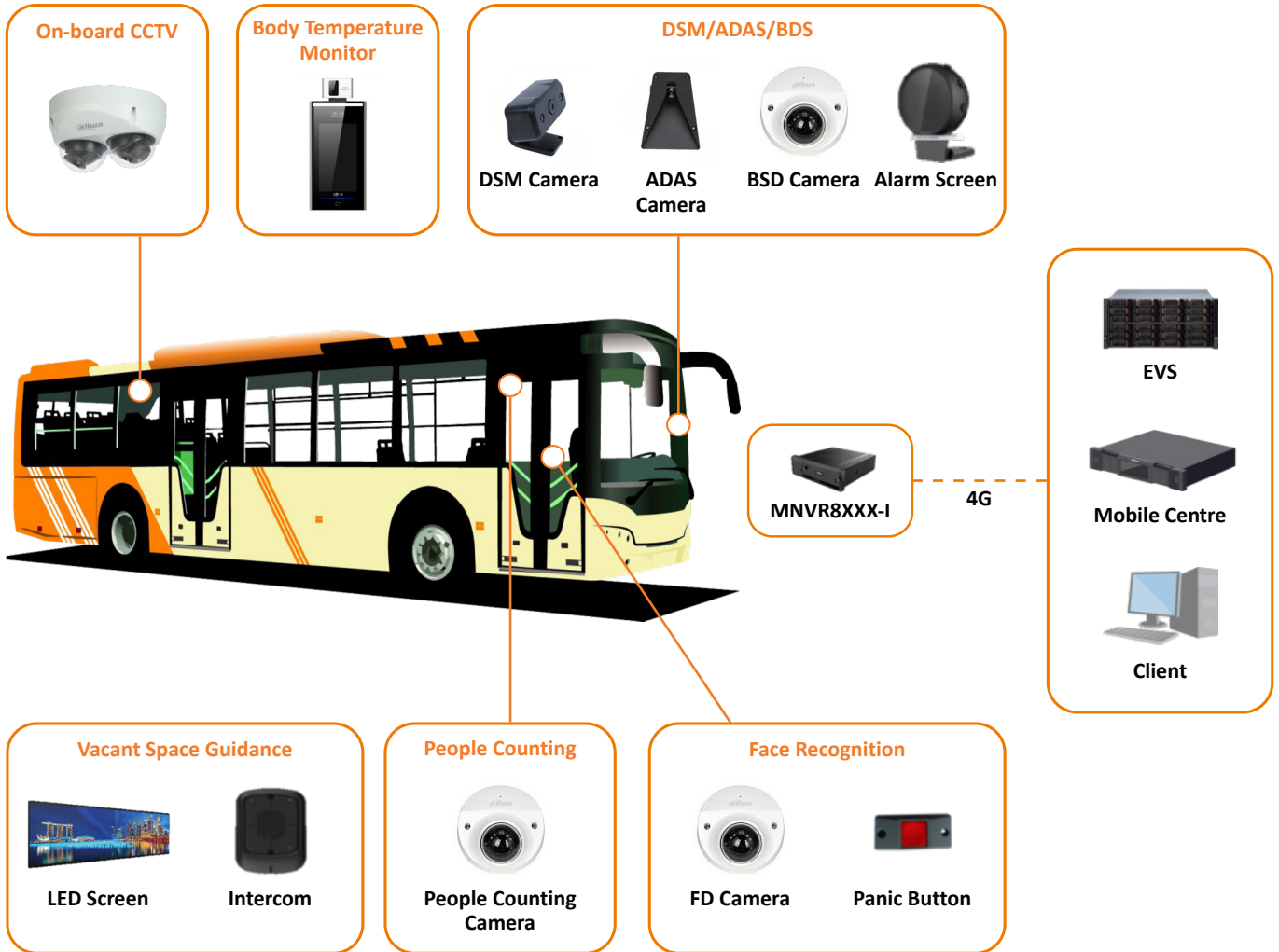

Complaints due to Bad Experiences

REQUIREMENTS

Operational Monitoring

Vehicle Management

Incident Management

SOLUTION OVERVIEW

On-board CCTV

Body Temperature Monitor

DSM/ADAS/BDS

DSM Camera   ADAS Camera   BSD Camera   Alarm Screen

MNVR8XXX-I

4G

EVS

Mobile Centre

Client

Vacant Space Guidance

LED Screen   Intercom

People Counting

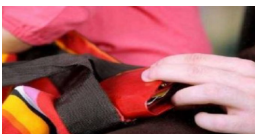People Counting Camera

Face Recognition

FD Camera   Panic Button

SOLUTION INTRODUCTION

PASSENGER SAFETY

Scenarios

Epidemic Prevention

Theft on the Bus

Items left on the Bus

Solution

Body Temperature Monitoring Terminal
Non-contact body-temp monitoring
The device can monitor the body temperature in a very efficient way and remind passenger to wear a mask. If someone's body temperature is abnormally high, the device generates an alarm to inform the driver to take preventative action.

MNVR
Data transfer and abnormal alarm
1. Obtain the passenger's body temperature and send to the platform to generate a statistic with face snapshot and body temperature.
2. The abnormal temperature alarm is immediately sent to the control centre.

Dual Lens Camera
No blind-spots
Dual lens camera and other internal cameras cover the entire bus to provide high-definition recordings without any blind-spots.

Panic Button
Emergency alarm upload
Panic button allows driver to send alarm to control room in real-time.

Benefits

• Automatic and non-contact method of measuring the body temperature of passengers, reducing the risk of cross-infection.
• Helps passengers to retrieve lost luggage by searching the HD video footage.

DRIVER SAFETY

Scenarios

Unusual Driver Behaviour

Dangerous Driver Behaviour

Bus Turning

Solution

DSM Camera
Driver status monitor
