INDIA CHAPTER

IRF INTERNATIONAL ROAD FEDERATION

Global Road Infratech Summit & Expo

GRIS GLOBAL ROAD INFRATECH SUMMIT & EXPO 2026

05-06 FEBRUARY 2026

Hotel The Ashok | New Delhi | India

Vision Zero India: Integrating Safety, Sustainability and Technology in Infra

GENERAL OUTLOOK OF TÜRKİYE'S INTELLIGENT TRANSPORTATION SYSTEMS JOURNEY

HAMDİ AYDIN

Chairman

emay
EMAY INTERNATIONAL
ENGINEERING and CONSULTANCY Inc.
www.emay.com

Treasurer & Executive Committee Member

IRF INTERNATIONAL ROAD FEDERATION

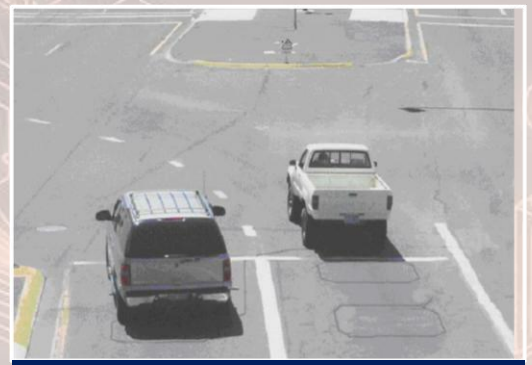
CONTENT

GLOBAL DEVELOPMENT OF INTELLIGENT TRANSPORTATION SYSTEMS

HISTORICAL DEVELOPMENT OF ITS in the WORLD

1960s

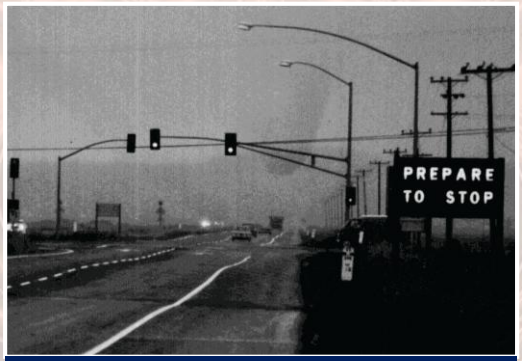
- Installation of Magnetic Loop Detector
- Usage of Red Light Enforcement Camera
- Introduction of Dynamic Message Sign
- Implementation of Rule-Based Speed Limit Sign
- Development of Electronic Route Guidance and Navigation System



•Magnetic Loop Detector

•Red Light Enforcement Camera

•Speed Limit Sign



•Dynamic Message Sign

•Electronic Route Guidance and Navigation System

Source: National Intelligent Transportation Systems Strategy Document 2020 - 2023

HISTORICAL DEVELOPMENT OF ITS in the WORLD

1970s

- Usage of Radar Speed Enforcement
- Establishment of Comprehensive Automobile Traffic Control Systems (CACS)
- Introduction of Automatic Number Plate Recognition System

•**Radar Speed Enforcement**

•**Radar Speed Enforcement**

•Comprehensive Automobile Traffic Control Systems' Control Room

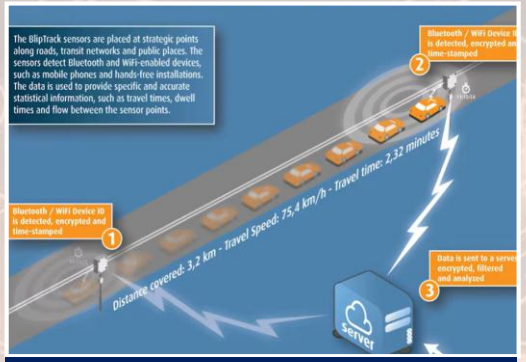
Source: National Intelligent Transportation Systems Strategy Document 2020 - 2023

HISTORICAL DEVELOPMENT OF ITS in the WORLD

1980s

- Usage of Mobile Speed Radar and Traffic Enforcement Cameras
- Implementation of Sidney Coordinated Adaptif Traffic System (SCATS)
- Introduction of Weather Monitoring System
- Development of Automatic Navigation System
- Introduction of Electronic Speed Enforcement

•Mobile Speed Radar and Traffic Enforcement Cameras



•SCAT System Principles

•First implemantation of SCATS at Castlereagh Street, Australia

•Weather Monitoring System

•Automatic Navigation System

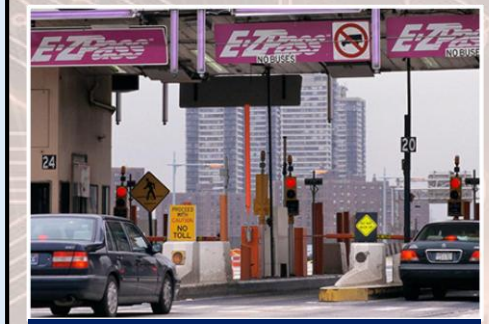
•Electronic Speed Enforcement

Source: National Intelligent Transportation Systems Strategy Document 2020 - 2023

HISTORICAL DEVELOPMENT OF ITS in the WORLD

1990s

- Automatic Toll Collection System
- GPS-Based Navigation Systems
- ISO Technical Committee 204 on ITS
- CEN/TC 278 Technical Committee on ITS
- Adaptive Traffic Signal Control Systems
- World Intelligent Transport Systems Congress
- Establishment of ERTICO-ITS Europe



•Automatic Toll Collection System

•GPS-Based Navigation Systems

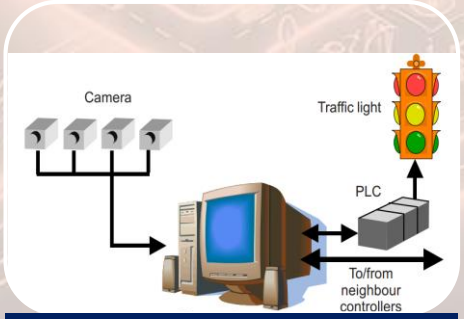
Deliverable	Published	Under development
International Standards	205	66
Technical Specifications	73	45
Publically Available Specifications	2	0
Technical Reports	72	15
Other (Amendments, etc.)	9	3
Total	361	129

(As of July 2025)

•ISO Technical Committee 204 on ITS

CEN/TC 278
ITS standardization

•CEN/TC 278 Technical Committee on ITS



•Adaptive Traffic Signal Control Systems

1st ITS World Congress
94

•World Intelligent Transport Systems Congress, Paris

ERTICO
ITS EUROPE

•ERTICO-ITS Europe

Source: National Intelligent Transportation Systems Strategy Document 2020 - 2023

HISTORICAL DEVELOPMENT OF ITS in the WORLD

2000s

- Usage of Digital Red Light Camera Systems
- Introduction of LED Traffic Lights
- Implementation of Accident Black Spot Information System – Mobile Traffic Information System
- Usage of In-Vehicle Wi-Fi Systems
- Emergency Call System
- Expansion of Web 2.0–Based Traffic Information Services

•Digital Red Light Camera Systems

•LED Traffic Lights

•Accident Black Spot Information System – Mobile Traffic Information System

•In-Vehicle Wi-Fi Systems

•Emergency Call System

•Electronic Speed Enforcement

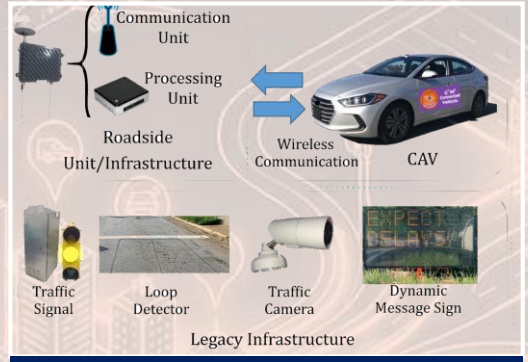
Source: National Intelligent Transportation Systems Strategy Document 2020 - 2023

HISTORICAL DEVELOPMENT OF ITS in the WORLD

2010

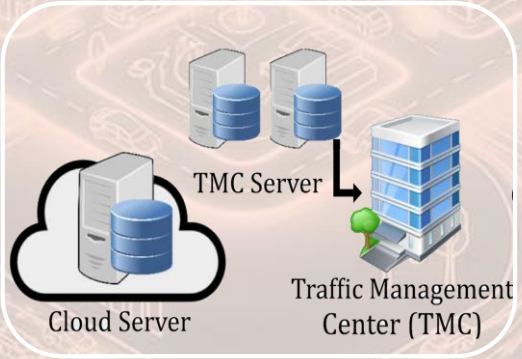
- Expansion of Autonomous Vehicle Research and Pilot Studies
- Usage of Connected Vehicle and Infrastructure
- Growth of Electric Vehicle
- Advancement of Data Management and Applications
- Expansion of Mobile and Internet-Based Transportation Solutions

•Autonomous Vehicle Studies



Connected Vehicle and Infrastructure

•Electric vehicle



•Data Management & Applications

•Expansion of Mobile and Internet-Based Transportation Solutions

Source: National Intelligent Transportation Systems Strategy Document 2020 - 2023

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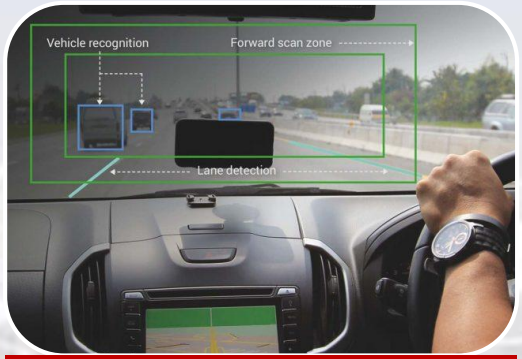
Resource: National Intelligent Transportation Systems Strategy Document 2020 - 2023

ITS APPLICATIONS

SMART VEHICLE

- Smart Navigation and 360-Degree Surround Vision System
- Driver Assistance Systems
- Automatic Parking
- Autonomous Vehicles

Smart Navigation and 360-Degree



•Driver Assistance Systems

•Automatic Parking

•Autonomous Vehicles

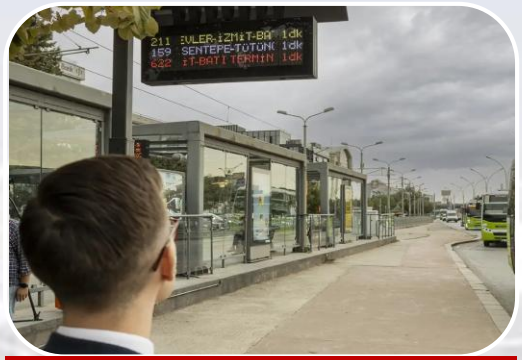
Kaynak: National Intelligent Transportation Systems Strategy Document 2020 - 2023

ITS APPLICATIONS

SMART ROADS

- Smart Intersections
- Passenger Information System
- EDS, VMS,ETS, LCS, ACC
- Green Wave, Cameras
- Traffic Sensors

Smart Intersections



•Passenger Information System

•Green Wave, Cameras

•Traffic Sensors

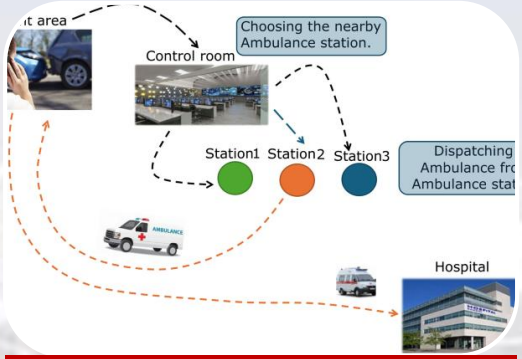
Kaynak: National Intelligent Transportation Systems Strategy Document 2020 - 2023

