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ICOS-CNG

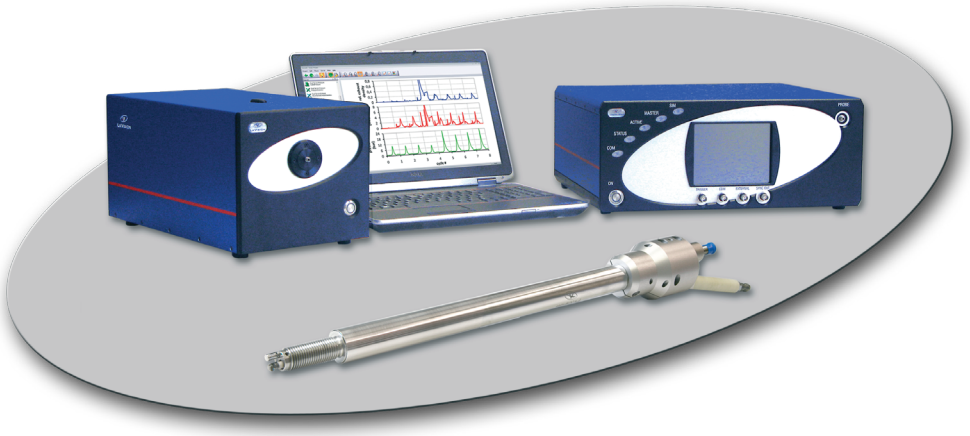
Boosting gas engines

New gas and dual fuel engine developments for significant carbon dioxide reduction are focused on using **Compressed Natural Gas** (**CNG**) for

- high efficient gas engines
- dual fuel Diesel engines

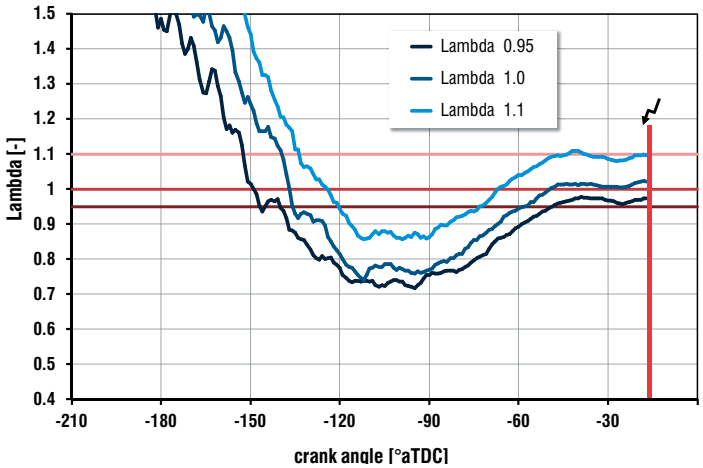
Especially direct injection of gas can deliver more torque at low rpm and offers high driving enjoyment.

The stratification of these gases with fresh air is different compared to liquid fuels due to the mixture formation. So knowledge about highly time-resolved air/fuel-ratio evolution within each cycle is necessary for fitting of engine parameters.



New tool

LaVision´s **ICOS-CNG** systems provide an ultrafast measurement tool to analyze the crank angle resolved in-cylinder air/fuel-ratio evolution of gas engines. The mixture formation and the degree of homogeneity is easily visualized.



Crank angle resolved air/fuel-ratio at methane gas engine with injection

Applications

- crank angle resolved air/fuel-ratio measurement in gas engines
- investigations of highly dynamic engine conditions
- analysis of gas mixture formation

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Operating principle

The optical system is based on infrared absorption spectroscopy of hydrocarbon molecules. The **ICOS** system is contactless and no gas sample extraction is required. Measurements are recorded without time delay and temporal smearing with rates of up to 30 kHz. The engine synchronized operation is used to analyze either motored or fired engine cycles in both stationary and dynamic test conditions with crank angle resolution.

System features

- specially tailored detection for CNG engines
- no gas sampling, measures directly inside the cylinder
- no modifications of the engine needed
- precise single cycle analysis
- fully resolved consecutive cycles for measurement of transient phenomena

Calibration

The system is factory calibrated for methane. A recalibration allows to adapt to typical CNG compositions.

Access to your engine

Various probes for locally detection at the spark plug tip or averaged at a line across the cylinder are available:

Line-of-sight probe	suitable for any engine condition, especially high loads, measures the average across the cylinder
Spark plug probe	very convenient access to any production type engine by replacing the spark plug by an M12 or M14-probe, while maintain the ignition capability, measures locally at the spark plug
M5 probe	minimum invasive probe fits into standard M5 pressure transducer bores, measures locally at the cylinder wall

ICOS family in-cylinder quantification

The **ICOS** family provides even more quantified in-cylinder data. With our **ICOS** and **ICOS-Temperature** systems more quantities are measured additionally from inside the cylinder without any gas extraction at high temporal resolution:

- exhaust gas recirculation
- gas temperature
- water concentration
- for gasoline and Diesel engines

Data provided by LaVision is believed to be true. However, no responsibility is assumed for possible inaccuracies or omissions. All data are subject to change without notice.

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