



SHAPING THE FUTURE OF Materials

According to **Patrick Siboni**, sales and marketing aerospace account manager, L&L Products, efficiency and sustainability are two trends shaping the future of aerospace materials.

The aerospace industry is entering a period of significant growth. Passenger traffic continues to rise, new categories of aircraft are emerging, and the demand for lightweight, high-performance parts is increasing rapidly. PwC's '2025 Global Aerospace and Defence: Annual Industry Performance and Outlook' projects that airlines and operators will require an estimated 44,000 new aircraft over the next two decades to meet passenger demand. At the same time, the industry faces the dual challenge of meeting this demand efficiently while advancing sustainability, which has become a central priority for OEMs, regulators and passengers alike.

These challenges, along with emerging markets such as UAVs and eVTOL, are changing how materials are designed, manufactured, and used. As aircraft fleets expand, manufacturers are under pressure to deliver parts at higher volumes without compromising quality and while simultaneously reducing environmental impact.

For aerospace interiors, two trends are driving innovation: the need for faster, more efficient processes and the development of more environmentally sustainable materials.

Driving process efficiency

Aircraft interiors can be a challenging component of aerospace manufacturing. Each plane requires thousands of interior parts, all of which must be produced quickly and consistently. Manufacturers must find ways to produce parts faster without

✈ InsituCore foaming core composites with aluminium and carbon fibre facings (below)

sacrificing quality. Traditional materials and processes, while proven, often fall short in today's environment.

Thermoset-based honeycomb panels are a great example. For decades, they have been a go-to solution for lightweight structural components. They offer an excellent stiffness-to-weight ratio but are costly and labour intensive - producing a flat panel using traditional thermoset materials can take as long as 30 minutes. Additionally, their design flexibility is limited, making them unsuitable for complex or organic geometries.

Pairing thermoplastic honeycombs with thermoplastic prepregs offers some improvements, but they require an effective adhesive solution to fully realise their potential.

Unlock faster processing

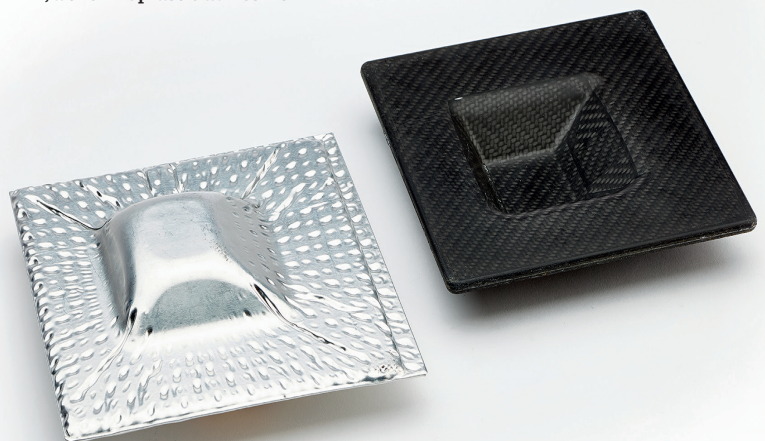
L&L Products, a global leader in materials science and advanced engineering, is working closely with partners to address these challenges. One of L&L Products' solutions is T-Link, a thermoplastic adhesive film

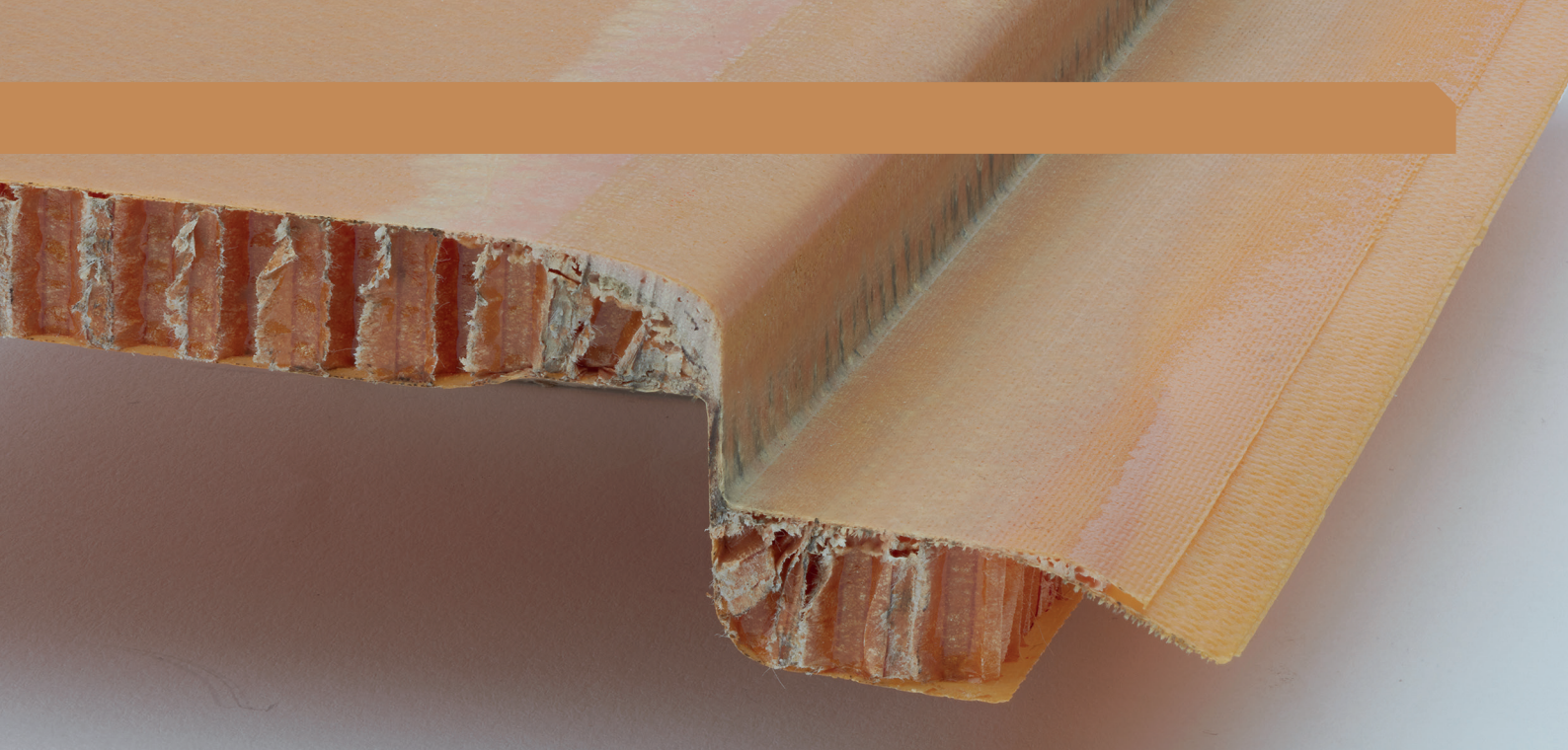
that significantly reduces curing cycle times from 30 minutes to just two or three minutes while remaining easy to handle. Because of its thermoplastic nature, T-Link can easily conform to irregularly shaped parts and enables easier disassembly for recycling.

