



**TS 10 MODAL SHIFT AND MULTIMODALITY –
ITS SUPPORTING BETTER SERVICES**

**MOTORCYCLE AS ITS PLATFORM FOR
SMARTER TRAVEL AND LOWER EMISSIONS**

RAMBOLL

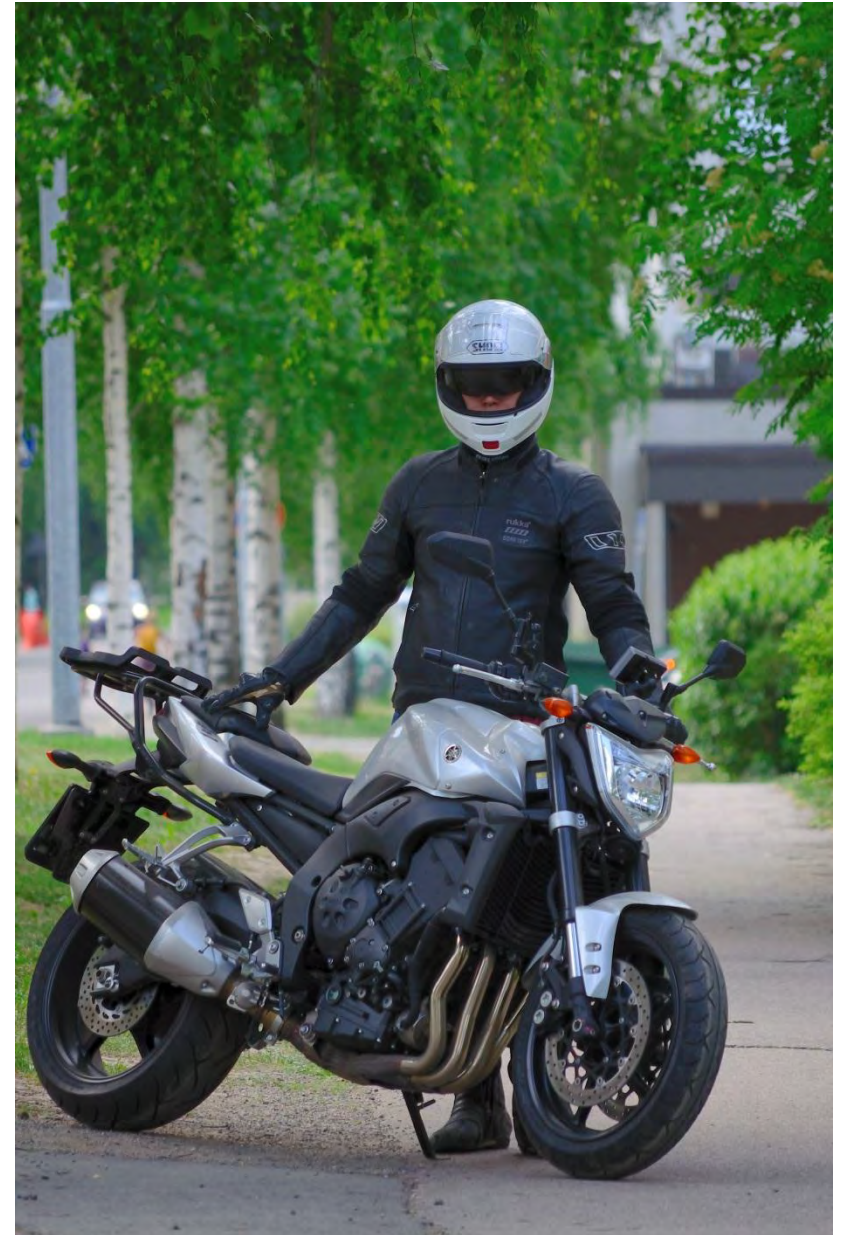


9th ITS EUROPEAN CONGRESS
REAL SOLUTIONS FOR REAL NEEDS

Dublin, Ireland | 4-7 June 2013

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

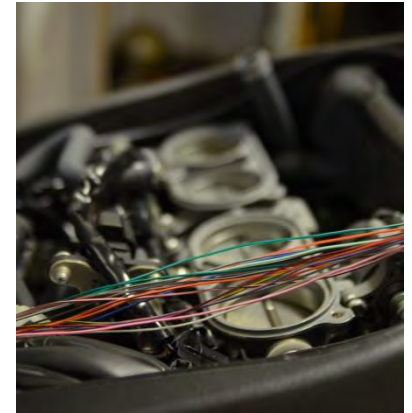
- Major issues
 - **Unprotected “detachable”** vehicle operator, separation imminent @ crash
 - Leaning vehicle with different riding and steering dynamics
 - Short of space on board, minimisation is a must
 - Human Machine Interface – i.e dashboard – out of sight
- Outcome
 - Incompatible vehicle systems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

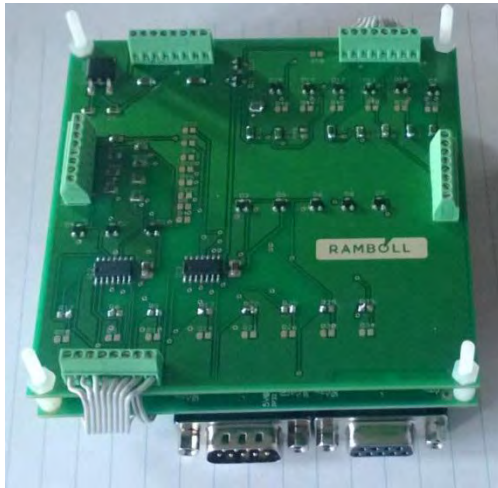
→ Data, Message and Command exchange challenging



