

## CUSTOMISED ORTHOTICS

### iOrthotics

**iOrthotics** is a fast-growing manufacturer of custom-made orthoses, which has successfully adopted fused deposition modelling (FDM) 3D printing methods. Due to the limitations of FDM, it has invested in newer and much faster Multi Jet Fusion production machinery. This project develops advanced processes and advanced knowledge within the company to digitise its operations, serve export markets, and enable the most productive use of this new asset.



#### How the Growth Centre helped:

**The AMGC has assisted through \$195,250 in co-funding, which has helped a cash-strapped but highly-promising manufacturer in a rapid growth stage.**

#### What's changed:

The project will allow iOrthotics to meet its expansion plans, including servicing two US labs it already has a relationship with,

at healthy margins. It will also cement the company's reputation as a technical leader in its market, following its early adoption of FDM for end-use products.

#### Success story overview

iOrthotics was founded in 2009 and has both expanded and adopted new technology rapidly. Its use of 3D printing for end use parts began in 2015 and continues to rise in sophistication and potential market impact.

Currently, iOrthotics serves 57 Australian clinics and two in the United States. It has manufactured over 75,000 pairs of custom orthotics over its history.

In the beginning, iOrthotics identified savings in repetitive manual labour and throughput increases through 3D printing over milling polyurethane products. It operated 30 machines using fused deposition modelling (FDM) technology, which melts and connects successive layers of thermoplastics to build parts.

This per pair cost was economical however, saving approximately 1.5 kilograms of waste compared to subtractive methods.

“I saw a change that could occur in our industry that I really wanted to initiate,” explains iOrthotics co-founder Dean Hartley, adding that recent growth forced output “to double-and-a-half almost triple, in the last 18 months” and created pressure.

“I am looking at all the technology that is out there now and what the current manufacturing methods were and just thinking, ‘we could scale it up, but we are going to need more floor space, a lot more skilled manpower and it is going to be costly’.”

Nowadays, additive manufacturing is essential in meeting ambitious export goals.

FDM, a notoriously slow process, was invented in 1988 and patented the following year by Stratasys founder Scott Crump<sup>1</sup>. iOrthotics began looking at HP’s Multi Jet Fusion technology in the last 12 months, investing in a \$500,000 machine late last year to scale up production. According to HP’s internal testing, MJF, released in 2016, is “up to 10 times faster” than FDM<sup>2</sup>.

iOrthotics and its collaborative partners are completely digitising the supply chain, from order to production, enabling the company to make the best use of its new investment and serve both its growing local clinic base and the US market. When complete, new processes will allow for 120 pairs of inserts created per day.



Work began in November. It continues iOrthotics’ partnership with University of Queensland, which has helped test and validate materials and finished parts. HP is contributing training, service and support on its printer and PA12 nylon powder and PA12 glass bead feedstocks. Local reseller Evok3D is also contributing service and support for the new machine.

Through this collaborative project, iOrthotics order entry system will be digitised, a QR and barcoding system developed for tracking jobs, patient foot scans will be digitised and integrated into the system, digital design optimised to minimise cost of manufacture, and postprocessing systems optimised to cut down time spent at this stage. The project will move from TRL (technology readiness level) 4 to TRL 8 over its course.

Outcomes will also include upskilling design engineers in “nesting” techniques to cut down on materials and costs.

Technical leadership and advanced processes will significantly raise competitiveness, allowing it to harness opportunities in the US market, which it already serves through two clinics. These labs alone could conservatively provide sales for 20,000 pairs in 2018, growing to 60,00 pairs next year.

Of the AMGC’s assistance, Hartley says, “We’re a private company and not a research institution, so we do need to have that help to facilitate what we are doing, or we simply cannot afford to innovate. We are sort of at that size where we are just lucky where we can commit money to it.”

“The network and industry knowledge that AMGC provides, is the impetus required for our growth. This facilitation is allowing iOrthotics to get where we need to go.”

<sup>1</sup> <https://patents.google.com/patent/US5121329>

<sup>2</sup> <http://h20435.www2.hp.com/t5/The-Shapes-of-Things-To-Come-The/Introducing-the-HP-Jet-Fusion-3D-Printing-Solution/ba-p/296466>