

Cadillac SRX

Cadillac says its 2004 SRX "luxury utility" vehicle combines a high towing capacity of up to 3500 lb (1590 kg) with sports sedan driving characteristics. As the first of the **General Motors** luxury division's S-series of models, the SRX is said to foreshadow and share automotive DNA with future vehicles like the



new STS sedan. It will be available in both rear-wheel- and all-wheel-drive applications and is based on GM's Sigma architecture, modified for the SRX to produce the longest wheelbase in its class. The architecture also allows a near 50/50 weight distribution, low center of gravity, Northstar-based powertrains, and the latest vehicle stability technologies. In mid-2003, SRX manufacturing will begin at Lansing Grand River Assembly.

Chevrolet Colorado

A new platform, powertrain, and interior complement the 2004 **Chevrolet** Colorado pickup truck as a product offering with no fewer than nine separate model configurations. The Colorado offers three different cab styles: crew, extended with four doors, and regular. The steel body on ladder-type frame pickup employs three different suspensions: rear live axle with steel leaf springs; independent front with coil springs on rear-wheel-drive models; and independent front with torsion bars on four-wheel-drive units. "The Colorado has 25% more torsional rigidity/stiffness than the current S-10 pickup truck," said Mike Ableson, Chief Engineer for the Colorado, which is the eventual replacement for the Chevrolet S-10.

While the new pickup's front and rear suspension types are the same as used on the S-10, the Colorado uses new geometry. "It's the same fundamental (suspension) concept, but completely re-engineered for this application," said Ableson.

The Colorado is powered by either a Vortec 2800 2.8-L inline four-cylinder or a Vortec 3500 3.5-L inline five-cylinder—both derived from the Vortec 4200 4.2-L

The SRX is powered by the next-generation 4.6-L Northstar V8 VVT (Variable Valve Timing) from the XLR roadster or an all-new 3.6-L V6 VVT. The 32-valve V8 has been extensively re-engineered with cam phasers on all four camshafts and is mounted longitudinally. It generates 315 hp (235 kW) at 6400 rpm and 310 lb•ft (420 N•m) at 4400 rpm. The 60° V6 borrows a number of Northstar features to produce about 260 hp (194 kW) at 6500 rpm and 252 lb•ft (342 N•m) at 2800 rpm. Both engines are mated to five-speed automatic transmissions: either a 5L50-E (for the V8) or 5L40-E (V6). The 5L50-E features an innovative new dual-plate torque converter and a separate transmission control module (TCM) with expanded power and memory.

Chassis management and vehicle control systems include the latest four-channel StabiliTrak stability control and a segment-first Magnetic Ride Control, which uses magnetorheological fluid for its fast-reacting adaptive damping. Aluminum components are used extensively to reduce unsprung mass

inline six-cylinder introduced on the 2002 Chevrolet TrailBlazer. "We can use the same fundamental engine, but size it by using different numbers of cylinders," said Ableson, noting that the four, five, and six all provide 0.7 L per cylinder. The Colorado's four- and five-cylinder engines feature electronic throttle control, variable valve timing, coil-on-plug ignition, and a cast aluminum block.

The Colorado marks the first application of this five-cylinder engine for any **General Motors** vehicle. It has ratings of 215 hp (160 kW) at 5600 rpm and 225 lb•ft (305 N•m) at 2800 rpm, making the engine more powerful than the Vortec 4300 4.3-L V6 that was standard on 2002 Chevy S-10 4x4 models. The four-cylinder engine produces 177 lb•ft (240 N•m) at 2800 rpm and maximum power of 170 hp (127 kW) at 5600 rpm.

Under the hood, the Colorado uses a similar setup as a system deployed on the 2002 TrailBlazer. "We're pulling cool air that enters through the front grille and bringing it into the battery box via a vent tube to keep the temperature of the battery lower than



and optimize performance of the independent short/long arm (SLA) front and multilink rear suspension.

The SRX seats up to seven passengers with its optional third-row seat. The second row seat is said to have the most legroom in its class and can be folded "virtually flat," and the third row seat power-folds into the floor—a first in the medium luxury utility segment. Said to be the largest in the segment, the optional UltraView sunroof can provide more than 5 ft² (0.46 m²) of open air over the first- and second-row seats and integrates a retractable power shade. UltraView Plus includes a vented glass roof over the third-row seat.

Kevin Jost



what it would otherwise be without the system," said Ableson.

