



Key Project Charts



Project Name	Tashkent Signal Master Plan, Signal Time Optimization and Coordination		
Country	Uzbekistan	City	Tashkent
Costomer Name	CityNet		
Project Duration (Month)	16 Months		
Project Officer	<input checked="" type="checkbox"/> Main Contractor <input type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	July 2022	Project Completion Date	October 2023

Project Description

The objective of this project is to solve the signalization infrastructure and superstructure problems and transportation problems in Tashkent, Uzbekistan by the evaluation of the infrastructure and superstructure conditions of the signalization systems at the existing signalized intersections within the city, making the necessary change proposals as a result of the evaluation, arranging the signal plans used in accordance with the traffic demand, time optimization and signal coordination studies.To achieve this, the existing structure of all intersections was examined, the infrastructure and superstructure components of the intersections were evaluated, proposed signal groups were prepared in line with these evaluations, capacity analyses were performed using the existing signal plans, the count data presented for the intersections were evaluated, the data obtained were analyzed in the micro-scale traffic simulation program, signal plans were prepared in line with these analyses and the prepared signal plans were tested with observations made at the intersections.

The studies aimed to increase traffic safety and reduce waiting times at the intersections and reduce total travel times at intersection groups that can be considered as corridors due to their proximity to each other. In this context, the signalization infrastructure and superstructure were renewed where necessary, and different phase designs were proposed for the signal programs.

Activities Performed in the Project

Project components within the scope of this study:

- Examination of the existing signalization infrastructure and superstructure:** On-site observations were made at the intersections, infrastructure between the intersection control device and signal poles were checked, signal pole locations, signal group connections and signal group locations were marked on the intersection sketches and reported.
- Signalization infrastructure and superstructure modifications:** Using the data obtained during the site inspections, the necessary infrastructure changes were arranged, the connections between the signal pole and the signal groups were changed where necessary, signal group location changes were made and their proper connections established with the traffic signal control device.
- Intersection capacity analysis:** By evaluating the existing signal plans used at intersections and the existing physical structure of the intersection (general layout, number of lanes, vertical alignment on the intersection approach), the vehicle capacities of the intersections were calculated and the points where the intersection capacity could not meet the demand were identified.

- **Signal time optimization and signal coordination studies:**
 - **Findings from field studies:** As a result of field observations for Tashkent city center, the causes of current traffic problems were investigated and potential future problems were evaluated. In this study, 20 intersections were analyzed.
 - **Evaluation of traffic counts and preparation of micro-scale traffic simulation models:** Traffic count data collected at 20 intersections in the city center during the morning, noon and evening peak hours were submitted by the client, and simulation models of the intersections were created in micro-scale traffic simulation software using the data obtained. Using the existing signal plans and traffic demand, direction-based average queue lengths and waiting times were calculated at the intersections. Signal time optimization studies were completed by modeling signal plan alternatives to meet the existing traffic demand. A holistic analysis was carried out for intersections that can be considered as corridors due to their distances from each other, and the total travel time of vehicles was reduced through signal coordination where necessary.
 - **Preparation of proposed signal plans:** Signal plans were prepared in accordance with the traffic signal control device depending on the analysis results at morning, noon and evening peaks for the intersections which simulation models were prepared for. Alternate signal plans were created to reduce waiting times at night in areas deemed dangerous for traffic safety, and the intersections were commissioned with new signal plans.
- **Signal plan tests with field observations:** Following the commissioning of the proposed signal plans, observations were made at the intersections during the morning, noon and evening peak hours, and the signal plans prepared in the simulation environment were tested in real time. If necessary, relevant changes were made to the signal plans and the time optimization study was completed.
- **Presentation and reporting:** All works carried out within the scope of the project were presented to the client, including pre- and post-work information.

Company name	ISSD Electronics Inc.	Project Manager	S. Batuhan CANDIR
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Sustainable Urban Mobility Plan of Konya Metropolitan Municipality		
Country	Turkey	City	Konya
Costomer Name	Rnst & Young		
Project Duration (Month)	11 Months		
Project Officer	<input type="checkbox"/> Main Contractor <input checked="" type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	30 July 2021	Project Completion Date	30 June 2022

Project Description

The objective of this project is to develop a Sustainable Urban Mobility Plan that addresses the mobility needs of individuals and institutions, aiming to provide a better quality of life. Within this scope:

- Preparation of a transportation model and conducting SWOT analysis for analyzing the current state and providing a foundation for alternative projects by incorporating current data and planned projects,
- Development of transportation policies aimed at increasing the use of sustainable modes of transportation (such as walking, cycling, and public transportation) and minimizing private vehicle usage,
- Identification of the current state of air and noise pollution through emission analysis, and the development of policies aimed at reducing these values,
- The promotion of alternative transportation modes that reduce the consumption of non-renewable energy sources,
- Establishment of an accessible transportation system for everyone through stakeholder engagement and contribution,
- Prioritization of safety through recommendations for enhancing traffic safety, has been purposed.

According to this, a transportation model has been constructed using the Konya Transportation Master Plan prepared in 2015, projects carried out until 2022, feasibility reports of planned projects, and citizen surveys. In constructing this model, the PTV Visum software, which includes a series of mathematical predictions and route preference formulas, was utilized, and current situation and trend scenario models were prepared. In this study:

- Meetings have been held with stakeholders, including the departments of Konya Metropolitan Municipality, district municipalities, the governorate, universities, and civil society organizations, as part of the study of Sustainable Urban Mobility Plan.
- Citizen survey studies have been conducted with the aim of determining the mobility situation in the city, establishing the vision of the SUMP, and prioritizing the projects developed for the identified scenarios according to user needs.
- A base year model was created in order to perform the current situation analysis and evaluate alternative scenarios.
- While creating the base year model, a model framework has been established by defining traffic analysis zones, nodes, the road and railway networks, as well as the transportation hubs (public transport stops, stations etc.) and transportation types and modes.
- A detailed model setup has been performed, including capacity information of the road network, volume delay functions, impedance values, public transportation routes and schedules, assignment models for private and public transportation.
- The current state of the road network has been defined by the contribution of the delay times at tram priority intersections.
- Field visits were conducted during morning and evening peak hours to analyze the traffic flow in current situation. These visits aimed to identify bottleneck areas, intersection points, and corridors experiencing congestion. Close collaboration was maintained with the

Konya Metropolitan Municipality in identifying these points, and preliminary identification of the relevant corridors was accomplished by utilizing Floating Car Data (FCD).

- In line with the principle of increasing mobility, which is the underlying basis of the SUMP project, the field study included the identification of well-established behaviors that create accessibility constraints for pedestrians, disabled individuals, bicycle users, and scooter users (such as roadside parking, sidewalk encroachment, etc.). The aim was to develop transportation policies targeting these behaviors and address them accordingly.
- Input for the transportation model has been provided by performing statistical analysis of survey studies.
- In order to achieve the most accurate results in network assignment for both private and public transportation, the following data have been utilized: traffic count (pedestrian, bicycle, and vehicle), travel times obtained from Floating Car Data (FCD), ticket data from rail systems and rubber-tire vehicles.
- Considering the existing infrastructure and future projections, business-as-usual scenario and alternative scenarios for the target year 2030 have been studied. These scenarios have been compared with the current state model, and transportation policies and measure packages have been identified for each target year.
- During the planning process, a geographic database has been created to include all quantitative data collected within the scope of the model and the developed outputs.

