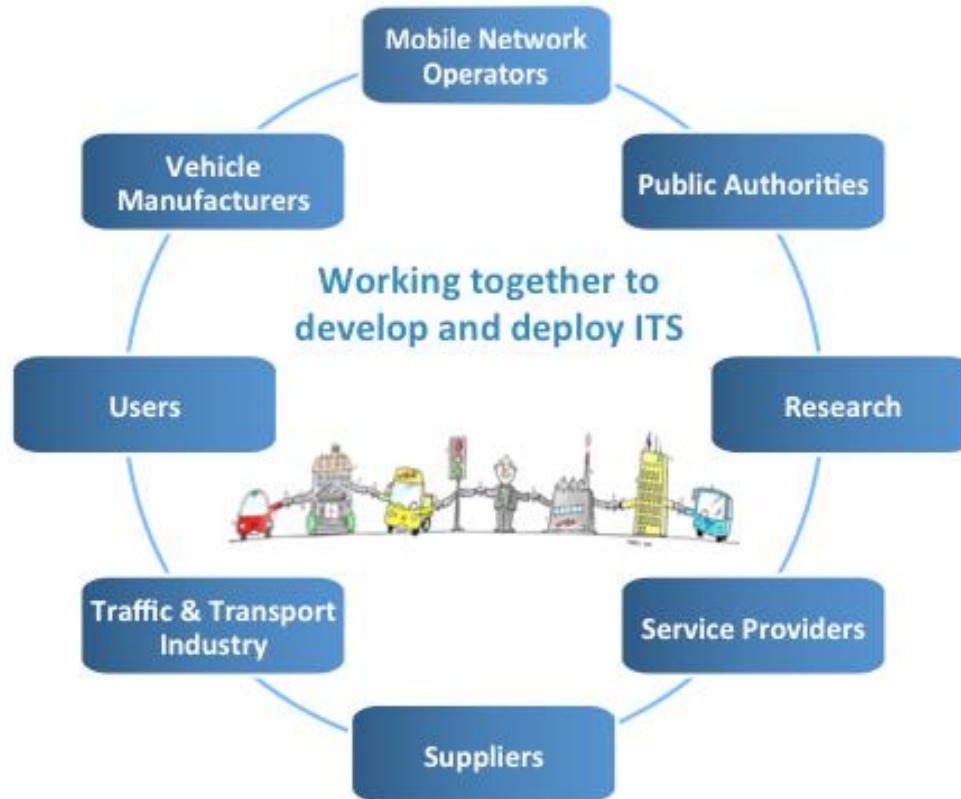# GNSS one key enabler for autonomous driving
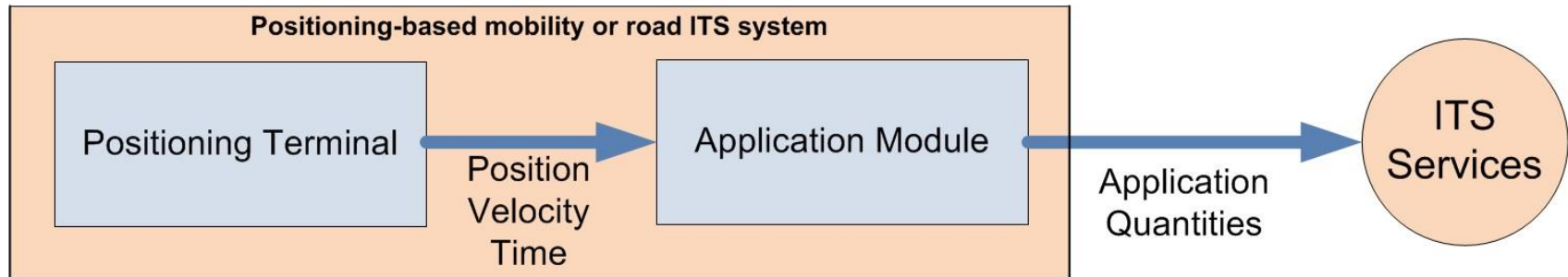## The 2nd EU-Japan Satellite Positioning Public-Private Roundtable

