aselsan
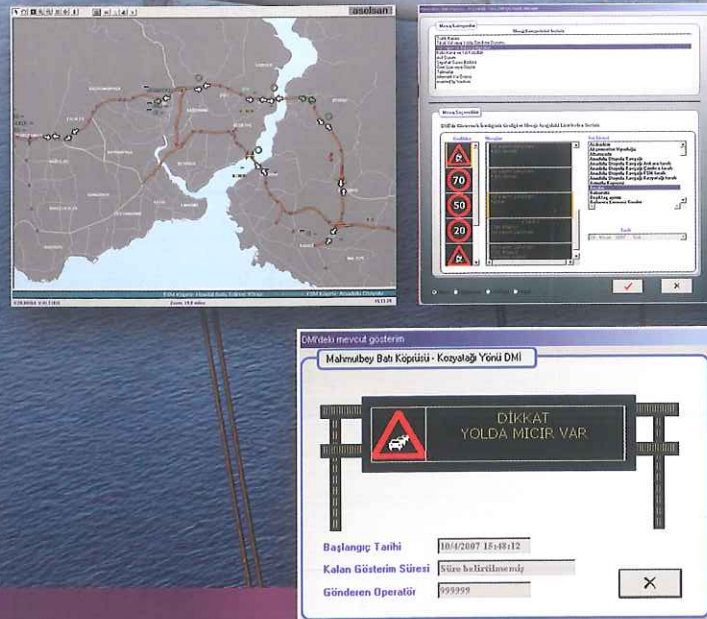## trafik

Traffic Systems

Traffic Management Systems

Aselsan offers complete traffic management solutions in a modular manner according to specific customer needs.

Traffic Management Systems

ASELSAN offers complete traffic management solutions in a modular manner according to specific customer needs. Main modules include the following:

- Traffic management center
- High-speed communication backbone
- Traffic counting and analysis
- Highway camera systems
- Incident detection
- Variable message signs
- Traffic information broadcasting
- Emergency telephone
- Tunnel management system
- Road Weather Information & Travel Time Measurement

Highway Toll Collection Systems

Aselsan's Highway Toll Collection Systems are based on years of research and experience in this field. The three types of systems offered; operator-assisted cash-based system, automatic card-based system and automatic Electronic Toll Collection system, cover all requirements of a modern toll collection administration.

Operator-assisted systems are mostly used by infrequent users, whereas automatic systems require a subscriber base formed in large by daily commuters. All three systems share the following features for a successful highway tolling operation.

- Fraud free, completely auditable toll collection in order to minimize toll evasion.
- 24 hour reliable operation under heavy traffic.
- Lanes-to-center and center-to-center modern LAN/WAN structures.
- State of the art, reliable and field-proven software at lanes and centers.
- Transaction recording, reporting, real-time lane monitoring and other administrative functions built around RDBMS database servers.
- Automatic Vehicle Classification (AVC) and Video Based Enforcement System (VES) for minimizing fraud risks.
- Integration of all toll collection functions from lane operations to subscriber services, database management at centers, violation processing and customer support stations.
- Option of purchasing modules separately according to administration's needs.
- Multilanguage support and convenient configuration for easy deployment in local markets.

Electronic Toll Collection (ETC) System

Aselsan's Electronic Toll Collection (ETC) System is a state-of-the-art, non-stop, fully automated system developed for paid highways and bridges.

Aselsan ETC, as an integrated system, provides subsytems for non-stop electronic transactions at the lanes, data collection, supervision, monitoring, violation processing, toll clearance operations and reporting facilities.

Contactless Smart Card Toll Collection System

Toll transactions are automatically executed as patrons place their contactless cards in the vicinity of special readers located on the toll lanes. To facilitate easy payment, the cards may not only be linked to credit card accounts but may also be configured as electronic purses.

Operator-Assisted Toll Collection System

At the entry lanes, an Automatic Ticket Issuing Machine (ATIM) issues magnetically encoded tickets indicating the entry station, date and time. Magnetic tickets are then processed at the exit lanes. The toll due is calculated automatically on the basis of distance traveled and the vehicle class.

