Market driven

Hannah Jeffery discovers a British company that has designed and built a sports coupé with a difference

THE Connaught Type-D GT Syracuse made its public debut at the Goodwood Festival of Speed at the beginning of July. The story behind its development is not only impressive because it is a British car designed and built by a British company, but also because Connaught aims to be the first company to launch a hybrid sports coupé onto the market.

The marque may already be familiar to some because it was originally the name of a company founded in 1948, which went on to become the first British manufacturer to win a post-Second World War Formula 1 Grand Prix. Though it was only small, the original company enjoyed some large successes, and in its new incarnation, launched in 2002, Connaught hopes to realise similar levels of achievement.

Company co-founder and vehicle engineering director, Tim Bishop has been a consultant to various automotive manufacturers in the past, including the board of GSR Tatra in the Czech Republic, SAAB, TVR and Jaguar. Financial director Roy Irish explains that Bishop has been involved in the industry for around 35 years and "would call himself a complete vehicle engineer. Although pretty much his speciality is power trains." When Bishop met Tony Martindale, also a Jaguar veteran and now programme management director at Connaught as well as co-founder, "the two hit it off immediately." Despite coming from different design backgrounds - Bishop was not versed in CAD tools whereas Martindale was fully trained and reached for a mouse as easily as a pencil - they both had ambitions to set up a car company and build something of which they could really feel proud.

Research

Connaught commissioned market research to help decide what kind of car to design. According to Irish, "This is where the first differences appear between a lot of car projects in the past and this one." He says Bishop and Martindale set out thinking "'let's go and find out what's the best sector to be in'. Not 'let's go and build a nice car, a pretty car and then sell it'." Preliminary market research revealed that not only is there currently a demand for sports coupés, but that this demand is set to grow in coming years.

Further research was then carried out among demographically diverse respondents in South East England who were interested in buying a car within the 'sports coupé' class. "What the consumers said," details Irish, "was 'we want it fast and we want it economic'." This is where it becomes apparent that this was not going to be just another sports coupé. As Irish puts it: "Tim's immediate reaction was to get that combination we must go down a hybrid route, and so from the first day the idea of a hybrid sports coupé was born, but purely and simply to deliver to the consumer something that was quick but also economic."

In order to meet new standards and regulations relating to emissions and safety, vehicles are gradually becoming heavier. This is reducing overall fuel economy and there is little that large manufacturers can do without investing in new facilities and complete re-designs. Connaught has not been restricted by high volume manufacturing techniques, though, and was therefore able to design its ideal vehicle architecture almost from scratch. The Type-D is very lightweight as a result, with a stainless steel and bonded composite chassis with laser cut holes in the steel structure to reduce weight further and yet maintain overall strength. The body is shaped in aluminium, which also helps keep the car's weight under 1000kg, but it is the new engine designed for the Type-D that is really expected to augment fuel efficiency.

The Type-D can be powered by a choice of engines, both designed in-house using CAD technology. The car can use either a 2-litre V10 with supercharger producing 300bhp, or a hybrid 2-litre V10. 'Hybrid' in this case has nothing to do with the fuel put into the car at the pump. Rather it refers to the car's power unit being a combined petrol engine and electric motor. Ordinarily, when a driver applies the brakes, energy is lost through conversion to heat, but in a hybrid car the electric motor stores that energy in capacitors or batteries in order to re-use this when pulling away again. With the Type-D, in town traffic, the engine will

automatically shut down when the car comes to a stop. The electric motor and lightweight super-capacitors will then take over and restart the car, offering improved fuel consumption in stop-start city driving. Once it is under way, the car can be run in economy, normal, or performance mode. In economy mode it pulls away using only electrical power and the engine management system then uses the most fuel-efficient drive cycle according to torque demand. In performance mode the car will use all the power available. Since the main aim behind the development of the hybrid engine was to improve fuel efficiency, the developers are pleased independent tests found it to be 20 per cent more efficient than a conventional benchmark engine. Because it uses a 48-volt power system to electrically heat the catalytic converters, which do not function properly until they are up to temperature, the system also minimises emissions and provides better light off times.