The Colorado offers an all-new five-speed manual transmission, new transfer case for four-wheel-drive versions, and the veteran four-speed automatic Hydra-Matic 4L60-E transmission that was originally engineered for the V8-powered Chevrolet Silverado full-size pickup. Traction assistance options consist of a shift-on-the-fly 4WD system; a locking differential available on 2WD and 4WD models; and traction control on rear-wheel-drive models. The brake system utilizes tandem power boosters, dual piston disc front brakes with audible wear sensors, and 295-mm diameter rear drums.

Kami Buchholz

Lexus RX 330

A smash hit in its original form, the new-generation RX will be key to **Lexus** maintaining leadership in the North American luxury market. The company hopes to sell 75,000 of the redesigned units annually. Unveiled January 7, the RX 330 features significant luxury content enhancements and is said by Lexus to offer the quietest and smoothest ride of any entry-level luxury SUV. The company created the car-based SUV segment five years ago with the RX 330's predecessor, the RX 300.

A stiffer body structure, a redesigned active engine mount, new sound-absorption materials, and refined aerodynamic details contribute to ride quality and noise improvements. Powertrain, road, and wind noise—already at benchmark levels in the previous model—have been reduced to nearly the same levels as in the Lexus ES 300 sedan.



An optional air suspension system provides automatic leveling, with four selectable height settings. In Normal mode, the system automatically lowers the vehicle by 0.3 in (8 mm) at speeds over 62 mph (100 km/h) for better handling and ride comfort. Low mode lowers the ride-height by 0.6 in (15 mm) to enhance handling response, while High mode raises ground clearance by 1.2 in (30 mm) for driving over rough surfaces at speeds of less than 30 mph (48 km/h). Access mode lowers the RX 330 by 1.2 in (30 mm) to provide easier entry, exit, and loading.

All RX 330 models equipped with air suspension feature a multi-mode automatic (sequential) transmission and an optional adaptive front lighting system. Also available are DVD-based navigation, Lexus Link emergency-response, rear backup camera, and adaptive laser cruise control systems.

Standard on both the front-wheel-drive and all-wheel-drive versions is Lexus's Vehicle Stability Control (VSC) system. The AWD system is simpler and lighter, and driveshaft elements are situated in a straighter line, which helps reduce friction, driveline noise, and vibration. Like its predecessor, the RX 330 uses a center differential to split engine power evenly between the front and rear wheels. In the RX 330, if lateral wheel slip occurs, the VSC system re-apportions power front-to-rear and side-to-side, eliminating the need for the viscous coupling used on the RX 300. The VSC system helps keep the vehicle going on its intended course via torque intervention and/or by braking individual wheels. With VSC and Brake Assist, if a driver has not stepped hard enough on the brake



pedal to engage the antilock brakes, the system applies maximum braking power until pedal pressure is released.

An increase in wheelbase by nearly 4 in (102 mm), length by 6.1 in (155 mm), width by 1.1 in (28 mm), and height by just under 0.5 in (12 mm) results in more interior room. The supplemental restraint system includes multi-stage front airbags for the driver and passenger, a new knee airbag for the driver, and a new kind of large side airbag in the front seats to protect the torso, abdomen, and pelvis. Side curtain airbags protect front and rear passengers.

Powering the RX 330 is a larger V6 engine. The 3.3-L unit generates 230 hp (172 kW) and 242 lb•ft (328 N•m). Electronic drive-by-wire throttle and continuously variable valve timing systems help it achieve a ULEV rating. Along with a new five-speed electronic automatic transmission, the V6 gets the RX 330 AWD model from 0 to 60 mph (0 to 97 km/h) in a class-leading 7.8 s while providing EPA estimated fuel economy of 18 mpg city and 24 mpg highway.

In about two years, a hybrid version of the RX 330 will hit the streets. The V6 will be a key component of the hybrid RX version, which, Lexus says, will deliver the power and torque of a



V8, the fuel economy of a compact car, and a fraction of the emissions of a typical SUV. The Hybrid Synergy Drive system from **Toyota** uses front and rear electric motors and a front IC engine. The system in the RX will operate at nearly double the voltage of the current Prius. In addition, the front and rear electric drive provides the benefits of all-wheel drive in a lighter and more compact package. The modular nature of the Hybrid Synergy Drive system means different-size motors and engines can be teamed in different types of vehicles, helping Toyota reach its goal of selling 300,000 hybrid vehicles annually by mid-decade.

Patrick Ponticel

Chevrolet Equinox

The **Chevrolet** Equinox compact sport utility vehicle is slated to begin production in early 2004 at the **General Motors Corp./Suzuki Motor Corp.** joint venture CAMI Automotive plant in Ingersoll, Ontario, Canada. The five-passenger 2005 model emphasizes cargo space and roominess. "A sliding rear seat can travel nearly eight inches for extra leg room or maximum cargo space," said Kurt Ritter, Chevrolet General Manager. The Equinox has a fold-flat front passenger seat, a split-folding rear seat, and a height-adjustable cargo shelf that can serve as a security cover or a picnic table.

