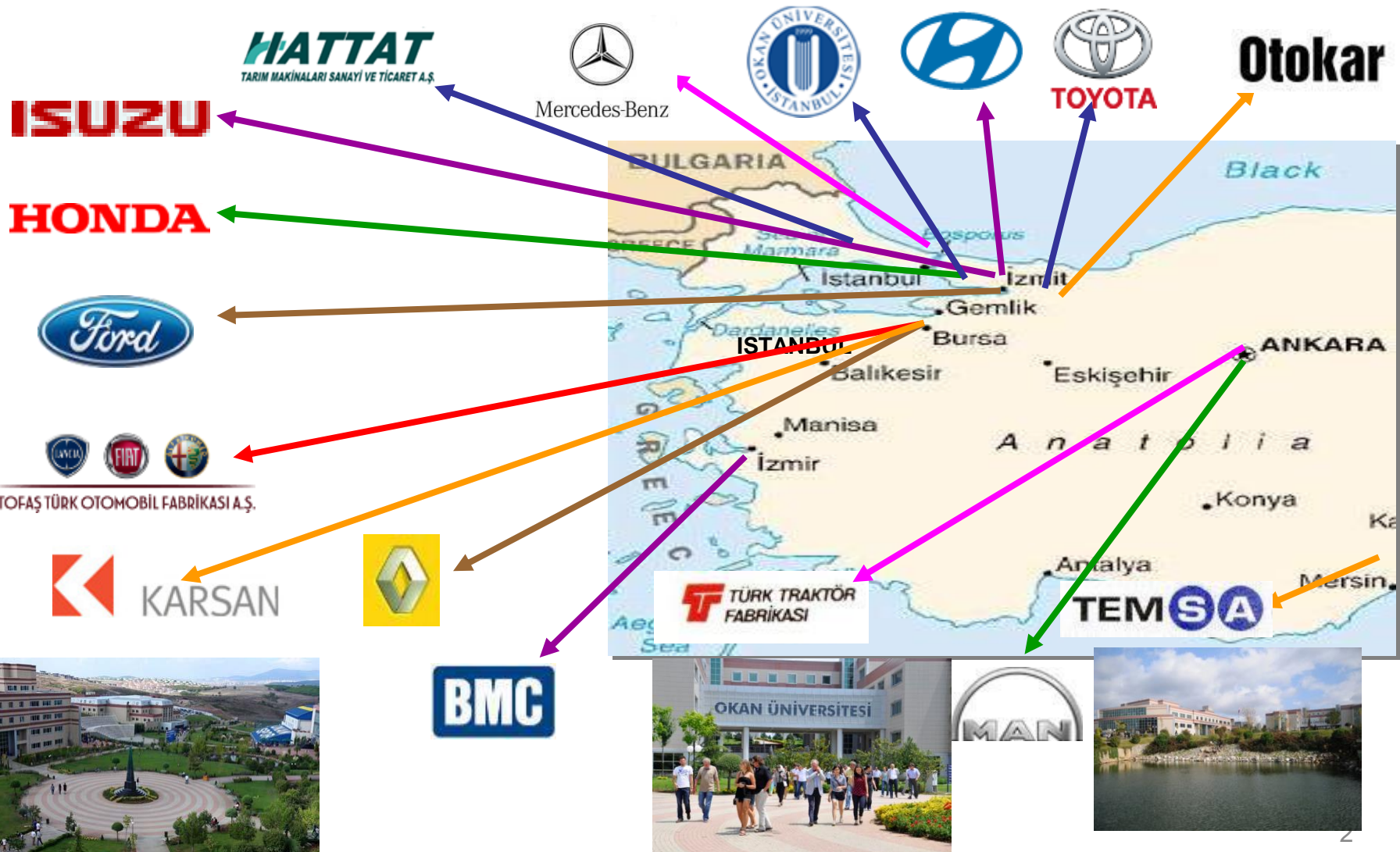# SOFTWARE DEVELOPMENT FOR AUTONOMOUS VEHICLES

INTERNATIONAL INTERUNIVERSITY CONFERENCES ISTANBUL, 2019

Prof. Bekir Tevfik Akgün, Ph.D.