Payment is registered by the toll collector and the vehicle is allowed to exit the highway. Transactions and violations occurring at the lanes are monitored in real-time at the Toll Plaza Control Center (TPCS) and recorded in the system database.

Highway Electronic Toll Collection System

ASELSAN's Electronic Toll Collection (ETC) System is a state-of-the-art, non-stop, fully automated system developed for paid highways and bridges. ASELSAN ETC, as an integrated system, provides subsytems for non-stop electronic transactions at the lanes, data collection, supervision, monitoring, violation processing, toll clearance operations and reporting facilities.

ASELSAN's ETC lanes are fully automated. Non-stop transactions are based on a 5.8 GHz microwave link between the Road-Side-Unit mounted on the canopy and the In-Vehicle-Unit mounted on the windscreen of subscribers' vehicles. The microwave link is fully compliant with the European CEN TC278 set of DSRC standards.

The system provides the following main benefits:

- Elimination of cash transactions, as a result of which potential fraud risks are reduced.
- All automated operation, which means reduction in personnel.
- Integrated toll system management for a country-wide operation.
- Multilanguage support eases deployment to any local market risk.

- May be operated together with conventional (cash based) toll collection lanes at the same plaza
- Automatic Vehicle Classification (AVC) at non-stop vehicle speeds
- Video Based Enforcement System (VES) in order to digitally capture license plates of violating vehicles.

Vehicle-Lane Microwave Link

- 5.8 GHz carrier frequency, compatible with European CEN278 WG9 DSRC standard
- Fast transaction at vehicle speeds up to 120 km/hr.
- Outdoor antennas at lanes, RF tags at vehicles.

A Typical Highway Electronic Toll Collection System (ETC) Lane comprises of the following components (*):

- Lane Software
- Lane Control Cabinet
- Automatic Vehicle Classification (AVC) System
- Video Based Enforcement System (VES)
- Toll and Message Display
- Traffic and Canopy Light
- Automatic Barrier
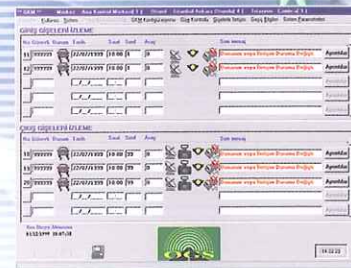
Highway Contactless Smart Card Toll Collection System

Toll transactions are automatically executed as patrons place their contactless cards in the vicinity of special readers located on the toll lanes. To facilitate easy payment, the ISO 14443 standard cards may not only be linked to credit card accounts but may also be configured as electronic purses.

- Full automatic operation reduces personnel requirements.
- Reduced toll transaction times increases lane capacity and decreases queues formed in front of toll lanes.
- Automatic operation reduces fraud risks by eliminating cash transactions and interactions with toll collectors.
- System integrates all functions required for a complete operation: card formating and personalization, card replenishment, toll collection at the lanes, station-level and higher-level management centers, centralized data base for transactions and customer accounts, violation processing and customer support terminals.

Contactless card read / write terminal

- Ergonomically designed IP 55 class, securely locked cabinet.
- Contactless cards and read/write units that comply with the ISO 14443 standard.
- Transactions of both passenger vehicles and large vehicles such as vans, trucks and busses are executed conveniently and ergonomically with two level read/write terminals.
- High volume buzzer
- LCD display with 2 rows and 40 characters.
- Display of collected toll and remaining credit on card.
- Red/green LED traffic lights to control traffic in lane.
- Intercom to communicate with plaza management center.

