



# isbak

Istanbul IT and Smart City Technologies Inc.

## ELECTRONIC DETECTION SYSTEM (EDS)

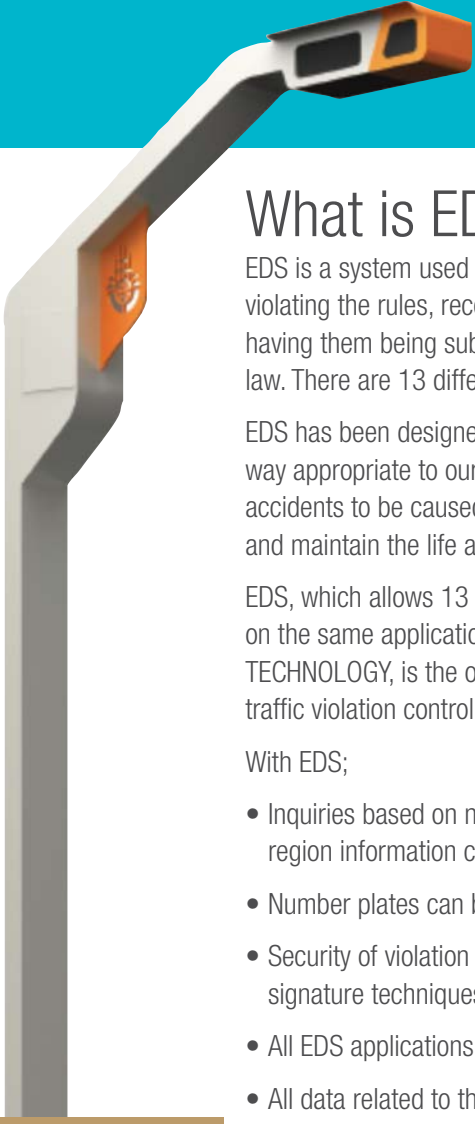
isBAK AŞ is an affiliated company of Istanbul Metropolitan Municipality



# Electronic Detection System







## What is EDS?

EDS is a system used for sensor-detection of the vehicles violating the rules, recording the related number plates and having them being subjected to the fine set forth in the relevant law. There are 13 different EDS enforcement systems.

EDS has been designed with an advanced technology in a way appropriate to our driving culture in order to prevent the accidents to be caused by the vehicles violating the traffic rules and maintain the life and property safety.

EDS, which allows 13 different enforcement systems to operate on the same application in the center by means of the CLOUD TECHNOLOGY, is the only internationally accredited domestic traffic violation control and detection product of Turkey.

With EDS;

- Inquiries based on number plates, violation type, time and region information can be conducted.
- Number plates can be determined from the digital image data.
- Security of violation images is provided by using digital signature techniques.
- All EDS applications can be managed from a single center.
- All data related to the violation registry can be saved in a safe environment and reported.



## General Features

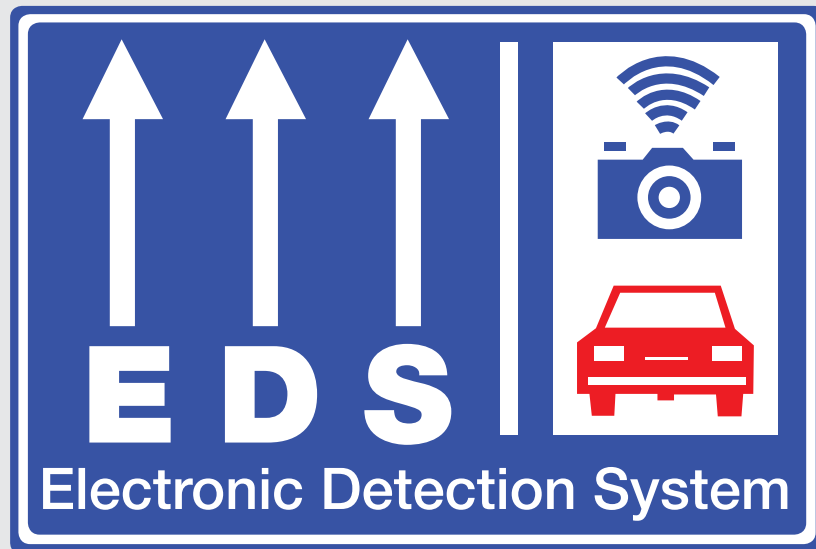
- Parametric violation video record within any desired time interval,
- 7x24 hours of continuous video recording,
- Renewable and expandable architecture structure,
- High-resolution camera technology for quality imaging,
- Operable in harmony with all types of communication systems,
- Allows issuance of any type of invoice format appropriate to the violation type such as Automatic Fine Invoice, summarized fine report, etc.,
- Being capable of tracking the fine violation records with smart mobile technologies,
- Performing virtual detector application by using image processing technique,
- Providing information such as vehicle count, vehicle classification, pedestrian detection, average speed, etc. in high accuracy ratio.
- Even under night and low light conditions, shooting color and quality photos on violation,
- Storing violation images at the center and local module,
- Coding violation images in MPEG4, H264, etc. techniques and transmitting them to the center,
- By using image processing technologies, reading square, rectangle number plates in different sizes,
- Upon the provision of necessary access rights, connecting automatically to the national security database and inquiring vehicle, address information (POLnet Integration),
- Inquiring and reporting based on any one or combination of number plate, intersection, date, region information,
- Performing the number plate recognition process manually, automatically, based on movement and by using sensor,
- Conducting plate recognition process on the central application (ANPR-Automatic Number Plate Recognition),
- Containing customized software such as user interface, database management software, communication system, etc.



## IP (Ingress Protection) Protection Class Certificates

EDS Product has both IP 55 and IP 65 Protection Class certificates.

## EMC (Electromagnetic Compatibility)



## Standards – Certifications- Safety

### Function Verification Test Reports

Regarding the EDS product, the reliable measurement is registered based on the function verification test reports provided by accredited institutions.

### LOW VOLTAGE DIRECTIVE

iSBak EDS product had successfully completed the LVD tests.

### Secure Communication Backbone

The communication between all EDS system points is performed through EDS center as well as a cabled and private network. (VPN-Virtual Private Network)

### Radar Calibration and FCC Certifications

Measurement documents showing the radar measurement accuracy.

### Encryption of Violation Images

Each image recorded by the site software is signed and encrypted by EDS software. The center software checks each image obtained for this signature. After the signature is verified, the violation image is recorded in the system.

### Dongle Application (Optional)

- It is operated under protection and via private software and equipment in order to prevent the site software from being moved to different places.
- Powerful algorithms to prevent the software piracy.
- Effective protection; against ATMSs such as anti-debugging and reverse engineering
- 1024-bytes privately signed license updates.