Available in either front-wheel drive or all-wheel drive, Equinox is powered by a Vortec 3400 3.4-L cast iron block with aluminum head V6 that generates 185 hp (138 kW) at 5200 rpm and 210 lb•ft (285 N•m) at 3800 rpm. The engine mates to a five-speed automatic transmission.

Equinox's chassis is based on GM's Theta architecture. The unitized high-strength steel bodied vehicle incorporates full-length frame rails. Following in the path of the **Saturn** VUE, the Equinox is the second introduction of a GM sport utility riding on a unibody construction. With a galvanized steel spaceframe and front and rear vibration-isolating subframes, Equinox employs an independent, strut-type front suspension with coil springs and stabilizer bar as well as an independent rear suspension with trailing arm and three lateral locating links, stabilizer bar, and coil springs.

In calendar year 2006, Equinox will be offered with a belt alternator starter (BAS) system with a continuously variable transmission. (GM will introduce a Saturn VUE with a hybrid system that combines an all-aluminum,



DOHC four-cylinder engine with twin electric motors in the 2005 calendar year.) "Look for the (BAS) hybrid system on other models derived from the Epsilon- or Theta-based high-volume platform architectures," said Tom Stephens, Group Vice-President of **GM Powertrain**.

Kami Buchholz

Chevrolet Malibu

The first North American application of **General Motors'** Epsilon global architecture—which is also the base for the latest **Opel Vectra** and **Saab 9-3**—provides the 2004 **Chevrolet Malibu** with a rigid platform. "Sixty-five percent of the body itself is high-strength steel," said Greg Bellopatrik, Chief Engineer for the Malibu, referencing the vehicle's 27-Hz body structure.

A hydroformed cradle also provides safety benefits. "We went with the hydroformed engine cradle because it gives us flexibility on where we put crush initiators for safety performance, and we could also increase the section size of the cradle itself for chassis loads," said Bellopatrik. The cradle is isolated from the frame via four widely spaced rubber mounts. There are integral attachments for control arm, radiator support, rear crossmember, steering gear, and powertrain mounts. The 21-mm (0.83-in) diameter front

stabilizer is mounted to the rear portion of the subframe and is connected at each bar end to the lower portion of the front strut by a direct-acting link.

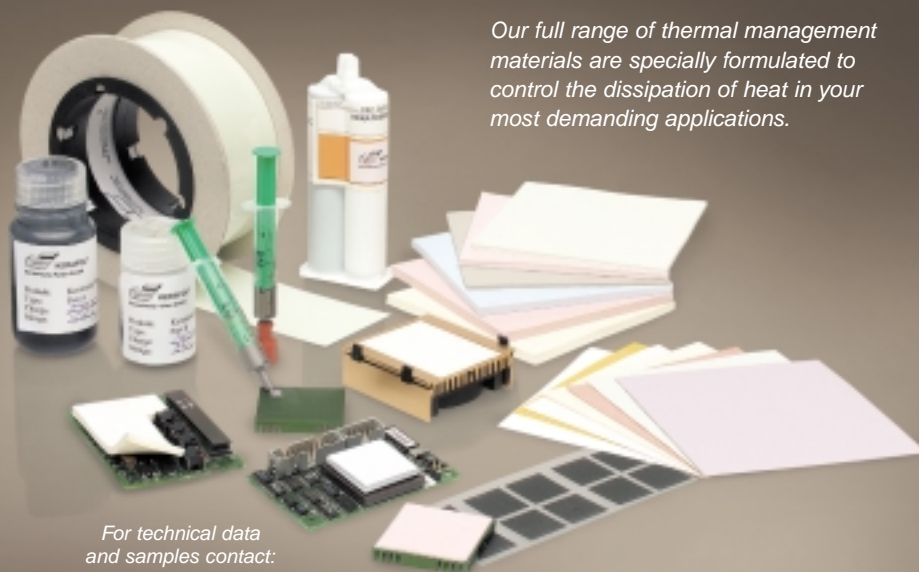
A four-link independent rear suspension incorporates twin-tube gas shocks, dual rate mini block coil springs, direct-acting solid stabilizer bar, and adjustable toe and camber. The aluminum control arm accounts for 2.7 kg (5.9 lb) of mass reduction, and it reduces unsprung mass. An 18.0-mm (0.71-in) diameter solid stabilizer bar links directly to the knuckle.

