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PANASONIC TOYOTA F1 SPEARHEADS MOTOR SPORT CHALLENGE

Toyota took a decisive step in its long and glorious motor sport history with the entry of the Panasonic Toyota TF102 into last weekend's Australian Grand Prix, the opening round of the 2002 FIA Formula 1 world championship.

The race entry marked the culmination of an intensive three-year programme to develop and built a complete Formula 1 car from scratch. It highlights Toyota's determination to tackle the challenge of Formula 1 – the ultimate test-bed for automotive technology.

In line with the spirit of this challenge, Panasonic Toyota Racing is one of only two F1 teams to produce its own chassis and engine under one roof, and is the first new entrant to do so since 1979. It is also the first Japanese manufacturer to compete in its own right since 1968.

The team has completed a successful and comprehensive test programme with both the initial TF101 test car and, more recently, the TF102 race contender. Since the launch of the test car in March 2001 the team has visited 11 of the current F1 venues worldwide, in addition to Toyota's home testing base at Paul Ricard in southern France. In the eight month period to November 2001, the test cars had clocked up 20,967 kilometres.

This year the new Panasonic Toyota TF102 has tested successfully with other F1 teams in Barcelona and Valencia with official drivers Mika Salo and Allan McNish. It has also completed a further 700 laps of testing at Paul Ricard.

Ove Andersson, Toyota Motorsport president, is rightly proud of what has been achieved so far but is realistic about the challenges ahead.

"I think our main target for the year will be to learn and to try to gain respect within the F1 paddock," he says. "We want to be the team that, at the end of the year, everybody will say: 'they came and we think they did a reasonable job'. That's my target for the first year."

Panasonic Toyota launched the TF102 race car on December 17 in Cologne. The car retains the distinctive Toyota corporate colours of red and white but has a new paint scheme which adds the logos of newly acquired race partners AOL Time Warner and Wella. The new car was designed by a team led by Gustav Brunner, chief designer.

"The TF101 we tested last year was designed to be a test car and nothing more," he explains. "It served that purpose very well. The 2002 race car is more conventional but still state-of-the-art. Our design and build time was very short but we still managed to meet our deadlines and create the new car in time to start the season."

Toyota Motorsport is based in Cologne, Germany at the site which was formerly the base for many of Toyota's previous triumphs in the World Rally Championship and in the Le Mans 24 Hours race. The

team's facilities have recently expanded from 18,000 to 30,000 square metres and the team employees 550 people from 27 different countries.

A PROUD HERITAGE

- 45 years of motor sport success
- Early days in sports endurance
- Worldwide rallying success over 20 years
- Endurance racing in US & Europe
- Engines for F3 and CART

Toyota's entry into Formula 1 is the culmination of a proud and successful history in motor sport. For more than 45 years, from the Toyopet Crown to the present T Sport brand, Toyota has proved to be passionate about the challenge of high performance motoring and motor sport.

The early days:

The first official entry by Toyota into competition was in 1957 at the Rally of Australia. Just one year later, Toyota won the Around Japan Rally with a Toyopet Crown.

The first ever Japan Grand Prix (for sedan-based models) took place in 1963 and Toyota dominated all three classes of the event with Crown, Corona and Publica models prepared by private teams. Publica entries took first to seventh places and Crown took first to third.

Open wheel 'formula' racing was introduced to Japan in 1964.

In 1966 Toyota entered the Japan GP with its production-based 2000GT finishing third against prototype rivals. This sparked interest in sports prototype racing, leading to the development of the Toyota 7.

Sports prototypes:

After a one year campaign with the 2000GT in the SCCA C-Production class, led by Carroll Shelby, Toyota developed the 3-litre, V8-powered Toyota 7 which proved a huge success in endurance sports prototype races.

In 1968 the Toyota 7 won a Japan Can-Am race and the Fuji 1000km, Suzuka 12 Hours and Suzuka 1000km races. Just one year later the 5-litre Toyota 7 debuted at the Fuji 1000km and, once again, won the Japan Can-Am race.

In 1970 the Toyota 7 project was halted. But Toyota's race ambitions were carried forward by the creation, in 1974, of Toyota Team TOM's which became the driving force behind Toyota participation in Japanese motor sport, Group C and Touring Car competition.

Meanwhile, in 1969, Toyota had launched the Celica; the sports car that was to transform its international performance in racing and rallying.

Team Toyota Europe:

A key meeting in the history of Toyota's motor sport challenge took place in London in 1972, when it was decided Ove Andersson would drive a Toyota Celica on the RAC Rally that autumn. Andersson finished 9th, making Toyota the top Japanese team and sowed the seeds for Andersson Motorsport – later to become, in 1975, Toyota Team Europe.

Later that year, 1975, Hannu Mikkola stunned the rally world by taking a 1.6-litre Corolla to victory on the 1000 Lakes Rally in Finland. His result emphasised the motor sport capabilities of the Corolla,

building on a previous win achieved by Walter Boyce on the US-based Press-on-Regardless Rally in 1973.

In 1979 Toyota Team Europe moved to Cologne from Brussels and, in 1991, Toyota decided to take over the operation and expand facilities, creating Toyota Motorsports GmbH in 1993. From its original base of 20 employees, TMG expanded to a staff of almost 300 people from 17 nations.

Over 25 years, Toyota became the dominant force in world rallying – taking 43 FIA World Rally Championship wins; three World Rally Championship manufacturer titles; four World Championship driver titles and four Middle-east Championship titles.

Although Toyota ceased official rally activities at the end of 1999 to focus on Formula 1, there is still a customer rally department in Cologne supplying Toyota distributors, dealers and private teams with competitive cars.

Endurance racing:

At the end of the 1970s TOM'S started working with DOME, based in Kyoto, to develop a car for the newly established Group C category. Toyota supported the project with works tuned engines and was deeply involved in development.

