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Publishable Executive Summary

This document is Deliverable D3.3 of the AEROFLEX project. It describes the basis for selection of the components and technologies for implementation on the EMS 25.25m demonstrator vehicle, in order to improve its aerodynamic performance. The investigated concepts were selected and combined from those identified as promising and presented in D3.1 (ref [1]), and further developed, using the CFD Baseline EMS25.25 model[1] in D3.2 (ref [2]). The study also aims to demonstrate how well the predicted improvements achieved with the Optimised EMS25.25 model[2] are translated to the more realistic demonstrator vehicle and to verify the potential of the proposed recommendations for fulfilment of the KPI specified for the vehicle in ref [3], namely 15% drag reduction compared to the Reference EMS1.

Three different setups, including different number of concepts with different level of complexity, were simulated in order to understand how the level of improvement varies when selecting different concepts in combination, and to find suitable setup to implement on the real demonstrator in order to fulfil the target KPI. The different combinations are briefly described in Figure 1-1 below.

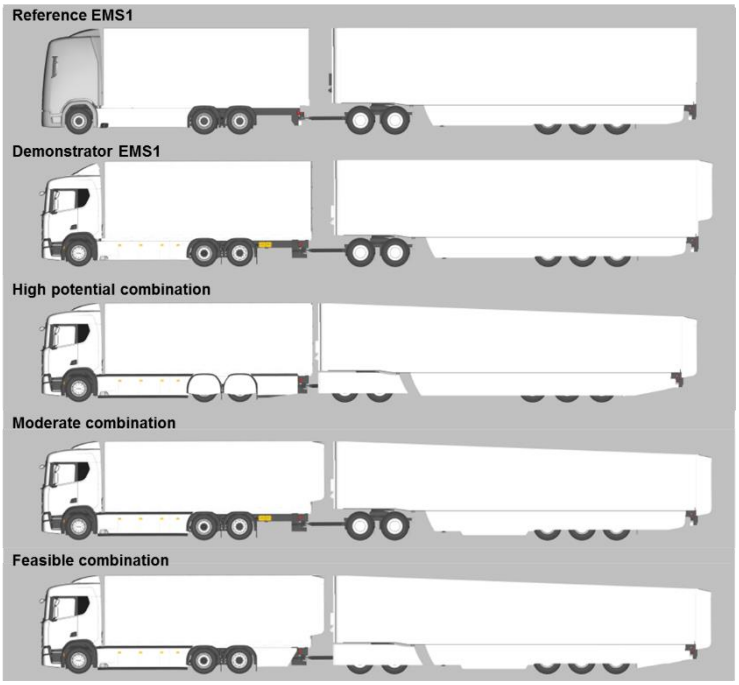

Figure 1-1: Reference EMS1 model and the demonstrator model with different concept combinations

Concepts concerning active air deflector and boat-tail were not considered to be part of the combinations, since they already are included in the model as static representations, in a position (more or less) optimised for the configuration considered.

The simulated combinations were compared with the Reference EMS1 model, for KPI assessment. Additionally, a realistic SCANIA Demonstrator EMS1[3], equipped with a Boat tail but otherwise as the Reference model, was used to better illustrate and quantify the benefit of the selected concepts. The resulting ΔC_D x A values, for a crosswind angle of 5˚ are presented in the Table 1-1 below.

Table 1-1: ΔC_D x A for the Demonstrator with different combinations of improvements applied, compared to reference models

	ΔC_D x A @ yaw -5˚					
	High potential		*Moderate combination*		*Feasible combination*	
	[m2]	*[%]*	*[m2]*	*[%]*	*[m2]*	*[%]*
Vs. Reference EMS1	**-2.07**	**35.4**	**-1.58**	**27.0**	**-1.87**	**32.0**
Vs. Demonstrator EMS1	**-1.48**	**28.1**	**-0.98**	**18.7**	**-1.28**	**24.4**

[1] The CFD Baseline model is a generic truck model, with extended front, representing the 2022 standard and equipped with what is considered as state-of-the-art today (ref [1])

[2] The Optimised EMS25.25 model is the optimised version of the CFD Baseline model, developed in Task 3.2 (ref [1])

[3] The Demonstrator EMS1 model is the base model with the realistic SCANIA truck, on which the different improvement concepts are applied and simulated

The result summary in Table 1-1 shows that all the different combinations presented here fulfil the required KPI for the Demonstrator EMS 25.25m with broad margin, which indicates that the KPI will most likely be realised when such combinations are applied on the real demonstrator. Based on the results, and the complexity of the concepts involved, the *Feasible combination* (Figure 1-2) is therefore recommended as suitable modification package to be applied on the test vehicle.

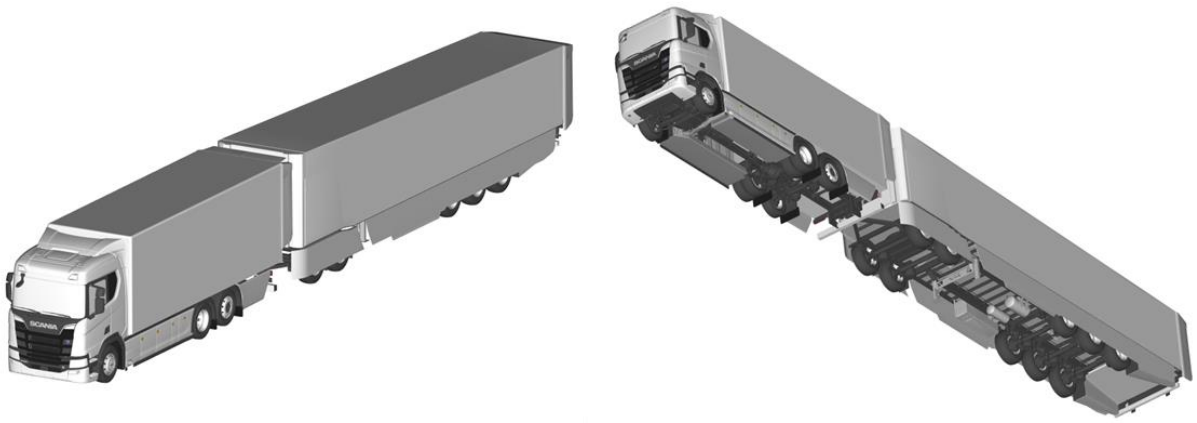

Figure 1-2: Recommended concepts for implementation on the demonstrator EMS 25.25m vehicle

The recommended combination consists of the following concepts:

1. Upper and lower side skirt extensions on truck
2. Adaptable body work height (-250mm)
3. Adaptable trailer shape (-300 to 800mm)
4. Underbody panels, covered fuel tanks
5. Rear side skirt on truck
6. Standard gap + 0° boat-tail on truck
7. Dolly side skirt
1. Short skirt extension on trailer
8. Trailer end underbody diffuser

In addition to the features listed above, the following active measures are recommended to be included on the test vehicle:

9. Adjustable roof air deflector
10. Boat tail with adaptable panels
11. Active ride height

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Project partners:

#	Partner	Partner Full Name
1	MAN	
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