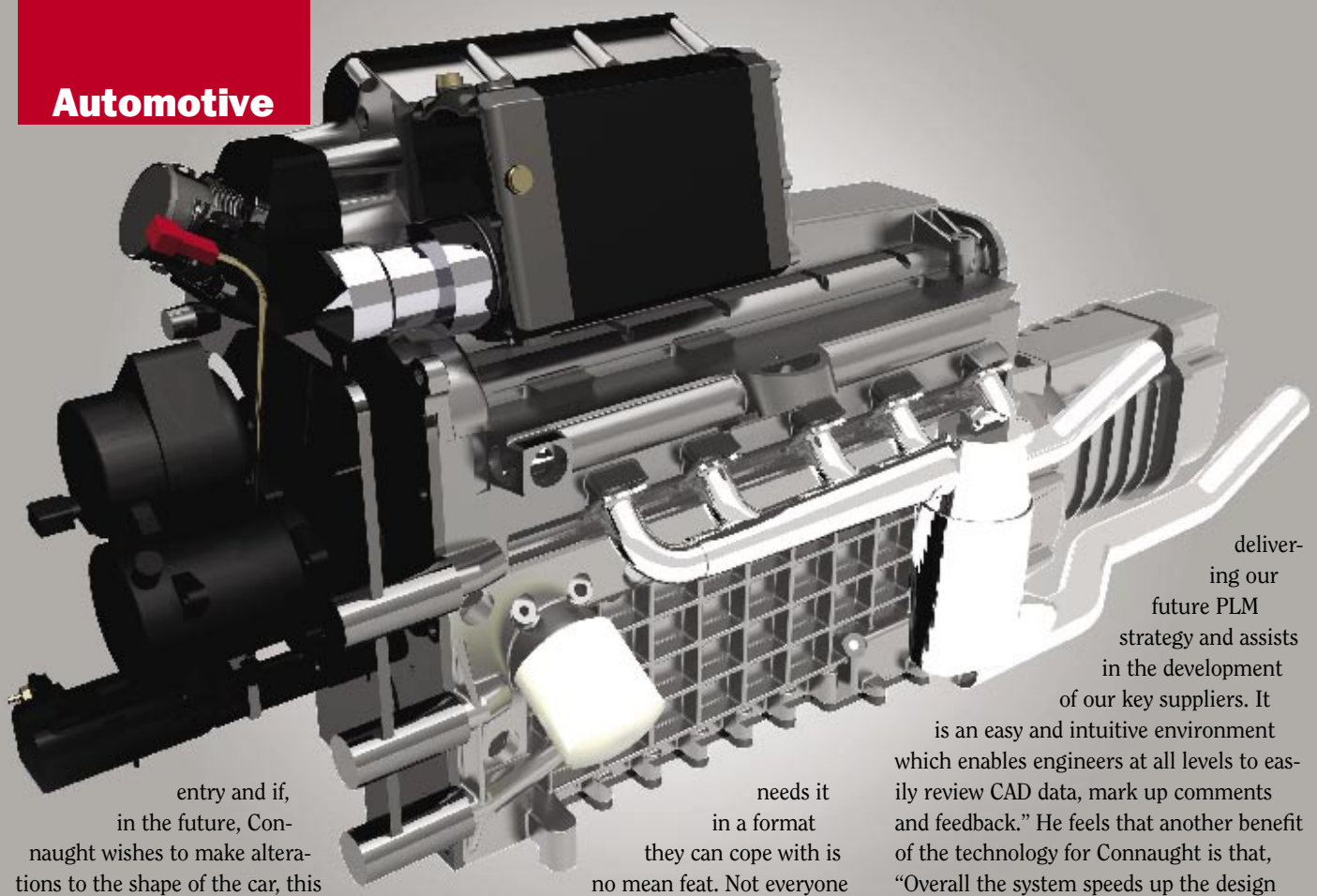
Options

Connaught's hybrid will go on sale after its non-hybrid GT car since the software and control systems connecting the engine with the rest of the vehicle take longer to calibrate - between about four and eight months for the hybrid rather than just a few weeks. The company has decided to offer a non-hybrid version first to get its brand up and running sooner and in order to offer customers a choice. The hybrid technology has recognised licensing potential both in Europe and particularly in the USA where there is a stronger awareness of its benefits, but even after production has begun on the hybrid, Connaught will continue to offer customers a choice of engine.