In 1982, the World Endurance Championship raced at Fuji (Fuji 6 Hours) and, in 1985, the DOME 84C won the Suzuka 500km with Toyota backing. From then on Toyota became more involved in international endurance racing, including the world famous Le Mans 24 Hours and the world championship series. DOME entries at Le Mans were powered by Toyota and, in 1990, Toyota developed the 3.6-litre 90C-V engine which finished sixth.

When the FIA created the Group C Sportscar World Championship, based on the same engine as Formula 1, Toyota developed the TS010 for the final entry of the 1991 series. In 1992 the TS010 won the opening round of the series at Monza and finished second at Le Mans, taking the lap record and the highest top speed.

Toyota endurance racing in the USA was developed in parallel with activities in Japan and Europe through the creation of Toyota Racing Development (TRD) and the team made its debut in the IMSA GTU series in 1981, finishing seventh.

The first IMSA win came in 1983 at Riverside with the Celica Turbo and, in 1985, the Celica 4T-GT won at Monterey. Two years later the Celica Turbo won both the Manufacturers' and Drivers' IMSA GTO titles.

In 1989 the team linked up with Dan Gurney and Eagle Racing resulting in a second Manufacturers' and Drivers' championship in IMSA GTP (1992) followed by wins in the 24 Hours of Daytona and the 12 Hours of Sebring (1993). The team established a record of 17 consecutive wins in the GTP class and won 19 of its last 21 races.

Back in Europe, Toyota decided to focus on Le Mans with a works programme based in Europe. In 1998 the Toyota GT-One (TS020) led the race until one hour before the end. In 1999, Toyota was on pole position – only to lose two race cars in crash and see the remaining car retire with blown tyres as it was closing on first place.

Toyota still holds the lap record and fastest top speed for the current version of the Le Mans track.

Engines for F3 and CART

Toyota was one of the first car manufacturers to recognise the importance of Formula 3 in developing teams and young drivers.

A young Ayrton Senna won the British F3 championship in 1983 driving a Ralt-Toyota in a season when Toyota (also represented by Martin Brundle) won all the races. Senna went on to win the Macau GP (the closest event in F3 to a world championship) that year.

Toyota F3 engines have won the Macau GP a further four times and has the largest number of wins at Macau.

JJ Lehto won the British F3 series in 1998 and, in 1997, Tom Coronel, won the Marlboro Master F3 event in Zandvoort, Holland.

In 1996 Toyota entered the very competitive CART series in north America, supplying engines for two teams: Arciero Wells and All American Racers. A change of policy in 1999 led to the supply of several teams with a first pole position for Scott Pruett at Fontana.

The first win for a Toyota engine in CART occurred in St Louis in 2000 with Juan Montoya and the engine took five wins that year. Six wins followed in 2001, with Toyota engines being used by five teams and nine cars.

Toyota TF102 Main Specifications

ENGINE	
Engine code	RVX-01
Layout	V10, 90°
Displacement (cc)	2998
Electronics	Magneti Marelli
TRANSMISSION	
Gearbox	6-speed semi-automatic
Clutch	Sachs triple plate
SUSPENSION	
Type	Push-rod with front and rear stabilizer bars
Shock absorbers	FFT/Sachs
BRAKES	
Braking system	Brembo/Alcon
Discs	Carbon Industries/Brembo
TYRES AND WHEELS	
Tires	Michelin Pilot
Wheels	BBS - Front: 13 x 12, Rear: 13 x 13.5
DIMENSIONS AND	

WEIGHT	
Length (mm)	4620
Front track (mm)	1450
Rear Track (mm)	1390
Wheelbase (mm)	3120
Weight (kg, with driver)	600

TOYOTA RISES TO 'SPIRIT OF CHALLENGE'

- Committed to continued success in Europe
- Full Corolla range roll-out in progress
- New concepts for new customers
- F1, Toyota's greatest motor sport challenge
- Advanced environmental technologies for our future

Toyota has, once again, achieved record sales in Europe – the fifth successive year of growth. Total sales for 2001 were 666,035, up 1.6 per cent on the year and with a market share of 3.7 per cent.

Toyota comes to the 2002 Geneva Motor Show with optimism for the new year and with new spirit to face the challenges of the future.

This spirit is shown at Geneva by the remarkable range of exciting new cars now displayed; the presentation of high technology solutions for the future and the first glimpse of new concepts which, maybe, will satisfy the needs of customers to come.

In this spirit, Toyota is committed to the challenge of remaining a global automotive leader and becoming a major player in Europe. It continues to invest in new technologies, new models and new markets to satisfy completely the needs of its customers.

Corolla a Hit Across Europe

Just a few short months after its reveal at last year's Frankfurt Motor Show; the all-new Toyota Corolla is now on sale across Europe.

The rapid roll-out of the Corolla range in a wide variety of body styles emphasises Toyota's commitment to the challenge of becoming a major force in the European car market – and a sales leader in the C-segment, Europe's most competitive arena.

Unlike other recent C-segment launches, new Toyota Corolla is already available across many European countries with a full range of bodystyles and advanced technology engines, covering around 84% of the market.

These include a new Corolla Verso in the fast growing compact MPV segment; mainstream Corolla Hatchbacks in three and five door style; a roomy and practical Corolla Estate and a classic and elegant Corolla saloon*. At the top of the new Corolla range is the exciting Corolla T Sport.

(* The saloon is to be introduced to the UK in the summer)

New Concepts For New Customers

Star of last year's Tokyo Motor Show, p.o.d – a car that thinks, talks, smiles and yes, even cries, with you – is presented in Europe for the first time at Geneva. Developed in conjunction with Sony Corporation, p.o.d is a technological showcase that points the way to the future when there will be a new relationship between cars and people.

p.o.d moves the car forward from being just a transport tool to being a partner in a journey. It recognises that modern technology enables the car-user relationship to develop as both man and the machine learn more about each other. In doing so p.o.d redefines totally the automotive concept, creating a whole new dimension in safety and comfort.

