ITS
Intelligent Transport Systems
Solution for the Sustainable, Low Carbon Oxide Development
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Leading You Toward a Greater Future than You Imagine

LSIS’ transportation system solution helps to build a faster, safer, more eco-friendly transportation system by incorporating cutting-edge technologies of electronics, electricity, control, and information communication fields into a transportation system, such as UTMS, DSRC, ATES, FTMS and TCS/ETCS.

Experience our transportation system solution, the fittest of all in the ever-evolving ubiquitous environment.
Speed Enforcement Camera
The UTMS is a system which, using a number of devices, collects, operates, and manages various traffic data of the downtown and adjacent areas to improve road efficiency, and to provide road users with more convenient transportation environment.

Features

- Enables a center to monitor the traffic conditions of major intersections and other roads in the city in real-time.
- Detects and responses to traffic congestions and accidents on the road in real time.
- Facilitates the construction of a highly-reliable city transportation management system.
- Monitors the system status and I/O-related on-site operation conditions in real time.
- With full graphic resources, it provides a user environment that allows optimal monitoring and control of the traffic conditions and the system.
- Supports various operating environments including Unix and Windows.
- Long-term data storage and efficient information management using a relational database.
- Provides a system environment that facilitates building an external linkage system with other systems.
- Provides various formats of a report to satisfy the user’s needs.
- Provides freeway users with the information of various types – text, image, etc. – through ARS, web, mobile phone, PDA, etc. (optional)
- Web-based monitoring function (optional)
**System Structure**

**Components**

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Components</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Management System</td>
<td>• Main frame</td>
<td>• Periodically processes the data collected by detectors and compiles statistics.</td>
</tr>
<tr>
<td></td>
<td>• Integrated operation terminal</td>
<td>• Monitors various system operation statuses and manages the DB.</td>
</tr>
<tr>
<td>Status Display System</td>
<td>• Status display (DLP, LCD, etc.)</td>
<td>• Monitors the entire road conditions, and displays all the task and status of the system for an operator.</td>
</tr>
<tr>
<td></td>
<td>• Wall Controller, etc.</td>
<td></td>
</tr>
<tr>
<td>Signal Control System</td>
<td>• Traffic signal control system</td>
<td>• Collects real-time traffic conditions data, such as traffic volume, occupancy, rate, speed, etc., from the road, and sends them to the signal control server.</td>
</tr>
<tr>
<td></td>
<td>• Signal control server [LMS, GMS]</td>
<td>• Processes the collected data according to the signal control algorithm, and controls the intersection coordination and the timing of each signal based on the results.</td>
</tr>
<tr>
<td></td>
<td>• Vehicle detector [loop], etc.</td>
<td></td>
</tr>
<tr>
<td>Bus Information System</td>
<td>• Information terminal in a bus/ at a bus stop</td>
<td>• Collects, processes and provides the bus information in real time.</td>
</tr>
<tr>
<td></td>
<td>• Bus information collecting device, etc.</td>
<td></td>
</tr>
<tr>
<td>Variable Message Signs (VMS) System</td>
<td>• Variable Message Signs (VMS)</td>
<td>• Provides road users with useful information using a roadside sign board.</td>
</tr>
<tr>
<td></td>
<td>• VMS Server, etc.</td>
<td></td>
</tr>
<tr>
<td>Video Collection System (CCTV)</td>
<td>• CCTV camera</td>
<td>• Collects and provides the real-time on-site video through CCTVs.</td>
</tr>
<tr>
<td></td>
<td>• CCTV server, etc.</td>
<td></td>
</tr>
</tbody>
</table>

**Function**

**Data collection / processing**

• Collects the traffic conditions data and compiles statistics.
• Monitors the operation status of on-site devices and the system.
• Collects and processes the location/operation data of buses.

**Situation response**

• Identifies and responds to traffic congestion, accidents, and restrictions in real time.
• Collects the real-time traffic data of intersections and roads, and operates the optimum signal control.

**Information delivery**

• Provides immediate reports on various information including traffic and settings information.
• Provides road users with the information of the traffic conditions, accidents, restrictions, etc. on a specific section of a road.
• Provides the bus location information, etc. in real time.
The DSRC

Dedicated Short Range Communication

The DSRC Transportation Information System facilitates a high-tech transportation environment that is more accurate and more intelligent.

