Additive manufacturing to meet the highest technical demands in the automotive sector. The case of Done Lab

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Done Lab: The alliance between academic innovation and industry

The Done Lab anufacturing laboratory was founded in 2016 with the aim of accelerating the development of new products and tools through advanced technologies such as additive manufacturing. Since then, it has established itself as a benchmark in applied research and knowledge transfer in both academic and industrial fields, offering innovative solutions for highly demanding environments. A track record that, for almost a decade, has been reinforced by technological collaboration with 3DZ.

SECTOR Educational/Automotive

APPLICATION Electromagnetic shielding

LOCATION Oporto- Portugal

PRINTER Markforged FX20™

TECHNOLOGY CFR

TECHNICAL CONSULTING 3DZ

Three key pillars for innovation at Done Lab

To fulfill its mission of **driving industrial innovation** through the development of cutting-edge products and tools, **Done Lab integrates design and manufacturing** in an agile and **disruptive way, drastically reducing development times** and exploring new solutions with **high-performance materials**.

These were three of its main pillars of innovation:

Rapid validation of functional prototypes

1

They needed to accelerate product development using functional parts that could be evaluated in real-world conditions, without relying on molds or slow traditional processes.

Exploration of technical materials with advanced properties

2

They sought solutions capable of combining structural strength, electromagnetic behavior, and adaptability in complex geometries.

Scalability and precision in production

3

As their projects grew in complexity and demand, they needed printers with greater build volume, control over fiber deposition and design freedom, without compromising quality or delivery times.

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Discover how Done Lab

has developed an electronic housing for motorcycles, reducing costs and development time without compromising technical protection.

"We are developing innovative projects and need physical prototypes to test and show industrial customers and researchers themselves how they can improve design issues for manufacturing. One of the great advantages of additive manufacturing is precisely this: it allows us not only to validate concepts quickly, but also to produce final parts directly when the project requires it."

António José Pontes, Director of Done Lab

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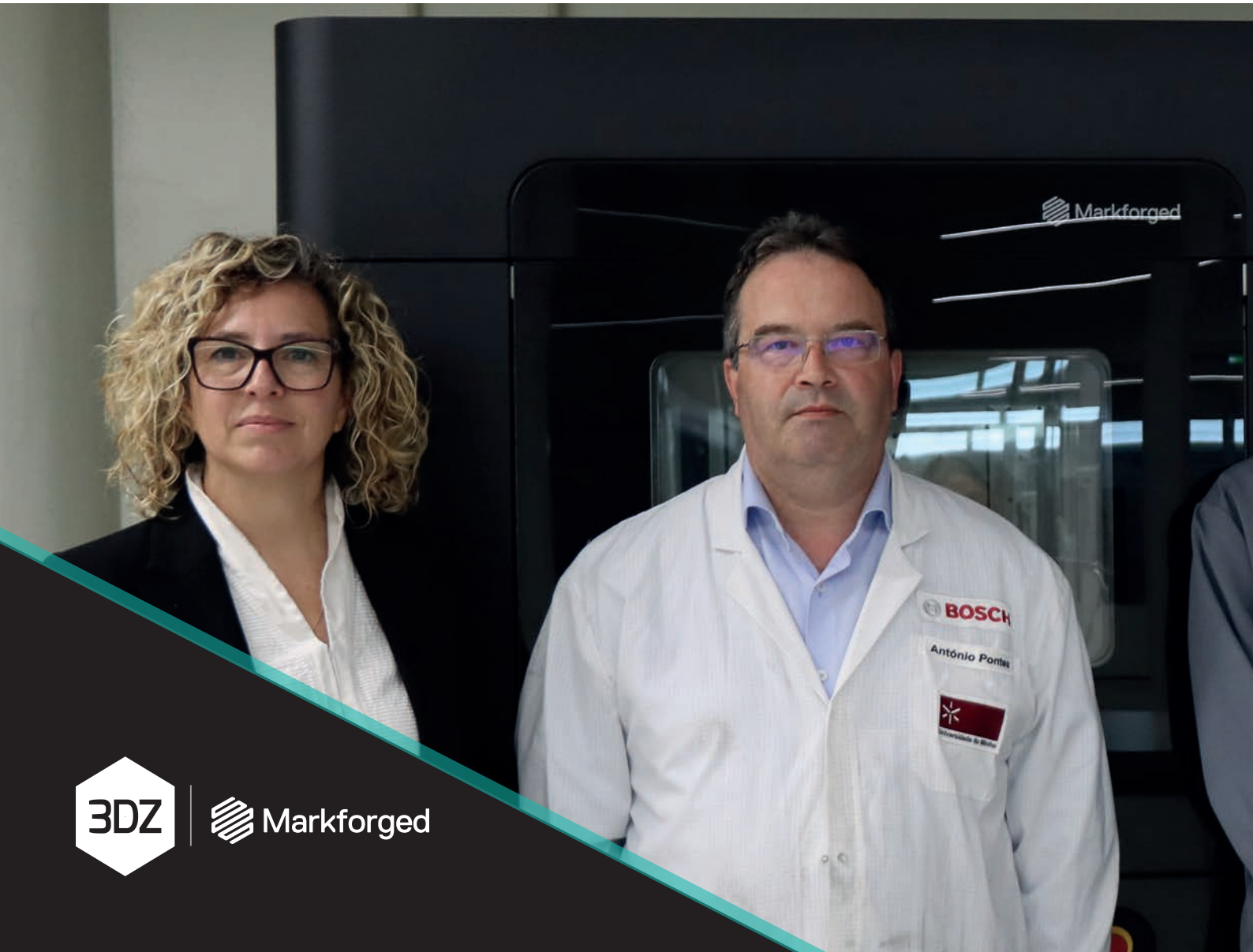
Functional 3D printing: an approach to applied innovation