The Toyota UUV (or Urban Utility Vehicle) is dramatically revealed in a world premiere as a possible face of the future. UUV has the potential to be the next step forward for Sports Utility Vehicles (SUVs) and to create an entirely new urban niche in the market.

UUV offers customers the unique 'stand-out' qualities of the current 4x4 market blended with typical urban features, such as sophisticated design, clean geometric surfaces and excellent road behaviour. It also seeks to blend Japanese culture – expressed by technical innovation – with European culture, represented by the exterior shape.

The UUV was created in Europe by Toyota's European design centre (ED²). The target of UUV is a new type of customer – born of the urban environment but ready to be adventurous in their driving.

Perhaps even more adventurous is FXS, a stunning Sports Concept car. FXS, short for Future Experimental Sports, is a two seater roadster developed to satisfy the true sports car enthusiast who believes driving is one of life's great pleasures.

FXS is a pure, open roadster – low slung and sexy, with a perfect balance front to rear for maximum performance and stability. The design offers classic beauty with simple exterior lines and aerodynamic nose.

FXS is very low and wide. The 4.3-litre V8 engine is mounted low, front midships and drives the rear wheels through a six-speed sequential gearbox operated by Formula 1 style shift buttons. Toyota promises 'abundant' power and torque up to 8,000rpm.

The Motor Sport Challenge

This year, Toyota faces one of its greatest challenges with its entry into Formula 1 racing, the ultimate test-bed for automotive technology.

The debut of the Panasonic Toyota TF102 in the Australian Grand Prix, the opening round of the 2002 FIA Formula 1 world championship, marks the culmination of an intensive three year programme to develop and build a complete Formula 1 car from scratch.

But the spirit of Toyota has been tested many times before in motorsport and the company has a successful heritage to build on. Toyota won its first motorsport event in 1958, scored numerous wins in the endurance Can-Am series in the 1960s, before going on to form the legendary Toyota Team Europe.

Over 25 years, Toyota Team Europe became the dominant force in world rallying – taking 43 FIA World Rally Championship wins; three World Rally Championship manufacturer titles; four World Championship driver titles and four Middle-east Championship titles.

In the 1990s, Toyota returned to the famous Le Mans 24 Hours race – the GT-One still holds the lap record for the current Sarthe circuit.

Toyota now offers its customers a chance to share in this sporting spirit through the T Sport range – Yaris T Sport, Celica T Sport and the latest Corolla T Sport.

The Challenges Ahead

The global automotive industry faces many challenges in the future as it seeks to provide customers with cars which completely satisfy their transport needs and desires – while protecting the environment.

Toyota is a world leader in environmental research and has risen to the challenge of developing and building cleaner, more fuel efficient vehicles by introducing hybrid technology to the market. The Toyota Hybrid System is not some theoretical power plant of the future, but a real, practical solution available here and now in major world markets with the popular Toyota Prius.

As a further sign of Toyota's commitment and belief in hybrid technology, the company is targetted to expand total production of hybrid-powered vehicles to 10 times current levels and reach annual production of 300,000 units by 2005.

Toyota also leads world car manufacturers in the development of fuel cell vehicles, which are widely seen as a potential answer to the great motoring challenge of the future - how to develop a zero polluting alternative to current hydrocarbon-based internal combustion engines.

With its real world experience in the development of petrol-electric hybrid vehicles, such as the Prius, Toyota has been working since 1992 on Fuel Cell Hybrid Vehicles (FCHV) which are now at the road testing stage. In total, Toyota has seven FCHVs on Japanese and U.S. roads, more than any other car maker.

A major new development has been the creation of FCHV-5 which generates electricity from hydrogen derived from Clean Hydrocarbon Fuel (CHF) using Toyota's own CHF reformer.

Clean Hydrocarbon Fuel is a relatively new concept and is seen as the next generation liquid fuel. It can be produced from crude oil, natural gas or coal and has a low sulphur content. Most importantly, it can be used as a fuel for current internal combustion engines and supplied through conventional petrol pumps.

Finally, closer to home, Toyota will shortly begin real world trials of its revolutionary diesel emissions purification system called DPNR (Diesel Particulate – NO_x Reduction System). The new system simultaneously and continuously reduces particulate matter (PM) and nitrogen oxides (NO_x) in diesel vehicle exhaust gas.

The commercial launch of DPNR, which will surely follow, will complement Toyota's existing advanced technology, D-4D common rail diesel engines – confirming Toyota as a leading diesel engine manufacturer in Europe.

TOYOTA TACKLES DIESEL PARTICULATES

- Diesel emissions purification system
- Reduces particulates and NO_x simultaneously
- European introduction in the near future

Toyota has risen to the challenge of reducing particulates and nitrogen oxides from diesel exhaust fumes – one of the few remaining barriers to the acceptance of diesel as a clean fuel of the future.

The company recently announced the development of the basic technology for a revolutionary diesel emissions purification system called DPNR (Diesel Particulate - NO_x Reduction System). The new system simultaneously and continuously reduces particulate matter (PM) and nitrogen oxides (NO_x) in diesel vehicle exhaust gas, based on Toyota's NO_x storage reduction three-way catalytic converter

technology.

Toyota has long worked on developing technology for cleaner diesel engine emissions and has achieved notable reductions in HC, CO, NO_x and particulate matter by using reduction catalysts, improved combustion technologies such as direct fuel injection, electronically controlled exhaust gas recirculation (EGR) and electronically controlled fuel injection systems.

To accomplish more reductions in HC, CO, NO_x and particulates, DPNR has been developed. The key attribute of the breakthrough basic technology for DPNR is to reduce PM and NO_x simultaneously and continuously with a simple and compact catalytic converter system.

In the DPNR purification process, particulate matter is first oxidized during lean-burn combustion using oxygen created when NO_x is temporarily stored inside the catalytic converter and oxygen that exists in exhaust gas. Then, when the engine momentarily switches to low-oxygen stoichiometric (rich) combustion, the stored NO_x is reduced producing more oxygen, which is used to oxidize particulate matter inside the catalytic converter.