Francois Fischer, Sr. Manager Innovation, ERTICO – ITS Europe

8 sectors for ITS deployment

GNSS and ITS application

- Positioning modules provide:
  - Position
  - Velocity
  - Time
  - Heading

ITS applications needing GNSS

- Vehicle position:
  - Emergency call
  - Electric Vehicle charging spot management
  - Navigation – traveller information
  - Traffic management / Transport and logistic
  - ADAS /Automated driving
- User & vehicle position
  - Mobility as a Service (MaaS)

GNSS for Automated Driving

GNSS for Automated Driving

- The suitability of GNSS is pending on the performances:
  - **Accuracy**: difference between the estimated and the true position
    - Where, Which road, which lane, where in the lane?
  - **Integrity**: trust in the correctness of the position
    - Is the position information usable or not?
  - **Availability**: time when the positioning service is usable
    - When and where is the Is the position available?

EU actions for GNSS performance

- ERTICO has supported several actions to define performance requirements for ITS:
  - eCall regulation (type approval)
  - Performance requirement standardisation at CEN and ETSI
    - eCall as a particular ITS use case for preparing the EU regulation (Vehicle Type Approval)
  - COST – SaPPART action – **final event 4 Oct. 2017 Brussels**
  - GSA EU funded actions (e.g. Inlane for lane level navigation)

ERTICO support to GSA Actions

- JUPITER: Raising Awareness of EU-GNSS for ITS applications
  - GNSS trainings for developers and decision makers
  - Best practices handbook and searchable web
  - Worldwide excellent outreach at the ITS Congresses 2015-16 with Automated Driving demos

- Inlane: GNSS and Computer Vision Fusion for Lane Level Navigation
  - Foster exploitation of GNSS + sensor fusion and lane level navigation
  - Fruitful dissemination at the Asia Pacific World Congress in Melbourne

Objectives

- Develop a new generation, low-cost, lane-level, precise turn-by-turn navigation application through the fusion of EGNSS and Computer Vision technology

- Enable a new generation of enhanced mapping information with real-time updating based on crowdsourcing techniques – Local Dynamic Map generation

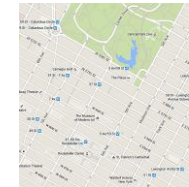- Bring navigation to a new level of detail and effectiveness

Only based on GNSS and actual cartography: not lane level accuracy, only road level

Cartography Update Problem

Severe simplification of road description

Information not based on vehicle's real position

Precise positioning & scene understanding

SLAM

IMU
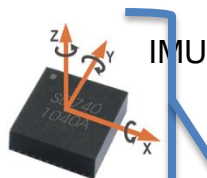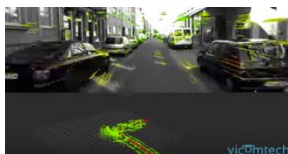
GNSS Receiver

EDAS

Computer vision
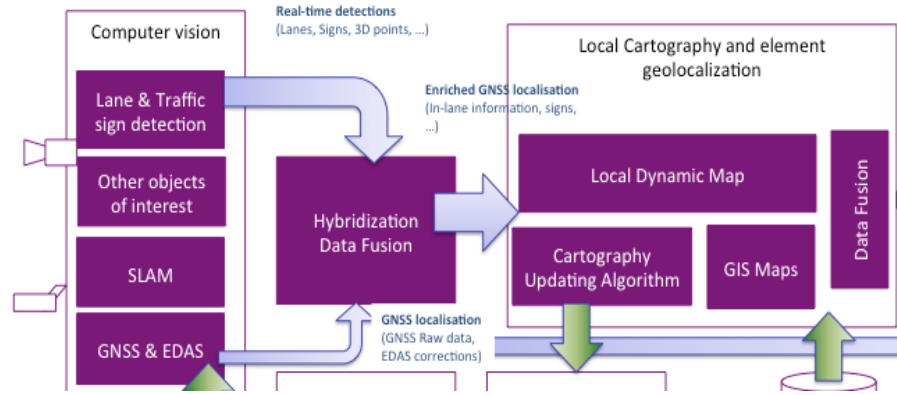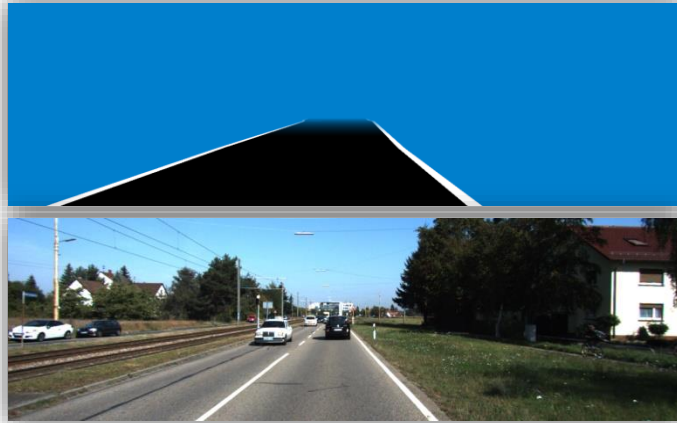
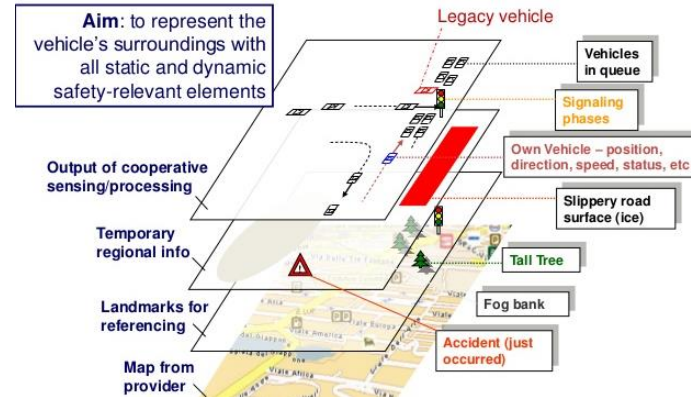Lane & Traffic sign detection