Istanbul Okan University

AUTOMOTIVE MANUFACTURING PLANTS IN TURKEY AND LOCATION

ISTANBUL OKAN UNIVERSITY
TRANSPORTATION TECHNOLOGIES & INTELLIGENT AUTOMOTIVE SYSTEMS APPLICATION AND RESEARCH CENTER «TTIS»

- TTIS aims to be a World Wide recognized node of knowledge and research as well as a Centre of Excellence in the field of Intelligent Transport Systems by 2020

- Member of ERTICO, and EGVIA (only university member from Turkey), and founder and management board member of National ITS Association(AUSDER)
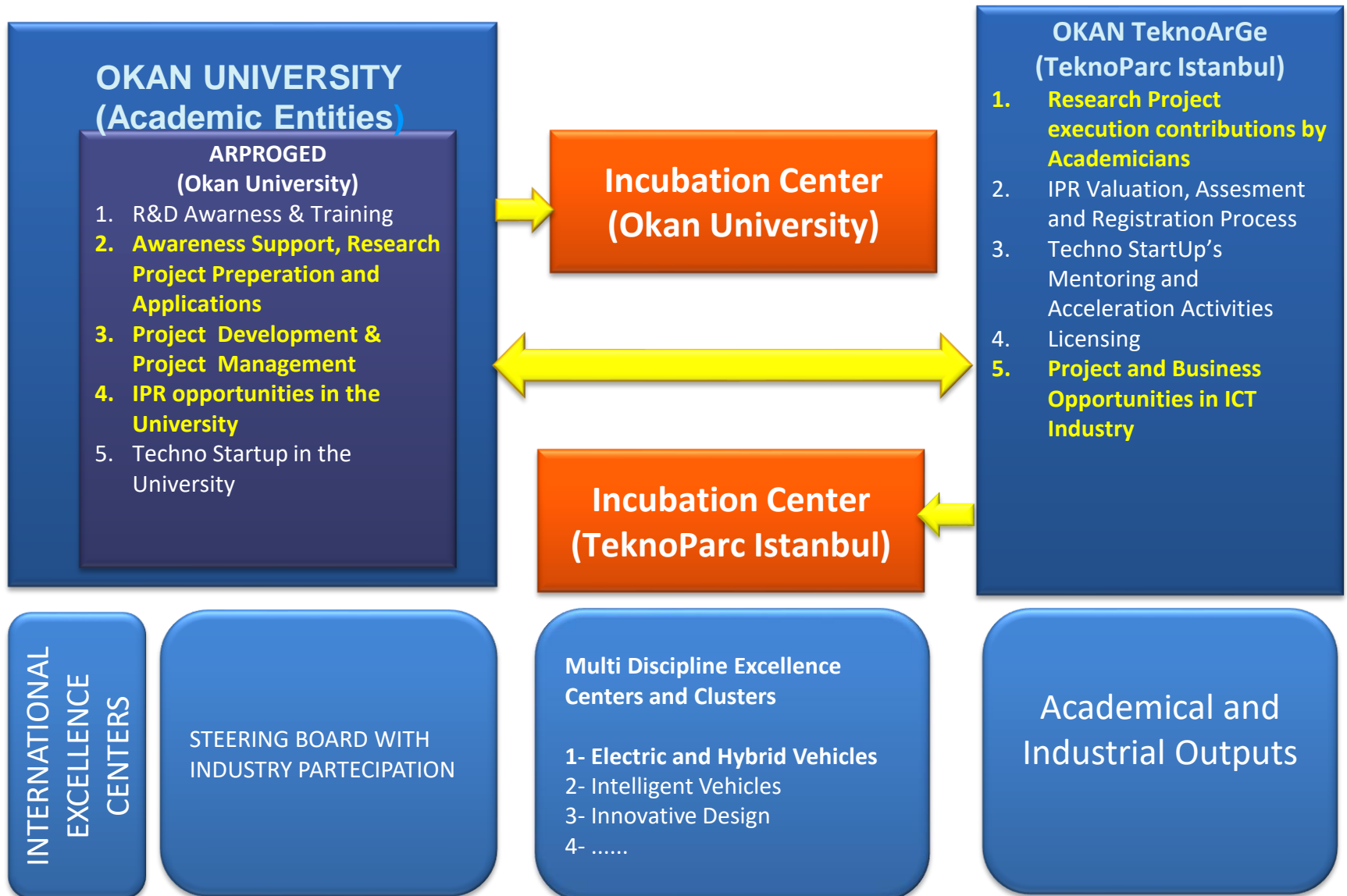

Research Areas
- Intellient vehicles
- Communicating Vehicles
  Intelligent Energy management systems
  Battery packaging and management systems
- Electric machine and inverter development
- Traffic management
- Big data management

Okan Technology Transfer Office & Okan Tekno ARGE Inc.