Activities Performed in the Project

- **Building the road network:** For the purpose of creating a base for the current state and alternative scenario models, the road network prepared for the database have been integrated into PTV Visum Transportation Planning software to be used in the model.
- **Establishment of an integrated transport system:** Different modes and type of transportation systems have been defined into the model. Necessary configurations have been made so that they can work in an integrated manner with each other.
- **Defining road and railway public transportation data to the model:** The relevant data has been obtained both through direct data transfer from public and private institutions and organizations, as well as through online platforms. This data has been used to define transportation hubs, public transportation routes, frequency of services, and schedules in the model.
- **Calibration and validation:** Model calibration, validationand matrix estimation processes have been done by using the annual average daily traffic data, cordon counts, travel times obtained from GPS data, roadside surveys, railway ticketing data, and airline passenger numbers.
- **Fieldwork and technical reporting:** A field study was conducted with the aim of treating the current state analysis and identifying problems. Results and comparison visuals have been prepared for the base year and target year scenarios. In addition, numerical output data has been generated to calculate emission values. Throughout the project, technical report presentations have been conducted to the Konya Metropolitan Municipality, ILBANK & World Bank
- **Workshop:** At the end of the project, participation in a workshop was carried out where views, thoughts, and recommendations were shared.

Company name	ISSD Electronics Inc.	Project Manager	Hilal SAAT
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Sustainable Urban Mobility Plan of Eskişehir Metropolitan Municipality		
Country	Turkey	City	Eskişehir
Costomer Name	Rnst & Young		
Project Duration (Month)	11 Months		
Project Officer	<input type="checkbox"/> Main Contractor <input checked="" type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	30 July 2021	Project Completion Date	30 June 2022

Project Description

The objective of this project is to develop a Sustainable Urban Mobility Plan that addresses the mobility needs of individuals and institutions, aiming to provide a better quality of life. Within this scope:

- Preparation of a transportation model and conducting SWOT analysis for analyzing the current state and providing a foundation for alternative projects by incorporating current data and planned projects,
- Development of transportation policies aimed at increasing the use of sustainable modes of transportation (such as walking, cycling, and public transportation) and minimizing private vehicle usage,
- Identification of the current state of air and noise pollution through emission analysis, and the development of policies aimed at reducing these values,
- The promotion of alternative transportation modes that reduce the consumption of non-renewable energy sources,
- Establishment of an accessible transportation system for everyone through stakeholder engagement and contribution,
- Prioritization of safety through recommendations for enhancing traffic safety,

has been purposed.

According to this, a transportation model has been constructed using the Eskişehir Transportation Master Plan prepared in 2015, projects carried out until 2022, feasibility reports of planned projects, and citizen surveys. In constructing this model, the PTV Visum software, which includes a series of mathematical predictions and route preference formulas, was utilized, and current situation and trend scenario models were prepared. In this study:

- Meetings have been held with stakeholders, including the departments of Eskişehir Metropolitan Municipality, district municipalities, the governorate, universities, and civil society organizations, as part of the study of Sustainable Urban Mobility Plan.
- Citizen survey studies have been conducted with the aim of determining the mobility situation in the city, establishing the vision of the SUMP, and prioritizing the projects developed for the identified scenarios according to user needs.
- A base year model was created in order to perform the current situation analysis and evaluate alternative scenarios.
- While creating the base year model, a model framework has been established by defining traffic analysis zones, nodes, the road and railway networks, as well as the transportation hubs (public transport stops, stations etc.) and transportation types and modes.
- A detailed model setup has been performed, including capacity information of the road network, volume delay functions, impedance values, public transportation routes and schedules, assignment models for private and public transportation.
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Eskişehir Metropolitan Municipality in identifying these points, and preliminary identification of the relevant corridors was accomplished by utilizing Floating Car Data (FCD).

- In line with the principle of increasing mobility, which is the underlying basis of the SUMP project, the field study included the identification of well-established behaviors that create accessibility constraints for pedestrians, disabled individuals, bicycle users, and scooter users (such as roadside parking, sidewalk encroachment, etc.). The aim was to develop transportation policies targeting these behaviors and address them accordingly.
- Input for the transportation model has been provided by performing statistical analysis of survey studies.
- In order to achieve the most accurate results in network assignment for both private and public transportation, the following data have been utilized: traffic count (pedestrian, bicycle, and vehicle), travel times obtained from Floating Car Data (FCD), ticket data from rail systems and rubber-tire vehicles.
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- During the planning process, a geographic database has been created to include all quantitative data collected within the scope of the model and the developed outputs.

Activities Performed in the Project

- **Building the road network:** For the purpose of creating a base for the current state and alternative scenario models, the road network prepared for the database have been integrated into PTV Visum Transportation Planning software to be used in the model.
- **Establishment of an integrated transport system:** Different modes and type of transportation systems have been defined into the model. Necessary configurations have been made so that they can work in an integrated manner with each other.
- **Defining road and railway public transportation data to the model:** The relevant data has been obtained both through direct data transfer from public and private institutions and organizations, as well as through online platforms. This data has been used to define transportation hubs, public transportation routes, frequency of services, and schedules in the model.
- **Calibration and validation:** Model calibration, validationand matrix estimation processes have been done by using the annual average daily traffic data, cordon counts, travel times obtained from GPS data, roadside surveys, railway ticketing data, and airline passenger numbers.
- **Fieldwork and technical reporting:** A field study was conducted with the aim of treating the current state analysis and identifying problems. Results and comparison visuals have been prepared for the base year and target year scenarios. In addition, numerical output data has been generated to calculate emission values. Throughout the project, technical report presentations have been conducted to the Eskişehir Metropolitan Municipality, ILBANK & World Bank.
- **Workshop:** At the end of the project, participation in a workshop was carried out where views, thoughts, and recommendations were shared.

Company name	ISSD Electronics Inc.	Project Manager	Hilal SAAT
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	T.C. Bursa Metropolitan Municipality Traffic Management Center (TMC) Project Traffic Engineering Studies		
Country	Turkey	City	Bursa
Costomer Name	Bursa Metropolitan Municipality & TÜRKSAT		
Project Duration (Month)	9 Months		
Project Officer	<input type="checkbox"/> Main Contractor <input checked="" type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	March 2022	Project Completion Date	December 2022

Project Description

In the scope of the TÜRKSAT-Bursa Metropolitan Municipality Traffic Management Center (TMC) Project, in this work carried out by ISSD Information Electronics Education; traffic engineering problems have been addressed at 91 signalized and non-signalized intersections under the responsibility of Bursa Metropolitan Municipality.

In the scope of the project, the signalized and/or non-signalized intersections included in the study were classified according to their relationships with the transportation network they are located in and other signalized and/or non-signalized intersections in their surroundings. As a result, while some intersections were modeled and analyzed individually, some analyses included multiple intersections. Analysis areas that contain multiple intersections are called corridor, and analysis areas that contain multiple corridors are named regional (network).

According to the intersection classification, traffic images were captured and decrypted during time periods covering peak hours on weekdays using cameras installed in the field. Singular, corridor, and/or regional simulation models of the intersections were created using current traffic count data and existing signal plans in the PTV Vissim traffic simulation software, and the intersections were analyzed. As a result of the analyses, level of service (LOS) values, average delay times per vehicle, approach leg-based queue lengths, and average speeds of the intersections were obtained. Algorithms for the current situation were also modeled in PTV VisVAP for signalized intersections operated by magnetic loops and/or pedestrian buttons. Floating Car Data was used in the calibration of the simulation models for the current situation, and speed profiles and queue lengths on the approach legs of the intersections were examined.

