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**LE MANS**

### The car (hoping to be) in front is a Toyota

After more than a decade away from international sportscar racing, Japanese giant Toyota is back – and the TS030 closed-cockpit LMP1 car on which it is pinning its hopes of Le Mans glory was tested at **Paul Ricard** last week. For the full story of its ambitions, see P34.

Pic: Moy/Toyota Hybrid Racing



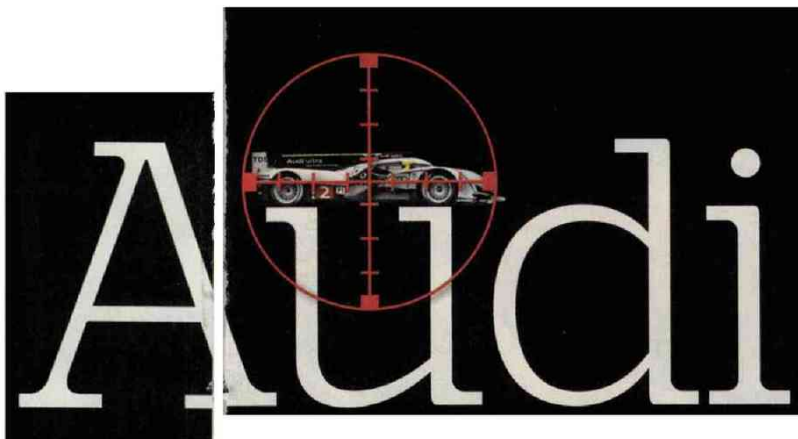
# Autosport (UK)





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# The car aiming to beat to beat



## Sportscar racing has lost Peugeot, but Toyota has stepped in. *GARY WATKINS* looks at whether the Japanese firm can beat the best

**T**oyota has had a long obsession with the Le Mans 24 Hours or, more correctly, trying to win the greatest sportscar race of them all. Once an almost permanent fixture on the entry list, the Japanese manufacturer has stayed away from the Circuit de la Sarthe for 12 years. Yet for more than half that period, it was plotting a return. The Toyota TS030 HYBRID unveiled last week is the manifestation of a project that started way back in the middle of the noughties.

### PROJECT TIMELINE

The seeds of Toyota's international sportscar return in the FIA World Endurance Championship, which includes Le Mans, were sown in 2005 when Hisatake Murata, Toyota's hybrid project leader, was charged with investigating the use of energy retrieval

in motorsport. A modified roadgoing Lexus GS450h was entered in that season's Tokachi 24 Hours in conjunction with the SARD team and one year later they won the event with a modified Super GT-Supra using Toyota's first racing hybrid system.

Murata will only say that development, focused on reducing the size and weight of the hybrid systems, has been continuous since that time and won't go into details. But it is known that an LMP1 test mule based on the Dome S101 ran as early as 2007 and that a further car built by the Japanese firm was on track in 2010.

There are a myriad of factors why it has taken so long for Toyota to arrive back on the international sportscar scene with its hybrid technology, according to Murata.

"We had economic issues, technical

issues and regulation issues," he explains. "It has been very complicated, but this was the first time that we could come."

The green light to design Toyota's new petrol-electric hybrid finally came at the end of 2010. The decision to build the car and put a programme in place for 2012 had been expected in March last year, only to be delayed by the earthquake that hit Japan that month and the events that followed.

The final go-ahead came last October, though technical director Pascal Vasselon insists that the delay hasn't had a significant impact on the scope of the project in 2012.

"Yes, the decision came late, but in the end it has only cost us Sebring," he

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says. "The programme for 2012 would always have been a development year, starting with one car. The only difference is that we could have been ready for the Sebring 12 Hours [the opening WEC round in March]."

Not racing in 2012 had been an option, according to Vasselon: "This year is a training season and there are several ways we could have done that. We could have spent the complete year testing, but we feel the best preparation is to go racing."

