Traffic Management Systems

# Complete Mobility Provider.

Who are we?

Founded in 2009, ISSD provides solutions to create added value in the field of intelligent transport. Its areas of expertise include traffic management, electronic applications and consulting services. With the slogan 'Complete Mobility Provider', ISSD contributes to mobility from A to Z by working for a greener, more efficient and accessible transport future in more than 5000 locations in 15 countries.

ISSD is located in METU Teknokent, Türkiye's most prestigious technology development zone. The company stands out from its competitors with its product portfolio, technical expertise, R&D capabilities and long-term customer relationships. ISSD's young and talented team is committed to creating value and aims to become a global leader by delivering this value to the world.

ISSD
INTEGRATED SYSTEMS & SYSTEMS DESIGN

CHAOS
Dynamic Junction Control System.
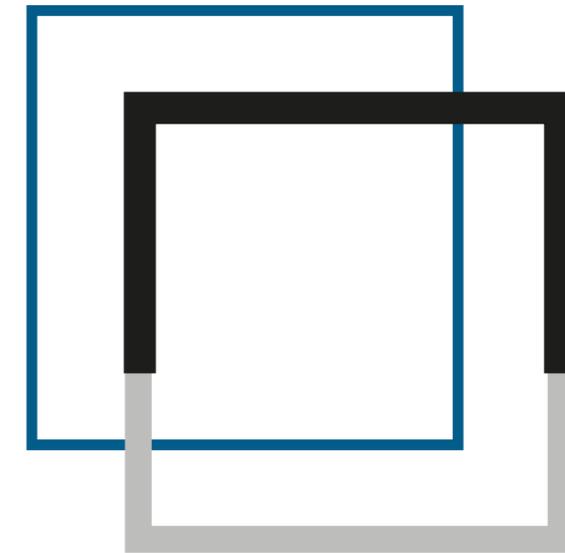
CHAOS
Dynamic Junction Control System.

"Türkiye's first patented dynamic junction control system"

CHAOS reduces delays and emissions at the signalized junctions by changing green time intervals dynamically depending on the number of vehicles on each approach. CHAOS systems can communicate with each other via wireless connection for signal coordination and network optimization.

CHAOS
Components.

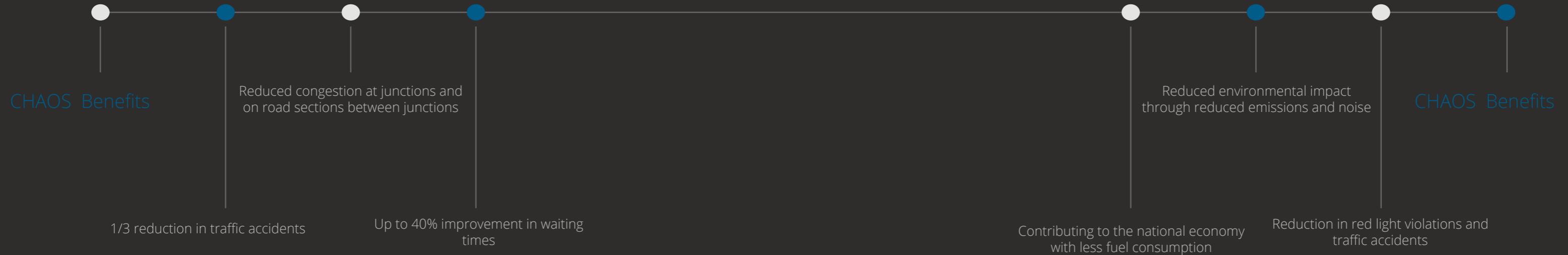### MANGO - Next Generation Traffic Management Centre Platform

MANGO is interactive traffic management software. Its user-friendly, web-based interface allows you to monitor, analyse, manage, and control different traffic systems and sensor sets.

VIERO-AI - Vehicle Counting System.

VIERO-AI, based on image processing, counts the vehicles passing through any road section 24/7, in all weather conditions.

CENTRIS - Dynamic Intersection Control Unit.

CENTRIS continuously optimises light durations at junctions by instantly analysing data such as the number of vehicles, vehicle density and average vehicle speed obtained from vehicle counting cameras placed at the junction.

CHAOS Benefits

1/3 reduction in traffic accidents

Reduced congestion at junctions and on road sections between junctions

Up to 40% improvement in waiting times

Reduced environmental impact through reduced emissions and noise

Contributing to the national economy with less fuel consumption

CHAOS Benefits

Reduction in red light violations and traffic accidents

CHAOS
Abilities.

CFM - FCD Supported Dynamic Junction Management

The CFM traffic management algorithm sets itself apart from other algorithms by incorporating traffic scene analysis cameras and Floating Car Data. This unique approach enables it to achieve a high level of orchestration between intersections, resulting in reduced travel times and increased comfort for drivers.

Signal Coordination

CHAOS systems can communicate with each other via wireless connection. This property can be used for signal coordination between consecutive junctions. The main purpose of signal coordination is to reduce travel times along a corridor by coordinating the junctions.

Tram and Pedestrian Priority

Existing or newly installed loop detectors, magnetometers or pedestrian buttons at intersections can be used by CHAOS algorithms to prioritise trams and pedestrians.

Emergency Vehicle Preemption

With CHAOS, it is possible to give priority to emergency vehicles coming from any approach of the junction. Emergency vehicles which are defined in Traffic Control Center software are detected and tracked by using GPS data.
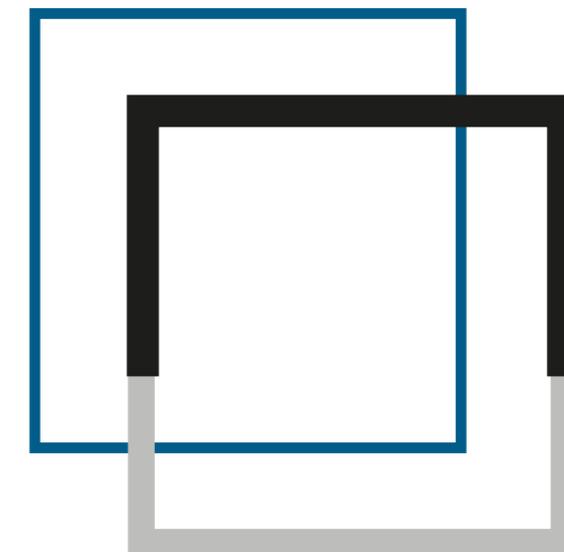
Dynamic Junction Management with Discharge Feature

Thanks to the discharge detection feature of our VIERO-AI vehicle counting cameras placed at the exit lanes of the intersection, congestion at the exits is detected and dynamic intersection management is performed accordingly.
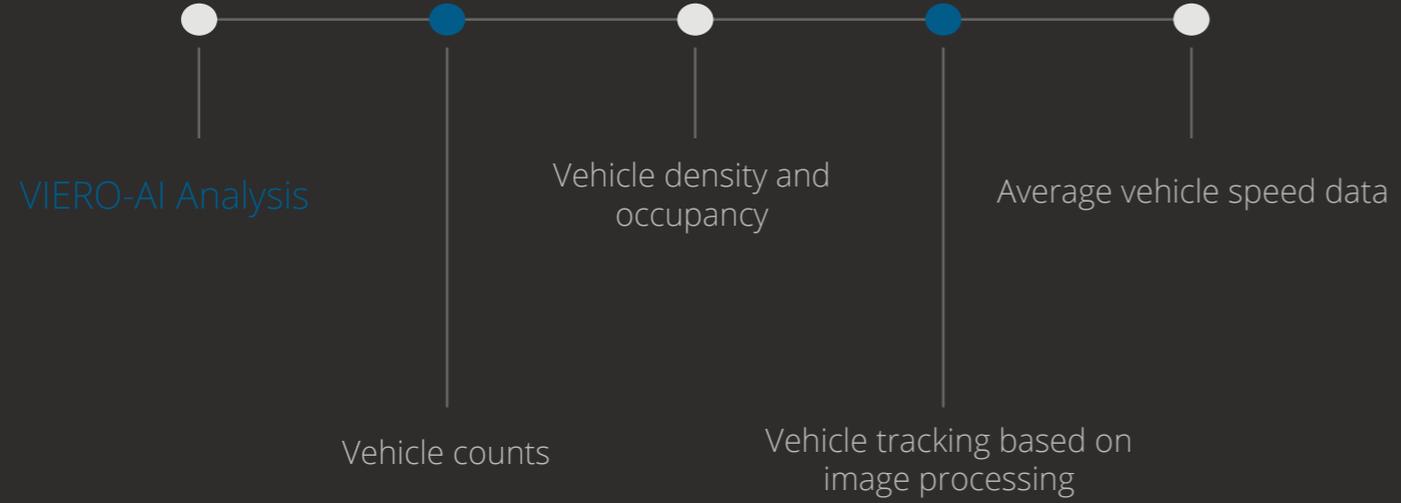
VIERO AI
Vehicle Counting System.

