TS 10 MODAL SHIFT AND MULTIMODALITY – ITS SUPPORTING BETTER SERVICES

MOTORCYCLE AS ITS PLATFORM FOR SMARter TRAVEL AND LOWER EMISSIONS
TOPICS

• From Cars to PTWs, from ADAS to ARAS
• Too Many ‘NO’s
• Design Issues
• Fieldbus and On-Board Diagnostics
• Outcome
ITS SYSTEMS FROM CARS TO PTW

• Major issues
  • Unprotected “detachable” vehicle operator, separation imminent @ crash
  • Leaning vehicle with different riding and steering dynamics
  • Short of space on board, minimisation is a must
  • Human Machine Interface – i.e dashboard – out of sight

• Outcome
  • Incompatible vehicle systems due to design parameters
ARCHITECTURAL DESIGN ISSUES – TOO MANY ‘NO’S

- No data gathering equipment on PTWs
- No in-vehicle fieldbus on PTWs
- No on-board diagnostic (OBD) connection
- No sensor connectivity backbone

→ Data, Message and Command exchange challenging
DESIGN & IMPLEMENT

- **CAN Bus Interface**
  - Receive analog and digital measurements
  - Interpret measurements to CAN Messages
  - Forward Messages for On Board Computer

- **On Board Computer**
  - Establish OBD Communications
  - Receive CAN Messages
  - Forward Messages for ITS Systems and Devices on board the PTW

![Image of CAN Bus Interface](image1.png)

![Image of On Board Computer](image2.png)
CAN BUS INTERFACE

Analogs
- O2 Sensor
- Throttle
- Manifold Air Pressure
- Intake Air Temp
- Coolant Temp
- Front Brake Press

Digitals
- RPM
- Speed
- Brake Light
- Left Turn
- Right Turn
- Steering angle

RAMBOLL CAN interface

CAN Bus

In vehicle CAN

RAMBOLL On Board Computer

ITS Dublin 2013 Congress, 4-7 June, Dublin
CAN BUS INTERFACE

- Operational amplifiers for analog signals
- Pulse shapers for digital signals
- I/O-module
- B/w the vehicle and the module inputs
ITS ON BOARD COMPUTER

- Linux computer
- ARM processor
- Mobile flash memory
- Two CAN Ports
- I/O for various sensors and external connections
- Communication links over Bluetooth and Ethernet interfaces
MAJOR PTW ITS DEVELOPMENT CHALLENGES IN THE PIPELINE

- On Board ITS Application Platform, supported in EcoIST Initiative by Transport Safety Agency TRAFI
- Sensor Development, supported in SENSIN Project by Technology Funding Agency TEKES
- Pan-European 112 eCall Systems, supported in HeERO Pilot Project by DG CNECT
- Development Platform for Safe and Efficient Drive/Ride, supported in DESERVE Project by ARTEMIS JU
PTW AS ITS RESEARCH PLATFORM

- Rider HMI
- ecoRoute Navigator
- SENSIN eCall sensors
- On Board Computer
- CAN Bus Interface
- Communication controller
- eCall controller
PTW AS STAND-ALONE AND COOPERATIVE ITS APPLICATION PLATFORM

- Rider HMI Framework
- Rear Approaching Vehicle and Blind Spot Monitoring & Warning
- Intelligent intersection (emergency vehicle detection)
- Rider Drowsiness
- Queue Ahead Warning
- Emergency braking ahead
- Electronic emergency brake light (from ego vehicle)

- 112 eCall
- Situational Speed w Rider Profile
- Motorcycle Parking Space finder
- Fast vehicle approaching @ PTW
- Motorcycle approaching @ Cars
- Road works rider warning
- Rider assistance request
- Occupant detection and classification
SUMMARY

- PTWs not “another car-like vehicle”
- Enabling technologies deployment to support ITS Systems and Services
- CAN Bus a major enabler
- Single On Board Data Access & Management Point for ITS Application
- Motorcyclists as Vulnerable Road Users
- Wide selection of C-ITS Applications suitable also for PTWs
- Specific attention in C-ITS Application, Hardware and Software development
- PTWs are a significant part of the Urban Mobility Structure
THANK YOU

Please contact:
Mr. Aki Lumiaho, Ramboll Finland
aki.lumiaho@ramboll.fi

Welcome to Helsinki for the 10th ITS EUROPE CONGRESS