



Heavy Duty Gas Engines integrated into Vehicles

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Project partners:

- 1 - AVL - AVL List GmbH - AT
- 2 - BWR - Borgwarner Ludwigsburg GmbH - DE
- 3 - BOSCH - Robert Bosch GmbH - DE
- 4 - DAI - Daimler AG - DE
- 5 - DINEX - Dinex Ecocat OY - DK
- 6 - FPT - FPT Industrial S.p.A. - IT
- 7 - IDIADA - IDIADA Automotive Technology S.A.- ES
- 8 - IVECO - Iveco Espana SL - ES
- 9 - MAN - MAN Truck & Bus AG - DE
- 10 - POLIMI - Politecnico di Milano - IT
- 11 - RCD - Ricardo UK Limited - UK
- 12 - SAG - SAG Motion GmbH - AT
- 13 - TNO - Nederlands organisatie voor toegepast natuurwetenschappelijk onderzoek - NL
- 14 - TUG - Technische Universiteit Graz - AT
- 15 - UEF - ITA-Suomen Ylipisto (University of Eastern Finland) - FI
- 16 - UASE - Hochschule Esslingen - DE
- 17 - UNR - Uniresearch BV - NL
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Executive summary

The following report describes the activities executed by MAN as part of work package 5, task 5.4 “Vehicle design and simulation”. It is planned to construct a test vehicle equipped with a prototype of a low pressure dual fuel port injected engine. This dual fuel technology also implies additional changes which affect the fuel system and the aftertreatment system. New components and modifications have to be considered. This includes the package investigation, design activities and vehicle simulation. The investigations documented in this report serve as preparatory work for the vehicle assembly in in task 5.5.

Section 2 of this report describes the vehicle as a whole . Firstly the base vehicle as it has been delivered from the factory. Secondly the modifications that need to be carried out for manufacturing the test vehicle along with the integration sequence for those modifications. Some activities can be done simultaneously, some successively. And finally a brief look at the vehicle weight, regarding the changes it will undergo.

Section 3 concerns the specific changes and components. The engine itself will be provided by IDIADA in task 5.3 around this time. Based on a production engine, the changes are negligible. The main part of the investigation deals with the fuel system, the LNG tank. The tank is completely new, designed by SAG in work package 2. The prototype is available middle this year. It requires new interfaces, its own brackets and a fuel quality sensor will be integrated. These parts have been defined and designed by MAN and constitute the major part of this report. The other tanks will be repositioned and replaced by more suitable versions. The aftertreatment system has been equipped with an additional methane oxidation catalyst by IDIADA and will be verified regarding the fitting. The battery box has been moved to the back of the truck.

Further it would be useful to assess the possible powertrain configurations and the shifting strategy. Section 4 points out the advantages of simulating the vehicle before first on-road tests. However, these simulations have not been executed for practical reasons.

Finally section 5 gives a conclusion of the obtained results and how MAN and its partners are going to benefit from this information. The activities from task 5.4 aim for ensuring and supporting the vehicle integration. After all the truck has to pass a type approval.