So far, the transportation information systems have adopted the one-way communication with image/loop detectors to collect data, which put inevitable limitation on the reliability and the usability of the data. The DSRC Transportation Information System, however, can collect accurate data through hi-pass terminals installed on vehicles, and deliver interactive, diverse content services through the two-way communication, laying the groundwork for a high-tech transportation environment.

System Features

Accuracy [99% or higher data reliability]
- 99% or higher communication success rate
- 99% or higher spatial detection accuracy
- 99% or higher accuracy of provided transportation information

Extensibility [A variety of application services available]
- Hi-pass-equipped vehicle tracking service
- Congestion toll collection function for urban areas
- Parking fee collection function can be added.
- Gas station payment solution can be added.

Affordability [No need for a communication system for each service]
- All is needed is to install roadside equipments.
- Various services can be applied using only one communication platform.
- Reduced cost by employing a Master/Slave structure
  [A solar power generator system is applicable. Wireless communication through CDMA.]
**Service**

**Real-time Transportation Information Delivery Service**
- Information delivery to a hi-pass terminal
- Information delivery to VMS and IT devices

**BIS (Bus Information System) Service**
- Information delivery to bus stops
- Operation management system

**Toll Collection Application Services**
- Congestion toll collection
- Unmanned parking fee/gas price collection

**Control Unit**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>32bit 400 MHz or higher</td>
</tr>
<tr>
<td>RAM</td>
<td>128MB</td>
</tr>
<tr>
<td>Flash Memory</td>
<td>128MB</td>
</tr>
<tr>
<td>External storage device</td>
<td>2GB or more (SD Type)</td>
</tr>
<tr>
<td>DS</td>
<td>Embedded Real-time DS</td>
</tr>
<tr>
<td>Operation Temperature/Humidity</td>
<td>-34°C ~ 74°C (10% ~ 90%)</td>
</tr>
<tr>
<td>Housing</td>
<td>470 x 760 x 287, IP-66 waterproof</td>
</tr>
<tr>
<td>Cooling method</td>
<td>Natural convection method</td>
</tr>
</tbody>
</table>

**Antenna Unit**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcasting frequency</td>
<td>5.8GHz (5.795GHz ~ 5.81GHz)</td>
</tr>
<tr>
<td>Channel bandwidth</td>
<td>8 MHz</td>
</tr>
<tr>
<td>Transfer rate</td>
<td>1.024Mbps</td>
</tr>
<tr>
<td>Power</td>
<td>DC 24V</td>
</tr>
<tr>
<td>Weight</td>
<td>2 kg</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>~ -35°C ~ 55°C</td>
</tr>
<tr>
<td>Housing</td>
<td>IP-66 waterproof</td>
</tr>
<tr>
<td>Performance</td>
<td>+ RF automatic temperature adjustment function</td>
</tr>
</tbody>
</table>
**ATES**

Automatic Traffic Enforcement System

"The Protector of the Road" for Safe Driving

The high-performance ATES equipped with LSIS’ accumulated technologies of electronics, information and communications facilitates safer and more pleasant transportation environments.

The ATES is a system which identifies violations of traffic regulations, such as speed limits, signals, bus lanes, etc. in real time, and automatically processes them administratively.

**Features**

- Enforces an 80km speed limit on freeways against freight cars over 1.5 tons
- Simultaneous enforcement of speed limits and bus lanes
- Simultaneous enforcement of speed limits and traffic signals
- In case of traffic congestion, complete compensation for signal interference by a vehicle in the back in case of traffic congestion
- Stable enforcement of traffic regulations in all seasons and weathers
- Identification of all vehicle registration plates that can be easily changed by upgrades.
### System Structure

- **Vehicle Background Check Computer**
- **Operative Terminal**
- **DB Server**
- **Disk Array & Backup Device**
- **Comm. Server**

### Components

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Components</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center System</td>
<td>• DB server • Vehicle background check computer</td>
<td>• Stores the enforcement data for each year, month, day and site.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Checks/prints/stores the background information of a vehicle that violated the regulation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provides various statistical reports to suit the user’s needs, and remotely controls a local controller.</td>
</tr>
<tr>
<td>On-site System</td>
<td>• Speed detection unit</td>
<td>• Calculates the speed with high reliability by using a loop detector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Perfect compensation for abnormal traffic patterns, such as traffic congestions.</td>
</tr>
<tr>
<td></td>
<td>• Image acquisition unit</td>
<td>• Acquires high-quality, high-definition images, even of vehicles running at high speed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimizes obstruction to drivers’ view caused by lights. Fast recharge.</td>
</tr>
<tr>
<td></td>
<td>• Control Unit</td>
<td>• Directly controls on-site equipments or check their status.</td>
</tr>
<tr>
<td></td>
<td>• Identification Software</td>
<td>• Identifies a license plate using acquired images, and send the results to the center in real time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Identifies a license plate in a fast and accurate manner by employing an efficient identification algorithm.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Continuous upgrades to identify all versions of license plates.</td>
</tr>
</tbody>
</table>

