

All information from the latest months of Implementation



Words from Project Manager

On behalf of the REVOLUTION team, I would like to welcome you to our 3rd newsletter, as we are now in the 36th month of this 3-year project.

During the project we have encountered and overcome several challenges but in fact the most critical risk to completion of the project has been rising inflation particularly with respect to purchase of injection moulds. Due to price, we were driven to source out of Europe which resulted in additional challenges, delays and even the items getting stuck in customs for a while. The moulds are now in place at Farplas though and parts are being produce.

We have now received approval for a 6-month extension to the project, so over the next few months we will focus on the production of demonstrator parts, validation at the Tofaş, CRF and Stellantis test facilities and dissemination of the final results.



Over the last 3 years, we have produced some excellent results, overcome technical challenges and in many cases achieved even more than we had originally envisaged. We look forward to sharing the final project results with you in 6 months' time.

(Stephen Ryley
Project manager)

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REVOLUTION: Supporting the Electric Vehicle REVOLUTION through maximising EV Range and End-of-Life Vehicle Recovery through optimisation of recycled plastics and advanced light materials

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REVOLUTION project

SCAN ME





Update of the project

Activities developed in the last year

REVOLUTION activities the last year have delivered some exciting results.

The end of the project is near and the final phase has started: demonstration and validation of the final components has begun, component durability is being evaluated, EV range tested, EoL strategies are being

proved next to the latest LCA results, and the integration of the AI-predictive control algorithm is taking place.

Our team submitted during this last year six deliverables related to: recycling feasibility, network patent analysis, compounds validation, process specifications and components simulations.

Component Prototyping and Validation Activities

TRINSEO has selected and produced a PMMA raw material for upscaling trials at MAIER to make demonstrator trim part for the PMMA B-Pillar cover. The material is based on ALTUGLAS™PMMA formula with 25% mechanically recycled content. Alternative formulations to increase the recycled content have been produced and sampled for lab evaluation at MAIER. The analysis of the sample plates showed various positive results.

For the Rear Crash Box and the Lower rear bumper, the tooling shipments and fixation activities started next to the test planning in Tofaş & IT STLA Safety Center.

The development of reinforced polyolefin panels developed for the rear

backseat panel is successfully advancing towards a new generation of truly circular materials. The first loop thermoforming trials was completed this summer and the final prototyping trials, and validation are planned for the winter.



Sustainability

Traditional strategy including shredding of end-of-life vehicles, with additional pre-treatments and possible robotic separation were studied and compared for all the user cases.

End-of-Life strategies were developed in order to identify long term value chains for the redistribution or recycled materials that can be recovered from the target components.

Q10 meeting



The **REVOLUTION** team celebrated its third physical meeting in Istanbul and Bursa (Turkey) during June 2023.

Both Farplas and Tofaş's installations were visited, where our colleagues had two days plenty of interesting meetings, roundtables and workshops.



During these days, a networking event with the VITAL project also took place, being both projects aligned on the use of polymeric solutions for cleaner, more climate neutral industrial value chains.

SISTER PROJECTS' UPDATES



LEVIS project has embarked on its final phase, dedicated to optimizing the innovative manufacturing processes of the demonstrators, implementing structural health monitoring, and completing the final validation.

At M30 general meeting the inaugural prototypes of various demonstrators took center stage for evaluation. These included a suspension arm, a battery box set, and a steering column carrier group.

Yeşilova plays a central role involving the complete battery case design, the manufacturing of aluminium components, assembly, and overseeing virtual validation.



FLAMINGo project is developing Lightweight Aluminium Metal Matrix Composites (Al-MMnCs) for eco-friendly vehicles.

Key strategies include nano-additive production for uniform nanoparticle dispersion, refining casting and extrusion processes, and applying topology optimization for weight reduction or improved structural stiffness.

The project brings significant economic and environmental benefits, with lightweight Al-MMnCs enhancing fuel efficiency and reducing carbon emissions, underscoring our commitment to a sustainable future in the automotive industry.



SALIENT stands for “Novel Concepts for Safer, Lighter, Circular and Smarter Vehicle Structure Design for Enhanced Crashworthiness and Higher Compatibility”.

The main outcome is a new Front End Structure (FES) design for vehicles, which is more circular, lightweight, safe and smart than available components on the market today.

REVOLUTION and **SALIENT** projects have signed an alliance this year!



FATIGUE4LIGHT project is working on the application of new materials tailored to the requirements of vehicle chassis.

Their main goal is to reduce vehicle chassis weight compared to the current solutions existing in the market, taking into account eco-design and circular economy aspects and ensuring optimal fatigue performance.

Currently, the consortium is working on ranking the performance of the different solutions developed in the project for chassis components under several criteria, such as mechanical performance, eco-design and economic aspects. The objective is to derive guidelines for lightweighting chassis components while fulfilling specific industry objectives.