VIERO AI
Vehicle Counting System.

"The easiest way to collect traffic data"

VIERO-AI performs real-time vehicle counting, density and occupancy measurement and generates average vehicle speed information. VIERO-AI works two different modes for day and night and achieves results with less than 8% error due to our image processing algorithms. VIERO-AI can run Artificial Intelligence based algorithms in real time thanks to the embedded INTEL Movidious Vision Processing Units.

VIERO-AI, is composed of a high resolution IP camera, an image processing board and a wireless communication module in an IP67/IK10 certified housing. VIERO-AI has a higher performance than its competitors due to the hardware-specific algorithms.
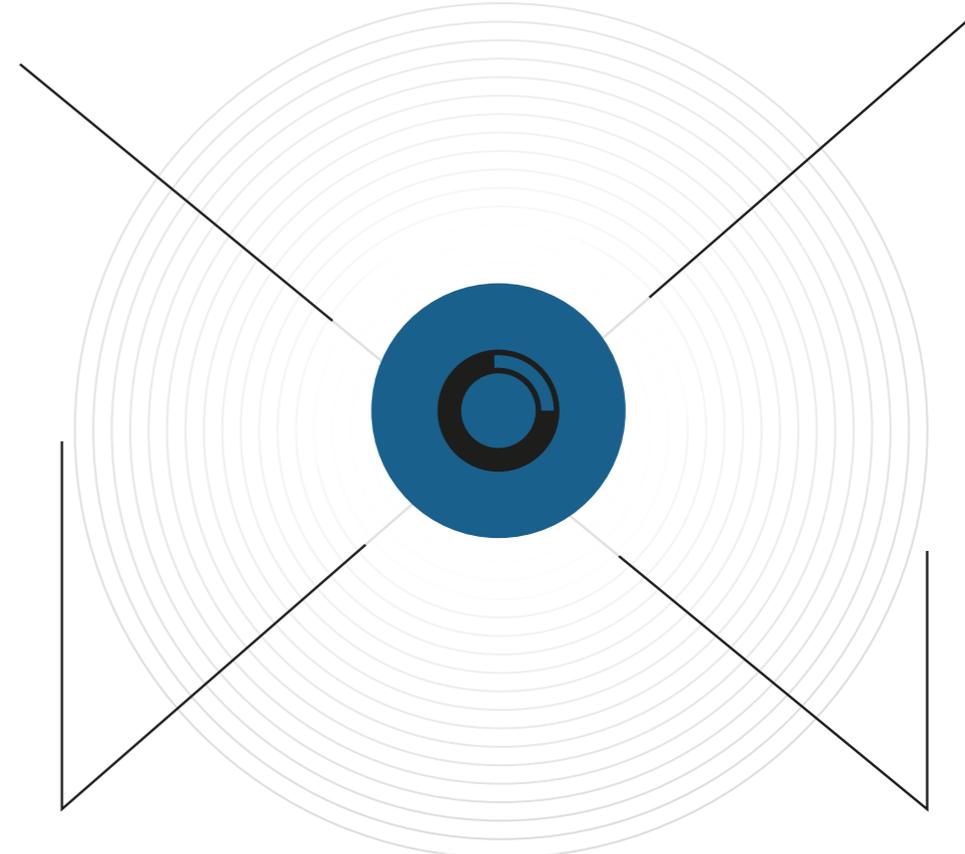
VIERO-AI Analysis

Vehicle density and occupancy

Average vehicle speed data

Vehicle counts

Vehicle tracking based on image processing

VIERO AI
Benefits.

Provides The Highest Performance 24/7

Counting Up To 6 Lines

Free Update During Guarantee Period

Clear View Up To 100 Meters

Wireless Communication Capability

VIERO-AI

It generates various traffic data by vehicle counting, density measurement, image-based vehicle tracking and average vehicle speed measurement.

24/7 Excellent Performance

Vehicle count, density and average vehicle speed measurement thanks to the artificial intelligence-based system.

Capable of Monitoring 6 Separate

Vehicle counting up to 6 lanes with a single camera on the designated point.

Data Transfer

Data Transfer to remote centers over the network.

Operating Temperatures

High performance operation in the temperature range of -40°C / +85°C.
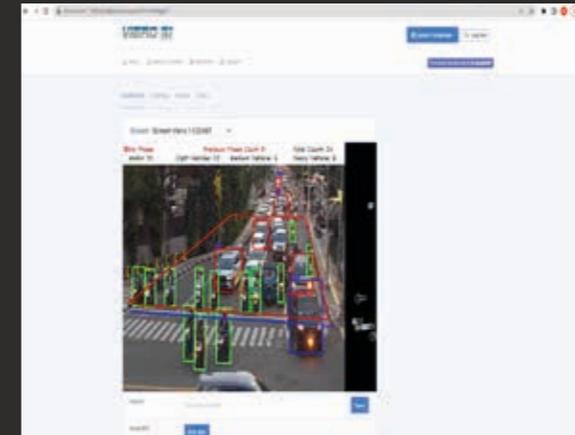
User Friendly Interface

Easy access to system settings and data with a convenient and simple design.

Remote Control

Quick and safe access to the system with built-in remote access features.

Traffic Data produced by VIERO-AI

VIERO-AI, produces a variety of traffic data by measuring vehicle counts, density and occuppancy, vehicle tracking based on image processing and average speed data. The data that system produces is used in various studies, mainly Dynamic Junction Control System (CHAOS), transportation-oriented design, planning, analysis, macro modeling and so on.

User Friendly Interface

VIERO-AI can provide traffic data around the clock and throughout different weather conditions to operators in real time with its efficient and easy-to-use user interface.

Real-time Vehicle Count

VIERO-AI Provides real-time vehicle count throughout day and night and within different weather conditions. The produced data is then instantly shared with traffic operators via the VIERO-AI interface.

VIERO AI
Vehicle Counting System.

General Specifications

Number Of Lanes Covered	Vehicle Count up to 6 lanes
Detection Distance	Field Of View of Up to a 100 meters
Day/Night Vehicle Counting and Classification accuracy	%92-94
Data Transfer	Ethernet/Wifi (Ops.)
Software Update	Free Updates During Warranty Period
Mode of Operation	Continuous Real-Time Operation

Camera Specifications

|	
Sensor Type	2 Megapixel Progressive StarvisTMCMOS
BLC Mode	BLC / HLC / WDR (140dB) / SSA /AGC /AWB
Noise Detection	3DN
Day/Night	Automatic (ICR) / Colored / S / B
Profile	ONVIF Profile S&G, API, PSIA CGI
Data Tranfer	Ethernet (RJ-45 (100 / 1000Base-T))
Data Storage	Mirco SD Card 128GB
Bit Rate	H.264: 32K ~ 10240Kbps
Power Source	DC12V, PoE + (802.3at)
Operating Conditions	-40 ° C ~ + 60 ° C (-40 ° F ~ + 140 ° F) / Less than 95% RH
Lens	2.7mm~13.5mm varifocal lens
Protection Rating	IP67, IK10w
Guarantee	2 years

VIERO AI
Vehicle Counting System.