ITS APPLICATIONS

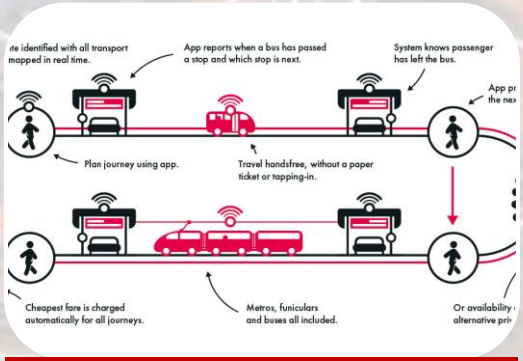
SMART CITIES

- Smart City Management Center
- Emergency Situations and Accidents
- Management
- Public Transportation and Fleet Management
- Smart Parking
- Safe Transportation Applications

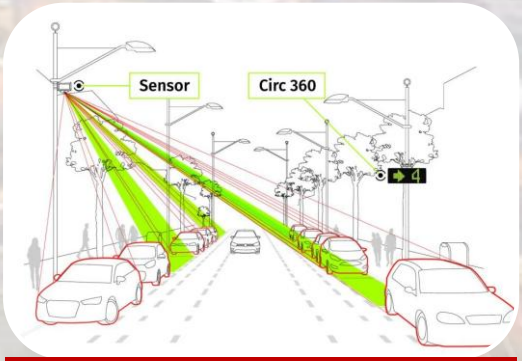
Smart City Management Center



•Emergency Situations and Accidents



•Public Transportation and Fleet Management



•Smart Parking

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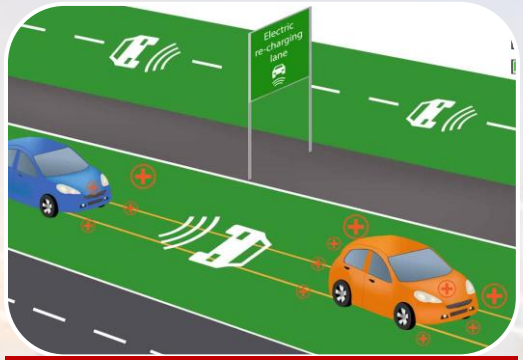
ITS APPLICATIONS

ECONOMY & ENVIRONMENT

- Smart Energy Systems
- Electric Vehicles
- Eco-Friendly Transport Infrastructure



Smart Energy Systems

•Eco-Friendly Transport Infrastructure

•Electric Vehicles

Kaynak: National Intelligent Transportation Systems Strategy Document 2020 - 2023

ITS APPLICATIONS

SYSTEM INTEGRATION

- Integration of Transportation Modes
- Transportation Control Center
- Cooperative ITS (C-ITS)
- Single Card Payment System for Transportation Modes

Integration of Transportation Modes

•Transportation Control Center

•Cooperative ITS (C-ITS)

•Single Card Payment System for Transportation Modes

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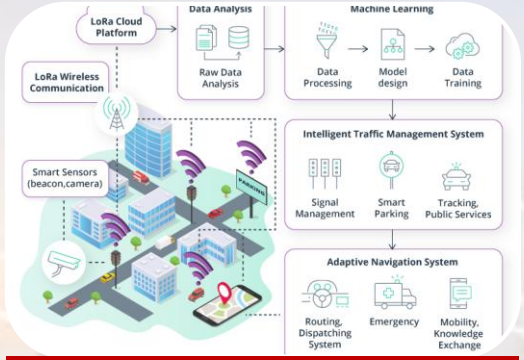
ITS APPLICATIONS

DATA & SECURITY

- Transportation Data, Big Data Management
- Data Security and Data Sharing
- Cybersecurity
- Communication Systems



Transportation Data, Big Data Management

Data Sharing

Cycbersecurity

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ITS APPLICATIONS

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DATA & SECURITY

- Transportation Data, Big Data Management
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- Cybersecurity
- Communication Systems

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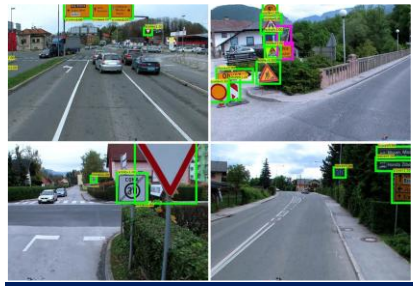
BENEFITS of ITS

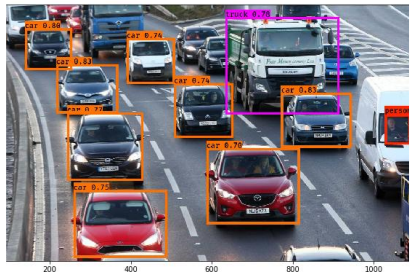
ITS APPLICATIONS FOR ROAD TRANSPORT

1. AUTOMATIC NUMBER PLATE RECOGNITION (ANPR)
2. TRAFFIC SIGN DETECTION AND RECOGNITION
3. VEHICLE DETECTION AND CLASSIFICATION
4. PEDESTRIAN DETECTION
5. LANE LINE DETECTION
6. OBSTACLE DETECTION
7. STRUCTURAL DAMAGE DETECTION
8. AUTONOMOUS VEHICLE APPLICATIONS

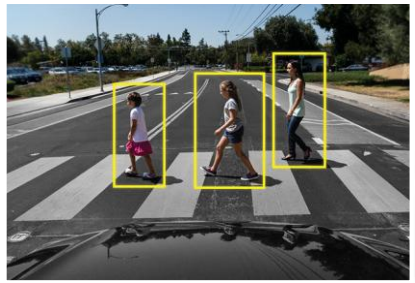
•Automatic Number Plate Recognition (ANPR)



•Traffic Sign Detection and Recognition



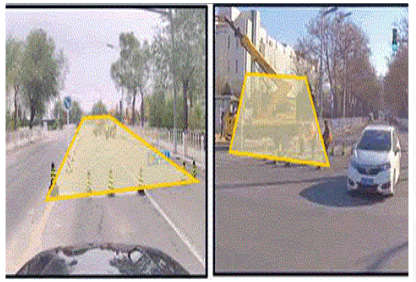
•Vehicle Detection and Classification



•Pedestrian Detection

•Lane Line Detection

•Obstacle Detection



Structural Damage Detection

Autonomous Vehicle Applications

ITS APPLICATIONS FOR ROAD TRANSPORT

1. AUTOMATIC NUMBER PLATE RECOGNITION (ANPR)
2. TRAFFIC SIGN DETECTION AND RECOGNITION
3. VEHICLE DETECTION AND CLASSIFICATION
4. PEDESTRIAN DETECTION
5. LANE LINE DETECTION
6. OBSTACLE DETECTION
7. STRUCTURAL DAMAGE DETECTION
8. AUTONOMOUS VEHICLE APPLICATIONS

9. OTHER APPLICATIONS

- Fully Automated Tunnel Monitoring
- Detection of Concrete Defects in Tunnels
- Detection of Red Light Signal Duration Using Low-Resolution CCTV Cameras
- Detection of Minor Road Hazards
- Traffic Congestion Prediction
- Detection of Traffic Anomalies
- Automatic Intelligent Classification and Detection of Tunnel Lining Defects
- Optimization of Signal Phases
- Automatic Traffic Volume Analysis at Road Intersections
- Driver Behavior Recognition and Detection
- Parking Occupancy Detection
- Vehicle Counting
- Vehicle Queue Length Estimation
- Real-Time Accident Detection Using Traffic Cameras
- Snow and Ice Detection
- Face Recognition Systems

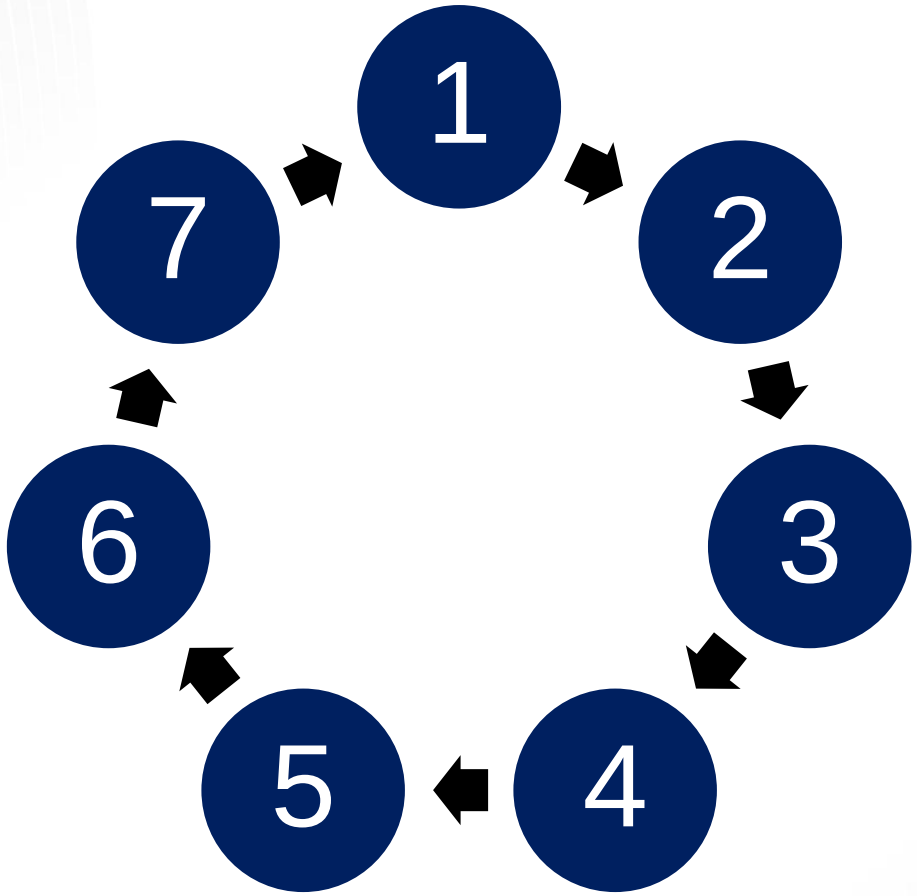
ITS BASED TRAFFIC SAFETY STUDIES PROCESS

Intelligent Traffic Systems

1. Compatible with Each Other
2. Covering the Latest Innovations
3. Addressing User Needs
4. Considering Interfaces with Other Transport Modes
5. Self Explaning and Forgiving Road Applications

BENEFITS OF ITS AT TRAFFIC SAFETY STUDIES

- Efficient Utilization of the Existing Road Network Capacity
- Real-Time User Information on Road, Weather, and Environmental Conditions
- Provision of Alternative Route and Lane Management
- Reduction of Environmental Impacts

