

ETAS INCA-RDE



AUTHORS

Dr. Ulrich Lauff is Senior Expert Marketing Communication at **ETAS GmbH**.

Rajesh Reddy is Product Manager in charge of the INCA-RDE tool at **ETAS GmbH**.

Determination of vehicle emissions under real-world driving conditions

Starting 2017, vehicles to be registered in EU countries must have their real driving emissions (RDE) checked. ETAS has developed an assistant that allows test drivers to track the status of measurements in real time. This will make it possible to monitor whether RDE measurements comply with statutory limits. This assistant has been seamlessly integrated into ETAS INCA so that specialists can continue conducting RDE tests in the same working environment. This product can be used to execute RDE driving tests in a controlled and reproducible manner.

Experts must consider many parameters. Parameters include the duration of measurement-collection drives, distances that must be covered in urban or rural areas or on motorways, permissible speed ranges, and requirements for driving performance. In addition, test and calibration engineers need the latest emission measurements.

INCA-RDE

The RDE assistant, which ETAS will market as INCA-RDE, evaluates measurement data in real time during a driving test (see figure 1). Drivers for INCA experiments will see the following INCA-RDE information displayed on virtual RDE-specific instruments:

- GPS location data

- Start of emission measurement
 - Measurement results
 - Monitoring of measurement equipment
- The following test parameters will also be shown:
- Environmental conditions and engine status
 - Distance and duration of route per route category

- Vehicle speed and acceleration
- Assessment of the conformity of measurements with RDE requirements

Figure 2 depicts the display of RDE data collected during an INCA experiment.

Mode of operation

The INCA-RDE software tool connects to the PEMS (Portable Emissions Measurement System) hardware over CAN protocol via an ES59x interface module. INCA-RDE evaluates emission measurements online as well as OBD and GPS data likewise collected by the PEMS. In this context, two methods are used to check the vehicle dynamics conditions of INCA-RDE: the method of moving averages (EMROAD) and ratings per performance class (CLEAR). The results of analysis – the actual RDE data – are displayed on RDE-specific instruments in the INCA experiment. This data is also recorded every ten milliseconds in synchronicity with signals from the INCA engine control unit (ECU). This simplifies correlation between recorded RDE data with the ECU measurement signals after measurement completion.

Summary

INCA-RDE provides test engineers with real-time information on uncluttered display instruments summarizing the execution and evaluation of RDE measurements accumulated during driving tests. This solution is integrated into the familiar tool environment for recording vehicle measurements, calibrating control units, and evaluating diagnostics. INCA-RDE makes it possible to efficiently determine RDE emissions and analyze this emission data with corresponding ECU signals.

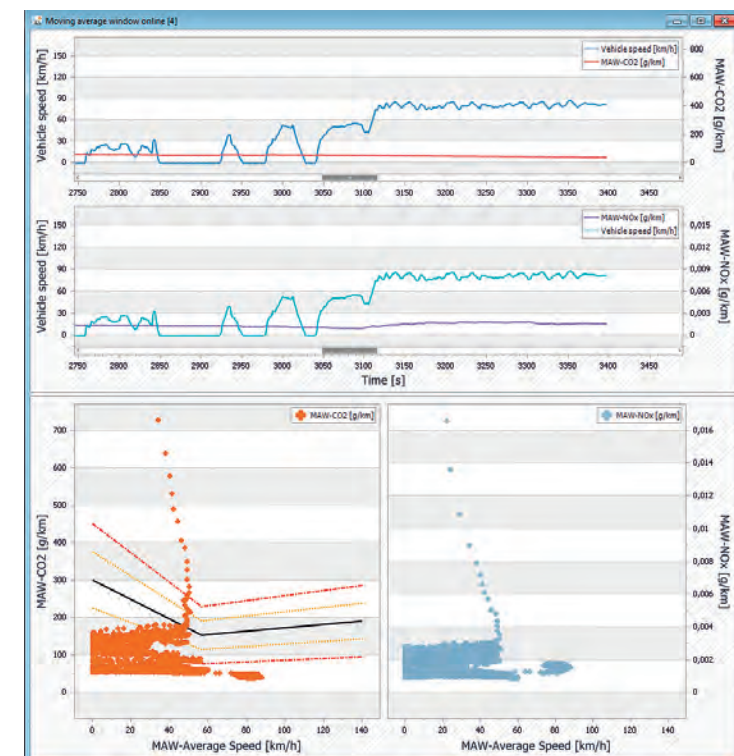
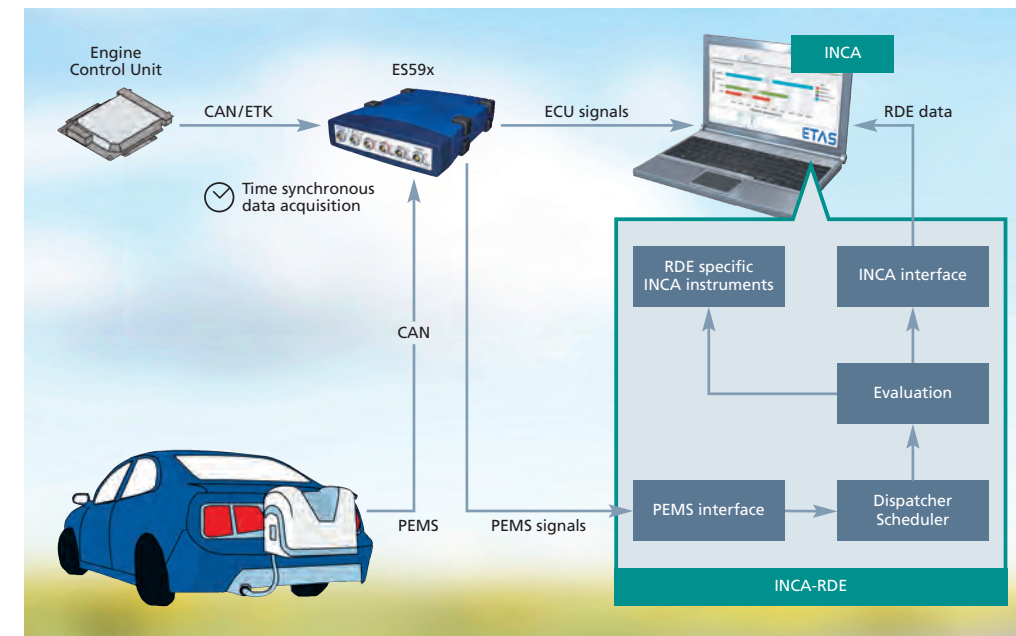


Figure 2: Top and in the middle – CO₂ and NO_x emissions in g/km and vehicle speed as well as duration of measurement in seconds. Bottom – CO₂ and NO_x emissions as well as vehicle speed. The bottom-left graph displays the characteristic CO₂ curve (black line) of the test vehicle and the corresponding tolerance ranges (yellow and red lines). In RDE testing, half of the CO₂ values that are averaged within a window of variable breadth (Moving Average Window, MAW) should be within the inner tolerance range.

Figure 1: Overview of the system. The emissions are measured with a portable measuring device in a test drive, evaluated with INCA-RDE and displayed in INCA with the help of specific instruments.