EDS IS THE REGISTERED  
TRADEMARK OF iSBak



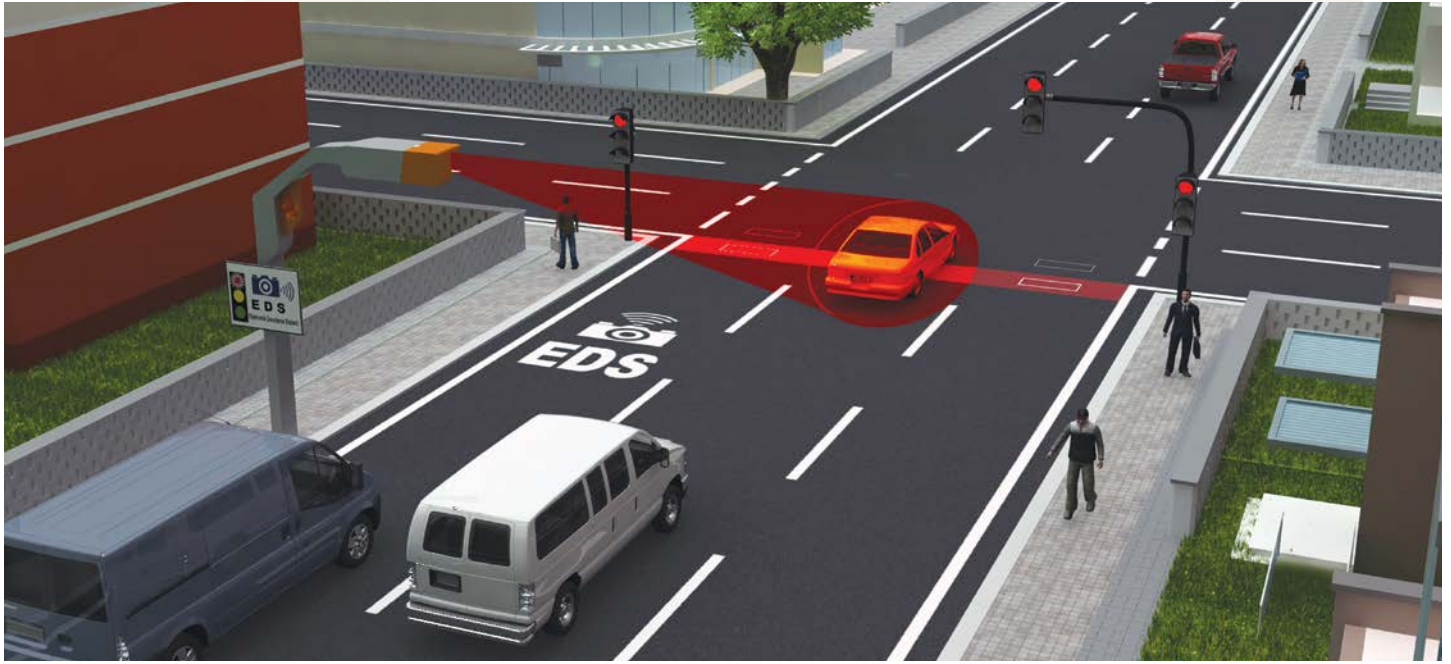
# Red Light Enforcement System

This system has been developed in order to detect the vehicles violating red light on intersections and take their photos.

The system continuously monitors the intersection and automatically detects any violating vehicle and triggers its high-resolution cameras.

The system automatically senses any red light and speed violation and generates digital evidence so that the violation can be recorded in the electronic environment.

At the locations, where the system is installed, 90% decrease is observed in the accident-causing factors.



## General Information

Our products, which contain the most innovative features in Enforcement Systems sector, have been designed in an individually-operable, compact and modular structure.

Considering the needs of the relevant regions; we offer a wide product range containing our innovative “L Pole” and “Tower Type Pole” designs.

## Basic Features

- Enforcement: Sensing and labelling violation by using violation sensor systems containing “3D Doppler based real-time tracking” technology.
- Easy installation: Tracking 5 lanes with only a single radar.
- Evidence pack: 3 photos per second. All details related to day or night high-resolution and color violation photos. Clear number plate photos of the violating vehicle, taken by a high-resolution and high-speed digital camera technology. Evidentiary video record of the violating vehicle, covering prior- and post-violation moment.
- Innovative, calibration and easy-to-install feature (PLUG AND PLAY TECH): By the help of all easy installable radar-based enforcement systems developed by ISBAK, there will be less operator dependency.
- It obtains all the parameters related to the road, where the radar is installed, in few seconds with the help of the artificial intelligence technology. By the help of this technology, operator-based false parameter entries can be prevented.
- Its innovative compact, modular design and light-weight body structure provide easy installation and transportation.
- Innovative Air-Conditioning System: By minimizing the consumption power, the device provides an operation environment up to 55°C. Therefore it is identified as “green technology”.
- Innovative Maintenance Ease: Easily replaceable modules. A broken module can be replaced maximum in 5 minutes. Separable modular design removes the need for camera and radar readjustment after the repair- and maintenance-based interferences.



# Flexible System Design Architecture

- Determine the pole technology required to be applied (L Pole or Tower Type Pole),
- Determine the camera technology required to be applied (GIGE or DSLR),
- Determine the sensor and measurement technology required to be applied (LOOP or 3D Doppler),
- Determine the lighting technology required to be applied (Flash, IR, RED Flash),

## Technical Features

### Sensor and Measuring Device Features

- With the 3D radar technology, performing multiple-lane, multiple-vehicle tracking and measuring the vehicles' speeds, locations and distances with a high accuracy.
- Auto-Calibration system obtains in seconds, all the measurement parameters related to the road, where the radar is installed.
- User-Friendly Software Interface allows the necessary settings to be made in few minutes.
- High accuracy ratio with the x, y coordinate information of vehicles in each image.
- Measuring at the same all approaching and departing vehicles and both lanes,
- Up to 5 measurements with a single sensor,
- High Measurement Reliability Ratio: up to 100km/h,  $\pm 3\text{km/h}$ ; over 100km/h  $\pm 3\%$  OIML compatible reliability ratios,
- Radar Measurement Range: 150m (ETSI) (FCC:200m)
- Speed Measurement Range: from 20 up to 300km/h.
- Energy Saving: Low power consumption: 0.5W@ 12VDC





## Cameras

- Violation Photo Camera: Evidentiary photos, in which all details can be caught by the colour, high-sensitive and high-resolution digital camera technology.

- Violation Video Camera: Clear violation videos taken, even under low light conditions, by a high-sensitive video camera, which can take 25 shots per second.

## Computer

- Industrial structure, which is resistant to adverse outer environment conditions,
- Long-lasting body structure,
- Advanced Electromagnetic Wave filtering and isolation,
- Buffer unit with high reading and writing speed.

## Strobe

- Operating Temperature Range: between  $-25^{\circ}\text{C}$  and  $+55^{\circ}\text{C}$ ,
- 4 flashes per second,
- $>80\text{m}$  lighting,
- 200000+ flashing life expectancy.



## General Features

- IP 65 protection class in all outer environment devices,
- Aluminum cabinet and stainless steel construction pole,
- Up to 5 lane measurements,
- IP 65 Protection class, EMC and LVD reports,
- Industrial cabinet design,
- Operating Temperature Range: between  $-25^{\circ}\text{C}$  and  $+55^{\circ}\text{C}$ ,
- Green Energy: 12VDC-based operating principle,
- A system protecting all electronic equipment contained in the main system against any energy fluctuation and stroke of lightning.



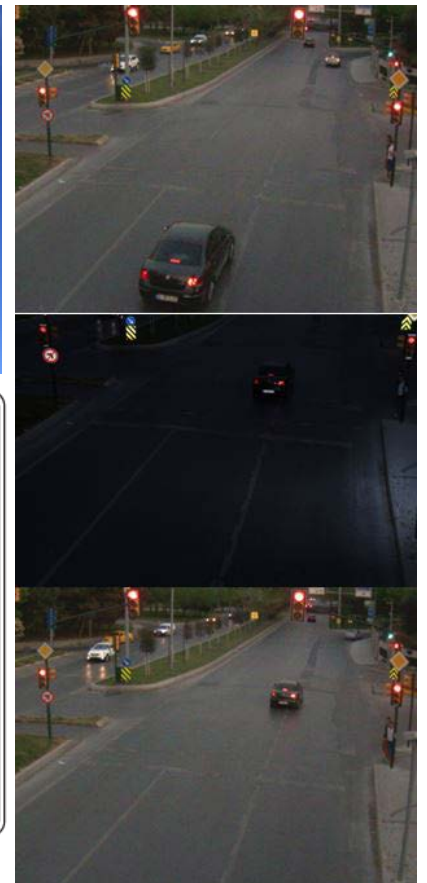
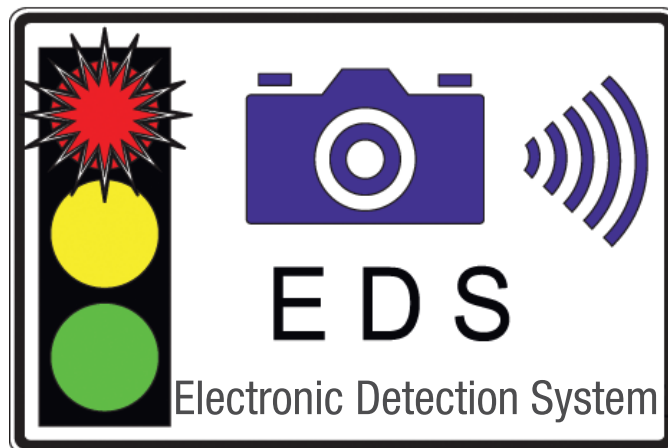


# Software Features

- 3 violation photos – 3 different scenes,
- High-resolution
- Video record of the violation moment containing prior- and post-violation images.
- 7x24 hours local vide record with high-resolution camera,
- Colored night violation photos,
- Warning system supported by smart algorithms for the unexpected situations on intersections (Ambulance, Fire Extinguisher Vehicle),
- Remote monitoring
- Central Automatic Number Plate Recognition
- A modular software support, to which new demands can be added,
- Simulation mode,
- Time-scheduled operating mode (day, week, month),
- Adjustable photo settings according to the ambient light for high image quality
- Private security signature on violation photos,
- All details related to high-quality and smart evidentiary photos,
  - o Date and hour,
  - o Frame counter,
  - o Device serial number,
  - o Software version,
  - o Evidence number,
  - o Vehicle speed,
  - o Vehicle type (car, truck),
  - o Vehicle plate number,
  - o (Approaching, departing) Vehicle direction,
  - o Vehicle identification number,
  - o Ratio of the vehicle's excess speed,
  - o Information regarding the violation lane,
  - o Intersection ID and location name,
  - o Full-size image of the violation and cropped image of the violating vehicle solely.
- Remote system configuration.