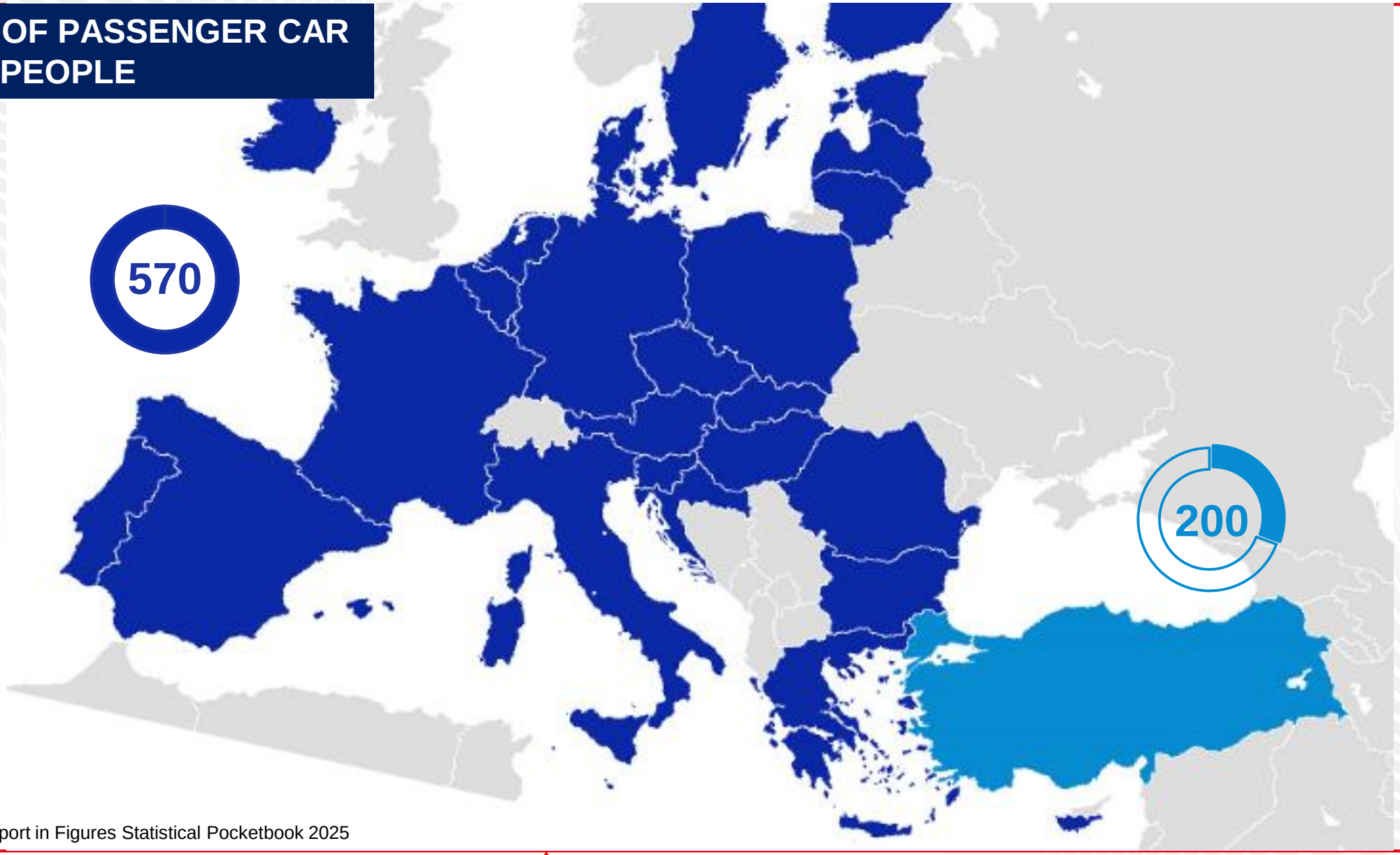


- Improving the Effectiveness of Road Maintenance and Operations Teams
- Traffic Safety Improvement
- Reduction in Travel Times Through Decreased Traffic Congestion

DEVELOPMENT OF ITS IN TÜRKİYE

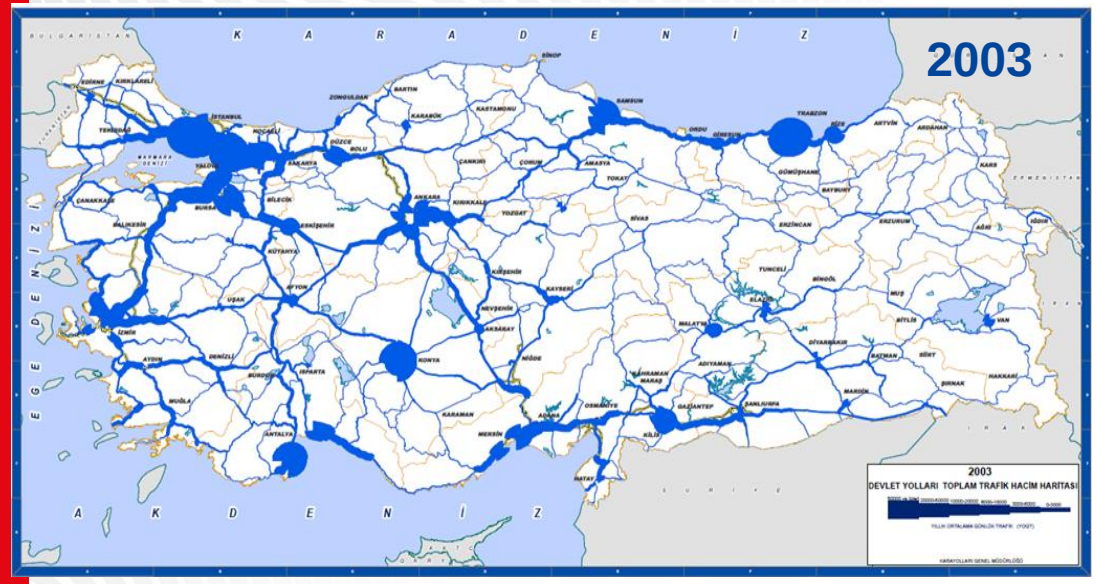
AUTOMOBILE AND TOTAL VEHICLE OWNERSHIP

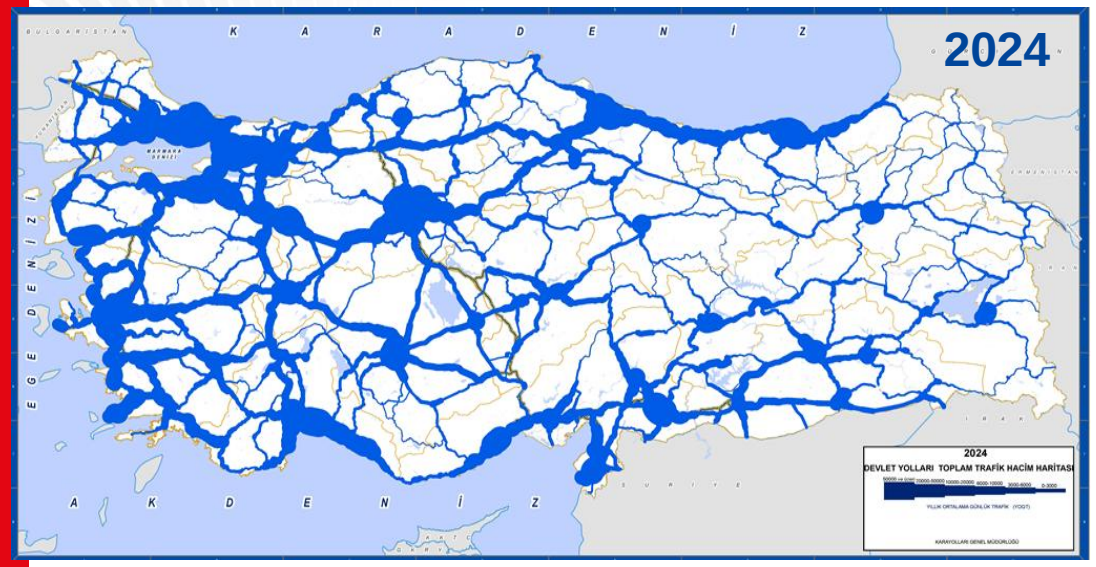
NUMBER OF PASSENGER CAR per 1,000 PEOPLE

