

autotech daily

TUESDAY
JANUARY 8, 2002

PAGE 1 OF 4

GM UNVEILS GENERIC FUEL CELL PLATFORM

General Motors has come up with a six-inch-thick vehicle platform called Autonomy that incorporates a fuel cell stack, hydrogen storage, individual electric motors for each wheel, suspension, system control module and complete x-by-wire control technology.

A central docking port atop the skateboard-like platform enables the driveable Autonomy to be "plugged" into any properly configured vehicle body. Decoupling the body and chassis simplifies manufacturing, in part by eliminating the need to re-engineer the chassis for each body. GM envisions customers buying one platform and leasing multiple bodies they swap out as their transportation needs change.

GM says the Autonomy concept could enable it to produce an entire lineup of cars and light trucks with just two or three platforms. It has applied for 24 patents related to the concept covering business models, technologies and manufacturing processes. GM partnered with Swedish-based SKF to develop the x-by-wire technology that includes driving, steering and other systems.

Autonomy is one of the most elegantly packaged fuel cell systems to date. But GM concedes the technology won't hit the street until a hydrogen refueling infrastructure can be created. It also says more work is needed to develop an affordable onboard hydrogen storage system. Both issues are expected to be addressed when the U.S. Dept. of Energy announces a new future car initiative, Freedom Car, in Detroit on Wednesday.

HYDRAULIC ASSIST SYSTEM BOOSTS BIG-TRUCK FUEL ECONOMY

Ford Motor Co. says a new adaptation of hydraulic-assist technology developed in collaboration with Eaton Corp. should be able to improve fuel economy in large trucks by 25% to 35%. The system, dubbed hydraulic launch assist, appears on the automaker's Mighty F-350 Tonka concept pickup truck unveiled in Detroit this week.

The system stores and then reuses kinetic energy normally lost through brake heat when a vehicle decelerates. It consists of a reversible pump/motor attached to the driveshaft through a clutch and an energy storage module that includes two large accu-



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WHAT YEAR WAS IT?

ZF introduces its first 5-speed automatic transmission for passenger cars, the 5HP18, characterized by high efficiency and reduced fuel consumption.

-1990

TUESDAY
JANUARY 8, 2002

PAGE 2 OF 4

mulators containing hydraulic fluid and nitrogen gas. During deceleration, the pump/motor forces hydraulic fluid into the high-pressure accumulator, where it is stored at pressures up to 5,000 psi. During subsequent acceleration, the flow of hydraulic fluid reverses to provide up to 15 seconds of acceleration boost. Ford says the system recovers up to 80% of the captured kinetic energy.

The Tonka concept truck has a 350-hp, diesel engine with hydraulic lash adjusters for quieter operation, turbocharger with electronic variable-pitch vanes to improve performance in heavy-load conditions, two-stage pilot fuel injection that smooths combustion and improves cold-weather starting and exhaust gas recirculation to reduce NOx emissions. The engine is mated to a five-speed automatic transmission, the first such pairing for Ford.

To make entry and exit easier, the F-350 Tonka kneels down nearly half a foot when its doors are opened -- thanks to air suspension springs.

TELEMATICS TO DRIVE MICROPROCESSOR USAGE

By the end of the decade, luxury cars will carry between 50 and 70 microprocessors each, collectively representing up to 15 times the processing power of a typical desktop PC today, says Telematics Research Group in Minneapolis. The firm is launching Telematics Intelligence Service, a new telematic information service for OEMs and suppliers, during the North American International Auto Show in Detroit this week.

The firm predicts that telematics control units by 2010 will include a 32-bit RISC processor running at 2+GHz, 2GB of DRAM and a 30GB hard drive in addition to various removable media devices and displays.

AUTOMATED MANUFACTURING BOOSTS PRODUCTIVITY FOR PIRELLI

Pirelli Tires says it has improved manufacturing productivity 80% with what it calls Modular Integrated Robotized System technology. MIRS requires only 72 minutes to produce a tire. Traditional techniques can stretch up to six days, according to data from consultants Frost & Sullivan, which awarded Pirelli its Market Engineering Technology Innovation Award for the tire industry.

MIRS is a software-based system that controls the manufacturing process from order inception to delivery. Once an order has been accepted, one of Pirelli's MIRS sites begins the build process with a segmented aluminum drum that is transferred through a series of stations by the MIRS robots, during which various components are applied at each station. The final assembly robot then physically hands the drum with the constructed tire to the curing press for vulcanization.



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WHAT IS IT?

It's an electronically controlled transmission that reduces fuel consumption in wheel loaders, fork lifts, mobile cranes and railroad engines.

