

Additive Manufacturing

AIM3D makes a comeback; optimises Voxelfill process
After a consolidation phase and reorganisation of its shareholder structure, after a management buyout, 3D printer manufacturer AIM3D is back in the game, it adds.

Germany-based AIM3D says it has also succeeded in optimising its patented Voxelfill process, for overcoming inhomogeneous strengths in 3D-printed components. The firm adds that Voxelfill achieves a high level of process stability comparable to injection moulding thanks to material-friendly extrusion and cross-layer material filling. Tensile tests with materials firm **Sabic's** Ultem PEI 9085 resin confirm the homogeneous properties.

Variations of the Voxelfill strategy enable hybrid multi-material solutions with different Voxelfill materials and different materials, including within the same component. In this way, the material properties can be 'customised'. Defined component weight, damping properties, elasticity or changes to the centre volume chambers (selective densities), component properties could be influenced in a targeted manner on the basis of FE simulations.

Clemens Lieberwirth, CTO at AIM3D, commented, "Of course, the Voxelfill process is particularly suitable for 3D printing of plastics and fibre-filled plastics, but it is also suitable for 3D printing of metal and ceramic components using the CEM process. In general, there are advantages due to the higher build speed and cross-layer filling."

Meanwhile, AIM3D is cooperating with Denmark-based software development company **Create it Real** on software optimisation and Germany's **Replique** for Ultem applications, which is extensively used in aerospace and industrial applications. The amorphous material has high temperature resistance, is flame retardant, and has good strength and chemical

resistance. Although expensive, it meets many requirements for manufacturing components for industrial and aerospace applications.

However, for serial production, printing needs to be improved and material costs need to be decreased. If AIM3D can achieve this, it can move into producing high-value components with Replique, with whom it has collaborated on a panel for **Alstom**.

In its tie-up with Create it Real it hopes to improve slicing in its slicing software, SlicEx, which it white labels from Create it Real. The company is hopeful it can enhance properties while printing at 150 cm³/hour and is aiming for a single machine to produce 1-4 tonnes of parts.

As well, AIM3D's ExAM 510 system is predestined for use in industrial production. The system, which was launched in 2022, currently operates at a maximum build rate of 150 cm³/hour, and it is aiming to up it to 300-600 cm³/hour.

Bio-based resins could offer recyclable future for 3D printing

A new type of recyclable resin, made from biosourced materials, has been designed for use in 3D printing applications.

In a study, published in Nature, researchers from the **University of Birmingham**, UK, showed that high-resolution, 3D printed structures can be manufactured from an entirely bio-sourced feedstock.

Once they have reached the end of their useful life, the products can be recycled within an almost fully closed-loop system.

Photopolymer resins, which harden – or cure – on exposure to light, are commonly used in the manufacture of bespoke 3D printed parts. However, while technologies to improve the resolution of 3D printing and its speed of manufacture have advanced

considerably, the resins themselves have changed very little since the process first emerged in the 1980s.

The basic materials – usually epoxies or acrylics – come mostly from petrochemical feedstocks. Although some progress has been made in the use of more sustainable resins derived from biomass, the recyclability of these is still limited, because they rely on irreversible bonds being created when the resin hardens. To break these bonds, additional chemicals have to be added at each stage, resulting in a 'snowballing effect', in which the only way to recycle the material is to make more of it.

In contrast, the Birmingham-led team has, for the first time, succeeded in producing a photopolymer resin that can be printed at high resolution but can then be



AIM3D has been relaunched with a new management team with Vincent Morrison (CEO), Clemens Lieberwirth (CTO) and Daniel Selck (CSO)