On the material side, a thermoplastic olefin is used on the door trim console armrest, and the instrument panel uses a magnesium support beam. For noise containment reasons, Malibu uses a cast foam-rubber barrier as a dash panel covering, a modular noise-damping plate in the dash panel, a compression-molded fiberglass-composite hood insulator, and "tight-fitting" carpet floor modules in the front and rear.



The standard engine is the Ecotec 2.2-L dual overhead cam inline four-cylinder producing 140 hp (104 kW) at 5600 rpm and 150 lb•ft (203 N•m) at 4000 rpm. The optional engine is a new overhead valve V6 that generates 200 hp (149 kW) at 5400 rpm and 210 lb•ft (285 N•m) at 3600 rpm. The engines mate to a four-speed Hydra-Matic 4T45-E automatic transmission versus the 4T40-E four-speed automatic with overdrive offered on the 2002 Malibu. In 2007, the Malibu will be offered with a hybrid system that combines a belt alternator starter (BAS) system with a continuously variable transmission.

KERATHERM® Thermal Management Materials for Your Custom and Standard Applications



Our full range of thermal management materials are specially formulated to control the dissipation of heat in your most demanding applications.

Materials...

- Gap Fillers
- Phase-Change
- Graphite
- Grease
- Compounds
- Silicone-Free
- Copper
- Ferrite
- Adhesive Tape
- Standards

Features and Services...

- Superior thermal, electrical, mechanical and physical properties
- Custom modifications
- Optional adhesive coating
- Custom die-cutting
- Variable thickness
- Installation is quick, easy and cost-effective
- Thermal engineering assistance
- Comparative product analysis

For technical data and samples contact:



USA: MHW International Corporation
 14 Leighton Place, Mahwah, NJ 07430
 Tel: (201) 891-8800 • Fax: (201) 891-0625
 E-mail: thermal@mhw-intl.com
 Web: www.mhw-thermal.com



Europe: Alfatec GmbH
 Meckenloher Straße 11 • D-91126
 Rednitzhembach, Germany
 Tel: +49-9122-9796-0 • Fax: +49-9122-9796-50
 E-mail: info@alfatec.de • Web: www.alfatec.de



The new Malibu achieves a segment-first with a factory-installed remote vehicle start package. "The engine remote start is targeted for up to 200 ft away," said Bellopatrick. All 2004 Malibu models are being equipped with electric variable assist power steering. Malibu 2002 models utilized power rack-and-pinion steering.

Joining the four-door Malibu will be a five-door Malibu Maxx with a 6-in (152-mm) longer wheelbase and a rear track increased by 28 mm (1.1 in) compared to the sedan. The Maxx is slated to be unveiled during the New York auto show. Production start is targeted for the third quarter of 2003 at GM's Fairfax assembly plant in Kansas City, KS.

Kami Buchholz

Infiniti FX45/FX35

Infiniti is using an existing platform and engine range to power its FX model, with modifications to both providing the basis for the company's first luxury crossover SUV. The 2003 FX—developed, designed, and engineered for its primary market, the U.S.—was described by Infiniti as a "bionic cheetah" when introduced as a concept vehicle two years ago.



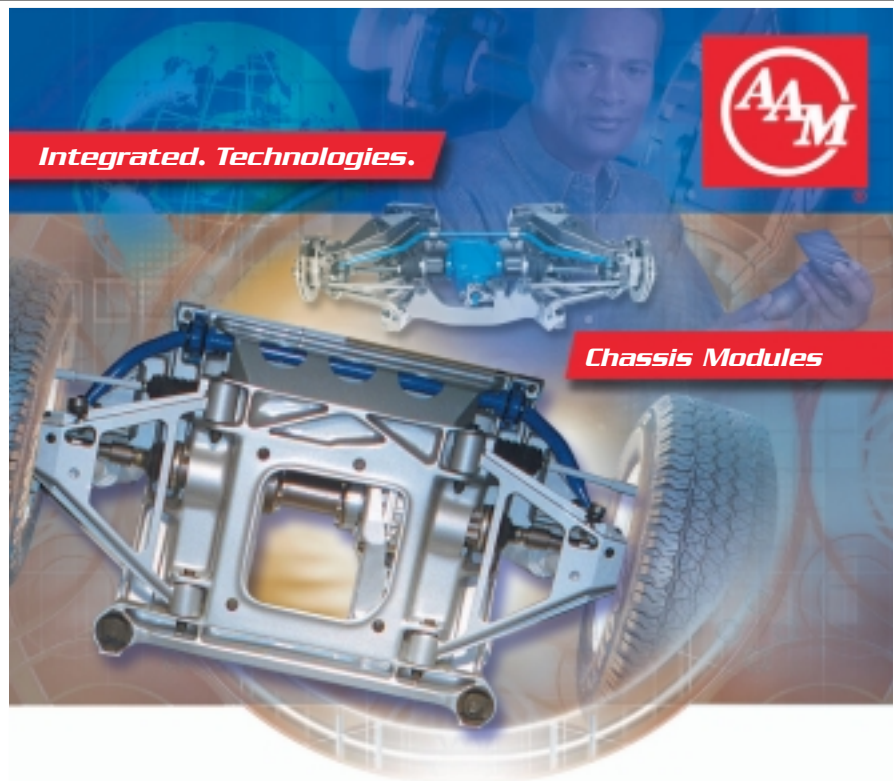
It is built on an SUV-enhanced version of Nissan's front-engine/rear-wheel-drive/front mid-ship platform for sports cars and sports sedans. Front mid-ship (FM, in Infiniti parlance) means the engine is located behind the front axle, providing a front-to-rear weight balance of 54:46 in the FX45, which is powered by a V8 engine and features all-wheel drive (the FX35 has a V6 engine and AWD, with rear-wheel drive an option). The AWD models feature the company's ATTESA ET-S (advanced total traction engineering system for all electronic torque split) system.