# Certificates

- IP (Ingress Protection) Protection Class Certificates (IP55-IP65)
- EMC (Electromagnetic Compatibility)
- LVD (Low Voltage Directive)
- Function Verification Test Reports
- Radar Calibration Certifications





# Automated Parking Enforcement System (Parking EDS)

One of the negative factors affecting especially the intracity traffic flow is the violation of stopping and parking rules. This type of violations may cause undesired situations on the narrow intracity roads, thus have negative impacts on public transportation and daily life.

Parking EDS is developed for effectively detecting such vehicles causing negative impacts and shooting their photos.

The system continuously monitors the areas, where parking or stopping is forbidden, automatically detects the violating vehicle via image processing software and triggers the high-resolution cameras so that the digital evidences of the violation moment can be generated.

At the locations, where the system is installed, 80% decrease is seen in negative incidents, which may occur due to parking violations.

## General Information

Our products, which contain the most innovative features in Enforcement Systems, have been designed in an individually-operable, compact and modular structure. Considering the needs of the relevant regions; we offer a wide product range.

## Basic Features

- **Enforcement:** Sensing and labelling parking- or stop-sign violating vehicles by using "Image Processing, Automatic Number Plate Recognition" technologies among the Violation Sensor Systems.
- **Evidence pack:** All details of the violation with high-quality and color violation photos. Clear number plate photos of the violating vehicle, taken by a high-resolution and high-speed digital camera technology. 4 evidentiary photos of the violating vehicle, covering prior- and post-violation moment.

- Its innovative compact, modular design and light-weight body structure provide easy installation and transportation.
- **Innovative Air-Conditioning System:** By minimizing the consumption power, the device provides an operation environment up to +55 °C. Therefore it is identified as "green technology".
- **Innovative Maintenance Ease:** By the help of the easily replaceable, modular design, the broken module can be replaced only in 5 minutes.





# Technical Features

## Sensor and Measuring

## Device Features

- With the HD-Resolution Camera technology, highly-successful enforcement and clear photo records containing violation details,
- User-Friendly Software Interface allows the necessary settings to be made in few minutes,
- Functional Software feature allows identification of many violation limits,
- 95% successful Automatic Number Plate Recognition feature,
- Its zooming feature enables controlling of 200 meters of distance via only a single system,

# Computer

- Industrial structure, which is resistant to adverse outer environment conditions,
- Long-lasting body structure,
- Advanced Electromagnetic Wave filtering and isolation,
- Buffer unit with high reading and writing speed.

# Cameras

- **Violation Camera:** With features of 25 shots per second, IP PTZ (Pan- Tilt-Zoom), color photo, high-sensitivity image sensor, night vision with IR LED technology, digital noise reduction; evidentiary photos with clear details. Accessibility with its MultiStream feature.
- **Incident Camera:** A high-sensitivity, high-resolution IP PTZ camera, which can take 25 shots per second. Even under low light conditions, it can provide a wide image of the sensor area including wide-angle photos of the violation.

## IR Lighting

- Lighting up to 120-meter distance,
- Automatic adjustment of light intensity according to the zoom level.

İSBAK

İsbak Park İhmal Tespit Sistemi

Ayarlar Hakkında

Bitir

Park Başlangıç(Dar)

Park Başlangıç(Geniş)

Park Bitiş (Dar)

Park Bitiş (Geniş)

PLAKA : 34TR0792H201

GİRİŞ ZAMANI : 28.02.2012 14:00:22

ÇIKIŞ ZAMANI : 28.02.2012 16:48:41

PARK LİMİT : 6 dakika

PARKLANMA SÜRESİ : 48:19

Parklanma Koruma Süresi

Park Limit

PlakaNo	EntryTime	ExitTime	ParkLimit	ParkingTime	Filenameentry	Filenameentry	FilenameexitC	FilenameexitC	Violator
34TR0792H201	28.02.2012 13:5...	28.02.2012 16:2...	6	28:44	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	36
34TR0792H201	28.02.2012 16:2...	28.02.2012 16:3...	6	8:23	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	37
34TR0792H201	28.02.2012 16:1...	28.02.2012 16:3...	6	25:1	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	38
34TR0792H201	28.02.2012 14:0...	28.02.2012 16:4...	6	48:19	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	39
34TR0792H201	28.02.2012 16:4...	28.02.2012 16:5...	6	16:28	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	40
34TR0792H201	28.02.2012 16:5...	28.02.2012 17:0...	6	8:27	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	41
34TR0792H201	28.02.2012 16:5...	28.02.2012 17:0...	6	7:50	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	42
34TR0792H201	28.02.2012 13:5...	28.02.2012 17:0...	6	15:1	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	43
34TR0792H201	28.02.2012 17:0...	28.02.2012 17:1...	6	8:24	34TR0792H201	34TR0792H201	34TR0792H201	34TR0792H201	44

İşlem Durumu

Plakalar kontrol ediliyor...

Uyarılar

v.1.0.0.2



# Speed Corridor Enforcement System

EDS Corridor Speed Detection System detects speed violations on the main arterial road by using average speed measurement techniques, senses electronic environment and takes photos. The system, with its average speed measurement feature, ensures that the vehicles travel in compliance with the speed limits applicable within the distance range determined. The system aims to create awareness for driving in compliance with the traffic rules thus to protect travel safety.

With the high-sensitive and high-resolution cameras used in the system, detailed photos of the violation can be taken even under the low light conditions.

With the average speed measurement approach, the radar points cannot be detected by the drivers as it happens in point speed measurement systems thus drivers can be prevented from learning where the radar points are and slow down. Therefore the travel safety can be maintained.

The automatic number plate recognition-based operating system, with the support of long years of image processing experience, is capable of performing the highest-successful number plate detection process in the sector.

The system, in addition to detection of vehicle speed in the relevant regions, calculates duration of travel. With this feature, it can be integrated to operate as data source for traffic density

## General Information

Our products, which contain the most innovative features in Enforcement Systems sector, have been designed in an individually operable, compact and modular structure. The EDS systems, which have been developed considering an engineering architecture to

## Basic Features

- **Enforcement:** Sensing and labeling speed limit violating vehicles by using Image Processing, Automatic Number Plate Recognition” technologies among the Violation Sensor Systems.
- **Evidence pack:** All details of the violation with high-quality and color violation photos. Clear number plate photos of the violating vehicle, taken by a high-resolution and high-speed digital camera technology. 4 evidentiary photos of the violating vehicle, covering prior- and post-violation moment.
- **Innovative Air-Conditioning System:** By minimizing the consumption power, the device provides an operation environment up to +55° C. Therefore it is identified as “green technology”.
- **Innovative Maintenance Ease:** With the easily replaceable,



maps or driver informing systems.

One of the negative factors affecting especially the intracity traffic flow is the violation of stopping and parking rules. This type of violations may cause undesired situations on the narrow intracity roads, thus have negative impacts on public transportation and daily life.

As a result of the statistical studies at the locations, where the system is installed, 85% decrease is observed in the number of accidents caused due to over speed.

ease installation and maintenance, offer customized solutions. EDS CLOUD COMPUTING TECHNOLOGY enables, with a new approach regarding enforcement systems, operation of different network and detection applications via only the central software.

modular design, the broken module can be replaced only in 5 minutes.