The ZF Ergopower Transmission

TUESDAY
JANUARY 8, 2002

PAGE 3 OF 4

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ZF TO RAMP UP CVT PRODUCTION

By the end of the decade, ZF Group North American Operations expects to be building one million continuously variable automatic transmissions (CVTs) per year at its joint venture operation with Ford in Batavia, Ohio. Initial applications are expected by late 2003 on Ford vehicles for the CVTs, projected to improve fuel economy 10% vs. conventional automatic transmissions.

ZF already supplies a smaller version of the Batavia transmission, called the Ecotronic VT1F, for the new BMW Mini. Unlike larger CVTs which use a hydraulic torque converter with a lock-up clutch, the Mini application features a wet multiplate clutch. Produced in Europe, the VT15 is able to handle torque ratings of up to 129 lb.-ft, compared with up to 221 lb.-ft. with ZF's larger Ecotronic CFT 23 and CFT 30 units.

Set shift stages can be programmed into the ZF control unit as "gears," which the driver can activate in sequence without using a clutch. This allows the system to simulate five, six or a greater number of gears.

THE LUTZ EFFECT: 4-MONTH CONCEPT CAR

A trio of General Motors concept cars and a 2003 production model based on another concept, all unveiled ahead of the North American International Auto Show in Detroit, demonstrate the automaker's commitment to building vehicles that Vice Chairman Bob Lutz says will make a "compelling emotional connection to people at first sight."

Lutz says the Pontiac Solstice roadster was developed from sketches to running prototype in less than four months after being conceived last September. Lutz, noting that the sporty two-seater uses components GM already produces in high volume, boasts that the Solstice could be sold at half the price of similar roadsters. The car is powered by a turbocharged, 2.2-liter engine with six-speed manual transmission.

GM's Chevrolet Bel Air two-door convertible concept car takes styling cues from its 1950s-era namesake. Under the hood is a new Vortec 3500, 5-cylinder, turbocharged engine based on the in-line engine family that debuted in GM's mid-size sport utility vehicles. The all-aluminum engine delivers 315 horsepower.

The Cadillac Cien supercar concept features a 7.5-liter V-12 engine derived from Cadillac's Northstar powerplant and generating a whopping 750 horsepower. The Cien's sleek low body is made of carbon fiber composites and aluminum. GM has no plans to produce the mid-engine, rear-wheel-drive two-seater.

The Cadillac XLR is another story. Based on the Evoq concept car and sharing drivetrain and suspension components with the Chevrolet Corvette, this rear-wheel-drive luxury roadster is due in U.S. showrooms in about one year. It eventually will be rolled out in Europe and Asia.

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JCI TOUTS INTERIORS BASED ON WHO SITS WHERE, AND WHY

Johnson Controls used results from a proprietary Internet survey it conducted about consumer seating and usage preferences to develop next-generation interior concepts being shown to reporters in Detroit this week.

The result, embodied in the Ariston concept vehicle, is an asymmetrical interior with four separate "micro-environments" for each seating position. The driver's position features minimalist electronic displays and a steering wheel that stows itself horizontally into the dash when not in use. The right rear seating position, deemed a leisure area, can be moved rearward into the trunk space and turned into a recliner. The left rear seat, intended for business, can be converted into a mobile office with a table that folds out of the back of the front seat.

Ariston's overhead ambient lighting is linked to the HVAC system. It shifts to red when the heater is on and blue when the air conditioning is activated in order to make the cabin appear subjectively warmer or cooler than it really is.

JCI admits the Ariston's features are years away from reality. In the meantime, it thinks OEMs will find the results of its seating survey helpful in matching potential interior features of specific vehicle types with the tastes and preferences of the customer groups who would buy them. One example: SUV owners prefer plastic to paper bags, so it would be smart to equip such vehicles with appropriate stowing hooks.

CHRYSLER PACIFICA SCORES BIG WITH CONSUMERS

Chrysler originally planned to introduce Pacifica, its combination station wagon and SUV, this summer. Now CEO Dieter Zetsche has ordered further refinements to the six-passenger car/truck that will delay production until early 2003. Even so, Chrysler says the Pacifica scored higher in consumer focus groups than any other vehicle the company has tested, including the former champ, the retro-styled PT Cruiser.

There's nothing retro about the Pacifica concept car. Chrysler describes the prototype unveiled in Detroit this week as 85% of the real thing. The production version will keep the prototype's low floor height and is expected to use the 3.5-liter, 24-valve V-6 engine currently found in the Chrysler 300M. Other features include adjustable pedals, a load-leveling rear suspension, side curtain airbags and a second row of bucket seats with fold-flat capability. Two elements unlikely to survive the move to mass production: the concept car's 19-inch wheels and all-glass roof.

Chrysler says the Pacifica crossover vehicle, which it modestly describes as a "segment buster" akin to the PT Cruiser, is expected to be priced somewhere between \$25,000 and \$30,000.

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