Markforged's Mark Two™ printer was the ideal starting point for Done Lab as it ventured into additive manufacturing with composite materials. This solution, renowned for its reliability and precision in continuous fiber printing, marked a strategic first step in the laboratory's natural evolution toward more advanced solutions. **As a result of this successful experience, the FX20™ was recently added with the aim of expanding development and production capabilities in this field.**



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António José Pontes, **Director of Done Lab**, comments on the laboratory's needs:

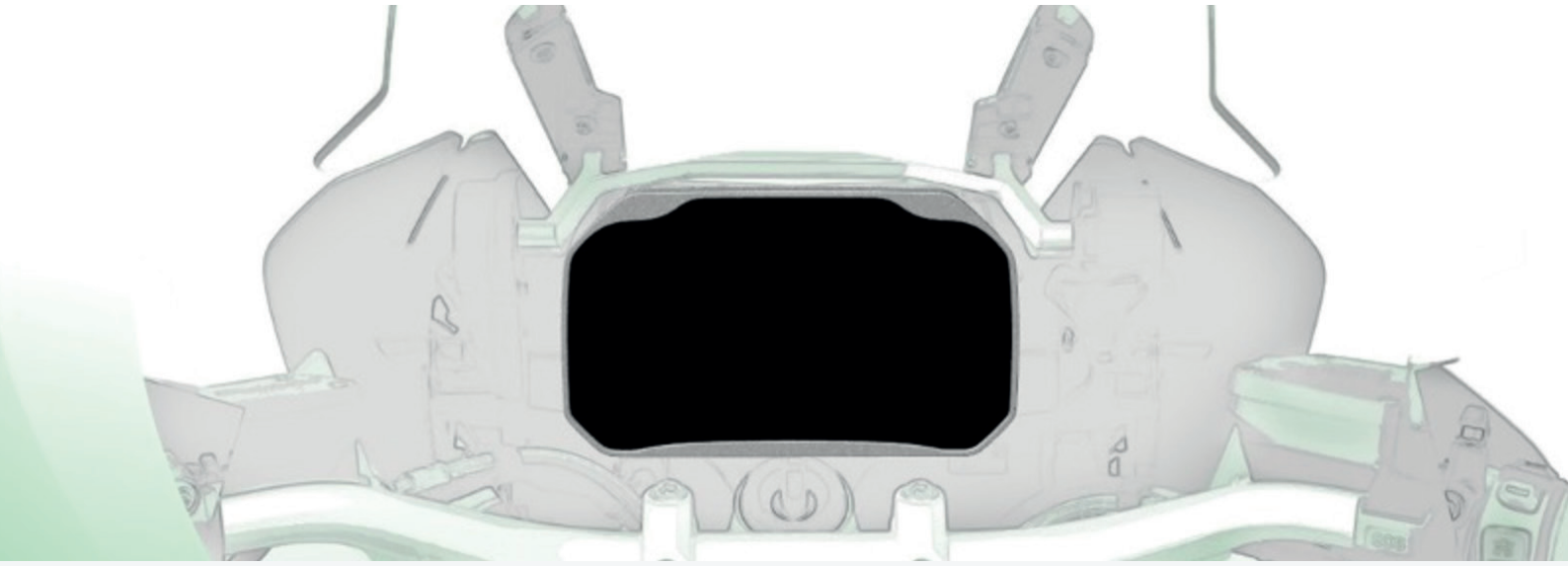
"We manufacture products with special characteristics, from components reinforced with continuous fiber to provide **superior structural performance**, *to products with* **specific electrical properties and the ability to dissipate** *electrostatic charges, for the protection of electronic devices."*

In the photo, Inma Vázquez, Markforged Sales Manager for France and Iberia, Professor Pontes, Director of Done Lab, Leandro Fernandes, Polymer Engineering at Done Lab, Catia Silva, Research & Innovation for Done Lab, and Pedro Costa, Country Sales Manager at 3DZ Portugal.

The challenge: to develop an electronic enclosure with electromagnetic shielding properties.