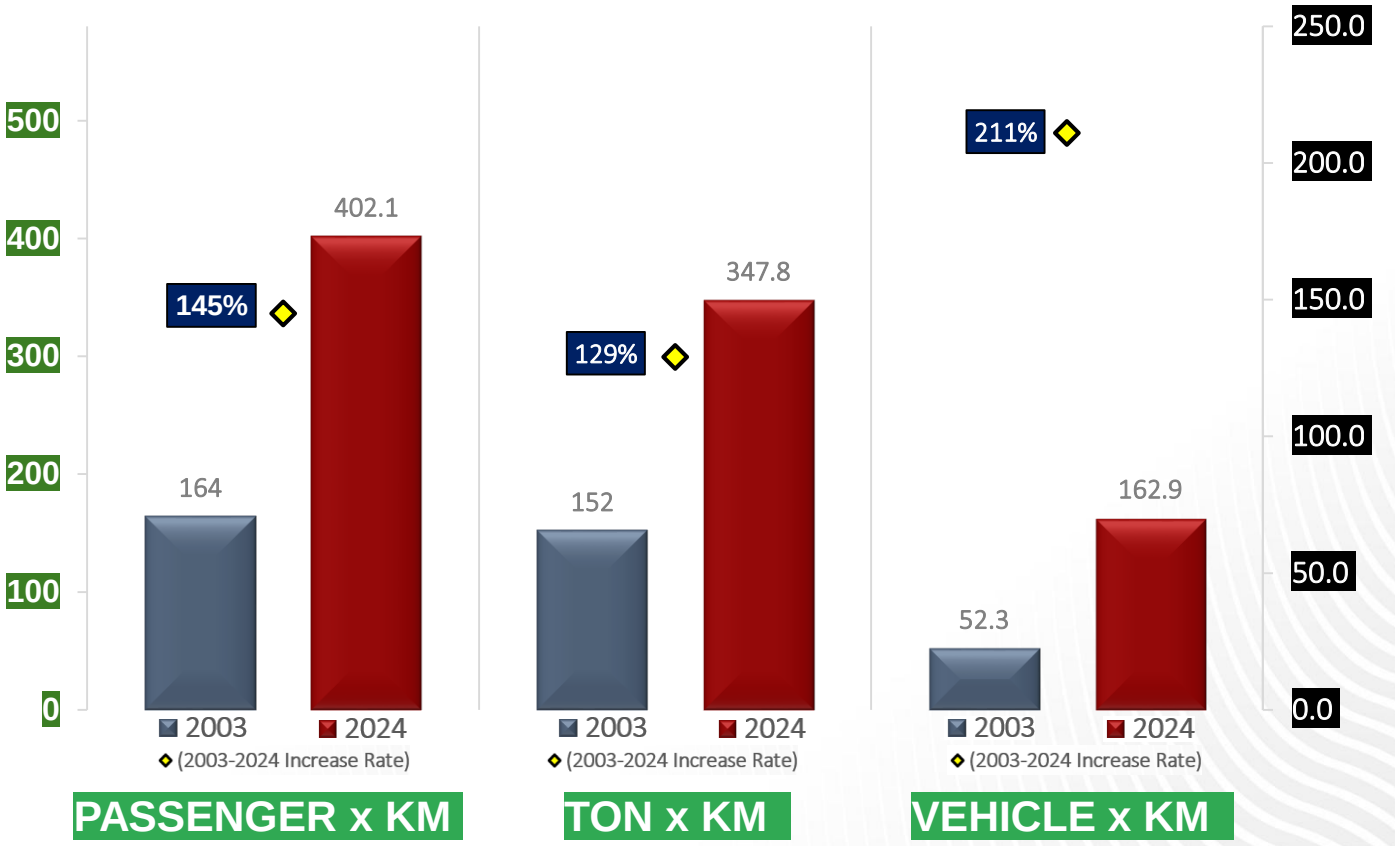


Source: EU Transport in Figures Statistical Pocketbook 2025

INCREASE IN TRAFFIC VOLUME



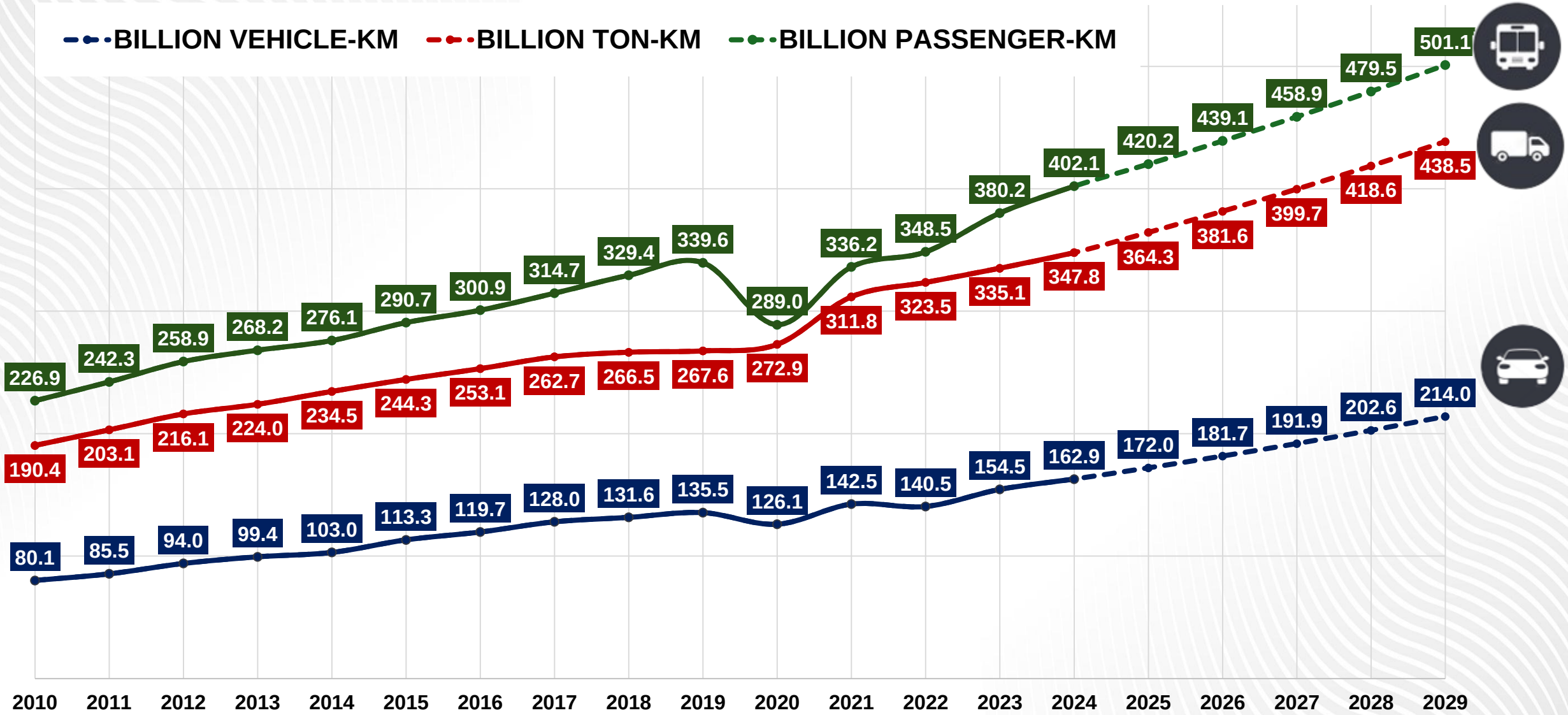




%197 Passenger Car Ownership Increase

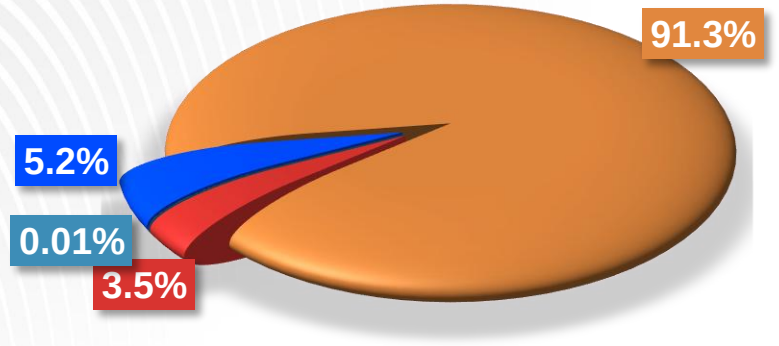
%202 Vehicle Ownership Increase

PASSENGER, FREIGHT, AND VEHICLE MOBILITY

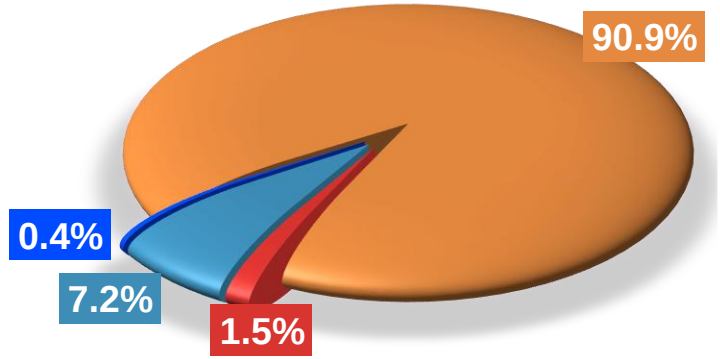


SECTORAL DISTRIBUTION OF MOBILITY

FREIGHT TRANSPORT



PASSENGER TRANSPORT



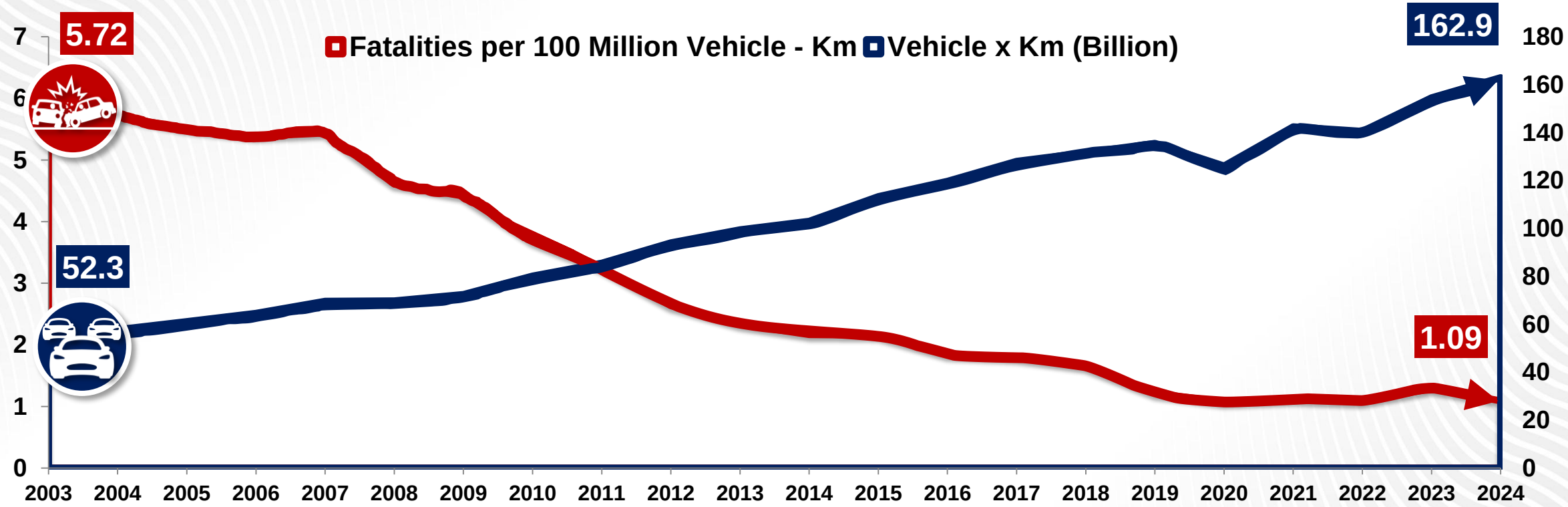
HIGHWAY		RAILWAY		AIRWAY		MARITIME	
FREIGHT (%)	PASSENGER (%)	FREIGHT (%)	PASSENGER (%)	FREIGHT (%)	PASSENGER (%)	FREIGHT (%)	PASSENGER (%)
91,3	90,9	3,5	1,5	0,01	7,2	5,2	0,4

2024	Vehicle Mobility	Freight Mobility	Passenger Mobility
	162.9 Billion Veh. x Km	347.8 Billion Ton x Km	402.1 Billion Pass. x Km

TRAFFIC SAFETY ON ROADS

Between 2003 and 2024, vehicle mobility increased by 211%

The number of fatalities per 100 million vehicle-kilometers fell by 81%, decreasing from 5.72 to 1.09



52.3 Billion Veh. X Km

162.9 Billion Veh. X Km

*In 2022, speed limits for cars were updated.

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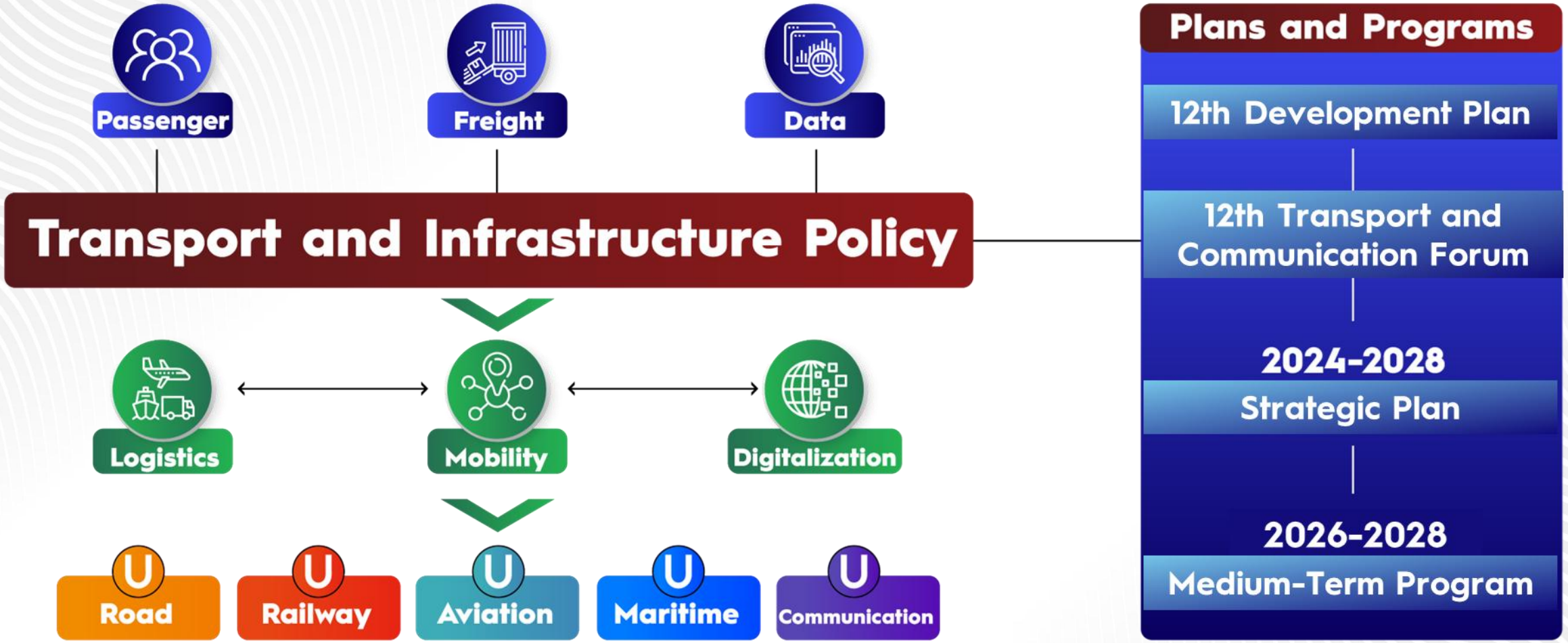
TRANSPORT AND LOGISTIC MASTER PLAN OF TÜRKİYE



