

# Mobile probe for green traffic management in the INTEGRREEN project



## ABSTRACT

The project INTEGRREEN (INTEgration of traffic and environmental data for improving GREEN policies in the city of Bolzano) is an EU LIFE+ project to improve traffic and environmental issues with new IT technologies.

The main objective of the project INTEGRREEN is to introduce a demonstrative system for the municipal mobility management center of the city of Bolzano that aims at providing the local public authorities with distributed correlated traffic and environmental information for the adoption of eco-friendly Real-Time traffic management policies.

To achieve this goal a new innovative mobile probe with both traffic and environmental monitoring units will be developed. The mobile probe transmits the sensor data to the traffic management center and receives information for the driver to offer him/her the possibility to more efficiently optimize his/her trip while en-route. The proposed system architecture is designed in a way, such that it can be easily exploited for other similar urban areas.

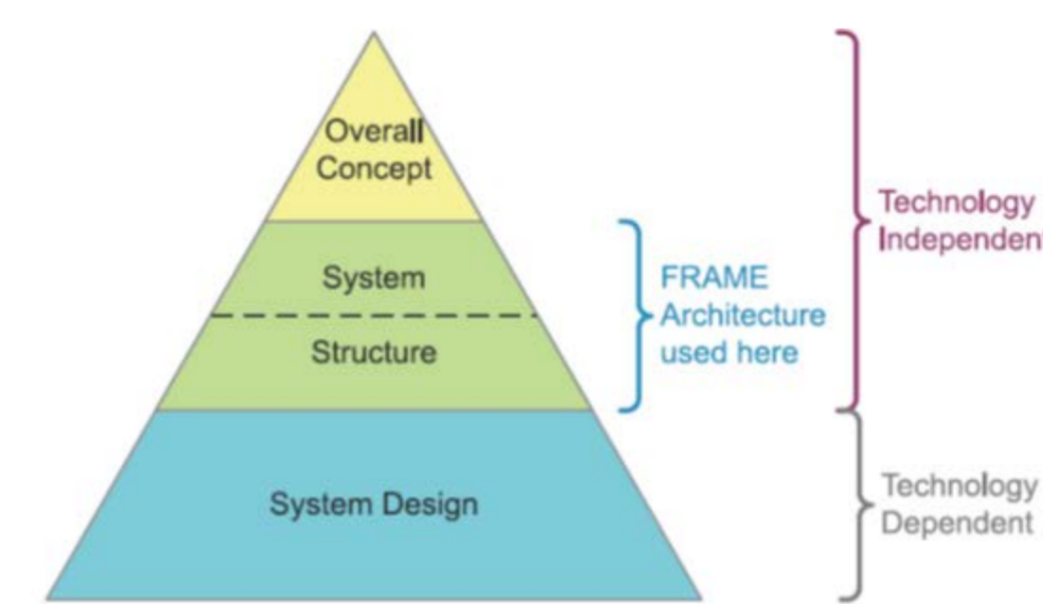
## Technical and Social Objectives

- Technical:** Analysis, Design, Implementation and Testing of new innovative modules to act as Real-Time mobile probes.
- Social:** Active involvement of local mobility population and stakeholders for an improved Eco-Driving and Urban-Management.