As part of the **SIFA – Smart System for Additive Manufacturing (POCI-01-0247-FEDER-047108)**, Done Lab tackled one of its biggest challenges: **developing a prototype** based on an existing electronic casing, **designed to integrate a digital display system created by Bosch Car Multimedia S.A.** for motorcycles.

This part had to protect internal components, such as the electronic board, display, and connectors, **from electromagnetic interference** that could affect the device's performance.



"In our design process, additive manufacturing allows us to quickly bring concepts to life, not only to evaluate form and fit in the early stages of the product development process, but also to critically explore usability, interaction strategies, and mechanical performance in order to improve the technology as a means for producing the final product."

Álvaro M. Sampaio, Vice-Director of Done Lab

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Traditional method vs 3D printing

Until now, these types of components **were manufactured from metal or using injection molding**, which meant

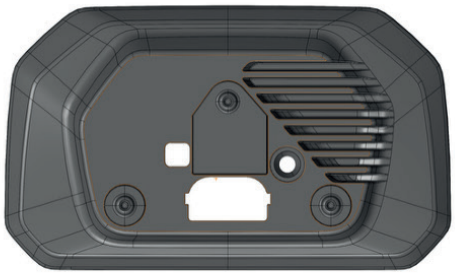
- high costs

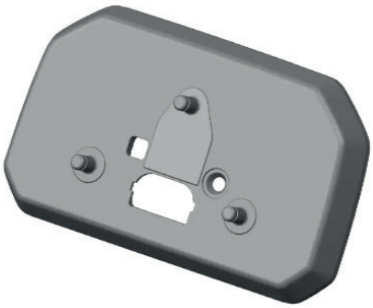
- inflexible processes

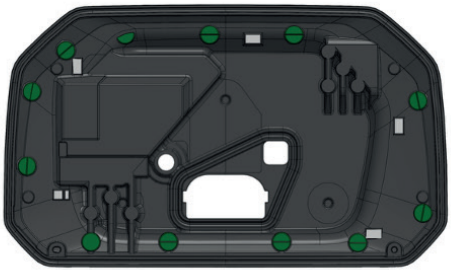
- long delivery times

Done Lab proposed a more agile approach: redesigning the casing so that it could be manufactured using **3D printing with carbon fiber-reinforced composite materials**, capable of offering both **mechanical strength and protection** against electromagnetic waves.