A Highway Contactless Smart Card Toll Collection System Lane comprises of the following components (*):

- Lane Software
- Lane Control Cabinet
- Automatic Vehicle Classification (AVC) System
- Video Based Enforcement System (VES)
- Toll and Message Display
- Traffic and Canopy Light
- Automatic Barrier

Highway Operator-assisted System

At the entry lanes, an Automatic Ticket Issuing Machine (ATIM) issues magnetically encoded tickets indicating the entry station, date and time. Magnetic tickets are then processed at the exit lanes. The toll due is calculated automatically on the basis of distance traveled and the vehicle class. Payment is registered by the toll collector and the vehicle is allowed to exit the highway. Transactions and violations occurring at the lanes are monitored in real-time at the Toll Plaza Control Center (TPCS).

- 24 hour reliable operation under heavy traffic
- Minimized transaction times in order to increase traffic flow
- Fraud free, completely auditable toll collection in order to minimize toll evasion
- Multilanguage capability
- Vehicle classes may be defined according to administration's requirements
- Option of purchasing modules separately according to needs.
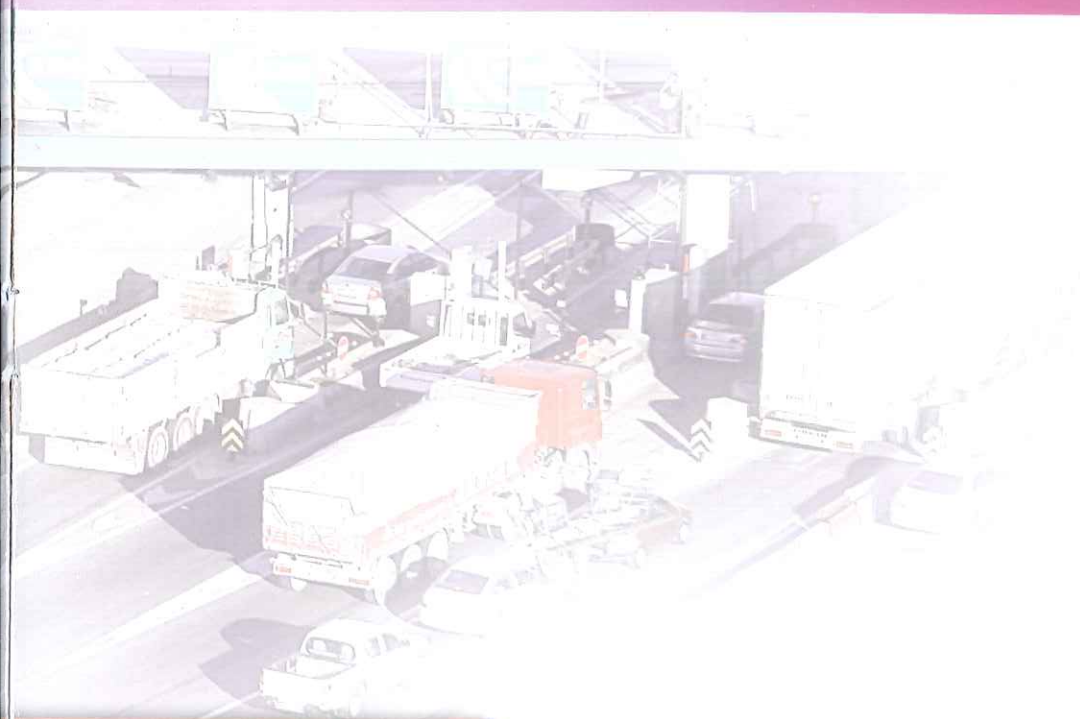
Automatic Ticket Issuing Machine (Entry Lanes)

- Full automatic (unmanned), two-level, fast, magnetic ticket issuing at entry lanes of CLOSED highways
- Easy change of ticket rolls
- ISO standard magnetic coding
- Industry standard communication interface
- Voice communication with plaza center
- IP 55 protected, locked, framed steel cabinet
- Easy installation and convenient maintenance

Toll Collector's Terminal (Exit Lane)

- Specially designed keyboard with large, durable keys eases toll collector's activities.
- Each key on the keyboard is labeled with its designated function.
- Ultra thin, flat panel, low-radiation TFT screen.
- User friendly, graphic-based screen design
- Voice communication over intercom system between the toll collector and the supervisor

