



## OCTOBER TEAM UPDATE

### Team Leader's Update

With the M014 materialising in our new workshop at the Newmarket campus, and University coursework picking up in anticipation of the end of semester, the past month has been a very busy one for all team members. The remainder of our outsourced machining has arrived in the last month, thanks to our machining sponsors, and the car itself is only days away from its first shakedown!

We are now well settled into our new workshop, and with the increase in machine shop space has come a major addition to our team – a second-hand 3-axis mill from University of Auckland Technical Services. In the past, the mill was a bottleneck during manufacture, but the newly expanded capacity is expected to remove this. This means that our machine shop is now equipped with two manual lathes and two 3-axis mills.

As our Chief Engineer, Aaron Johnson, mentioned in last month's newsletter, our new suspension design was being retrofitted to the M013. Upon completion, the vehicle was taken to the Mt Wellington track for a test session. The session proved to be successful, and the design will now be fitted to the M014, with the hope that initial testing will further prove its performance.

As many of you will be aware, the team's annual raffle has been underway for several months, with many of our sponsors providing fantastic prizes. If you are interested in purchasing tickets and still haven't, contact your closest team member before the end of the week, or send the team a message through [raffle@fsae.co.nz](mailto:raffle@fsae.co.nz). Tickets cost only \$5 each, with over \$2000 worth of prizes to be won! These include DeWalt power tools, Facom toolboxes, restaurant vouchers and amusement park trips.

The raffle draw will occur on Wednesday the 22<sup>nd</sup> at our MEG Dynamic Display, the team's second annual event, catering to our valued sponsor, the Mechanical Engineering Group (a technical subgroup of IPENZ) and its members, as well as other selected sponsors. The evening will see three past cars and the M014 prototype on the track, competing in various pursuit-style events, followed by refreshments and a good look at the cars themselves.



**Isaac Grigor | Team Leader**

## Powertrain Team Update

The past months have seen the powertrain team hard at work fitting the engine, driveline, fuel and cooling systems into the 2014 chassis. This work has been greatly aided by the fantastic facilities provided at the Newmarket campus workshop, in particular a dedicated room for engine work. A useful feature of this room is the ventilation system, which positively pressurises the room at all times to keep dirt and dust away from the delicate engine components. Alongside time at the workshop, a number of team members have been busy testing and tuning engine modifications on the University of Auckland's dynamometer facility.



*Yamaha crate engine fitted in the M014 chassis*

The newly designed intake system has provided an improvement of 2.2 kW from that of last year. The cylinder head has received porting modifications, thanks to the kind assistance of Lynn Rogers Automotive. Coupled with this is a high compression piston, which takes the compression ratio from the standard 12.3:1 to 13.5:1. With these modifications we are making a further 3.7 kW, which takes the total peak power output to approximately 41 kW. In comparison, the 2013 engine produced 35 kW. Dyno tuning is still ongoing, and it is hoped that the power output can be increased even further with the use of YZ450 intake cams, which offer greater lift and opening duration.

Suggestions for the 2015 competition rules hint at an improvement in the way a turbocharger can be used on a Formula SAE engine. If implemented, these new rules will make the prospect of a turbocharged engine far more appealing than it currently is. We will be seriously considering a turbocharger on the 2015 car if these changes take effect.