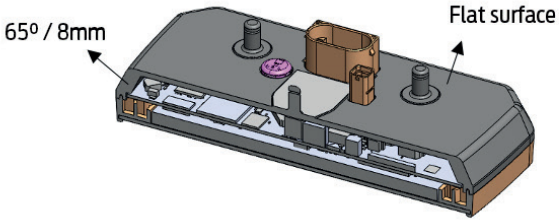
The challenge was not only technical, but also strategic: to validate a new way of manufacturing these types of critical parts, accelerating development without compromising on quality or the requirements of the automotive industry.







"Backplate" initial



"Backplat" redesigned for additive manufacturing

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The solution: continuous fiber and 3DZ

With the support of 3DZ, Done Lab opted for Markforged technology and the FX20 printer, which allows large parts to be manufactured with continuous fiber reinforcement. The 3DZ team not only provided the technical knowledge necessary to choose the right system, but also advised on the entire project implementation and validation process.

The process included:

- Study of materials (Onyx™ with different layers of carbon fiber).
- Design adapted for additive manufacturing (including internal ribs and sloping walls).
- Electromagnetic compatibility test according to CISPR 25 standard.

Catia Silva, engineer specializing in polymers and composites at Done

The results were conclusive, meeting the levels required by electromagnetic compatibility standards in the automotive sector, such as CISPR 25. This result not only validates 3D printing for functional prototypes, but also for the manufacture of final parts, as demonstrated by the case study developed for the motorcycle display system."

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Results: validated innovation and proven operational efficiency

Thanks to the redesign of the electronic casing and the use of 3D printing with composite materials, Done Lab was able to manufacture a functional part with electromagnetic protection properties within the levels required by the automotive industry.

The process, which is more agile and flexible than traditional methods, allowed for:

Efficiency from design to validation

1

Validate the design, optimize times, and reduce costs in the development phase.

Resistance and functionality for new challenges

2

Open up new opportunities for other applications where structural strength and advanced technical properties are required.

Consolidate the use of composite materials

3

Strengthen the team's confidence in Markforged's continuous fiber reinforcement technology.

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“The relationship with 3DZ has been, and continues to be, key to our development in additive manufacturing. Their knowledge, proximity, and responsiveness have made all the difference. Their team of experts worked hard to understand our structure, our products, and our projects. Our experience has been extremely positive. I would definitely recommend them both for their advice on equipment purchases and for their excellent after-sales service.”

Catia Silva, ingegnere specializzato in polimeri e compositi presso Done Lab

The future: further enhancing manufacturing capabilities

“The experience has been so positive that we intend to continue our growth and further enhance our additive manufacturing capabilities in collaboration with 3DZ. Done Lab wants to increase printing volume and enable the production of larger parts and the use of advanced materials, including thermoplastics and high-performance fibers for demanding industrial applications,” says **Cátia Silva.**

Done Lab and 3DZ: making tomorrow's manufacturing a reality today

Done Lab's experience with additive manufacturing, backed by the knowledge and support of 3DZ, demonstrates how the combination of advanced technology, innovative materials, and expert guidance can transform the way complex products are developed.

Done Lab continues to move forward and explore new challenges with 3D printing as a strategic ally. It does so with the assurance of having a partner that provides real, customized solutions. This strength is reinforced in **Portugal**, where **3DZ is a strategic partner of NORCAM**, a leading company since 1991 in advanced engineering and digital manufacturing solutions.

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