Based on the findings obtained from the current situation, draft scenarios have been identified to improve traffic management strategies for intersections, corridors, and/or regions. Starting from low-cost methods to high-cost ones, scenarios have been developed primarily for signal design and time optimization studies, and then scenarios were developed for revised intersection geometry, and each of them was modeled separately in the PTV Vissim traffic simulation software. For currently unsignalized intersections, signalization requirement analyses have been conducted using the PTV Vistro traffic analysis software. During the technical meetings held with the authority throughout the process, the results of traffic engineering analyses for intersections, corridors, and regions have been mutually evaluated, and revision studies have been carried out based on the feedback received.

The studies aimed to improve traffic safety and reduce waiting times at the intersections covered by the project, as well as to reduce the total travel times in groups of intersections that can be classified as corridors and/or regions due to their proximity to each other. In this context, advanced traffic management system algorithms to be applied in the field were modeled with PTV VisVAP, and feasibility studies were conducted for traffic management strategies to be implemented in conjunction with Intelligent Transportation Systems in the field.

Activities Performed in the Project

Project components within the scope of this study:

- Data collection**
 - **Traffic count data:** Temporary fisheye cameras were installed at 68 intersections for traffic count studies and two-day video recordings were taken per intersection. The obtained video recordings were deciphered as directionally and vehicle-classified to perform traffic engineering analyses at intersections. The Authority provided 2021 traffic count data and these were used for intersections other than the relevant 68 intersections.
 - **Existing signalization infrastructure and signal plans:** The existing signal plans and signalization infrastructure data for 91 intersections in the scope of the study were obtained from the Authority and examined. The algorithms of signal plans operated by magnetic loops or pedestrian buttons were deciphered and made suitable for modeling in PTV VisVAP.
 - **Floating Car Data (FCD) analyses:** Average queue lengths and speed profiles in approach legs of intersections were analyzed using Floating Car Data of the days on which traffic count data were obtained.
- Simulation modeling and analyses**
 - **Modeling of the existing situation:** 91 intersections were divided into 16 different analysis groups and modeled in PTV Vissim traffic simulation software with the existing geometric situation, existing signal plan, and traffic management algorithms. Floating Car Data was used for calibration of simulation models.
 - **Modeling of improvement scenarios:** Different signalization designs and optimized signal timings for intersections were developed with scenario-based approaches such as signal coordination, phase skipping, or pedestrian button operation when deemed necessary based on the analysis findings. In addition to these scenarios, scenarios including various intersection geometric designs and turning movement restrictions to increase intersection capacity and improve corridor/zone travel times were developed.
 - **Feedback and revision works:** The existing situation and improvement scenarios were periodically presented to the Authority in a comparative manner and evaluated in line with their own transportation investment plans and projects. Revised scenarios were identified for the required intersections and intersections were reanalyzed according to new scenarios.
- Presentation and reporting:** All works carried out within the scope of the project were presented to the Authority in a way that includes pre- and post-study information.
- Implementation in the field:** Traffic engineering strategies that were the subject of feasibility studies with PTV Vissim and PTV VisVAP within the scope of the TÜRKSAT-Bursa Metropolitan Municipality Traffic Management Center (TYM) Project were put into operation with the Dynamic Intersection Control System installed in 35 intersections in the field.

Company name	ISSD Electronics Inc.	Project Manager	Halil SENTURK
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Kutahya Transportation Master Plan		
Country	Turkey	City	Kutahya
Costomer Name	Eskisehir Osmangazi University		
Project Duration (Month)	5 Months		
Project Officer	<input checked="" type="checkbox"/> Main Contractor <input type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	July 2021	Project Completion Date	December 2022

Project Description

The PTV Visum software, which incorporates a series of mathematical prediction and route preference formulas, has been used to analyze the current state of road travel demand comprehensively in terms of economic, social, and technical aspects and to generate solutions. Within the scope of this study:

- By inputting current data and planned projects, which will be beneficial for analyzing the current state and providing a foundation for alternative projects,
- With creating traffic analysis zones, nodes, road network, transportation hubs (such as public transport stops and stations etc.), alternative transportation types and modes, as well as demand segments,

a transportation model has been developed. Additionally, in order to enhance the accuracy of this model:

- A detailed model setup has been performed, including capacity information of the road network, volume delay functions, impedance values, public transportation routes and schedules, assignment models for private and public transportation.
- The statistical analysis of the survey studies was made and the input to the transportation model was provided.
- Private and public transport passenger modeling has been passed through the calibration and validation process to achieve the most accurate result. The model was validated by using the traffic counts, cordon counts, and License Plate Recognition System data.
- During the planning process, a geographic database has been created to include all quantitative data collected within the scope of the model and the developed outputs.

Activities Performed in the Project

- **Building the road network:** For the purpose of creating a base for the current state and alternative scenario models, the road network prepared for the database have been integrated into PTV Visum Transportation Planning software to be used in the model.
- **Establishment of an integrated transport system:** Different modes and type of transportation systems have been defined into the model. Necessary configurations have been made so that they can work in an integrated manner with each other.
- **Defining public transportation data to the model:** The relevant data has been obtained both through direct data transfer from public and private institutions and organizations, as well as through online platforms. This data has been used to define transportation hubs, public transportation routes, frequency of services, and schedules in the model.
- **Calibration and validation:** Model calibration, validationand matrix estimation processes have been done by using the traffic counts, cordon counts and License Plate Recognition System data.
- **Technical reporting:** Results and comparison visuals have been prepared for the base year scenario. In addition, numerical output data has been shared with EskişehirOsmangazi University to calculate emission values.

Company name	ISSD Electronics Inc.	Project Manager	Hilal SAAT
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Preparation of Çorum Traffic Circulation Plan and Improvement Proposals Consultancy Project		
Country	Turkey	City	Çorum
Costomer Name	Çorum Municipality		
Project Duration (Month)	5 Months		
Project Officer	<input checked="" type="checkbox"/> Main Contractor <input type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	July 2021	Project Completion Date	November 2021

Project Description

This study covers the analysis of the traffic circulation plan covering the city center and the surrounding areas in order to provide solutions to the transportation problems in Çorum city center, preparation of improvement proposals for this circulation plan, analysis and proposals regarding the technical elements for implementation.Within the scope of the study, it is aimed to improve the existing road network infrastructure standards in different terms ensuring more efficient use,reduce travel times and traffic density, reduce transportation costs, contribute to the protection and development of the environment by reducing the negative effects of transportation on the environment, reduce possible accidents by ensuring traffic safety, improve the conditions of active travel modesto provide a safer and more comfortable active travel circulation in the region.The method of the study was designed with the quantitative data obtained from the analysis conducted in the city center. Traffic data collected with Bluetooth sensors and cameras were used in the preparation of macro and meso-scale simulations to reproduce existngtransportation problems in the city center, then traffic circulation plans that provide solutions to those transportation problems were prepared in line with the traffic analysis data and the master development plans of the city.In this context, one-way and two-way transportation plan scenarios were prepared, signal plans were created, pedestrianization, parking, alternative routes and different modes of transportation were proposed, and geometric design projects for intersections and corridors were prepared.