The FM platform's rigidity has been enhanced for the FX via increased plate thickness of the front side members, side sills, and rear wheel housing. Increased

rigidity comes without compromising the platform's 112.2-in (2850-mm) wheelbase, 62.7-in (1593-mm) front track, 64.6-in (1641-mm) rear track, and low center of gravity, said FX45 Chief Product Specialist Ejiro Fukai.

Standard braking system components include four-wheel ventilated disc brakes,

Brake Assist, and Electronic Brake Force Distribution. Steering is provided by an engine-speed-sensitive rack-and-pinion system. Available on FX45 models with the Intelligent Cruise Control (ICC) system is a special feature of the standard Brake Assist called Preview Braking. Without the Preview function, braking is activated only



AAM's Driveline Systems and Chassis Modules Give You a Performance Advantage.

AAM's team took three **chassis modules** from design concept through final vehicle development in 12 months. AAM **modules** ... delivering benefits in improved NVH, ease of assembly, supply chain management and vehicle performance.

AAM's Full-Circle SupportSM addresses needs at any point – and every point – in your program cycle. For maximum value based on design innovation, manufacturing muscle and proven performance, give us a call.

Visit us at SAE Booth #1853

AAM vehicle integrated systems and **modules** bring improved vehicle performance on line faster and more economically than ever before. How do we do it? Focus and experience. Working in a dedicated facility,



World Headquarters • 1840 Holbrook Avenue, Detroit, MI 48212-3488
 1.800.299.AXLE FAX: 1.800.556.AXLE • www.aam.com



when the driver presses the brake pedal. With the Preview function, sensors associated with the ICC system are used to anticipate braking situations and pre-pressurize the brakes to reduce activation time lag.

The engines have been tweaked for off-the-line acceleration, out-of-the-corner power, and passing power. The 4.5-L V8, which also sees duty in the Q45 and M45, generates 315 hp (235 kW) and 329 lb•ft (446 N•m) to move the all-wheel-drive FX45 quickly off the mark. At 280 hp (209 kW) and 270 lb•ft (366 N•m), the 3.5-L V6 under the hood of the FX35 similarly delivers somewhat less performance than the vehicle it now motivates—the G35.

For the optional Intelligent Key keyless system, the fob incorporates a circuit board, emergency key, and transponder. For the door-lock and -unlock functions, the driver pushes a request switch on either of the doors or tailgate; the transponder then checks the Intelligent Key unit for the correct identification. To start the engine, the driver pushes the ignition knob into the steering column. If the identification is correct, the knob can be turned to start the engine. Intelligent Key has the same functions as regular remote-entry systems.

Patrick Ponticel

Nissan Quest

At the unveiling of the 2004 **Nissan Quest**, the company's Senior Vice President-Design, Shiro Nakamura, said a minivan "is no



longer just a carrier for people and cargo, but a comfortable room in which to share interaction." Jack Collins, Vice President-Product Planning, Nissan North America, Inc., carried the "room" theme further, saying the minivan's interior design "is modern, like an urban loft, and it's as comfortable as people's ambitions for their homes."

The Quest is a pretty big room, indeed, with more interior space than any current front-wheel-drive minivan, according to Collins. Overall interior volume of 197 ft³ (5578 L) is a result of, in part, a 124.0-in (3150-mm) wheelbase—the longest in its class, Collins said—and 66.9-in (1699-mm) front and rear tracks. It uses Nissan's FF-L (front-engine, front-wheel-drive, large) platform as a base.