Processor Specifications

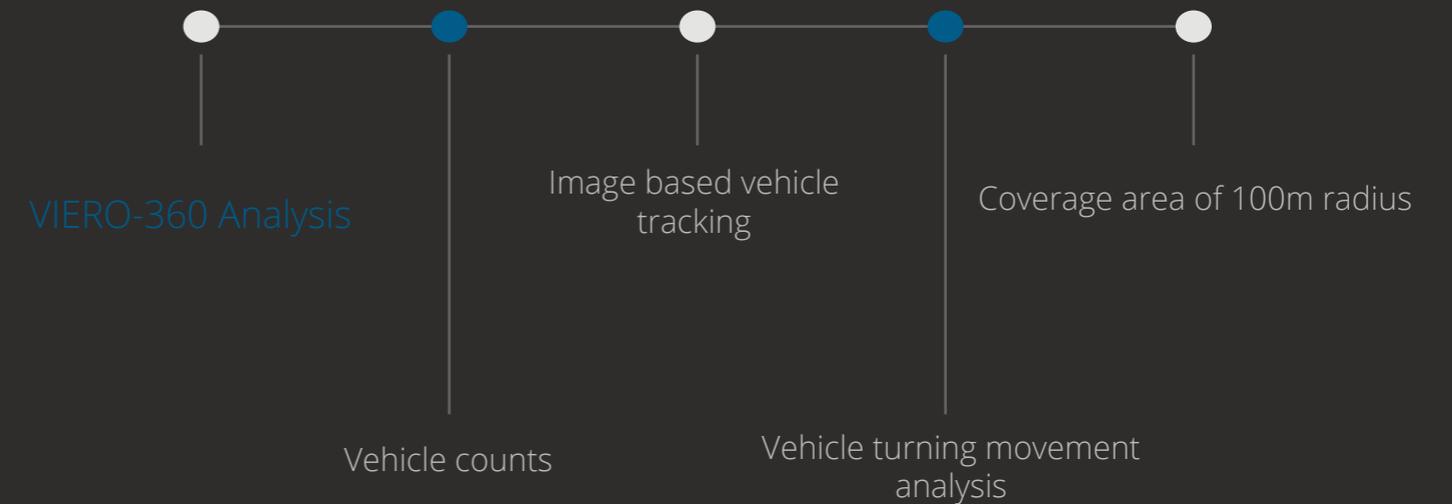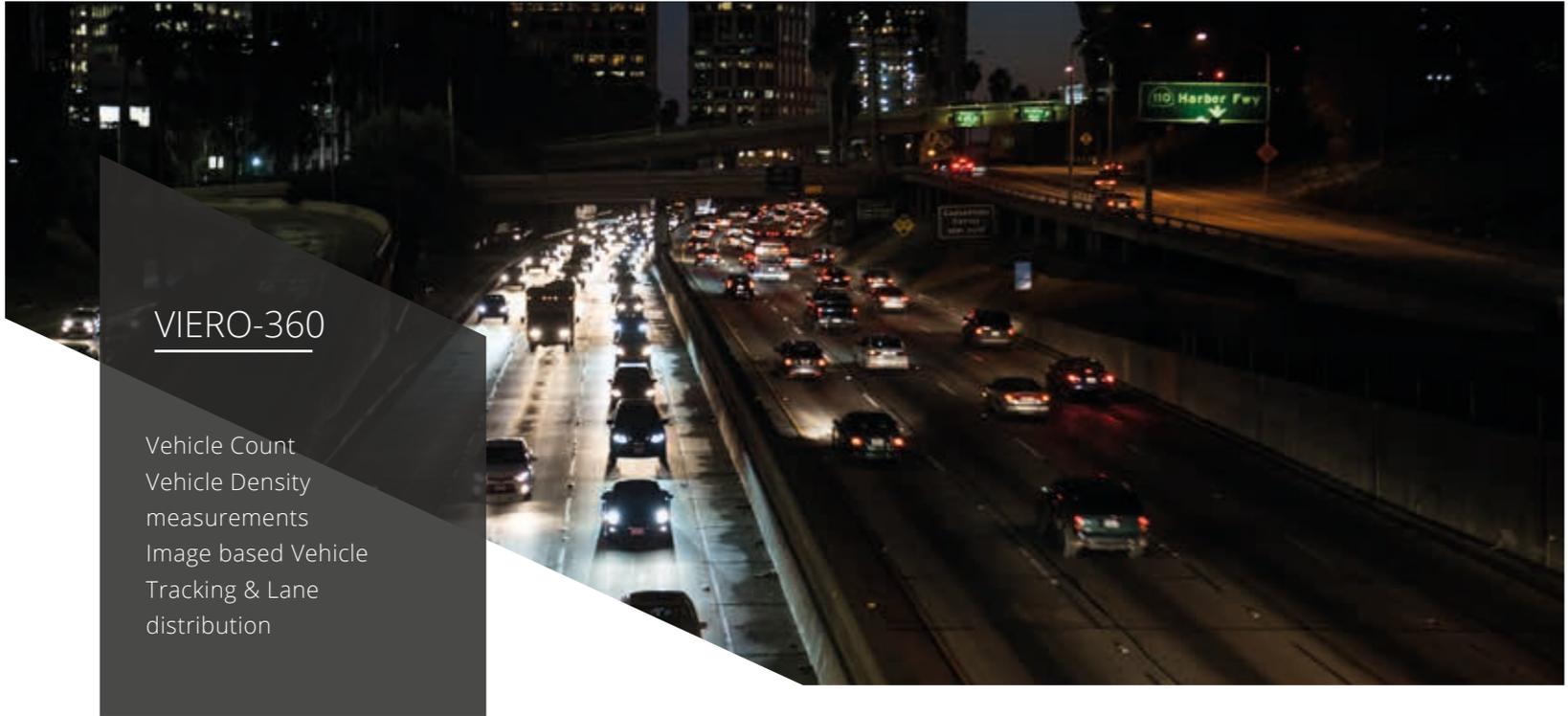|	
Processor Frequency	2.5 GHz
Cache Memory	6 MB
Core Count	4
RAM	4 GB
Storage	32 GB
Processor Model	7. Generation Intel i3
Image Transfer	1x HDMI, 1x Displayport
USB Interface	2 x USB 2.0 ve 2 x USB 3.0
Network Interface	2 x RJ45 Konnektör 10/100/1000 Mbps
Additional Hardware Features	PCI slot 32-bit/33 Mhz PCIex4 slot 4GB/s
Operating System	Ubuntu 18.04
Software Features	Supported with OpenVino cards over PCI express for deep-learning purposes
	Ability of processing Deep learning algorithms in addition to Pytorch and Tensorflow compliable libraries
	The processor module has sub-hardware support for deep learning models.

VIERO 360
Junction Analysis System
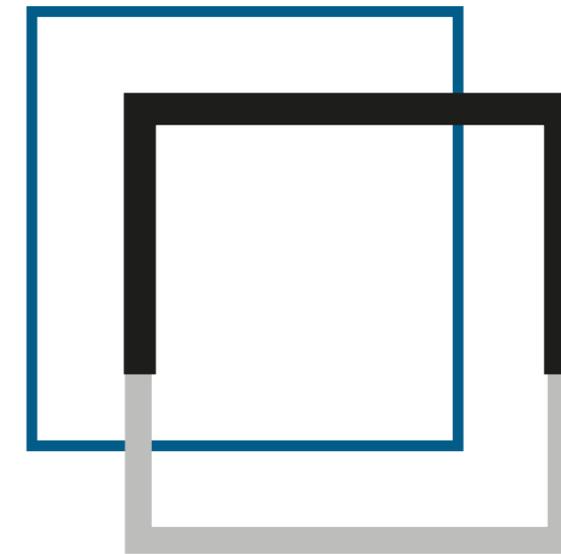
A cost-effective
solution for accurate
junction analysis

VIERO 360
Junction Analysis System.

VIERO-360 utilizes Fisheye Cameras and Artificial Intelligence based detection algorithms to extract vehicle turning movement data within junction with an accuracy of 90% during daylight conditions.

The system is able to determine the path of every vehicle crossing the intersection. The obtained data is then instantly shared with traffic operators via the VIERO-360 interface.

VIERO-360 Analysis

Image based vehicle tracking

Coverage area of 100m radius

Vehicle counts

Vehicle turning movement analysis

VIERO-360

Vehicle Count
Vehicle Density
measurements
Image based Vehicle
Tracking & Lane
distribution

VIERO 360
Junction Analysis System

VIERO 360, produces a variety of traffic data by measuring vehicle counts, density and occuppancy, vehicle tracking based on image processing and average speed data. The data that system produces is used in various studies, mainly Dynamic Junction Control System (CHAOS), transportation-oriented design, planning, analysis, macro modeling and so on.

User Friendly Interface

By using this interface, Operators will be able of determining the path of every vehicle crossing the intersection .

