

Designs on Geneva

by *Stuart Birch*

Design chic, design blending, and design promise were all present in the halls of the Geneva Palexpo exhibition center for the city's International Motor Show, which this year celebrated the centenary of its beginning. Geneva has always been a strange venue for such a distinctive event because Switzerland has no motor manufacturers of its own. And yet, year after year, the Geneva show manages to attract companies from across the world to create a highly distinctive event that never disappoints.

Design chic was represented by the **Honda Civic** concept, **Alfa Romeo Brera**, and the **Citroën C6** among many other examples. Design blending was demonstrated by the **Citroën C1**, **Peugeot 107**, and **Toyota Aygo**, sharing more than 90% commonality, built at the same plant at Kolin, Czech Republic, and, despite different detail styling, looking like near-identical triplets. Design promise

was, as ever, down to concepts, which ranged from the **Renault Zoë** to the **Lamborghini Concept S** by way of **Ford's** crossover **SAV**.

But the show is not just about image; there was interesting technology there, including a triple-turbodiesel-engine **Mercedes-Benz SLK** able to reach 100 km/h (62 mph) from rest in 5.3 s and return the fuel consumption of a small family sedan. A few years ago, such an extraordinary combination would have been almost shocking; this year it hardly raised an eyebrow. The advance of diesel technology in Europe continues apace.

Alfa Romeo—It is very seldom that Alfa Romeo creates a new car that fails to emerge as a motor show star, and the 2+2 Brera and 159 sedan, which made their world debuts, were no exceptions. The Brera, which replaces the GTV, was initially seen as a concept at Geneva two years ago. Designed by **Giugiaro** in collaboration with the Alfa Romeo Styling Center, the car will be in production later this year. Alfa describes it as having "generous" dimensions including 1830-mm (72.0-in) width, 4413-mm (173.7-in) length, and 1372-mm (54.0-in) height on a 2525-mm (99.4-in) wheelbase. Alfa's traditional shield-type front grille has elements of the marque's 1950s designs, while its rear windshield has cues from the 1960s Giulietta Sprint. The Brera has folding rear seats, a facility which boosts luggage capacity from 236 to 546 L (8.3 to 19.3 ft³). Engines include 2.2-L, 185-bhp (138-kW) and 3.2-L, 260-bhp (194-kW) gasoline and Alfa's excellent 2.4-L JTD turbodiesel producing 200 hp (149 kW). The transmission at launch is a six-speed manual, with an auto following. Suspension is double wishbone front, multilink rear. Some versions will be offered with all-wheel drive.

The 159 sedan, again designed by Giugiaro and the Alfa Styling Center, will also be available with all-wheel drive. It replaces the successful 156 and has a "completely new" chassis and suspension—as with the Brera, double wishbones

Alfa Romeo Brera coupe



Alfa Romeo 159



Aston Martin V8 Vantage

at the front, multilink at the rear—and a “new generation” of engines and transmissions. The car has more interior space than that of the 156, is 1828 mm (72.0 in) wide, 4660 mm (183.5 in) long, and 1417 mm (55.8 in) tall on a 2700-mm (106.3-in) wheelbase. The car’s all-wheel-drive system is adopted from Alfa’s Q4 Crosswagon, which has three differentials including a Torsen C self-locking central system.

Aston Martin—The V8 Vantage is a very fast sports car. With that succinct statement, Aston Martin unveiled its latest two-seat model at Geneva. The V8 was no secret, and a concept had been previously revealed, but now the car is production-ready. Like most Astons, it is basically all about aesthetics and engine, the former very much in traditional Aston Martin-style, with a “family” nose and smooth contours, using hand-built body panels and all-alloy underbody structure of bonded aluminum extrusions and castings. The front fenders, tailgate, and sills are made of “advanced composites.” A single, hand-finished, steel pressing is used for the body sides, and lightweight alloys are used for the hood and roof.

Its 4.3-L V8 engine, producing 283 kW (380 hp) and 410 N·m (302 lb·ft) available at 5000 rpm, is described as being unique to Aston Martin. Top speed is 280 km/h (174 mph) and 0-100 km/h (0-62 mph) time is 5 s. The engine, with dry sump lubrication, is positioned in a front-mid-engine configuration with “rear-mid” trans-



Audi RS4

mission. The all-alloy engine is built on the site of **Ford’s** Cologne engine plant and is hand-assembled. Aston has paid great attention to achieving the required engine note for the car using a resonance induction system, each bank of cylinders featuring a four-into-two-into-one manifold, an arrangement more usually found on racecars, says Aston. Bypass valves provide a quieter exhaust at low speed, opening at higher engine speeds to reduce the pressure in the exhaust system. The engine has variable inlet timing.

Suspension includes double wishbones at the front. The steering rack is solidly mounted ahead of the front wheels, another typical racecar layout. The V8 Vantage’s mass is 1570 kg (3460 lb) and its Cd 0.34.

Audi—Audi’s compact A4 sedan is the basis for the new RS4 quattro revealed at Geneva. It has a direct gasoline injection 4.2-L V8 engine able to rev to 8250 rpm. Naturally aspirated, it delivers 420 PS (296 kW), which equates to a little over 100 PS/L (74 kW/L) and 254 PS/ton (184 kW/t), with some 90% of its peak torque of 430 N·m (317 lb·ft) available from 2250 to 7600 rpm. Performance figures include a 0-100 km/h (0-62 mph) in 4.8 s and 0-200 km/h (0-124 mph) in 16.6 s. This is the first time that direct gasoline injection has been used in a road-going V8, although the technology was fitted to the Audi R8 Le Mans racecars.

The RS4 has steering-wheel-button selection of throttle mapping adjustment. The car’s ESP (electronic stability program) has been set to intervene later and for less time than that fitted to lower-powered A4s. Aluminum is used for hood, front wings, and suspension components. The car rides 30 mm (1.2 in) lower than a regular A4 and has a wider track front and rear. It also has a new evolution of Audi’s quattro all-wheel drive, which is able to transfer a larger-than-usual proportion of torque between front and rear axles, operating in conjunction with DRC



Bentley Flying Spur

(dynamic ride control), a system adopted from the RS6 quattro. The RS4 has 19-inch wheels.

Bentley—“Flying” is the operative word for Bentley’s new Flying Spur; with a claimed 195-mph (314-km/h) top speed, it is the fastest four-door sedan ever built by the company and one of the fastest road cars in the world. Based on the two-door Continental GT, it was publicly revealed at the Geneva Motor Show. It manages to combine dynamism, elegance, and understatement and is not an overtly powerful car. Initial design work on the all-wheel drive Flying Spur started alongside the GT in 1999. That car was launched two years ago and development continued on the four-door readying it for introduction this year.

