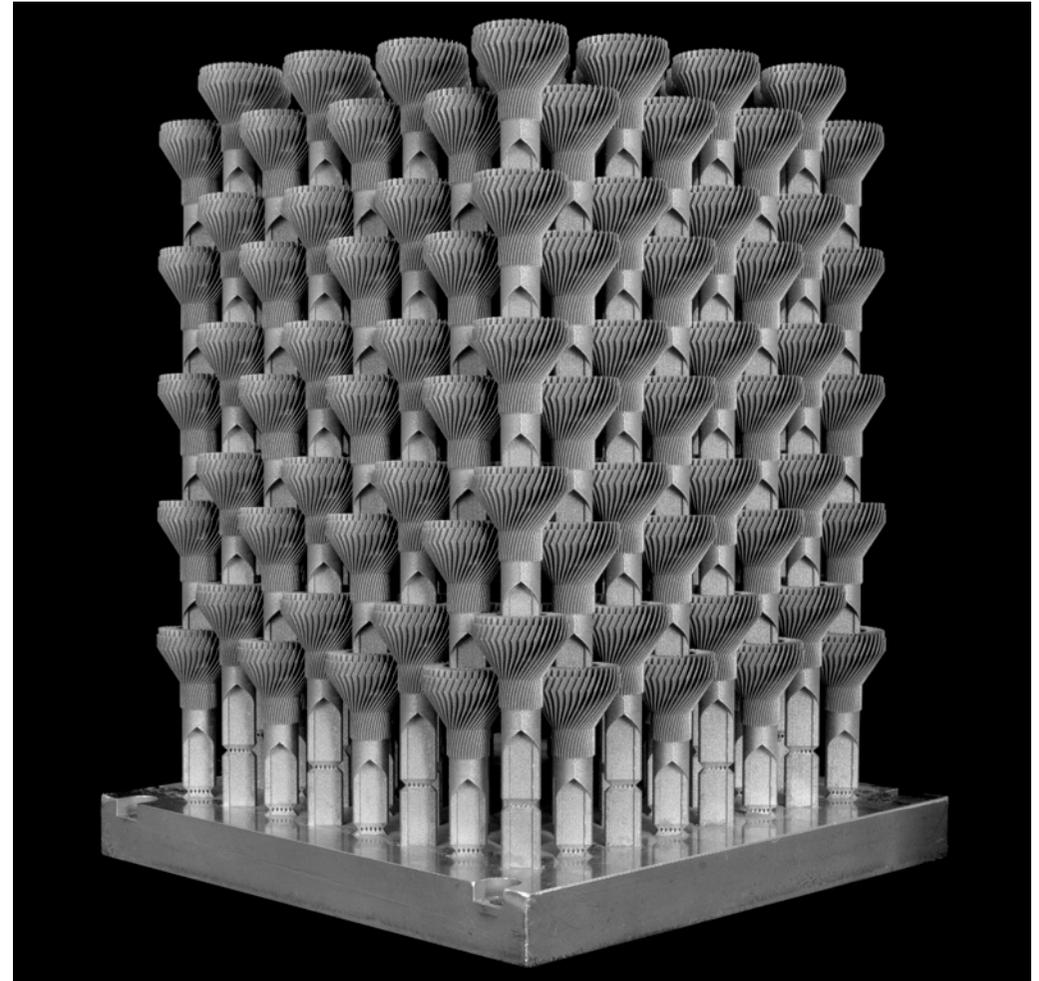


Betatype is challenging this current status quo; producing 384 qualified metal automotive parts in a single build with Laser Powder Bed Fusion (LPBF). Reducing part cost to £3 from £30+ and shrinking build times from 444 hours to 30 hours.



The key to making AM productive enough for wider adoption across these high-volume industries, however, lies in process economics – choosing the most additive process for each part. Combining these principles with our knowledge of the limits of additive – as well as how and when to push them – together with our powerful optimisation technology, we supports customers with the design and production of parts that not only perform better, but that are economically viable against existing mass production technologies.