A Highway Operator-Assisted Toll Collection System Lane is comprised of the following components (*):

- Lane Software
- Lane Control Cabinet
- Automatic Vehicle Classification (AVC) System
- Video Based Enforcement System (VES)
- Toll and Message Display
- Traffic and Canopy Light
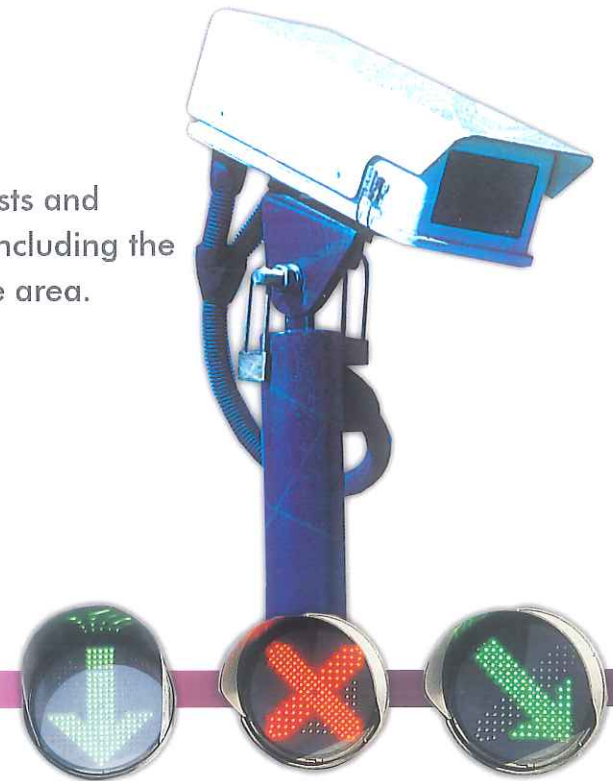- Automatic Barrier

Lane Software

- Real Time Multitasking Operating System.
- Configuration management for convenient change of system parameters such as lane/station/highway number, system timeouts, system unit enable / disable parameters etc.
- Communication with Toll Plaza Control Station (TPCS) computer system via ETHERNET LAN over TCP/IP protocol. A fault tolerance layer on top of the TCP / IP protocol guarantees no message is lost under any condition.
- In case of a communication failure with the TPCS, the lane computer may operate autonomously and all transaction data is stored at the lane computer. The stored data may be transferred to the TPCS by USB disk or after the communication is reestablished the data is sent to the TPCS automatically in the order the data is generated. The lane control computer detects all device failures. The device failures are reported to the TPCS.

Video Based Enforcement System (VES)

- High resolution black&white camera with outdoor housing.
- Nighttime illumination automatically controlled by a light sensor.
- Video/Text overlay device overlays collector's actions on video as text.
- Alarm lines from lanes to the center.
- Video images received from lanes are stored in a digital video recorder at the center. Alarm lists and corresponding video portions are stored in a separate area. Video images include all actions including the vehicle approaching the lane area, toll collector receiving the cash and vehicle exiting the lane area.

