

Pioneering the next generation of heat exchangers



conflux TECHNOLOGY

ESTABLISHED: 2014

FOUNDER: MICHAEL FULLER

Conflux Technology is a Melbourne-based advanced manufacturing operation focused on the design, development and production of parts utilising direct metal additive manufacturing (AM) technology.

confluxtechnology.com

MONASH University Centre for Additive Manufacturing

ESTABLISHED: 2010

MCAM is a VPTN member facility with the latest technology to take research from a broad range of disciplines and apply them to manufacturing including material science, alloy design and processing, surface engineering, corrosion and hybrid materials.



platformtechnologies.org/facility-profiles

AMAERO ADDITIVE MANUFACTURING

ESTABLISHED: 2013

Amaero was developed by MCAM as a spin-off company, functioning as the commercial arm with a foot in both commercial production and research.

amaero.com.au

YouTube Victorian Platform Technologies Network channel – [watch Michael Fuller](#) on Conflux Technology’s 3D printed heat exchanger

ADDITIVE MANUFACTURING’S TIPPING POINT

Additive manufacturing or 3D printing has come a long way since it was discovered and patented in the 1980s¹. With more complex printing machines being built in recent years, we are achieving larger components, greater precision and finer resolution at higher speeds and lower costs bringing the technology to a tipping point.

This will transform manufacturing flexibility –allowing organisations to cut development time, eliminate tooling costs, and simplify production runs – while creating complex shapes and structures that were not possible before. Supporting this, McKinsey Global Institute research suggests that 3D printing could have a global economic impact of up to AU\$770 billion a year by 2025².

BIG PICTURE OPPORTUNITY

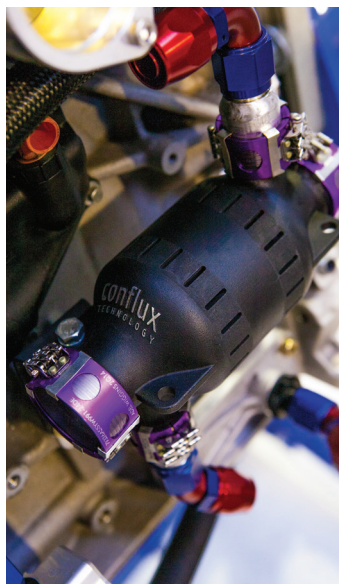


With deep roots in Formula One, engineer and Conflux Technology’s founder Michael Fuller, has an innate appetite for risk and in developing new technologies. His vision is bigger than his prototypes in exploring the democratisation of manufacturing.

As a 3D printer costs the same in China as it does in Australia, Fuller believes the production of goods becomes cheaper within the right marketplace, and that we can reduce high labour and global transportation costs of manufacturing in moving towards additive manufacturing in industries such as automotive, chemical, solar and thermal products.

With no significant innovation in this area in the last 20 years, Fuller’s first step in testing his hypothesis is making parts at the point of use. And as we’ve just reached that point where the maturity of this technology makes it possible, he predicts a manufacturing base that will be smaller, faster and more reactive, with capabilities a hundred times more effective than what we have today.

SOLUTION IN THE MAKING



Found in everyday items such as car engines, refrigerators and air-conditioners, a heat exchanger is profound in its simplicity to transfer heat either into or out of a piece of equipment, yet its performance is based on complex geometry.

A heat exchanger is the ideal candidate for a 3D surface because the optimal shape can’t be created using traditional manufacturing methods. Fuller’s objective is to 3D print a heat exchanger that is more efficient, cost effective, half the weight of existing designs and environmentally safe.

Consulting to the university sector in Melbourne at the time, Fuller had an “aha moment” and decided to invest his own money to create the first prototype, but needed to outsource the additive manufacturing expertise. He approached Amaero Engineering as the commercialisation arm of Monash Centre for Additive Manufacturing (MCAM) – a VPTN member facility – to see how he could bring his concept to life.

Through this collaboration and the support of the Technology Voucher Programme, Michael worked with Amaero and MCAM for 6 months. Fuller’s design brief would push the limits of MCAM’s selective laser melting machine (EOS) which is capable of producing high precision and complex parts.

Amaero conducted a risk reduction assessment to ensure the design was optimised for success and from this, five prototypes were developed and tested through automotive performance solutions.



"I have to say that my experience in the Australian public innovation ecosystem has been fantastic,"... "ultimately working with Amaero and MCAM in developing this technology means we can do more with less."

Michael Fuller, Conflux



"Working with companies like Conflux is exciting as they push the boundaries of the current technology and help us grow as an organisation and facility. This also presents an opportunity for Monash and industry to tap into this knowledge to innovate."

Ben Batagol, Amaero



"I think the VPTN is really valuable as a repository of scientists and their expertise – those that can do things we can't. I see it (VPTN) as a gateway organisation that could also facilitate access to funding programmes in the future."

Michael Fuller, Conflux

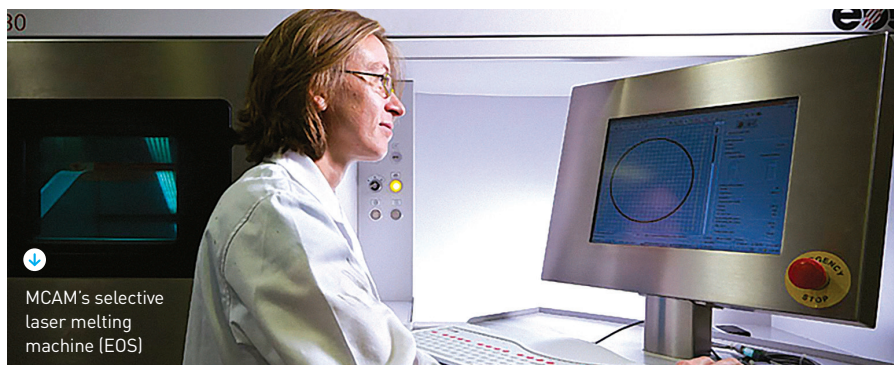
ABOUT THE VPTN

Established in 2009, the Victorian Platform Technologies Network (VPTN) plays a key role in connecting publicly-funded facilities in Victoria with industry and researchers. Through its online services – **ARIN and PlatformConnect** – VPTN is unique in offering a centralised, open and cross-institutional network of over 150 platform technologies across more than 30 institutions. VPTN is realising its vision by linking innovation with technology and expertise in biological, materials, engineering, physical, chemical, food, sports, information, nano, design and mathematical sciences. The VPTN is an initiative supported by the Victorian Government, Biomedical Research Victoria and Monash University. Discover more at platformtechnologies.org

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GETTING RESULTS

Conflux Technology's 3D printed heat exchanger is the start point of the future in getting the market economics right to manufacture goods that are better than what they're replacing: performance, efficiencies and sustainability.

Fuller is confident we're on the cusp of getting those market economics right, compared to existing designs. His heat exchanger is now delivering:

40%

improvement on the thermal exchange

50%

lighter than devices currently on the market

30%

improvement on heat pumping losses

Conflux Technology's heat exchanger has passed proof-of-concept and has caught the attention of the Australian media, with interviews and write-ups including Sydney Morning Herald³, Future Crunch⁴ and Manufacturing Monthly⁵. Four final prototypes have been tested by a Formula One team, leading German automotive manufacturers and Fuller's heat exchanger is being discussed with development partners.

LOOKING AHEAD

With the belief that Australia has the engineers and an abundance of accessible resources which can compete globally, Fuller is now driving his next big project in financing the AU\$11 million Australian pilot production plant.



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