

## From F1 cars to caravans



*Swift Group isn't named because of the speed of its products. So Andy Spacey, its technical director, explains why racing car technology is being brought to bear on its latest ranges of caravans*

**W**hen aerodynamics expert Dr Rob Lewis uses computer technology to keep a Formula 1 car on the track, the racing team is looking for a mix of blistering speed and colossal downforce. So what's he doing working for The Swift Group? Technical director at the East Yorkshire caravan and motorhome builder, Andy Spacey, helps explain: "In the last two years, the cost of fuel has rocketed from under £1 a litre to over £1.45 and, to counter this, The Swift Group has already undertaken aggressive weight saving initiatives on all our products to improve the fuel efficiency," he says.

But the equation doesn't end with weight. The 'barn door' front of a caravan is a necessary evil as designers attempt to balance the need for interior space within a fixed length over aesthetics but aerodynamics play a critical part in reducing fuel use and improving towing stability.

"Drag studies and affects are not new to The Swift Group, having previously studied this affect in the 1970s. Along with a number of partners, we utilised early wind tunnel technology to lead the research into aerodynamic airflow around a caravan itself, and the conclusions helped to shape the current caravan designs," says Andy.

"However, the belief has always been that the air flow around the towcar has such a massive affect on the towed vehicle that a study of the aerodynamics of a caravan alone was a pointless exercise, until we reviewed these principles."

So Swift Group drafted in Dr Rob Lewis and his company TotalSim, formed in 2007. Recent TotalSim projects have included road car aerodynamic optimisation,

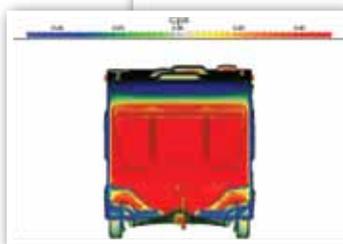
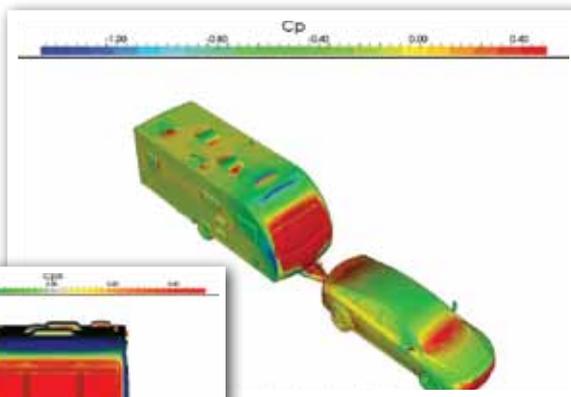
aerodynamics support for an F1 team, development of a new aero concept for a Le Mans LMP1 car, work for UKSport on track cycling, and other Olympic sports.

The process began with looking at customer data, figuring out which cars were the most popular for towing. Then the team began with car manufacturers' own 3D data and high-tech 3D laser scanmings of its own caravans – in micrometer detail – creating a 'virtual rig' in the computer.

Using this meshed fluid-dynamic study, as it is termed, was a learning curve, admits Andy Spacey: "Finding a partner with the facilities and expertise to fully laser scan a large caravan to the level of detail required for this study and to then convert this scanned data into a useable format was a real challenge for the team."

But it was worthwhile, as Andy explains: "The Swift Group now leads the way in this type of large-scale scanning. A number of technical challenges, including the reflective nature of the bodyshell, have been overcome with unique methods."

Being the first to perform a meshed fluid-dynamic caravan study with a simulated moving ground and rotating wheels, even the experts were unsure what to expect.



While a series of pre-meetings had concluded we could estimate the affects of the towcar and the difference in the shape of the caravan, the actual result even surprised Dr Rob Lewis.

"The size and shape of the wake on the rear of the towcar and how this affected the caravan was a surprise to the team, this led us to consider how we could optimise the airflow to further improve stability and fuel efficiency.

"We studied the flow around each of the models to understand areas of thrust and drag on all the models used. Again, the results were surprising with the smaller features not having as great an impact as first thought," says Andy. "By comparing the flow in CpT (total accumulation of flow energy) form, a direct overlay between the models could be performed."

The outcome has been five patents filed by Swift Group, all relating to improved aerodynamics and, while even better designs are in the pipeline, the pay-off for

caravanners is already a 2012 Swift Challenger/Conqueror range which shows 10% less drag than its leading competitor and a theoretical 9% fuel saving when the caravan is hooked up to a family estate car. That's around £60 that stays in your pocket this year if you drive 3000 caravan miles, with the prospect of more to come.

So it's not just the commercial car market that takes its tech tips from the track. Want to see what's set for your caravan in the future? Keep your eyes firmly fixed on the motorsport grid.



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