



# The Need for Speed

AUSTRALIAN MOTOR RACING TEAM ACCELERATES DESIGN PROCESS WITH FDM TECHNOLOGY

*“Every piece of our team, no matter how big or small it is, contributes to us winning the championship. We cannot afford to miss any piece, and the Dimension 3D Printer makes sure that we don’t.”*

*– Craig Johnstone, Triple Eight Race Engineering*

## CASE STUDY



3D printing has helped propel Triple Eight Race Engineering to multiple motor racing championships.

Since its inception in 2003, Triple Eight Race Engineering has grown to become one of the largest and most successful motor racing teams in Australia. The team has dominated the country’s premier motorsport, winning the V8 Supercars Championship six times – an international touring car racing championship that draws crowds of over 150,000 spectators and several million TV viewers. They also won the Bathurst 1000 – Australia’s version of Le Mans – five times.

Apart from a renowned team of drivers, there are more than 30 race technologists, engineers and technicians working behind the scenes to produce next-generation vehicles that help Triple Eight cement its position. In late 2013, to keep the team’s momentum going, Triple Eight introduced a series of new specification touring cars with the debut of the Red Bull Racing Holden VF Commodore. This introduction was made possible, in part, to the company’s use of 3D printing.

## Speeding Up Concept Modeling Process

The V8 Supercars Championships have strict rules and regulations on what teams can do to their cars. Hence, every advantage in vehicle design and engineering can make a huge difference in winning or losing the race. Therefore the team continually improves its design to fine-tune its performance while maintaining the vehicle's stability.

The Holden VF Commodore was a sophisticated piece of modern-day machinery, so to customize every part and perform feasibility tests before production required a vast amount of resources and time. A best guess in design functionality was not an option, especially when a tenth of a second can mark the difference between victory and defeat.

These mounting design challenges led the team to invest in an in-house 3D printer in 2007. "The Dimension® Elite™ 3D Printer has reduced our time to market by speeding up our design process and increasing our prototyping precision," says Craig Johnstone, machine shop manager of Triple Eight. "The level of flexibility in producing custom parts for testing is remarkable and we can get real-time, real-life feedback on different designs, eliminating any theoretical guesswork based on what-ifs."

Triple Eight now uses its Dimension 3D Printer to produce models in-house in ABSplus™ thermoplastic before fabricating them in end-use materials such as steel and aluminum. This avoids costly concept models from heavy metals. Eliminating the cost and time delays associated with outside companies have helped the team reduce model production time by close to 70 percent and cut costs by 90 percent.

## Prototyping Functional Parts for Design Validation

Triple Eight has also used 3D printing to create functional prototypes of complicated parts. Highly complex components such as driver cooling housings, light brackets, pedal box and brake pedal pads often include compound angles with minute differences in dimensions.

"Producing close to 20 different parts with complex geometries on a regular basis for testing would have been nearly impossible without 3D printing solutions," says Johnstone. He adds that the accuracy and level of customization "allows us to detect any flaws and effortlessly repeat production till perfection."

Johnstone and his team built functional prototypes such as steering wheel cruise control buttons and helmet ducts. The helmet duct was especially important as it controlled the driver's air intake – any minor crack or malfunction might risk the driver's well-being. Johnstone first 3D printed the helmet duct prototype, and then glued it onto the driver's helmet for form, fit and functional testing, making sure that the helmet duct was kept intact and ventilation was constantly well maintained.

"We now use the Dimension 3D Printer around the clock because it provides us with quick turnaround time, strong parts, as well as the ability to build sophisticated parts that we could not build in the past," says Johnstone.

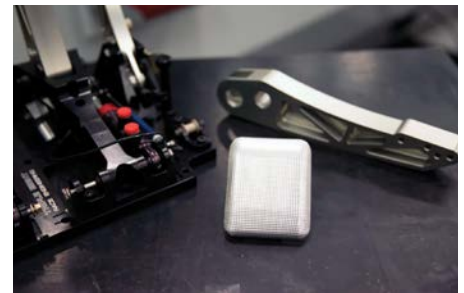
This strategy is a winning one for Triple Eight Race Engineering now and into the future. They have just beaten the competition at the end of 2014 and retained their championship title for the fourth consecutive year.



Triple Eight 3D printed the prototype of this seat mount in the racing car.



The seat mount prototype compared to the final end-use part.



Triple Eight 3D printed prototypes for the final versions of this brake pedal pad and pedal arm.



This brake light mount end-use part was also created on the Dimension 3D Printer.

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