# For Your Safe, Efficient And Intelligent Travel

Dahua smart bus solution

More Secure

More Efficient

More Profits

# Background

With the development of AI technology, mobile surveillance industry is turning into a new era. As safety is always a top priority, transportation department are looking for innovative ways to reduce accidents and improve customer satisfaction.

With the advent of AI transformation in the mobile industry, Dahua Technology, a world leading video-centric smart IoT solution and service provider, launched its Smart Bus Solution. This solution aims to solve the challenges related to security, efficiency and value. For example, AI technologies like ADAS and DSM are applied to reduce accidents and protect both passengers and drivers. Our solution is based on customer requirements and project experience, and covers the whole process from the moment the driver gets on the bus until the bus returns to the bus station.

# Challenges

## Safety Problems

- Illegal Driving (Fatigue Driving)
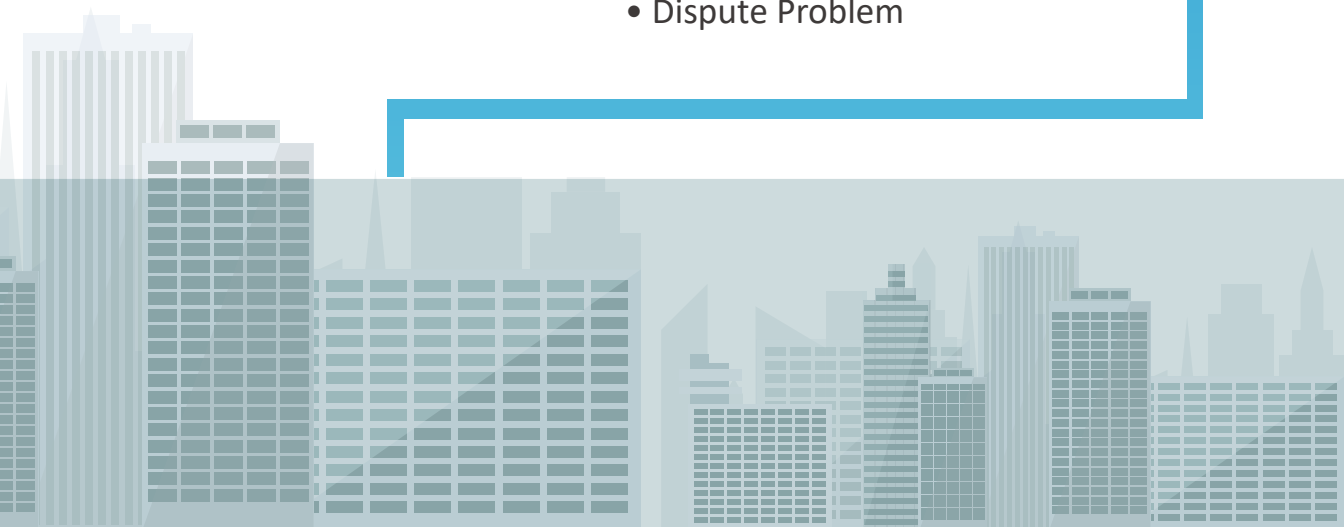- High Accidents Rate
- Hard To Find Evidence

## Low Efficiency

- Low Efficiency Of Driver Attendance
- Manual Schedule For Bus Trip
- Parking Lot Management