- **Operable Integrated with Intelligent Transportation Systems:** It can operate and facilitate its speed measurement, vehicle count and travel duration measurement functions integrated with the other Intelligent Transportation System equipment.
- **Interoperability:** With the modular structure of its software and equipment architecture; it can be operated as integrated with other systems, thus expandable and sustainable.
- **It gives the opportunity to perform speed measurements in all lanes as required by the road.**



## General Features

- IP 65 protection class in all outer environment devices,
- Aluminum cabinet and stainless steel construction pole,
- 200-meter distance measurement,
- EMC and LVD reports,
- Industrial system equipment,
- Operating Temperature Range: between -25°C and +55°C,
- Green Energy: 12VDC-based operating principle,
- Enabling the system to operate under control during the power failures with jelly-type, maintenance-free batteries,
- A system protecting all electronic equipment contained in the main system against any energy fluctuation and stroke of lightning.

## Software Features

- 4 violation photos; photos of start of violation moment and limit timeout,
- High-resolution,
- Possibility to take real-time image of up to 10 users at the same time,
- With IR technology, being able to operate under low light conditions,
- Remote monitoring,
- Automatic Number Plate Recognition,
- Modular software support
- Time-scheduled operating mode (day, week, month),
- All details related to high-quality and smart evidentiary photos,
  - o Date and hour,
  - o Location ID,
  - o Location name,
  - o Vehicle plate number,
  - o Full-size image of the violation and cropped image of just the violating vehicle.
- Remote system configuration

## Certificates

- IP (Ingress Protection) Protection Class Certificates (IP55-IP65)
- EMC (Electromagnetic Compatibility)
- LVD (Low Voltage Directive)
- FUNCTION VERIFICATION TEST REPORT





## Technical Features

### Sensor and Measuring Device Features

- With the high-resolution camera technology, highly-successful enforcement and clear photo records containing violation details,
- User-Friendly Software Interface allows the necessary settings to be made in few minutes,
- Functional Software feature allows identification of many violation limits,
- 95% successful Automatic Number Plate Recognition feature,
- With its feature of calculating average travel duration; functioning as a traffic measurement sensor,
- GPS- and NTP-based time synchronization feature,
- Provides narrow and extra wide-angle photos of the violation, thus enables a view of the entire road.

### Computer

- Industrial structure, which is resistant to adverse outer environment conditions,
- Long-lasting body structure,
- Advanced Electromagnetic Wave filtering and isolation,
- Buffer unit with high reading and writing speed.

### General Features

- IP 65 Protection Class in all outer environment devices,
- Aluminum cabinet and stainless steel construction pole,
- Measurement at any given distance,
- EMC and LVD Reports,
- Industrial system equipment,
- Operating Range: between -25°C and +55°C,
- Green Energy: 12VDC-based operating principle,
- Enabling the system to operate under control during the power failures with jelly-type, maintenance-free batteries,
- A system protecting all electronic equipment contained in the main system against any energy fluctuation and stroke of lightning.
- Operable 24 hours,

## Cameras

- Violation Camera: With features of 25 shots per second, IP colour photo, high-sensitivity image sensor, night vision with IR LED technology, digital noise reduction; evidentiary photos with clear details. Accessibility with its MultiStream feature.
- Incident Camera: A high-sensitivity, wide-angle IP camera, which can take 25 shots per second. Even under low light conditions, it can provide a wide image of the sensor area including wide-angle photos of the violation.

## IR Lighting

- Lighting up to 130-meter distance,



- Point Speed Measurement Integration,
- With the support of the specific date-based operation plan option, the system can be automatically started and stopped on any desired date,
- The system is real-time operable from one center and integrated with all other EDS systems,
- The artery road, where the system is installed, can be continuously watched live for 24 hours by the center,
- The violation determined can be reported in compliance with the relevant article of the traffic law,
- In case required, the wanted vehicles by the police can be determined and reported to the center,
- On the road where it is installed, the system can generate data such as; average speed, vehicle count, etc.



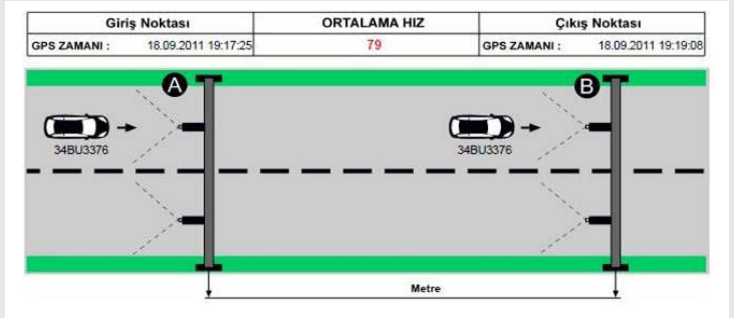
# Software Features

- 4 violation photos, corridor entry and exit photos,
- Full HD resolution 2 Mpx
- Possibility to take real-time image of up to 10 users at the same time,
- With IR technology, being able to operate under low light conditions,
- Remote monitoring
- 95% successful Automatic Number Plate Recognition feature,
- Modular software support
- Time-scheduled operating mode (day, week, month),
- All details related to high-quality and smart evidentiary photos,

- Date and hour,
- Location ID,
- Location name,
- Vehicle plate number,
- Full-size image of the violation and cropped image of just the violating vehicle.
- Remote system configuration.
- Possibility to see the violation photos via site software,
- Opportunity to build an extra corridor on the artery road determined, with a single site software,
- Variable speed limit and option to determine the over speed limit ratio,

# Certificates

- IP (IngressProtection) Protection Class Certificates (IP55-IP65)
- EMC (Electromagnetic Compatibility)
- LVD (LowVoltage Directive)
- FUNCTION VERIFICATION TEST REPORT





# Pedestrian Lane Safety System (Pedestrian EDS)

Pedestrian EDS is a system to record the violation occurring on the uncontrolled pedestrian crossing locations, in case any vehicle violates the pedestrian right of way.

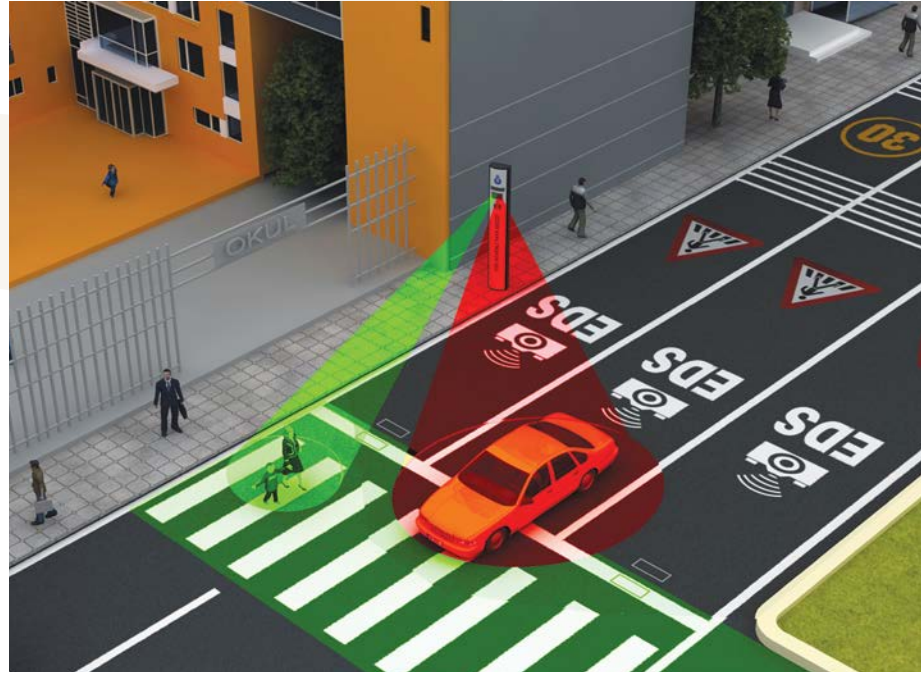
It is controlling system developed in order to raise consciousness in drivers in terms of pedestrian right of way.

Pedestrian EDS has been designed for the purposes of enabling the pedestrians to safely cross the street and to raise awareness regarding the pedestrian right of way, especially at locations, where the traffic density is high such as school surroundings and shopping malls and there is no signalization system.