In an individual pre-announcement reveal to **AEI** by Engineering Director Ulrich Eichhorn, Sales and Marketing Director Adrian Hallmark, and Design Director Dirk van Braeckel, emphasis was also placed on the Flying Spur’s dynamic qualities allied to its aesthetics. “It contains all the coachbuilt cues typical of a Bentley,” said van Braeckel, who joined Bentley from **Skoda**. Despite a wheelbase extended by some 300 mm (11.8 in) to 3065 mm (120.7 in) to give very generous legroom front and rear, and the addition of a couple of doors, torsional stiffness is the same as that of the GT. Said Eichhorn: “The challenges for the two were quite different. The GT is a B-pillarless coupe, the Flying Spur has a B-pillar but two large rear doors. The target was for them both to have the same rigidity; it was not easy but we achieved it.” Mechanically, the cars are all but identical, so the Flying Spur has a 6.0-L twin-turbo, 552-bhp (412-kW) W12 engine driving through a six-speed **ZF** auto gearbox. Maximum torque of 650 N·m (480 lb·ft) is delivered from 1600 rpm.

Externally, the Flying Spur is almost the same as the GT up to the trailing edge of



Bertone Villa

the hood with a “chicken wire” or, officially, matrix type radiator grille, and short front overhang. But the windshield is more upright and the doors are framed instead of frameless. Treatment of the trunk design is similar to that of the GT and the substantial C-pillar shape has a hint of semi-fastback. The sedan has a horizontal “powerline” (flank crease); on the GT this meets prominent haunches. Overall carryover from the GT for all aspects of the car is around 60%. The Flying Spur can be built down the same line as the GT, and will be priced slightly above that of the GT. The new car will further boost Bentley output, but the company has put a limit of around 9000 units per annum on its total production.

Although the GT and sedan are very similar mechanically, the software of the Spur’s gearbox has been changed to a less sporty profile, with maximum use being made of available torque. The roomy interior of the Flying Spur (made possible partly by the longitudinal space saved by the short W12 engine) is very much in the wood and leather tradition of Bentley, and there is a choice of four- or five-seat configuration. Bullseye ventilation outlets and organ stop controls are fitted. The dashboard is the same as that of the GT. The car has four-zone climate control.

Bertone—There is always something to totally surprise at Geneva, and this year the Bertone Villa was firmly in that

category. The Villa originates from the desire to break the rules, to rebel against the homogeneity of the contemporary car, stated the company. And it does. Based on the **Cadillac SRX**, the Villa is all about its entrance area and interior.

It has what Bertone describes as two huge glass doors, which form part of the roof and sides, moved upwards and, respectively, forwards and backwards by hydraulic arms. It is therefore possible to board the vehicle walking upright, although this is not best done in a rain-storm. The interior includes a special 23-in **Bose** video screen. **Finnlamex**, **Gruppo Mario Levi**, and **Michelin** also helped to create the Villa.

Bolloré—“The Bolloré Group has no ambitions to become a car maker,” was one of the more unusual statements at the Geneva Motor Show. The group originally specialized in the production of thin papers, went on to metallized paper, plastic films used in the manufacture of capacitors. From there it was a short step to batteries—notably a lithium-metal-polymer type called **BatScap**—for use in cars. To demonstrate this, the company decided to build the BlueCar electric vehicle and take it along to Geneva to show what might be done. The company’s battery is said to be five times lighter than a lead-acid type, liquid free, fully recyclable, and have an estimated service life of 10 years. It is fully rechargeable in six hours but “just a few minutes” is said to give



Bolloré’s BlueCar



BMW M6

sufficient energy for the car to cover “several dozen kilometers.”

BlueCar has been designed as city transport. It is 1.6 m (5.2 ft) tall, 1.71 m (3.8 ft) wide, and 3.05 m (10 ft) long—the same as the original **Mini**. Including two fold-up seats, the car can carry five people. Maximum speed is 135 km/h (84 mph), 0-60 km/h (0-37 mph) takes 6.3 s, and average operating range is 200-250 km (125-155 mi). Phillippe Guédon, CEO of **Espace Développement** and former chairman of **Matra Automobiles**, designed the BlueCar. Though Bolloré has no ambitions to become an automaker, it is eager to work with vehicle manufacturers on a BlueCar-type vehicle.

BMW—In addition to the new 3 Series, BMW showed the latest member of its high-performance M family, the M6. It shares the M5 sedan’s 5.0-L V10 engine producing 500 bhp (373 kW) and driving through a seven-speed SMG (sequential manual gearbox) Drivelogic programmable (11 different change patterns) gearbox. Like the BMW M3 CSL, the car has a carbon-fiber roof. Performance figures include a 0-100 km/h (0-62 mph) time of 4.6 s, with distance traveled from 100-0 km/h (62-0 mph) at 36 m (118 ft). Top speed is electronically limited to 250 km/h (155 mph), but without this restriction it is claimed to top 320 km/h (199 mph). Engine CO₂ rating is 357 g/km. Peak power is developed at 7750 rpm, but the engine can be taken



Cadillac BLS

to its 8250-rpm redline. Maximum torque of 520 N·m (384 lb-ft) is achieved at 6100 rpm, with 450 N·m (332 lb-ft) from 3500 rpm. The engine is managed by an MS S65 control unit, which has three, 32-bit processors that handle more than 200 million operations per second from more than 50 incoming signals.

The M6's suspension is based on that of the 4.4-L V8 645Csi. With the exception of components such as tie-bars, wheel mounts, and bearings, the double-arm spring strut front axle is made completely of aluminum. The integral rear axle is also aluminum. The M6 has a variable, speed-sensing M Differential lock, which builds up locking action if one of the wheels begins to spin, providing drive to the wheel with the most grip. Electronic Damper Control is standard. The M6 has three driver-selected suspension settings. DSC stability control has been adapted for it, allowing "considerable angles of controllable oversteer." The engine has a Power Button (*a la* M5), permitting only 400 bhp (298 kW) for city driving, but with full output available when selected. Mdrive Manager allows the driver to pre-select various settings for specific system behavior, including that for the SMG gearbox, DSC, and headup display (which shows engine speed, gear selected, and road speed).



Citroën C6

The braking system includes aluminum double piston calipers and cross-drilled discs. Wheels are 19 in.

As well as its carbon-fiber roof, which saves about 5 kg (11 lb), the M6 incorporates similar weight-saving construction to other 6 Series models including thermoplastic front fenders and aluminum doors, hood, and trunk lid. BMW quotes overall mass of the M6 as being 1710 kg (3770 lb), which is slightly less than that of the M5. Visually, the car differs from the regular 6 Series models in having a deeper front valance with air intakes for engine and brakes, more contoured sills, and a rear valance that includes a diffuser. Four exhaust tailpipes make it clear that this is very much a high-performance car.

Cadillac—Designed specifically for the European market, the Cadillac BLS concept car provides a preview of what can be expected in spring 2006 when the production premium mid-class sedan hits the streets.

Built on **General Motors'** Epsilon architecture, the new entry-level model will have a range of powertrain choices, including Cadillac's first-ever turbodiesel engine—a necessity to compete in the European market—and three gasoline engines. The 1.9-L four-cylinder turbodiesel variant, from the **Fiat-GM Powertrain** joint venture, with common-rail direct-injection technology features a maintenance-free diesel particulate filter that will comply with Euro 4 emission standards.

The range of gasoline engines—all of which are turbocharged—will comprise two 2.0-L four-cylinder versions and one 2.8-L six-cylinder unit. All the power units can be combined with either manual or automatic transmissions.