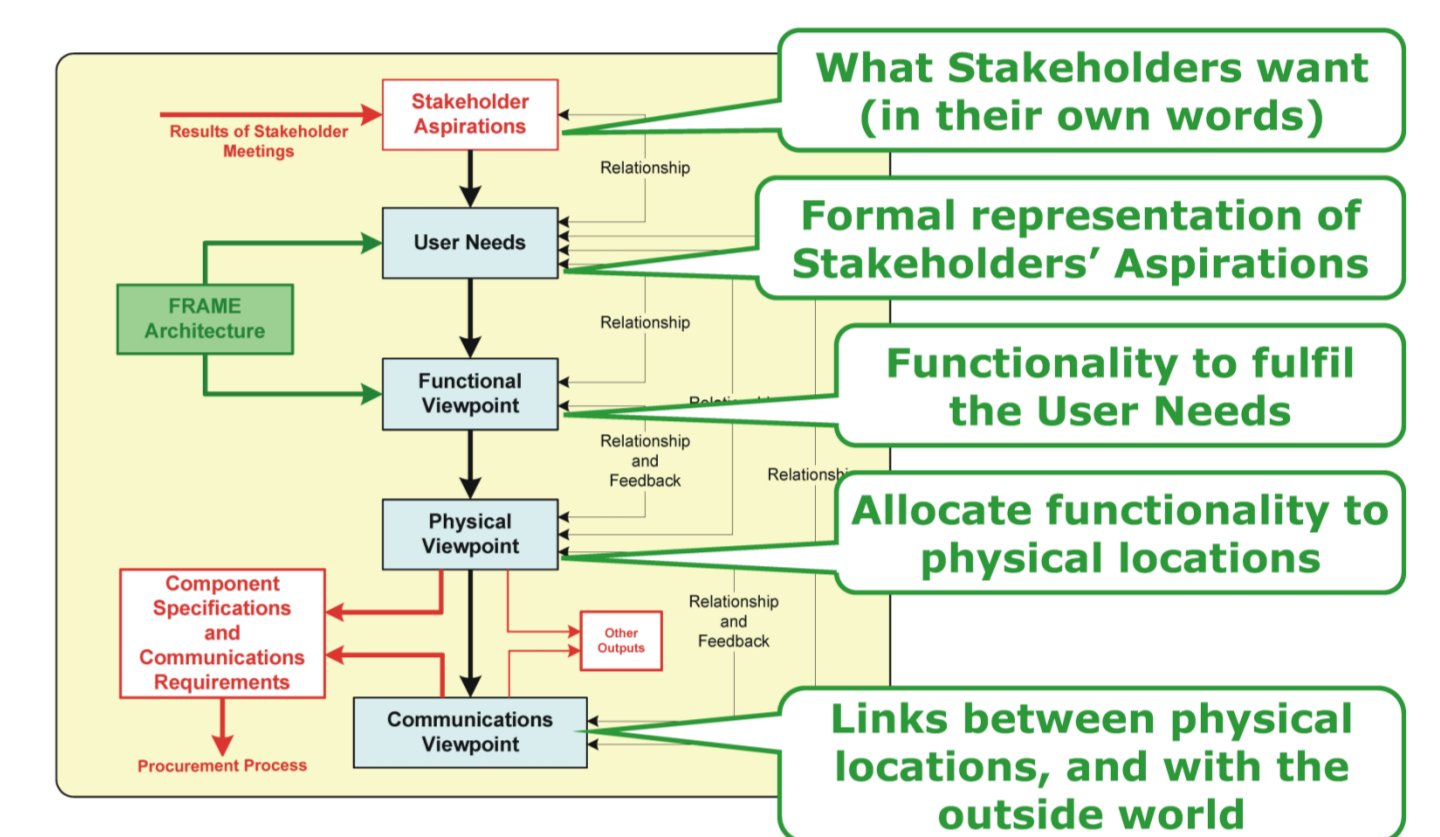


## INTEGRREEN and the FRAME Architecture

The integration of the INTEGRREEN Subsystem into the existing traffic management system of Bolzano will be modeled through the FRAME Architecture. The objective of combining data from mobile and roadside units in order to proactively manage and improve the traffic and air-quality of the city will be implemented following a standardised approach.

