WP2

Multi-fuel Combustion

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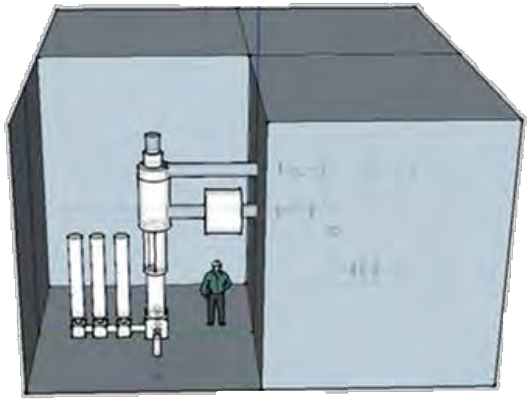
Progress update (2-stroke)

2.1 Fuel flexible test facility

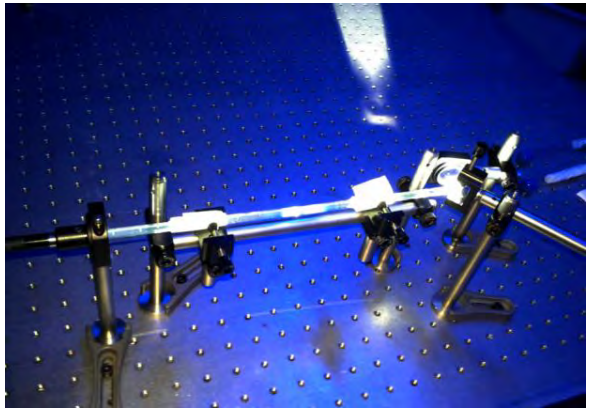
- Design team formed
- 2 concept designs currently under detailed investigation
- Building specifications drafted



Spray Combustion Chamber

2.2 Injection&ignition characterisation

- Development of optical techniques for test rig and engine started
- Modifications to optics and optical access for multi-fuel covers on test engine started
- Injector validation measurements on atmospheric pressure rig performed