The low-height instrument panel departs from the typical driver-centric concept to one of "social space." The new IP layout features a center-mounted instrument cluster with a 6.3-in information display screen and an IP-mounted transmission shift lever. The centralized control stack takes on the look and feel of a

E-T-A[®] CIRCUIT PROTECTION FROM BUMPER TO BUMPER



1610
 Designed for automotive fuse block installation



3130
 Snap-in panel mount, attractive protection of lighting and accessories



1170
 Compact single pole, push-to-reset, SAE J553 Type III



1658
 Cost effective ignition protection



With new technology being built into every vehicle, from the family car to the heaviest off-highway equipment, electrical system reliability has become critically important. This is precisely why many of the world's leading vehicle manufacturers are switching from fuses to trouble-free circuit protection technology. The name they choose is E-T-A. Our circuit breakers for transportation equipment cover all of the circuit protection technologies... thermal, thermal-magnetic, magnetic, and high performance. Technology⁴ — it's exclusive to E-T-A and it ensures that your circuit protection perfectly fits your application. E-T-A's circuit protection is designed for vehicle manufacturers who demand superior protection from bumper to bumper.



483
 Miniaturized, on/off manual actuation for rugged applications



412
 High performance suitable for high shock and vibration applications

www.etache.com/vehicle
 1-800-462-9979

847-827-7600 fax 847-827-7655





desk or table and leaves ample legroom for driver and front passenger to easily turn around toward the rear of the vehicle.

Cargo space behind the second- and third-row seats, which fold flat, is "significantly improved" over the previous-generation Quest. Second-row seats fold down and drop forward into the floor. Third-row seats easily fold and rotate into a recess in the floor behind them. With this storage scheme, the Quest can carry 4- x 8-ft construction materials on the floor with the liftgate closed. First-row shoulder room is among the best in class. The seats "look and feel like high-end furniture," Collins said, with a "strong focus on color and materials."

Optional is a full-length rear overhead console and a rear-panorama

Toyota Sienna

After a product cycle during which the Sienna was consistently outshone by the bigger, better-featured **Honda Odyssey**, **Toyota** did its homework developing the all-new version. But rather than depending on focus groups to steer the Sienna's redesign, the new van is the product of a single man's vision. Chief Engineer Yuji Yokoya crisscrossed the U.S. in competitive vans and the old Sienna, learning which features were best from each van and incorporating them into the new Sienna.



Skyview roof consisting of four glass panels. There's also an available rear DVD entertainment system and the first **Bose** audio system ever developed for a minivan.

At 33.8 in (859 mm), the opening of Quest's sliding rear doors is 4 in (102 mm) wider than the nearest competitor's. That is one part of Nissan's solution to owners' biggest complaint, which is access to and from the third-row seats. The other part of the solution is a second-row seat "tip up" feature.

New safety features include the first North American application of Nissan's advanced airbag system, as well as standard head curtain supplemental airbags that protect occupants in the first-, second-, and third-row outboard positions.

Powering the front-wheel-drive Quest is a 3.5-L DOHC V6 engine producing more than 230 hp (172 kW) and mated to either a four- or five-speed automatic transmission with overdrive. The vehicle has a new four-wheel independent suspension. Nissan's Traction Control System is standard and its Vehicle Dynamic Control is available on select models.

Patrick Ponticel

Manufacturers with uncompetitive entries in the segment withhold development money, complaining there is no profit in the segment and that development money is better spent on higher-margin products such as SUVs. But Honda and **Chrysler** have shown that families will pay a premium and even wait in line for practical vans when they offer features unavailable elsewhere, regardless of the unfashionable image and stodgy styling. Yokoya has succeeded, building a product that includes every nifty feature available elsewhere and adding new ones not available in any competitive van.

While there is no breakthrough technology in the Sienna, it does break new ground in terms of packaging an array of features that are likely to lure the crowds away from Honda dealers, at least until we see the new Odyssey later this year. The Odyssey's claim to fame when it debuted in 1999 was a third-row seat that folded flat into the

STANLEY

*Designed to Exceed
Your Expectations*



1105W
Dome Lens Type LED

- Narrow viewing angle (40° - 50°)
- Unique package design
- Extended operating temperature range
- Wide assortment of colors
- Exceptional brightness up to 560mcd @ 10mA
- Top mount and reverse mount compatible
- Industry standard footprint 3216 (1206)

DNK324U

*High-Speed and High
Power Infrared LED*



- 5mm package
- Wide distribution
- 870nm peak wavelength
- Cut off frequency 40MHz minimum
- Output power (TYP): 22mW
- Suitable for wireless communication