### Function

- **Speed enforcement system** • Enforces speed limits in freeways, national roads, and city streets
- **Bus lane enforcement system** • Enforces bus lanes in freeways and city streets
- **Multifunctional enforcement system** • Enforces traffic signals and speed limits in city intersections and crossroads

- **Image Acquisition**
  - **Identification of a Violator’s Vehicle**
    - Acquires the images of a violator’s vehicle
    - Secures and processes high-quality images

- **Real-time Enforcement Data Transfer**
  - Real-time data transfer
  - Communication control and error detection

- **Statistical Data Display**
  - Displays the annual/monthly/daily statistical data
  - Displays statistics for daytime/nighttime

- **Easy-to-Use Maintenance GUI**
  - Menu configuration convenient for on-site use
  - Various H/W control menus

- **Vehicle Background Check**
  - Automatic/manual check function

- **Remote Control of a Local Controller**
  - H/W remote control (to change a target lane)
  - S/W remote control (to change the enforced lane)
The FTMS is a system which monitors traffic conditions, collects the information, and provides them to freeway users using vehicle detectors, data processing devices, etc, to maximize the efficiency and the capacity of the freeway.

Features

- Allows a center to monitor the freeway conditions of the entire section in real time.
- Automatically detects traffic congestions and incidents in real time, and respond to them in a rapid, safe manner.
- Facilitates a reliable FTMS that meets the user’s needs.
- Provides real-time monitoring of the system status and I/O-related on-site operation conditions.
- Supports various operating environments including UNIX and Windows.
- Long-term data storage and efficient information management using a relational database.
- Provides a system environment that facilitates building an external linkage system with other systems.
- Provides various formats of a report to satisfy the user’s needs.
- Provides freeway users with the information of various types – text, image, etc. – through ARS, web, mobile phone, PDA, etc.
- Web-based monitoring function (optional)
**System Structure**

**Subsystem**

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Components</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Management System</td>
<td>• Main frame&lt;br&gt;• Integrated operation terminal&lt;br&gt;• Network devices, etc.</td>
<td>• Processes the data collected by detectors and compiles statistics periodically.&lt;br&gt;• Monitors the communication conditions and automatically detects traffic incidents and restrictions.&lt;br&gt;• Monitors various system operation statuses and manages the DB.</td>
</tr>
<tr>
<td>Status Display System</td>
<td>• Status display (DLP, LCD, etc.)&lt;br&gt;• Wall Controller, etc.</td>
<td>• Monitors the entire road conditions, and displays all the task and status of the system for an operator.</td>
</tr>
<tr>
<td>Vehicle Detection System (VDS)</td>
<td>• Loop detector&lt;br&gt;• Image detector&lt;br&gt;• Ultrashort wave detector, etc.</td>
<td>• Collects in real time the traffic conditions data, such as traffic volume, occupancy rate, speed, from the road, and sends them to the center.</td>
</tr>
<tr>
<td>Variable Message Signs (VMS) System</td>
<td>• Variable Message Signs (VMS)&lt;br&gt;• VMS Server, etc.</td>
<td>• Provides road users with useful information using a roadside sign board.</td>
</tr>
<tr>
<td>Video Collection System (CCTV)</td>
<td>• CCTV camera&lt;br&gt;• CCTV server, etc.</td>
<td>• Collects and provides the real-time on-site video through CCTVs.</td>
</tr>
<tr>
<td>Emergency Phone System (EP)</td>
<td>• Roadside emergency phone&lt;br&gt; • Keyphone switcher, etc.</td>
<td>• Allows road users to contact the Traffic Information Center from the road in case of emergency.</td>
</tr>
<tr>
<td>ARS/Web System</td>
<td>• ARS/Web server, etc.</td>
<td>• Provides road users with various real-time traffic information through the ARS or the Internet.</td>
</tr>
</tbody>
</table>