The front-wheel-drive sedan has McPherson struts in front and a four-link rear axle. "The development of the chassis was focused to enable dynamic driving, but at the same time ensuring a ride with comfort," said Larry Craig, Program Engineering Manager for the Cadillac BLS.

"Apart from that, we also devoted attention to achieving effective noise and vibration isolation," added Craig.

"Environmental influences are, as far as possible, kept away from the passengers."

A number of measures have been taken to achieve this isolation, according to Craig. For example, the rear axle and the chassis are decoupled from one another via special rubber bushings, and the wheelhouses, roof, and trunk are especially sound-insulated.

With its sharply defined contours and wedge shape, the four-door sedan continues Cadillac's characteristic design language. The style is further expressed by vertically positioned headlamps featuring bi-xenon technology, fog lamps integrated into the body-colored bumper, a wide air intake below the radiator grill, and 19-in multi-spoke alloy wheels. The BLS is 4680 mm (184 in) long, 1762 mm (69 in) wide, and 1449 mm (57 in) high.

Inside, the show car includes details such as an analog clock on the center console and seat surfaces covered with high-quality leather with the stitching visible to emphasize quality. The outlets for ventilation/air conditioning have the same brushed aluminum look as the frame of the center console. The infotainment system consists of high-quality audio units from **Bose**, DVD-based navigation with touch-screen operation, and a Bluetooth-capable telephone system. The sedan will be available with left- or right-hand drive.

The BLS could be sold in other global markets, but it will not be offered in the U.S., said Carl-Peter Forster, GM Europe President, during the car's reveal in Geneva. It will be produced in Trollhättan, Sweden, alongside the **Saab** 9-3 and 9-5.

Citroën—A long wheelbase of 2900 mm (114.2 in), a coupe-like roof treatment with elements of the 1970s CX about it, distinctive corporate chevron front-end styling, long front and short



Dodge Caliber



Fenomenon Stratos

rear body overhangs, a concave rear window, a modest integrated spoiler on top of the tailgate, and a luxury interior distinguish Citroën's spacious, all-new C6 executive sedan scheduled for production this year.

Technology includes active suspension elements with variable damping, an electric parking brake, lane departure warning, directional xenon headlamps, and a headup display (HUD). Engine choice is **PSA Peugeot Citroën's** fine 2.7-L, 150-kW (201-hp), V6 HDi turbodiesel with particulate filter or a 3.0-L gasoline with 155 kW (208 hp), each driving through a six-speed auto gearbox.

The design of both the driving position and ergonomic dashboard allows drivers to keep their eyes on the road at all times, while laminated side windows also help to improve driver concentration by filtering out external noise, states Citroën.

The C6 has zoned air conditioning with a "soft diffusion system" designed to create what the company terms a uniform blanket of air around the front passengers to enhance thermal comfort. Stowage compartments in the doors are said to have been inspired by the "latest trends in home furniture design, thus reinforcing the concept of the car as a



Ferrari F430 Spider

'loungue on wheels.'"

Door windows are frameless and the doors very long. Spearhead-shaped rear lights curve around the top of the rear fenders, where, slightly offset, they meet the roof arch. The HUD projects driver information onto the windshield, and an information display screen is positioned on top of the dashboard. According to Citroën, the HUD makes a significant contribution to safety with its direct read-out; 0.5 s are saved, based on the time normally taken by drivers to look away from the road and refocus on the screen in front of them. Vehicle speed is constantly projected, but the driver can select other information as required. The C6 is fitted with a lane-departure-warning system, activated from 80 km/h (50 mph).

Suspension includes double wishbones at the front with a linked hub carrier and a multilink layout at the rear on a light-alloy crossmember. The suspension incorporates hydropneumatic technology for springing and damping having 16 control laws. It maintains ride height up to 110 km/h (68 mph), at which speed the body lowers by 12 mm (0.5 in) to improve aerodynamics and stability. The suspension requires no maintenance for five years or 200,000 km (124,000 mi). The car incorporates safety features of PSA Peugeot Citroën's Platform 3 vehicles introduced with the Citroën C5. It has nine airbags including a kneebag for the driver.

Dodge—Dodge revealed its thinking for its next entry in the "C" car segment when it replaces the Neon next year with the Dodge Caliber crossover wagon featuring strong styling cues from the company's popular SUV and truck models.

"The Dodge Caliber concept brings emotion to the C-segment sea of sameness and strongly hints at the direction of

Dodge in the global car market," proclaimed Chrysler Group Senior Vice President of Design Trevor Creed.

As a styling concept, no details were provided on which powertrains will be employed for which markets. The angular, blocky styling and Dodge crosshair grille design illustrate Creed's point that it remains possible to produce distinctive-looking cars within hotly contested segments where function is a significant requirement.

Fenomenon—It may look like a **Lancia** Stratos, but this new Stratos is by Fenomenon, a London-based vehicle design agency. Described as a modern re-interpretation of the 1970 mid-engined Lancia that triumphed in the World Rally Championship, it has been engineered for on-road and dirt/rally stage use. Fenomenon states that it owns rights to the Stratos name and that the new project has been executed independently of Lancia. It is not a retro design, says Fenomenon, and has been engineered for production starting in 2006-07 with EU compliance. Power comes from a mid-engine 428-PS (315-kW) V8 driving the rear wheels. It has a carbon fiber and aluminum composite chassis, and carbon fiber body panels.

Fenomenon explains that the car has been engineered for use in both developed and developing countries and has high ground clearance and long-travel suspension. The engine drives through a six-speed gearbox.

Ferrari—Making its formal world premiere at the Geneva Motor Show was Ferrari's F430 Spider. As with the F430 Berlinetta, it is powered by a 4.3-L 90° V8 with 11.3:1 compression ratio, giving the car a top speed greater than 193 mph (310 km/h) and a 0-100 km/h (0-62 mph) time of 4.1 s. The car was designed by



Fiat New Croma

Pininfarina using aerodynamic simulation programs applied to F1 cars. The soft top Spider has a rear lip spoiler, pronounced rear air intakes, and a rear valance that incorporates a diffuser. The engine can be seen beneath its glass cover.

Like the Berlinetta, the Spider incorporates two elliptical air intakes feeding the front radiators, their shape said to be inspired by the Ferrari F1 cars of 1961, notably the 156F1 driven by American Phil Hill to that year's World Championship title. The spoiler that joins the two intakes at their bottom edge is highly effective in directing the central airflow towards the car's flat underbody.

As with the Berlinetta, the F430 Spider, built on an aluminum space-frame, has plenty of other technology links to F1. These include an electronic differential (E-diff) to improve traction and roadholding.

The Spider also gets the Berlinetta's steering-wheel-mounted rotary switch (called a manettino) to adjust the car's setup. The Spider's folding electric roof is fully automatic. Mass is up by about 70 kg (154 lb) compared to the Berlinetta.