Activities Performed in the Project

Project components within the scope of this study:

- Literature Review: A literature review was conducted and reported on the following topics: Development and improvement of pedestrian mode use, urban parking management, development and improvement of bicycle mode use, urban logistics management, corridor and intersection management in urban transportation.
- Investigation of project area from a transportation perspective
 - Findings from field studies: As a result of the field observations for Çorum city center, the causes of the current traffic problems were investigated and potential problems that may occur in the future were evaluated. In this study, 24 intersections and 3 corridors were examined and bicycle and pedestrian routes throughout the city (in corridors and intersections) were examined.
 - Traffic count study and creation of origin-destination matrices: Image recordings were taken with 10 existing and 14 temporarily installed fisheye cameras in the city center. Directional traffic counts were made, evaluated and reported in 15-minute periods with the images collected from the fisheye cameras during the morning, noon and evening peak hours.
 - Data collection with Bluetooth-based traffic analysis system (BLUESIS): Bluetooth-based traffic analysis system was used to make the traffic impact in the city center digitally processable at a macro level in order to make a macro-scale improvement. In addition to the traffic improvement works at corridors and intersections, the transfer of the existing traffic load to alternative routes was

also of great importance. In this regard, travel times were calculated, evaluated and reported at macro level using BLUESIS for the relevant corridors and alternatives. Thanks to BLUESIS sensors, origin-destination matrices of urban traffic at macro level were also extracted, evaluated and reported. In this way, it is possible to investigate the possible effects of the scenarios on other corridors in the city center at the macro level.

- Floating Car Data (FCD) analysis: As a result of the studies conducted on FCD, vehicle movements were examined at the city center scale. Through these analyses, the points where vehicle movements slowed

down and the areas where traffic congestion occurred were identified, evaluated and reported, taking into account the service levels of the roads.

- Traffic Safety investigations: Thanks to the location data of the accidents in the past, the locations of the accident points were examined and the maps of the areas where the accidents in the past were concentrated were created, interpreted and reported using the nearest neighbor algorithm. In addition, using the statistical information of fatal and injury accidents in the past, graphs were obtained, interpreted and reported according to various characteristics of accidents (weather, type of accident, etc.).
- Existing road network analysis with transportation planning models: For macro-scale city center transportation analysis, PTV Visum macro-scale transportation planning software was used to obtain and visualize traffic volume values for the transportation network as a result of the assignments made with the data obtained with the above-mentioned techniques, volume/capacity ratios on arteries were obtained and saturation maps were created, and these were interpreted and reported.
- Existing intersection analysis with traffic simulation models: Within the scope of the study, the existing conditions of a total of 24 intersections, 7 of which are single intersections and 17 of which are on 3 different corridors, were analyzed in the light of the data obtained with the techniques mentioned above. PTV Vissim micro-scale traffic simulation software was used in the current situation analysis and the evaluation results of the intersections were interpreted and presented in tables.
- Determination of general strategies for the coming years in the project area: In the light of the above-mentioned completed current situation analyses and literature review, vision strategies for the city covering short, medium and long term corridor and intersection management, parking management, pedestrian mode development, bicycle mode development and urban logistics management were prepared and reported with their justifications.
- Presentation of traffic circulation scenarios in the project area: Based on the analyses, the results of the baseline simulations at macro, meso and micro scales and the requests of the administration, 10 different traffic circulation scenarios were prepared. Similar to the existing state analysis, these scenarios were analyzed and evaluated using PTV Vissim and PTV Visum software at macro, meso and micro scales. The potential positive and negative impacts of the scenarios in terms of vehicle delay times, parking, walkability, cycling, public transportation and corridor-intersection management are interpreted and reported.
- Presentation and reporting:All simulation models realized within the scope of the project were presented to the administration. Finally, all studies were reported in detail and presented to the administration.

Company name	ISSD Electronics Inc.	Project Manager	Hilal SAAT
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Preparation of Traffic Counts, Preliminary Design and Simulation Models for Roads and Intersections on the Çobançeşme-Haramidere Route on D100 Highway		
Country	Turkey	City	Istanbul
Costomer Name	Istanbul Metropolitan Municipality		
Project Duration (Month)	10 Months		
Project Officer	<input checked="" type="checkbox"/> Main Contractor <input type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	February 2021	Project Completion Date	November 2021

Project Description
<p>In this study, the problems of the approximately 15 km long highway corridor between the Haramidere and Çobançeşme intersections of the D100 Highway, which is within the responsibility area of the Istanbul Metropolitan Municipality, have been identified from a transportation perspective and solutions have been proposed. There is a total of 8 grade-separated intersections within the study area. The studies completed in general throughout the project are as follows:</p> <ul style="list-style-type: none">• Traffic counts were conducted by decoding drone and fisheye camera images taken from strategic points of the corridor identified as critical for traffic management and interpreted and reported from a transportation engineering perspective.• Factors and locations affecting the road capacity of the corridor were identified by utilizing field observation and technological applications (Floating Car Data (FCD), drone images, etc.). Bottleneck points and zones were then identified using the same methods.• The existing state of the corridor was modeled using PTV Vissim software considering the traffic counts and existing road geometry. The modeled existing traffic network was calibrated using drone images, traffic counts and travel times obtained from field observations.• In order to increase the traffic efficiency and safety of the corridor, solutions were proposed by taking into account the current urban development status by using classical engineering methods and intelligent transportation systems. While proposing these solutions, preliminary projects of the proposed geometric design changes were drawn in CAD environment.• By applying the proposed solutions individually and in combinations when deemed necessary, various proposed case scenarios were modeled and calibrated using PTV Vissim software.• The results obtained from the modeling were evaluated and reported from a transportation engineering perspective.

Activities Performed in the Project
<p>Project components within the scope of this study:</p> <ul style="list-style-type: none">• Assessment of the current state of the corridor:<ul style="list-style-type: none">◦ Findings from field studies:<ul style="list-style-type: none">▪ Traffic count study: Along the corridor, images were taken mainly at the points where the main road crosses the side road and where the secondary roads connect to the side road. A similar approach was followed to take images at the approaches of grade-separated intersections. Within the scope of the study, a total of 73 traffic counting points, 35 in Edirne direction and 38 in Ankara direction, were identified and traffic counts were made and reported for 4 different vehicle classes at these points.▪ Field survey trips and travel time measurements: During the morning and evening peak hours along the corridor, the vehicle was driven around the route and travel time measurements were made and driver behaviors were evaluated and reported from a traffic engineering perspective.▪ Drone shots: Drone footage was taken at critical strategic points of the corridor identified from a traffic engineering