The result of these processes is a greater-than-80% initial reduction in both particulate matter and NO_x (when compared to the permitted level of exhaust from a 2-ton diesel truck under 1998 Japanese regulations).

Toyota plans to introduce vehicles featuring DPNR starting in the next couple of years, after thoroughly testing and checking the system's performance in terms of purification ability, durability and reliability. The system requires the use of a common-rail diesel engine with electronic fuel control and ultra-low sulphur fuel.

NEW CONCEPTS, NEW CUSTOMERS FOR TOYOTA UUV

Toyota is using this year's Geneva Motor Show for the world premiere of a concept car that challenges current thinking in automotive design.

The new concept highlights the spirit of innovation within Toyota worldwide and the company's constant desire to leap forward – studying new markets and new opportunities in order to offer customers their dream cars of the future.

So, the Toyota UUV (or Urban Utility Vehicle) is dramatically revealed as a possible face of the future.

It has the potential to be the next step forward for sports utility vehicles (SUVs) and to create an entirely new urban niche in the market – just as Toyota did with the launch of the breakthrough RAV4, back in 1994.

UUV offers customers the unique 'stand-out' qualities of the current 4x4 market blended with typical urban features, such as sophisticated design, clean geometric surfaces and excellent road behaviour. It also seeks to blend Japanese culture – expressed by technical innovation – with European culture, represented by the exterior shape.

The UUV was created in Europe by Toyota's European design centre (ED²). The target of UUV is a new type of customer – born of the urban environment but ready to be adventurous in their driving. These customers are progressive, successful and already drive large family cars which they enjoy for their comfort, space and premium equipment levels. But they seek more.

They are active people for whom the choice of car is a statement about themselves and their lifestyle. They are looking for something different, powerful and innovative. At the same time they want to retain the prestige of a premium car.

Perhaps in their early 40s, with a family, these customers are ready to move out of the traditional

mainstream and take a step forward.

They will do this with Toyota UUV.

Innovative concept

The Toyota UUV is a new generation of multi cross-over vehicle which blends the best characteristics of SUVs with other premium car values such as design, road behaviour, comfort and performance.

The UUV concept blends hatchback, saloon and estate into one harmonised multi-cross body. The car has 4x4 presence on the road with strong flared wheelarches and huge wheels. It is big (around 4,430mm long, 1,820mm wide and 1,650mm high). A long wheelbase ensures a spacious interior.

Yet the overall effect is sleek and aerodynamic. The exterior features strong sweeping character lines, sharp surface edges and a tall, sloping roofline. Tense, geometric surfaces are typical of the urban environment in which this car will mainly be seen.

Advanced technology

Toyota is a worldwide leader in the SUV market with advanced 4x4 technology, proven reliability and design. The UUV builds on this positioning with further Japanese advanced thinking.

A key feature of the interior is the full width, dash mounted screen which offers entertainment and navigational functions to both driver and passenger. This system is called 'Glass Vision' and is supplied by Denso. This screen is made of a special resin called photopolymer, which is capable of refracting light in the form of a prism. Another component of the system is the projector, which is used to project a clear holographic image in this screen.

The advantages of 'Glass Vision' over a traditional LCD display are quite clear. This innovative system allows a more realistic display and allows a bigger projection area without the constraints of a 7" screen, like usual. Undoubtedly, 'Glass Vision' breaks new ground in the field of in-car navigation and entertainment systems.

Innovation also extends to the high performance, run-flat tyres especially designed for the UUV which allow Toyota to dispense with the spare tyre, saving space and weight.

Yet functional and comfortable

Ultimately, UUV will offer many of the car-like features which are so important to customers the world over. UUV may be progressive but it is also versatile; it may be striking but it is also spacious; it may be sporty but it is also comfortable.

Toyota's Urban Utility Vehicle – a glimpse of the future?

p.o.d – THE FACE BEHIND THE SMILE

Put away your prejudices. Take a journey into the near future with Toyota and p.o.d – a car that thinks, talks, smiles.... and yes, even cries, with you.

Star of last year's Tokyo Motor Show, p.o.d is presented in Europe for the first time at Geneva. Developed in conjunction with Sony Corporation, p.o.d is a technological showcase that points the way to the future when there will be a new relationship between cars and people.

p.o.d moves the car forward from being just a transport tool to being a partner in a journey. It recognises that modern technology enables the car-user relationship to develop as both man and the machine learn more about each other. In doing so p.o.d redefines totally the automotive concept, creating a whole new dimension in safety and comfort.

Who needs a car with feelings?

Yes, p.o.d can smile. In fact p.o.d can express 10 different emotional states including happiness, surprise and sadness, using a combination of coloured lights and front features such as lights, grille and door mirrors. It can even wag its tail, using the radio aerial on the boot.

But that is missing the point. p.o.d's ability to have intelligence and, apparently, emotions means it is capable of knowing its driver's and passengers' personality, mood and taste. It can then react accordingly and respond with a whole new dimension in:

- o safety
- o passenger comfort
- o mobile entertainment, information and communication.

To truly understand why p.o.d is a real life concept ahead of its time, you need to look beyond the smile.

Why p.o.d?

Simple: p.o.d is associated with the concept of a cocoon – a protective shell which gently envelops and protects family members.

Therefore p.o.d is a people mover that involves and transports its occupants with the excellent levels of safety, comfort, commodity and entertainment.

An intelligent life form with four wheels?

Intelligence is defined as the power of learning, understanding and reasoning. Therefore, p.o.d is able to learn and understand the personality and characteristics of its driver and passengers as they use the car – and adjust to create a suitable environment.

p.o.d's intelligence allows it to learn the driving style of its owner and the type of roads he/she usually takes, adapting itself accordingly to each situation. For instance, if its owner prefers a sportier driving through winding roads the p.o.d can figure it out and will choose a harder suspension setting and the auto gearbox will also cope with a more performant use. This feature allows the driver to take full advantage of modern vehicle dynamics systems, without having to deal with upsetting buttons or controls. By the other way, if the driver chooses a relaxed driving the p.o.d will reward its passengers with a comfortable ride and better fuel consumption.