Fiat—Fiat is using the Croma name again, although with the qualification "New" coupled with it. The original Croma, produced from 1985 to 1994, was the result of a platform-sharing collaboration between the Fiat Group (for Fiat, **Lancia** and **Alfa Romeo** models) and **Saab** (for the 9000). The New Croma, based on **General Motors'**



Ford Sport Activity Vehicle (SAV)

Epsilon platform, is described as an advanced station wagon concept that will be built at Fiat's Cassino plant.

Designed by **Giugiaro**, the New Croma is initially available with a single body style that is a cross between a hatchback and wagon. Length is 475 cm (187 in), width 177 cm (70 in), and height 160 cm (63 in), with a 270-cm (106-in) wheelbase. The car stands about 10 cm (3.9 in) higher than the norm for its class, says Fiat, and has raised H-points and a flat floor. Interior space is comparable to that offered by an MPV (multipurpose vehicle).

As would be expected, engine choice is diesel and gasoline, the most powerful being a 2.4-L 200-bhp (149-kW) Multijet turbodiesel. Transmission choice includes five- and six-speed manual gearboxes or an automatic sequential. Suspension is MacPherson front and multilink rear.

Safety systems include seven airbags as standard, with nine an option.

Ford—The extraordinary collection of initials used to describe vehicle types is ever expanding, so joining SUV, MPV, and MAV we now have the SAV (Sport Activity Vehicle), courtesy of Ford. The concept of the SAV was unveiled at Geneva by Lewis Booth, Chairman and CEO of Ford of Europe, together with Martin Smith, Executive Director, Design, Ford of Europe. Smith said the SAV is first evidence of a new design direction. "I believe we are at a turning point for Ford of Europe's design language," he said.

Rather more pragmatically, the SAV can be described as a two-/three-row monospace that slots into Ford's model lineup between the Mondeo and Galaxy and benefits from the company's flexible



Ford Focus ST



Ford Focus four-door

architecture philosophy. The bodysell includes a steeply raked windshield flowing from a steeply raked hood, blending into an arching roofline. In keeping with recent trends towards very large radiator grilles, the SAV has a deep trapezoid lower grille. The outboard lower bumper incorporates brake cooling ducts finished in brushed aluminum. At the rear, the SAV has been given a venturi-effect lower bumper design.

The most interesting element of the interior is a powered central rear seat, which slides rearwards between integrated, fitted luggage trolleys that form armrests for the occupant. The two rear outer seats can then be moved inwards slightly if required.

Ford also showed a four-door version of the new Focus and a three-door ST (Sport Technologies) with 220 PS (162 kW). The Focus sedan joins the wagon, hatch, and C-MAX multi-activity vehicle, all of which are in production, as Ford confirms that a coupe-cabrio (folding hardtop) seen as the Vignale concept at last year's Paris Motor Show will be built from late next year. The Focus sedan will be available with gasoline or diesel engines. Trunk space, with space saver spare tire, is 526 L (18.6 ft³).

The car forms the base architecture for the production version of the Vignale concept, which will be built at **Pininfarina's** Turin facility. Ford's Streetka, based on the Ka hatchback, is already assembled there. Full technical



Honda Civic

details and the name of the production version of this new Focus model will be announced closer to its launch in about two years' time.

The high-performance ST has a turbo-charged 2.5-L five-cylinder engine allied to a six-speed gearbox. It is said by Ford to provide a strong base for performance road cars and competition models. Its Geneva appearance served as a taster; the car will not be on sale until late this year. It sits on low-profile 225/40 tires fitted to sculpted 18 x 8-in five-spoke aluminum wheels. The model follows through Ford's ST configuration for the Fiesta and Mondeo.

Honda—Making its world debut in Geneva, the Civic Concept "is very close to the final styling" of the next European production version, said Takeo Fukui, President and CEO of Honda Motor, during the car's unveiling. Shown as a five-door hatchback, the car is wider and lower than the current Civic, a design that takes Honda's best-selling model in a more "emotional," sporty direction.

Honda's 2.2-L i-CTDi diesel engine will be part of the Civic lineup. Power output for the Civic i-CTDi is expected to be a class-leading 140 PS (103 kW) with a maximum torque of 340 N·m (250 lb·ft). Gasoline engine variants will also be available.

The new model will continue to be built in Honda's European manufacturing plant in Swindon, UK. Beginning with this new Civic, "we are...introducing diesel engine assembly in our UK plant," said Fukui.



Hyundai HED-1

As for safety, "we plan to equip every model in the new Civic lineup for Europe with class-leading features," including the Vehicle Stability Assist system and side-curtain airbags, said Fukui.

With all of these changes, the eighth-generation Civic will set new standards for the premium end of the C-segment in Europe, added Fukui.

The production version is scheduled to appear at the Frankfurt Motor Show in September, and sales are to begin in early 2006.

Hyundai—Referred to as a "structural and sociological exercise" in redefining the B-segment MPV of the future, Hyundai's HED-1 concept vehicle has a "lounge bar ambience" that offers the benefits of Internet and computer technology in a functional and intuitive way, according to Hyundai Senior Designer Eduardo Marchena and his team.

Integral to the design are triangular LED head, tail, and indicator lamps. Opening the doors reveals the car's B-pillarless construction for ease of entry and egress in limited space. In front of the dashboard is a full-width video screen on the bulkhead. All minor controls, such as the external mirror settings and the



Hyundai Grandeur

handbrake, are flush-fitting and touch-sensitive electronically operated. The front seats can swivel 180°, and a folding table rises from the central console.

Between the front seats is an interface control column. On it a round selector activates all the systems of the car, including the door-mounted ambient lighting strips. Four different press buttons control entertainment, communications, navigation, and climate functions, which appear on the bulkhead screen. This central control column can be removed and used remotely from any location in the vehicle.

The rear seats are electrically operated. Maximum luggage space is achieved by sliding them forward, and by extending the two-tier, sliding luggage platform forward. Maximum rear legroom is achieved by sliding the seats backward, causing the loading platform to automatically recede. This design eases loading by extending the top tier 250 mm (10 in) rearward once the rear sill has been lowered.

The HED-1 was designed to accommodate the new Hyundai Theta series of world engines, which range from 1.8 to 2.4 L.

Hyundai also unveiled the new Grandeur sedan, which aims to move the brand upscale in the executive car segment. This car replaces the XG and is scheduled for showroom launch in July.

Powering the Grandeur is a 3.3-L all-aluminum DOHC V6, offering 171 kW (229 hp) at 6000 rpm with 304 N·m (224 lb·ft) at 3500 rpm. A 2.2-L diesel option with 107 kW (143 hp) will be available following the car's launch.

According to Hyundai, intensive development work was done regarding the Grandeur's road-holding, stability, and handling attributes. Double wishbone front suspension and a redesigned multi-link rear suspension have been adopted with ESP (Electronic Stability Program) as standard on all models.



Kia Rio

At 4895 mm (193 in) long, 1845 mm (73 in) wide, and 1490 mm (59 in) high, the new Grandeur is 20 mm (0.8 in) longer and wider, and 70 mm (2.8 in) higher than the XG. This has allowed an increase of 30 mm (1.2 in) in the wheelbase, which translates into more interior space, increased directional stability, and extra handling precision. Seventeen-inch alloy wheels with 235/55 tires are standard.