OKAN UNIVERSITY (Academic Entities)

ARPROGED (Okan University)

1. R&D Awarness & Training
2. **Awareness Support, Research Project Preperation and Applications**
3. **Project Development & Project Management**
4. **IPR opportunities in the University**
5. Techno Startup in the University

Incubation Center (Okan University)

OKAN TeknoArGe (TeknoParc Istanbul)

1. **Research Project execution contributions by Academicians**
2. IPR Valuation, Assesment and Registration Process
3. Techno StartUp's Mentoring and Acceleration Activities
4. Licensing
5. **Project and Business Opportunities in ICT Industry**

Incubation Center (TeknoParc Istanbul)

INTERNATIONAL EXCELLENCE CENTERS

STEERING BOARD WITH INDUSTRY PARTECIPATION

Multi Discipline Excellence Centers and Clusters

1- **Electric and Hybrid Vehicles**
2- Intelligent Vehicles
3- Innovative Design
4- ......

Academical and Industrial Outputs

Innovative and Sustainable Electric and Hybrid Vehicle Technologies Development Center and Cluster

Okan University Innovative E-Mobility Clustering Project
# «E-HIKE»

Innovative and Sustainable Electric and Hybrid Vehicle Technologies Development and Clustering Center Project , **«E-HIKE»**
funded by Istanbul Development Agency
Project Aim ;

- Form a cluster with stakeholder companies
- Develop innovative business solutions and technologies for the stackholders
- Analysis the whole value chain
- Form the basic research structure
- Develop innovative concepts for
  - *Urban Electric Vehicle Design*
  - *Energy management*
  - *Battery management*
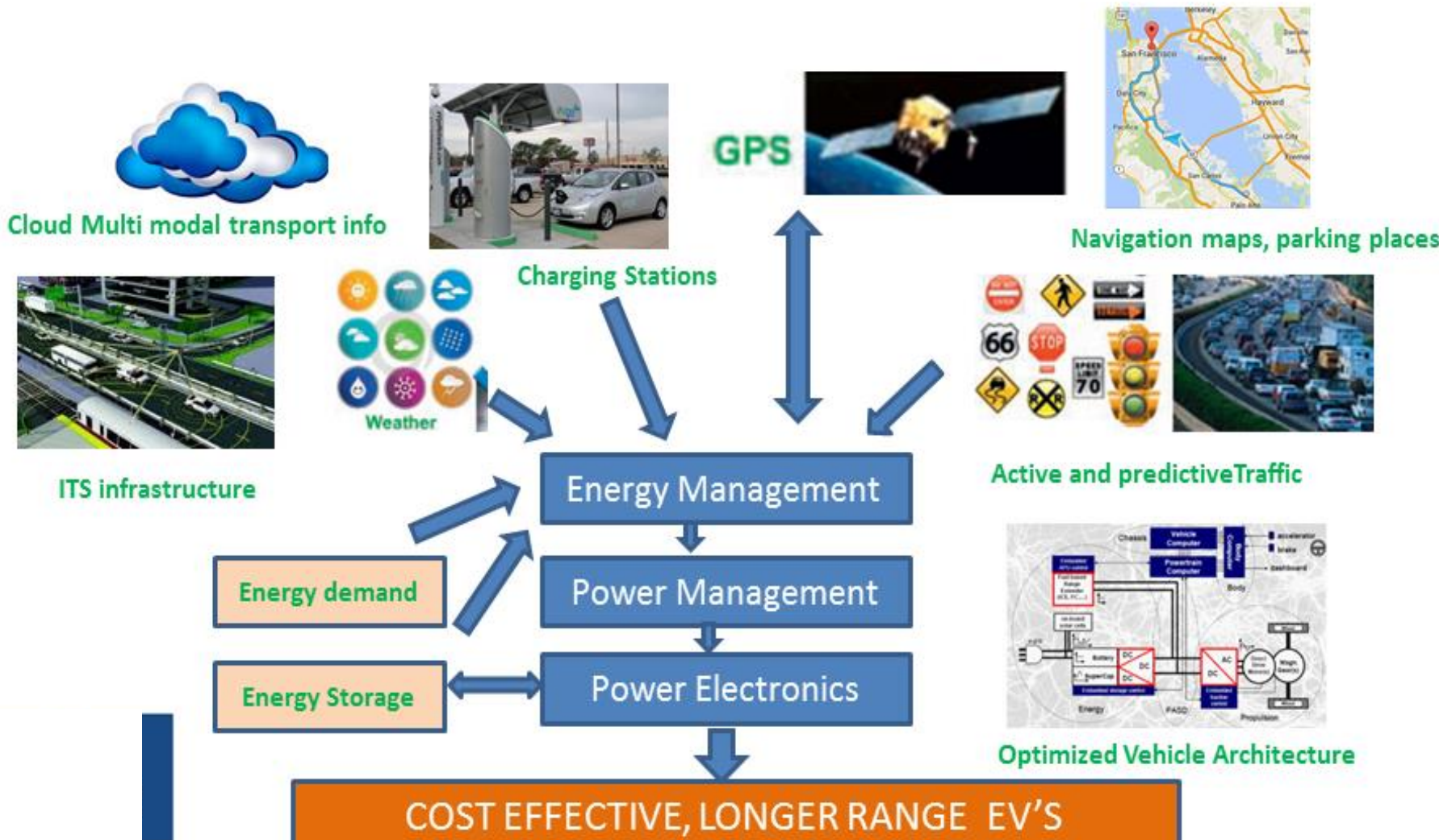 - *Light and safe vehicle body structure*
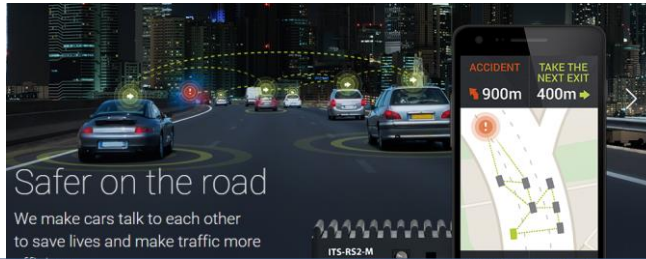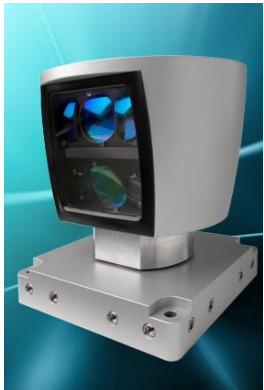 - *Electric engines*