**Function**

<table>
<thead>
<tr>
<th>Data collection / processing</th>
<th>• Collects the traffic condition / system operation data in real time using various devices.&lt;br&gt; • Processes and provides the data for operators and road users in real time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation response</td>
<td>• Identifies and responds to unpredicted situations caused by accidents, natural disasters, etc. in real time.&lt;br&gt; • Identifies and responds to traffic congestion in each section of the road in real time.</td>
</tr>
<tr>
<td>Information delivery</td>
<td>• Provides road users with useful traffic information in real time.&lt;br&gt; • Provides operators with useful road/system operation information in real time.</td>
</tr>
</tbody>
</table>

**Traffic Monitoring System**

- Traffic condition monitoring screen<br> - Accident/restriction monitoring screen<br> - On-site system status monitoring

**VMS Operation Screen**

- Real-time VMS message monitoring<br> - VMS message editing<br> - Remote control of the on-site VMS.

**Accident/Restriction Response Screen**

- Identification of traffic accidents and restrictions<br> - Editing and display of VMS emergency messages<br> - Road restriction status management

**CCTV Operation Screen**

- Monitoring of the on-site video<br> - CCTV control<br> - Video input/output control

**Web Information Display Screen**

- The traffic conditions<br> - Traffic accident/restriction status<br> - Real-time road images

**Report Screen**

- Daily/monthly annual reports<br> - Various statistics DB reports print-out<br> - A report that meets the user’s needs.
Image Detector

An image detector is a traffic data measuring system which accurately measures the information (traffic volume, speed, vehicle length, etc.) of a vehicle on the road in real time using a video camera, and then collects, analyzes, and saves the information at a minimum time unit to provide them to a VDS server and a host computer.

**Applicable Areas**
Traffic information collection system, traffic accident auto-detection system, traffic signal controller, unmanned monitoring system (speeding, traffic signal violation, etc.), and other ITS-related devices and applications.

**Features**
- Reliable accuracy
- Extensibility in terms of the traffic operation
- Easy adjustment of the detection range
- Simultaneous detection of several vehicles
- Easy maintenance
- Reduced maintenance cost

**Camera Unit**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera</td>
<td>1/4&quot;CCD, NTSC, 570 TV lines or more</td>
</tr>
<tr>
<td>Lens</td>
<td>F1.4~360, C/CS Mount</td>
</tr>
<tr>
<td>Housing</td>
<td>Aluminum, Built-in heater (temp. management function)</td>
</tr>
<tr>
<td>Bracket</td>
<td>Stainless, Loading capacity of 10 kg or more</td>
</tr>
</tbody>
</table>

**Control Unit**

<table>
<thead>
<tr>
<th>Component</th>
<th>Local Type</th>
<th>Center Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Pentium or higher</td>
<td>Centralized control by a center</td>
</tr>
<tr>
<td>RAM</td>
<td>128MB or more</td>
<td></td>
</tr>
<tr>
<td>I/F</td>
<td>4 Serial, 2 Parallel, 1 LAN, 4 Digital I/O</td>
<td></td>
</tr>
<tr>
<td>Real Time Clock</td>
<td>1/100 or less Built-in battery backup function</td>
<td></td>
</tr>
<tr>
<td>Control Type</td>
<td>On-site control</td>
<td>Centralized control by a center</td>
</tr>
</tbody>
</table>
Loop Detector

A loop detector is a traffic information collection system which detects the occupancy rate, the speed, the traffic volume, etc. of a vehicle passing through a loop coil installed on each lane of freeways, national roads, and city streets. It also saves and analyzes the vehicle information detected by a loop detector controller, and transfers the information demanded by the center.

**Applicable Areas**
Traffic information collection system, traffic accident auto-detection system, traffic signal controller, unmanned monitoring system (speeding, traffic signal violation, etc.), and other ITS-related devices and applications.

**Features**
- Sends the Main Control Center the lane information – traffic volume, speed, occupancy, vehicle length, etc.
- More-than-95% reliability of the collected information, such as volume, speed, occupancy, etc.
- Incorporating a 4-channel loop detector card.
- Can be used as a detector to verify the video VDS.