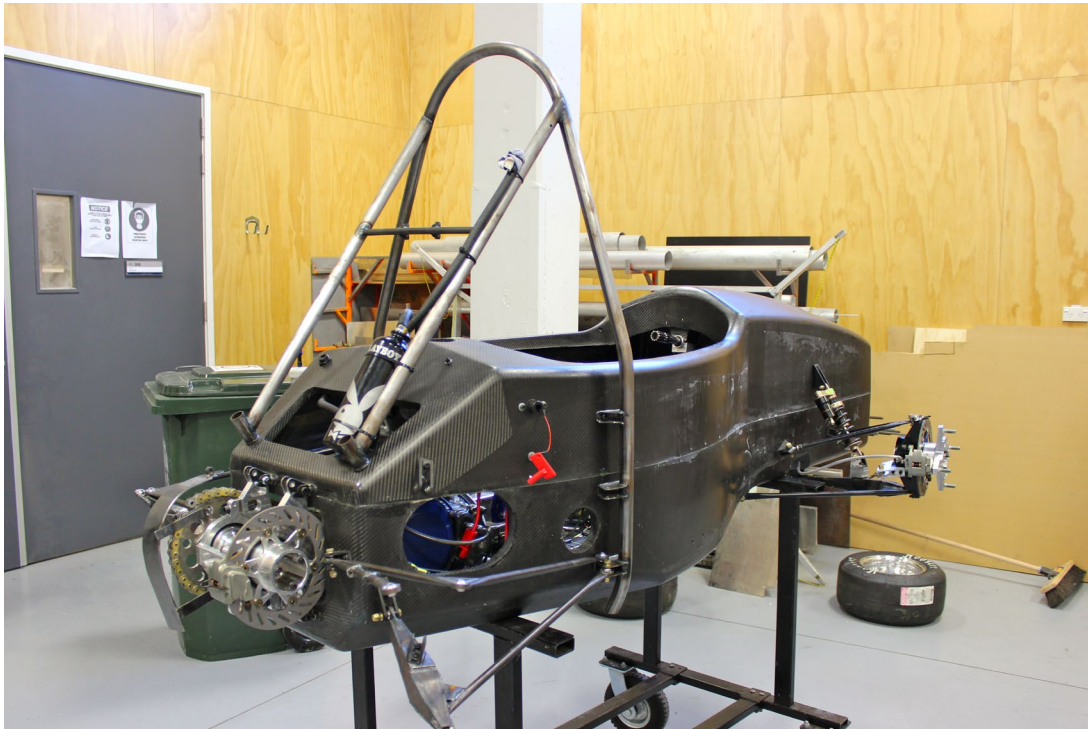


**Wil Killip | Powertrain Team Leader**



## Race Team Update

Over the coming weeks, the race team will take charge of the newly readied M014 car. The car will be shaken down, setup, tested, adjusted, added to and even rebuilt in some areas. This is an intense time of year where the team must come together to keep the campaign and car on schedule. The car will be taken to Kartsport Mt Wellington, who offer us track time at no cost, and complete its first few tentative laps, piloted by one of our test drivers. Throughout the day the pace will pick up, and any flaws will be addressed as necessary.



*The M014 prototype*

Following this will be a period where the car is 'set up'. Having been built from scratch, it is highly unlikely that the car will handle exactly as expected on its first drive. Although simulation greatly assists with handling, some adjustment will be required to turn it into the fast, predictable vehicle we expect. This process involves modifying the ride height, springs, tyre pressures and damping rates in response to feedback from the driver and onboard data acquisition system, until the car performs as expected. More complex sub systems will then be added to the vehicle, including our large aerodynamics package and bodywork. These items are initially not included in an effort to reduce the complexity of early test sessions.

Once the car is running close to its final state, test sessions will be dedicated to collecting data to validate our designs, such as measuring downforce at various speeds, as well as finding small improvements to the overall performance of the vehicle. This will be a stressful period for the team, but it is also an opportunity to see our original vision and a year of hard work realised. We will keep our website and social media accounts updated with lots of information about how we are fairing.



**Max Olson | Race Engineer**

## Sponsor Spotlight: Mobil 1



Mobil 1 was introduced in 1974 by the Mobil Oil Company – ExxonMobil. Today, it is the world's leading synthetic motor oil brand. Mobil 1 is not only the first choice of The University of Auckland Formula SAE Team, but also of over 55 car manufacturers worldwide.

Mobil 1 gives our cars superior protection and the ability to perform well under the demanding conditions present in autocross. Their product line is second to none, and we are very grateful to use Mobil 1 lubricants, hydraulic fluids, and cleaning agents. The company has also been an extraordinary help in getting us to competition at the end of the year. Mobil 1 has also helped the team by improving our workshop and publicizing the team at various events throughout the year.

Mobil 1 began sponsoring the team last year, assisting with not only the M013 campaign, but also by giving us the opportunity to refurbish the M08 to a running condition. They have continued to support the team with our 2014 campaign, for which the team is extremely grateful.



*The M08 on display at the Newmarket workshop*