DESIGN & IMPLEMENT

• CAN Bus Interface

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

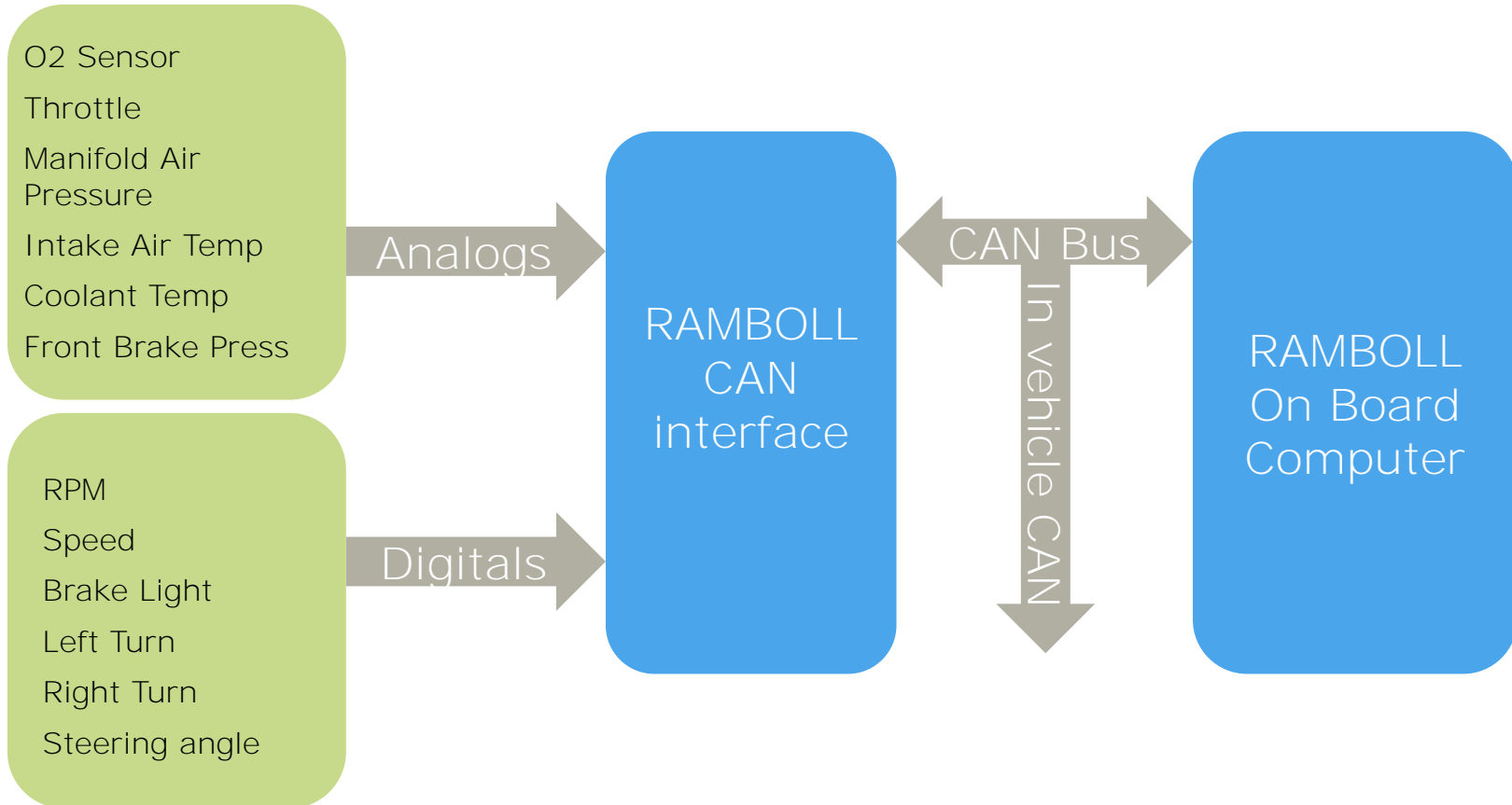


• On Board Computer

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