Being an intelligent car, the p.o.d is always concerned with safety. It constantly monitors and records the driver's driving style and compares it to the performance of an experienced driver. From then on, p.o.d can either warn or praise the driver sending messages to the centre monitor.

The emotional condition of the driver has a strong influence on their driving style and p.o.d senses this using physiological sensors for pulse and perspiration rate on the driving controls. It will then try to calm the driver down by displaying warning signs, playing relaxing music or cooling the air flow.

Through the use of DSRC (Distance Short Range Communication), p.o.d can even detect when unexpected obstacles are about to cross in front of the car, like other vehicles and pedestrians, warning the driver in time.

All these innovative features forge new frontiers in active safety.

It's intelligent, but does it talk?

Well, not exactly: but it can communicate and it does listen.

Again, DSRC is used to collect information from its surroundings and 'communicate' with the driver, other cars and pedestrians when necessary.

Equally, p.o.d can communicate with drivers of other cars warning them it is about to overtake, or even saying 'thank you', by means of a radio horn signal. When horn signals from another car are received, p.o.d announces the message from the speaker at the driver's seat. So, yes, it does talk!

p.o.d listens to conversation within the car (using microphones on the display monitors) and can react accordingly, such as making a phone call or changing the music. It can also send messages to the right persons if the driver is late for an appointment.

p.o.d's intelligence is coupled with modern communication systems to allow a whole new dimension in passengers-to-car communication and vice-versa, which, consequently makes it a lot easier to be in touch with the outside world.

To entertain and inform

Like many other things in p.o.d, entertainment and information capabilities are raised to an unprecedented level.

There are two types of display monitors in the interior: one centre display and four personal displays (one for each seat). The centre display monitor can be used to display communal information related to the operation or use of the car. The personal displays are used for individual selection of music and video software.

On listening to its passengers' conversations, p.o.d can display information related to the topics discussed or change its navigation route. The navigation system initially chooses routes according to the driver's preferences and when there is a delay on the estimated time of arrival the driver is informed. It can also take pictures of things the passengers find interesting and display them later.

p.o.d is also gifted with enough technology to know when something is wrong with its health (fuel, wheels, brakes, engine, etc.). This being the case, it will display a 3D image of the problem part in the interior display, giving further instructions to solve the problem.

A portable terminal, called a "mini p.o.d", plays an important role in the entertainment and information process, memorising such items as musical and TV programme preferences based on behaviour at home. The mini p.o.d also acts as a keyless entry system to the car – letting p.o.d know who is on-board and what mood to expect. The mini p.o.d uses this information to choose background music and other data such as route planning and shopping guidance.

p.o.d has four individual seats designed to allow passengers to communicate together. For example, each seat will turn to face the doors for easy entry, or they can face each other for a welcoming atmosphere, family meeting or picnic. Of course, when driving, they all face forward like a normal car.

Each of these seats incorporates its own display where each passenger can listen to their favourite music or video. Each headrest is equipped with a full range speaker and a super tweeter. Furthermore, subwoofers have been installed under each seat and vibration transducers have been incorporated into the seat backs and cushions. The sound from speakers is focused so that each passenger can listen to different music without disturbing each other.

All this hardware accomplishes an unrivalled fidelity in sound reproduction, way beyond what is found in today's most expensive luxury cars.

More than just user-friendly

This concept uses its vast technology to showcase advances in the automobile in many different areas. Ease of operation is just one of them. With a minimal number of commands, driver and passengers can

control a vast number of advanced functions.

However, the most impressive example in this area is the Drive-by-wire system. p.o.d uses this system that replaces conventional controls such as the steering wheel and pedals with a Drive Controller. This greatly improves vehicle performance in areas such as operational ease, interior space.

The Drive Controller is controlled by the right hand only like a joystick and relays "go", "stop" and "turn" information to the various actuators for steering, braking, acceleration and gearshifts by way of electronic control. Pull back to accelerate, push forward to brake, turn left or right – it's that simple.

Welcome and farewell

When you approach with your mini p.o.d, p.o.d will welcome you with a cheerful expression, open the door, rotate the seat for easy entry and adjust the seat height to suit. When you are ready, the engine will start.

When you switch off the engine and leave with your mini p.o.d, it will bid you farewell, drop in height and go to sleep – however angry you are. But then that's what friends are for.

Toyota p.o.d Main Specifications

ENGINE AND TRANSMISSION	
Valve Mechanism	DOHC, 4 valves per cylinder
Number of cylinders	4, in-line
Fuel injection system	EFI
Displacement (cc)	1496
Drive system	Front-wheel drive
DIMENSIONS	
Overall length (mm)	3930
Overall width (mm)	1800
Overall height (mm)	1860
Wheelbase (mm)	2500
Tread (mm) front	1460
Tread (mm) rear	1440

TOYOTA HYBRID SYSTEM – FUTURE IS HERE, NOW

Toyota has risen to the challenge of developing and building cleaner, more fuel efficient vehicles by introducing hybrid technology to the market. The Toyota Hybrid System is not some theoretical power plant of the future, but a real, practical solution available here and now in major world markets such as Europe, Japan and the US.

Toyota Hybrid System has already proved it is capable of achieving outstanding fuel efficiency and low

tailpipe emissions. Indeed, there are now three different versions of THS, each developed to make the world a better place to live while helping to power a wider range of vehicles with hybrid powerplants.

As a further sign of Toyota's commitment and belief in hybrid technology, the company is targetted to expand total production of hybrid-powered vehicles to 10 times current levels and reach annual production of 300,000 units by 2005.