**Detection Unit**

<table>
<thead>
<tr>
<th>Coating Material</th>
<th>A single/multi-layer insulation made of polyethylene or equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Temperature</td>
<td>No damage to the outer surface at the temperature above 200°C</td>
</tr>
<tr>
<td>Loop Inlet Line</td>
<td>600m or shorter</td>
</tr>
</tbody>
</table>

**Control Unit**

<table>
<thead>
<tr>
<th>CPU</th>
<th>32Bit, 66MHz or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Interface</td>
<td>RS-232C / Ethernet</td>
</tr>
<tr>
<td>Number of input channels</td>
<td>up to 32 channels [max. 16 lanes]</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>-34℃ to +74℃</td>
</tr>
<tr>
<td>Housing Material</td>
<td>Stainless</td>
</tr>
<tr>
<td>Input Power Voltage</td>
<td>AC220V±10%, 60Hz±1Hz</td>
</tr>
</tbody>
</table>

**Data Management Function**
Analyze/saves in real time the traffic parameters at a time interval predefined by an operator.

**Self Diagnosis Function**
In case of initial operation, a short circuit, or restoration, a self-diagnosis program checks RAM, ROM, and Watch Dog Time.

**Data Collection/Management Function**
Upon request from the main device, it transfers the computed data required for statistical analysis of the main device, such as the average vehicle speed (km/h), traffic volume (number of vehicles/h), occupancy rate (%), and the vehicle length.
The TCS
is a system which collects tolls, measures traffic volume, and carries out all office tasks related to the toll collection. It also enforces traffic regulations and gathers traffic information.

The ETCS
is a system which collects tolls using the wireless communication between an on-board unit (OBU) installed on a vehicle and a roadside antenna, allowing a vehicle to pass through a tollgate without any hassle.

Features

TCS
- Reduces time necessary to process toll payments to improve users’ convenience
- Accurate, easy toll collection process based on a reliable system
- Minimizes the workforce size by streamlining the work process
- Enables various modes of payments by employing an electronic card (compatible with ETCS)

ETCS
- Eliminates wait time by enabling a driver to make a payment without stopping at the tollgate
- Safe toll collection based on a password authentication method
- Reduces operation cost by adopting an unmanned system
### System Structure

#### Components

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Components</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Headquarter (Center) Equipments</strong></td>
<td><strong>Office Equipments</strong></td>
<td></td>
</tr>
<tr>
<td>Center server</td>
<td></td>
<td>Processes and stores the collected operation data based on various algorithms</td>
</tr>
<tr>
<td>Office server</td>
<td></td>
<td>Prepares reports based on the data shared with the lane equipments. It also stores the data, transfers them to a upper-level computer, etc.</td>
</tr>
<tr>
<td>Weigh-in-motion server</td>
<td></td>
<td>Processes the data transmitted from a weigh-in-motion lane to enforce the weight limit</td>
</tr>
<tr>
<td>Evasion server</td>
<td></td>
<td>Stores and processes the data uploaded by the anti-evasion system.</td>
</tr>
<tr>
<td>Automatic ticket issuing machine</td>
<td></td>
<td>Automatically issues a user with a ticket containing information, such as the vehicle type, the office number, etc.</td>
</tr>
<tr>
<td>Vehicle classifier</td>
<td></td>
<td>Classifies a passing vehicle as Type 1 - 6 to provide the information to the lane controller.</td>
</tr>
<tr>
<td>Vehicle detector</td>
<td></td>
<td>Calculates the number of entering vehicles.</td>
</tr>
<tr>
<td>Lane controller</td>
<td></td>
<td>Processes and stores various data, and controls all the peripheral devices.</td>
</tr>
<tr>
<td>Ticket reader</td>
<td></td>
<td>Verifies the information on the ticket received from a user, and carries out an attendant’s responsibilities.</td>
</tr>
<tr>
<td>Prepaid ticket reader</td>
<td></td>
<td>Processes a freeway card, subtracting and printing out the toll fare.</td>
</tr>
<tr>
<td>Receipt issuing machine</td>
<td></td>
<td>Prints out and issues a receipt showing the information processed by the ticket reader.</td>
</tr>
<tr>
<td>Anti-evasion system</td>
<td></td>
<td>Prevents toll evasion by photographing the license plate of a violator’s vehicle.</td>
</tr>
<tr>
<td>Toll fare indicator</td>
<td></td>
<td>Indicates the vehicle type and the toll road price.</td>
</tr>
<tr>
<td>Toll terminal</td>
<td></td>
<td>Processes and stores various data of an open-type road. Controls peripheral devices and carries out an attendant’s responsibilities.</td>
</tr>
<tr>
<td>Integrated lane controller</td>
<td></td>
<td>Oversees every process of ETC-type toll collection and every equipment on a lane. Complies with the standards for an ETCS Integrated Controller that is compatible with both IR and RF methods.</td>
</tr>
<tr>
<td><strong>On-site Equipments</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entry Lane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exit Lane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exit Booth</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ETCS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR/RF antenna</td>
<td></td>
<td>A wireless device mounted on a gantry in the lane to communicate with an IR/RF OBU installed on a vehicle.</td>
</tr>
<tr>
<td>Photo enforcement device</td>
<td></td>
<td>Photographs a violator’s vehicle when it passes through a tollgate.</td>
</tr>
<tr>
<td>Driver indicator</td>
<td></td>
<td>A display that provides necessary information to a driver driving through a lane.</td>
</tr>
</tbody>
</table>