## General Features

- At the violation moment, the number plate is read and taken under record with 2 photo shots from different angles.
- The system automatically detects any pedestrian on the pedestrian crossing and if any approaching is in violation or not.
- The system targets not to punish the drivers but to create change in driving behaviors.
- The system detects pedestrians and vehicles with its virtual sensors.
- The system performs number plate-dependent detection by using either metal detection or image processing technology.
- Pedestrian EDS is the first system in this sense developed in Turkey as well as the world.





# Number Plate Recognition System (PTS)

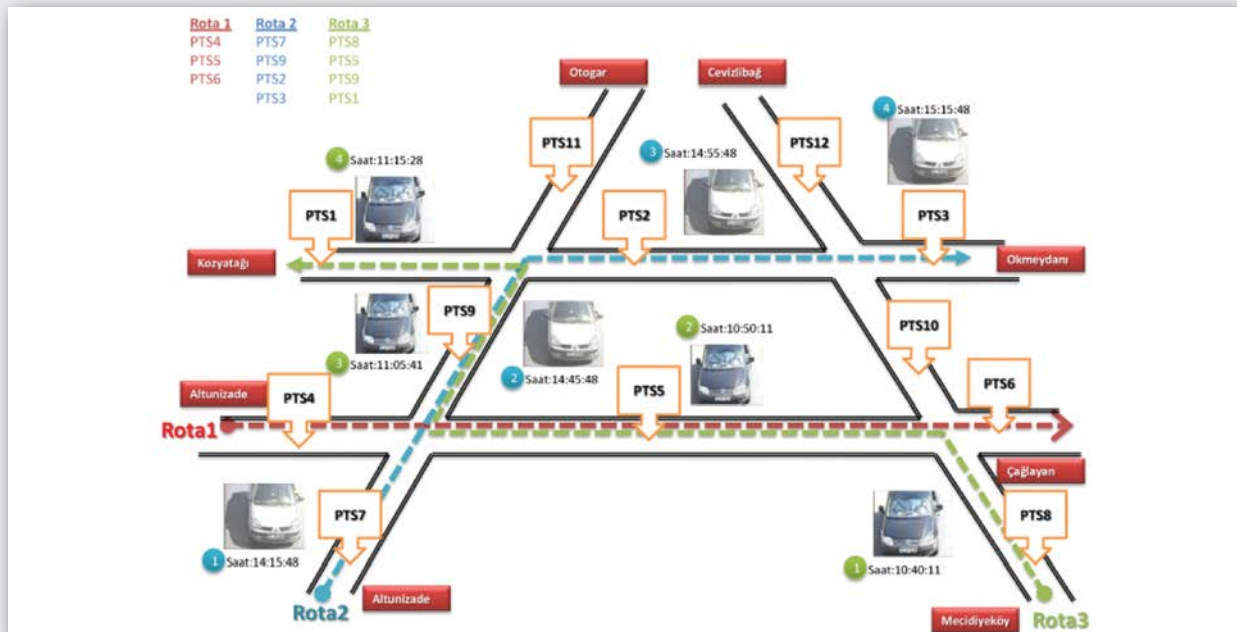
Number Plate Recognition System is an image processing technology used for identifying vehicles based on their plate numbers. This technology can be used particularly in detection of the vehicles entering and exiting parking places, security practices, traffic projects and applications. With the image processing plate recognition system placed on the main artery roads, not only the constant speeds of vehicles but also, as a first in Türkiye by tracking the vehicles throughout the whole travel duration, their average speeds can be calculated.



## Features

- Capable of reading square, rectangle number plates in all sizes,
- Measurement and monitoring of traffic flows (From-To),
- Lane, artery road and total vehicle counts,
- Average travel duration,
- Hourly, daily, weekly, monthly, yearly road use and density ratios,
- Vehicle classification based on polnet records,
- Corridor and global speed detection system,
- Left lane large vehicle violation (Polnet connected),
- Detection of vehicles stolen or searched,
- Establishing a database for the vehicles using the same route regularly,
- Infrastructure for congestion management and pricing,
- Over 80% capturing and over 95% accuracy in number plate recognition,
- High accuracy reading rate during day-night and under heavy weather conditions.

## System Architecture





# Railroad Grade Crossing Enforcement System



The system continuously monitors the railroad grade crossing, where it is installed, and detects any railroad grade crossing violation by using the automatic image processing method.



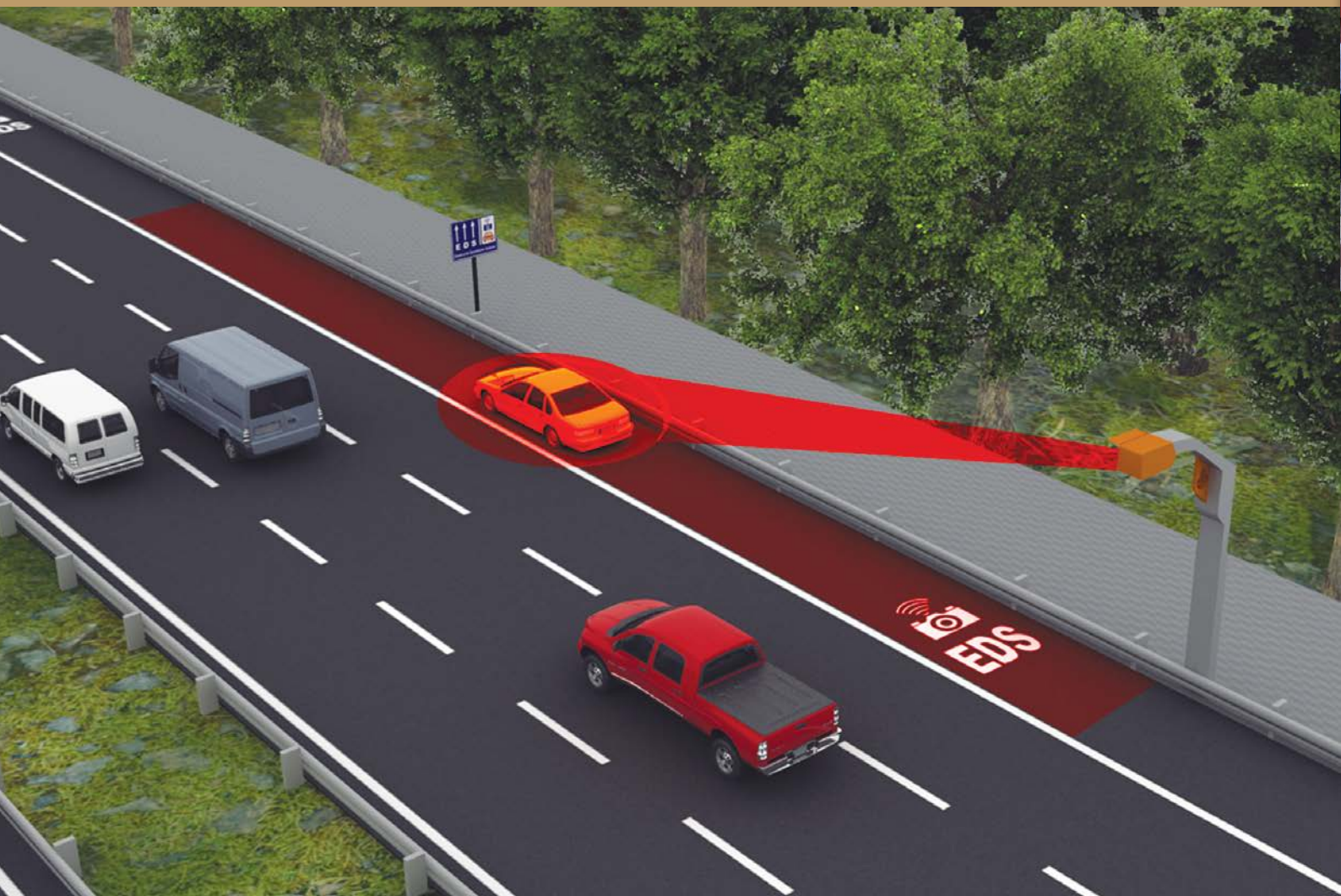
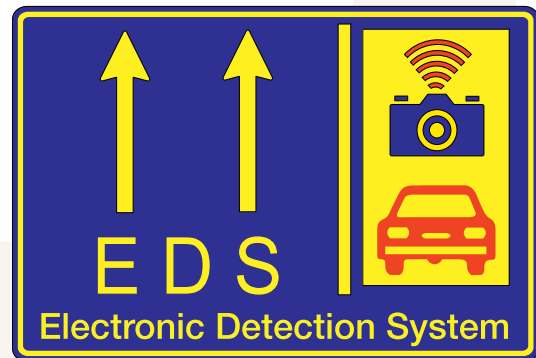


# Hard Shoulder Enforcement System



Hard shoulder enforcement system, by sensing the vehicles moving on the safety lane, performs violation detection. Entirely automatic system takes the photo of violating vehicles and transmits them to the center.