Traffic and Canopy Light

- RED cross (stop) and GREEN arrow (go) design within a single beacon head.
- 100-200 mm diameter Traffic Light, 300 mm diameter Canopy Light.
- Long life, ultra bright LED technology
- Low power consumption (<15 Watt)
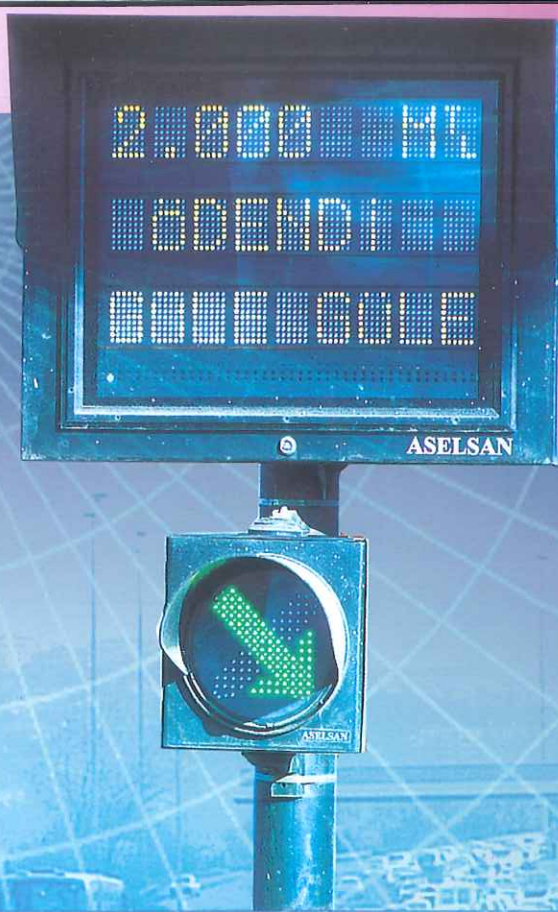
Automatic Barrier

- Open/Close time less than 1 second.
- Mean Time Between Failure 5.000.000 open/close operations.
- Swing-away (horizontal) movement capability for protection against vehicle hits. This mechanism protects both the barrier arm and the vehicle in case of a hit on the arm.
- A clutch mechanism protects damage on a vehicle in case vehicle enters under a closing barrier.
- A magnetic loop is used for secure operation of the barrier.

Toll and Message Display

- Ultra bright (2000mcd per LED), 590 nm (yellow) LED's are used.
- 3 lines, 9 characters per line. The message on the display is readable from 50 meters.
- Aluminum cabinet with black antistatic paint for extra protection against corrosion. The cabinet is heated and ventilated.
- A grid is used on top of LED elements for increased contrast. Automatic light intensity adjustment.

Automatic Vehicle Classification

- Long life fiber optic axle sensors buried under the road surface. Suitable for vehicle speeds from 0 km/hr to more than 100 km/hr.
- Magnetic loop in between sensors in order to distinguish vehicles from pedestrians.
- Optical curtain with IR transmitters and receivers providing better than 2 cm resolution.
- Dedicated CPU for the Automatic Vehicle Classification. Inputs and Outputs are individually protected. The algorithm (software) may be upgraded in the field conveniently.
- Serial line communication with the lane computer.
- Any classification scheme based on measurable quantities such as vehicle profile, axle count, axle separation or height on the first axle may be implemented. Software is capable of detecting failures such as AVC communication failure, axle detector failure and magnetic loop failure. All anomalies are reported to the lane controller.

Ruggedized Lane Control Cabinets and Outstations

- Locked, framed steel, zinc coated and electrostatic painted, heated and ventilated cabinets
- Industrial computer with passive backplane controls lane electronics. Each card, including the CPU, may be changed separately in order provide fast and convenient maintenance.
- Thermal receipt printer & magnetic ticket read/write compliant to ISO standards.
- OPTO-22 compatible optically isolated Input/Output module rack
- DIN rail mounted, screwless cage cable termination
- High performance rugged switching mode power supply
- Power line and serial communication line voltage protection
- DIN rail mounted vehicle detectors
- Structured cabling
- CE Certification

Free-Flow Video Enforcement Systems

Multi-Lane Free-Flow Vehicle Recognition and Vehicle of Interest Tracking

Multi-Lane Free-Flow Vehicle Recognition system, recognizes the license plate, color and brand/model of a vehicle in Multi Lane Free Flow traffic conditions. Vehicles of interests are identified and tracked throughout different system locations.

- Provides non-intrusive checks in multi-lane free-flow traffic.
- No extra sensors on the road.
- Full coverage of the road with a single gantry solution.
- High resolution imaging.
- Infrared illumination.
- License plate, vehicle color, brand/model recognition.
- High performance in day, night and all weather conditions.