Safety features include active headrests, and front/rear side and curtain airbags. Windshield de-icing is optional. Inside the car is dual-zone climate control with an air-quality control system, a dual-color interior trim, featuring high-quality leather with metal and wood elements, and a premium sound system with **Infinity** speakers and steering wheel-mounted controls.

Kia—The five-door hatchback and four-door sedan Kia Rio models, which go on sale across Europe this late spring, are more than 50 mm (2 in) taller, 15 mm (0.6 in) wider, and have a wheelbase that is 90 mm (3.5 in) longer than their predecessors, leading to “significantly more” cabin space.

The B-segment car offers a choice of gasoline (1.4 and 1.6 L) and diesel engines. The 110-PS (81-kW) 1.5-L CRDi diesel engine features a variable-geometry turbocharger and is said to offer best-in-class performance, delivering 36% more power “than most other diesels in this segment,” according to Kia. A new 97-PS (71-kW) 1.4-L engine—making its debut in the Rio—is said to generate 17.5% more power than the class average, while the 112-PS (82-kW) 1.6-L CVVT (continuously variable valve timing) engine produces 10% more power.

All three engines are offered with a five-speed manual transmission as standard. A four-speed automatic transmission is available on both gasoline engines.



Lamborghini Concept S

The longer wheelbase and wider track of the Rio offer ride and handling improvements, as do its independent front and semi-independent rear suspension system. The power-assisted rack-and-pinion system requires 3.01 turns of the steering wheel lock-to-lock, and the Rio’s turning circle is less than 4.92 m (16 ft).

Four-channel, four-sensor, ABS is standard fit for all Rio models in Western Europe. The system incorporates an electronic brake force distributor (EBD), helping to distribute braking force evenly between front and rear wheels. Electronic stability control (ESC) is available as an option.

Other passive and active safety measures include side-impact beams in all four doors, dual front airbags, available side airbags for the front seats, available curtain airbags, and an optional active head restraint in the driver’s seat that moves forward and upward during a collision to protect the occupant from whip-lash injuries.

Inside, the Rio offers a choice of four audio systems—radio/cassette, radio/CD, radio/CD/MP3, or radio/cassette/CDC with optional external amplifier—depend-



Lexus IS

ing on model, country, and customer preference. Sound is broadcast through a system with up to six speakers, including two optional tweeters.

Lamborghini—

Lamborghini may turn its Concept S design study shown at Geneva into a limited-edition model.

The company describes it as an “extreme” expression of the Lamborghini brand, following its 350S and Miura forebears. It was created by Luc Donckerwolke, Head of

Lamborghini Design at the company’s Centro Stile in Sant’Agata.

The car does not have a conventional windshield but uses wrap-around aerosecreens or “saute vents,” which divide the cabin into two compartments. The space between the screens provides added air for the car’s engine. The concept also has an electronically controlled, retractable central rearview mirror that allows the driver to see what is happening behind the car “when required.”

Lexus—Lexus chose Geneva for the world premiere of its new-generation IS, which will be available with the marque’s first diesel engine. The aluminum 2.2-L unit produces 130 kW (174 hp) at 3600 rpm and 400 N·m (295 lb-ft) between 2000 and 2400 rpm. The engine has common-rail technology with piezoelectric injectors—claimed as a first in its displacement category. At only 15.8:1, the compression ratio is said to be the world’s lowest for a production car diesel unit, while injection pressure is a high 1800 bar (26.1 psi). There are up to four separate injections per cycle. Emissions treatment includes a diesel particulate NOx reduction four-way catalytic converter—the only catalyst in the world that reduces NOx and particulate matter simultaneously, claims the company. The engine drives through a six-speed manual



Mazda MX-5

gearbox. The IS is also available with a direct gasoline injection 150-kW (201-hp) 2.5-L V6, which is offered with a six-speed manual or six-speed automatic transmission with paddle shifters.

Safety equipment includes 10 airbags including double knee bags. A radar-controlled PCS (pre-crash safety system), ACC (adaptive cruise control), and I-AFS (intelligent adaptive front lighting system) are all available. Suspension is double wishbone at the front, multilink at the rear. Extensive use is made of aluminum. Steering is a new electric, speed-sensitive system.

Described as a compact sports sedan, the new car is 90 mm (3.5 in) longer and 75 mm (3.0 in) wider than the previous IS. It has the twin-barrel headlamp clusters of the previously seen LF-S concept and a vertically latticed radiator grille—a frontal signature that will become a feature of future Lexus models.

The car's interior design is also new, with a mix of concave and convex surfaces. There is an engine start button and bird's-eye maple wood is a trim option. The satellite navigation system is said by Lexus to have the world's fastest route-calculation technology and incorporates Bluetooth hands-free capability for compatible mobile phones. Voice recognition also covers audio and climate functions.

Mazda—"Why spoil a good thing?" seems to have been Mazda's guiding philosophy for the new MX-5 Miata.



Mercedes-Benz B-Class

According to Mazda, it is "a markedly better vehicle than its predecessor." Although it has been extensively redesigned in many respects, its overall shape is still very much like the original and highly successful MX-5 from 1989, with rounded, simple lines and no pretensions of being anything other than a pure two-seat sports car. However, the "cola bottle shape of the contours" has been eliminated, explains Mazda, and the fender arches are more pronounced. The wheelbase is increased by 65 mm (2.6 in), length by 20 mm (0.8 in), width by 40 mm (1.6 in), and height by 20 mm (0.8 in). The cockpit is wider, roomier, and has a more up-market look, with some surfaces getting a piano-black finish. The steering wheel is adjustable and the well-shaped seats have more movement than those of the previous model.

The new MX-5's bodyshell is stiffer, there are side airbags placed inside each seat backrest, and new waist-level vents direct warm or cool air through the cabin. A mesh air deflector behind the seats reduces buffeting.

Engines, from Mazda's MZR family, are a 1.8-L with 93 kW (125 hp) and a 2.0-L with 118 kW (158 hp). Of course, the powertrain configuration is front engine, rear drive with 50:50 weight distribution. Transmission is five- or six-speed manual or six-speed auto with paddles. Suspension is by double wishbones at the front, with a new multilink layout at the

rear. The braking system now incorporates larger ventilated front discs with stiffer calipers and solid discs at the rear.

Mercedes-Benz—The new Mercedes-Benz B-Class, M-Class, and R-Class were all at Geneva, along with a 286-hp (213-kW) V6 triple turbodiesel SLK 320 concept with 464 lb-ft (629 N-m). BMW's 535d uses two turbochargers (the lighter operating at low revs), but the SLK is technically significant because DCX has taken things a step further. Two of the SLK's turbochargers are positioned on the outside of the cylinder banks, with the third between the V of the banks.

At reduced engine speeds or on light loads, air flows through all three, but with the two smaller ones doing most of the work. When engine speed rises and the flow is continuous, the largest takes over supplying the greatest share of the charge pressure, and the smaller two are turned off via a bypass system. At high engine speeds and loads, only the largest turbocharger operates. An extra-large intercooler is fitted. The rev counter is redlined from 4500 to 5000 rpm. Performance figures include a 0-100 km/h (0-62 mph) time of 5.3 s and a top speed electronically limited to 250 km/h (155 mph). Fuel consumption (NEDC overall) is 7.5 L/100 km.