Because the engine is set in line with the length of the car and is very narrow, it can sit much further back in the body than would normally be possible. This means the Type-D has a similar weight distribution to that of a mid-engined car and because the engine sits well down in the chassis, lowering the car's centre of gravity, this should improve handling.

It also means more space is available for passengers and their luggage in the car. This was also driven by the market research, which revealed that a gap in the market existed for a coupé with ample seat space. Explains Irish: "you've got anything from very poor back seats to no back seat at all in a lot of the competition and so genuinely they did start from day one to design a package for four reasonably sized adults in this car." This may not be the overriding issue when choosing a sports coupé, but Irish insists that it is nonetheless, "very important in the market place. I think you've got to look at this as a package solution. There are a lot of people out there who quite like the idea of having a nice sports coupé - you can imagine the sort of people, young couples who have had their sports coupé, but suddenly the kids come along, they've got other priorities and there's a lot more demands and this car is a whole balance of things which produces that result."

The result was achieved by a team of almost 20 staff, nearly all of who have worked with major automotive companies and have wide experience with both specialist and volume production techniques. The company is therefore quite proud that even though it is relatively small, it has been able to develop and implement good working practice that echoes the techniques used by larger OEMs. It is using an outsourced manufacturing model, which means it has not had to invest large amounts of capital in plant and machinery. The Type-D will be manufactured and built in the UK thanks to a close cooperation with several technology and financial partners, including among others, 3M - which has helped with bonding technologies - Coventry University - which was involved in virtual styling development, foam modelling, 5-axis milling, and production - and the Energy Saving Trust - which provided funding for the development of the hybrid engine. Specialist in prototyping and the low-volume manufacture of vehicles and components, Coventry Prototype Panels (CPP) has been involved in production of the fabricated lightweight chassis and bodies for the Type-D Syracuse GT. Parts are shaped on a jig at the firm's site in Cov-



entry and if, in the future, Connaught wishes to make alterations to the shape of the car, this will be more easily achievable here than it would be for a larger firm or car manufacturer that has invested in larger volume production facilities. Working in partnership with CPP and other firms has permitted Connaught to create a template for larger volume production, meaning logistics and resource management could be divided between several organisations, reducing operational risks and making the best use of specialist resources available.

It has also meant that a range of different CAD platforms was used to design the Type-D car and engines. The resulting data then had to be shared amongst all the teams involved in designing and building the car, in order for everyone to be able to work from the same plans. Keeping control of such a volume of information and making sure that it is available to everyone who needs it in a format they can cope with is no mean feat. Not everyone involved in a project can receive the necessary levels of training to operate all the different CAD engineering programmes used, or interpret the 3D CAD data produced by these. It can be expensive to provide sufficient software and licences to ensure everyone involved is using the same programme to start with. Files sent via the Internet are at risk of being intercepted and large files require extra bandwidth, which can mean further expense. Connaught avoided these problems by using a digital design communications platform developed by San Francisco-based technology firm, Actify. The motor company chose to use Actify's products to undertake the digital mock-ups it needs to carry out internal engineering reviews. It is also using the same products to share information with its supply chain. Explains Tony Martindale: "This is key in delivering our future PLM strategy and assists in the development of our key suppliers. It is an easy and intuitive environment which enables engineers at all levels to easily review CAD data, mark up comments and feedback." He feels that another benefit of the technology for Connaught is that, "Overall the system speeds up the design process, manages data transfer and then improves time to market."

The primary target consumer identified by market research for the Type-D is male - pre-, growing- or post-family - who wants a car with sports styling and performance but needs more space than a traditional sports coupé provides. He is probably a car enthusiast and excited by innovation- though this does not mean he is a technical expert. 'Britishness' was also found to be attractive to the target buyer, especially where a niche car manufacturer is concerned. Connaught, then, as a small British brand working with UK companies to produce a technically innovative car - with enough leg room in the back seats for average-sized adults to sit comfortably - could be said to have designed a car that should keep such a man happy. E