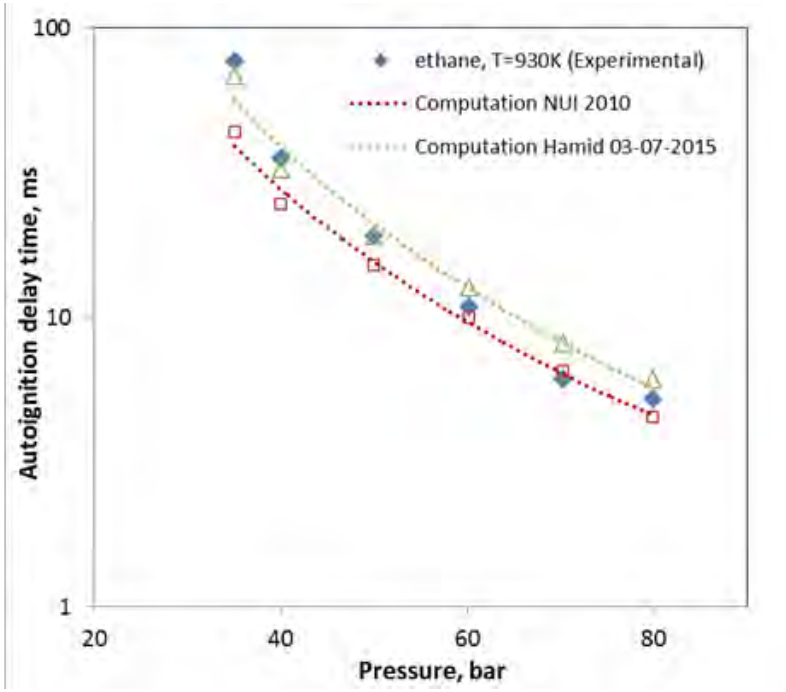


Test of illumination optics

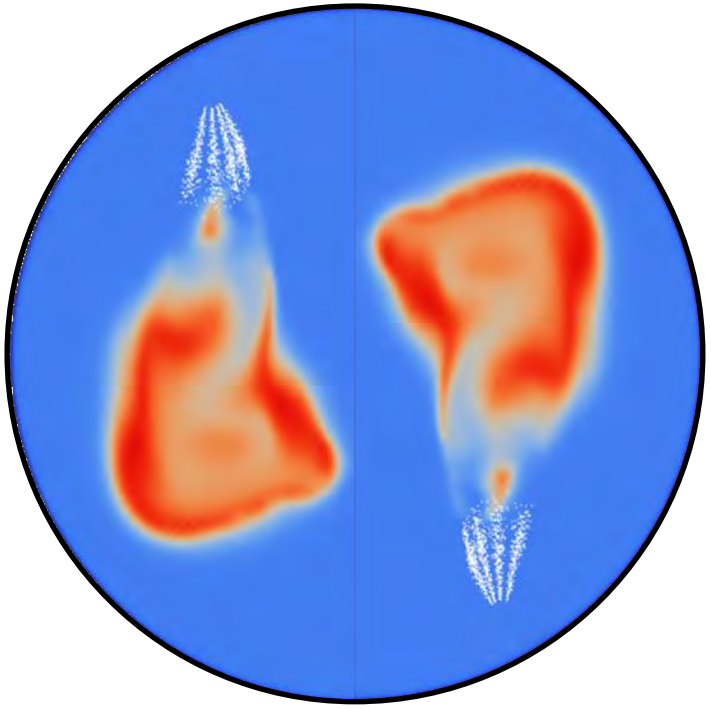
Progress update (2-stroke)

2.3 Numerical studies of fuel and ignition

- Development of detailed chemical kinetic model for light HC and alcohols, and evaluation of existing reduced models under engine conditions are ongoing
- Implementation work into CFD started