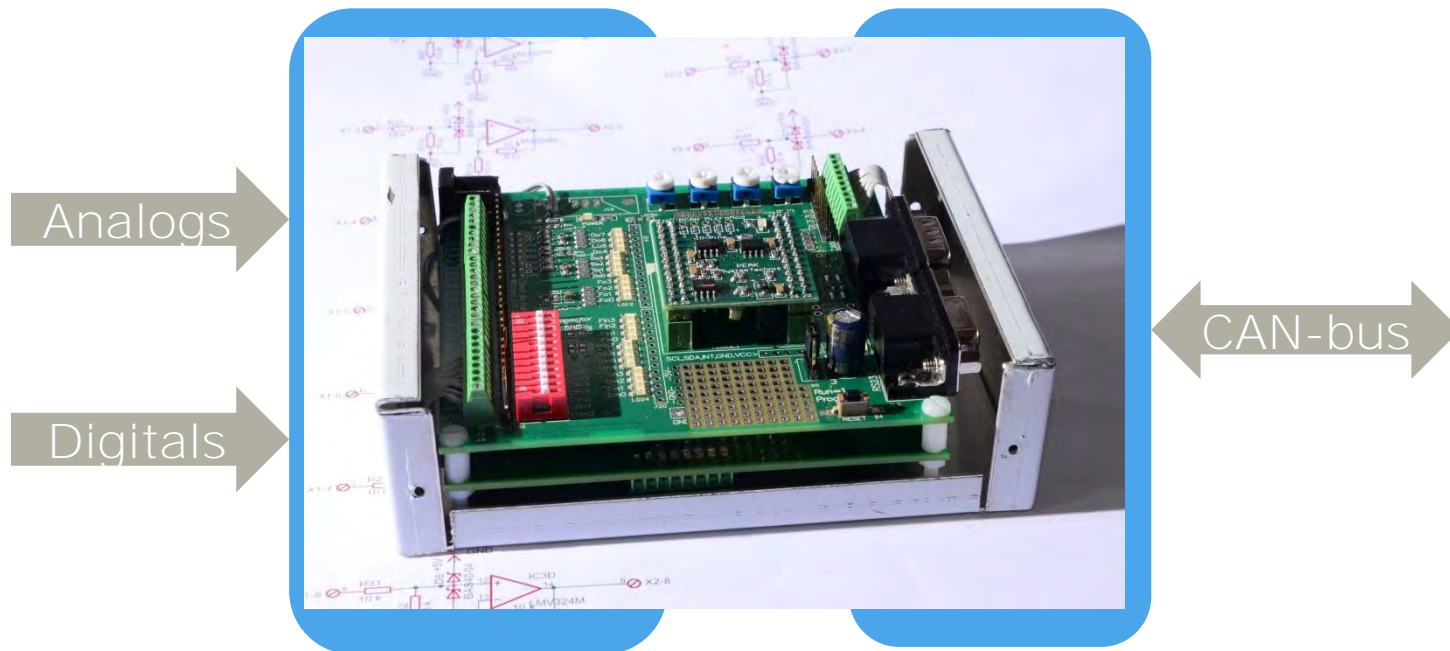


CAN BUS INTERFACE



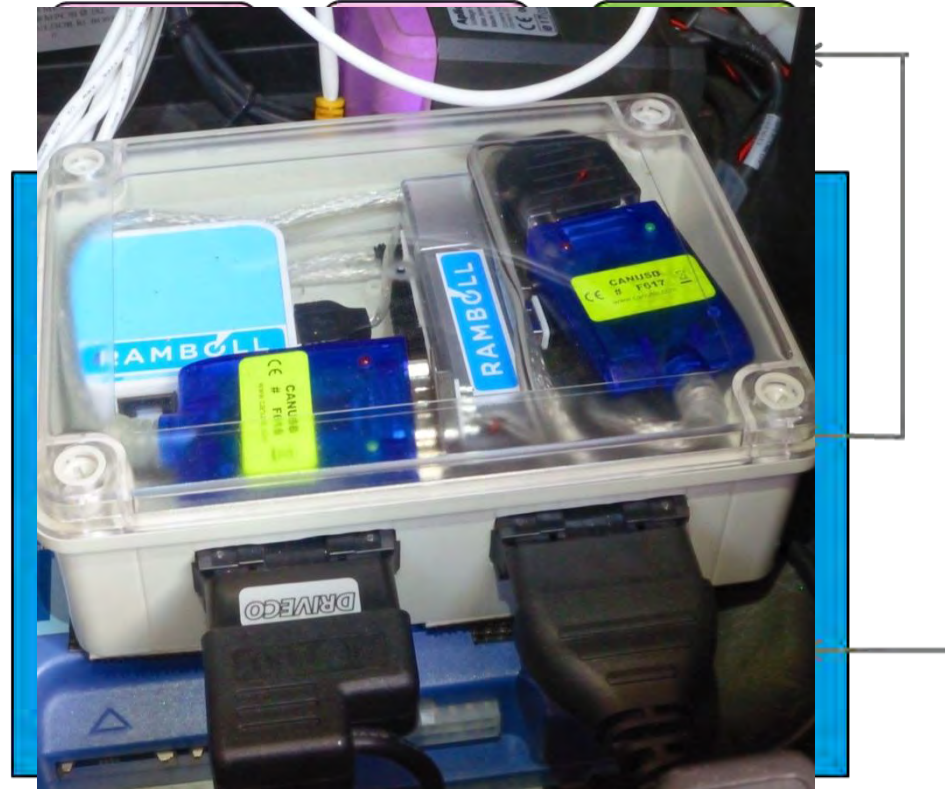
CAN BUS INTERFACE

- 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

