PELMOB

Funded by the European Union

Intelligent transport systems

Professor Emeritus Dr. Zoran Avramović
AUB, Faculty for Traffic, Communication and Logistic, Budva

Introduction to ITS

"Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be."

Partnership for Promotion and Popularization of Electrical Mobility through Transformation and Modernization of WB HEIs Study Programs/ PELMOB
Call: ERASMUS-EDU-2022-CBHE-STRAND-2
Project Number: 101082860

Introduction

- According to the data World Health Organization (WHO, 13.12.2023):

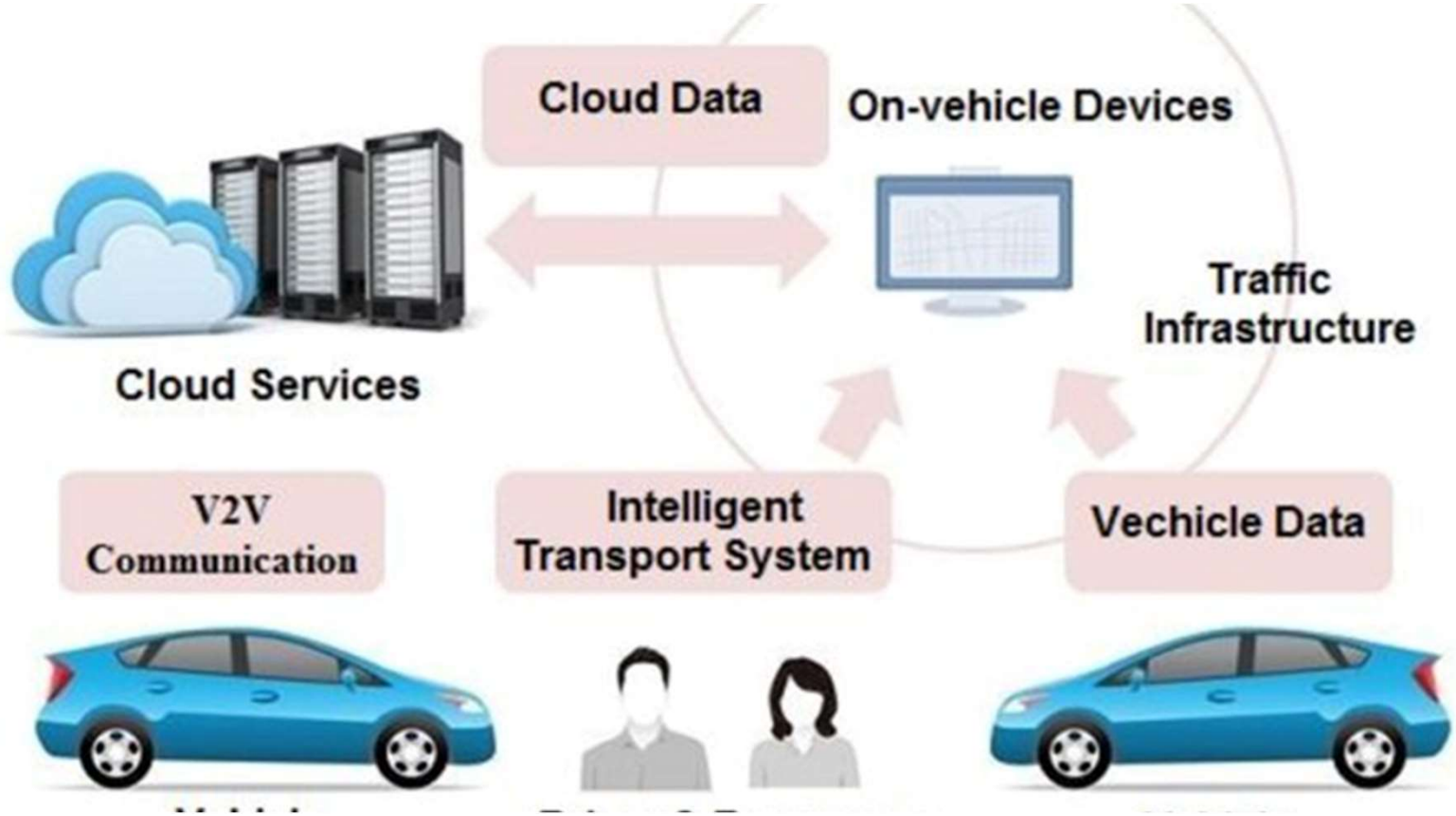
- About 1.19 million people each year in the world lose life from consequences in traffic accidents.

What are intelligent transport systems (ITS)?

- ITS represent integration informational and communication technology in transportation systems works improvements efficiency , safety and sustainability .
- ITS is automated system information and leadership of traffic , without which there is guidance traffic in large cities difficult conceivable .

- The application of ITS offers new ways to increase :
- permeable power road and
- degree security on them .