Hardware in The Loop System
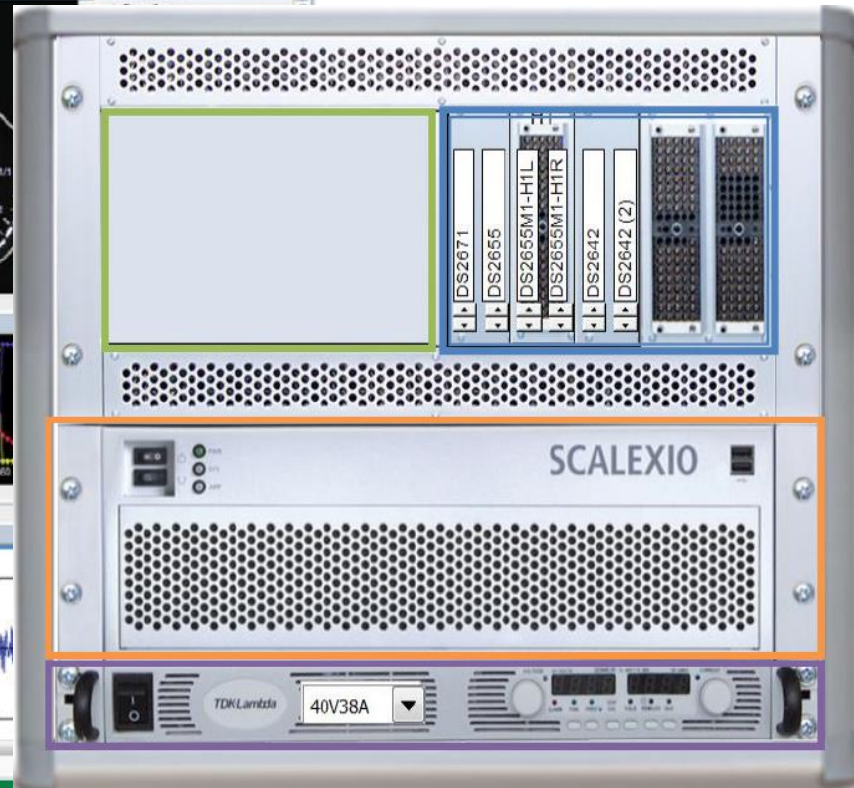
- **Electric Drive Simulation**
- **Energy Management System Simulation**
- **Battery Management System Simulation**