THS and Toyota Prius

- World's first hybrid petrol-electric car
- One of the cleanest cars on the Planet

In 1997 Toyota presented to the world the first hybrid petrol/electric vehicle, Toyota Prius and its revolutionary Toyota Hybrid System. Starting with a high efficiency 1.5-litre petrol engine and an electric motor, along with an electrically controlled CVT gearbox and a pack of Ni-MH batteries, the system can automatically change between petrol and electric power in response to the highest energy-efficient performance.

As one of its commitments to environmental protection, Toyota made this technology available to the world's major automobile markets with a convincing package. The Prius has the performance, space, comfort and price to match conventional saloons with outstandingly low fuel consumption and is one of the cleanest cars on the planet.

In addition both the highly efficient petrol engine and the electric motor are quite silent, which adds to ride comfort, while low-stress running accounts for the higher durability and reliability of the powertrain. For added peace of mind, Toyota gives an unprecedented 5-year or 100,000 km warranty (whichever comes first) to this model.

Since December 1997, worldwide sales of the Prius have achieved more than 70,000 units.

THS-C and Toyota Estima

- World's first electric four-wheel drive hybrid system
- Impressive environmental technology package
- Power supply for both internal and external use

Toyota has launched the world's first petrol, electric-four-wheel-drive hybrid system, built into the popular Estima (Previa in Europe) MPV. The combination of MPV modularity and Toyota Hybrid System economy creates a whole new concept of an environmentally friendly, family lifestyle vehicle.

THS-C, representing a revolutionary leap in automotive technology, is a four-wheel drive hybrid system that uses two electric motors, instead of one as in the Prius. The petrol engine also has a higher displacement of 2.4-litre. The second electric motor exclusively powers the rear wheels. This will happen only when needed, such as when traction loss occurs on the front wheels, or when accelerating from a standing stop. This operation is controlled by E-Four. This system provides better driving performance by controlling the rear-wheel drive motor as it coordinates electric power distribution to all four wheels according to the driving conditions.

When braking or decelerating, the regenerative braking system acts on all four wheels, which adds for even better energy saving.

THS-C and E-Four interact with a technologically advanced Vehicle Dynamics Management system. This system allows better handling and stability in braking by using independent as well as linear hydraulic controls for each wheel.

It controls the ECB (Electrically Controlled Brake System), the world's first electronically controlled braking system installed in a production vehicle. ECB oversees the application of ABS with EDB (Electronic Brake force Distribution), Brake Assist, VSC (Vehicle Stability Control) and TRC (Traction Control). ECB also improves the regenerative braking performance.

In the Estima Hybrid, the system uses just 5.6 litres of petrol per 100km (in the Japanese test cycle), about twice the fuel efficiency level set by the Japanese government as the standard for vehicles in its class by 2010. Its clean emissions contain hydrocarbon (HC) and nitrogen oxide (NOx) levels more than 75% below the level specified by the latest regulations.

The Estima Hybrid has a maximum cruising range of around 1,000 kilometres (Japanese cycle at 100 km/h).

The innovative hybrid system can also generate up-to 1,500 watts of auxiliary power at 100-volt AC – more than enough to power a hairdryer or microwave oven.

Last year, Toyota managed to sell 5,886 units of the Estima Hybrid in Japan. This figure proves hybrid vehicles can certainly be the cars of the near future and Toyota is leading the way.

THS-M and Toyota Crown

- World's first mild hybrid system with 42V PowerNet
- Wide application across many vehicles
- Around 15% fuel saving
- Zero-emissions when stopped at idle

The Toyota Hybrid System-Mild (THS-M) a simple, easy-to-adapt hybrid system that is ideal for application in many types of cars. Toyota introduced this fuel-saving, emissions-reducing system into the Toyota Crown saloon in Japan last August.

THS-M comprises of three main components: a small motor/generator connected via an auxiliary drive belt to a high-efficiency petrol engine, a compact 36V secondary battery for 42V power supply to the motor, and a control unit.

When a vehicle equipped with THS-M comes to a stop, the system goes into "idling stop" mode, automatically shutting down the petrol engine to prevent idling. To get the vehicle moving again, the electric motor provides the initial drive force and restarts the petrol engine.

When decelerating or braking, the motor acts as a generator to convert braking energy into electrical energy that is recovered by the battery. The motor also enables the air conditioning to run during "idling stop" to help occupants stay comfortable.

THS-M improves fuel efficiency by about 15% (in the Japanese test cycle for vehicles with automatic transmission) and reduces emissions. When combined with a direct fuel-injection petrol engine, a J-LEV* certification can be achieved, which means 50% lower level emissions than those set for 2000 by the Japanese government.

*Japan-Low Emission Vehicle

TOYOTA BEGINS FUEL CELL ROAD TESTING

- Passenger car (FCHV-4) road testing has begun
- New FCHV-5 uses clean hydrocarbon fuel (CHF)

- Fuel Cell Hybrid Bus also under development

Toyota leads world car manufacturers in the development of fuel cell vehicles, which are widely seen as a potential answer to the great motoring challenge of the future - how to develop a zero polluting alternative to current hydrocarbon-based internal combustion engines.

Fuel cell technology uses the chemical reaction between compressed hydrogen and oxygen (in the air) to produce electricity for vehicle power – and water as its only waste product. Worldwide development has centred on producing sufficient electricity from a 'stack' of cells to power a passenger car and the systems necessary to control the flow of that power.

With its real world experience in the development of petrol-electric hybrid vehicles, such as the Prius, Toyota has been working since 1992 on Fuel Cell Hybrid Vehicles (FCHV) which are now at the road testing stage. In total, Toyota has seven FCHVs on Japanese and U.S. roads, more than any other car maker.

Toyota began real-world road testing of its FCHV-4 passenger car, based on the Kluger V/Highlander SUV, after it received certification from the relevant Japanese ministry to allow public road use in June 2001. Five FCHV-4 cars are running on Japanese roads and two more were taken in July 2001 to the United States for participation in the California Fuel Cell Partnership road test project.

The road tests include an evaluation period of data gathering which involves putting the car through its paces in demanding conditions such as high speed motorways and steep hills. The information will be applied to the development of a thoroughly practical Fuel Cell Hybrid Vehicle.