- perspective and these images were monitored, evaluated and reported accordingly.
- **Findings obtained with FCD:**
 - Prior to the traffic count study, speed profiles were created by analyzing the historical FCD on the main roads in the study area. In this way, the starting locations and times of bottlenecks were analyzed. This also provided a basis for the peak hour intervals to be selected for decoding in traffic counting studies. Then, during the study, heat maps of the speed profiles were created using FCD for both the main and side roads in the study area, thus enabling a more detailed investigation in terms of traffic engineering.
 - **Development of corridor improvement proposals:**
 - Based on the speed/current/density relationship, which is the basis of traffic engineering, suggestions are given from a traffic engineering perspective to keep vehicle density under control along the corridor in order to increase the volume of vehicles that can pass through the road sections.
 - Within the existing physical boundaries along the corridor, proposals have been developed to make the D100 3-lane and the side roads 2-lane continuous, to define unnecessary widenings on the side roads, to remove or give function to excess widths.
 - Suggestions have been made to regulate the irregular vehicle density on D100, which occurs in sections that adversely affect traffic flow, through design changes.
 - Suggestions have been made to minimize the impact of the crossing points of the D100 and side road corridors on each other and to ensure lane balance.
 - In order to balance the vehicle density along the side road corridors and provide a regular traffic regime, recommendations have been made such as creating signal-controlled intersections and/or ramp-metering at appropriate and acceptable points on the side roads.
 - In order to create a hierarchical road network systematic in order to improve vehicular fluidity, recommendations have been made to separate the sections with common functions (such as road sections that work both as intersection approaches and side roads) that negatively affect the flow, especially on the side roads.
 - Geometric design change proposals have been made for 8 grade-separated intersections in the corridor, taking into account the existing urban development plans.
 - **Simulation modeling**
 - First of all, in order to understand the current or potential problems of the corridor and the intersections in the corridor from a transportation perspective, the existing state scenario was modeled, calibrated and evaluated and reported using PTV Vissim software with the help of the collected data.
 - The above-mentioned proposed regulations to improve the traffic efficiency and safety of the corridor and intersections were modeled, calibrated and evaluated using PTV Vissim software individually and in combinations as needed.
 - The modeled scenarios were compared at meso and micro levels from a transportation engineering perspective and their possible positive and negative impacts were evaluated and reported.

Company name	ISSD Electronics Inc.	Project Manager	M. Alper KOC
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Preparation of Intersection, Roadway and Traffic Design Projects on Cengiz Topel Avenue		
Country	Turkey	City	Mersin
Costomer Name	Mersin Metropolitan Municipality		
Project Duration (Month)	3 Months		
Project Officer	<input checked="" type="checkbox"/> Main Contractor <input type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	November 2020	Project Completion Date	January 2021

Project Description

Within the scope of this study, intersection, road and traffic regulation studies were carried out at the intersections of Sahil Yolu Babil (signalized), Onur Sitesi (signalized), Viranşehir (signalized) and Yağmur Market (non-signalized) on Cengiz Topel Avenue located in Mersin city center, and geometric design change proposals were made in the light of simulations and analyses made at the intersection and corridor scale, and implementation projects of these proposals were prepared. Within the scope of this project, the following project files and reports were submitted to the administration:

- Calibrated traffic simulation models for the existing state scenario
- Calibrated traffic simulation models for the proposed case scenario
- Modern roundabout analysis report
- CAD drawings of the proposed application projects
- Signalization infrastructure and superstructure CAD drawings and quantity take-off documents of the proposed application projects
- Detail album of the proposed project

Activities Performed in the Project

Project components within the scope of this study:

- Existing corridor and intersection analysis and simulations:
 - Analysis and simulation studies were carried out considering the existing geometric structures of the arterial and the intersections on the arterial and the existing traffic counts. In this context, analysis and simulation studies were carried out at the intersection level as micro level and also at the corridor scale as meso level. In addition, public transportation data were also taken into consideration in the simulation modeling. The parameters of delay per vehicle, total delay time, number of stops per vehicle, average speed and total travel time were taken into consideration during the related analyses.
- Intersection, road and traffic circulation design works:
 - Design works were carried out according to national and international standards in the light of existing state analysis and field observations.
 - The following work items were addressed within the scope of geometric design changes:
 - Current baseline maps were prepared.
 - Lane and median widths were measured and necessary arrangements were made on the project.
 - Road sections suitable for widening were identified and necessary widening or narrowing operations were carried out according to the needs.
 - Intersection areas were designed.
 - Roadside parking areas on the artery on which the intersections are located have been arranged.
 - Public transportation stops locations and dimensions have been arranged where necessary.
 - The type of material to be used in the proposed projects (apron, substructure and superstructure, etc.) is specified in the project and design files.

- In areas where the capacity and/or physical characteristics of the artery are insufficient, roadway design projects were prepared at the corridor scale as requested by the administration in order to improve the artery and to determine the standard required by the traffic load carried by this artery and to improve the characteristics of the roads where necessary to ensure that this standard is maintained throughout the entire road. In this scope;
 - Sidewalks, medians and lanes along the approximately 1700-meter road are shown, and the number of lanes, lane widths and directional conditions are determined.
 - Measures such as pedestrian zones, pedestrian paths, pedestrian crossings (at-grade, over or underpass etc.) have been developed to facilitate pedestrian access and regulate pedestrian movements along the road, and opportunities for bicycle use have been investigated and implemented. The studies were presented as detailed projects at the scale requested by the administration.
 - Design changes have been made for parking areas along the road and bus stop pockets where possible. Detailed projects of these design changes were prepared at the scale requested by the administration.
 - Typical cross-sections were prepared for the required locations along the road and detailed designs of these cross-sections were prepared at the scale requested by the administration.
 - Landscaping work proposals have been made for undefined areas after design changes on the artery which is focused on healthy streets concept to organize these areas. In addition, partial and local details of these works are also prepared where necessary. Cross-sections of the project were given at the scale requested by the administration. For each of the materials to be used in the project, suggestions such as color, coating type, product type, technical details of the materials to be used, etc. were presented to the administration.
 - In cases where existing lighting and power lines on roads, streets and pedestrian areas need to be relocated or moved in line with the application projects, the poles that need to be moved are identified and their locations are specified in the project.
- In order to improve the existing state of the intersections considering traffic safety and efficiency, geometric design changes are on the artery and application projects for these design changes are prepared. In this context;
 - Proposed intersection designs were made in accordance with national standards.
 - Along with the design of the intersections, signalization components (signal poles, signalization infrastructure, infrastructure for ITS components, etc.) at signalized intersections are also shown in the project.
 - Signalization infrastructure components are shown in the cross-sections of the specific locations of the intersection approach arms.
 - CAD drawings of signalization infrastructure and superstructure were drawn and quantity take-off documents were prepared.
 - Signal design of signalized intersections, appropriate scale signalization superstructure plans and optimum phase layouts were prepared.
 - Pedestrian crossings, dimensions, curve radii, slope, horizontal and vertical markings were shown in the intersection application projects.
- Corridor and intersection analysis and simulations of the proposed projects:
- Analysis and simulation studies were carried out considering the proposed geometric structures of the artery and the intersections on the artery. In this context, analysis and simulation studies were carried out at the micro-scale for intersections and also at the corridor scale as meso-scale. In addition, public transportation data were also used in the simulation modeling and suggestions were made regarding public transportation. The parameters of delay per vehicle, total delay time, number of stops per vehicle, average speed and total travel time were taken into consideration in the related analyses.
- Preparation of plan information and drawing sheets:
- The plan information and drawing sheets of the application projects were prepared by taking into account the development plan data on the 1/5000 scale master development plan and 1/1000 scale implementation development plan in effect.

