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BOX-OFFING SMASH

SCOOP **LOTUS M250** Porsche's Boxster had better watch out – a British-born 250bhp sports car is getting ready to steal its thunder. Steve Cropley reports



Interior aims to combine race car technology with comfort, space and style



Sporty detailing evident in aluminium central control panel and gearshift

It seems entirely correct that Lotus's new £40,000 Porsche-chaser, the M250, should be taking shape inside the company's new prototype-build HQ within a few yards of the thundering A45, which takes traffic from Coventry to Birmingham. Over the years that road has been a test site for the cream of British sports cars: Jaguars and Triumphs, MGs and Jensens, road cars and racers.

If any British sports car ever deserved the description "cream" on the evidence of its shape and specification, it is this Lotus. Even before it turns a wheel it promises to be cheaper, faster and much more radical in design than the Porsche Boxster S, one of the most desirable cars on the road. After toying for a year with the concept of building a

model to fit between the Elise and Esprit, Lotus took the plunge six months ago, revealing that it would launch the new compact supercar early in 2002, in volumes to equal or possibly exceed the Elise's present 3000 cars a year.

In recent days, the new car, originally dubbed Emas (Malaysian for gold) by chief executive Chris Knight and since codenamed M250, has been driven on all kinds of roads at all different speeds, cornered at and over the limit, braked at the limit of grip and crashed into a variety of barriers – but all in a computer. Lotus is using computer design and simulation more than ever before for this new model, and the new tools are so realistic that engineers have so far built only a couple of Esprit-bodied mules because the

proving phase for new cars nowadays is far shorter than it once needed to be. Thus appearances of traditional taped-up M250 prototypes on the A45 will be a comparative rarity – or so say the Lotus experts at work on the project.

Lotus Coventry is the research centre formerly operated by automotive research consultants MGA. Its most prominent building has a listed '20s facade whose elegance has crumbled in recent times but will soon be restored under a Lotus-funded programme. Over the years the front office has been an aero engine factory, part of Standard Triumph, and home to the secret studios which in the past produced the Bentley Java concept car and earliest versions of the MGF. Now it's where

Lotus builds prototypes, using five-axis CNC milling machines to produce components and full-size cars. Somewhere in the labyrinth behind the elegant entrance hall lie treasure troves of M250 shapes and components, speeding towards production in less than 18 months' time.

According to Lotus styling boss Russell Carr, the M250's shape has barely changed from the original concept. "We had been designing this car in our minds for the best part of 10 years," he explains, "so when the call came to do it seriously, we had the benefit of an awful lot of prior thought. All the far-out ideas could be discarded, because we'd already moved beyond that." As things are going, the M250 seems very likely to make it to production





pretty well as drawn, because the styling committee – all Lotus people – is happy with the way it's going.

Carr's most recent revelation has been his interior, which combines a lot of Elise-style aluminium building blocks lower down in the cabin with some softer elements higher up, to please the £40,000 buyer. The interior has already received rave reviews from those who've seen it at motor shows.

The one discovery which has affected things in recent times is Carr's perception that the actual dimensions of modern drivers, especially height, is up to 50mm greater than industry standard data, which makes him glad that his cabin space was always fundamentally roomy.

Designers and engineers are especially proud of the M250's

scissor-wing doors, not quite gullwing affairs, more like those of a Lamborghini Countach or Diablo. According to Lotus's head of product development, Andy Hogg, the company counts the doors as one of the car's "wow" components, adding both value and convenience.

The M250 doors lift forward, Hogg explains, removing a section of the side sill as they go to relieve the entry difficulties of the Elise and remove problems with clearances when parked close to other cars.

Lotus remains reluctant to be pinned down on the details of the M250's construction, beyond the fact that the body will be in various composites: the chassis will be extruded aluminium, with a composite floor and bulkheads, and high-strength composites such as

HANDLING AND PERFORMANCE

The Lotus M250 will be quicker in a straight line and around any circuit than the Elise or Exige. Its engineers are already sure of it. But how, precisely, will it drive? How will we describe the control efforts, their progression and precision?

The best answer is to take a drive in a contemporary Lotus – I chose Exige – with chief test driver Alistair McQueen. Even in the rarefied world of professional wheelmen, the modest Scot's touch is famous.

He drives like some people paint pictures, with full concentration and small but precise movements.