In practical terms, T-Link allows manufacturers to dramatically increase throughput without requiring large investments in equipment or facilities. This capability is particularly important for emerging markets such as eVTOL, where lightweight blades and panels must be produced at high volumes.

In addition to new innovations, there is an opportunity to look at existing material solutions to better support efficiency. Small improvements across production processes can yield significant benefits:

- Splice films: Earlier generations required storage and transport at extremely cold temperatures, as well as 24 hours of thawing time. Modern splice films remain stable at





room temperature for seven months, simplifying logistics and reducing energy costs.

- Epoxy FST adhesives: Traditional fast-curing adhesives could cause shrinkage and surface deformation, which required rework before painting. L&L's FST adhesives cure quickly without shrinkage, preventing costly surface corrections.

- Core and edge fillers: Older fillers required slow curing to avoid porosity. New generation options cure quickly and without degassing, ensuring a smooth surface finish while reducing cycle times.

Together, these improvements streamline production, reduce energy use and cut labour costs.

While efficiency drives immediate production needs, sustainability is reshaping the long-term trajectory of aerospace interiors. OEMs, regulators and even passengers are demanding more environmentally friendly solutions that lower emissions and reduce waste.

Foam cores are often used as an alternative to honeycombs in sandwich structures. While they offer processing advantages, for aerospace interiors they typically require machining on CNC equipment to achieve the final shape. This generates substantial waste, as 60-70% of the foam block may be removed during machining, resulting in a 'buy-to-fly' ratio of only 30-40%. Most of the removed material often cannot be reused, increasing both costs and environmental impact.

L&L's InsituCore technology provides a direct solution to these problems. Instead of machining foam blocks, InsituCore is introduced as a film between panel skins. During curing, it expands to fill the cavity, precisely forming the part.

The result is a simple, clean, one-step process that eliminates machining

and achieves a nearly 100% 'buy-to-fly' ratio. Virtually all the material goes into the flying part, which reduces waste significantly. InsituCore also exhibits strong mechanical properties and can reduce overall part weight when compared to honeycombs.

This combination of performance and material efficiency demonstrates how sustainability can be integrated directly into production processes rather than treated as a standalone goal.

Collaboration is the key

As the industry moves into high-growth markets like UAVs and eVTOLs, the need for high-performance, lightweight structures produced quickly, at scale and in an environmentally friendly way will only grow. Meeting these demands will require not only innovation but collaboration.

KPMG's '2024 Global Sustainability in Aerospace and Defence Report' found that nearly half of respondents said that collaboration was a top enabler in creating the technologies they need to meet sustainability goals.

L&L Products is already embracing a collaborative approach. Rather than offering off-the-shelf materials, L&L works closely with partners to co-develop tailored solutions that are technically advanced, compliant and production ready. Innovations like T-Link and InsituCore demonstrate that collaboration can accelerate both efficiency and sustainability.

Two sides of the same coin

Efficiency and sustainability are often presented as separate priorities, but they are deeply connected. Many innovations deliver benefits on both fronts: faster processes lower energy consumption, eliminating cold storage reduces emissions and avoiding machining accelerates production time while cutting waste.

For manufacturers, these dual wins make new materials especially attractive, improving short-term economics while aligning with long-term sustainability goals. By rethinking the manufacturing processes for adhesives, foams, fillers and bonding solutions, the industry is demonstrating that efficiency and sustainability truly go hand in hand.

Putting 44,000 new planes in the sky over the next two decades is a significant challenge, but tailored material solutions and collaborative approaches provide a clear pathway.

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→ L&L's core splicing solutions (above)

→ L&L's bond core edge finishing solutions (below)

→ L&L's Reinforce solution for manufactured (bottom)

