Portable Nano-Particle Emission Measurement System

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Publishable Executive Summary

In the previous deliverables (D2.08, D3.2, and D3.6) for MGA (model guided application), a simulation platform was formulated to consider the particle evolution from engine-out up to the measurement device based on a single cylinder test engine. The model was calibrated for 12 steady-state operating points. The calibrated quantities include in-cylinder pressure traces, particle size distributions at engine-out, as well as engine-out gas phase emissions. In this deliverable, surrogate models are constructed for these quantities so that they can be used in a drive cycle simulation. The simulation workflow is extended to include a drive cycle simulation. For this work, GT-suite, which is a third party 1D engine simulation tool, is used for the drive cycle simulation. The surrogate models are integrated with GT-suite to calculate the tailpipe emissions across the full WLTC drive cycle. A drive cycle simulation can give useful guidance on the vehicle's performance, such as the cumulative emissions over the entire cycle as well as the evolution of particle size distribution with time.

2 / 3

D3.7 – Surrogate models for particle size distribution and composition to evaluate PN concentrations from vehicle-in-loop drive cycle simulations (transients) for NEDC and WLTC (CO)

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