Production is now starting for Mercedes-Benz's new B-Class, which has grown out of the A-Class and uses much of that car's technology including a sandwich configuration for the engine and transmission ahead of, and partly beneath, the passenger cell.

Described by Mercedes as a Compact Sports Tourer and previously seen as a concept, the production version was at the Geneva Motor Show. The emphasis is on packaging, with the car having the interior space of larger cars. With an overall length of only 4270 mm (168.1 in) on a wheelbase of 2778 mm (109.4 in), the distance between seat rows and knee room almost match those of the S-Class. The load compartment floor is height-adjustable and the rear seat is divided, foldable, and removable. A removable front passenger seat is an option. Load capacity is variable from 544 to 2245 L (19.2 to 79.3 ft³), with maximum loading length of 2.95 m (9.7 ft).

Engine choice includes diesel and gasoline units producing from 70 to 142 kW (94 to 190 hp). The B200 Turbo has a



Mitsubishi Colt coupe-cabriolet



Mitsubishi Nessie

new 2.0-L unit with 280 N·m (207 lb-ft) from 1800 rpm, getting it to 100 km/h (62 mph) from rest in 7.6 s and on to a top speed of 225 km/h (140 mph). Another of the powerful diesel engines has 103 kW (138 hp) and 320 N·m (236 lb-ft) for 0-100 km/h (0-62 mph) acceleration that takes 2 s longer than the B200 Turbo.

The B-Class's steering is a newly developed electromechanical variable assistance system. Suspension includes a parabolic rear axle. The car's ESP (electronic stability program) now includes steer control operating in tandem with the electromechanical power steering, providing "appropriate" servo assistance in critical handling situations to help the driver stabilize the car. Selective dampers are fitted, stiffening through bends at higher speeds.

An opening panoramic and louvered sunroof is optional, and a fixed panoramic roof is also available. Active lighting with a cornering function is a further option.

The B-Class is also "predestined," according to DCX, to eventually have fuel-cell motive power. At Geneva, the company announced a new high-torque electric motor that will develop more than 100 kW, 35 kW more than that of the unit in the A-Class fuel-cell car. Range is now up to almost 400 km (249 mi) and component reliability and longevity have



Nissan Zaroot



Opel/Vauxhall Zafira VXR

been improved, says the company.

Mitsubishi—Mitsubishi Motors Corp. (MMC) revealed its third variant of the European Colt: a coupe-cabriolet concept with retractable roof, designed and engineered in close collaboration between MMC, Mitsubishi Design Europe, and **Pininfarina**.

The direct successor of the C22 Cabriolet concept, unveiled in Geneva two years ago, the Colt coupe-cabriolet is more compact than the original concept—3.89 m (12.8 ft) vs. 3.95 m (13 ft). The concept is built off the Colt hatchback platform, rather than the shorter Colt three-door, for packaging purposes—allowing the adoption of a retractable hard-top while offering the extra space and seating arrangement of a 2+2 configuration.

Under the hood of the concept is the 150-PS (110-kW) 1.5-L MIVEC turbocharged engine that is shared with the new Colt CZT.

The Colt coupe-cabriolet concept previews the production car that will be built at the Pininfarina plant in Turin, Italy, starting in early 2006. Mitsubishi's NedCar plant in Born, The Netherlands, will be providing Pininfarina with body-in-white components, as well as its production engineering expertise in the building process of the new Colt.

Another Mitsubishi concept vehicle was on display in the **Italdesign Giugiaro** stand. The Nessie "2.5 volume SUV coupe"—a new vehicle architecture, according to the coachbuilder—is powered by a hydrogen-fueled V8 engine, supplied in collaboration with the **Linde**

Group. The "clean" power source is operated and managed by an automatic gearbox and a sophisticated electronically controlled transmission system.

The 2.5 volume SUV coupe configuration provides extra space to the rear, which incorporates a second half-door on the right side to ease access to the second row. There are seats for four inside the vehicle, with room for a fifth passenger on the rear bench.

The vehicle features a panoramic glass roof panel protected by an arrow-shaped structure used as a roll bar and a snap-catch for carrying skis or windsurfs. The roll bar is not anchored to the glass roof, but rather "leans" against the belt line in the rear. The front door has a transparent band for enhancing visibility when off-roading. The SUV coupe rides on **Pirelli** 305/40/23 tires with 22-in **ATP Tecnoforming** wheel rims.

The instrument panel incorporates a GPS navigation system, monitors, and Internet connection, supplied in collaboration with **LG Electronics**. Other suppliers include **Brembo** (brakes) and **Poltrona FRAU** (interior seating).

Nissan—Nissan revealed its Zaroot concept at the Geneva Motor Show. Described as a vision of how "sporty SUVs could look in the future," it is said to have serious off-road capability. The design includes gullwing doors extending from the A-pillars to the rear of the passenger compartment. There is no B-pillar. The "arch graphic" roofline of the Zaroot echoes a theme seen on other recent Nissan concepts.

Opel/Vauxhall—Although the latest version of the Opel/Vauxhall Zafira has been designed as a practical, compact seven-seat MPV (multipurpose vehicle), **General Motors Europe** (GME) unveiled a high-performance version at Geneva. A turbocharged 2.0-L engine producing 240 PS (177 kW) gives the Zafira VXR a top speed of 144 mph (232 km/h), and 0-60 mph (0-97 km/h) takes 7.2 s.

The car has GME's IDS-Plus (electronic chassis control) system, which includes stability control and a more powerful braking system with 321-mm (12.6-in) discs at the front. Bodywork changes include a honeycomb radiator grille, larger front bumper with central intake and integrated fog lights, deep sill extension, and twin trapezoidal exhaust tailpipes and tailgate spoiler. Wheels are 18-in alloys.



Citroën C1 and Peugeot 107

The interior includes **Recaro** sport front seats and GME's established Flex7 seating system, the latter allowing five of its seven seats to be folded into the floor.

PSA Peugeot Citroën and Toyota—Amongst all the glitz and hyperbole that is the Geneva Motor Show, three all-new closely related small cars emerged as its stars, not so much for their aesthetics or technology but more for what they represent in terms of international design and industrial collaboration. They are the Citroën C1, Peugeot 107, and Toyota Aygo. With some 92% commonality among them, the three measure 3.4 m (11.2 ft) long, 1.6 m (5.2 ft) wide, and 1.5 m (4.9 ft) tall. The distinctively styled four-seat hatchbacks will be produced in three- and five-door forms at **Toyota Peugeot Citroën Automobile** (TPCA) in Kolin, Czech Republic.

"In Europe, demand is emerging for affordable compact cars," said Jean-Martin Folz, CEO of PSA Peugeot Citroën, on the eve of the Geneva Show. "The niche is still underdeveloped but is expected to enjoy sustained growth. This cooperation between independent car makers has provided a fast, cost-efficient response to market demand through the sharing of expertise and experience."