Real-Time Vehicle Counting

VIERO-360 provides real-time vehicle count throughout day and night and within different weather conditions. The obtained data is then instantly shared with traffic operators via the VIERO-360 interface.

24/7 Excellent Performance

Vehicle counting and density measurement with artificial intelligence based system.

Data Transfer

Data Transfer to remote centers over the network

User Friendly Interface

Easy access to system settings and data with a convenient and simple design.

Coverage area of 100m radius

Image based Vehicle Tracking & Lane distribution

Operating Temperatures

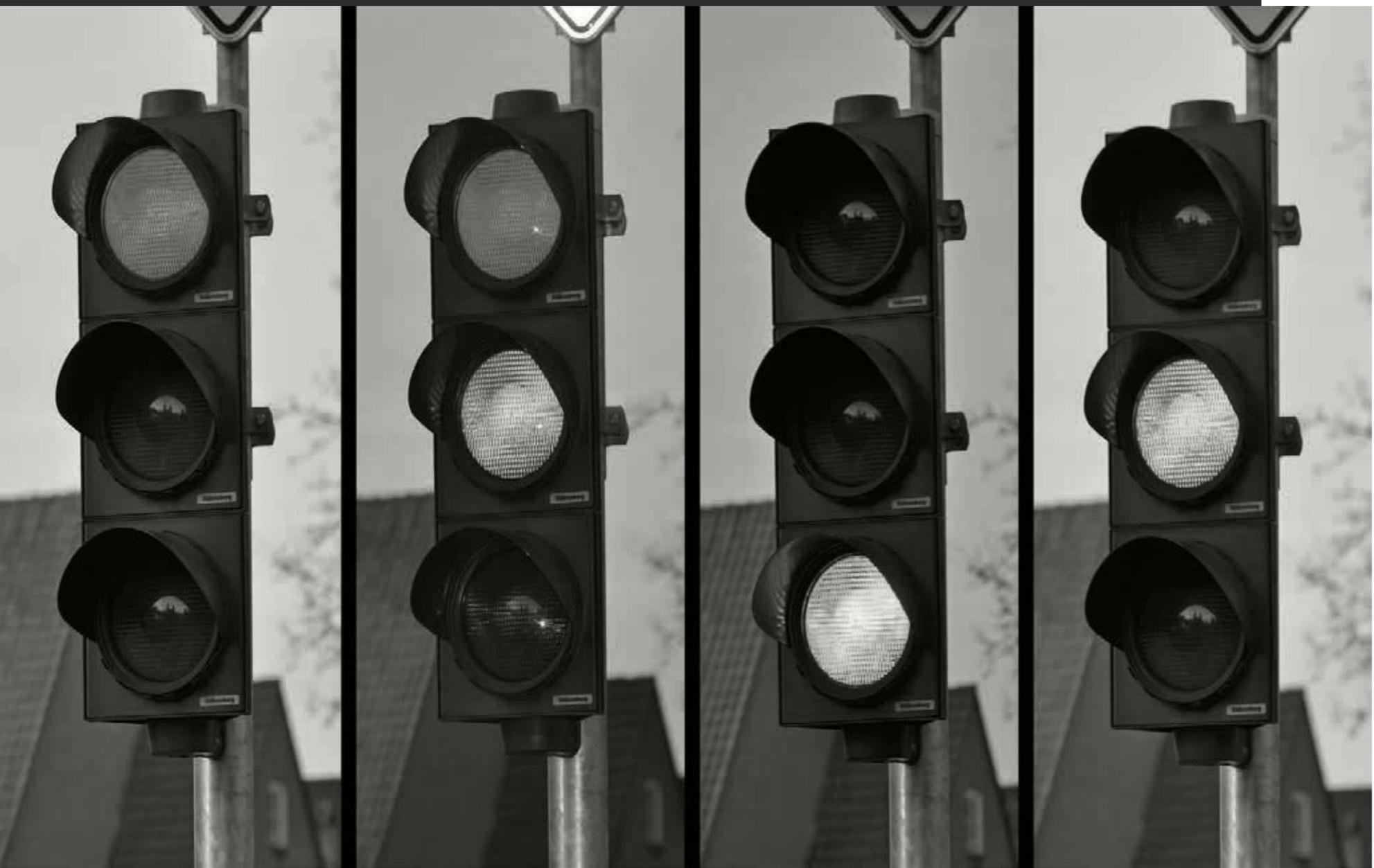-40 ° C ~ + 60 ° C (-40 ° F ~ + 140 ° F) / Less than 95% RH

Remote Access Capability

Quick and safe access to the system with built-in remote access features.
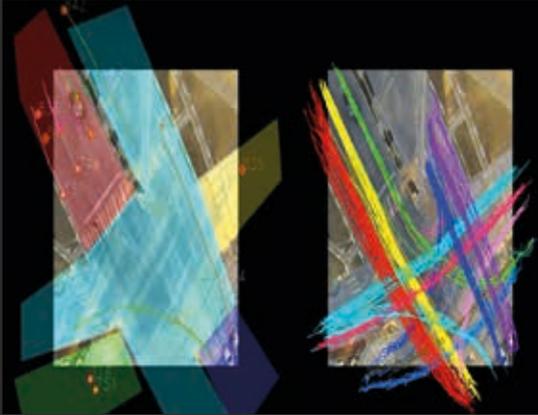
General Specifications

Day/Night Vehicle Counting and Classification accuracy	%70
Data Transfer	Ethernet/Wifi (Ops.)
Software Update	Free updates during the warranty period
Mode of Operation	Continuous real-time operation

Camera Specifications

|	
Sensor	5 MP Progressive CMOS
Imaging Area	1.47mm Fisheye Lens for 180 ° Panoramic View and 360 ° Surround View
IR Fed Görüş Mesafesi	Built-in IR illuminators, effective 850nm IR LEDs up to 20 meters * 6
Day/Night	Auto (ICR) / Color / B / W
ONVIF	ONVIF
Verification Mode	Panoramic, Double Panoramic, Original, 1 + 3, EPTZ, 4 pictures
WDR	WDR Pro
Viewing Area	180 ° (Horizontal) 180 ° (Vertical) 180 ° (Diagonal)
Video Compression	H.265, H.264, MJPEG
Built-in Storage	Slot-Type: Micro-SD
Data Transfer	Ethernet (RJ-45 (100 / 1000Base-T), addressable
Power Source	DC12V, PoE + (802.3at)
Guarantee	2 years
Operating Conditions	-40 ° C ~ + 60 ° C (-40 ° F ~ + 140 ° F) / Less than 95% RH

Processor Specifications

Processor Frequency	2.5 GHz
Cache Memory	6 MB
Core Count	4
RAM	4 GB
Storage	32 GB
Processor Model	7. Generation Intel i3
Image Transfer	1 x HDMI, 1 x Displayport
USB Interface	2 x USB 2.0 ve 2 x USB 3.0
Network Interface	2 x RJ45 Konnektör 10/100/1000 Mbps
Additional Hardware Features	PCI slot 32-bit/33 Mhz PCIex4 slot 4GB/s
Operating System	Ubuntu 18.04
Software Features	Supported with OpenVino cards over PCI express for deep-learning purposes
	Ability of processing Deep learning algorithms in addition to Pytorch and Tensorflow compliable libraries
	The processor module has sub-hardware support for deep learning models.