### THE TSO30

The new Toyota LMP1 coupe has been developed, like its predecessor the GT-One of 1998-99, at Toyota Motorsport GmbH in Cologne. Back then, TMG was a team straight out of the World Rally Championship, which is why it turned to Dallara Automobili in Italy for technical assistance. Now TMG is an ex-Formula 1 team with facilities and expertise to match, which explains why the car has been designed and built almost entirely in Cologne, says Vasselon.

"Most of the processes in place for F1 have been used on this car, and the same people, too" he says of the TSO30. "The car has been entirely designed and built at TMG. A total of 86 per cent of the carbon parts have been built in-house."

That development process is still ongoing. The TSO30 that makes its race debut at the Spa 6 Hours WEC event on May 5 will not look the same as the one unveiled at Paul Ricard last week. That's why Vasselon admits he is only "half-happy" with what the world has seen so far.

"It looks good, but it is not the final bodywork," he says. "Knowing what is in the pipeline, I am struggling a little bit to find it extraordinary. You can expect a car that pushes the boundaries a little more."

### THE ENGINE

The TSO30 is powered by an all-new

3.4-litre V8 developed in Japan that shares only its 90-degree vee angle with the customer engine used by the Rebellion Lola team in last year's Le Mans Series and Intercontinental Le Mans Cup.

The new powerplant is smaller and lighter than the Super GT-based unit used by Rebellion because of the need to go some of the way to cancelling out the weight disadvantages that come with running as a hybrid. Murata says ▶

◀ that the new engine is approximately 20kg lighter than its predecessor.

### CAPACITORS VERSUS BATTERIES

The Toyota Hybrid System-Racing (THS-R) uses super-capacitors rather than a battery to store retrieved energy. The decision to go in that direction was taken back in '06 and came about because of unique racing requirements.

"Racing means a big power delivery in a short time," says Murata. "A lithium battery has a big storage capacity, but the power ratio is very low. A capacitor has a small storage capacity but a high power ratio."

### FRONT VERSUS REAR RETRIEVAL

Toyota is still experimenting with hybrid systems on the front and rear axles. It will have to make a decision on which to use, as per the regulations, a minimum of 30 days before its race debut at Spa.

There are pluses and minuses of both systems. Energy retrieval on the front axle should be more efficient because more than 50 per cent of the braking loads on an LMP1 car are at the front, but Vasselon says the question is much more complicated than that.

"The main advantage with using the front axle is traction, which has to be better because you are using four wheels," he says. "There are also advantages in terms of tyre management because it is much easier for the rear tyres when the extra power is delivered on the front."

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"The negative side is weight, because of the addition of driveshafts at the front and these can be intrusive on your aerodynamic concept."

### THE TEAM

The decision to sign up the French ORECA team, winner of last year's Sebring 12 Hours with a first-generation Peugeot 908, as a partner was a "natural choice", according to Vasselon.

"We know how to set-up a car and we will use TMG processes to do that, but we have to accept that we don't have recent experience of endurance racing," he says. "ORECA will add their Le Mans experience to this programme. We believe we have the best of both worlds."

### AMBITIONS IN 2012

Despite billing 2012 as a development year, Toyota still has lofty ambitions for the car. Vasselon insists that the aim is to be "the fastest hybrid at Le Mans" even though he is expecting 10-time winner Audi to race with an energy-retrieval system. And in that

he claims there is no contradiction.

"In terms of the hybrid system we are all starting from a white sheet of paper and in some respects we expect to have an advantage," he says. "That is why we think it is realistic to be the fastest hybrid."

Vasselon distinguishes between being at least on Audi's pace and beating them.

"As racers we will go to Le Mans to win; that is passion talking," he explains. "But when reason is talking

it may not be realistic to last 24 hours at the very first attempt."

### BIGGER PROGRAMME

Toyota expanded its Le Mans attack from one to two cars, before Peugeot announced its withdrawal earlier this month. The suggestion that it could run all the races after the 24 Hours, rather than the selected events originally planned, isn't dismissed by Vasselon.