The plant will have a capacity of 300,000 units, with a likely ratio of 200,000 to Peugeot and Citroën, the balance to Toyota.

Of course, collaboration has long been in place in the auto industry, particularly in Europe. PSA Peugeot Citroën has been



Toyota Aygo

involved in partnerships for some 30 years and is now working with **Ford** on diesel engines and **BMW** on gasoline technology. Among other projects, PSA is working with **Mitsubishi** to co-produce an SUV in 2007. But the Kolin operation is something very significant, and if it all works out, there is likely to be more joint ventures by PSA and Toyota.

For the tiny trio, Toyota looked after the major part of the vehicles' development and of the construction of the TPCA plant; PSA Peugeot Citroën's expertise included diesel engines, seats, and, significantly, project procurement, selecting suppliers on the basis of competitive tenders "in line with both partners' purchasing policies." They include those regularly used by PSA and Toyota, plus Czech companies. "Some 80% of purchasing volumes, representing more than 50% of total sourcing value, come from the Czech Republic," said Folz. The entire project was managed via a common decision-making process.

Engines for the trio are three-cylinder 67-bhp (50-kW) 1.0-L gasoline from Toyota with intelligent variable valve timing and a 53-bhp (40-kW) 1.4-L diesel from PSA. A new engine mount system is used to reduce NVH. Instead of a conventional three-mount configuration, one is positioned on each side of the engine on a line that passes through the unit's center of gravity. A torque rod at the bottom of the engine bay replaces the usual third mount. At 69 kg (152 lb), the gasoline engine is claimed to be the lightest unit fitted to a production car today. Top speed of the gasoline car is 98 mph (158 km/h).



Peugeot 407 Coupe Prologue

Suspension is MacPherson at the front, torsion beam for the rear. Electric power steering is fitted. The transmissions are five-speeds in manual or multi-mode auto mode. Maintenance costs for the triplets will be low; cumulative maintenance time is 4.2 h up to 60,000 mi (97,000 km).

Looking far more up-front in a literal sense than its elegant, understated stylistically balanced predecessor, Peugeot's other significant reveal was the new Coupe, in concept form. The 407 Coupe Concept Prologue "strongly hints" at the forthcoming production 407 Coupe, says the company. Roughly translated, this is just about it.

It is based on the 407 sedan and SW (station wagon), comes from the Peugeot Style Center, and carries the huge front grille of the current 407. The directional headlamps wrap around the front fenders, under which are three side vents. There is a rear spoiler integrated into the trunk lid, tapering into the rear fenders. Wheels are 19-in alloys. Side windows are of laminated glass.

Peugeot has given particular design attention to the interior (an area of criticism of the previous coupe), with aluminum and red leather on the dashboard and the seats featuring finely perforated leather. The center console has a black lacquer finish.

The concept's engine is a V6 HDi turbodiesel with maintenance-free particle emission filter. Output is 150 kW (201 hp) and 440 N-m (325 lb-ft). The gearbox is a six-speed auto with Tiptronic manual shift selection facility. Suspension is all 407, with double wishbones and drop link at the front and multi-arm at the rear.

Renault—Renault invariably uses the Geneva Show to reveal designs of which at least some elements will find their way on to production models. This year it opted for a short approach and took along its Zoé urban car concept.

Described as an "upper-range" urban vehicle, with the accent on "genuine



Renault Zoé

motoring pleasure in a compact package," Renault has given it three seats because, says the company's design boss, Patrick le Quément, "it has been shown that cars carry only 1.4 people on average, but two-seat interiors are perceived as a constraint."

A particular novelty of the Zoé is that the trunk space is behind the driver's seat alongside the back (third) seat. And the car has a system called "Pass," which adjusts interior ambience to individual driver tastes, including choice of music. The car is 3.45 m (11.3 ft) long and has a motorized passenger door with a two-hinge, three-axis opening system, its travel adjusted for access to the front seats or the front and rear. The hatchback is raised by a twin opening system, with the rear window being lifted and the lower part of the tailgate swinging up below it. The car's rear quarter-light can be lowered to enable small items to be placed on the parcel shelf or in the trunk. The passenger seat-back can be completely lowered, abutting the single rear seat to form a carrying platform. Developed with **Valeo**, the headlights have high-performance LEDs.

The car's engine is a new 1.2-L turbo producing 73 kW (98 hp), with CO₂ emissions of less than 140 g/km.

Rinspeed, Esoro, and Bayer—Bayer Material Science, Rinspeed, the Swiss automotive design house, plus engineering company Esoro worked together to create the Senso. The concept runs on environmentally friendly natural gas and can



Rinspeed Senso



Rolls-Royce long-wheelbase Phantom

actually "sense" the driver by measuring his or her biometric data, according to Bayer. It can then exert a positive effect on the driver with the help of patterns, colors, music, and fragrances.

A biometric Polar watch measures the driver's pulse and a camera records driving behavior including speeds reached and lane changes made. An onboard computer evaluates the data and establishes, with the aid of special algorithms, the driver's state of mind. Then four Sharp LCD monitors emit stimulating (orange/yellow), relaxing (blue/violet), or neutral (green) color patterns in the driver's line of vision. They are integrated into the interior panels, bathing the cockpit in dazzle-free ambient light. This is made possible by using smart surface treatment—electroluminescent film technology developed by Bayer and Swiss electronics specialist **Lumitec**.

As for the rest of the vehicle, the driver sits alone with two **Recaro** passenger seats behind. Fully recyclable composites are used for the bodywork and the speedster-style windshield is made of Makrolon polycarbonate from Bayer. The Senso has a mass of 1385 kg (3050 lb) and is powered by a 3.2-L **Porsche** Boxster engine. Its chassis was developed by **KW Automotive**.

Rolls-Royce—Rolls-Royce stretched a point at Geneva and brought along its new long-wheelbase Phantom. The car has been given an extra 250 mm (9.8 in) overall length, all behind the B-pillar, so back seat passengers benefit. Coach doors open to 80° and are also 250 mm (9.8 in) longer. The car was designed,

engineered, and is built at Goodwood in the UK.

The long-wheelbase version was planned from the beginning of the Phantom project, which is partly why an aluminum spaceframe chassis was chosen as it "lends itself to structural adaptation with relative ease." The extra length has been gained by using longer extrusions in the construction of the body, which, says Rolls-Royce, avoids any loss of torsional rigidity, usually a penalty when cutting and welding-in extra metal to create longer wheelbase variants.

Aluminum roof and door panels are the only new exterior parts and at 2670 kg (5890 lb) unladen, the car is about 75 kg (165 lb) heavier than the regular version. Chassis and body components are hand-welded.

Mechanically, the larger car remains the same as the standard version, with its 6.75-L V12 engine producing 453 bhp (338 kW) and 720 N·m (531 lb-ft). Performance figures include a 149-mph (240-km/h) top speed a 0-60 mph (0-97 km/h) time of 5.9 s.

Saab—Saab revealed its 9-3 SportWagon. Based on the 9-3 sedan, it has similar torsional rigidity of 21,000 N·m/° (15,500 lb-ft/°). The car follows the European trend for sporting estate cars in which flexible practicality, not load carrying, is the priority. However, the Saab is roomy, with rear seat up/down VDA-measured volume of 419/1273 L (14.8/45.0 ft³). It has twin-floor stowage.