1104B
PLCC-2 Type LED

- Wide viewing angle (120°)
- Robust package design
- Extended operating temperature range (-40°C ~ +100°C)
- Wide assortment of colors
- High brightness and superb quality
- Industry standard footprint (PLCC-2)

**To Request a Catalog Call
1-800-533-5231**



Stanley Electric Sales of America, Inc.
 2660 Barranca Parkway, Irvine, CA., 92606
 Tel.: 949-222-0777 • Fax.: 949-222-0555
www.stanley-electric.com

floor. Since then, only **Mazda** has introduced a similar seat, though **Nissan** will have one on its new Quest van. Toyota moved a step ahead however, with a third-row seat that not only folds flat into the floor, but that splits 60/40. That provides greater passenger/cargo flexibility, and it means that each of the seats weighs less than a larger single seat for easier operation.

Moving forward, the Sienna brings innovation to the second row, with an optional bench seat that gives the Toyota eight- instead of the usual seven-passenger capacity in the class. The middle section of the seat slides forward, letting parents move infants up closer to the front seats. Unfortunately, the eight-passenger configuration is not available with the optional all-wheel drive.

Dual sliding rear doors have been standard in the segment for some time, but since Mazda showed that those doors could carry power windows, that has become the new

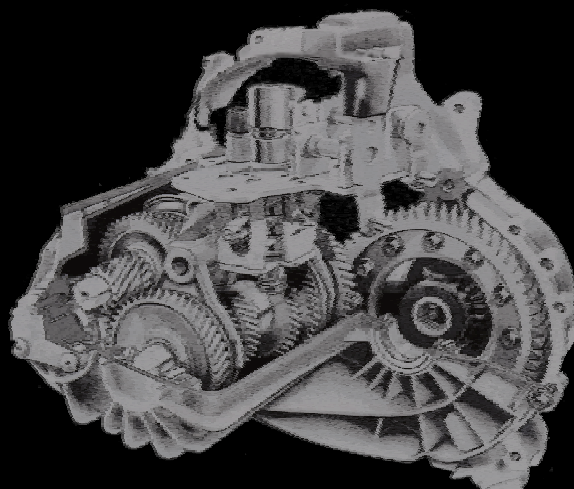
standard. Toyota included opening windows in the Sienna's sliding doors and added built-in window shades for both the second- and third-row windows. The doors are also designed so they only open 75% of the way when the window is down, so that if a passenger's arm is through the window frame it won't be pinched as the frame slides past the C-pillar.

Underneath, the Sienna rides on the Camry platform that debuted last year. Sixteen-inch wheels are standard equipment and the optional 17-in alloy wheels mount run-flat tires for the peace of mind of family drivers. The new platform's wheelbase is 5 in (125 mm) longer than the outgoing model, and front and rear tracks are nearly 4 in (102 mm) greater. But turning radius has been tightened by more than 3 ft (0.9 m) and is now best in class by 1 ft (0.3 m), according to Toyota. A total interior volume increase of 44 ft³ takes the Sienna from one of the smallest to



one of the largest front-drive vans in the U.S. market. The rear cargo area will now hold 4- x 8-ft sheets of building materials, an important factor for occasional do-it-yourselfers.

The Sienna's 230 hp (172 kW), 242 lb•ft (328 N•m) V6 engine and five-speed automatic transmission are both built in Toyota's West Virginia manufacturing facility. Toyota expects the Ultra Low Emission Vehicle-II (ULEV-II) V6 engine to propel the Sienna from 60



GEARS GO GIF.



Gesellschaft für Industrieforschung

Konrad-Zuse-Straße 3 • 52477 Alsdorf • Germany • ☎ +49-2404-9870-0 • 📠 +49-2404-9870-109 • 📧 info@gif-ac.com

<http://www.gif-ac.com>

mph (97 km/h) from a standstill in only 8.4 s, while achieving best-in-class EPA gas mileage with an expected 25 mpg highway rating for the front-wheel-drive model. City mileage is forecast at an impressive 20 mpg, and the all-wheel-

drive model is expected to return 18 mpg city and 22 mpg highway.

The Sienna is also packed with electronics including optional vehicle stability control, traction control, and brake assist. A GPS navigation system

keeps the Sienna on course, and a rearview parking camera shows the view behind the van on the navigation system display.

Dan Carney

Mitsubishi Endeavor


The 2004 Endeavor is the first vehicle in what Mitsubishi dubs its Project America initiative, a \$1.5 billion investment by the automaker to develop vehicles in North America specifically for the North American market. The midsize SUV's new platform will carry at least three other future vehicles, said Pierre Gagnon,



President and Chief Executive Officer of Mitsubishi Motors North America, Inc., including the next-generation Galant midsize sedan, Eclipse sport coupe, and Eclipse Spyder convertible.