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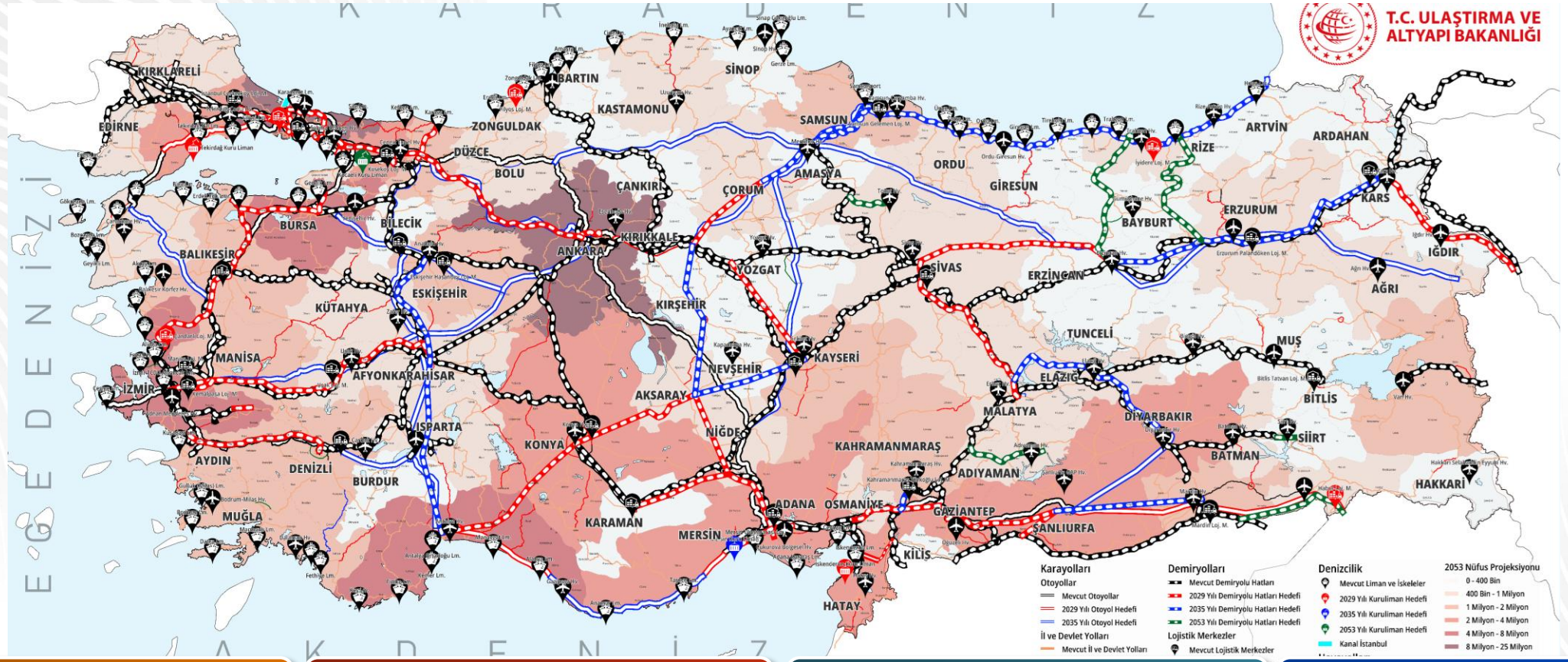


Divided Road

2002	6.101 Km
2025	30.049 Km
2028	31.250 Km
2053	38.060 Km

Railway

2002	10.159 Km
2025	13.919 Km
2028	17.287 Km
2053	28.590 Km

Airport

2002	26
2025	58
2053	61

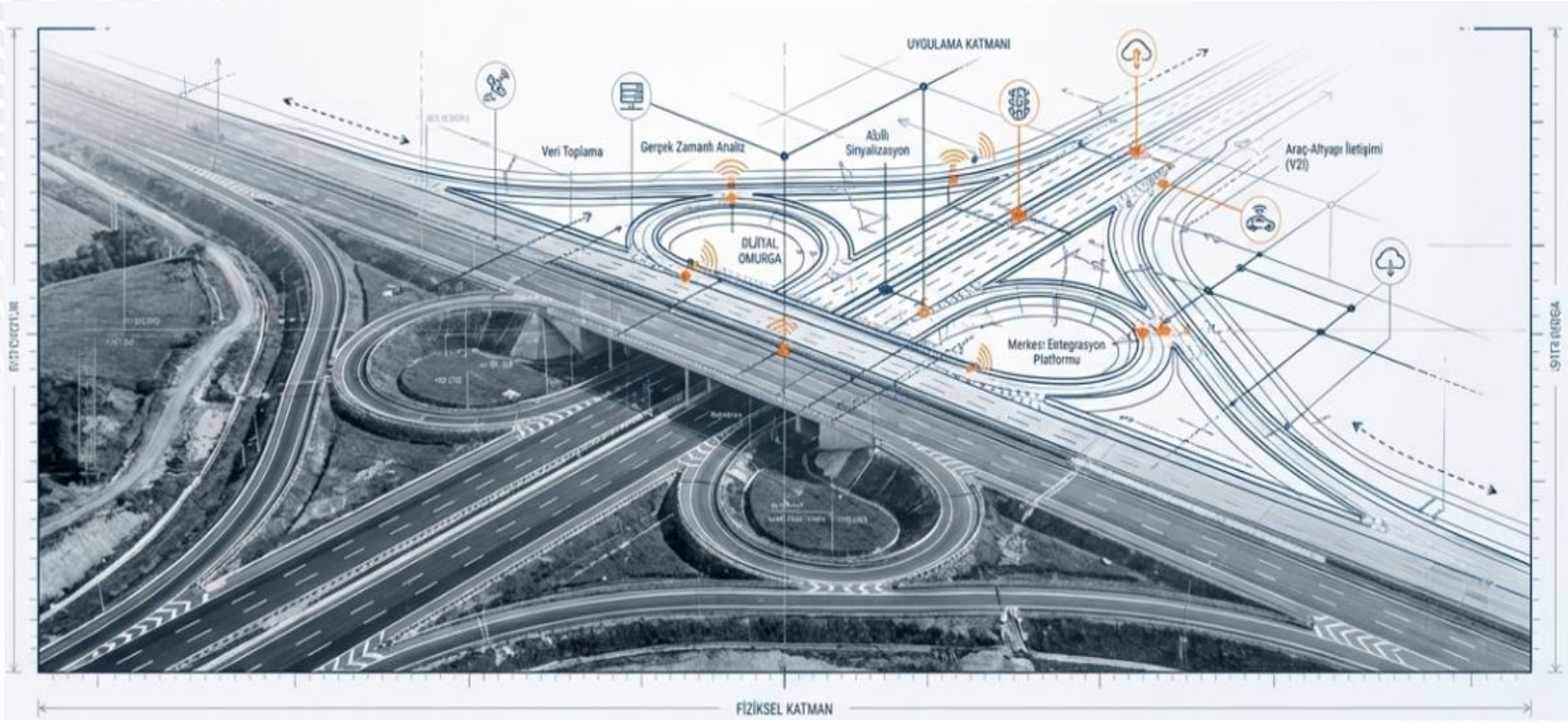
Port Facility

2002	152
2025	217
2053	255

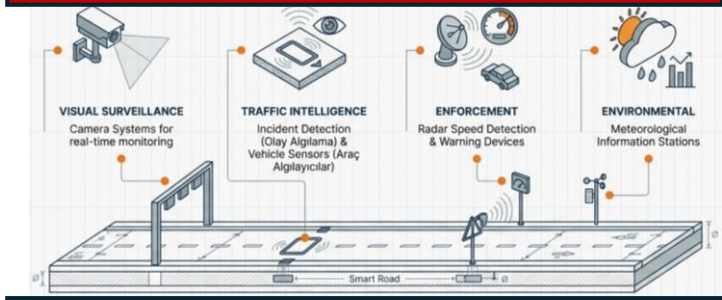
TÜRKİYE NATIONAL ITS ARCHITECTURE

The Türkiye ITS Architecture and Implemantation Plans studies were carried out by EMAY Engineering.

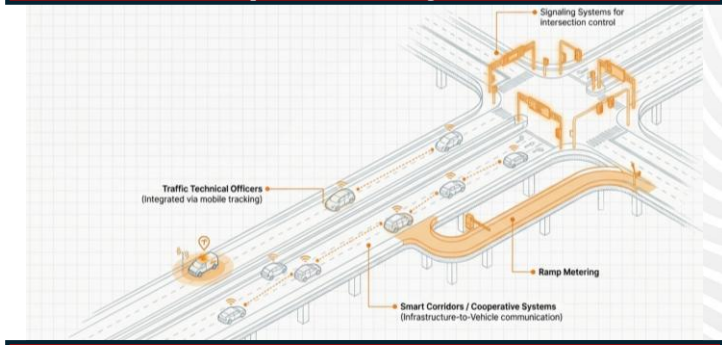
These studies aim to improve traffic management and road safety by implementing ITS solutions, making Türkiye's national highway network smarter, more efficient, and ready for future mobility technologies.



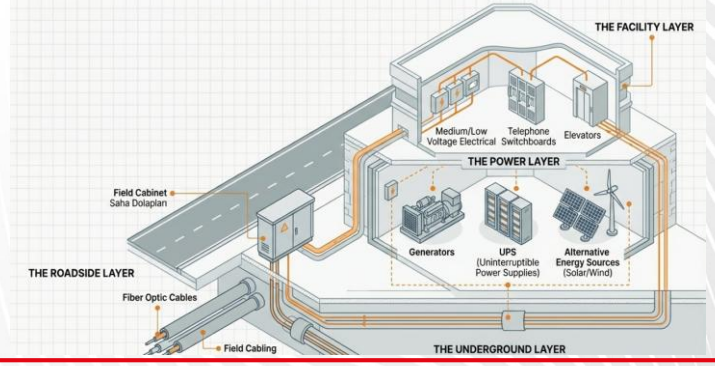
High Decision Detection Technologies



Active Traffic Control and Cooperative Systems



Infrastructure Planning



TÜRKİYE NATIONAL ITS ARCHITECTURE

“NATIONAL ITS ARCHITECTURE AND IMPLEMANTATION PLANS”

Studies Conducted within the Scope of the Türkiye National ITS Architecture by EMAY Engineering

STRATEGY AND PLANNING

- International Benchmarking and Analysis
- National ITS Architecture and Implementation Plan
- Needs Assessment and Roadmap Definition

TECHNICAL INFRASTRUCTURE AND STANDARDIZATION

- Preparation of Guidelines, Technical Documentation
- Some Systems with Defined Standards

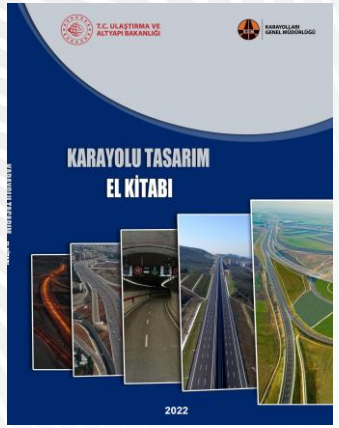
- Information Sharing Between Institutions