ALMA project works on decreasing the environmental impacts of electric vehicles by reducing the weight of the structure, saving materials and energy, thereby reducing CO2 emissions.

As the project is nearing the finish line this year, progress has been made in several fronts.

One of the main achievements is the concept car's remarkable mass reduction of 160,5 kg, representing 22% weight savings compared to the baseline BEV.

The resulting total carbon footprint was also reduced by more than 30%.

This lightweighting required multi-scale material experiments to confirm structural integrity, reliability & crash safety of multi-material body structure.



ENLIGHT EVs

The purpose of the **Enlight EVs** cluster is to develop innovative solutions, tested in industrial pilots, that can be rapidly applied in the automotive market to reduce the weight of electric vehicles (EVs), while considering structural integrity, passengers' safety, and sustainability, through eco-design, topology optimisation, materials' design and circular practices.

This cluster is composed by five H2020 EU funded projects: **LEVIS**, **REVOLUTION**, **FLAMINGo**, **ALMA** and **FATIGUE4LIGHT**

Since its beginning, the cluster has been working towards delivering on their common objectives, promoting awareness regarding the research results and promote knowledge transfer with relevant stakeholders.



FINAL STAKEHOLDER EVENT

REVOLUTION at GACS23 with Enlight EVs cluster

REVOLUTION project joined the Global Automotive Components and Supplier Expo this year at Stuttgart, Germany.

From the 5th to the 7th of December, automotive component manufacturers from around the world were

at the expo to display their very latest technologies and products.

REVOLUTION project was present during the whole expo exhibiting its latest results and organized its final stakeholder event next to the EnLight EVs cluster.

REVOLUTION event

The EnLight EVs cluster organized a joint event during the GACS Expo last 5th December: "Leading the Way in Innovative Lightweight EV Components", where LEVIS, ALMA and FLAMINGo projects also participated.

Our common goal is to adapt cutting-edge solutions to the automotive market to reduce the weight of EVs, using eco-design and circular practices for developing sustainable components.

During this conference, REVOLUTION's final stakeholder event took place: "Embracing the Future: Digitalization of Light-weight and Sustainable EV Components".



The REVOLUTION event showcased how the material optimization and components development of the uses cases answer to the challenges and barriers in the automotive industry.

Sensor's technology applied in the project were also a focus of the event, next to the automatization and machine learning use.



All of this employed without forgetting sustainability considerations: economical, environmental and social.

The conferences brought together people from the Automotive sector: from supply chain manufacturing partners to materials' experts.



Exhibit booth

The EnLight EVs cluster shared a booth during the whole Expo, focusing on the lightweighting materials applied to automotive industry.

From REVOLUTION's side, SRPP panel and Crash Box compounds were shared thanks to Norner, Tofaş and Farplas partners.

Visits from industry professionals and technology enthusiasts encouraged the exchange of innovative ideas.



PAST EVENTS

RTR Conference

Brussels, February 2023 (Farplas)

The RTR Conference is a unique entry point into the achievement of EU-funded projects in road transport.

Horizon 2020 and Horizon Europe projects' results in essential areas for road transport: Green Vehicles, Urban Mobility, Logistics, Intelligent Transport Systems, Safety, Automated Road Transport.

Dr. Yavuz Emre Yağcı from Farplas presented the REVOLUTION project at the conference.



InnovationForum4Plastic

Brussels, March 2023 (Farplas)

The European Strategy for Plastics in a Circular Economy takes in account that Our society, economy and environment are all negatively affected by the way plastics are currently designed, produced, used and discarded.

European R&D projects dealing with plastics recycling and Re-Use were invited in order to share their updates.

Our coordinator Emre Elmas joined on behalf of the REVOLUTION project.

1st International Conference on Lightweight materials

Milan, May 2023 (Tofaş)

This conference dedicated to the advancement of industry regarding the progress on materials took place in Milan.

This conference gathered technical presentations from academia, industry, and Open Innovation Test Beds in the field of lightweight materials.

REVOLUTION project was presented by Tuğba Okay from Tofaş.



REVOLUTION's co-organized webinars during 2023:

- "EVs lightweighting assessment based on AI machine learning and numerical modelling using new materials" with *Fatigue4Light* project
- "Sensors for Electric Vehicles: Challenges, Advances and Applications" with *Greenvehicles LEVIS* project
- "Towards a more sustainable mobility through the implementation of advanced solutions and lightweight materials in Electric Vehicles" with *EnLight EVs cluster* for the European Green Week

REVOLUTION NEWSLETTER VOL.3



This project received funding from the European Union's Horizon H2020 research and innovation programme under grant agreement n° 101006631