The five-passenger SUV is powered by a new 3.8-L, 60°, SOHC V6 engine that produces 215 hp (160 kW) at 5000 rpm. The engine's intake and exhaust events are tuned to provide the majority of its torque at lower rpm, with its 250-lb•ft (340-N•m) peak occurring at 3750 rpm. Revised ignition timing and an improved exhaust gas recirculation rate provide improved fuel economy over the automaker's previous 3.5-L engine.

The V6 also incorporates a throttle-by-wire control system that eliminates the mechanical control between the accelerator pedal and throttle plate. The throttle-valve-control microprocessor is integrated into the vehicle's main ECU, enabling the Mitsubishi Active Skid and Traction Control system (available in the fall on Limited models) to enhance vehicle control on slippery surfaces by receiving data from wheel speed sensors to govern engine speed. In addition, an injection-molded, thermoplastic intake manifold offers a 2-kg (4.5-lb) mass savings over a comparable cast-aluminum manifold and helps lower the engine's center of gravity in the chassis.



Dynamic Testing Solutions

by Diversified Technical Systems, Inc.



TDAS G5

dtsweb.com


Diversified Technical Systems, Inc., the world leader in the development of advanced measurement technologies for test dummies and structural measurements at automotive and aerospace test facilities, is proud to introduce the TDAS G5 system.

A variety of new possibilities for safety testing are available with the new TDAS G5 system -- automotive, aerospace, military, motorcycle, pedestrian, government industry, biomechanical research and many other applications where cables and other devices interfere with the data collection processes.

Features include:

- Modular System, 32 channel block configurations per module
- 500 G shock rated
- Module Size: 25 x 54 x 85 mm
- Fits into the current family of Crash Test Dummies
- Seamless integration into existing products
- Meets SAE J211/ISO 6487 standards
- 100BaseT Ethernet Communications Interface
- Intuitive graphic user interface
- Compatible with all sensor types

www.dtsweb.com



All Endeavor models, with either front- or all-wheel drive, are equipped with a four-speed automatic transmission with Sportronic mode that allows drivers to manually engage their desired gear. The transmission features fully adaptive shift control that "learns" driver inputs and tailors transmission operation to their habits. All-wheel-drive models rely on a transfer case that combines a bevel-gear center differential with a viscous coupling to achieve a 50/50 torque split between the front and rear wheels. The transfer case includes a fine-pitch hypoid gear that helps reduce noise and a differential oil cooler that improves the unit's reliability.

The Endeavor has a new car-based chassis for enhanced ride quality and handling. Its four-wheel independent suspension features a MacPherson strut design up front, and a rigid crossmember helps control the torsional flexing of the front subframe, improving suspension performance

while reducing NVH. The rear suspension uses a low-mounted, multilink configuration with trailing arms. The low mounting points reduce intrusion into the rear cargo bay, allowing a 41-ft³ (1.2-m³) cargo-carrying capacity behind the rear seat. A hydroformed-steel lattice structure helps increase suspension rigidity, especially at the control link mounting points, and provides a reduction in road noise and vibration. In all-wheel-drive models, this lattice structure supports the rear differential and half shafts, eliminating the need to reconfigure the rear suspension or add another crossmember.

Functional roof rails are included on all six Endeavor models; the XLS and Limited trim levels include roof rack crossmembers that facilitate the mounting of accessories. The SUV's interior features an available 4.9-in color LCD display that provides climate and navigational information, and



functions as a computer interface that can allow owners to customize many of the vehicle's interior functions.

The first Endeavor rolled off the line at Mitsubishi's manufacturing facility in Normal, IL, in mid-January. The plant now produces a total of six different cars and trucks on a single assembly line—more than any other U.S. plant, says the automaker.

Ryan Gehm

High Performance

Not just the car.
EPCOS components inside.

Documented Performance:

- QS-9000
- FMEA
- PPAP
- APOQ
- AEC-Q200
- Bluebook Qualification
- ISO/TS-16949

EPCOS components perform reliably, even under extreme conditions. For a proven automotive track record with documented performance, count on EPCOS electronic components:

- Capacitors
- Varistors
- Thermistors/Sensors
- Gas Discharge Tubes
- Inductors
- SAW Filters

For immediate assistance, log on to www.usa.epcos.com
 EPCOS, Inc., Iselin, NJ 08830 U.S.A.
 800-888-7729

EPCOS – just everywhere...

EPCOS 21