DSM camera can detect unusual driver behaviour such as fatigue, closed eyes, smoking and using mobile phone while driving.

ADAS Camera
Advanced driving assistance system
ADAS camera can detect and alert against dangerous driving such as forward collision warnings, headway monitor warnings and lane departure warnings.

BSD Camera
Blind spot detection camera
BSD cameras can detect if a pedestrian or motorcycle is in the driver's blind spot when the bus turns.

AI MNVR
All in one AI MNVR
AI MNVR supports all of the above intelligent functions with a deep learning algorithm that triggers alarms to remind driver to focus on driving.

Benefits

• Bus accidents (collisions with pedestrians) are reduced significantly due to warnings from active safety solution.

PASSENGER EXPERIENCE

Scenarios

Passenger Counting

Bus Lane-only Occupation

Passenger Guidance

Solution

People Counting Camera
Count passengers getting on a bus
Passengers getting on the bus at each station are recorded and his generates data which helps bus operators to optimise the bus schedule to reduce passenger waiting time. The camera limits the flow of people getting on the bus, further preventing the spread of the virus.

ANPR Camera
Capture the car occupying the bus lane
When a private vehicle drives in a bus lane the camera will capture and recognise the number plate of the car automatically, which helps keep lane free for buses.

LED Screen
Arrival information display
1. LED screen shows the bus stopping information and will display the next bus stop name when the bus approaches it.
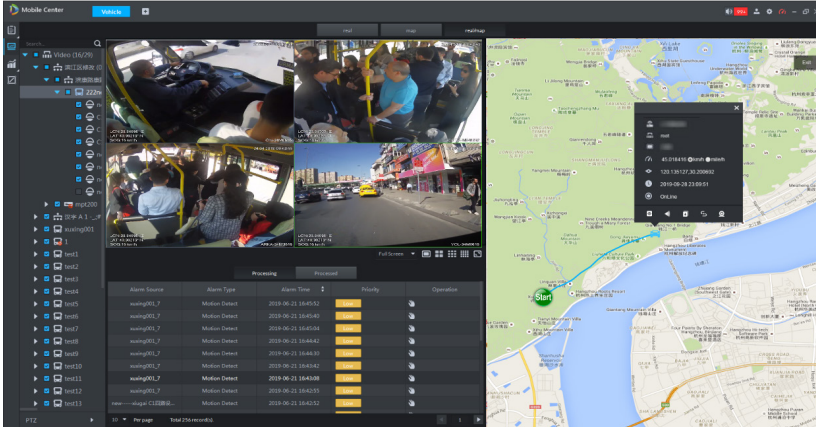2. Displays advertisement to increase revenue.

MNVR
Information transfer and linkage
1. Transfers the people counting data to platform
2. Supports bus lane recognition and ANPR
3. Displays bus stop name and links this with bus stop coordinates.