## Lack Of Values

- Lack Of Guidance
- Lack Of Extra Revenue
- Dispute Problem

## Solution Overview

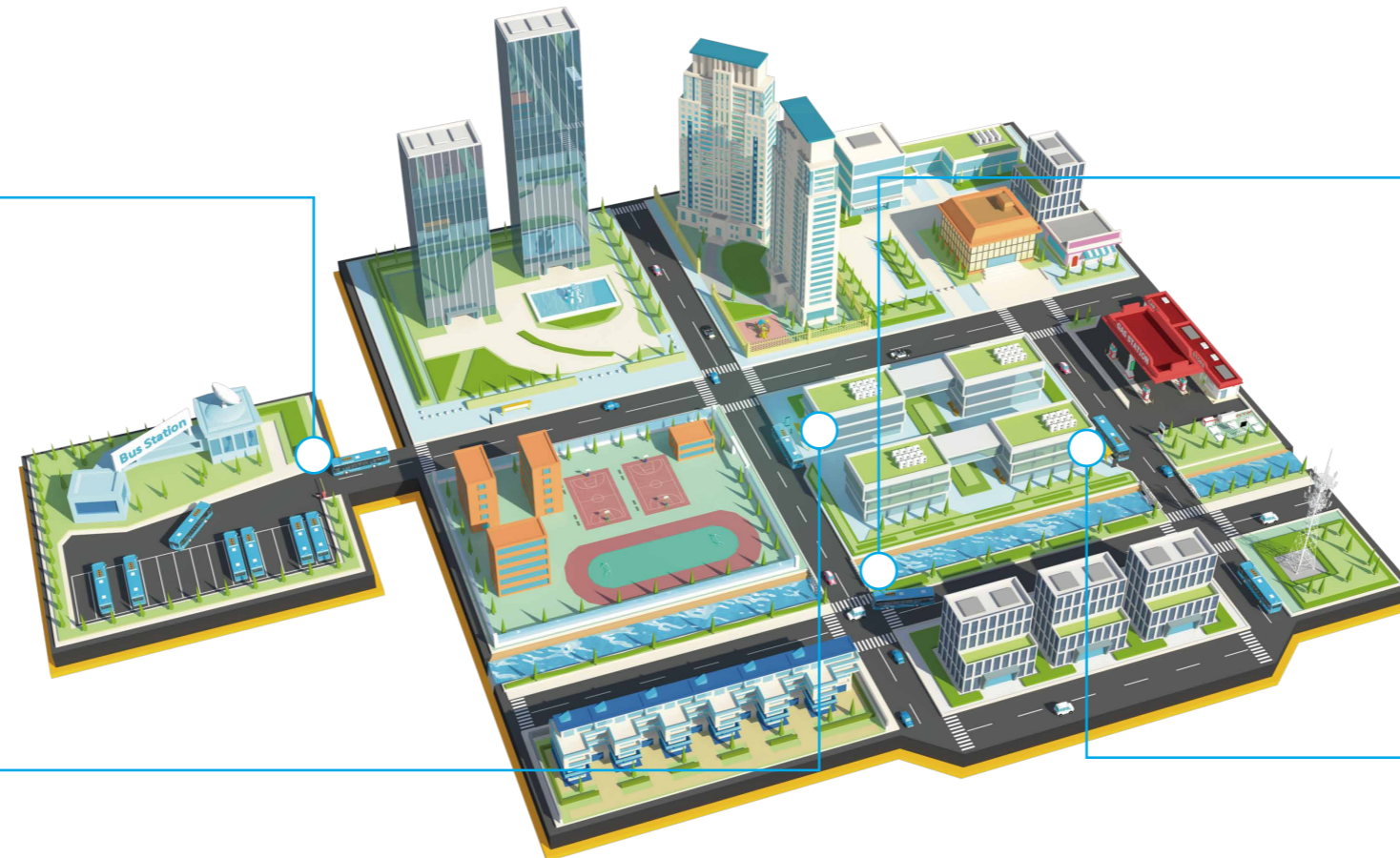**Improve Safety**

**Improve Efficiency**

**Improve Value**



**Start From Bus Station**
- Automatic Attendance
- Entrance & Exit Management



**Passengers Get On The Bus**
- Schedule Optimization
- Suspect Detection



**Drive On The Way**
- Active Prevention:
- DSM (Driver Status Monitor)
- ADAS (Advanced Driver Assistance System)
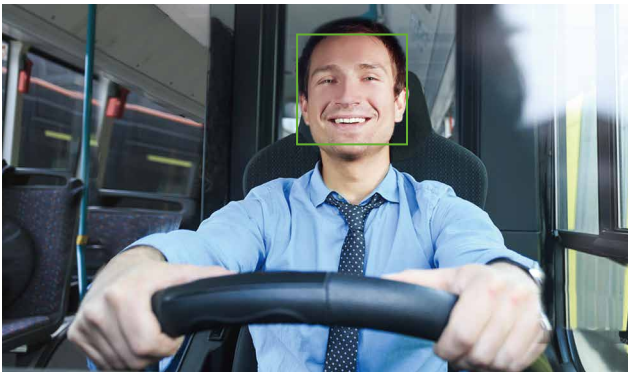- BSD (Blind Spot Detection)