- With the moving cameras used in the system, 200-meter distance can be scanned,
- Distance of the areas to be controlled can be adjusted.





# Wrong Way Violation Detection System (Reverse Direction EDS)

The system is used for taking photos of the no-entry road and reverse direction violations via the cameras placed on the road.

## General Features

- The violation system is commanded via the master control software found at the control center.
- When required, violation detection area can be monitored online by connecting to the cameras in the system.
- Violation detection is performed by magnetic and virtual sensors.
- Violation information is recorded in the system database and data inquiry can be performed via database mentioned.





# Bus Lane Violation Detection System



It is a traffic violation detection system developed in order to prevent public transportation lanes (bus, metrobus, minibus, etc.) or other lanes designated for similar purposes from being misused.

The system automatically determines the vehicles travelling, without the right, on the lane designated for special use thus detects the violation.

- Bus lane violation is documented with 2 photos of the related vehicle to be shot at least within an interval of 30m.
- Violation detection is performed by magnetic and virtual sensors.
- The plate-based detection system is operated by image processing technology.





# Mobile Electronic Detection System

Mobile EDS, is a mobile detection means, which contains most of the EDS technologies, offers mobile solutions for the locations, where there is no possibility to establish fixed violation detection system; has incident detection and incident tracking capabilities and equipped with advanced technology moveable cameras and mobile operation adaptable.

It is developed especially to give support in prevention of the traffic problems

arising from parking violations, which affect negatively the intracity traffic flow; in controlling safety lanes, intersections in terms of safety violations and maintaining the life and property safety in transportation as well as in the city, by conducting regional safety controls via the moveable cameras.

The detection equipment found in the system continuously and automatically detects the violations in the areas, where parking or stopping is forbidden, via the image processing software and accordingly triggers the high-resolution cameras. This way, violations can be digitally evidenced.



## General Information

Our products, containing the most innovative features in the Enforcement Systems sector, with their modular and expandable architecture which may be integrated with the mobile means.

## Basic Features

- **Enforcement:** Sensing and labeling parking, stop-sign and safety lane violating vehicles by using innovative and high-successful “Image Processing, Automatic Number Plate Recognition” technologies among the Enforcement Systems.
- **Evidence pack:** All details related to the violation with high-resolution and color violation photos. Clear license plate photos of the violating vehicle, taken by a high-resolution and high-speed digital camera technology. Evidentiary photos of the violating vehicle, covering prior- and post-violation moment.
- **Mobile Design:** The entire equipment used in the system has been designed in a way suitable for mobile means and passed through vibration tests.
- **Maintenance Ease:** With the easily replaceable, modular design; the broken module can be replaced only in 5 minutes.

## Technical Features

### Sensor and Measuring Device Features

- With the high-resolution camera technology, highly-successful enforcement and clear photo records containing violation details,
- The system, with the support of specially-designed Infrared High Speed PTZ cameras, which are resistant to high temperature and adverse weather conditions, has the capability to take photos during night time.
- User-Friendly Software Interface allows the necessary settings to be made in few minutes,
- Functional Software feature allows identification of many violation limits,
- 95% successful Automatic Number Plate Recognition feature,
- With its optic zooming feature, the system can control long distances.
- Capability to view the details in the most accurate angle via the cameras mounted on telescopic poles.
- Manual alarm button to be used for recording unexpected order and security problems as well as the general public order issues.
- Enforcement and safety control with eyeglass-type cameras by real-time image transfer even at locations, where no vehicles allowed.
- With image processing technologies, detection of hard shoulder violations and photo-shooting.



## Cameras

- Violation Camera: With features of 25 shots per second, IP PTZ (Pan- Tilt-Zoom), color photo, high-sensitivity image sensor, night vision with IR LED technology, digital noise reduction; evidentiary photos with clear details. Accessibility with its MultiStream feature.
- Incident Camera: A high-sensitivity IP PTZ camera, which can take 25 shots per second. Even under low light conditions, it can provide a wide image of the sensor area including wide-angle photos of the violation.

## IR Lighting

- Lighting up to 120-meter distance,
- Automatic adjustment of light intensity according to the zoom level.

## General Features

- IP 65 protection class in all outer environment devices,
- By the help of the telescopic pole, a more accurate view angle.
- 180-meter distance measurement,
- Industrial system equipment,
- With the full industrial Toughbook mounted on the front panel of the vehicle, multiple operator support.
- Option for image recording with the alarm button, when required.
- Access to and management of the system equipments both on the front panel and interior panel of the vehicle.

## Software Features

- 4 violation photos; photos of start of violation moment and limit timeout,
- Possibility to take real-time image of up to 10 users at the same time,
- With IR technology, being able to operate under low light conditions,
- Remote monitoring,
- Real-time recording option during alarm conditions.
- On-location violation warrant issuance.
- Automatic plate recognition feature.
- Control of all the cameras via single software.