Company name	ISSD Electronics Inc.	Project Manager	M. Alper KOC
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Kroman Celik Steel Factory Expansion Project Traffic Impact Assesment Phase I & Phase II		
Country	Turkey	City	İstanbul &Kocaeli
Costomer Name	Kroman Celik Sanayii A.S.		
Project Duration (Month)	12 Months		
Project Officer	<input checked="" type="checkbox"/> Main Contractor <input type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	PI: June 2019 PII: December 2020	Project Completion Date	PI: November 2019 PII: May 2021

Project Description

In this project, the effect of the expansion project of the Kroman Celik steel factory on the transportation network inside and around the factory campus was examined. Solutions were developed for the forecasted traffic and transportation engineering problems. The first phase of the project was focused on the possible congestions at the existing campus transportation network with forecasted traffic. According to the outputs of the first phase, the second phase of the work was focused on the management of traffic flow of the expanded campus transportation network. The following approach was used:

- In the transportation network around the factory, intersections that could be affected by the expansion project have been identified. Traffic count study was carried out at these intersections.
- The transportation network and factory campus were modeled using PTV Vissim software. Advanced modelling attributes have been used due to the complexity of the scenarios.
- Traffic count data obtained from the field and traffic data within the factory campus obtained from factory officials were used in the simulation model and analyzes were made.
- The outputs obtained from the simulation model were evaluated in the several meetings held with factory officials and common solution proposals were developed.
- A technical report on the project work was prepared.

Activities Performed in the Project

- The project component under this assignment are;
 - **Traffic counts:** Video recordings were taken with a camera at the peak hours on the same day at 7 different signalized and non-signalized intersections in the study area. The video recordings were analyzed and reported according to the turning movements of the vehicles and vehicle classes.
 - **Existing traffic condition analysis:** The existing status of the factory campus entrance-exit gate and the vehicle parking area at the gate, the transportation network within the scope of the project area and the intersections where traffic counts were made were modeled using PTV Vissim software. Level of service for the intersections and the bottlenecks throughout the network have been determined.
 - **Future traffic condition analysis:** Data were obtained from the factory officials with the information of the expansion project and the factory traffic foreseen in the future. Together with these data, the situation that emerged with the increase in traffic on the transportation network was modeled with PTV Vissim software. Solution suggestions were made for the anticipated bottlenecks and decreasing service levels of intersections.
 - **In-campus traffic circulation analysis:** Due to the expansion of the factory, the increased vehicle traffic within the factory campus was also modeled and bottlenecks which caused by the campus transportation network and/or factory industrial operations in the campus area were identified. Solution proposals were developed for vehicle circulation within the factory campus.
 - **Final technical report:**All stages of the study were reported with technical details, which can be presented to the relevant institutions by the factory authorities.

Company name	ISSD Electronics Inc.	Project Manager	Halil SENTURK
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Preparation of ITS Master Plan for City of Erzurum		
Country	Turkey	City	Erzurum
Costomer Name	Erzurum Metropolitan Municipality		
Project Duration (Month)	4 Months		
Project Officer	<input type="checkbox"/> Main Contractor <input checked="" type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	November 2019	Project Completion Date	February 2020

Project Description

A combination of rational and participatory planning approaches has been adopted for the preparation of a strategic ITS master plan to develop Erzurum as a smart city. The following approach was used:

- A detailed review of available documents, reports relating to Smart City, relevant ITS Master Plans, national and international standards and regulations were done.
- Existing ITS applications were evaluated and things that needed improvement were identified and reported.
- Traffic congestion and traffic incidents data were examined and visualized.
- Field observation and technical inspection are made at the main arterials of the city center to experience traffic congestion, on-street parking problem, public transit issues and highway sections with speed rule violations.
- Consultative meetings/workshop/discussion were done at various.
- The selection of ITS projects was done in close coordination of concerned stakeholders (Municipality) and needs-based approach.

Activities Performed in the Project

The project component under this assignment are;

- **Review of the state-of-the-art for ITS:** Several ITS Master Plans from different countries, national and international standards and regulations are reviewed. Case studies for variable ITS applications have been examined and reported.
- **Development of strategy and impact indicators for ITS applications:** A set of indicators have been worked out as a part of the project which shall guide the authorities on deciding the solution which will have the most impact on society.
- **ITS implementation roadmap for 2035:** Every suggested ITS solution is located under a strategy. According to these strategies, implementation phases are put on a timeline as a roadmap.
- **Development of the final master plan report:** Detailed ITS Master Plan Report is prepared under City of Erzurum Transport Master Plan. The report included review of national and international standards and regulations, best use cases worldwide, and custom ITS strategy for Erzurum Metropolitan Municipality, Department of Transportation for 2035.

Company name	ISSD Electronics Inc.	Project Manager	Sule YILDIZ
Company Representative	R. Cagri YUZBASIOGLU	Title	Project Manager

Project Name	San Manuel Indian Casino Expansion Project Traffic Modeling		
Country	ABD	City	San Bernardino, CA
Costomer Name	Transtech Engineers Inc.		
Project Duration (Month)	15 Months		
Project Officer	<input type="checkbox"/> Main Contractor <input checked="" type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	April 2018	Project Completion Date	August 2019

Project Description

In this project, following the new building constructions and parking lots in the San Manuel Indian Casino complex, the traffic situation near the complex and within the complex is modeled. Solutions were developed for the forecasted traffic and transportation engineering problems. The following approaches were used:

- In the transportation network around the casino, intersections that could be affected by the expansion project have been identified.
- The transportation network and Casino complex were modeled using PTV Vissim software.
- Traffic count data obtained from the client and used in the simulation model and analyzes were prepared.
- The outputs obtained from the simulation model were evaluated in the several meetings held with client and common solution proposals were developed.
- A technical report on the project work was prepared.

Activities Performed in the Project

The project component under this assignment are;

- **Network modelling:** The casino area and its surrounding transportation network has been modeled using PTV Vissim software. The traffic count data obtained from the client.
- **Intersection LOS analysis:** The intersections in the transportation network around the casino area were modeled on both PTV Vissim and PTV Vistro and the service levels of the intersections were determined. Signal time optimization and signal design studies were performed.
- **Parking analysis:** Capacity analyzes were made for the open and closed car parks within the casino area. Strategies were developed on how to use different parking lots depending on the vehicle density. The scenarios developed were modeled on PTV Vissim software.
- **In-campus intersection design analysis:** Alternative projects of the intersections to be designed in the casino area were modeled in PTV Vissim software. In different scenarios, the service levels of the intersections were determined and arrangements were made to improve the designs.
- **Roundabout analysis:** Conceptual roundabout intersection designs were modeled and analyzed by using PTV Vissim software. Congested areas, vehicle delays and queue lengths were reported to the client in order to revision works for roundabout design.
- **Final technical report:** All stages of the study were reported with technical details, which can be presented to the relevant institutions by the client.

Company name	ISSD Electronics Inc.	Project Manager	M. Alper KOC
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	Etlik Integrated Health Campus Transportation & Traffic Evaluation		
Country	Turkey	City	Ankara
Customer Name	Astaldi-Türkerler Joint Venture		
Project Duration (Month)	16 Months		
Project Officer	<input checked="" type="checkbox"/> Main Contractor <input type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	Pl: February 2016 Pll: May 2018	Project Completion Date	Pl: May 2016 Pll: May 2019

Project Description

Within the scope of the first project, the traffic situation expected to occur in and around the campus after the commissioning of the Etlik Integrated Health Campus which is planned to be built, was predicted and analyzed, modeled, and then suggestions were made to increase traffic efficiency and safety from a traffic engineering perspective according to the results obtained. Within the scope of the second project, images were taken from the intersections around the campus, decoded and traffic counts were made, and using these counts, modeling and analysis of the intersections were carried out and evaluated and reported from a traffic engineering perspective. Then on-campus traffic circulation and pedestrian access analyses were conducted and recommendations were made. In addition, a literature review on ITS for the campus and its surroundings was conducted and recommendations were given.