Everything deft and rhythmical and *meant*. When the car goes fast, you sense that he's merely allowing the machine its head. He reacts a little more quickly as our speed grows, but there's no change in the size or urgency of his tiny steering and

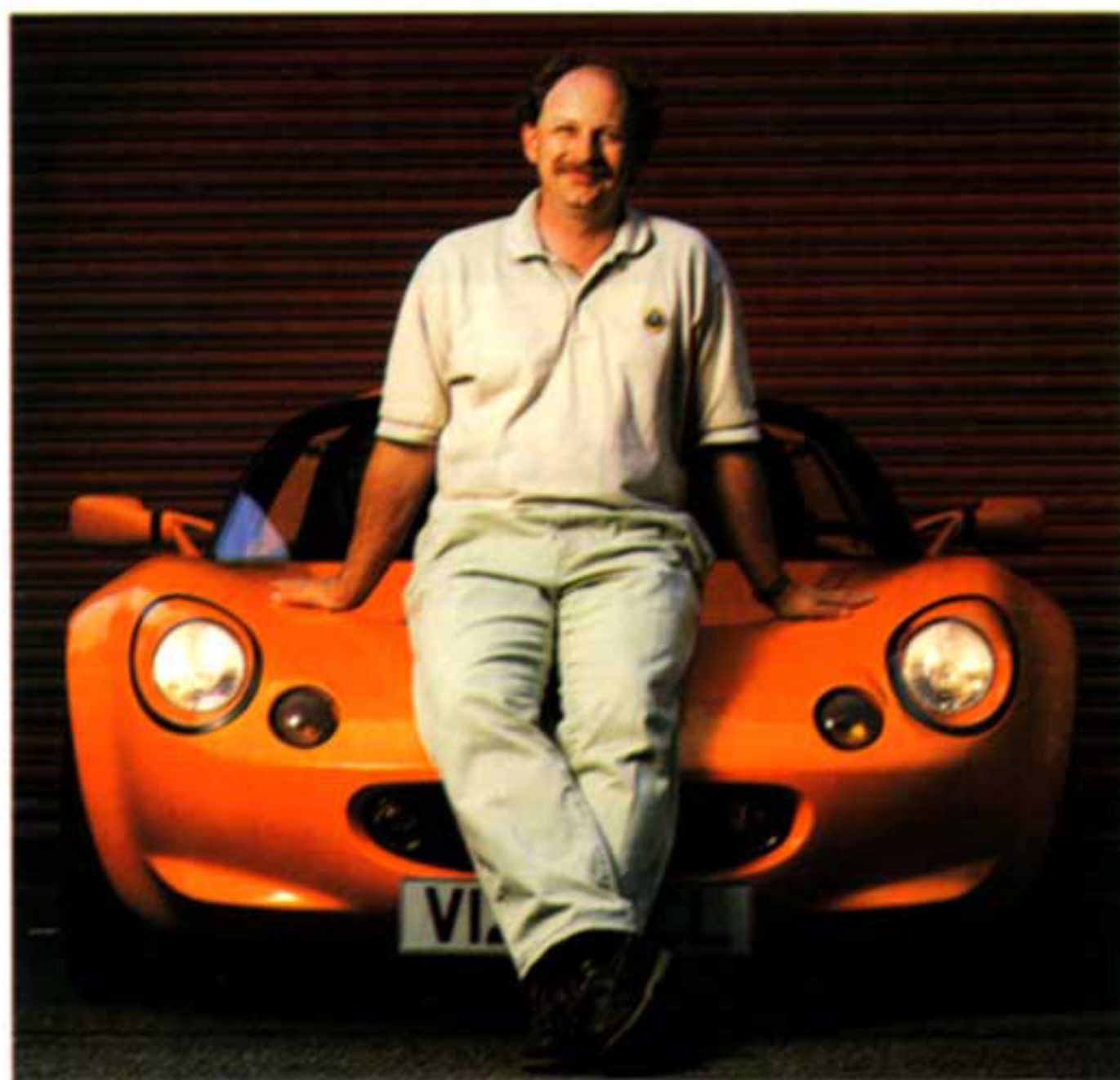
throttle corrections. This is Lotus's stability-with-speed principle brought to life.

In these experienced hands the Exige is light and responsive, benign and stable. That's how McQueen's boys like their cars, and at Hethel the test drivers have unprecedented say. The Lotus M250 will drive that way, too.





Aerodynamic performance crucial, as indicated by large diffusers and wing



Lotus development chief Andy Hogg confident M250 will have "wow" factor

◆ carbon fibre will be used in high-stress areas such as the windscreen pillars. Composites can be moulded to do two jobs at once: the floor is shaped to accommodate the seat rails, for instance. It's one of many means Lotus is using to keep M250's dry weight below 1000kg – a Boxster weighs over 1250kg.

It's no secret that the M250 will use double wishbones with coil-over suspension units, but Lotus will be aiming for the highest possible ride/handling standards. Engineers claim

they've learned much since the Elise's earliest days, both about taming the handling of transverse mid-engined cars on the limit, and providing extra ride comfort in a car with relatively stiff spring rates. "It will be compliant, but always feel well damped," says Hogg. "The secret is in how you specify your shock absorbers."