**Arrive At The Bus Stop**
- Passenger Guidance
- Advertisement

# Start From Bus Station

## Automatic Attendance

**Face Recognition System**

· DSM cameras can detect the driver's face, enabling the face recognition function to realize automatic attendance.

· The platform provides report and data for driver attendance management.



## Entrance & Exit Management

**ANPR System**

· Entrance and exit cameras can recognize plate numbers to open the barrier automatically.
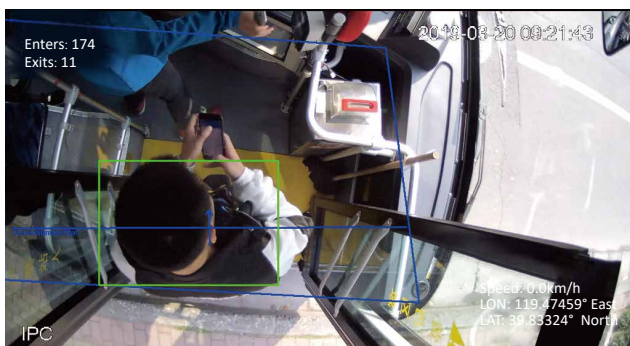
· Saves labor costs and time.



# Passengers Get On The Bus

## Schedule Optimization

**People Counting System**

· People counting cameras calculate the numbers of passenger getting on/off bus in every stop, providing data for scheduling optimization.



## Suspect Detection

**Face Recognition System**

· AI MNVR can support face recognition and compare with the blacklist to identify suspect.

# Drive On The Way

## Active Prevention

**DSM (Driver Status Monitor):** Detect illegal driver behaviors using DSM cameras, including looking around, yawning, closing eyes, smoking and making phone calls.