FCHV-4

The FCHV-4, available today at the Toyota stand, is powered by hydrogen stored in high pressure tanks and is based on the Toyota Kluger V (Highlander in the US) sports utility vehicle. The power unit features a Toyota FC Stack with an output of 90 kW and a permanent-magnet electric motor which develops up to 80kW (107 DIN hp) and 260Nm of torque.

In addition to the fuel cell power source, FCHV-4 has a nickel-hydride secondary battery which helps provide power during acceleration and is recharged for energy storage by regenerative braking. Power supply for optimum energy efficiency is controlled by Toyota hybrid technology.

The FCHV-4 has a maximum speed of almost 150km/h and a cruising range of around 250km. It is three times more efficient than a petrol powered car on the so-called 'well-to-wheel' efficiency index.

The high pressure hydrogen tanks are installed under the rear floor and, to further decrease the use of hydrofluorocarbons (HFCs), the vehicle has a newly developed heat pump air-conditioning system that uses CO₂ as the refrigerant.

FCHV-5

On the last Tokyo Motor Show Toyota presented its FCHV-5. Although similar to FCHV-4 from the outside, this vehicle uses a new fuel called CHF (Clean Hydrocarbon Fuel), developed by the automaker itself in cooperation with ExxonMobil. FCHV-5 uses the CHF to produce hydrogen, which can be achieved by Toyota's own CHF reformer. Hydrogen will then be processed by fuel cells to generate electricity.

Clean Hydrocarbon Fuel is a relatively new concept and is seen as the next replacement for conventional petrol and diesel. It can be produced from crude oil, natural gas or coal and has a low sulphur content. Most importantly, it can be used as a fuel for current internal combustion engines and supplied through conventional petrol pumps.

Therefore Toyota FCHV-5 running on CHF will be useful where an existing hydrogen supply

infrastructure is not available.

The FCHV-5 shares many components with the FCHV-4 but its CHF reformer, a new catalyst and heat exchanger offer excellent acceleration and high fuel efficiency. All component parts of the system are located beneath the floor so as not to compromise interior cabin space.

The newest Toyota fuel cell vehicle is already undergoing test-course evaluation.

FCHV-BUS1

Toyota has also developed jointly with Hino Motors a low-floor city bus powered by a hydrogen fuel cell hybrid system. The FCHV-BUS1 can transport 63 passengers and will contribute to improved urban air quality and reduced urban noise.

The bus features roof-mounted, high pressure storage tanks and a Toyota developed fuel cell stack. The use of a unique hybrid system which includes secondary batteries to store energy from regenerative braking gives the bus a cruising range of over 300km.

Toyota has begun road tests of the FCHV-BUS1 in Japan as a continuation of the bus's development.

FCHV-4 Main Specifications

Vehicle	Base platform	Kluger V (Highlander in USA)
	Dimensions	4,735(L) x 1,815(W) x 1,685(H) mm
	Maximum speed	Over 150 km/h
	Cruising distance	Over 250 km
	Seating capacity	5 persons
Fuel cell stack	Type	Polymer electrolyte fuel cell
	Output	90 kW
Motor	Type	Permanent magnet
	Maximum output	80 kW
	Maximum torque	260 Nm
Fuel	Type	Pure hydrogen
	Storage method	High-pressure hydrogen storage tank
	Maximum storage pressure	25 MPa (250 atmospheres)
Secondary battery	Type	Nickel-metal hydride battery

FCHV-5 Main Specifications

Vehicle	Base platform	Kluger V (Highlander in USA)
	Dimensions	4,735(L) x 1,815(W) x 1,685(H) mm
	Seating capacity	5 persons
Fuel cell stack	Type	Polymer electrolyte fuel cell
Reformer	Type	Auto thermal
Motor	Type	Permanent magnet
	Maximum output	80 kW
	Maximum torque	260 Nm
Fuel	Type	CHF (Clean Hydrocarbon Fuel)
Secondary		

battery	Type	Nickel-metal hydride battery
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FCHV-BUS1 Main Specifications

Vehicle	Base platform	Hino low-floor city bus HU2PMEE
	Dimensions	10,515(L) x 2,490(W) x 3,360(H) mm
	Maximum speed	Over 80 km/h
	Cruising distance	Over 300 km
	Occupant capacity	63 persons
Fuel cell stack	Type	Polymer electrolyte fuel cell
	Output	90 kW
Motor	Type	Permanent magnet
	Maximum output	80 kW x 2
	Maximum torque	260 Nm x 2
Fuel	Type	Pure hydrogen
	Storing method	High-pressure hydrogen storage tank
	Maximum storage pressure	25 MPa (250 atmospheres)
Secondary battery	Type	Nickel-metal hydride battery

T SPORT BRAND REFLECTS MOTORSPORT CHALLENGE

Toyota has developed the T Sport brand to create an emotional link with its rich motorsports heritage and today to the exciting Formula 1 world.

The T Sport brand embodies this motor sports spirit within the Toyota range - offering higher performance levels, positive handling and suspension characteristics, and increased driver involvement, without sacrificing comfort or practicality.

Through T Sport, customers are able to enjoy the sporting characteristics of the latest generation of Toyota products and drive cars which stand out from the crowd – safe in the knowledge that core Toyota values such as reliability and safety have not been compromised.

T Sport models feature the latest in Toyota advanced technology, intelligently applied to ensure dynamic performance differences. T Sport models stand out from the crowd in several key performance areas:

- increased engine power and torque
- improved braking performance
- refined handling
- slick, sporty gear changes
- distinctive engine sound
- distinctive exterior and interior sports styling

There are currently three Toyota models available in the T Sport brand, each with its specific sporting characteristics:

- the newly introduced Corolla T Sport
- the Celica T Sport
- the Yaris T Sport

Corolla T Sport

The new Corolla T Sport hatchback is the most exciting and powerful Corolla ever launched into mainstream production. No other model more accurately sums up the dramatic new face that is now Corolla, and Toyota, in Europe.