Activities Performed in the Project

Activities carried out within the scope of the first project:

- A fisheye camera was installed at 5 points around Etlik Integrated Health Campus and the images were decoded and directional traffic counts were obtained.
- Standards on on-campus traffic management and parking utilization were researched and reported from the relevant legislation and literature.
- Together with these standards, the campus traffic network was digitized in computer environment in accordance with the campus design plan, on-campus transportation and traffic management principles determined by the employer.
- To be used in campus modeling, on-campus and off-campus access demand was determined based on user group and time by using special travel forecasting models for health institutions.
- The assignment of the determined demand to the previously digitized campus network was made using PTV Visum.
- In the report prepared according to the assignment results;
 - Demand and occupancy rates of campus parking lots,
 - Traffic density on the roads in and around the campus,
 - Identified areas of traffic congestion and queuing,

- Necessary regulation suggestions developed for traffic efficiency and safety are included.
- Traffic assignment results were also modeled with the help of PTV Vissim for 5 different critical time periods and reported from a traffic engineering perspective.

Activities carried out within the scope of the second project:

- Intelligent transportation systems consultancy services were provided.
 - A literature review on ITS issues was conducted.
 - Through the literature review, ITS recommendations for the campus and its surroundings were developed and reported.
- By decoding the images taken from 7 intersections around the campus, direction-based traffic counts including 4 different vehicle types were obtained and evaluated and reported from a traffic engineering perspective.
- Within the scope of short-term analyses, on-campus traffic modeling was performed for the morning, noon and evening peak hours using PTV Vissim software, taking into account the public transportation system and pedestrian movements, and recommendations were made from a traffic engineering perspective.
- Considering only vehicle traffic, PTV Vissim models were updated according to the latest campus design and new volumes. Various scenarios for morning, noon, evening peak hours and emergency vehicles (ambulances, etc.) were modeled and evaluated from a traffic engineering perspective and recommendations were made.
- PTV Vistro models were made using the latest campus design and new traffic volumes and accordingly traffic impact analysis studies were updated and the models were evaluated and reported from a traffic engineering perspective.
- The walkability level assessment of the on-campus pedestrian road network was carried out in the light of the literature review and recommendations were made. In addition, drawings of the proposed pedestrian road network were made.
- Within the scope of the medium-term analysis, the demand model was updated in relation to possible changes in the project plan, and on-campus traffic modeling was carried out using PTV Vissim software for the morning, noon and evening peak hours, taking into account pedestrian movements and assuming the construction of a metro station, and evaluated from a traffic engineering perspective and recommendations were made.

Company name	ISSD Electronics Inc.	Project Manager	Sule YILDIZ
Company Representative	R. Cagri YUZBASIOGLU	Title	Project Manager

Project Name	Directorate of Highways – 13th Regional Directorate Intelligent Transportation Systems Consultancy Project		
Country	Turkey	City	Antalya
Costomer Name	13th Regional Directorate of Highways		
Project Duration (Month)	36 Months		
Project Officer	<input type="checkbox"/> Main Contractor <input checked="" type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	October 2019	Project Completion Date	October 2021

Project Description

Within the scope of this project, consultancy services were provided in order to determine the system requirements of the ITS corridors planned to be established in the Antalya-Tekirova, Antalya-Sandıklı, Antalya-Gazipaşa highway corridors within the borders of the 13thRegional Directorate of Highways of the Republic of Turkey, to ensure the standardization of these systems by gathering them under a single platform, to establish integrity and interoperability between systems, to ensure the traceability and manageability of highways, and to increase operational capability by guiding technological developments with the requirements to be put forward.

The works carried out within the scope of this project are listed below:

- Field observations and analysis of all intersections on the route were made and software and hardware requirements were determined.
- For 1 month, the Floating Car Data (FCD) collected from the corridors was analyzed and the effectiveness of the event detection system was analyzed.
- Central software requirements were identified.
- Merging main and auxiliary road access strategies were determined.
- Requirements and description of ITS applications proposed to be installed in the study area.
- Sample technical specifications for the relevant ITS applications were prepared.

Activities Performed in the Project

The project components completed within the scope of this project are as follows:

- **Intersection Analysis:** All intersections in the study area were visited one by one and field survey was carried out. For the unsignalized intersections within the scope of the study, signalization requirement analyses were carried out using PTV Vistro software, and hardware requirements were determined by proposing signalized management forms for the intersections deemed necessary. Half-hour camera recordings collected from all signalized intersections were analyzed and evaluated from a traffic engineering perspective. In addition, as a result of this study, the following studies were conducted and reported for each signalized intersection in each corridor:
 - The geometric type of the intersection and the existing phase layout were extracted.
 - The hardware information of the existing traffic signal controller (TSC) was extracted.
 - Suggestions for new intersection management style were made.
 - Hardware and software requirements for the recommendations were derived.
 - Important traffic engineering issues noted during the field observation were noted.

- **FCD Analysis:** Within the scope of the project, average travel time, average speed and coverage information were produced with FCD obtained from GPS data obtained from over 1 million vehicles in Turkey, and traffic data was collected, stored, processed with traffic analysis algorithms and analyzed on a map-based basis for each 50-meter road segment. In this way, traffic behaviors were extracted, traffic density analysis, incident detection and incident management strategy studies were carried out. The activities carried out during these studies are as follows:
 - In order to archive the FCD data effectively, big data processing methods were used to make the data ready for analysis.
 - To make the data suitable for analysis, data mining methods were used to remove noise and outliers in the data.
 - In order to extract traffic behaviors, the data was clustered using machine learning methods and these clusters were automatically updated over time.
 - Time series modeling was performed to determine the time-dependent trend of traffic and to extract daily, weekly and annual seasonal variability.
 - Machine learning based anomaly detection is used to detect abnormal traffic situations and incidents.
 - Strategies for incident management are developed and proposed.
- **Determination of Central Software Needs:** In order to ensure traffic coordination within the borders of our country and to increase traffic management dominance, the requirements for the ITS central management software are determined and reported which includes being a software that increases the field efficiency of traffic operators, monitors and manages field operations from the center, ensuring the implementation of the strategies and decisions taken at the center in the field to solve planned or unexpected traffic incidents, monitoring and controlling vehicle entrances and exits to public areas remotely, recording and archiving all data generated in these applications, and providing common management and coordination of all these features on a single platform.
- **Recommendation of ITS Applications:** In the light of the analysis and evaluations made along the corridors, topics such as ramp-metering, dynamic intersection control system, bluetooth based travel time measurement system, automatic license plate recognition system, FCD usage, etc., which are recommended to be used in the corridors, have been explained by conducting research and the software and hardware requirements for such applications have been reported.
- **Providing Recommendations on Citizen Application:** The features that should be included in the citizen application, which is intended to work as a dynamic mobility assistant for travelers during their journeys, enabling the sharing of real-time traffic conditions on road networks with citizens, were determined and reported.
- **Transportation Modeling Software Recommendations:** Suggestions for modeling software required for the analysis of future changes in road networks (increase in demand, road widening, etc.) at macro, meso and micro scales are presented and their capabilities are explained.