Intelligent Electric Vehicles

Cloud Multi modal transport info

Charging Stations

GPS

Navigation maps, parking places

ITS infrastructure

Weather

Active and predictiveTraffic

Energy Management

Energy demand

Power Management

Energy Storage

Power Electronics

Optimized Vehicle Architecture

COST EFFECTIVE, LONGER RANGE EV'S

Innovative Intelligent and Communicating Vehicles Technology Development and Clustering Centre

Innovative Intelligent and Communicating Vehicles Technology Developmet and Clustering Centre

- ## Scope

Objectives

- Form a cluster with stakeholder companies
- Develop innovative business solutions and technologies for the stackholders
- Analysis the whole value chain
- Develop an open research structure
- Develop innovative concepts for
  - Advanced autonomous vehicles
  - Vehicles with V2V and V2X
  - Intelligent vehicles for safety
  - Business models
  - Future transport systems

Safer on the road
We make cars talk to each other to save lives and make traffic more

- 3D LİDAR
- 3D Camera
- Modem and road unit
- Signal generator and analyzer
- HIL System
- Real time processor
- NVIDIA Drive PX

Full Otonomous Vehicle

IPA II

Open Innovation Autonomous Vehicle Development and Testing Platform «OPINA»
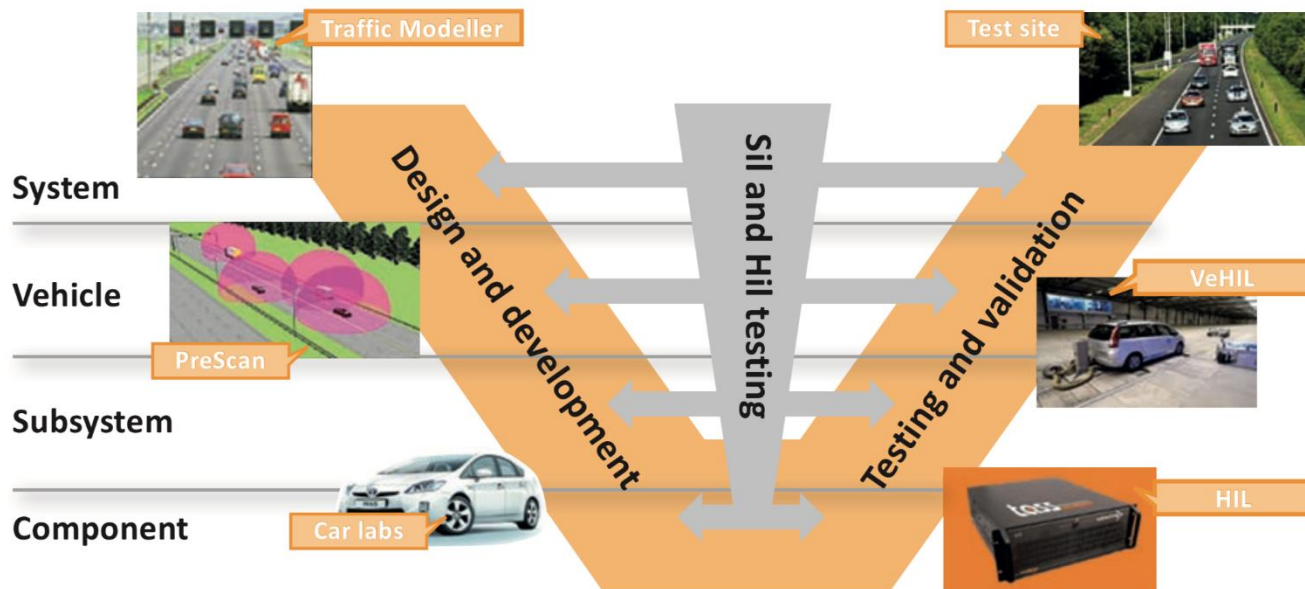
OKAN ÜNİVERSİTESİ