**ADAS (Advanced Driver Assistance System):** Assists in detecting lane departure, avoiding collision and keep safe distance using ADAS cameras.
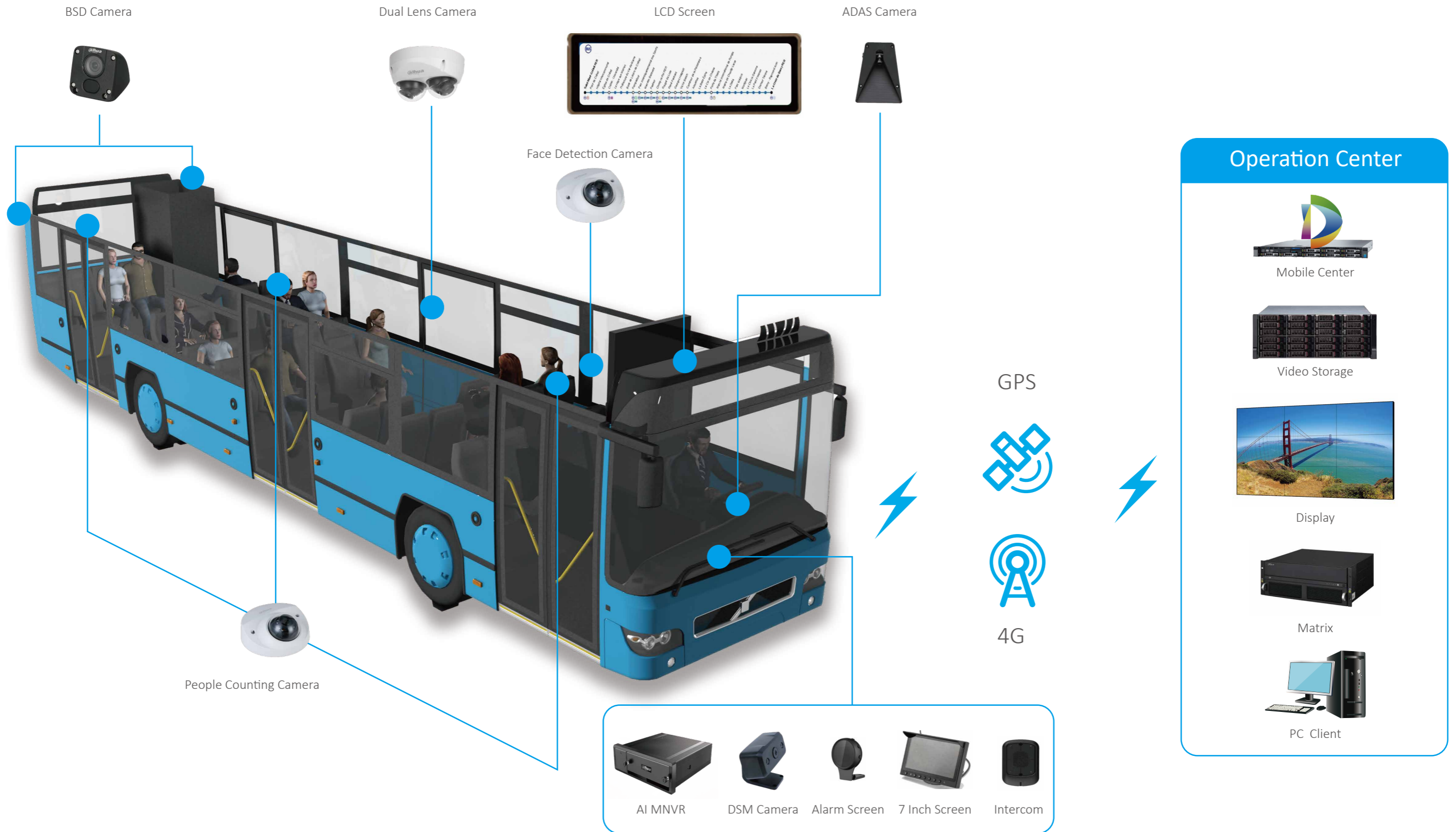




**BSD (Blind Spot Detection):** Detect the pedestrians and vehicles approaching the bus and reminder the driver to avoid blind spot accident.

# Arrive At The Bus Stop

## Passenger Guidance And Advertisement

· The LCD screen both inside the bus and on the bus stop can display the bus line information and advertisement at the same time.

· The inside screen will change to display the name of the next bus stop to remind the passengers when bus approaching the stop.

BSD Camera

Dual Lens Camera

LCD Screen

ADAS Camera

Face Detection Camera

People Counting Camera

GPS

4G

## Operation Center

Mobile Center

Video Storage

Display

Matrix

PC Client

AI MNVR

DSM Camera

Alarm Screen

7 Inch Screen

Intercom

# Key Technology

## · DSM (Driver Status Monitor)

The DSM camera adopts global exposure CMOS, with capturing speed of up to 60 frames per second. Its optimized exposure mode effectively prevent deformation on the face image.

The DSM camera uses 940nm infrared fill light combined with an infrared lens, which can avoid interference of ordinary visible light to the driver's image and can effectively improve the brightness in a dark environment.
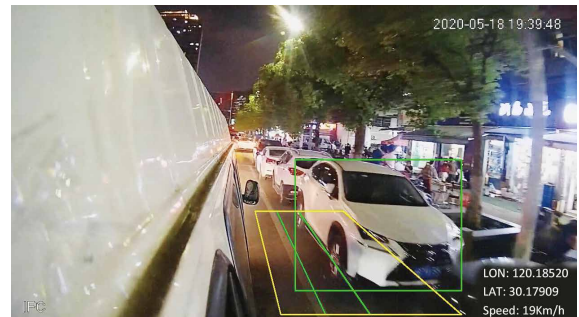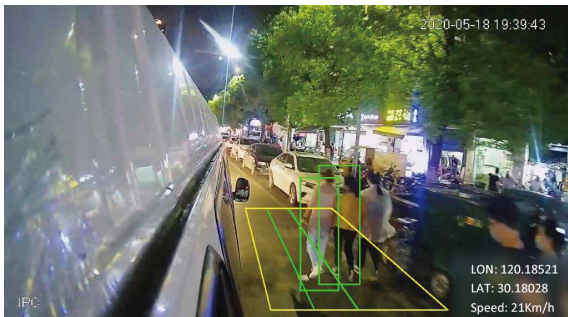