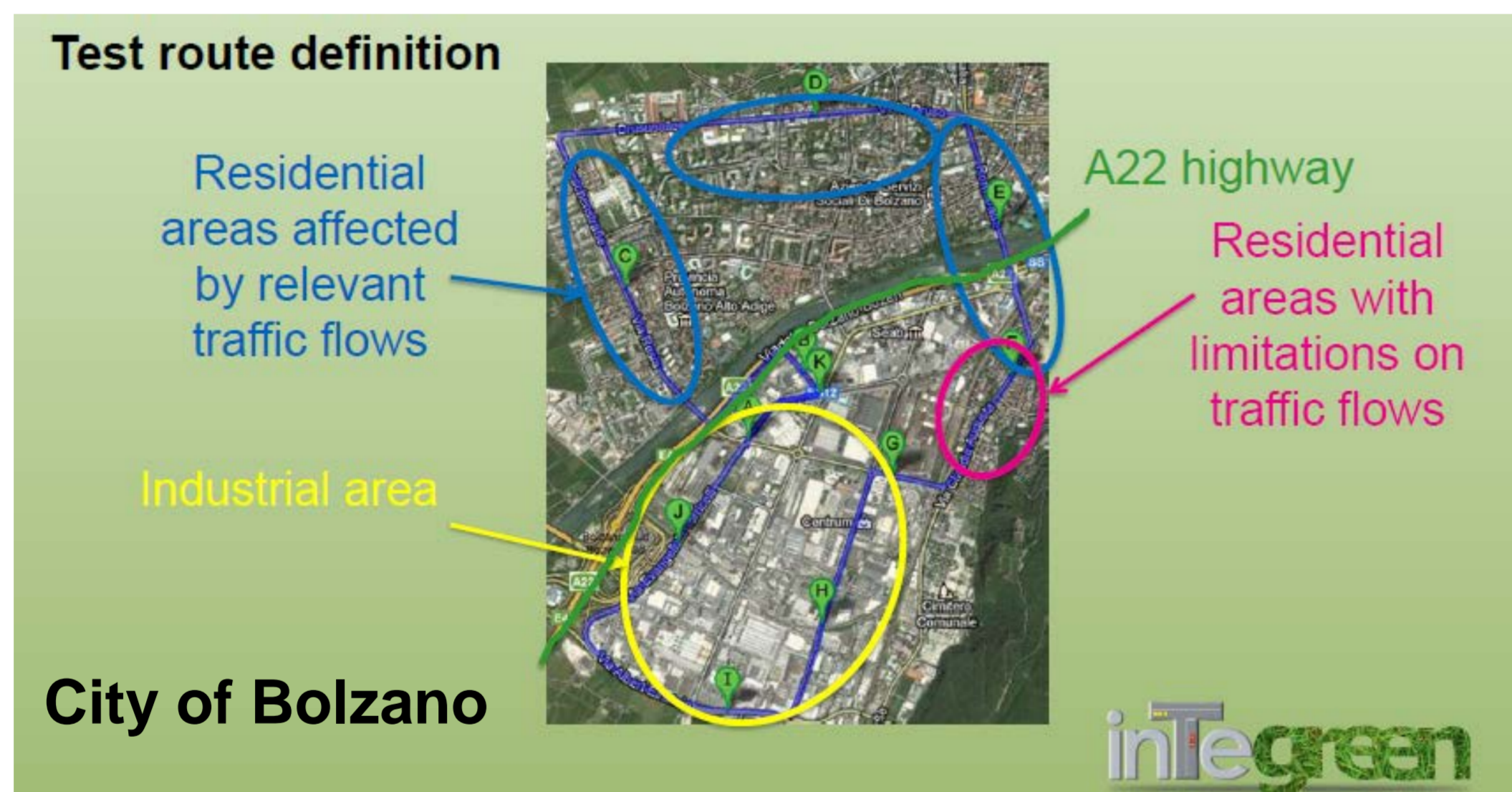


### Creating Specific