

WP 1

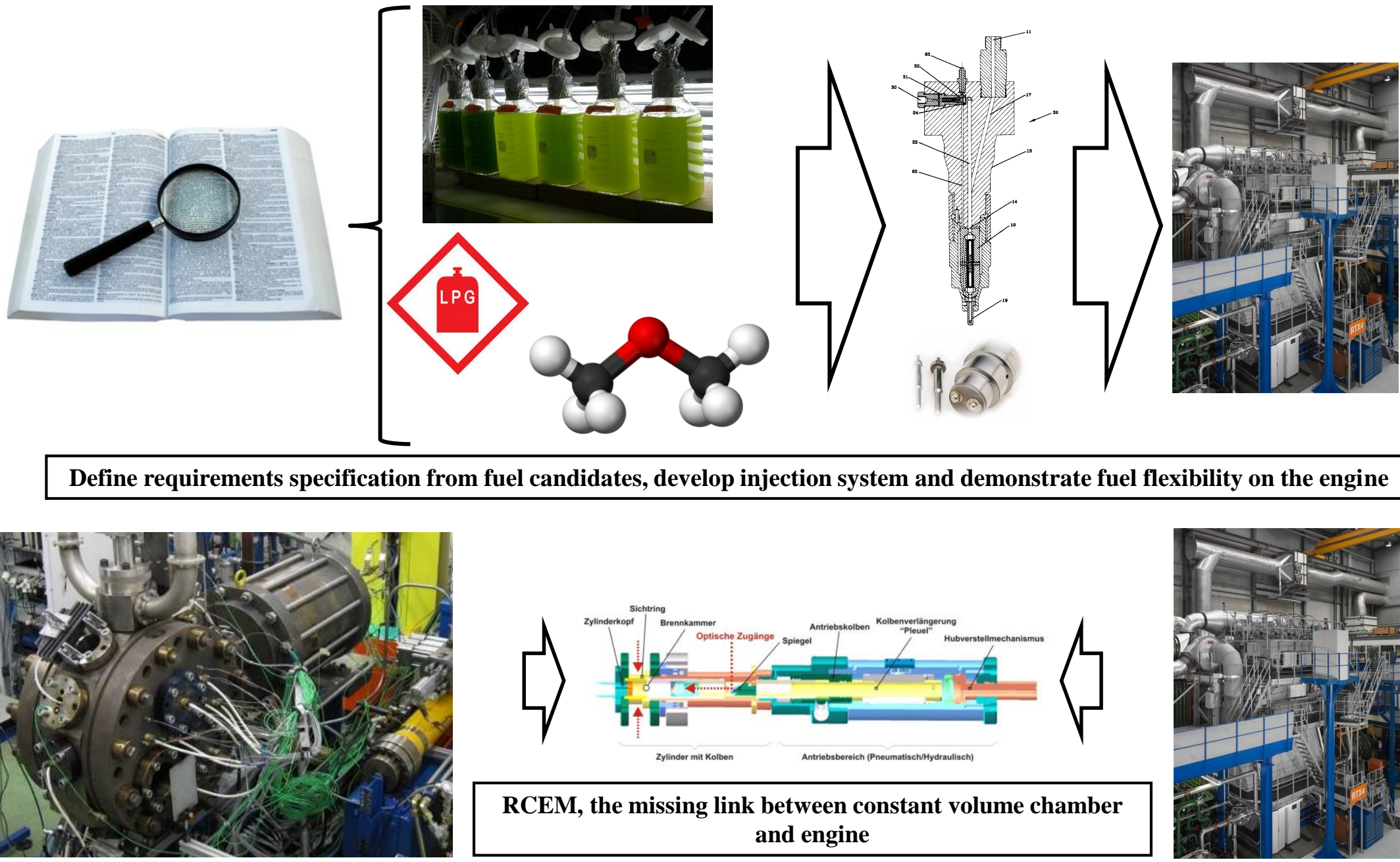
Fuel Flexible Engine



WP OBJECTIVES

To develop **engines able to switch between fuels**, whilst operating in the most cost effective way and complying with the regulations in all sailing regions.