Rear three-quarter styling incorporates frosted, steeply raked light cluster lenses and LED lighting technology. There is a



Saab 9-3 SportWagon



Seat Leon

choice of seven engines, the high-performance Aero getting a new 250-bhp (186-kW), 24-valve, 2.8-L turbocharged V6. This engine will also be available in the 9-3 sedan and convertible. The 2.8-L V6 Turbo has ESP Plus, with Hill Start Assist for manual gearboxes to prevent roll-back.

Saab says that the 9-3 is its first car to achieve zero lift levels at both axles. The SportWagon's Cd is 0.33, helped by an integrated rear roof spoiler.

Seat—When Seat showed its sporty Salsa concept at Geneva in 2000, it was clear that the car's design heralded models to come. This year at Geneva, the company unveiled the prototype of the new Leon, with styling that demonstrated clear links to the Salsa—as do other Seat production models.

The car is another that merges four-door sedan and coupe styling, with no obvious handle for the rear door *a la Alfa Romeo* 156. The prototype is configured as a 2+2, but the production car, which arrives later this year, will have five seats and be built at Seat's Martorell plant near Barcelona. Length is 4343 mm (171.0 in). Power is delivered by a 2.0-L 200-PS (147-kW) turbocharged direct gasoline injection engine driving through a DSG (double clutch) six-speed gearbox. Performance claims include a top speed of 236 km/h (147 mph) and 0-100 km/h (0-62 mph) time of 6.9 s.

Skoda—The Yeti is truly a study and not an anticipation of a car that could soon be mass produced, according to



Skoda Yeti



Stola S86

Skoda, as it revealed its chunky concept at Geneva. And it added that it is a "deliberate antithesis to all the big, aggressive-looking, off-road cars," reflecting wide criticism in Europe, from environmental and social circles, of many SUV designs.

But Skoda still describes it as an SUV, so the study is to find out whether an automobile with such looks and robustness—and sufficient ground clearance for it to be driven off-road as well—could be "credibly produced with only front-wheel drive." The car has an overall length of about 4.0 m (13.1 ft).

The Yeti's body looks good even when it is dirty or slightly dented, says Skoda, making an excellent point almost unheard of in the sometimes unreal world of vehicle styling. The "marks of use" are said to become part of the car's design.

Interesting technology facets include a single windshield wiper which runs on parallel rails across the whole rectangular area of glass.

Stola—In an automotive world where reducing lead times is a constant aim, Stola has shown what can be done. It says that it created its S86 Diamond static coupe study shown at Geneva to demonstrate its ability to react quickly. It took just five weeks to complete. The car takes its name from the number of years that the company has been in existence.

The study is a two-seat coupe with an overall length of 4275 mm (168.3 in), width of 1930 mm (76.0 in), and height of 1225 mm (48.2 in). But the company insists that the S86 is neither just a show car nor a styling exercise and demon-



Tata Xover

strates its ability to take a project from style feasibility to small series production. Stola has headquarters in Rivoli, Italy, but engineering centers in other parts of Italy as well as China, the U.S., France, and Brazil.

Tata—Crossover vehicles look set to become *de rigueur*, and India's Tata has joined the club, simply calling its concept of the genre, Xover. Seen at Geneva, the Xover looks likely to make production and could take Tata's own next-generation engines. Designed, developed, and engineered specifically for the European market, it is a combination sedan, SUV, and MPV. Overall length is 4.85 m (15.9 ft), and there is seating for seven.

The **IDEA institute** in Italy was involved in styling the 4x4 Xover. The car's doors incorporate air-conditioning controls for "personal climate zones," and there is a load platform that "slides backwards and tilts down, allowing easy loading of cumbersome objects like mountain bikes."

Suspension is double wishbones with coil springs at the front; five-link with coil springs at the rear.

Valmet—Valmet, which among its other contracts builds the **Porsche** Boxster (100,000 units so far), showed a folding hardtop concept of the production soft top **Audi** A4 cabriolet at Geneva. Top down it is difficult to spot the difference between the concept and the production cabriolet. The project was completed in only three months. The roof comprises three panels; when folded they are stowed using a principle called "onion fold," which maximizes trunk space. The largest, rearmost panel is stowed on top of the "layers." The car remains a four-seater, the original back seat of the cabriolet and the standard rollover protection system continuing to be used.

Valmet also showed the RaceAbout



Valmet's Audi A4 Cabriolet folding hardtop



VW Passat



Valmet RaceAbout



VW Polo

concept, an "example of what a modern small-series sports car could be." It has an all-aluminum monocoque, honeycomb floorpan, stainless steel subframes, and carbon fiber body panels. The car was designed and assembled by Finnish automotive engineering and design students at the **Helsinki Polytechnic Stadia** and the **University of Art and Design, Helsinki**.

Volkswagen—A strength of the Volkswagen Passat has always been its slightly understated persona, but the sixth-generation model is a little bolder, with a prominent chromed radiator grille and headlamp design. Its size is up slightly, with length now greater by 62 mm (2.4 in) to 4.77 m (15.6 ft); it is 74 mm (2.9 in) wider at 1.82 m (6.0 ft), and height is increased by 10 mm (0.4 in) to

1.47 m (4.8 ft). Wheelbase is 2.71 m (8.9 ft). Torsional rigidity of the body is said to be 57% greater than that of the previous model, although no specific figures were given.

Thanks to highly innovative production methods and materials, Volkswagen says the weight spiral has been stopped even though there have been major improvements in body properties and a clear increase in size. The body does not weigh any more than that of its predecessor. Trunk volume is now better by 90 L (3.2 ft³) at 565 L (20.0 ft³).

Power for the Passat comes from homogeneous direct gasoline injection engines with a power range from 85 kW (114 hp) to the top model's 3.2-L V6 producing 184 kW (247 hp), which arrives later this year. The entry-level model gets a 75-kW (101-hp) 1.6-L with conventional fuel injection.

Diesels range from 88 to 125 kW (118 to 168 hp), and the engines will be available with a particulate filter, the most powerful getting a piezo high-pressure injection system.

As expected, the six-speed, dual-clutch DSG automatic transmission will be avail-

able on some models, while others can be specified with a Tiptronic six-speed auto.

The Passat's chassis includes a new four-link rear suspension, with MacPherson struts at the front. Brakes have a wipe function, the pads applied lightly at specific intervals in wet-road conditions. An electronic park brake is standard (a claimed first in the Passat's class). Options include adaptive cruise control, draft-free Climatronic ventilation similar to that fitted to the Phaeton, and bi-xenon headlights with a cornering function.

Also new from VW is the facelifted Polo, which was unveiled, not at Geneva, but at the Leipzig Motor Show in April. The car has a new "face" similar to that of the Passat, with a deep grille with chromed bars in the upper section. Its V signature is continued through the hood shape to the base of the A-pillars. The car's redesigned front-end increases overall length by 19 mm (0.7 in) to 3916 mm (154.2 in).

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