ITS Architecture sub-sets



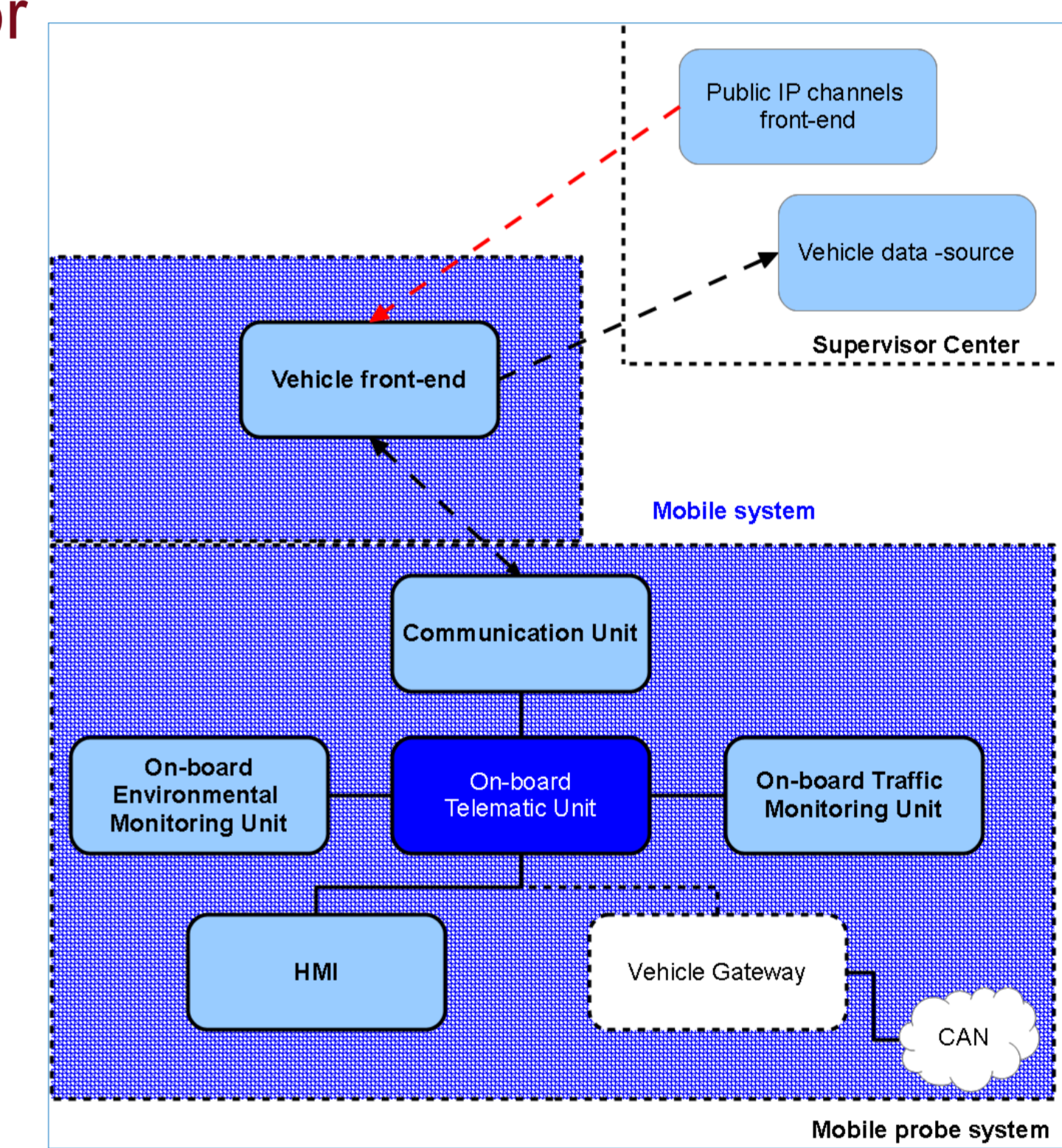