Yawning


Making phone calls

## · ADAS (Advanced Driver Assistance System)

The camera is equipped with true wide dynamic technology, digital wide dynamic technology, and high light suppression image pre-processing algorithm, which effectively suppresses strong light from headlights at night while improving overall brightness and transparency.


Forward Collision Warning


Lane Departure Warning

## · BSD (Blind Spot Detection)

Equipped with cameras powered by deep learning algorithm, our system can detect human, motor vehicle and non-motor vehicle at a certain distance that can be set by the user.


2020-05-18 19:39:43
LON: 120.18521
LAT: 30.18028
Speed: 21Km/h


2020-05-18 19:39:48
LON: 120.18520
LAT: 30.17909
Speed: 19Km/h

# MNVR

## Anti-vibration

When the vehicle is running on the road, the onboard shock and vibration are the main causes of HDD damage and video footage loss. Dahua mobile devices comply with **ISO 16750-3** and **E-mark** to protect the system from electrical surge and vibration.
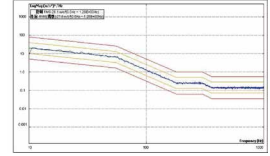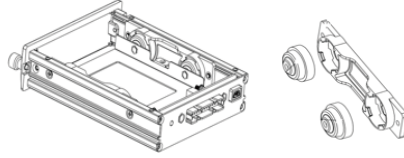


## Power-off Protection

- Super-capacitor is applied to achieve smooth swith off in case of sudden system power down thus to avoid data loss and extend the hard disk lifespan.
- It keeps working about **5 sec after power off.**
- Dahua devices have already passed standards **ISO7637-2.**
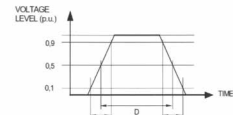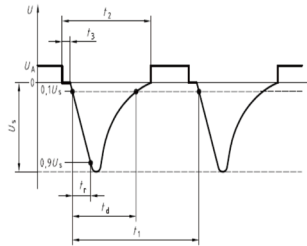- Wide voltage input **DC 6-36V.**



Figure 1: Test waveform

Table 1: Supply overvoltage(Un=24V)

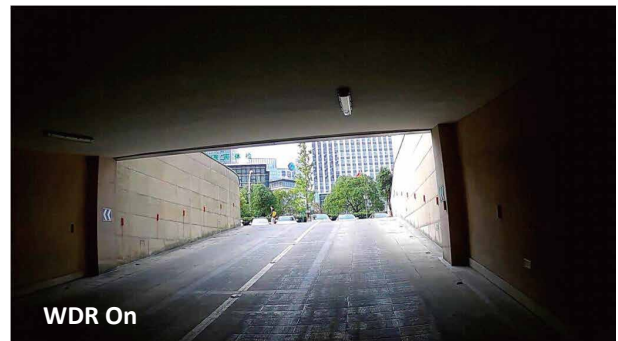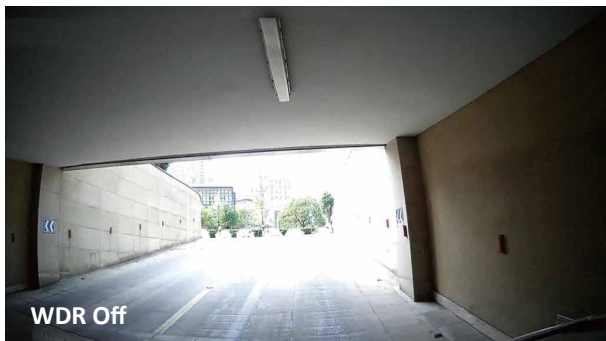| Voltage level min. | Duration d max. | Duration D max. | Series Resistor (Tol.±10%) |
|---|---|---|---|
| 1.4Un | 0.1s | 1.0s | 1 Ω |