There will be no carry-over parts between Elise and M250 ("the geometry is too different") but Hogg promises that the new car is faithful to Elise principles,

POWERING THE M250

Nobody at Lotus denies that the M250 will use the Renault Clio V6's 3.0-litre, 250bhp engine. But nobody will confirm it either.

However, motor show spies long ago recognised it in the engine bay of the "show" Lotus, and the fact that Lotus requires a six-speed gearbox for its new car – and Renault offers a selection of two race sequential and conventional H-pattern – adds fuel to the rumours.

If Lotus does choose the Renault (the other mill in the frame is an improved Vauxhall Omega unit), we've already driven it. Road test editor and TVR Tuscan racer Stephen

Sutcliffe sampled it a year ago in a Renault Clio Trophy race car. Based on the compact, punchy all-aluminium Laguna V6, it developed 285bhp but the track-ready car's power to weight ratio was almost identical to the 250bhp per tonne

Lotus is seeking with M250.

Sutcliffe found the engine "strong from 3000rpm, mean from 4500 and plain fabulous between 5500 and 7400rpm."

Lotus's bespoke installation is certain to be more refined. Engineers will refine this unit's race-ready tune. But there's no denying the potential. This V6 is an engine with which Lotus can work.



refined and extended in the highly impressive new Exige coupe. The M250 chassis is around 50 per cent more torsionally stiff than the Elise: engineers say their aim is to make it feel completely solid.

Key factors in the M250's stability and agility are its weight distribution and aerodynamics. At present the weight split is 40 per cent front, 60 per cent rear, but as work proceeds Hogg is moving it towards the 45:55 he considers ideal for a performance car with

250bhp per tonne.

"If you never had to accelerate – in other words if the car always travelled at speed in a steady state – the ideal distribution would be 50:50," he says. "But it needs some rearward weight bias because we're putting a lot of power through the rear wheels."

Lotus is coy about discussing a conventional drag factor, preferring to stress the fact that its body generates impressive downforce (applied with an ideal balance, front to rear) at all ◆



Distinctive scissor-wing doors designed for easy access as well as visual appeal; composite panels used throughout construction of lightweight body



AAAS & STAN PAPIOR

Styling barely changed since original concept due to its popularity at Lotus

Transverse 3.0-litre V6 with 250bhp expected to come from Clio or Omega

◆ speeds. Few cars generate downforce at all speeds, Hogg claims, and that's the key issue. "The philosophy of the car is to ensure that stability does not decrease with speed," he explains, "and we've got to be fairly clever about how we deal with aero forces because it's a light car which doesn't have as much static mass as many cars, to keep it anchored on the road."

Carr says the body shape was conceived from the beginning to avoid the "waisting" of the Elise's body sides, which are known to generate drag at higher speeds. It was always going to be necessary to make this car as slippery as possible, he acknowledges, because its short overhangs and compact dimensions don't give it a natural teardrop aspect.

A decision to limit the top

speed to 155mph should play an important part in making the car agile, explains Hogg. If the car were allowed to run to its natural top speed, its suspension settings would have to be prepared for greater aero loads (since downforce increases as the square of speed). With top speed limited to 155mph, the car can be specified both for more agility at lower speeds and a more compliant ride. There's also an undoubted driver benefit in the arrangement of gear ratios, which don't have to cater for a potential top speed beyond 170mph, and can therefore be stacked more closely.

Lotus is still being coy about its choice of 3.0-litre V6 to power the car, though the Renault engine used in the Clio V6 looks favourite. It comes with a six-speed gearbox, one of

Lotus's desired components for its new car, and there is a strong traditional link between the British and French firms.

Lotus insists the bought-in engine it chooses will be tuned to suit Lotus parameters (it will be torquey, but have a strong top end) and will produce around 250bhp. The sporty Clio's engine does that already. Lotus engineers admit their chosen powerplant will be transversely mounted – early reports had suggested an in-line installation would be chosen – and point to space efficiency and the extra rear-crash crumple space the layout affords.

There can be little doubt that Lotus faces by far its greatest modern-day challenge with the M250, seeking to sell it in greater numbers than the Elise, and at close to twice the price.

This will be the most easy-to-live-with Lotus in history, featuring twin airbags and anti-lock brakes, though no power steering and no traction or stability control. Lotus's brilliant test drivers – led by Alistair McQueen (see panel on p39) – insist on a minimum of electronic interference.

Only assessment of a production car will show whether Lotus can produce such a car, and buyers can accept such a Lotus. But after Elise and Exige, via 340R, confidence among Lotus engineers is sky high.

Questioned about the difficult job of injecting some of that Exige-style "wow" factor into the M250, Hogg appears to have no doubts. "We know how to do it," he says. "That's what we're paid for." ○