CENTRIS
Dynamic Junction Control Unit.
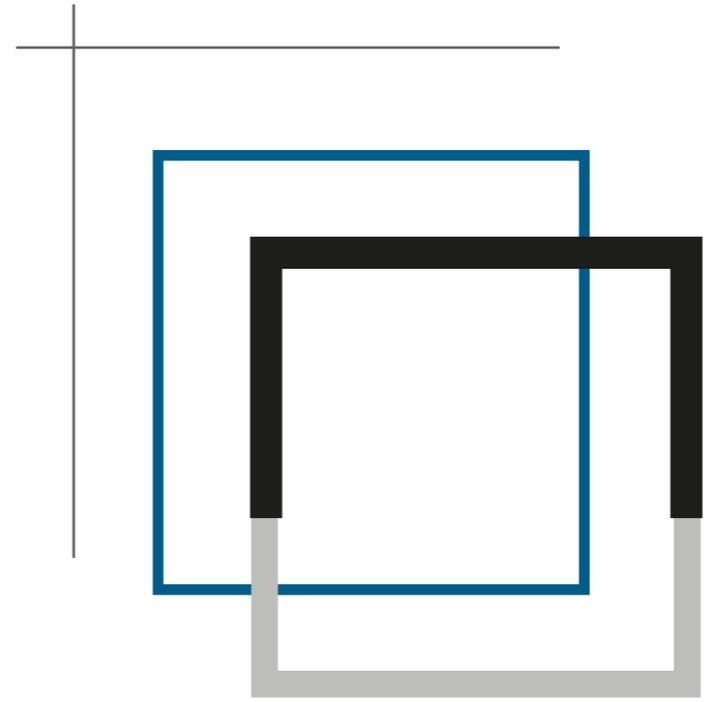
CENTRIS
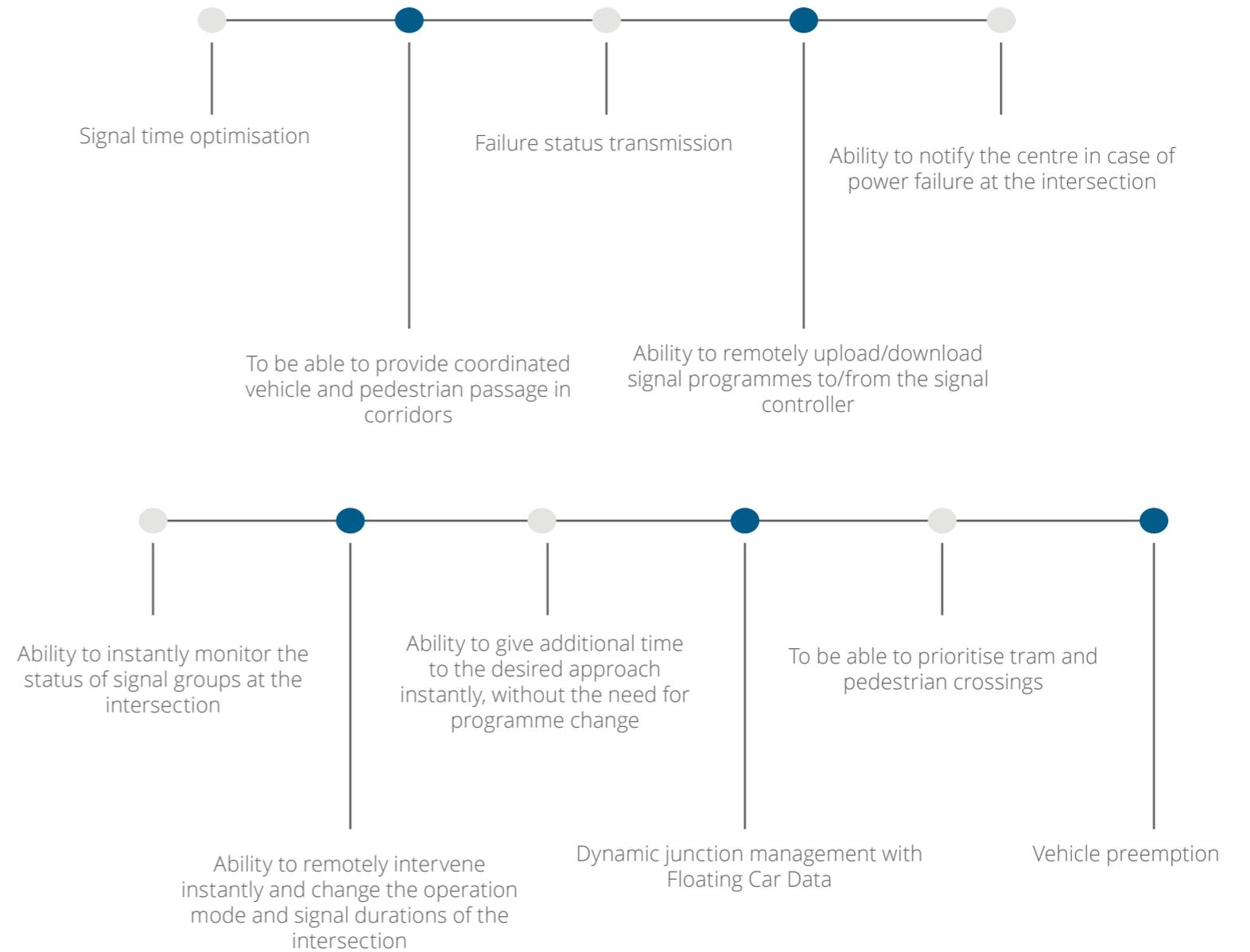## Dynamic Junction Control Unit.

CENTRIS is a multi-functional/control unit, which is used for junction management, signal optimization and the remote control of any traffic sensor/device including the detection of failures. Its high-speed processor allows analyzing collected data from various sensors in real time, and running the customized algorithms inside.

CENTRIS module instantly analyses the data such as vehicle count and vehicle density data produced by Vehicle Counting Cameras VIERO-AI, to be placed on the junction to optimise the traffic light durations continuously. Thus, the average waiting times such as the delay of the vehicles at the traffic lights are reduced.

CENTRIS works integrated with the Traffic Control Centre software MANGO. Signal programmes prepared through MANGO can be uploaded to CENTRIS with remote access.

Centris Abilities

Signal time optimisation

Failure status transmission

Ability to notify the centre in case of power failure at the intersection

To be able to provide coordinated vehicle and pedestrian passage in corridors

Ability to remotely upload/download signal programmes to/from the signal controller

Ability to instantly monitor the status of signal groups at the intersection

Ability to give additional time to the desired approach instantly, without the need for programme change

To be able to prioritise tram and pedestrian crossings

Ability to remotely intervene instantly and change the operation mode and signal durations of the intersection

Dynamic junction management with Floating Car Data

Vehicle preemption

CENTRIS
Dynamic Junction
Control Unit.

Everything is under control

<table>
<tr><td rowspan="13" style="writing-mode: vertical-lr;">General Specification</td><td>Processor</td><td>ARM Cortex-A8</td></tr>
<tr><td>Serial Communication</td><td>SPI, I2C, RS232 USB and Digital I/O Units</td></tr>
<tr><td>Memory</td><td>512MB RAM, 4GB Storage, SD Cart</td></tr>
<tr><td>Network</td><td>100Mbit Ethernet, GSM Quad Band</td></tr>
<tr><td>Supported Protocols</td><td>NTCIP, OCIT, Customized Communication Protocols</td></tr>
<tr><td>Power Consumption/Power Input</td><td>10W / 220V AC</td></tr>
<tr><td>Housing</td><td>IP54</td></tr>
<tr><td>Operating Temperature</td><td>-10°C ~ +85°C</td></tr>
<tr><td>Dimensions (LxExD) (With/without box)</td><td>250mm x 305mm x 115mm / 205mm x 130mm x 50mm</td></tr>
<tr><td>LCD Screen to Display (The Current)</td><td>Time/Date, phase status, working status, connection status</td></tr>
<tr><td>Minimum Data Transmitted to Traffic Control Center Software</td><td>ICU (Time/Date, instant fault recording, working status, Instant Status of ICU output cards</td></tr>
<tr><td>Wehigt (With/Without Box)</td><td>1740 gr / 685 gr</td></tr>
</table>

MANGO

Next Generation City Traffic
Management Platform
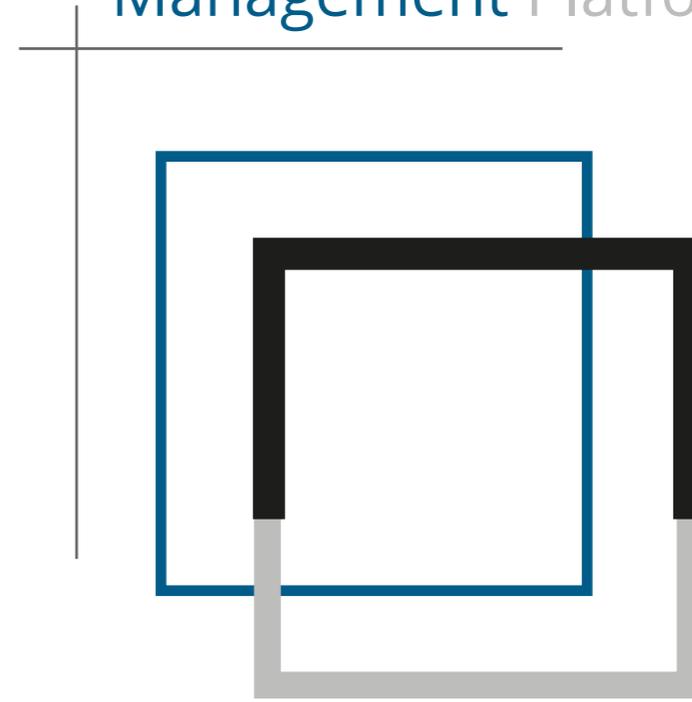
MANGO
Next Generation City Traffic Management Platform