# Camera

## Low Illumination

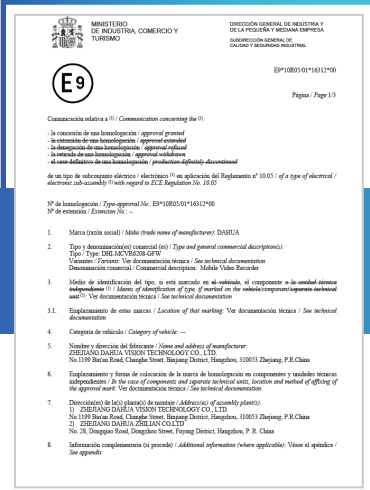Dahua new image sensor greatly improves signal-to-noise ratio and color reproduction.



**Original**



**Now**

## WDR

- Up to 120dB Wide Dynamic Range to capture an optimized image quality even in high contrast environment.
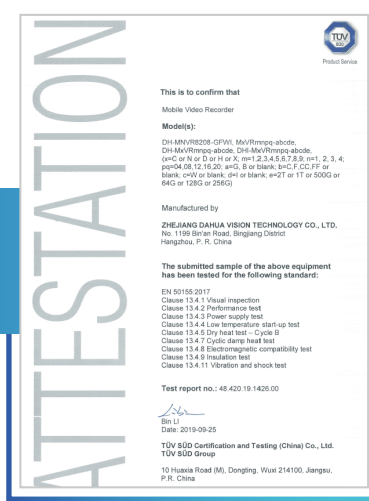


**WDR Off**



**WDR On**

# Certification

E-mark/EN50155/ISO16750/ISO7637-2/CE/FCC/EN45545-2



E-mark



EN50155



ISO16750

# Cyber Security

Nowadays, video surveillance has become ubiquitous, including buses, taxis, subways and other public places of travel. Passenger's personal information is collected anytime and anywhere. The European Data Protection Commission issued General Data Protection Regulations to regulate public transport operators to protect passengers' safety and privacy at the same time. More and more attention has been paid to personal privacy protection and cyber security.



First in the global video surveillance industry, the Dahua IP video products are certified to comply with GDPR (General Data Protection Regulation) by TUV Rheinland.
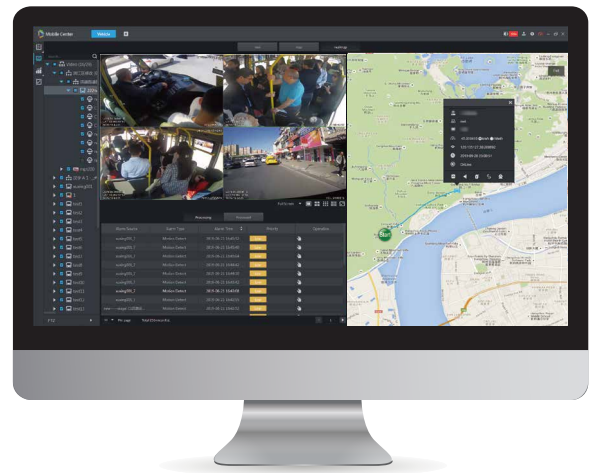
# Software

## · Mobile Center

**Introduction**

Mobile Center is a professional platform for managing mobile vehicles. It meets the requirements of large and medium-sized projects through distributed extension.

It can provide basic functions like live view, playback, statistics of vehicles, e-fence. And also advanced function like alarms report including ADAS and DSM and safety dashboard.