"Going to two [cars] was partly down to the enthusiasm the programme generated," says Vasselon, who denies Toyota is under pressure to do more races from the Automobile Club de l'Ouest (the Le Mans organiser and WEC promoter).

"We cannot say there is pressure, but as a participant we need to think what we can do."

### THE FUTURE

Toyota is back in frontline sportscar racing for the foreseeable future, Vasselon describing it as a "long-term project". He explains that nothing is confirmed beyond the end of this season because the Japanese manufacturer only commits its budgets on a year-by-year basis.

On the horizon are new rules in 2014, which will place a premium on the kind of alternative technology Toyota is developing on the TS030. The timing of its return this year suggests that finally winning Le Mans when those regulations come into force is the real target.

Vasselon begs to differ: "We expect to be competitive this year and then the first big push will come in 2013." ❄

## TOYOTA'S LE MANS HISTORY

### 1975

Toyota Racing Development supplies the engine used by the Sigma team (now SARD).

### 1985-86

Japanese constructor Dome fields single-car entries at Le Mans powered by 2.1-litre turbocharged Toyota engines.

### 1987-88

First official entry when Dome Group C design runs under the Toyota banner.

### 1989-90

New car powered by V8 twin-turbo engine comes on stream.

### 1992-93

Toyota returns with new 3.5-litre Group C car developed in the UK at TOM'S GB.

### 1994

SARD enters a reworked V8 turbo car in new LMP900 class and nearly wins.

### 1995-96

Toyota maintains its Le Mans presence with Japanese GT-spec Supras run by SARD in the GT1 class.

### 1998-99

Toyota Motorsport GmbH masterminds the Japanese giant's Le Mans comeback with the GT-One.

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### Toyota's Le Mans heartache **FAST BUT FLAWED**

A glorious failure or just downright unlucky? There are two schools of thought when trying to assess Toyota's long history at the Le Mans 24 Hours. There have been times when the millions it spent created cars that weren't good enough, other times when misfortune was the only thing that stood between it and victory.

The turbo Group C Toyotas were never a match for the best cars in the field, the Jaguars and Sauber-Mercedes, and when it got serious for 1992 with the British-developed TS010, it

again fell short against the all-conquering Peugeot 905. The Toyota was neither as fast nor as reliable as the French car and notched up a best result of second, albeit six laps in arrears, in 1992.

A privateer, though works-blessed, entry arguably came closest to giving Toyota its longed-for Le Mans victory. SARD's reworked Group C car would have won but for a broken gear linkage with 90 minutes to go in 1994.

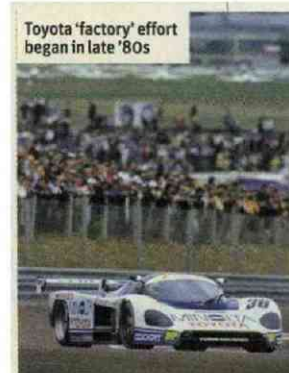
The GT-One might well have ended Toyota's drought. In 1998, the entry driven by Thierry Boutsen, Ralf Kelleners and Geoff Lees was still in the mix with just over an hour to go, despite

two changes of gearbox internals. The car's late retirement was down to a spot of finger trouble: the sump plug, hastily put back during the replacement of the gear cluster, fell out.

The GT-One driven by the all-Japanese line-up of Ukyo Katayama, Toshio Suzuki and Keiichi Tsuchiya finished a close second the following year after a late puncture dropped it off the lead lap. The other two, faster Toyotas both went out in the night through no fault of the drivers involved. Martin Brundle ran over some debris on the Mulsanne Straight and Boutsen was injured after being punted up the rear at the first corner.



Toyota will fight Audi after Peugeot pull-out



Toyota 'factory' effort began in late '80s

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Nakajima, Wurz and Lapierre lead line-up

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Petrol-electric hybrid  
got first run at Ricard



GT-One of late '90s was  
firm's last Le Mans car

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TS030 racer's look will change before it races



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