CAPACITY BUILDING AND REPORTING

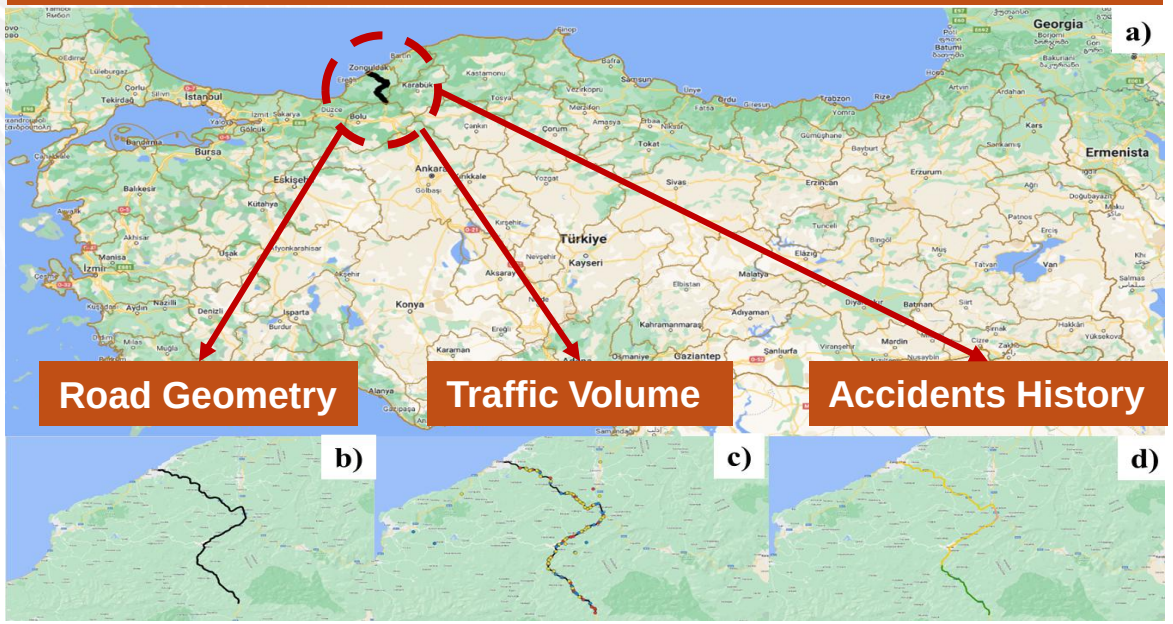
- Personnel Training
- Preparation of Technical Reports

DEVELOPING A DECISION SUPPORT SYSTEM FOR ROADSIDE RESTRAINT SYSTEMS (RRSS)

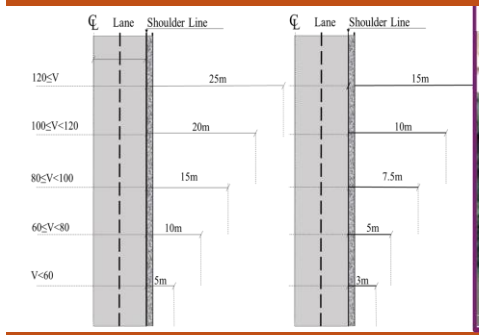
Road Safety Guidelines of Türkiye

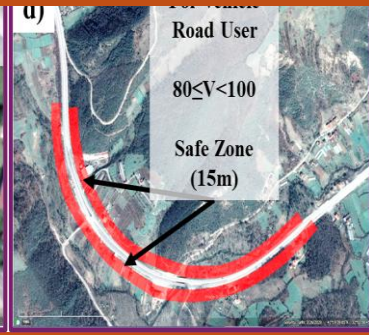


Traffic Safety Control

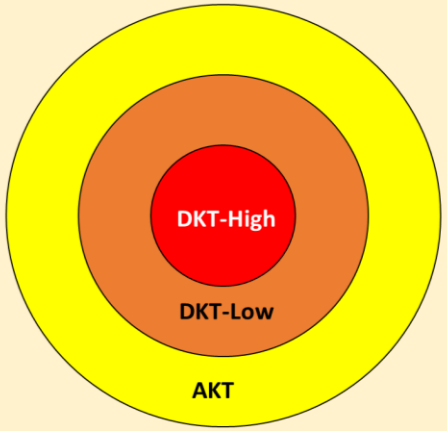


Safety Area and Possible Guardrail Application Determination





Threat / Danger Control for Vulnerable Road User and Vehicle Road User



Threats/Danger Definitions for Vulnerable Road User (High)

Vehicles, which run of road with in external user safety distance,

- Structures with a high risk of explosion and fire that there has a collision risk (chemical factories, transformers, gas stations, etc.)
- Structures where the collapse could result in significant distributions or multiple losses in transportation systems (bridges, actively used buildings, etc.)
- Locations where High-Speed Rail Lines are susceptible to damage
- Recreational facilities, picnic areas, children's parks, cultural and sports structures, mosques, shopping malls, etc., where there may be interaction with pedestrians and cyclists
- Side roads where serious consequences can occur in the road network

Threats/Danger Definitions for Vulnerable Road User (Low)

Vehicles, which run of road with in external user safety distance,

- Pedestrian and bike lane users
- Infrequently used public transportation stops (bus, minibus, etc.) and pedestrian overpasses
- Parking areas
- Side roads where serious consequences can occur in the road network

Threats/Danger Definitions for Vehicle Road User

Vehicles, which run of road with in vehicle user safety distance,

- Spatial barriers perpendicular to the direction of traffic (retaining walls, bridge abutments, etc.)
- Non-deformable (designed not to break) singular obstacles (e.g., trees with a trunk wider than 10 cm, CCTV poles, communication control cabinets, columns, store signs, lighting poles, sign/signal support legs, etc.)
- Unpassable obstacles (rocks larger than 20 cm, culvert headers, etc.)
- Roadside ditches parallel to the road (with a slope steeper than 1:3 and a height exceeding 50 cm)
- Roadside curbs (higher than 20 cm)
- Embankments (with a slope steeper than 1:3 and a height exceeding 3 m)
- Cuts (with a slope steeper than 1:1 and a protruding surface)
- Rivers and ponds (deeper than 1 m)

TÜRKİYE STRATEGIC ITS DOCUMENTS

MISSION

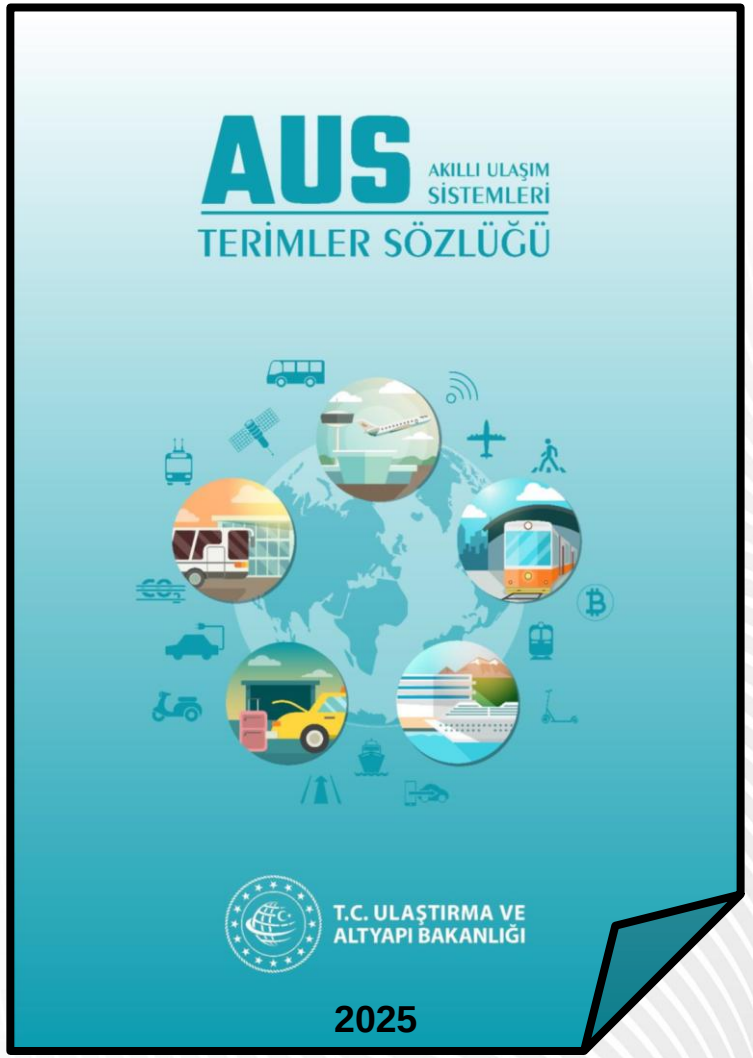
To develop a sustainable, intelligent transportation network integrated across all transport modes, based on advanced technologies and domestic resources.

VISION

A human and environment oriented transportation system in Türkiye enabled by advanced information technologies

NATIONAL ITS STRATEGY AND 2020–2023 ACTION PLAN

ITS TERMINOLOGY GLOSSARY



INTELLIGENT TRANSPORTATION SYSTEM ASSOCIATION OF TÜRKİYE

National Intelligent Transportation Systems Strategy Document and Action Plan

AUS TÜRKİYE
ITS TÜRKİYE

Founded on March 15, 2016, with 20 founding members

Established in line with the National Intelligent Transportation Systems Strategy Document (2014–2023) and the Supplementary Action Plan (2014–2016) prepared by the Ministry of Transportation and Infrastructure.

ITS Türkiye, a national non-governmental main organization to coordinate stakeholders from different sectors and disciplines for the effective implementation of Intelligent Transportation Systems.

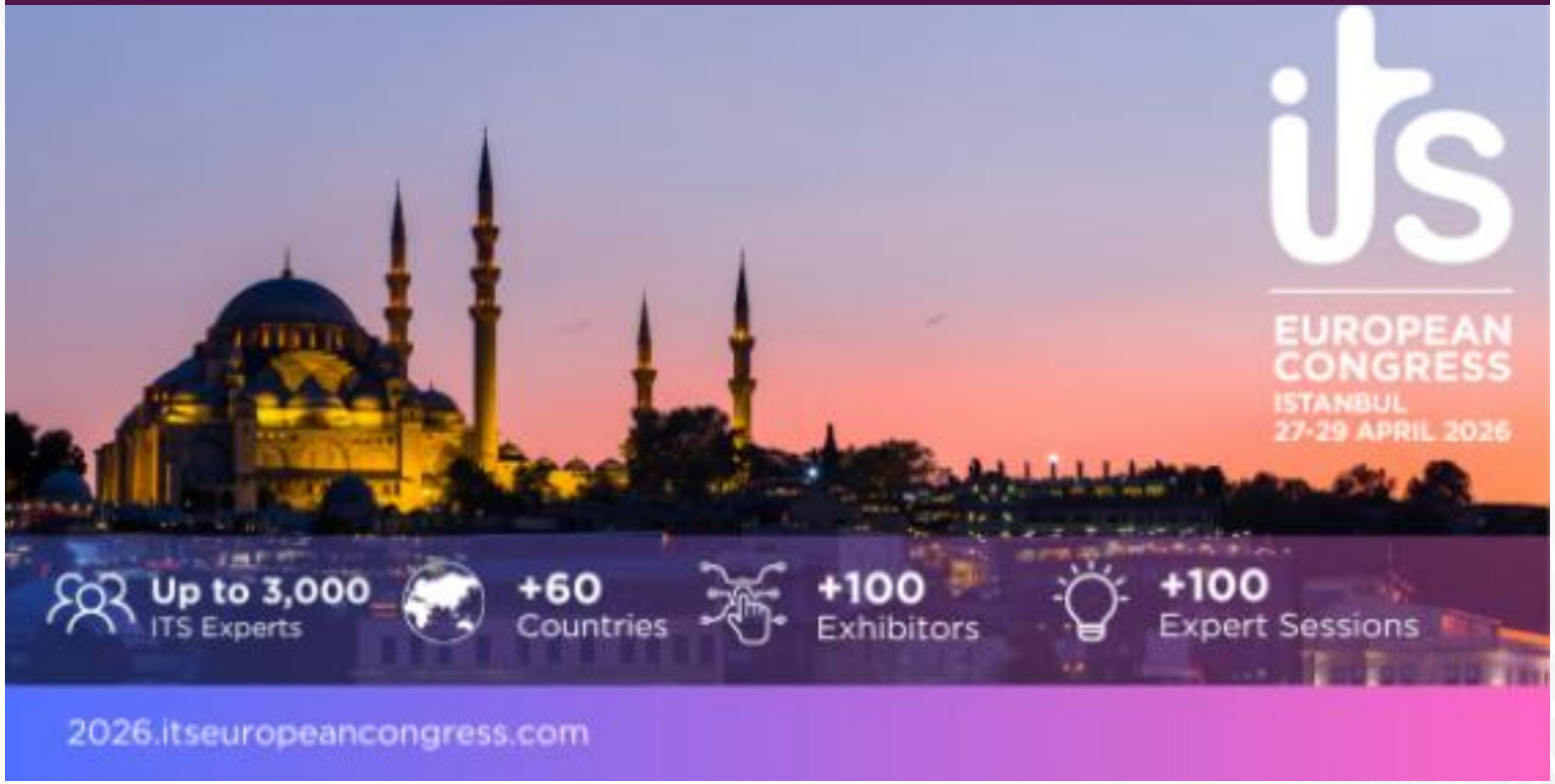
17th ITS EUROPEAN CONGRESS 2026, İSTANBUL