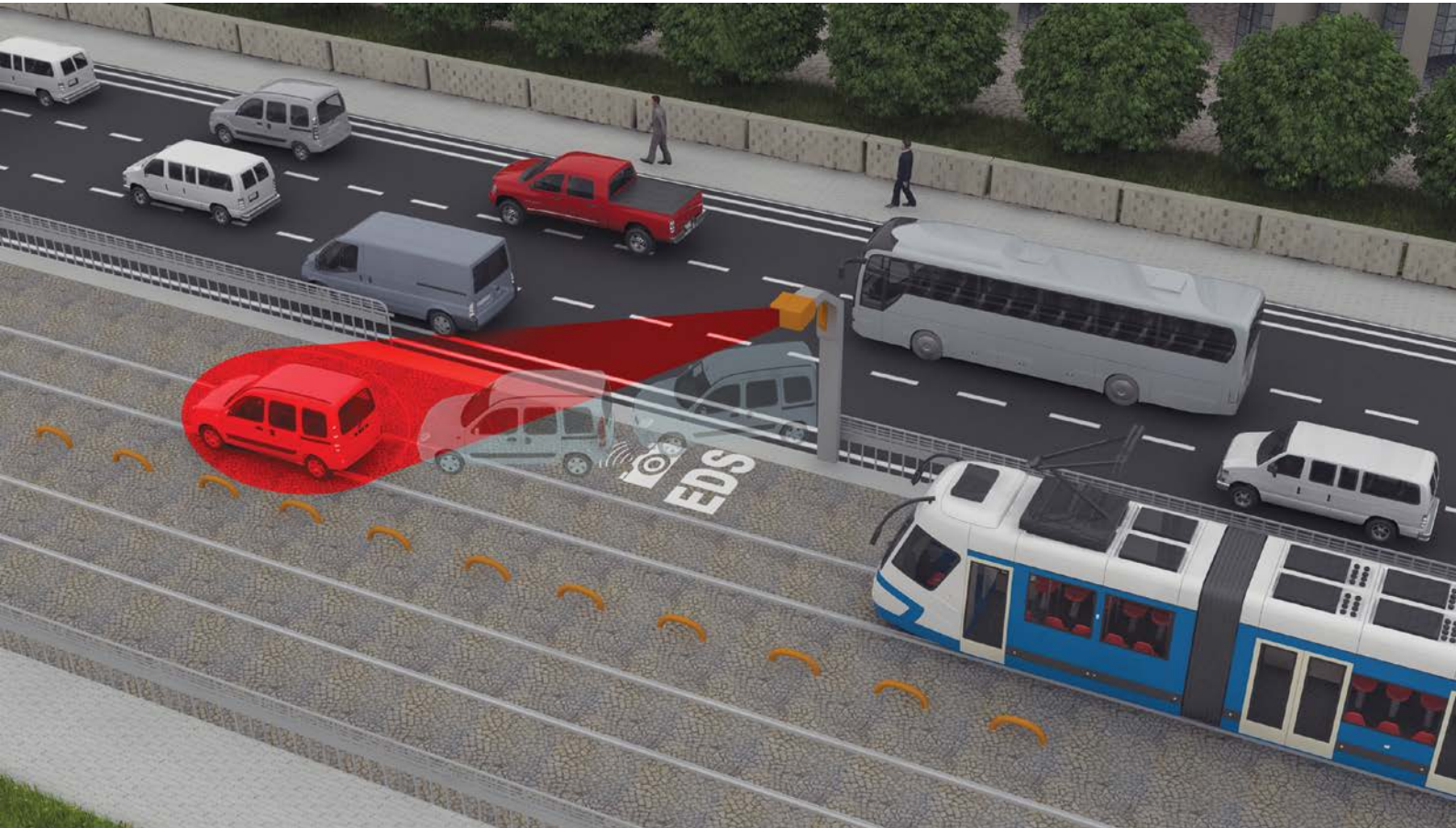


- Data transfer to the center via the communication systems (3G, 4G).
- In-vehicle power management system.
- Taking images with glass-type cameras.
- Operating Temperature Range: from -25°C to +50°C
- Green Energy: 12VDC-based operating principle,
- With jelly-type maintenance-free batteries, enabling the system to operate under control while the vehicle is not working.
- A system protecting all electronic equipment contained in the main system against any energy fluctuation and stroke of lightning.
- Modular software support
- Time-scheduled operating mode (day, week, month),
- All details related to high-quality and smart evidentiary photos,
  - o Date and hour,
  - o Location ID,
  - o Location name,
  - o Vehicle license plate,
  - o Full-size image of the violation and cropped image of just the violating vehicle.



# Tramway Route Violation Detection System

The system monitors the tramway route, where it is fixed and detects tramway route violations by using the automatic image processing method. The images can be saved in the high capacity archiving unit and transferred to the control center.

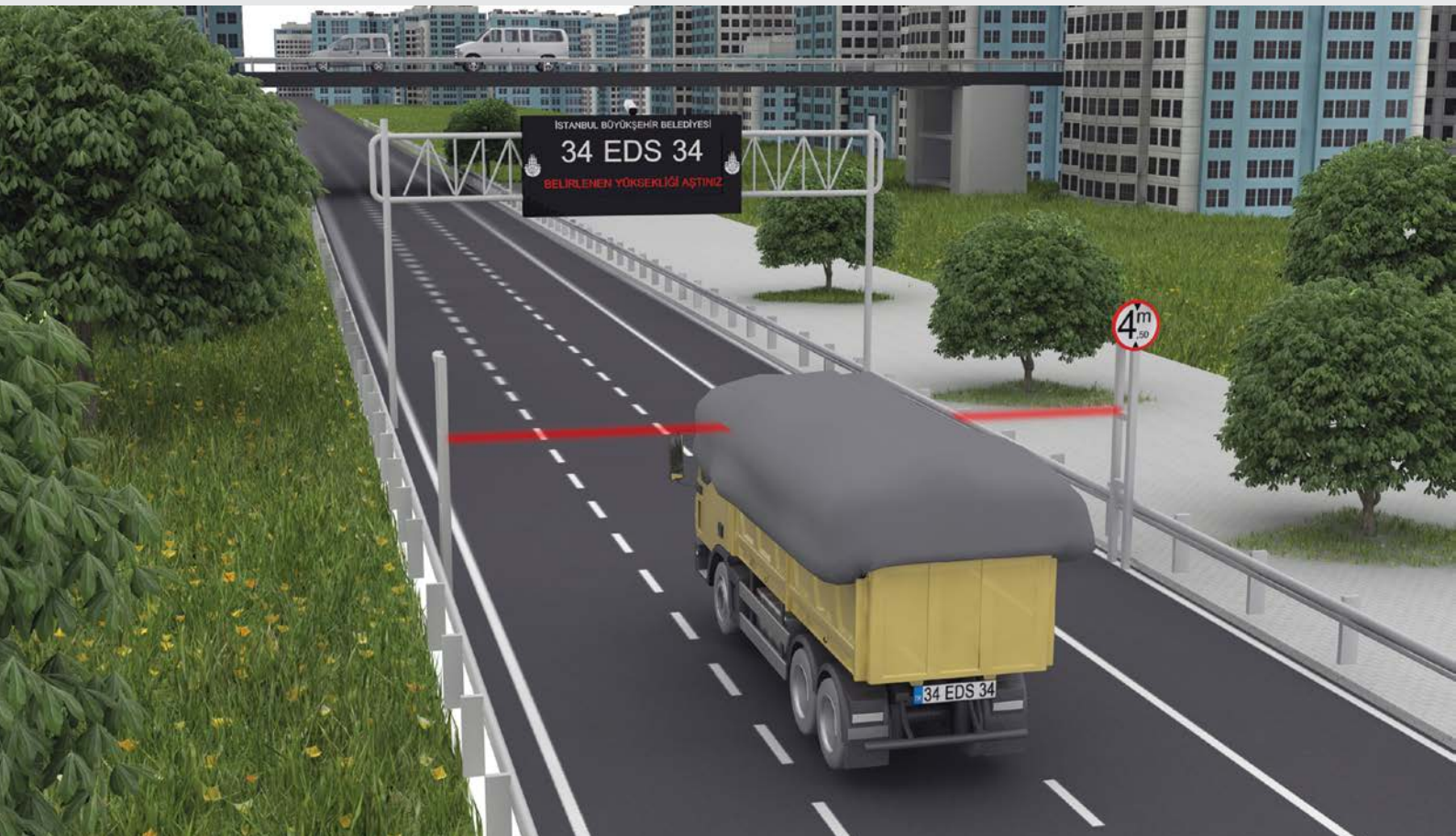




# Overheight Vehicle Detection System EDS

Overheight EDS is a detection system, which automatically detects the vehicles violating rules of the height-limit roads and tunnels. It is developed for warning, when required, the vehicles bearing an over-height risk thus preventing the potential accidents.

- The sensor technology used can continuously operate without being affected from dust, dirt and rain.
- In the system, IP camera technology is used.
- 2 photos of the violating vehicle is shot and sent to the center.





# TDS – 3D/4D Doppler Radar

TDS-3D/4D Doppler Radar, which is a new generation multiple lane, multiple vehicle speed measurement system, with its light and compact design, can perform enforcement not only in fixed systems but also on tripod (portable) and in mobile systems. With its innovative technology, it can be also added to in-vehicle systems.

The system performs a high-accurate detection process according to the internationally-accepted OIML recommendations.

By the help of an advanced technology product, the innovative sensor approach used in the system; distances up to 150m can be measured. This is a precaution against the possibility of the vehicles slowing down in the radar area.

Automatically recording every speed limit violation, the system simultaneously creates digital data of the violation by using the high-resolution violation photos as well as the violation video received.

At the locations, where the system is installed, 90% decrease is observed in the accident-causing factors

## General Information

Our products, which contain the most innovative features in Enforcement Systems sector, have been designed in an individually-operable, compact and modular structure. Considering the needs of the relevant regions; we offer a wide product range containing our innovative “L Pole” and “Tower Type Pole” designs.

## Basic Features

- Enforcement: Sensing and labeling violation by using violation sensor systems containing the innovative “4D Doppler based real-time tracking” technology.
- Easy installation: Its modular and light-weight design allows easy installation.
- Tracking 5 lanes with only single radar.
- Evidence pack: 4 photos per second. Variable camera settings. Instant ambient light intensity measurement during day and night. All details related to the violation with high-quality and color violation photos. Clear license plate photos of the violating vehicle, taken by a high-resolution and high-speed digital camera technology. Evidentiary video record of the violating vehicle, covering prior- and post-violation moment.
- Innovative, calibration and easy-to-install (PLUG AND PLAY TECH): By all easily installable radar-based enforcement systems



developed by ISBAK, there will be less operator dependency. It obtains all the parameters related to the road, where the radar is installed, in few seconds with the help of the artificial intelligence technology. With this technology, operator-based false parameter entries can be prevented.