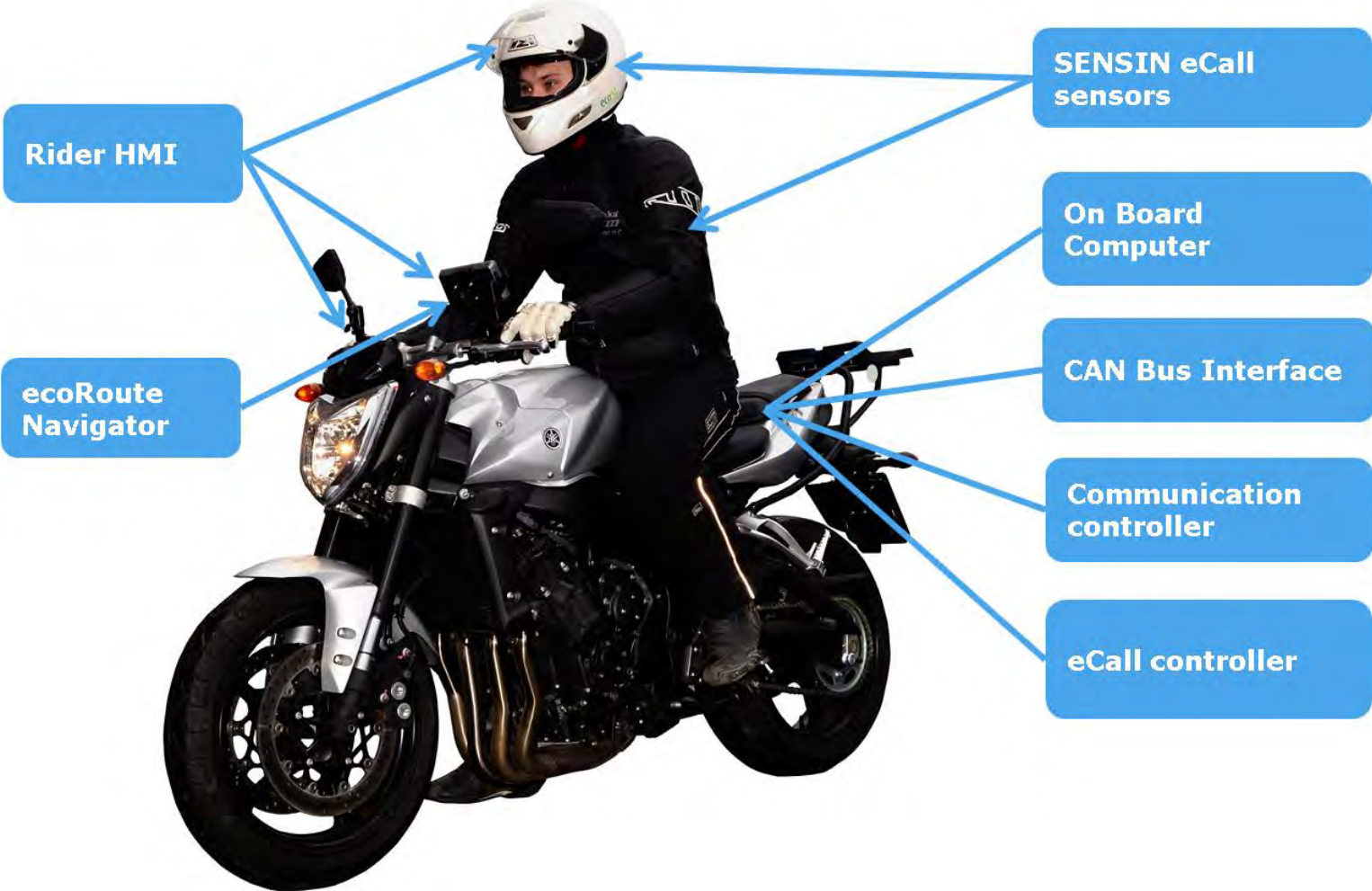


MAJOR PTW ITS DEVELOPMENT CHALLENGES IN THE PIPELINE

- 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



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

ITS must not leave
the rider out of the loop

Please contact:

Mr. Aki Lumiaho, Ramboll Finland

aki.lumiaho@ramboll.fi

Welcome to Helsinki for the 10th ITS EUROPE CONGRESS



9TH ITS EUROPE CONGRESS @ DUBLIN, IRELAND