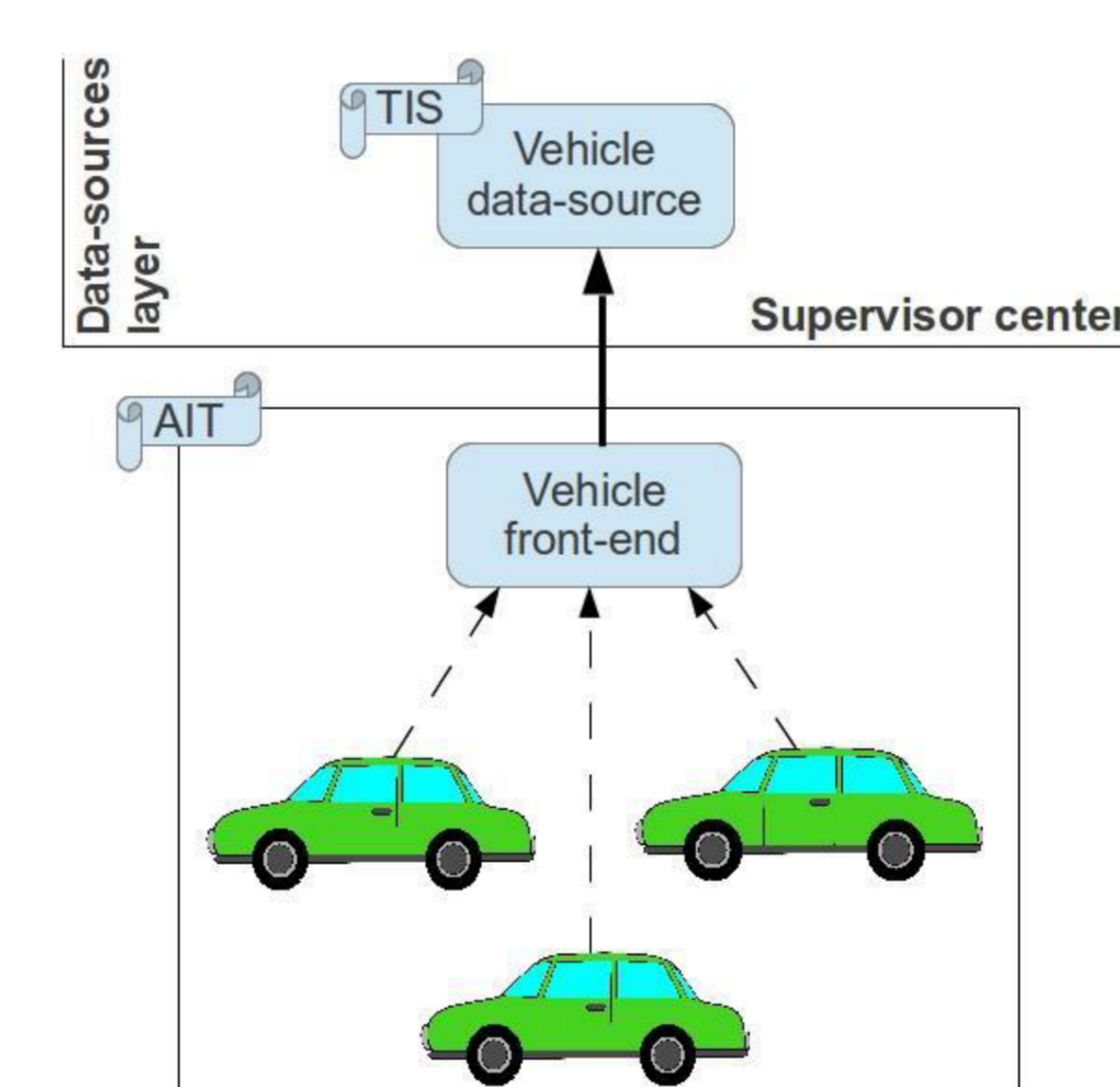
## INTEGRREEN Use Cases