BRIDGING INNOVATION: INTEGRATED, SAFE AND SEAMLESS MOBILITY

17th ITS European Congress 2026

İSTANBUL

27-29 April 2026



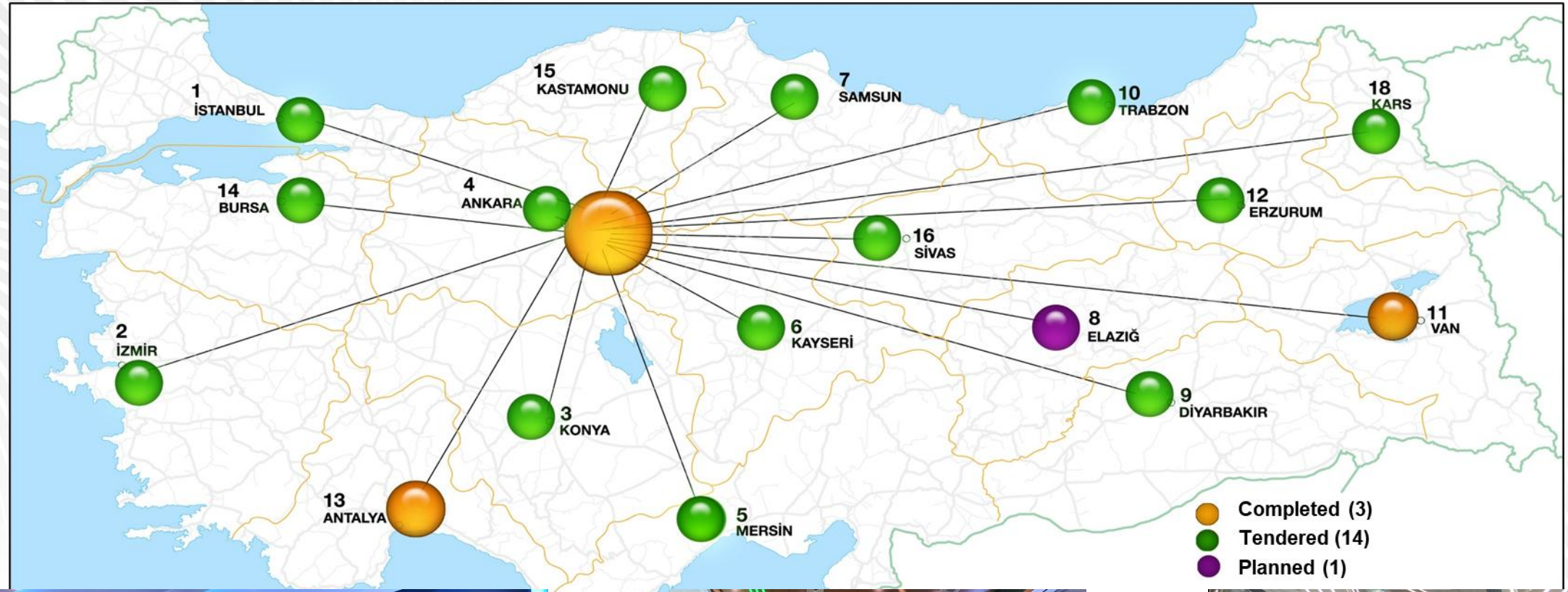
https://2026.itseuropeancongress.com/its-istanbul

ITS APPLICATIONS IN TÜRKİYE

ITS APPLICATIONS ON TURKISH ROADS

1973	**Cash / Manual Toll Collection System** (Bosphorus Bridge and the 1st Beltway)
1999	**Automatic Toll Collection System (OGS)** Vehicle classifications depends on 5 classes.
2005	**Card Access System (KGS)** With KGS, three systems operated together.
2011	**Remove of Manual Toll Collection System** 60% were carried out via OGS and 40% via KGS
2012	**Fast Toll Collection System (HGS)** KGS was abolished, leaving only HGS and OGS.
2013	**The first Intelligent Transportation Systems (ITS) consultancy project *"National ITS Architecture and Implemantation Plans"* tender was taken form EMAY Engineering.**
2014	**Free Flow Tolling System (SGS)** HGS and OGS remained in operation
2015	***"National ITS Architecture and Implemantation Plans" were* completed. Technical Specifications, Application Plans, Country Reports, and Technical Reports were prepared.**
2018	**520 km fiber-optic cable communication infrastructure has been established in pilot area.**
2018	**The specifications of the NTCIP protocol to be used as the communication protocol have been defined**
2020	**Intelligent Transportation Systems (ITS) Center has been established at the GDH campus**
2022	**ITS Center and implementation of Adaptive Signal Control Systems was established in Antalya.**
2023	**Software Development for Cooperative Intelligent Transportation Systems (C-ITS) has been initiated**
2024	**ITS Center has been established in the province of Van.**

ITS CENTERS at TÜRKİYE



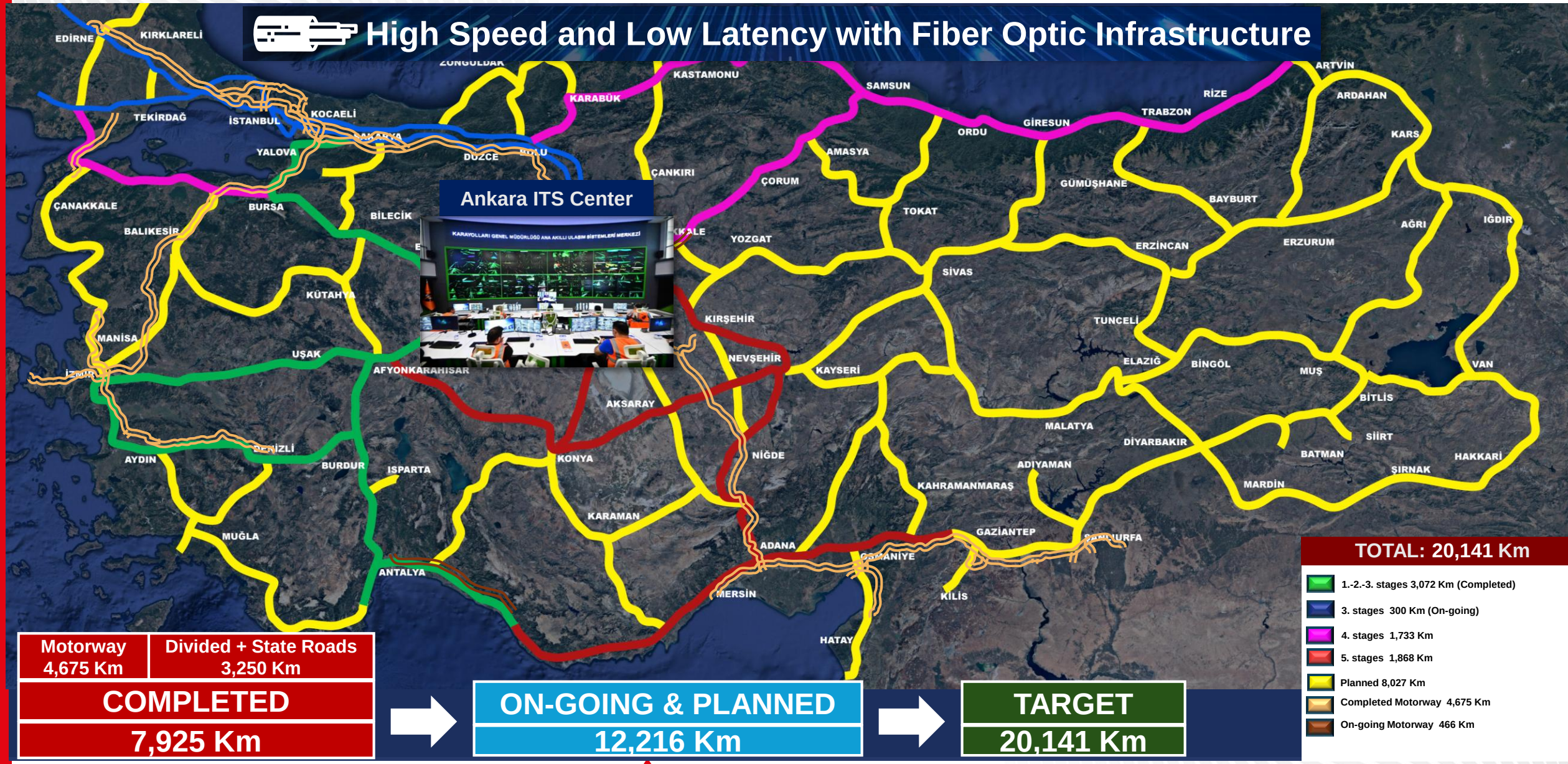
ANKARA ITS Main Management Center

ANTALYA

VAN

DIGITAL INFRASTRUCTURE ON HIGHWAYS

High Speed and Low Latency with Fiber Optic Infrastructure



Ankara ITS Center

Motorway	Divided + State Roads
4,675 Km	3,250 Km

COMPLETED
7,925 Km

ON-GOING & PLANNED
12,216 Km

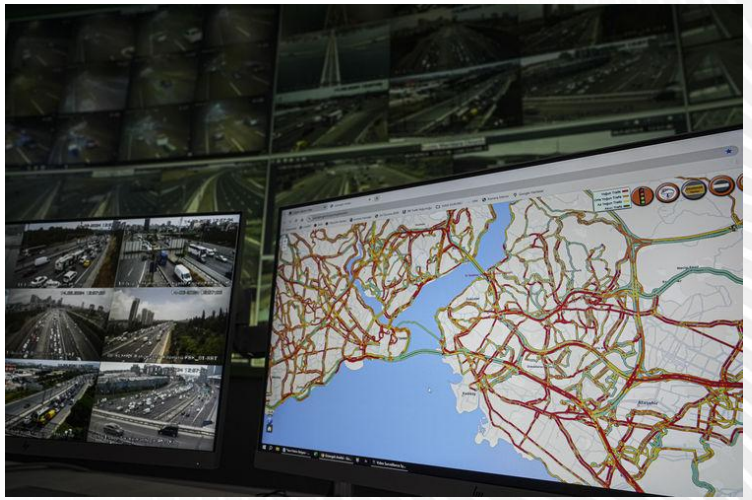
TARGET
20,141 Km

TOTAL: 20,141 Km

- 1.-2.-3. stages 3,072 Km (Completed)
- 3. stages 300 Km (On-going)
- 4. stages 1,733 Km
- 5. stages 1,868 Km
- Planned 8,027 Km
- Completed Motorway 4,675 Km
- On-going Motorway 466 Km

emay

ANKARA ITS CENTER



ITS HIGHWAY APPLICATIONS IN TÜRKİYE

Adaptive and Semi Adaptive Signal Systems

ITS Monitoring Center

Tunnel Entrance Control Systems

Meteorological Information

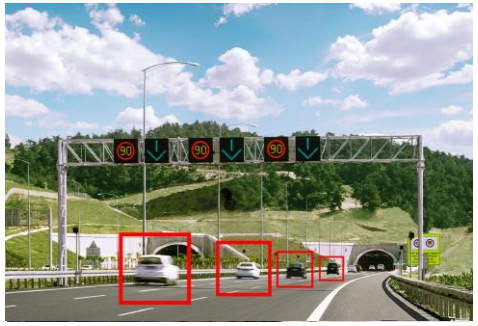
Variable Message Signs (VMS)