ITS architecture



Subject learning objectives

- Acquisition knowledge which enable
- design ,
- development ,
- simulation and
- evaluation management system by traffic with help intelligent transport system on city network , on intersections and roads .

Subject learning objectives

- Increase security traffic.
- Reduction congestion and delays.
- Improvement mobility.
- Reduction influence on life the middle.

Program: ERASMUS-EDU-2022-CBHE-STRAND-2
Project number: 101082860
Funded by the European Union

OPTIMIZATION OF TRAFFIC SAFETY THROUGH ITS APPLICATION

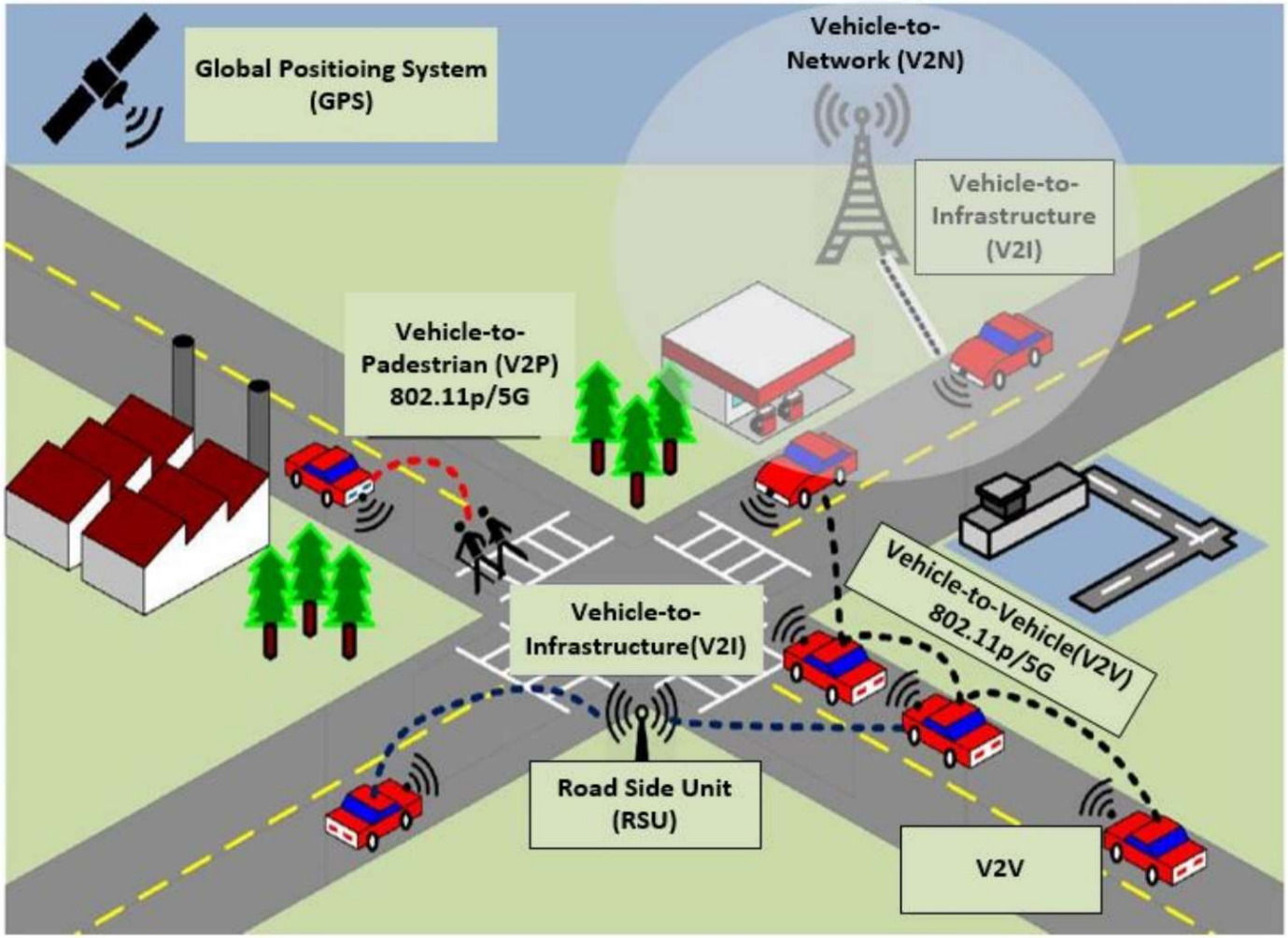
1. Intelligent infrastructure
2. Intelligent vehicles
3. Smart city concept

PELMOB

Program: ERASMUS-EDU-2022-CBHE-STRAND-2
Project number: 101082860

Funded by the European Union

Intelligent infrastructure



Intelligent vehicles

- Warning on too fast driving
- Warning on surrounding vehicles
- Dynamic finding optimal path

- Level 0, levels 1, 2, 3, 4 and 5

Program: ERASMUS-EDU-2022-CBHE-STRAND-2
Project number: 101082860

Funded by
the European Union

Smart cities

Smart cities

•Does not exist unique definition of the phrase " smart city".
•The EU defines it as "A place where traditional networks and services more efficiently provide by using digital and telecommunications technology for well-being their inhabitants and business ".
•Some authors they believe that such a city consists of 6 important features (smart) buildings, smart economy, smart management, smart mobility, smart life and smart environment).