### Function

**TCS (Toll Collection System)**
- **Accurate toll collection**: Enables precise toll collection by more than 99.7% accurate categorization of the vehicle type.
- **Various payment methods**: Facilitates freeway users to make payments using various methods (cash, credit card, prepaid care, etc.)

**ETCS (Electronic Toll Collection System)**
- **Fast, accurate toll collection**: Enables fast, accurate toll collection by allowing a driver to make a payment without stopping the car.
- **Reduced operation cost**: Reduces the lane operation cost by adopting an unmanned toll collection system, and minimizes pollution caused by car idling.
The TCS (Toll Collection System) is a cutting-edge system which collects tolls, measures traffic volume, and carries out all office tasks related to the toll collection. It also enforces traffic regulations and gathers traffic information.

**Closed-Type System**

A system collects tolls which based on used distance

- **Vehicle Classifier**
  - Identifies the type of a passing vehicle
  - Detects the vehicle height to determine the appropriate ticket issuing machine
  - Classifies a vehicle with more than 99.7% accuracy
  - Treadles durability: more than 10 million axes (based on the number of passing vehicles)

- **Vehicle Detector**
  - Detects an axle, and notifies the lane controller whether a vehicle has passed or not
  - More than 99.9% accuracy when linked to an axle sensor

- **Automatic Ticket Issuing Machine**
  - Automatically issues a ticket
  - Controls peripheral devices and communicates with the office server
  - Fast issue of a ticket [less than 1.5 sec.]
  - Ethernet communication and easily extendable memory
  - Facilitates easy operation with total 4,500 tickets equipped

- **Ticket Reader**
  - Processes a collected ticket
  - Magnetic recording and printing of the information of a user vehicle
  - Equipped with a durable magnetic head that can read up to 2 million tickets
  - A button can be added by applying a touch panel

**Common Equipments of Closed- and Open-Types**

- **Lane Controller**
  - Processes and stores various data
  - Easy operation by adopting a maintenance panel
  - Controls peripheral devices and sends/receives data to/from the office server
  - Ethernet communication and easily extendable memory

- **Toll Evasion Prevention System**
  - Photographs the license plate of a toll evader’s vehicle
  - Photo accuracy of more than 97%
  - More than 97% TCS connection
  - Adjustable camera, lens, and lights to suit the surrounding environment

- **Toll Fare Indicator**
  - Displays the vehicle type and the toll amount to a user
  - Displays the toll amount within one second after reading the ticket
  - Self-luminous, high-brightness LED
ETCS (Electronic Toll Collection System)

The ETCS is a system which collects tolls using the wireless communication between an on-board unit (OBU) installed on a vehicle and a roadside antenna, allowing a driver to make a payment without stopping a vehicle.

**Open-Type System**

A system collects tolls which based on fixed distance

**Vehicle Classifier**
- Identifies the type of a passing vehicle
- Treadles durability: more than 10 million axes (based on the number of passing vehicles)
- Classifies a vehicle with more than 99.7% accuracy

**External Terminal**
- Enables swipe card payment
- Voice message function and ergonomic design to make swiping a card more convenient
- RF antenna durable for 100,000 uses

**Toll Terminal**
- Processes and stores various data
- Controls peripheral devices and sends/receives data to/from the office server
- Provides an operator interface screen
- Built-in e-card payment function

**Features**
- Eliminates wait time by enabling a driver to make a payment without stopping at the tollgate
- Safe toll collection based on a password authentication method
- Reduces operation cost by adopting an unmanned system.