- Its innovative compact, modular design and light-weight body structure provide easy installation and transportation.
- Innovative Air-Conditioning System: By minimizing the consumption power, the device provides an operation environment up to 55 °C. Therefore it is identified as “green technology”.
- Innovative Maintenance Ease: Easily replaceable modules. A broken module can be replaced maximum in 5 minutes. Separable modular design removes the need for camera and radar readjustment after the repair- and maintenance-based interferences.



## Flexible System Design Architecture

- Determine the pole technology you want to use (L Pole or Tower Type Pole),
- Determine the camera technology you want to use (GIGE or DSLR),
- Determine the sensor and measurement technology you want to use (3D or 4D Doppler),
- Determine the lighting technology you want to use (Flash, IR, RED Flash),

## Technical Features Sensor and Measuring Device Features

- With the 4D-Radar technology, tracking and customized software identification of 15 different vehicles. Measuring the vehicles' speeds, locations and distances with a high accuracy.
- Auto-Calibration system obtains in seconds, all the measurement parameters related to the road, where the radar is installed.
- User-Friendly Software Interface allows the necessary settings to be made in few minutes.
- High accuracy ratio with the x, y, z coordinate information of vehicles in each capture.
- Measuring at the same all approaching and departing vehicles and both lanes,
- Up to 5 measurements with a single sensor,
- High Measurement Reliability Ratio: up to 100km/h,  $\pm 3\text{km/h}$ ; over 100km/h  $\pm 3\%$  OIML compatible reliability ratios,
- Radar Measurement Range: 150m (ETSI) (FCC:200m)
- Speed Measurement Range: from 20 up to 300km/h.
- Energy Saving: Low power consumption: 0.5W@ 12VDC

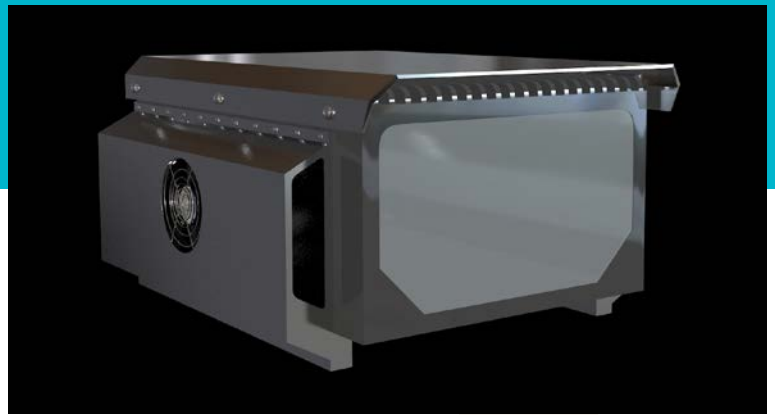
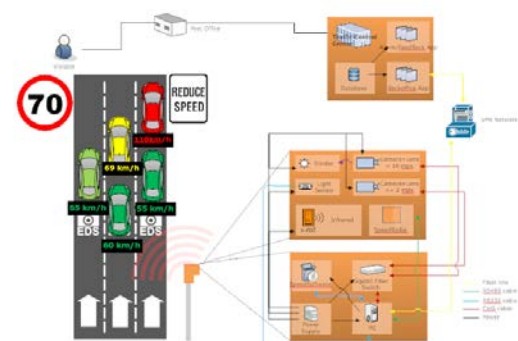


## Computer

- Industrial structure, which is resistant to adverse outer environment conditions,
- Long-lasting body structure,
- Advanced Electromagnetic Wave filtering and isolation,
- Buffer unit with high reading and writing speed.

## Strobe

- Operating Temperature Range: from  $-25^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$
- $\geq 3$  flashes per second,
- $> 80\text{m}$  lighting,
- 200000+ flashing life expectancy



## Cameras

- Violation Photo Camera: Evidentiary photos, in which all details can be caught by the color, high-sensitive and 16MP digital camera (with 19 MP option).
- Violation Video Camera: Clear violation videos taken, even under low light conditions, by a high-sensitive 2MP camera, which can take 30 shots per second.



## General Features

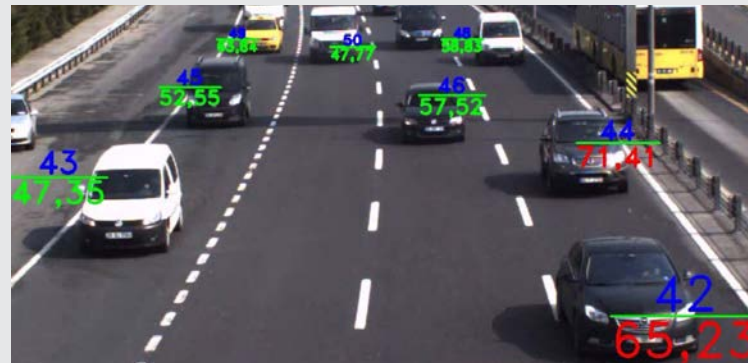
- IP 65 Protection Class in all outer environment devices,
- Aluminum cabinet and stainless steel construction pole,
- Up to 5 lane measurements,
- IP 65 Protection Class, EMC and LVD reports,
- Industrial cabinet design,
- Operating Temperature Range: from -25°C to +55°C
- Green Energy: 12VDC-based operating principle,
- Enabling the system to operate under control during the power failures with jelly-type, maintenance-free batteries,
- A system protecting all electronic equipment contained in the main system against any energy fluctuation and stroke of lightning.

## Software Features

- Real-time of measurement for up to 15 vehicles and display of the required data such as; “speed, distance, vehicle ID, lane information” of the vehicles evaluated by the software.
- 4 violation photos – 4 different scenes
- High-resolution digital camera
- Video record of the violation moment containing prior- and post-violation images. The duration of the record can be adjusted via software.
- Colored night violation photos,
- Remote monitoring
- Central Automatic Number Plate Recognition,
- A modular software support, to which new functions can be added,
- Time-scheduled operating mode (day, week, month),
- Feature of determining direction- and lane-based speed limit,
- Feature of determining speed limit according to different vehicle types (Automobile-Truck)
- All details related to high-quality and smart evidentiary photos,
  - o Date and hour,
  - o Frame counter,
  - o Device serial number,
  - o Software version,
  - o Evidence number,
  - o Vehicle speed,
  - o Vehicle type (car, truck),

## Certificates

- IP (IngressProtection) Protection Class Certificates (IP55-IP65)
- EMC (Electromagnetic Compatibility)
- LVD (LowVoltage Directive) - LOW VOLTAGE DIRECTIVE
- Function Verification Test Reports
- RADAR CALIBRATION CERTIFICATIONS



- o Vehicle plate number,
- o (Approaching, departing) Vehicle direction,
- o Vehicle identification number,
- o Ratio of the vehicle's excess speed,
- o Information regarding the violation lane,
- o Regional ID and location name.
- Full-size image of the violation and cropped image of just the violating vehicle.
- Remote system configuration.
- 7x24 local video recording with 2 Mpx resolution.
- Adjustable photo settings according to the ambient light for high image quality
- Remote system configuration.
- With the map-based speed demonstration function, displaying the vehicles on the map data of the region, where the measurement is performed,
- Regional identification of the area, where the violation photos will be taken, via the software,
- Identification of the area, where the measurement process is requested, by the sensor via the software,
- Parametrically determining the number of the photos to be taken and the interval of shooting,
- By using video analytic methods, eliminating shadow and headlight effects,
- Marking the violating vehicles on the image,



- INTELLIGENT TRANSPORTATION SYSTEMS
  - TRAFFIC ENGINEERING
  - ADAPTIVE TRAFFIC MANAGEMENT SYSTEM (ATAK)
  - CONTROL CENTER
  - TRAFFIC SIGNALIZATION SYSTEMS
  - ELECTRONIC DETECTION SYSTEM (EDS)
  - COMMUNICATION SYSTEMS
  - TRAFFIC MEASUREMENT SYSTEMS
  - VARIABLE MESSAGE SYSTEMS
  - CAMERA AND SECURITY SYSTEMS
- TUNNEL SCADA MANAGEMENT SYSTEM
- INTELLIGENT LIGHTING SYSTEMS
- CONTENT MANAGEMENT SYSTEMS
- VEHICLE TRACKING AND FLEET MANAGEMENT
- SYSTEM (ISMOBIL)



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