Company name	ISSD Electronics Inc.	Project Manager	Sule YILDIZ
Company Representative	R. Cagri YUZBASIOGLU	Title	Project Manager

Project Name	Konya Park Trade Center Traffic Impact Analysis Study		
Country	Turkey	City	Konya
Costomer Name	Konya Metropolitan Municipality		
Project Duration (Month)	5 Months		
Project Officer	<input checked="" type="checkbox"/> Main Contractor <input type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	March 2017	Project Completion Date	July 2017

Project Description

Within the scope of this traffic impact analysis study, the possible effects of the residences and the shopping center within the Konya Park Trade Center project on the existing transportation system were evaluated and future traffic forecasts were made. According to the results of these calculations, traffic regulation and precaution plans have been prepared, and necessary recommendations have been given to ensure that the necessary investments are planned with the opening of the facility and integrated with existing public transportation systems. In addition, traffic modeling and parking lot analyses have been carried out for the existing state and the scenarios resulting from the demand forecast that the project will bring. In short, within the scope of the study, the analysis of the existing state, the estimation of the traffic demand that the project will generate and the impact of this demand on the existing transportation infrastructure have been analyzed and precautionary suggestions have been made.

Activities Performed in the Project

The project components completed under this project are as follows:

- Existing State Analysis:** In this section, the existing state of the study area was analyzed from a transportation perspective. While conducting these analyzes, a field survey was carried out and evaluations were made and reported from a traffic engineering perspective. In addition, traffic count data were obtained by decoding the images taken from the cameras installed around the project site and interpreted. Then, through the signal programs obtained from Konya Metropolitan Municipality and traffic counts, modeling was carried out for the analysis of the current service levels and performances of the intersections in the project area were evaluated and reported from a traffic engineering perspective.
- Traffic Demand Forecast:** In this section, studies have been carried out to estimate the traffic that will be generated due to the demands created by the residences and spaces with different usage areas (movie theaters, stores, supermarkets, restaurants, etc.) that will be located within the scope of Konya Park Trade Center and to predict the possible effects of this traffic on the existing transportation network. The studies conducted in this context are as follows:
 - Travel Generation Estimation:** According to the capacities and usage characteristics of the venues in the project, the hourly travel generation was determined.
 - Travel Distribution Forecast:** The projected percentage distribution of the project's trip generation and attraction according to the zones identified in and near the project area was determined.
 - Modal Split Forecast:** With the help of the Konya Transportation Master Plan, the travel modes by which the projected trips will be

- made have been predicted on a percentage basis and reported.
- Travel Assignment:** After the trip distribution and mode split studies, all routes between the arrival directions determined for trip distribution and Konya Park Trade Center zones were modeled in PTV Vistro program.
 - Level of Service Analyses:** The impact of the traffic volume added to the roads and intersections within the scope of the study area as a result of the determined routes on the existing transportation infrastructure was determined through traffic models and interpreted and reported from a traffic engineering perspective.
 - Proposals:** In this section, geometric design change proposals and signalization proposals were made in CAD environment in order to ensure pedestrian and vehicle traffic safety and to maintain traffic levels of service, and these proposals were modeled as scenarios and the levels of service of the intersections were determined, and then the model results were interpreted and reported from the perspective of traffic engineering.
 - Public Transportation Analysis:** In this section, the current capacity of the existing public transportation services in the project area and the capacity status of the public transportation services after the additional trips foreseen to be generated as a result of modal split forecast made are analyzed and reported from the perspective of transportation engineering.
 - Parking Analysis:** In this section, the capacity analysis of the parking areas in the project and the mobility analysis during the day based on the traffic demand forecast were made and then circulation suggestions were made for the existing parking lot design.

Company name	ISSD Electronics Inc.	Project Manager	Halil SENTURK
Company Representative	Sule YILDIZ	Title	Project Manager

Project Name	National Transport Master Plan of the Republic of Turkey		
Country	Turkey	City	
Costomer Name	The Ministry of Transport and Infrastructure		
Project Duration (Month)	18 Months		
Project Officer	<input type="checkbox"/> Main Contractor <input checked="" type="checkbox"/> Subcontractor <input type="checkbox"/> Individual		
Project Start Date	July 2016	Project Completion Date	December 2017

Project Description
<p>National Transportation Demand Forecast Model, which processes and evaluates a series of complex mathematical formulation processes, has been developed within the PTV Visum software in order to analyze and compare the current and future supply and demand in the field of road, rail, air, maritime and inland waterway passenger and freight transportation in a holistic way in terms of economic, social and technical terms. Based on this model, demand forecasts for freight and passenger transportation in future years have been prepared using macro indicators such as GDP, vehicle ownership, economic growth, and inflation. The following studies were carried out within the scope of this study:</p> <ul style="list-style-type: none">• A nationwide survey was conducted with the support of the Ministry of Transport and Infrastructure, the General Directorate of Highways, the General Directorate of Security, the Gendarmerie General Command and other institutions.• A base year model was created in order to perform the current situation analysis and evaluate alternative scenarios.• While creating the base year model, a model framework has been established by defining traffic analysis zones, nodes, the road, railway, sea and air transport networks, as well as the transportation hubs (bus stations, train stations, airports, ports, etc.) and transportation types and modes.• A detailed model setup has been performed, including capacity information of the road network, volume delay functions, impedance values, public transportation routes and schedules, assignment models for private and public transportation.• Input for the transportation model has been provided by performing statistical analysis of survey studies.• Private and public transport passenger modeling has been passed through the calibration and validation process to achieve the most accurate result. The model was validated by using the annual average daily traffic data, cordon counts, travel times obtained from GPS data, roadside surveys, railway ticketing data, and airline passenger numbers.• The freight transportation modeling has been developed based on different types of goods, and growth calculations have been made taking into account GDP activities.• Considering the existing infrastructure and future projections, alternative scenarios for the target years of 2023, 2029, and 2035 have been studied. These scenarios have been compared with the current state model, and transportation policies and projects have been identified for each target year.• During the planning process, a geographic database has been created to include all quantitative data collected within the scope of the model and the developed outputs.

Activities Performed in the Project			
<p>Activities carried out within the scope of this project:</p> <ul style="list-style-type: none">• Building the road network: For the purpose of creating a base for the current state and alternative scenario models, the road network and railway network prepared for the database have been integrated into PTV Visum Transportation Planning software to be used in the model.• Establishment of an integrated transport system: Different modes and type of transportation systems have been defined into the model. Necessary configurations have been made so that they can work in an integrated manner with each other.• Defining road and railway public transportation data to the model: The relevant data has been obtained both through direct data transfer from public and private institutions and organizations, as well as through online platforms. This data has been used to define transportation hubs, public transportation routes, frequency of services, and schedules in the model.• Four-step travel demand model: Survey analysis results, land use information and socio-economic data have been used for travel demand forecasting. As a result of this study, a four-step transportation demand forecasting model has been developed, which includes trip generation, trip distribution, mode choice and network assignment steps. Origin-Destination matrices have been generated as part of this process for each transportation mode.• Calibration and validation: Model calibration, validation and matrix estimation processes have been done by using the annual average daily traffic data, cordon counts, travel times obtained from GPS data, roadside surveys, railway ticketing data, and airline passenger numbers.• Establishing the infrastructure of target year projects: The numerical data of the planned projects for the target year have been integrated into the model.• Technical reporting: Results and comparison visuals have been prepared for the base year and target year scenarios. In addition, numerical output data has been generated to calculate emission values. Throughout the project, technical report presentations have been conducted to the Ministry of Transport and Infrastructure.• Workshop: At the end of the project, participation in a workshop was carried out where views, thoughts, and recommendations were shared.			
Company name	ISSD Electronics Inc.	Project Manager	Hilal SAAT
Company Representative	Sule YILDIZ	Title	Project Manager

Imprint

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