Benefits

• Reduces passenger waiting time by optimising bus route.
• Reduces bus travel time as bus-only lane is free.
• Improves journey experience with arrival information notifications.
• Improves revenue by displaying on-board advertisements.

PLATFORM - FLEET MANAGEMENT

Solution

Benefits

- All-in one and easy to manage map shows the operational status of all buses

- Quick response dealing with alarm notifications

- Fast intervention for unusual driving behaviour, helping avoid potential accidents

PLATFORM - DATA ANALYSIS

Solution

Passenger Counting Statistics

- Passenger flow at bus stops
- Passenger flow of different bus routes
- Passenger flow forecasting

Safe Driving Statistics

- Safe driving ranking
- Driving violation statistics
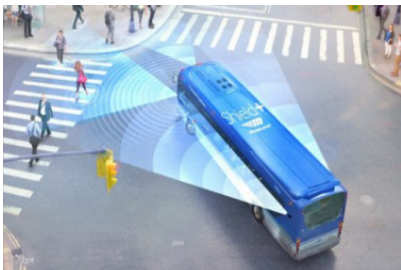- Intelligent alarm statistics

Benefits

- Optimise bus intervals based on passenger counting statistics to reduce passenger waiting time and increase revenue
- Regulate driver behaviour based on safe driving statistics to improve safety and reduce costs as a result of an accident/incident

SOLUTION BENEFITS

Much Safer

- Supports body temperature monitoring and flow limits to protect passengers
- Supports alerts to monitor driver behaviour to reduce accident rates

Fewer Costs/Increased Revenue

- Reduce losses due to fewer accidents
- Revenue increases by better bus route optimisation and on-board advertisements

Better Experience

- Reduced journey times with no unauthorised vehicles in the bus lane
- Reduced waiting at peak times

CASE STUDIES

Background

- The widest coverage of transportation in Turkey is by public bus
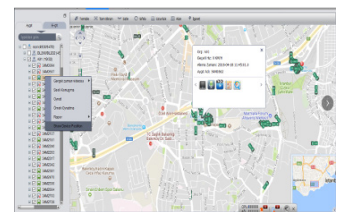- Total of 1.5 billion ticketed passengers in 2019

EVS

Mobile Centre Platform

Client

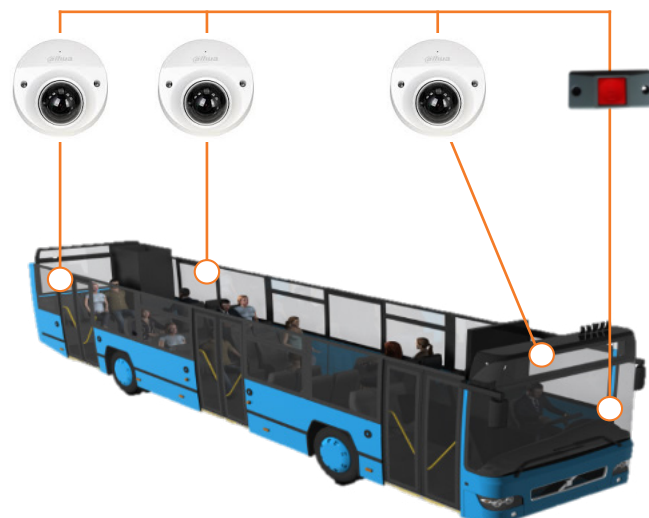**Core Switch**

MNVR

MNVR
7,500

Camera
30,000

Panic Button
7,500

Platform
23

Benefits

In February 2017 Dahua, together with a local security installer in Istabul, delivered a project by installing HD cameras and mobile video recorders in each bus. With Dahua's mobile solution it helped the bus operator solve many problems.

- Help passengers to retrieve lost baggage
- Help determine who was at fault regarding bus accidents
- Help to resolve disputes between drivers and passengers

Helped retrieve lost baggage:
36
cases

Helped determine liability:
70
cases

Helped resolve disputes:
6
cases

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Dahua UK & Ireland

Driving Innovation to an AIoT Future

* AIoT is the convergence of Artificial Intelligence (AI) and the Internet of Things (IoT) where connected devices meet human interface. This is enabling unlimited possibilities through the integration of connected devices and security solutions.

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