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“Nature has already solved many of the engineering challenges we face today”

Italy, a growing market

JEC Forum Italy 2025 opens new horizons to composites manufacturers



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Inspired by bionic design, a new fibre placement technology enables faster, more sustainable production of high-performance composite components. By aligning fibres precisely along load paths, the method minimises material waste while enabling high-performance, recyclable components. We asked Elias Hirschbichler, cofounder of Fibionic, how this approach could reshape lightweight manufacturing across industries.

Interview



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JEC Composites Magazine: Can you introduce Fibionic in a few words?

Fibionic: Fibionic was born from a simple yet powerful idea: nature has already solved many of the engineering challenges we face today, especially in lightweight design. Look closely at a dragonfly’s wing or a tree leaf, and you’ll see structural efficiency perfected: material used only where needed, nothing wasted. In nature, form follows

function – and that principle is at the core of our approach. Our innovation combines this design methodology with the world’s fastest fibre placement technology, which enables the production of ultra-efficient and fully recyclable components, all with virtually zero material waste.

Fibionic was officially founded in June 2021 by Johannes Mandler and Thomas Rettenwander, who together bring deep expertise in mechatronics, fibre composites, automation and materials science. Elias Hirschbichler joined the company in 2024 as a late cofounder to help scale the company. Today, we are a powerful team of 8, based in Innsbruck, Tyrol, where our 1st fully automated production machine is now operational.

This series machine achieves a cycle time of just 1 min per part, with an annual output capacity of up to 500,000 components.

How does your patented bionic fibre placement technology distinguish your solution from other players in this market segment?

Fibionic: What sets us apart is the combination of bionic design logic with a radical shift in production efficiency. Our Fibionic Fibre Placement (FFP) technology is a true differentiator. Unlike traditional composites, we align fibres along load paths, based on bionic logic – placing material only where it’s needed. We combine this approach with our patented air stream technology. This allows us to cut material usage, eliminate waste and massively

reduce costs due to our fast fibre alignment.

Our system is fully automated, uses thermoplastic materials (for recyclability) and is the fastest process of its kind globally. We are able to position load path aligned fibres in milliseconds. In short: higher performance, lower cost and almost zero waste.

How can your airstream production method be described as disruptive (vs. incremental innovation) and what are its concrete implications?

Fibionic: It’s disruptive because it completely redefines the manufacturing process of lightweight composites. Using an airstream fibre deposition method, we can build entire fibre layers in just milliseconds – significantly faster than



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conventional textile or tape-laying methods.

That speed allows us to deliver high performance lightweight components in under a minute. It's fast, flexible, and highly scalable. This methodology outperforms traditional production techniques, especially in high-volume composite manufacturing (1,000+ units). With ultra-short cycle times per component (≈ 1 min), our FFP technology opens doors to new markets and poses a serious challenge to long-established materials like aluminium across a range of applications. Finally, the short cycle times and optimised material usage can be converted to sustainable cost advantages. The range of applications targets different focus industries among others our beach head market sports & leisure, over consumer electronics until automotive and aerospace.

How do you manage to solve the equation of mass production of high-performance composite materials while adhering to a sustainable approach?

Fibionic: Sustainability is built into every step. Due to the bionic design principal, we can cut the usage of reinforcement materials to a minimum. Because our parts are lighter,

they reduce CO₂ not only in production but also during use – for example, in transportation – this translates to real emission savings over vehicles use phase. Regarding the recycling process of our products, I would like to highlight the following with a practical example:

a carbon saddle reinforced with continuous fibres can be shredded after use. The resulting material is a thermoplastic (e.g., PA12 or PA6) with short carbon fibres, which can be directly reintroduced into the injection moulding process. Importantly, this plastic-carbon fibre compound is not only recyclable – it is in fact a highly valued material for injection moulding applications. Additionally, we can use different reinforcement fibres – we have already carried out successful initial trials using naturally biodegradable reinforcement materials, including hemp or flax fibres.

Last but not least, we are focusing on decreasing our ecological footprint within our R&D initiatives, with the goal to further emphasise reinforcements with lower climate impact like glass fibres, the usage of carbon fibres with low CO₂ footprint using renewable energy in production, further exploring matrix materials from recycled fractions (e.g. PP) and foster the usage of

materials from renewable (e.g. PA11 from castor oil).

You present yourselves as a full-service provider, what do you offer to an operator who contacts you?

Fibionic: We support customers from concept to production. Our business model consists of basically 3 overarching pillars: prototyping and services, in-house production and solution sales. In the long run Fibionic positions itself as a technology provider, by selling the equipment, the software and the input material, while focusing on further developing the technology.

What is your strategy for penetrating different markets and for economic development?

Fibionic: We follow a staged strategy. First, we focus on our beach head market the sports and leisure industry, where we face relatively low entrance barriers, have a strong need to enhance product performance, can deal with reasonable product margins and have already a strong customer traction. We incrementally will supply in other already defined focus markets, which are the following industries: consumer electronics, industrial machinery, automotive, aerospace, medical devices and military & defence. However, fortunately we are facing a strong need on the defined future focus markets with ongoing prototyping customers in electronic wearables, the drone market and automotive.

In the next 2 years, we will focus on supplying our customers (mainly sports and leisure) by making use of our inhouse production plant, which provides us with the possibility to further optimise our series

production machinery and provide the proof of concept in an industrial production setting. From 2027 onwards we will kick off our solution sales model to supply the full ecosystem to manufacturers globally by selling software, machinery and input materials. This way, we shorten time-to-market, establish new production standards and create recurring revenues through licensing and material supply.

Which partners have you already contracted with, and what are your next projects?

Fibionic: As we signed non-disclosure agreements, we cannot provide further input on our ongoing customer projects. However, we can say that the first end customer product with Fibionic fibre reinforcement structure will be available on the bicycle component market this autumn. We are also currently working on drone wing reinforcement structures and parts in the consumer wearable sector. Aside our customer projects, we have strong partnerships with machine builders that are capable to produce our series production plants, above all our local partner Micado with whom we could build our first fibre inject machinery based on our developed concept machinery. We are also proud to partner with different research and development institutions/firms like a recently from FFG funded development project together with Transfercenter für Kunststofftechnik GmbH (TCKT) to further explore our technology and extend the range of its application. □

More information:
www.fibionic.com