- Study ignition capability of selected fuel candidates
- Develop a fuel injection system for multi fuel purposes
- Demonstrate fuel flexible engine operation
- Perform feasibility study on Rapid Compression Expansion Machine (RCEM)



EXPECTED OUTCOME

Sub project 1.1:
The demonstration of a novel injection system, allowing the closed loop controlled application of alternative fuels in marine engines.

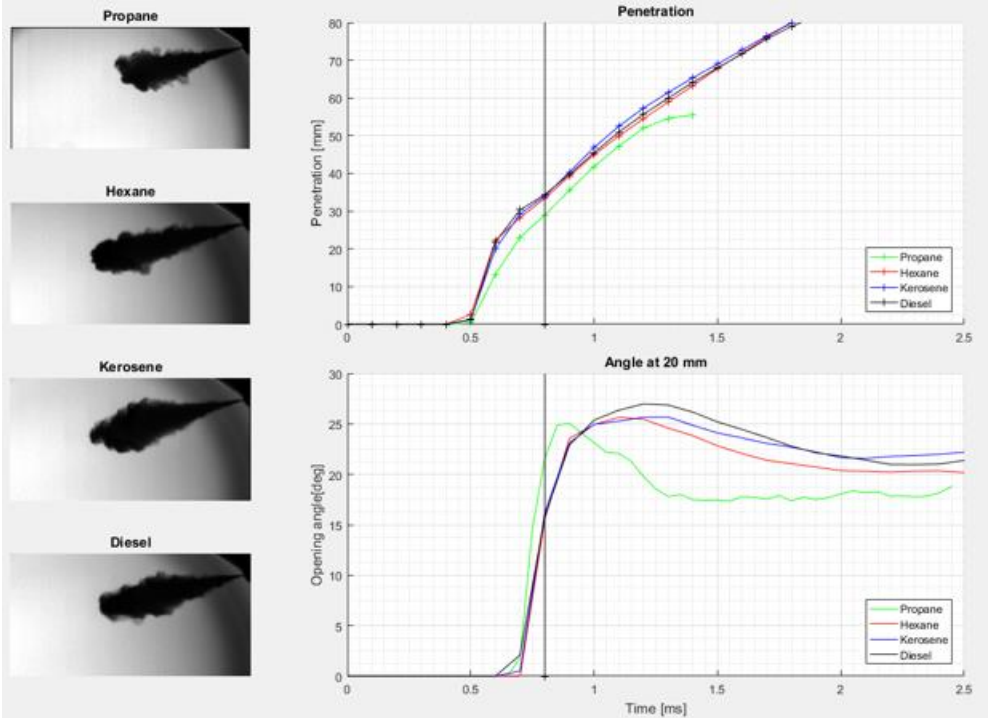
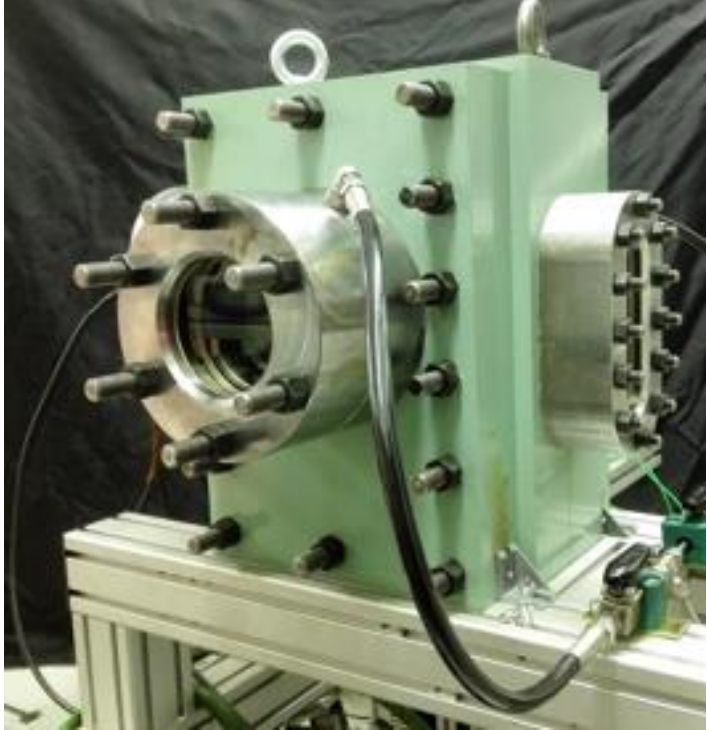
Sub project 1.2:
Feasibility study on rapid compression/expansion machine to base decisions on for further steps