**Performance**
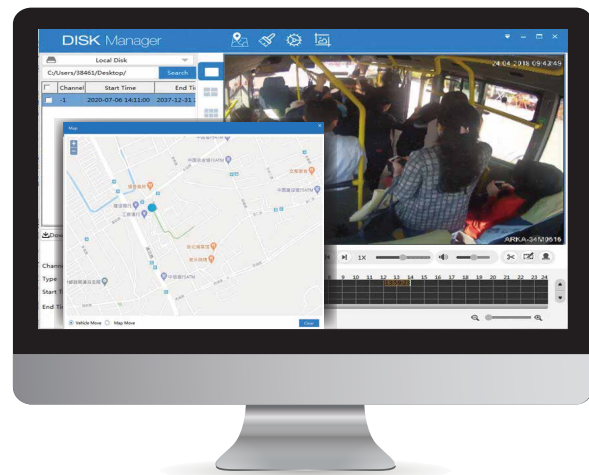
· Supports max. 2,000 channels (supports max. 1,000 devices).
· Supports 600M transfer capability.
· Supports 600M local storage capability.

## · Disk Manager

This software is used to playback and download the records from hard disk by connecting the hard disk box with computer.

It supports to check the bus's history track on google map at the same time while playback record.

## · DSS Mobile 2

DSS Mobile 2 App is a mobile monitoring software that is designed for small-scale mobile surveillance project. It can support functions such as live view, playback, real-time GPS, historical GPS and alarm prompts for the buses.
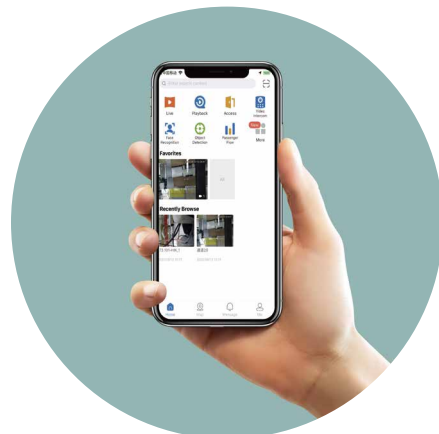
# Product Selection

## MNVR8208-I

**8 Channels PoE H.265 2 HDDs Intelligent Mobile Video Recorder**
- Support 8 channels of PoE IP cameras input and 2 channels of HDCVI input.
- Support H.265/smart H.265 video compression
- Support 4MP real time recording
- Support face detection, license plate recognition, driving behavior detection of smoking, calling, yawning, and warning of cars hit

## MNVR4208

**8 Channels PoE H.265 2 HDDs Mobile Video Recorder**
- Support 8 channels PoE IP cameras input
- Support H.265/smart H.265 video compression
- Support 8 channels 4MP real time recording
- Support 2 HDDs and 1 SD card

## MXVR4104

**4 Channels H.265 1 HDD Mobile Video Recorder**
- Support penta-brid (HDCVI/AHD/TVI/CVBS/IP) video input
- Support H.265/smart H.265 video compression
- Support 4 channels 1080P real time recording
- Support 1 HDD and 1 SD card

## IPC-HDBW5241F-M-SA

**IPC-HDBW5241F-M-SA**
- 1/2.8" 2Megapixel progressive scan STARVIS™ CMOS
- H.265 & H.264 triple-stream encoding
- 25/30 fps @ 1080p (1920×1080)
- WDR (120 dB), Day/Night (ICR), 3D DNR, AWB, AGC, BLC
- Multiple network monitoring: Web viewer, CMS (DSS/PSS) & DMSS
- 2.8 mm fixed lens (3.6 mm, 6.0 mm, 8.0mm optional)
- Max. IR LEDs Distance: 30 m
- Micro SD memory, IP67, IK10

## HAC-HDBW2241F-M-A

**2MP Mobile HDCVI IR Dome Camera**
- Starlight, 120dB true WDR, 3DNR
- Max. 30fps@1080P
- Audio in interface, built-in MIC
- HDCVI output (Aviation connector)
- 3.6mm fixed lens (2.8mm optional)
- Max. IR length 20m, Smart IR
- IP67, IK10, DC12V±30%
- IP6K9K, shock-proof

## HAC-HMW3200D-H/V

**2MP Mobile HDCVI IR Cube Camera**
- Max 30fps@1080P
- CVI/CVBS/AHD/TVI switchable
- 2.8 mm fixed lens
- Max. IR length 20 m, Smart IR
- IP67, DC12V
- Shock-proof