OPEN INNOVATION AUTONOMOUS VEHICLE DEVELOPMENT PLATFORM

TTIS & Companies
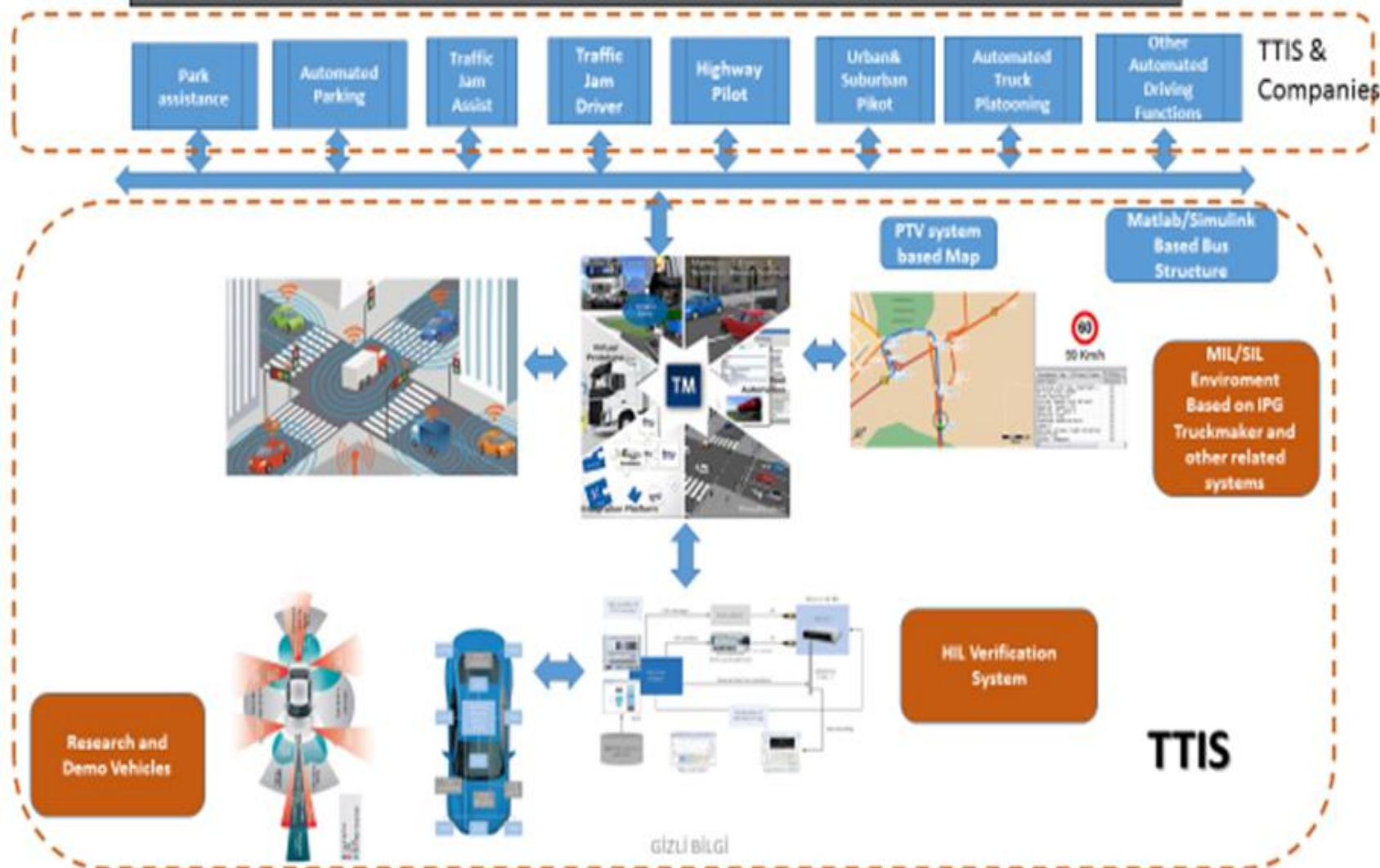
THE SYSTEM

The autonomous driving platform proposed in this project is defined based on the V-Desing development logic:

• The platform provides interface and tools to support end-to-end development starting from system requirement to real vehicle testing on a test site.

• The proposed platform intended to have SIL-MIL-HIL testing capabilities with drag and drop integration of modular tools including various controllers, plants, and sensor modules that an autonomous vehicle needs.

THANK YOU

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