**Vehicle Classifier**
- Identifies the type of a passing vehicle
- Treadles durability: more than 10 million axes (based on the number of passing vehicles)
- Classifies a vehicle with more than 99.7% accuracy

**IR/RF Antenna**
- Wireless Communication with an IR/RF type OBU
- Reports the toll collection results to the lane controller

**Vehicle Classifying System**
- Component: Vehicle separator, Car detector 1,2,3
- Automatically Identifies the type and location of a passing vehicle
- 99.7% accuracy, Treadles durability More than 10M axes

**Receipt Issuing Machine**
- Issues a toll payment receipt
- Easy-to-operate auto-cutting type
- Detects a shortage of print paper
- A thermal print head durable for 500,000 tickets.

**Integrated Lane Controller**
- Controls the authentication process for toll collection
- Controls peripheral devices and sends/receives data to/from the office server
- Standard : Korean Expressway Corporation (Can be designed various standard)

**Driver Indicator**
- Indicates the vehicle type and payment amount
- Indication : LED Display, Siren, Signal etc

**Photo Enforcement Device**
- Photographs the vehicle Licence plate a violator’s or a uninstalled OBU
- Automatically to Suit the surrounding environment and Transmission to the image server

**On-Board Unit (OBU)**
- Wireless communication device for the toll collection
- LCD and voice message
- Compatible with Various card system
- Certification : Korean Expressway Corporation
YOU HAVE OUR PROMISE THAT LSIS WILL ALWAYS BE A COMPANY THAT GROWS ALONGSIDE ITS CUSTOMERS.

**Innovators of Innovation**

Vision 2015
“How to Grow”

World Class 3P
People/Product/Process

A Culture of Openness
Flexibility/Faithfulness/R&R/Harmony

LSIS establishes fast, safe and environmentally-friendly traffic systems by applying highly advanced technologies to them, including electric, electronic, control, information & telecommunication technologies. As it develops and supplies cutting-edge systems related to traffic management, control, and the flow of traffic information such as its UTMS (Urban Traffic Management System), DSRC (Dedicated Short Range Communication), ATES (Automatic Traffic Enforcement System), FTMS (Freeway Traffic Management System) and TCS/ETCS (Toll Collection System) the company is getting a clear picture of what infrastructure future traffic environment will require before anyone else. Furthermore, LSIS’ ITS (Intelligent Transport System), which was created with a wide range of systems, brings innovative change to traffic management, ensuring smoother traffic, fewer traffic accidents, shorter operating hours, and decreased operation & management costs.
Korea is the No. 1 nation in semiconductors and shipbuilding Now, LSIS will continue the legend in a new field

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**Electric Power | Electrical Equipment, Electrical Systems**

From low voltage to ultra high voltage, LSIS’s wide-ranging devices and systems have been recognized worldwide for their efficient design and superior quality. We have acquired not only ISO9001 and 14001 certification, but also accreditation from such testing agencies as KEMA, TUV, CESI, ASTA, and KERI. We offer only the finest quality products made in accordance with various international standards, including IEC, UL, ANSI, CCC, JIS, and KS. LSIS is a total-solution provider of electrical systems, from engineering, design, manufacturing, installation, and operation all the way to diagnosis and rationalization.

**Automation | Automated Equipment, Industrial IT**

LSIS is Korea’s first PLC, inverter, and DCS developer. A longstanding pioneer in Korea’s automation industry, LSIS uses its abundant experience in the industrial facilities sector to provide the very best control equipment and systems requiring state-of-the-art technologies. We offer total solutions in automation through the application of various products.

**New Businesses**

Set to play a key role in distribution innovation, our RFID business provides advanced technologies optimized for application in our clients’ fields. We operate a reader production line with an annual output of 100,000 units and a tag production facility with an annual capacity of 100 million. We are also building and operating a pilot production line for power semiconductors, a core component in power electronic devices. LSIS continues to uncover new business areas, including eco-friendly energy-saving automobile parts and electrical energy conversion devices.

**Power Testing & Technology Institute**

Our Power Testing & Technology Institute is a KOLAS-accredited facility providing world-class testing and evaluation services, with a wide range of testing equipment including Korea’s first privately-owned 1,600MVA short circuit tester. Our testing center offers international credibility through strategic alliances and mutual recognition of test results with the US’s UL, EU’s CE, the Netherlands’ KEMA, and Italy’s CESI.
Green Innovators of Innovation