# ENABLING A SAFER SOCIETY AND SMARTER LIVING

**Dahua USA**
Tel: +1 (949) 679-7777
Email: sales.usa@dahuatech.com
support.usa@dahuatech.com

**Dahua Mexico**
Tel: +52 55 67231936
Email: sales.mx@dahuatech.com
support.mx@dahuatech.com

**Dahua Colombia**
Tel: +571 7446110
Email: sales.co@dahuatech.com
support.co@dahuatech.com

**Dahua Brazil**
Tel: +55 11 32511871
Vendas: comercial.br@dahuatech.com
Suporte Técnico: suporte.br@dahuatech.com

**Dahua Perú**
Tel: +511 500-8555
Email: sales.pe@dahuatech.com
support.pe@dahuatech.com

**Dahua Chile**
Tel: +56 232705421
Email: sales.cl@dahuatech.com
support.chile@dahuatech.com

**Dahua Argentina**
Email: project.ar@dahuatech.com

**Dahua Panama**
Email: sales.pa@dahuatech.com
Support: support.pa@dahuatech.com

**Dahua Thailand**
Tel: +66 2541 5188
Email: info.th@dahuatech.com
hr.th@dahuatech.com

**Dahua Singapore**
Tel: +65 65380952
Email: sales.sg@dahuatech.com

**Dahua Turkey**
Email: sales.tr@dahuatech.com
support.tr@dahuatech.com

**Dahua Malaysia**
Tel: +60376620731
Email: sales.my@dahuatech.com

**Dahua Indonesia**
Tel: +62 811 867 7728
Email: sales.indo@dahuatech.com

**Dahua S.Korea**
Tel: +82 7081618889
Email: sales.kr@dahuatech.com
support.kr@dahuatech.com

**Dahua India**
Tel: +91 1244569100
Email: sales.india@dahuatech.com

**Dahua Russia**
Tel: 8 (499) 682-60-00
Email: info@dahuatech.com

**Dahua Kazakhstan**
Tel: +7 727 3110838
Email: sales.kz@dahuatech.com

**Dahua VISION LLC**
Tel:+998 (78) 1488666
E-mail:dh_uzbekistan@dahuatech.com

**Dahua UK**
Tel: +44(0)1628 613 500
Email: sales.uk@dahuatech.com

**Dahua the Netherlands**
Tel: +31 (0) 79 799 96 96
Email: sales.benelux@dahuatech.com

**Dahua Iberia**
Tel: +34 917649862
Email: sales.iberia@dahuatech.com

**Dahua Italy**
Tel: +39 362182681
Email: sales.italy@dahuatech.com

**Dahua Germany**
Tel: +49 211 20544121
Email: sales.de@dahuatech.com

**Dahua France**
+33 1 48 53 70 53
Email: sales.france@dahuatech.com

**Dahua CEE & Nordic**
Tel: +48 223957400
Email: dh.cen@dahuatech.com

**Dahua Poland**
Tel: +48 223957400
Email: biuro.pl@dahuatech.com

**Dahua SRB**
+38 1 (11) 4429999
Email: dh.srb@dahuatech.com

**Dahua Denmark**
Email: Nordic.ne@dahuatech.com

**Dahua Hungary**
Tel: +36 17899852
Email: sales.hu@dahuatech.com

**Dahua Bulgaria**
Tel: +35929950013
Email: support.bg@dahuatech.com

**Dahua SRL**
Email:marketing.ro@dahuatech.com

**Dahua Czech**
Tel: +420 225 986 001
Email: admin.cz@dahuatech.com

**Dahua S. Africa**
Email: sales.za@dahuatech.com

**Dahua Australia**
Tel: +61 299285200
Email: sales.oc@dahuatech.com

**Dahua Middle East**
Tel: +971 48815300
Email: sales.me@dahuatech.com
info.me@dahuatech.com

## DAHUA TECHNOLOGY
No.1199 Bin'an Road, Binjiang District, Hangzhou, China. 310053
Tel: +86-571-87688883    Fax: +86-571-87688815
Email: overseas@dahuatech.com
www.dahuasecurity.com