PROGRESS AND PLANS

SP: 1.1: 4-stroke

Fuel injection measurements in spray chamber with high speed camera

- The objective is to determine the opening angle and penetration with different fuels.
- Kerosene, Hexane, and Propane. Diesel used as reference fuel
- Injection pressures used: 550 bar and 1000 bar
- Chamber density: 1,2 kg/m³, 35 kg/m³ and 100 kg/m³



SP: 1.1: 2-stroke

Progress:

- New cover directly derived from RTX-6, same injector position
- Injector adapters installed
- New heating system installed
- New illumination system installed

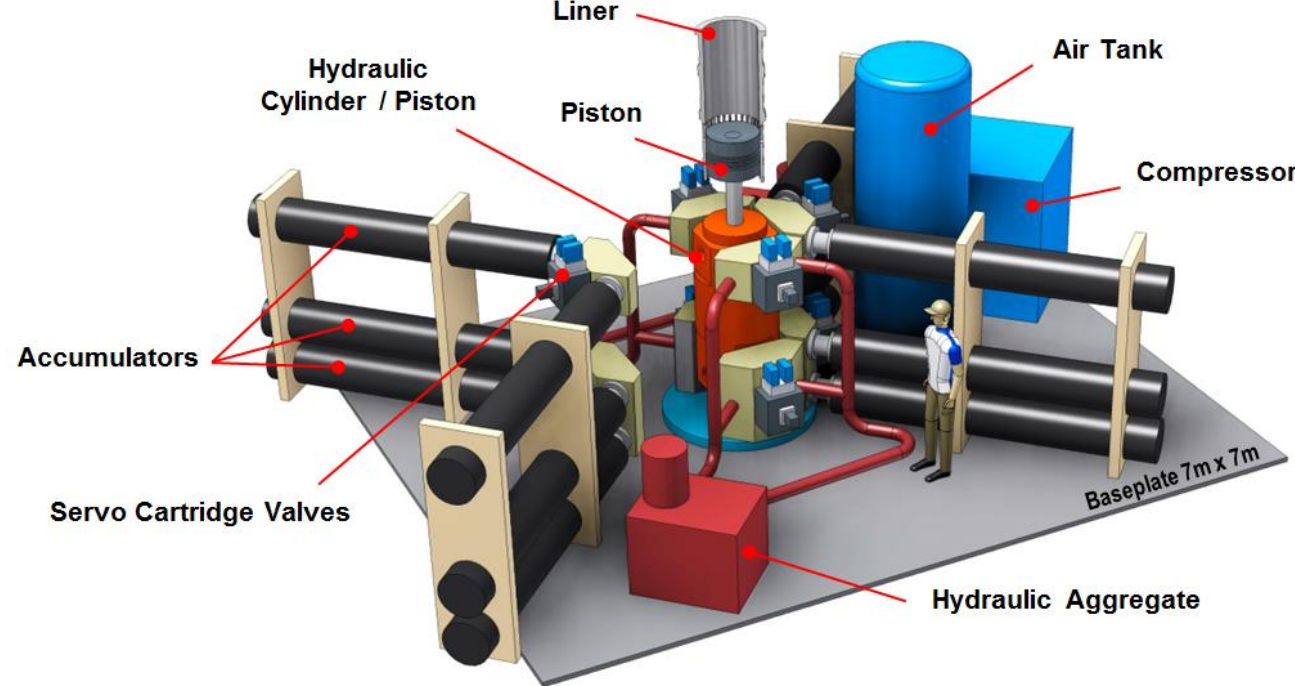
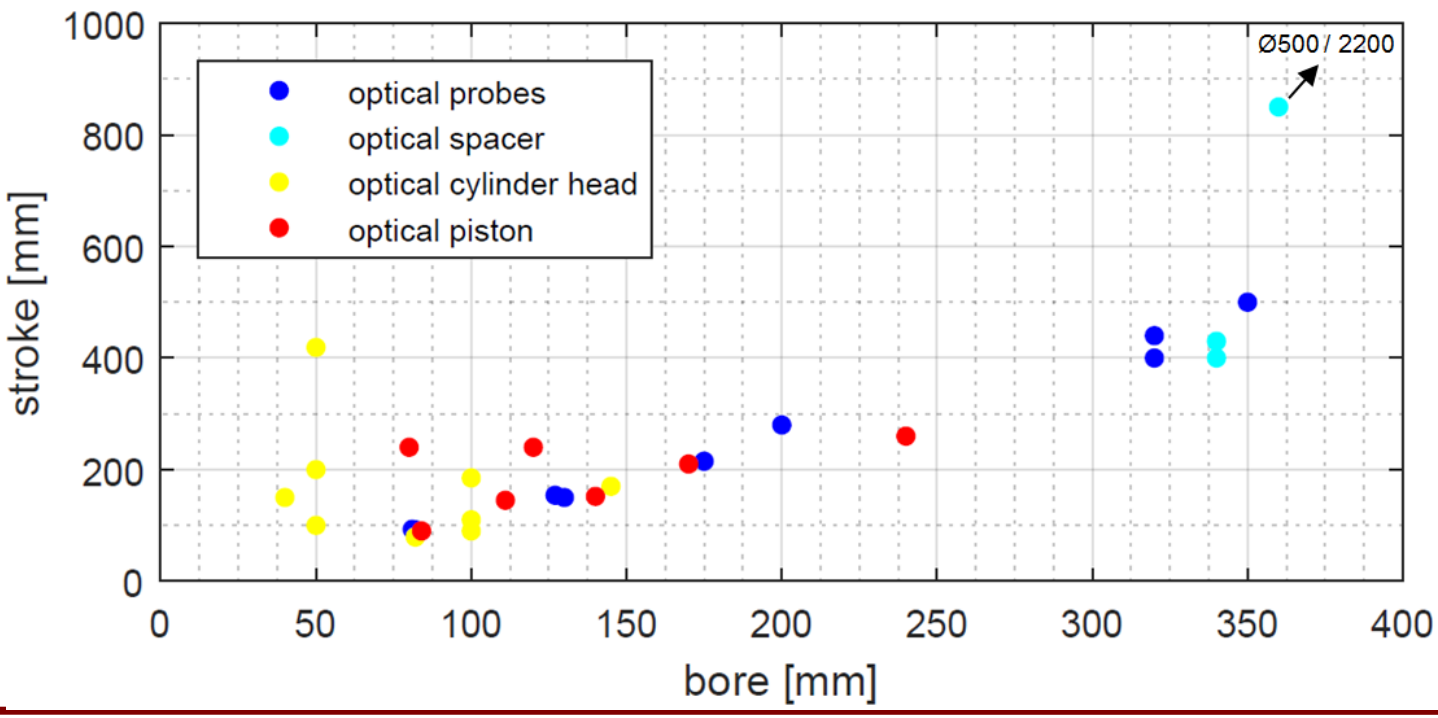
Next steps:

- First measurements with reference injection system (RTX-6)
- Commissioning multi fuel injection system
- Spray tests with alternative fuels
- Reactive tests with alternative fuels



SP: 1.2

included systems	combustion	+ charge movement	+ compression stroke	+ expansion stroke	+ intake stroke	+ gas exchange
categories	Constant Volume Combustion Chamber	Rapid Compression and Expansion Machine	Single Cylinder Engine			
operating mode	single combustion	single combustion single stroke	single combustion continuous motored	continuous combustion continuous motored		
example						
optical accessibility engine-like piston motion	excellent	good	poor			
bore	up to Ø500 mm	up to Ø100 mm	from Ø 200 mm to Ø 600 mm depending on the optical accessibility			



WP PARTICIPANTS

WP1 - 4 stroke

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WP1 - 2 stroke

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