Electronic Toll Collection Systems

WIDESPREAD ITS APPLICATIONS IN TÜRKİYE

Electronic Toll Collection Systems

Variable Message Signs (VMS)



Vehicle Detection Systems

Meteorological Information Stations

Traffic Management

Intersection Management

Push Buttons

Incident Detection Systems

Parking Management

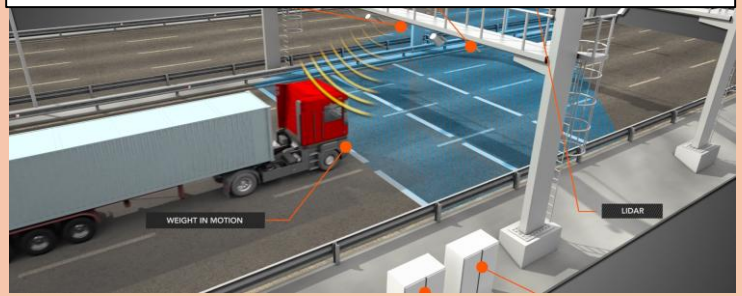
Automatic Number Plate Recognition (ANPR)

WIDESPREAD ITS APPLICATIONS IN TÜRKİYE

Traffic Measurement Systems

Air Quality Measurement

Weight in Motion (WIM)



Meterological Measurment

Traffic Enforcement Systems

Speed Violation Detection

Parking Management

Red Light Violation

Emergency Lane Violation

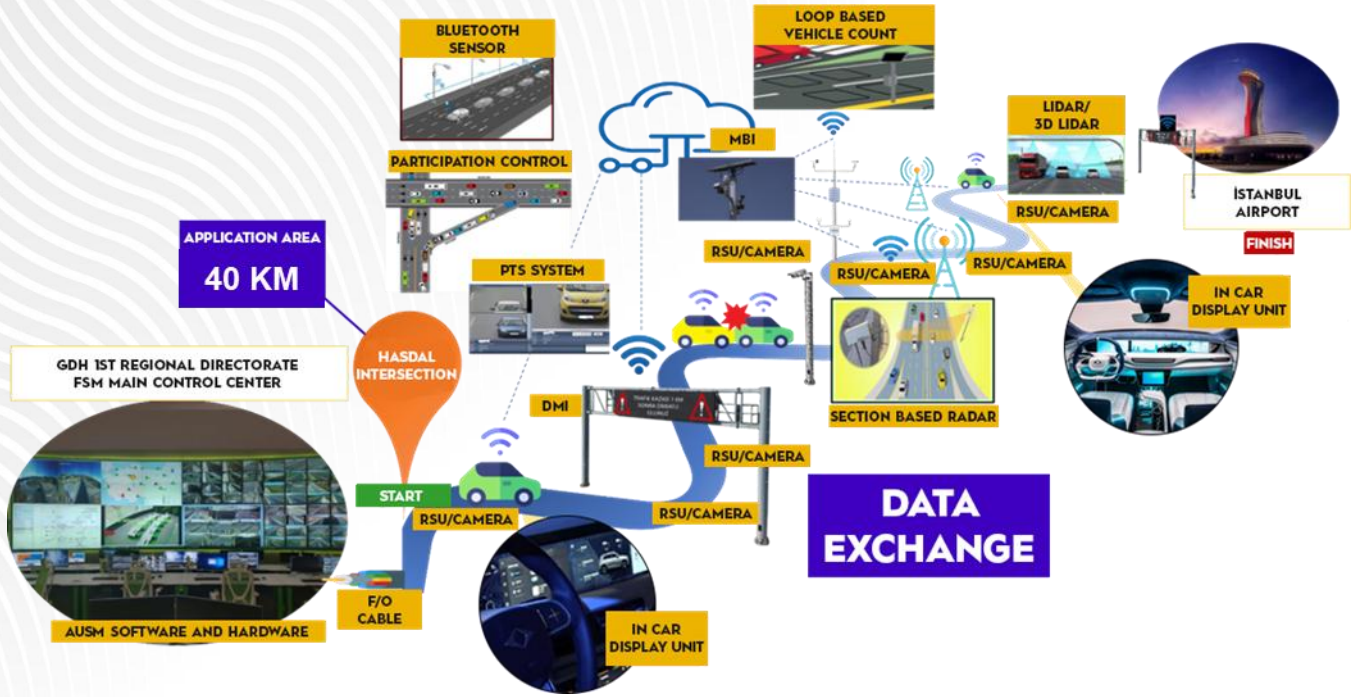
Public Transport

Passenger Information Display

Smart Stations

COOPERATIVE ITS (C-ITS) CORRIDORS in TÜRKİYE

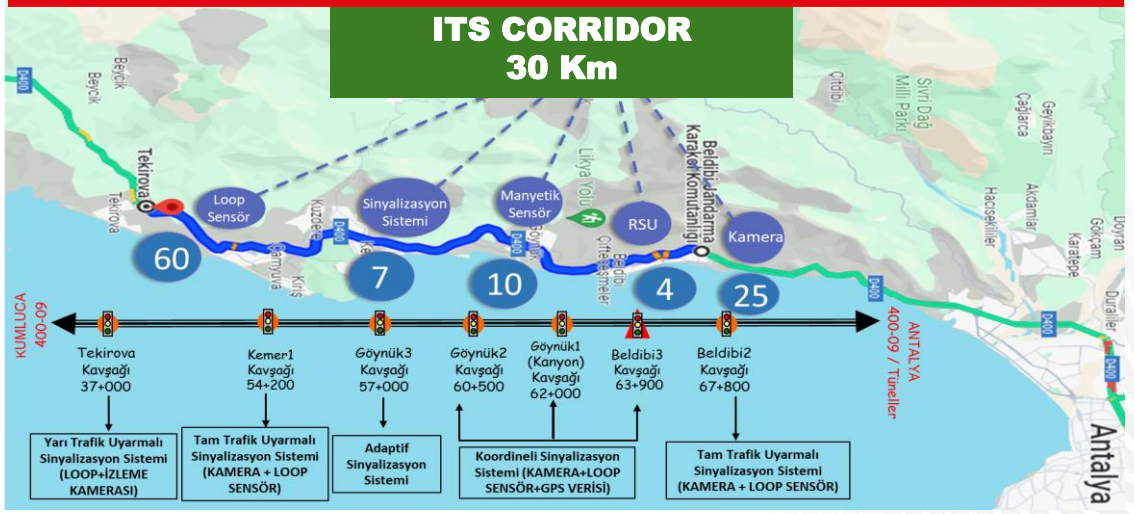
HASDAL - İSTANBUL AIRPORT



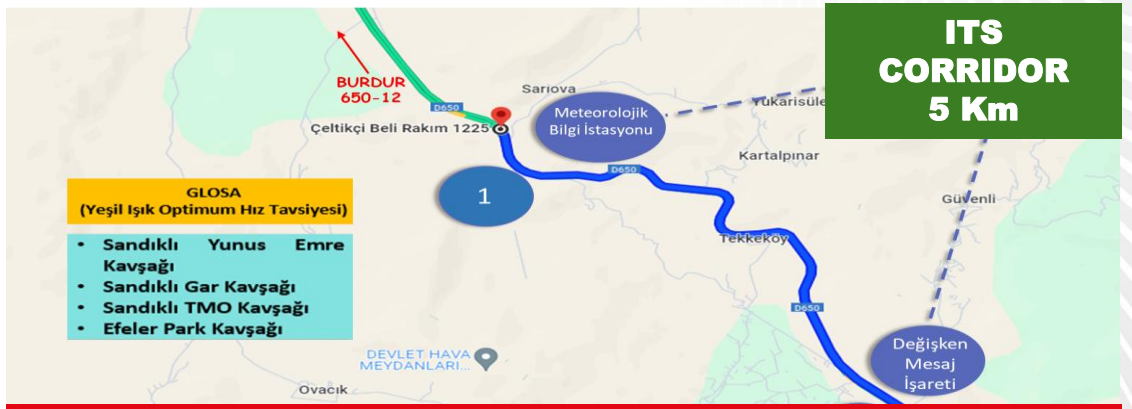
A 40 km-long C-ITS Test and Implementation Corridor established between the Hasdal Interchange, Istanbul Airport, and the Yassıören Maintenance Facility.

Data exchange will be enabled between vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and infrastructure-to-ITS center (V2X) through fiber-optic cables, short-range communication, and mobile communication technologies

ANTALYA-KEMER



ANTALYA-SANDIKLI



HIGHWAY SIGNALIZATION SYSTEMS

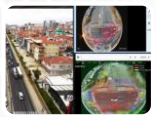
SIGNALIZATION SYSTEMS

Fixed-Time Signal Control (1,965)


Pedestrian Actuated Signal Control (**260**)


Semi Actuated Signal Control **(411)**


Actuated Signal Control **(405)**


Adaptive Signal Control **(8)**

Traffic Actuated Signal Control System (1,084)

A total of 3,049 signalization systems

Signalization systems that are being increasingly expanded every day will be fully integrated with ITS.

Benefits of Adaptive Signal Control Systems

Vehicle delay per vehicle

%30 improvement

CO_2 emmision

213 ton decrease

Fuel Saving

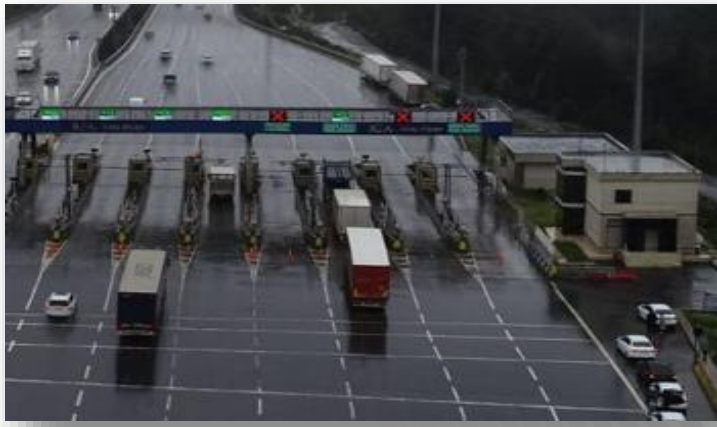
125,000 Liter / Year

Time Saving

37,500 Hour / Year

HIGHWAY TOLL COLLECTION SYSTEMS

TOLL COLLECTION SYSTEMS



	General Directorate of Highway		Authorized Company	
Number of Toll Collection Stations	106		127	
	80 Island-Type Toll Booth	26 Free Flow Tolling System	89 Island-Type Toll Booth	38 Free Flow Tolling System
Number of Vehicles Pass in 2024	575 Million		510 Million	

THANK YOU.

HAMDİ AYDIN

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Treasurer & Executive Committee Member of International Road Federation

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