Ethane auto-ignition

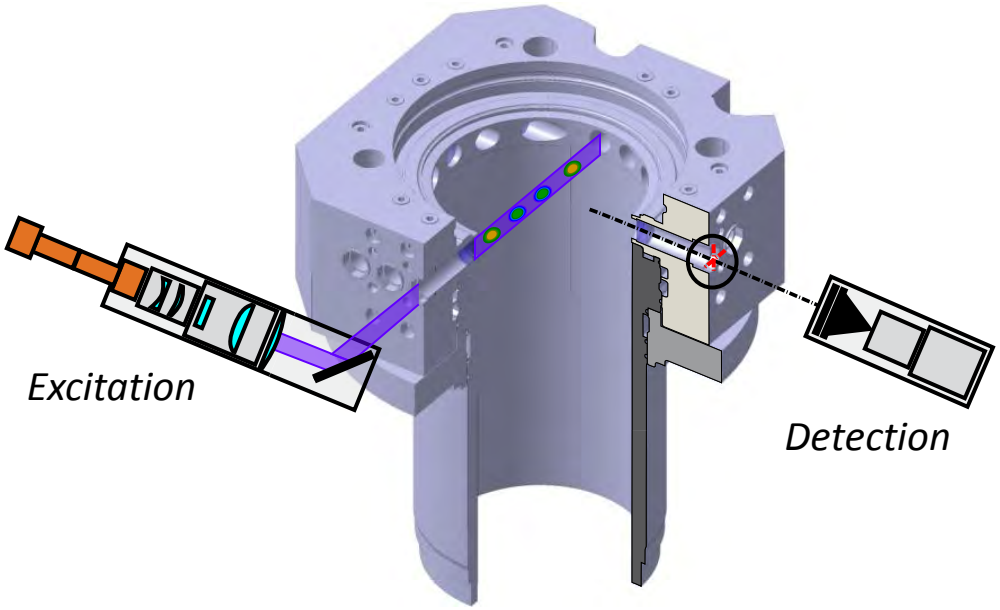


MDO-CFD

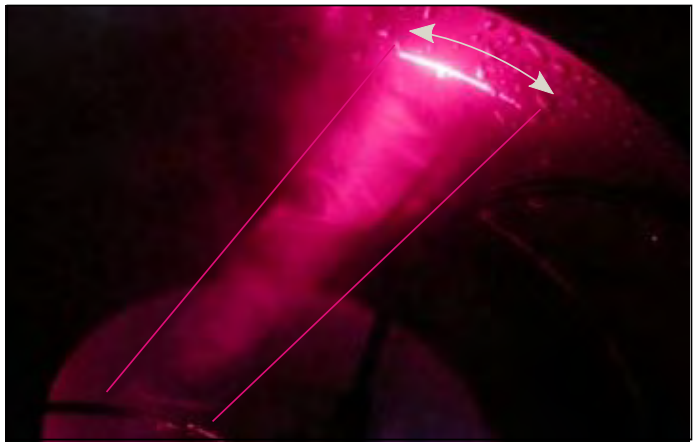
Progress update (4-stroke)

2.4 In-cylinder mixture formation

- Comparison of different possible optical accesses --> finished
- Detailing of different concepts --> ongoing
- Literature study on different measurement techniques --> finished
- Integration of possible measurement techniques into optical engine concept --> ongoing



Conceptual design for measuring mixture distribution



Light-sheet test

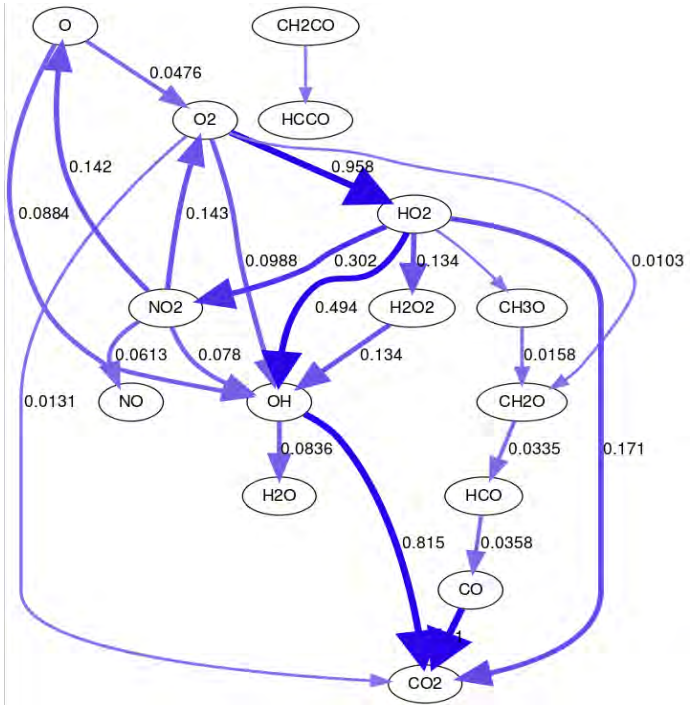
Progress update (4-stroke)

2.5 Fuel-specific engine-control strategies

- First basic engine tests --> finished
- Preparation of single cylinder parts and spray chamber measurements for investigation of different fuels --> ongoing

2.6 Low temperature NO_x formation

- First calculations show promising results



NO_2 reaction path

Future work (2-stroke)

- Finish design concept for multi-fuel test rig
- Start design, construction and preparations for test rig
- Developing optical techniques for test rig and engine
- Finish modifications for optical access to test engine for operation on novel fuels
- Development of a detailed chemical kinetic model for the oxidation of light HC and alcohols
- Implementation of skeletal chemical models for novel fuels into CFD
- Start CFD modelling of novel fuels in 2-stroke Diesel process

Future work (4-stroke)

- Detailing of different concepts for optical accesses and concept evaluation
- Evaluation of different λ measurement techniques
- Integration of possible measurement techniques into optical engine concept
- Spray Chamber measurements for investigation of different fuels
- Single cylinder engine tests with different fuels
- Investigation of different NO/NO_2 models