MANGO is a traffic management software, which is able to monitor, analyze, manage and control a variety of traffic systems and sensor sets from a single, user-friendly, web-based interface. The software increases the traffic management capabilities of cities by offering an **interoperable city traffic management environment.**
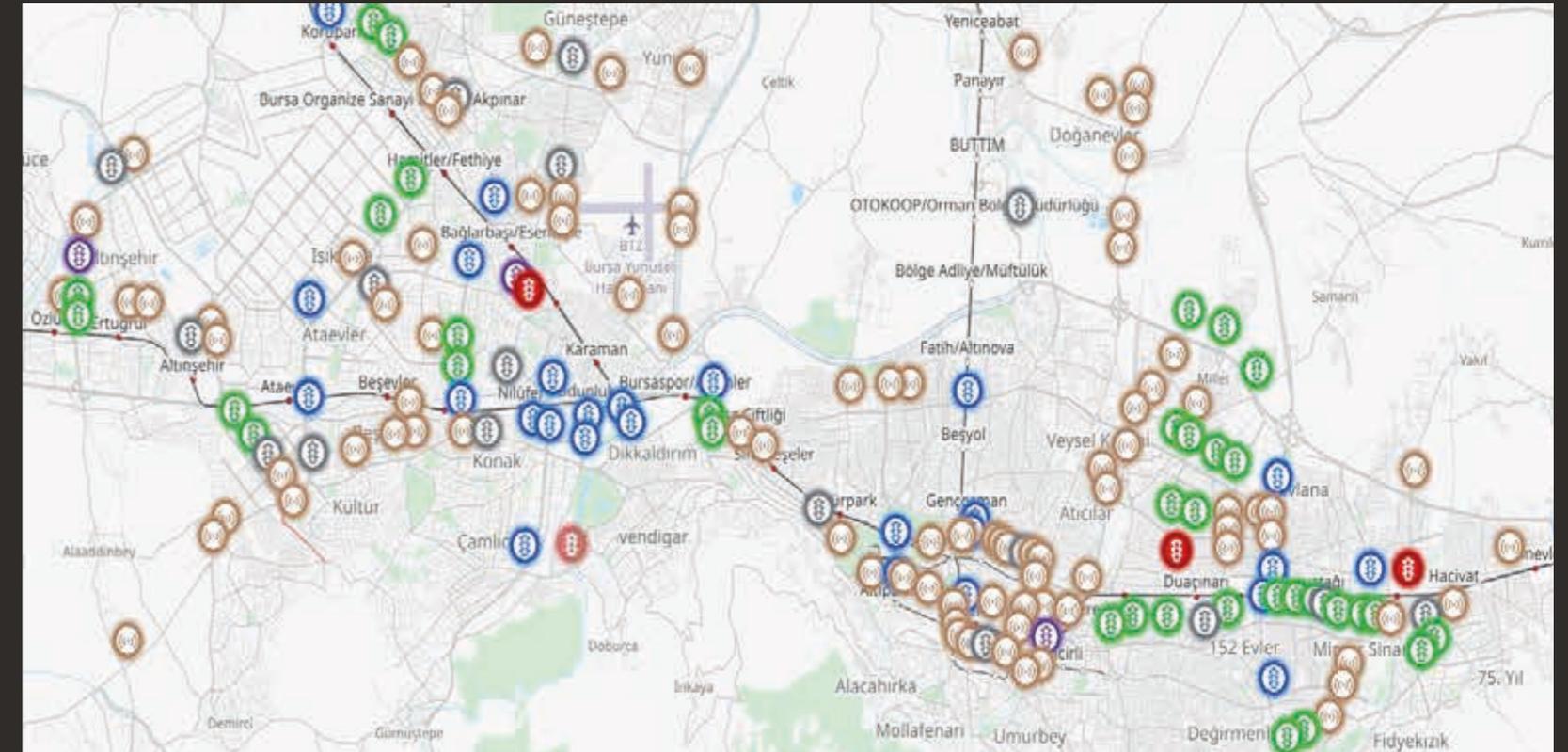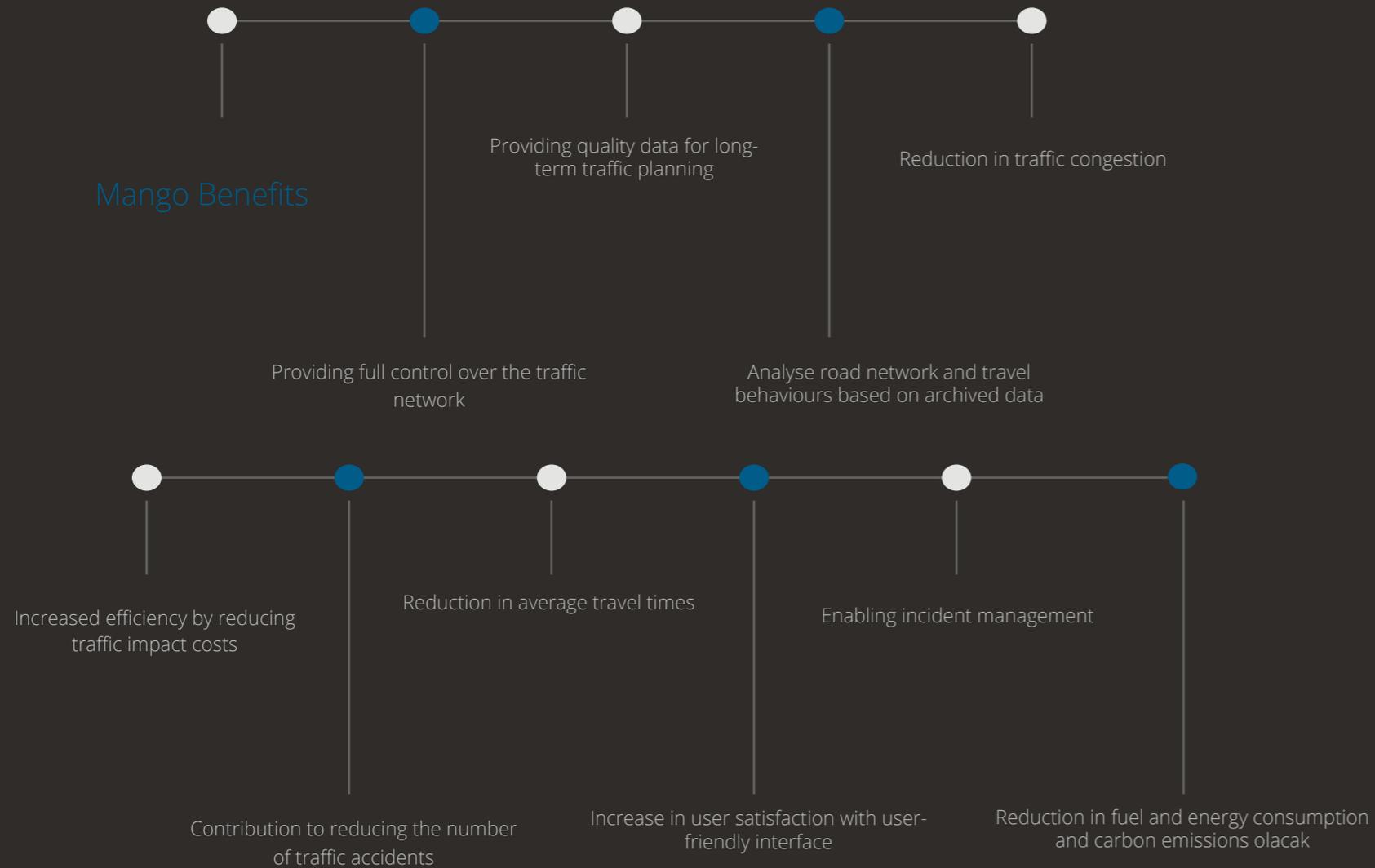
MANGO, based on a digital map, is a totally web-based software which enables the remote control of junctions, perform statistical analysis based on selected data and time, communicate with junctions 24/7.