KEY BENEFITS TO WORKING WITH US

DESIGN FOR AM PRODUCTION

Our expertise delivered designs optimised for AM with maximised packing and minimised supports, delivering over 384 parts on a medium frame LPBF system.

GREATER PRODUCTIVITY

Our Process Portfolio, delivered through Engine, reduced build time by 90% from 444 hours to 30 hours. Unlocking a part cost reduction of 90% and a productivity gain of 13x.



Production build of 384 Heatsinks. Manufactured by Progressive Technology on an EOS M280.



After-market Automotive LED Headlight

INCREASED COMPLEXITY & HIGHER VOLUMES

Often AM is described as a process that is capable of any geometry. In reality, AM can provide greater design freedom than other traditional manufacturing processes, but still comes with its own set of constraints. Understanding these constraints is imperative to identifying applications that fit well with AM, namely those with specifically complex geometries that work best with the physics of additive processes. This thinking has traditionally only been applied to low volume parts, however.

Die casting and other traditional manufacturing processes can manufacture millions of components per year, while AM processes such as LPBF can excel and add value by delivering geometric complexity with the least amount of material possible, but not economically at high volumes. This has long



LED Headlight with LPBF Heatsink

been a trade-off, one that has seen automotive companies dismiss AM for production applications – but this is changing.

Our unique expertise and technology portfolio demonstrates how it is possible to combine the innate geometric capabilities of AM with increased production volumes of cost-effective parts and improved performance.

AUTOMOTIVE LED HEADLIGHTS

With the right part, it is completely possible to break with conventional thinking about what LPBF is capable of, both in terms of what can be built, how and how many. The Automotive industry's switch to the use of LED headlights brings with it new challenges in thermal management – and provided our team with the opportunity to demonstrate what LPBF can truly achieve.

Typically, these new LED headlight components require comparatively large heatsinks which are often actively cooled. We recognised that the specific geometry for these metal parts made them ideal for producing with LPBF, which can consolidate multiple manufacturing processes into a single production method.

FULL BUILD VOLUME. NO SUPPORTS.

By considering the LPBF process at the initial design stage of the component, we were able to design a part with in-built support features, allowing us to stack multiple headlight parts on top of each other, without the need for additional supports. It was then possible to snap apart the finished parts by hand, without the need for further post processing.

Full stacking is often deemed extremely difficult with LPBF due to the thermal stresses involved in the layer process, but by intelligently designing the structure to reduce thermal stresses, we were able to make it a viable option with minimal thermal distortion.

The innovative design of the part enabled a series of them to be 'nested' together to maximise the build volume, resulting in 384 parts being produced in one go within a single build envelope (an EOS 280M).

HYPER-OPTIMISED LASER SCANNING

Our expertise in design and data processing technology mean we can easily design, manage and optimise every toolpath within each part.

Through specific control parameters, the exposure of the part in each layer to a single toolpath where the laser effectively

melted the part was reduced significantly, with minimal delays in between. This, coupled with our optimisation algorithms and process IP, reduced the build time of each part from 1 hour to under 5 minutes per part. That's 10x faster than using a standard build processor.

Reducing costs and build times with single and multi-laser systems

Equipment amortisation is still a major driver in part cost. Reducing build times is key to making parts more cost-effective with LPBF. Our unique optimisation technology is a key factor here and for this application with metal material, has demonstrably brought cost-per-part down from upwards of £30 to under £3.

Moreover, on single laser medium frame systems, such as the EOS M280 and Renishaw RenAM500M, we were able to reduce build time from 444 hours to under 30 hours for the 384 parts. With the new multi-laser, medium frame systems, this optimisation approach further reduced this figure to under 19 hours. Using these high productivity systems, it was possible to realise a 13x gain in productivity over a year of production per system from 7055 parts to 135,168. With an installation of 7 machines running this optimised process, volumes can approach 1 million parts per year – parts that are more functional and more cost-effective.