Smart cities

•Many emphasize importance of ICT technologies concerning smart city.

•Therefore, it is important that, in the case of adoption concept smart city, towns they are building and gradually expand the ICT platform which will to be implemented .

•However , it can be considered that smart cities they aim to security sustainability cities , improvements quality life population by using informational and communication funds .
•ICT is a tool for rapid and efficiently management all in parts city .

Smart cities

- A smart city would therefore be a city which not only possesses ICT technologies in particular areas ,
- Technologies implemented on a way that positively affects on local community .

Smart cities

Some authors they list 8 key fact which define smart city:

- smart mobility ,
- smart management in e-governance
- smart energy ,
- smart buildings ,
- smart infrastructure ,
- smart technology ,
- smart health protection and
- smart citizens .

So that the city could define as smart must satisfy at least five criteria out of eight mentioned .

ITS in practice

- ITS represents the application of computer science, information technology, electronics and other innovative sciences in the field of traffic systems with the aim of increasing the efficiency of the traffic system and reducing the negative effects of the traffic process.
- The development of ITS is motivated by the need to solve traffic challenges, such as congestion, accidents, and emissions.
- Also, ITS systems focus on improving the experience of passengers and public transport users, as well as the efficiency of goods transport.

IEEE ITS identification

IEEE (English Institute of Electrical and Electronics Engineers) defines **Intelligent Transport Systems (ITS)** through its standard **IEEE 1512** and other relevant documents. According to IEEE, ITS includes:

"The application of information and communication technologies in transport systems with the aim of improving the efficiency, safety, mobility and sustainability of transport."

Supporting technologies

ITS includes a wide range of technologies, such as:

- **Sensors and detectors** (eg cameras, radars, lidars, IoT devices)
- **Automated and connected vehicles**
- **Smart traffic infrastructure** (e.g. smart traffic lights, electronic toll collection)
- **Traffic management systems** (e.g., traffic flow optimization algorithms)
- **V2X (Vehicle-to-Everything) communication**

The main goal of ITS is to increase traffic efficiency and reduce accidents through the use of advanced technologies.

EU standards

Directives and legal frameworks for ITS in the EU

1.1. EU ITS Directive (2010/40/EU)

•Defines priority areas for ITS development:

•It obliges member states to implement ITS solutions in accordance with EU guidelines.

1.2. European regulation on C-ITS (Cooperative ITS)

•Rules for **Vehicle-to-Everything (V2X)** communication.

•Communication via **ITS-G5 (802.11p Wi-Fi) and 5G networks** .

1.3. Legal framework for autonomous vehicles and ITS

•EU regulation on automated vehicles (2022)

•Vienna Convention on Traffic (1968) – autonomous vehicles on European roads.

European projects

There are a number of **Intelligent Transport Systems (ITS) projects in Europe** , funded by **the European Union** and other organisations. These projects aim to improve transport infrastructure, increase safety and efficiency, and reduce the environmental impact of transport.

The most important European ITS projects:

1. C-ROADS

•Goal: Implementation of **cooperative ITS (C-ITS)** systems across Europe.
•Focus: V2X (Vehicle-to-Everything) communication between vehicles and infrastructure to improve traffic safety and efficiency.
•Partners: Several European countries, including Germany, France, Austria, Italy and others.

European projects

2.CONCORD

•Goal: Integration **of connected and autonomous vehicles (CAVs)** with existing ITS systems.
•Focus: Testing 5G networks to improve cooperative traffic.
•Locations: Test corridors in the Netherlands, Germany, Spain, France and Italy.

3. SAFER-LC

•Objective: Improving safety at **railway crossings** .
•Focus: Using sensors, cameras and V2X technology to reduce accidents.

European projects

4. MOBILE NET

•Goal: Development of **a smart transport platform** that connects carriers, users and ITS services.

•Focus: Digital platform for improving mobility and multimodal transport.

5. TN-ITS GO

•Objective: Improve the exchange of data on **traffic signs and speed limits** between authorities and vehicles.

•Focus: Updating digital maps in real time to increase safety.

6. 5G-MOBIX

•Goal: Testing **5G networks** for autonomous and connected vehicles.

•Focus: Improving communication between vehicles and infrastructure through low latency and high data throughput.

Program: ERASMUS-EDU-2022-CBHE-STRAND-2
Project number: 101082860

Funded by
the European Union

Thank you for your attention!

www.fskl-cg.me