MANGO users have access to a highly flexible and scalable platform, with various applications that can be added as plug-ins to the software. It means that, MANGO can solely be a dynamic junction management software, but it can also be enhanced with real-time traffic information from different data sources such as Floating Car Data (FCD), smart cameras, GPS data, magnetic detectors etc.
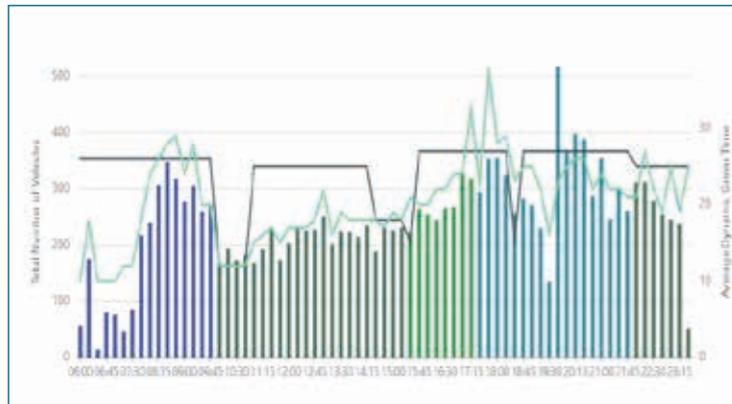
MANGO
Modules.

Dynamic Junction Management

Measurement of Effectiveness

Automatic Incident Detection

Bluetooth Based Traffic Analysis

Camera Management

Real-time Traffic Information and Forecast

Integrated Corridor Management

Emergency Vehicle Preemption

Variable Message Sign Management

Mango Benefits

Providing quality data for long-term traffic planning

Reduction in traffic congestion

Providing full control over the traffic network

Analyse road network and travel behaviours based on archived data

Increased efficiency by reducing traffic impact costs

Reduction in average travel times

Enabling incident management

Contribution to reducing the number of traffic accidents

Increase in user satisfaction with user-friendly interface

Reduction in fuel and energy consumption and carbon emissions olacak

MANGO
An interoperable city traffic management environment

MANGO

A platform that connects live to intersections and is in contact 24/7.

CFM
FCD Supported Dynamic Junction Management.

CFM module runs on servers with MANGO software. The algorithm automatically selects the appropriate working mode between coordination and isolated dynamic management based on real-time traffic conditions.Solely camera-based management reduces traffic wait times around %20- 25. Combined with FCD data increases performance to %25-%40. FCD data is being processed in the servers and run inside MANGO. Via MANGO, system arranges management modes and cycles times, and sends data to ITS modules in the intersections.
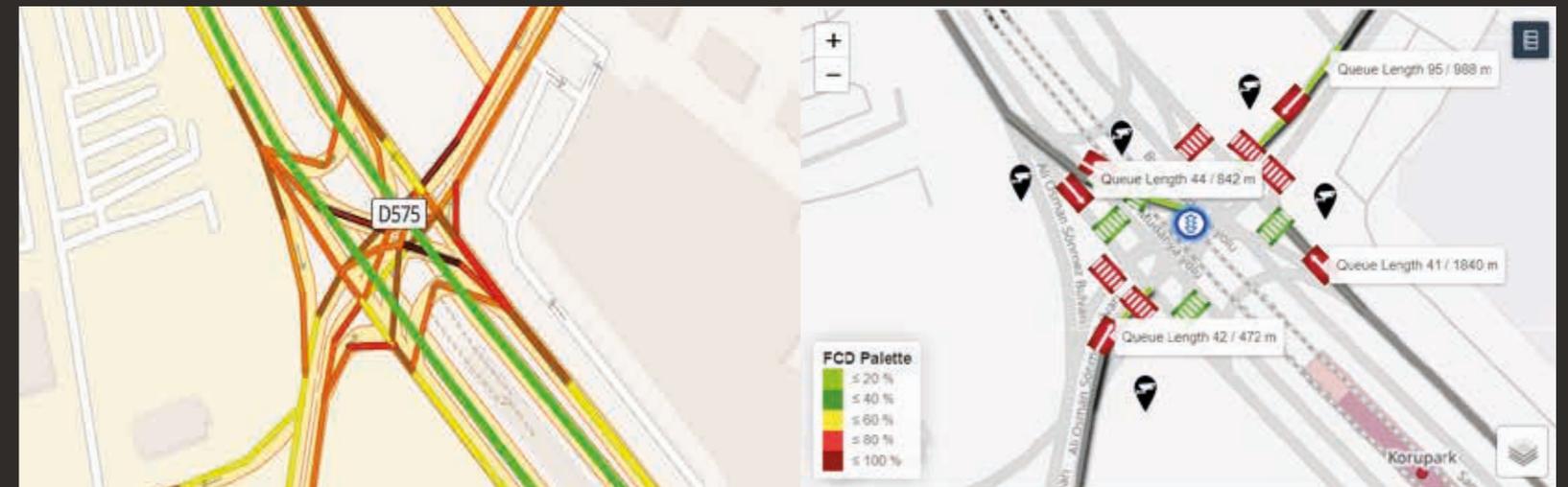
What
we care.

Simple and Intuitive User Interface

Communication between the system and the users is established quickly and easily from a single intuitive user interface in our software. Users both have a holistic management opportunity and can easily access customized data/reports according to their needs.

Security

Our software is protected with encyrption at the device level and at the center to secure the sensitive data of existing applications.

Open Data, Platform ve API

The methods of our software are open to third-party developers. Developers who want to access the system interface could use the shared API information and the system can integrate with new devices/applications.

Scalability

Our software is scalable and %99 available, and it has an architecture that can process trillions of data regardless of system and sensor size.

Interoperability

Our traffic management software has a system design that can work with third-party software. Any kind of integration levels are allowed for MANGO.

