Smart and Safe Cities in Kazakhstan

Digitalization: Ensuring security in the cities of Kazakhstan
Cities digitalization and effects

Strategic Programs:

- The state program "Digital Kazakhstan"
- National project "Technological Breakthrough through digitalization, science and innovation"
- The reference standard of «Smart Cities» of the Republic of Kazakhstan (Safety)

Five Main Directions

- Digitalization of economic sectors
- Transition to digital state
- Creation of an innovative ecosystem
- Development of human capital
- Implementation of digital Silk Road

Kazakhstan in International rankings

- 28th place out of 193 in the development of "electronic government" in the UN rating (UN Global E-Government Development Index)
- 20th place out of 90 in terms of the speed of digitalization development in the rating Digital Intelligence Index
- 61st place out of 130 in the network readiness index Network Readiness Index 2021
- 79th place out of 139 in the Speedtest global index for mobile Internet speed (38.27 Mbps)
37,000 cameras are installed in the cities

17,000

- hardware and software complex (АПК) cameras «Sergek»

20,000

- CVS cameras in the system

on 48%

Traffic incidents death rate is reduced

on 50%

Crime rate in public areas is reduced

105 mln. USD

proceeds from penalties

53 mln. USD

Payments from budget

- Implemented projects "Sergek"
System competitive advantage

- Self-contained power supply from alternative energy sources
- Low power consumption
- Wire and wireless data transmission
- Low cost in comparison with others vendors in 2-3 times
- Fast installation on existing lighting poles (no construction and installation operations are required)
- All-weather operation
- Integration with any types of chambers and solutions
- Audit of the system source code for special services for the purpose of information security (IS)
Proactive Alert Sergek Qorgau

The functionality makes it possible in real time to see the worst offenders of traffic rules and to carry out operational and preventive measures to prevent accidents

- Lack of license plate
- Deprived of a driver's license
- Fake license plate
- Unidentified driver
- Insurance
- Technical inspection
- Violator
- Excess speed
Several types of events can take place with a vehicle:

- **NO/DEMOUNTED NUMBER PLATE**
  - No/demounted number plate on the motor vehicle.

- **DRIVER’S LICENSE IS REVOCATED**
  - Vehicle owner data
  - License revocation term.

- **FALSE NUMBER PLATE**
  - Motor vehicle photo from the camera mismatches the vehicle photo from the database.

- **UNIDENTIFIED DRIVER**
  - No vehicle driver data are available in the database. The scenario “input data” is available only.

- **INSURANCE**
  - Car insurance is expired.

- **VEHICLE INSPECTION RECORD**
  - Vehicle inspection certificate is expired.

- **TRAFFIC VIOLATOR**
  - There are non-notified instructions in respect of the vehicle. The scenarios “Deliver” or “Refuse”.

- **SPEED LIMIT BREAKER OVER 30 KM/HR**
  - Vehicle exceeded the speed limit
  - Speed exceeds the such permitted by the traffic regulations.

**Mobile application sergek «qorgau»**
Mobile application «sergek» operating process

1. Traffic violation video recording
2. Data transmission to a server
3. Data transmission to the nearest traffic control post
4. Vehicle is stopped and measures are taken
All points bulletins and prevention of road traffic accidents

The car, which police officers are in search for
Or aggressive driving (several traffic violations in succession)

Data server
Analysis and collection of number plate data according to the data from the Unified state registry of administrative proceedings and cameras “Sergek”

Time to notification to the data pad of the traffic police patrols: less than 5 seconds

Notification to the mobile device of the traffic police patrols

Vehicle crew on patrol
Mobile application "sergek" operating process

1. Traffic violation video recording
   Recorded traffic violation elements

2. Data transmission for processing
   Traffic violations are automatically transmitted to the dedicated servers for further processing

3. Data transmission to storage

4. Notification

   «Sergek. Patrol»  «Sergek.Qorqau»

Data transmission for processing
The card "All Points Bulletin" contains necessary information on an incident. Colour designations of the point type are applied for ease of use.

In addition, the cards of "All Points Bulletin" are classified as follows:

- Criminal
- Administrative
- Vehicle APB
- Person APB
- Property APB

- Tablet location
- Dangerous driver
- Vehicle location
- Active marker
- Selected item in the list
- «Track vehicle» button
- Go to the «track» screen where you can see the movement of the vehicle.
«Sergek patrol»

The camera outside the car:
- Operates in the artificial intellect mode
- View range is 180 degrees
- Operates in the remote control mode
- Possibility of rotation on 360 degrees
- Day/night recording capability

The camera in the passenger compartment:
Video recording and audio recording in the passenger compartment

01 Video stream transmission in the real time mode
02 Roof camera remote control
03 Video records storage during the period up to 30 days
ARTIFICIAL INTELLECT CAPABILITIES:

Automatic identification of the number plate
Recording of the facts of traffic violation
Verification against target databases

Parking/stop in the sign 3.28 effectiveness zone
Parking in the sign 3.27 effectiveness zone
Parking/stop in the paid parking areas
Movement on the dedicated bus-only lane

All events, recorded in the automatic mode (in the unauthorized tampering resistant system), are transmitted via secure communication links (VPN) in the Situational centre, including for penalty invoicing
ITS
transport system simulation
Project objective

Traffic analytics
Transport system condition analysis

Ecology
City contaminated areas detection and monitoring

Transport system simulation
Development of the city transport infrastructure simulation model

Simulation modelling based on the data
Proposals and recommendations on the city transport system optimization
City monitoring of and visual control
Parameter based statistics
Emission and noise measurement and simulation

- Identification of elevated pollution and noise areas
- Comparative analysis of contamination sources (vehicles, buildings)
- Revealing of the street-and-road network sections with most crowded traffic based on the emission calculation
System capabilities

1. All over the city operational (real time) data
   - Operative data stream in the real time mode
   - Processing (cleaning, structuring) and storage in automatic mode
   - Results presentation on the map and in the tabulated reports

2. Deep historical data
   - Possibility of comparison and collation of historical data of various depth
   - Accounting of repeatability in the data (day, week, year, season)
   - Continuous data provide the completeness required for accurate analysis

3. Wide range of analysis tools
   - Quality mobility plan (KMK)
   - Analytics platform “Sergek ITS”
   - Modeling and simulation system

4. Statistical analysis
   - Statistics based on parameters
   - Revealing of statistics abnormality
   - Computer-aided learning
City safety

**AS IS**
- London, San Francisco: 15 cameras per 100 residents
- Astana, Almaty: 2 cameras per 100 residents

**TO BE YEAR 2025**
- Astana, Almaty: 15-20 cameras per 100 residents
City safety. To Be

- Creation of an intelligent security system
- Using artificial intelligence algorithms to detect fights, thefts and other incidents
- Predictive analytics for crimes and offenses
- Forecast for the future period and recommendations for taking preventive measures
- Digitization of criminal cases. The data will be stored digitally on the blockchain network.