Other objects of interest

SLAM
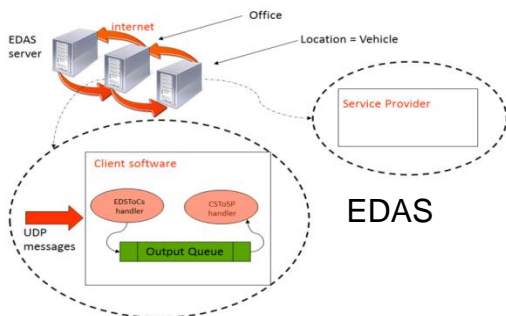
GNSS & EDAS

- Lanes
- Relative Position
- Road Geometry
- Lane Marking
- Traffic Signs
- Preceding Vehicle

Dynamic Map

Camera to Map Aligment

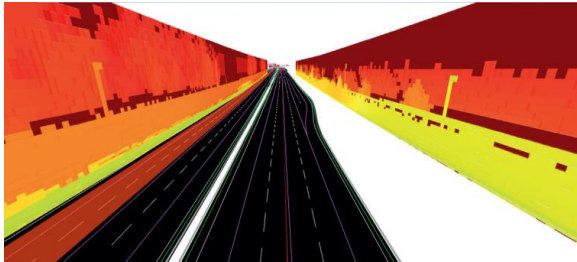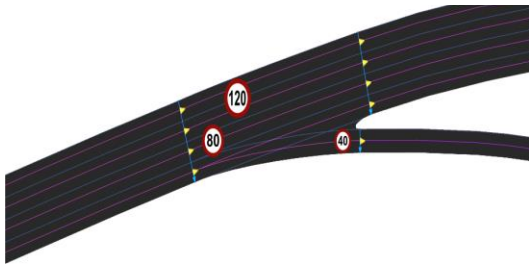# Standardization

Cartography

Navigation Data Standard
PSF Physical Storage Format

Positioning performance standardization for ITS

Appropriate management of positioning performance standards for ITS requires:

• Establishment of a common language for their measurement (metrics)

• Definition of performance at system/application level

• Definition of performance at positioning level

• Engineering procedure to link the two above

• Establishment of procedures for testing (measurement of performance metrics)

Standarization Groups

ETSI
2013 Celebrating 25 years

TC SES/SCN

TC5/WG1   cen CENELEC

cost   SaPPART

Conclusion

- ITS applications and in particular Automated Driving require well evaluated high levels of performance

- ERTICO has contributed to develop a suitable ITS performance requirement framework for the EU-GNSS

- The ERTICO partnership supports continuously EU and international actions to ensure seamless integration of EU-GNSS solution for ITS and Automated Driving

- Inlane is expected to bring navigation and autonomous driving to a new level of effectiveness

ERTICO
ITS EUROPE