BLUESIS
Bluetooth Based
Traffic Analysis System.
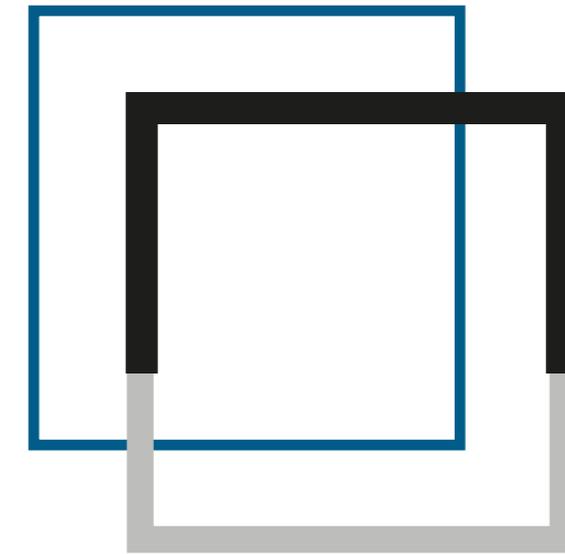
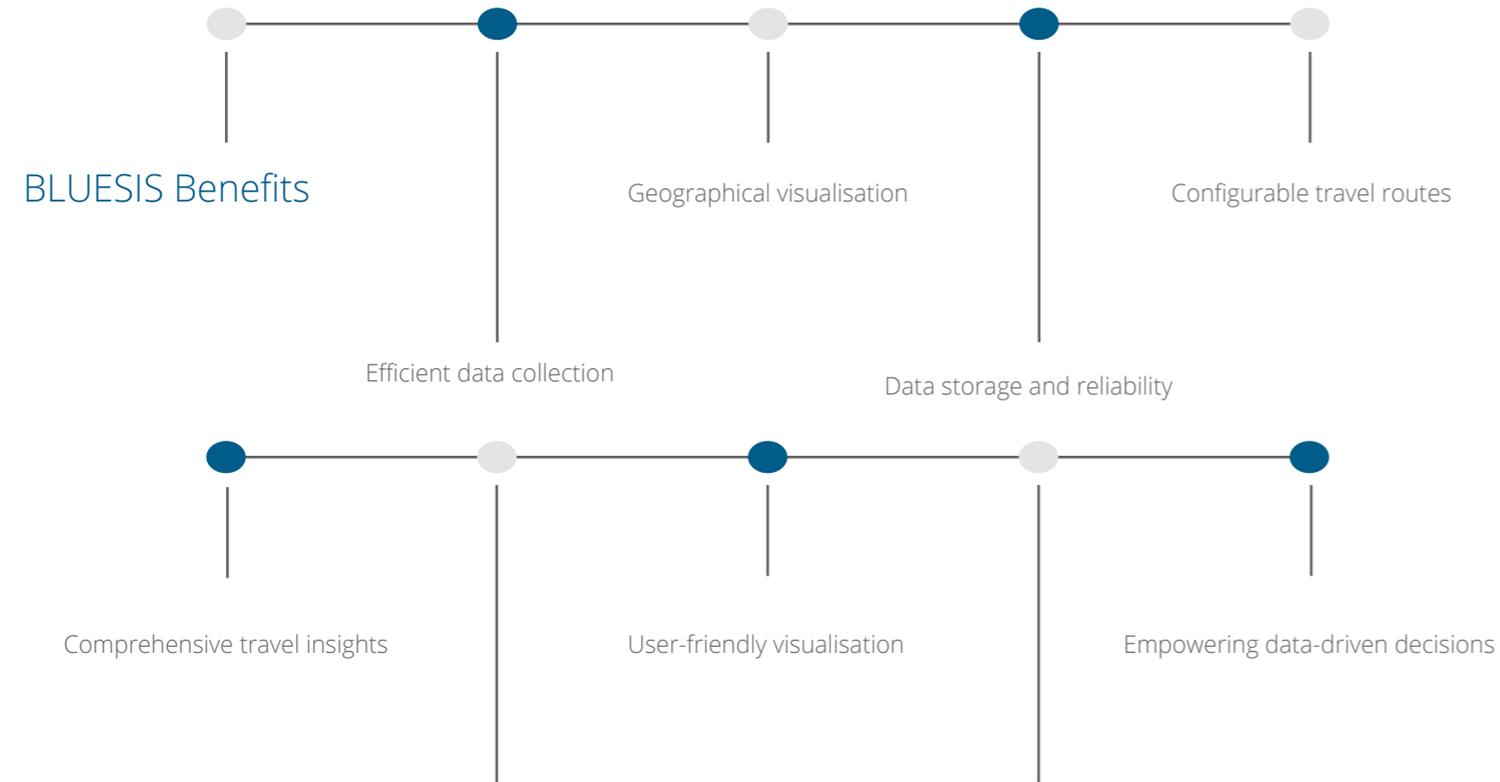# BLUESIS
Bluetooth Based
Traffic Analysis System.

"Your travels are under surveillance with BLUESIS"

Bluetooth Based Traffic Analysis System BLUESIS, positioned across diverse city locales, has the ability of catching unique MAC addresses of Bluetooth-enabled devices such as, in-vehicle audio systems, headsets, mobile phones etc. By leveraging this data,

MANGO Bluetooth Analysis Module performs comprehensive calculations to determine travel durations and speeds for each route on a per-minute basis. This module not only derives average travel time and speed

between pairs of these sensors, but also provides vehicle trajectories and daily distribution of interzonal travel in an Origin-Destination matrix with percentage-based representations.

BLUESIS has bi-directional range up to 200 meters and IP65 enclosure which has maximum performance in all weather conditions. BLUESIS can even work with solar energy panels thanks to the low power consumption feature.

BLUESIS Benefits

Geographical visualisation

Configurable travel routes

Efficient data collection

Data storage and reliability

Comprehensive travel insights

User-friendly visualisation

Empowering data-driven decisions

BLUESIS Analyses

- Average travel time calculation
- Average vehicle speed calculation
- Vehicle density measurement
- Alternative route suggestion
- Origin-Destination matrix estimation
- Pedestrian movement analyses
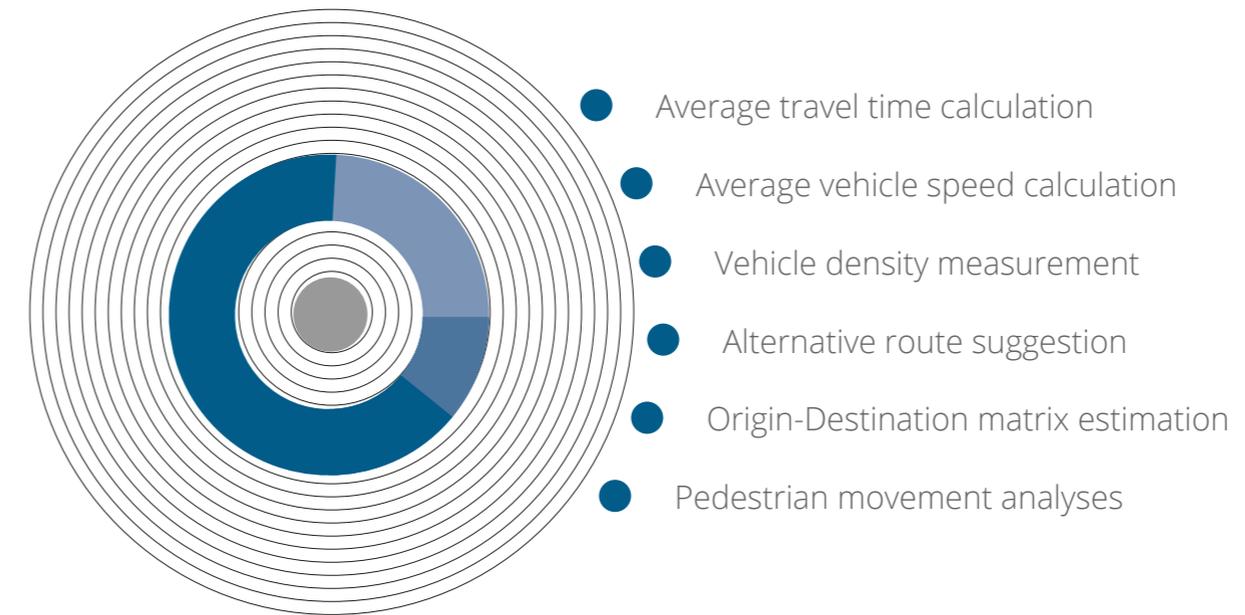
BLUESIS
Bluetooth Based
Traffic Analysis System.

Easy Installation and Integration

Remote configuration
Easy and fast installation
without calibration
Integration with Traffic
Control Centers in OCIT/
NTCIP standards.

Low Power Consumption, Wide-ranging Sensing

Detection range with a
radius of 100 meters
Ability to work 24/7 in all
weather conditions
IP 65 enclosure
Low power consumption
Ability to work with solar
panels (12V DC) or 220V AC
3G/4G/4.5G and wired
communication support.

Wireless Data Transfer

BLUESIS can transmit data
wirelessly. Thus, it is not a
big challenge to install the
system in site locations
where the infrastructure
is not available. BLUESIS
also can save collected data
onto an SD memory card
and prevents data
loss in case of failure in
communication channels.

General Specifications		
Operation System		Linux Based OS
Detection Distance		100 m radius, 200 m range
Speed Detection		Average speed in every 1 min.
Data Transfer		Integrated GSM Module, Ethernet
Setup		User Friendly Interface
OD Matrix		Distribution of Vehicle Routes in the Traffic Network

Hardware Specifications		
Processor		ARM Cortex-A8
Side Unit		SPI, I2C, USB ve Dijital I/O Units
Memory		512MB RAM, 4GB Storage, SD Cart
Bluetooth		Single/Double Channel
Network		100Mbit Ethernet, GPRS/GSM Quad Band
Power Consumption		5W
Power Input		9-18VDC (Solar Panel), 220VAC

Other Specifications		
Enclosure		4,2 Meters
Operating Temperature		(Plate, System Name, Date, etc.)
MTBF Value		Plates with Non-Reflective Floor (Rectangular, Square)
Weight		2.5 Kg

Housing Specifications		
Dimensions		106 x 159 x 180 mm (GxYxU)
Material		Reinforced Plastic