Corolla T Sport is powered by the latest version of the 192 DIN hp (141kW), 1.8-litre VVTL-i (Variable valve Timing and Lift – intelligent) engine also found in the Celica T Sport, linked to a 6-speed manual gearbox. It delivers the type of power that will allow the enthusiastic driver to fully exploit the potential of the new Corolla's chassis and suspension.

Top speed is a maximum 140mph and 0-62mph takes just 8.4 seconds – so Corolla T Sport can offer breathtaking performance with the refinement of upper-class cars, setting a new standard in its segment.

Along with the more powerful engine, Corolla T Sport also receives updated suspension, brakes and a unique interior treatment with eye-catching red Optron meters.

Corolla T Sport rides on 16-inch alloy wheels with ultra-low profile sports tyres and has an advanced handling package, including Vehicle Stability Control, Traction Control and Brake Assist for maximum safety without affecting driver control.

Celica T Sport

The Toyota Celica T Sport features a sophisticated 1.8 litre engine with Variable Valve Timing and Lift - intelligent (VVTL-i) combining the benefits of Variable Valve Timing-intelligent (VVT-i) with a two stage Lift change mechanism. This is the most advanced valve management system available in a production engine today.

The result is a significant boost in maximum power output to 141kW (192 DIN hp) at 7,800rpm and maximum torque to 180Nm at 6,800rpm.

The Toyota Celica T Sport with a close ratio, six-speed manual gearbox, will accelerate to from 0-62mph in 7.4 seconds and has a top speed, where permitted, of 140mph. Yet, thanks to VVTL-i and its intelligent engine management, the Celica T Sport is easy to drive - and economical too.

Apart from the discrete T Sport logo and exclusive colour, this version also has an updated braking system, with better bite and improved resistance to fade, therefore capable of coping with an even sportier driving.

Yaris T Sport

The Yaris T Sport is the high performance version of Toyota's award winning Yaris, the European Car of the Year 2000.

Yaris T Sport features a 1.5-litre VVT-i engine developing 78 kW (106 hp DIN), dynamic new looks, lowered suspension, sports-style interior and exterior. It offers class leading performance and economy in the European supermini segment.

The T Sport add driving performance to the many enjoyable characteristics of the award winning Yaris range. It will accelerate to 100mph in just 9.0 seconds and will have a top speed, where permitted, of 118mph.

T Sport range specifications

ENGINE	Yaris	Corolla	Celica

Engine type	1NZ-FE	2ZZ-GE	
Valve Mechanism	16-valve VVT-i	16-valve VVTL-i	
Displacement (cc)	1497	1796	
Bore x Stroke (mm)	75.0 x 87.4	82.0 x 85.0	
Compression Ratio	10.5:1	11.5:1	
Max. Power DIN hp/rpm (kW)	106@6000 (78)	192@7800 (141)	
Max. Torque (Nm/rpm)	145@4200	180@6800	
ACCELERATION (sec)	Yaris	Corolla	Celica
0-100km/h	9.0	8.4	7.2
0-400m	16.7	16.1	15.0
Max. speed (Km/h)	190	225	225
DIMENSIONS	Yaris	Corolla	Celica
Overall length (mm)	3635	4180	4335
Overall width (mm)	1660	1710	1735
Overall height (mm)	1485	1475	1315
Wheelbase (mm)	2370	2600	2600
Tread (mm) front	1445	1480	1490
Tread (mm) rear	1420	1460	1480
Kerb weight (kg)	940	1210-1260	1140-1145
SUSPENSION	Yaris	Corolla	Celica
Front	McPherson Strut		
Rear	Torsion Beam		Double wishbone
BRAKES	Yaris	Corolla	Celica
Front disc (size mm)	255	275	279
Rear disc (size mm)	260	270	255

REAR DISC (SIZE mm)	200	210	230
TYRES AND WHEELS	Yaris	Corolla	Celica
Wheels	15" aluminium	16" aluminium	
Tyre size	185/55 R 15 81V	195/55 VR 16	205/50 R 16

FXS IS THE ULTIMATE SPORTS CONCEPT

Toyota is using the Geneva Motor Show to present a stunning Sports Concept car, the FXS, for the first time in Europe.

FXS, short for Future Experimental Sports, is a two-seater roadster developed to satisfy the true sports car enthusiast who believes driving is one of life's greatest pleasures.

FXS is a pure, open roadster – low slung and sexy, with a perfect balance front to rear for maximum performance and stability. The design offers classic beauty with simple exterior lines which end abruptly in the aggressive but aerodynamic nose.

FXS is very low and wide with a length of 4150mm, width of 1870mm and height of 1100mm.

The silver prism-like lustre of the exterior paintwork is dramatically complemented by the full leather interior and moonlight blue background. Chrome and blue-white illuminated dials concentrate minds on the driving experience.

A triple cluster instrument panel consists solely of speedometer, tachometer and fuel and oil pressure gauges. FXS has a unique, two-spoke steering wheel.

The 4.3-litre V8 engine is mounted low, front midship and drives the rear wheels through a six-speed sequential manual gearbox operated by Formula 1 style shift buttons. Toyota promises 'abundant' power and torque up to 8,000rpm.

With double wishbone suspension all-round and an all-up weight of around 1,300kg, FXS promises performance to match its looks.

Toyota FXS Main Specifications

ENGINE AND TRANSMISSION	
Valve Mechanism	4 valves per cylinder
Number of cylinders	V8
Fuel injection system	EFI
Displacement (cc)	4292
Transmission type	Rear-wheel drive, 6-speed sequential manual transmission
DIMENSIONS AND WEIGHT	

Overall length (mm)	4150
Overall width (mm)	1870
Overall height (mm)	1110
Wheelbase (mm)	2500
Tread (mm) front	1550
Tread (mm) rear	1560
Kerb weight (kg)	1300