

## CHASE program - Controlled Homogeneous Auto-ignition Supercharged Engine.

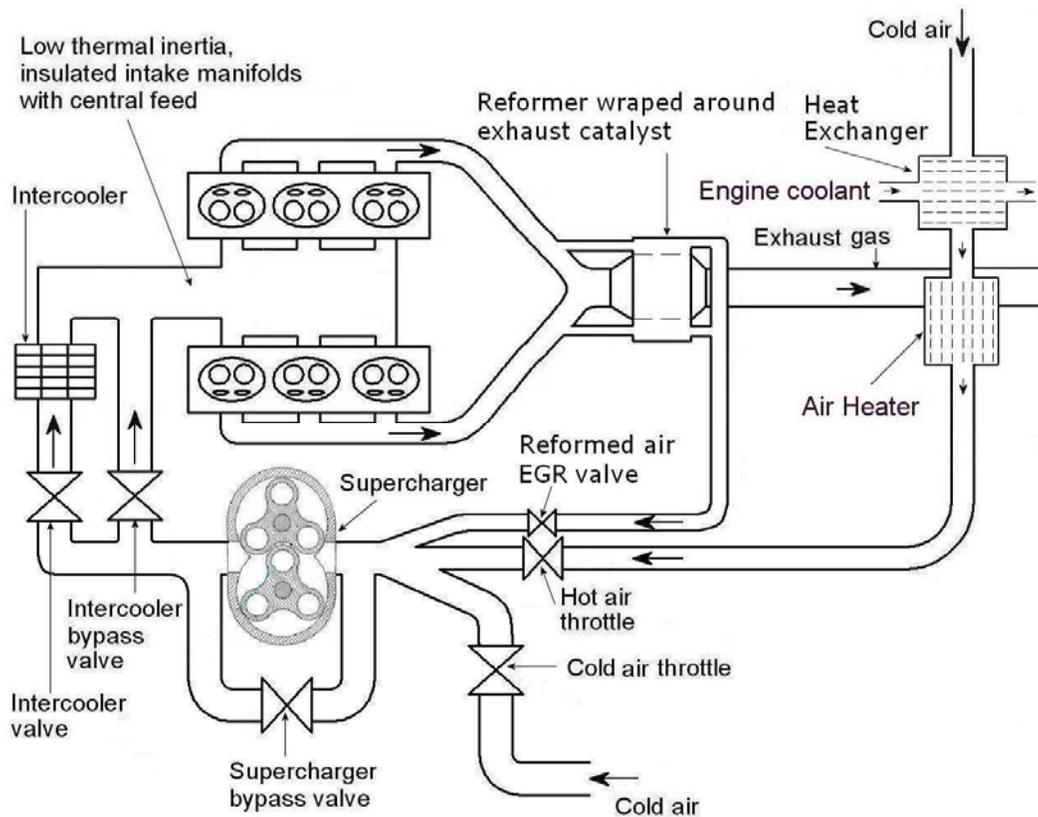
This project is funded by the UK Government through the Foresight Vehicle Program in collaboration with Jaguar Cars. Total Budget £2.359 million.

The project aims to develop a clean and efficient powertrain system centred on a supercharged homogeneous charge compression ignition engine with on-board fuel reformer and thermal management.

This project targets the extension of the range of operation of gasoline HCCI both at high and low loads by combining: boosting, low temperature fuel reforming, combined exhaust after-treatment and total thermal management.

### Benefits:

The direct beneficiary will be the UK vehicle manufacturing companies by offering new opportunities to achieve the future legal requirements on emissions (including CO<sub>2</sub>) and also reducing the energy consumption.



### Achieved objectives:

- The project has demonstrated that the combination of HCCI (Homogeneous Charge Compression Ignition) and Thermal Management can be used to increase the upper operating range by using an intercooler and supercharging whereas the lower boundary can be extended using the combined effect of heating and throttling. Furthermore an HCCI control strategy has been proposed aiming to primarily to reduce emissions and in particular NO<sub>x</sub> and secondary HC.

- A mathematical model describing the CHASE Thermal Management system has been developed and verified. Using this model one can operate and predict the behaviour of the Thermal Management system enabling the extension of the operating envelope and investigation of the various configurations in the HCCI operating region.
- The system model can run in real time and can easily be implemented for a forward predicting control strategy. In addition this model is used for predicting the boundary conditions for further and detailed modelling investigations such as in CFD computations.

Partners for this project are:

- University of Birmingham
- Jaguar and Land Rover
- Mass Spec UK
- National Engineering Laboratories
- Johnson Matthey
- Race Technology
- Shell