

# EURIPIDES Forum 2010 in Paris

September 30<sup>th</sup> – October 1<sup>st</sup>, 2010 in Paris

## IQF Sensor

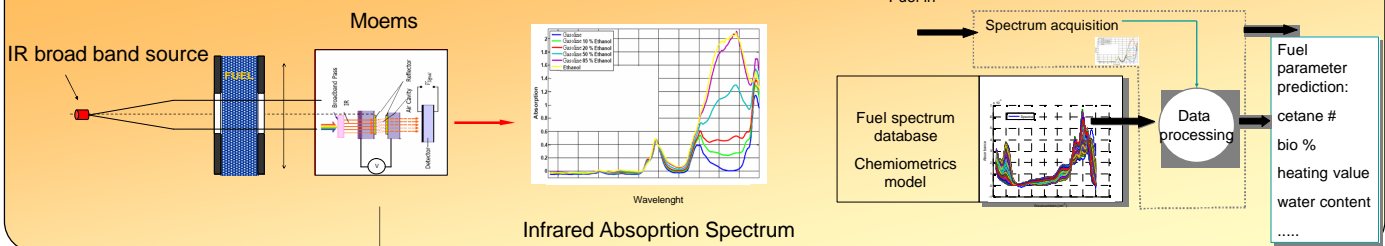
Integrated Fuel Quality Sensor – EUR 07-408

### INTRODUCTION:

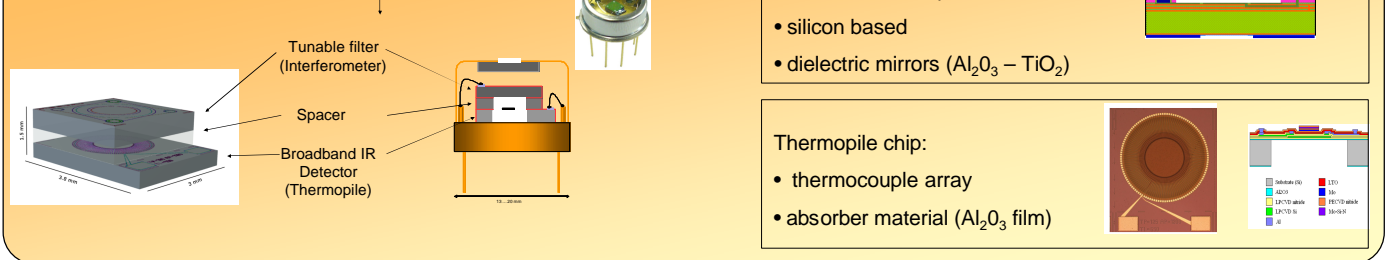
"IQF sensor project" is devoted to development of one automotive embedded sensor (MOEMS based) for real time measurement of used fuel composition together with related engine and exhaust gas aftertreatment control function. Fuel type can be either diesel or gasoline.

The sensor is using Near Infrared Absorption spectroscopy together with mathematical model (chemiometry) to predict the fuel parameters relevant for engine combustion and exhaust gas aftertreatment efficiency. The spectrometer and detection units are based on 2 MOEMS components integrated within one single package.

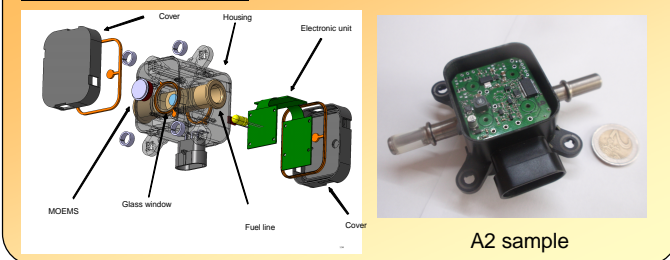
### MOEMS SPECTROMETER:



### SENSING PRINCIPLE:

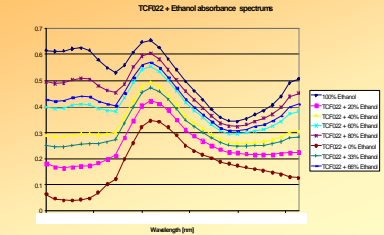


### SENSOR DESIGN:



### LAB RESULTS:

- from A2 samples
- good linearity
- good repeatability



### TARGET SPECIFICATION:

	Measurement Range	Accuracy
Biodiesel Concentration	0-100% vol	±5 %
Density	700 – 900 kg/m <sup>3</sup>	±5 kg/m <sup>3</sup>
Cetane Number	40 – 70	±4
Heating Value	Depends on bio concentration	±2%
Sulphur Content	classification high/low content	Threshold = 500ppm
Ethanol Concentration	0-100% vol	±5 %
Octane index	80-100	±2
Road vapor pressure	350-1100 hPa	±35 hPa

Measurement location: in fuel line  
 Pressure Range: <10bar  
 Temperature range: -40°C to +85°C  
 Sensor Signal: CAN, SENT  
 No field calibration

### BENEFITS:

- Optimization of engine and after treatment units efficiency (DPF, SCR, CO): reduction of CO<sub>2</sub>, NO<sub>x</sub>, particle emission and fuel economy
- Improvement of drivability (e.g.: engine knocking, cold start)
- Engine component reliability improvement
- Same concept can be used for Oil and AdBlue diagnostic

### PROJECT DATA:

Starting: April 2008      SP1: specification/added value - completed  
 Closure: October 2011      SP2/SP3: sensor/MOEMS design – 50%  
 Budget: 8.1 Meuros      SP4: engine control function – 10%  
 Man Power: 519 MenMonths      SP5: test/validation – 0%