

EUROPEAN COMMISSION

HORIZON 2020 PROGRAMME - TOPIC H2020-GV-05-2017
Electric vehicle user-centric design for optimised energy efficiency

GRANT AGREEMENT No. 769902



Design OptiMisation for efficient electric vehicles based on a
USer-centric approach

DOMUS – Deliverable Report
D4.3. Weight-optimized Dashboard

Deliverable No.	DOMUS D4.3	
Related WP	WP4	
Deliverable Title	Weight-optimized Dashboard	
Deliverable Date	Report actually completed on 2021-04-07 DoW: report expected in month 34 (August 2020).	
Deliverable Type	REPORT	
Dissemination level	Confidential – member only (CO)	
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Checked by	Jean-Christophe LE FLOHIC (FIS)	2021-02-23
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Approved by	Ines MUNOZ (IDIADA)	2021-04-07
Status	Final	2021-04-07

Change Log

Version	Modifications of document	Author	Date
Draft 1.0		Jean-Christophe LE FLOHIC	2020-10-14
Draft 2.0	<ul style="list-style-type: none"> Explain design change to improve the stiffness of the lower bracket and estimate the associated costs and lead time, and the information FIS would need to redesign and test the new lower bracket, Explain the process of making prototype parts by additive manufacturing and how the SLS process works 	Jean-Christophe LE FLOHIC	2021-01-18
Draft 3.0	<ul style="list-style-type: none"> Add chapters missing to the deliverable: Introductions, ducts and optimization material 	Jean-Christophe LE FLOHIC	2021-01-26
Draft 4.0	<ul style="list-style-type: none"> Add Publishable summary. Explanation of main design constraints associated with the Hybrid CCB. – Comparison of actual mass reduction with the objectives mentioned in the DoW. 	Jean-Christophe LE FLOHIC	2021-02-23
Final	<ul style="list-style-type: none"> Add explanation of tensile tests of the 3D printed CCB components 	Jean-Christophe LE FLOHIC	2021-04-07

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769902. The information and views set out in this publication does not necessarily reflect the official opinion of the European Commission. Neither the European Union institutions and bodies nor any person acting on their behalf, may be held responsible for the use which may be made of the information contained therein.

Publishable summary

Three innovative concepts are proposed to reduce the mass of dashboard components :
Twin Sheet air ducts , Structural hybrid cross beam and NafiLite.

NafiLite (Faurecia Interiors)

The main parts of the FIAT 500e dashboard are made of injection-molded mineral filled Polypropylene (P/E-MD20 for the top cover and P/E-MD30 for the defroster duct). The NafiLite concept consists in replacing this mineral filled Polypropylene by another Polypropylene material that :

- is reinforced with 20 % of hemp fibers
- has a microcellular structure

The potential mass reduction of the FIAT 500e dashboard is of 30%.

The objective was a mass decrease of 36%.

Structural hybrid cross beam (Faurecia Interiors)

In the Hybrid Cross Car Beam, the right end portion of the FIAT 500e steel Cross Car beam is replaced by a mineral filled and glass fibers reinforced thermoset component.

The potential mass reduction is of 5.9 %.

The objective was a mass decrease of 15 to 20 % .

Twin Sheet air ducts (Hutchinson)

Within the scope of cabin comfort, weight reduction and energy efficiency improvements for Electrical Vehicle (EV) in DOMUS project, a novel air vent ducts subsystem in a Twin Sheet thermoforming process (using cross-linked PE foam) has been investigated by Hutchinson.

The total mass of the Twin Sheet Air Ducts is about 60 g, saving up to 90% of weight compared to the traditional air ducts made by extrusion blow-molding of polypropylene (PP) (total mass of the baseline is about 840 g). The relative mass reduction actually obtained is greater than the objective mentioned in the DoW : up to 70%.

5 Acknowledgement

The author(s) would like to thank the partners in the project for their valuable comments on previous drafts and for performing the review.

Project partners:

#	Partner	Partner Full Name
1	IDIADA	IDIADA AUTOMOTIVE TECHNOLOGY SA
2	CRF	CENTRO RICERCHE FIAT SCPA
3	TME	TOYOTA MOTOR EUROPE
4	Volvo Cars	VOLVO PERSONVAGNAR AB
5	AGC	AGC GLASS EUROPE SA
6	DNTS	DENSO Thermal Systems S.p.A.
7	Faurecia	Faurecia Sièges d'Automobile
8	HUTCH	HUTCHINSON SA
9	IEE	IEE International Electronics & Engineering S.A.
10	LIST	LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY
11	COV	COVENTRY UNIVERSITY
12	Fraunhofer	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.
13	IKA	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN
14	TECNALIA	FUNDACION TECNALIA RESEARCH & INNOVATION
15	VIF	Kompetenzzentrum - Das Virtuelle Fahrzeug, Forschungsgesellschaft mbH
16	UNR	UNIRESEARCH BV
17	FIS	Faurecia Interieur Industrie
19	FCA	Fiat Chrysler Automobiles Italy SPA



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 769902

6 Appendix A – Quality Assurance

The following questions should be answered by all reviewers (WP Leader, peer reviewer 1, peer reviewer 2 and the technical coordinator) as part of the Quality Assurance Procedure. Questions answered with NO should be motivated. The author will then make an updated version of the Deliverable. When all reviewers have answered all questions with YES, only then the Deliverable can be submitted to the EC.

NOTE: For public documents this Quality Assurance part will be removed before publication.

Question	WP Leader	Peer reviewer 1
	JC LE FLOHIC (FIS)	Ines MUNOZ (IDIADA)
1. Do you accept this deliverable as it is?	Yes	Yes
2. Is the deliverable completely ready (or are any changes required)?	Yes	Yes
3. Does this deliverable correspond to the DoW?	Yes	Yes
4. Is the Deliverable in line with the DOMUS objectives?	The description of the FIS technologies is done but none of them was actually applied in the DEMO car.	The description of the FIS technologies is done but none of them was actually applied in the DEMO car.
a. WP Objectives?		
b. Task Objectives?		
5. Is the technical quality sufficient?	Yes	Yes