- Traffic state estimation
- Estimation of emissions generated by private transport
- Air Quality state estimation
- Traffic Management
- Pre-trip
- On-trip

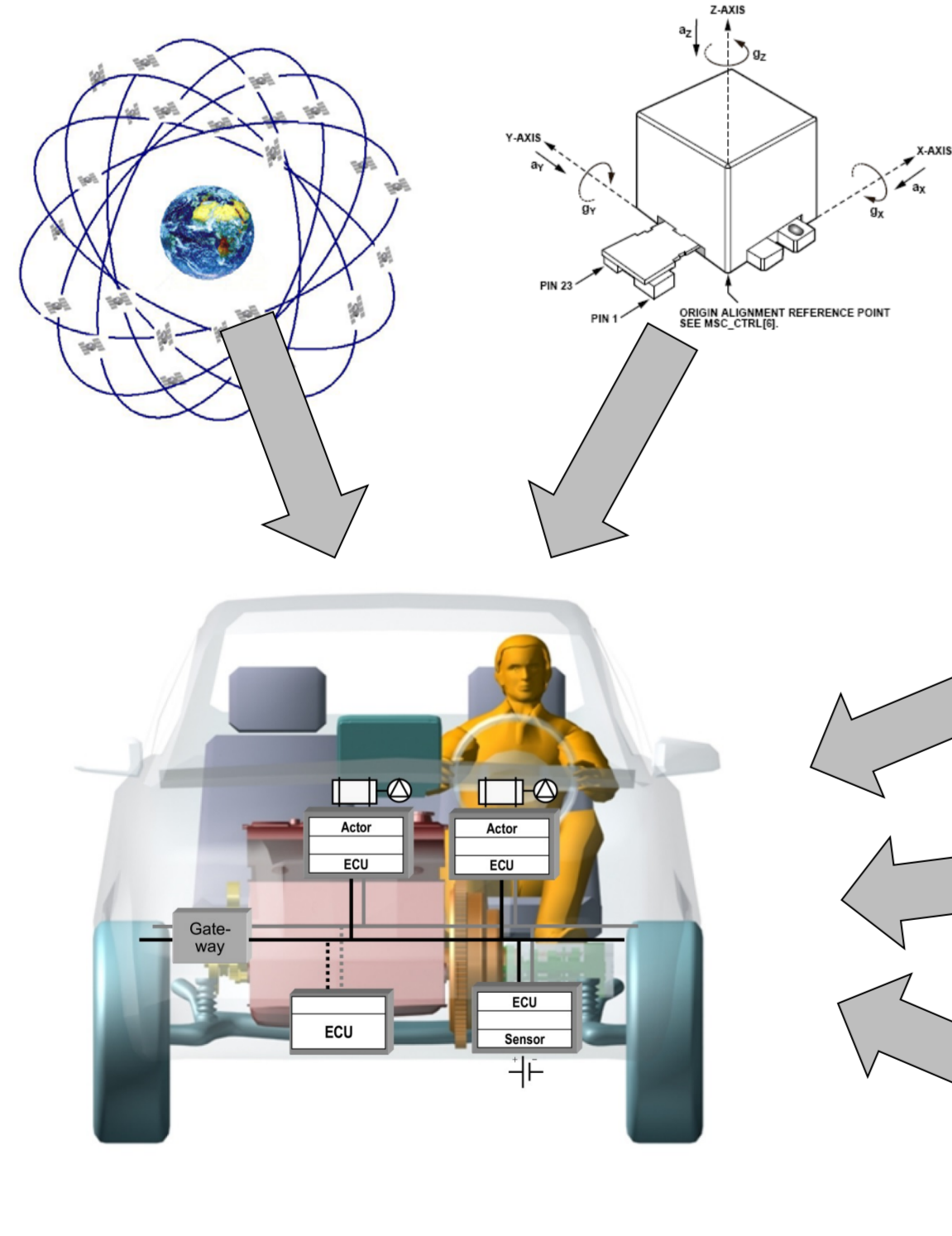


## The Car as a Real-Time Sensor

The mobile probe of the INTEGRREEN system will be integrated into vehicles frequently traveling in the city.



## INTEGRREEN On-Board-Unit and Sensors



### Traffic Unit:

- Planned Functionalities:
  - CAN-Bus access
  - GPS sensor
  - Position sensor
  - USB-Connection
  - Generation of timestamp

### Environment Unit:

- Planned Functionalities:
  - Environmental Sensors:
    - NOx (nitrogen oxides)
    - O3 (ozone)
    - CO (carbon monoxide)
    - PM10 (particulate matter)
    - Air temperature
    - Air humidity
  - Air inlet distant from road surface
  - Air flow control

## Achieved Results and Next Steps

- Preliminary Field Measurement:
  - Two Sensor types of NO2 and PM10 have been tested
  - Collected sensor-data shows detection of air changes
- Next Steps:
  - On-Board-Unit system integration
  - Sensors calibration
  - Field measurement campaign in Vienna and Bolzano



## REFERENCES

- "Calcolo e valutazione delle emissioni di CO2 e definizione di scenari di riduzione per la città di Bolzano", a study produced by EURAC research for the Municipality of Bolzano, [http://www.comune.bolzano.it/UploadDocs/7528\\_BolzanoCO2\\_Report\\_Ita\\_100201.pdf](http://www.comune.bolzano.it/UploadDocs/7528_BolzanoCO2_Report_Ita_100201.pdf) , 2010
- "Valutazione dell'impatto sulla qualità dell'aria nella città di Bolzano", a study produced by CISMA for the Municipality of Bolzano, [http://www.comune.bolzano.it/UploadDocs/9152\\_Qualita\\_aria2\\_27\\_01\\_2011.pdf](http://www.comune.bolzano.it/UploadDocs/9152_Qualita_aria2_27_01_2011.pdf), 2011
- FRAME architecture, <http://www.frame-online.net> , 2011

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