



**U.S. DEPARTMENT
OF ENERGY**



FUTURETRUCK 2003
Unconventional Thinking. Extraordinary Results.

NEWS MEDIA COVERAGE REPORT

Prepared by:



July 7, 2003

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SECTION 1

Executive Summary

2003 Media Strategy

"The competing teams employ creative approaches to achieve both short- and long-term solutions to improving the fuel efficiency and environmental impact of SUVs. "

-As reported by
Capital Times
June 14, 2003

The FutureTruck 2003 media strategy remained flexible throughout a tumultuous news year based on the nation's circumstances and an ever-changing world environment. Plans for reaching out to Capitol Hill and influencers were paused, and focus was shifted to localized markets. Regional and grassroots hometown coverage proved effective as well as trade publication and web-based coverage that was obtained. In addition, continuous outreach efforts were made to leverage FutureTruck's participation in Ford's Centennial celebration.

In order to provide electronic outlets with a compelling story, an armchair radio tour was conducted using all 15 teams before and after the competition. Also, a pre-and post-competition VNR was produced.

Media Attendance at Media Day

Attendance at the Media Day Ride & Drive event included radio, television, trade press and online outlets, including, but not limited to, the following:

Automotive Engineering Intl.
BBC
Edmonton Sun
Motor Trend Radio

Today Newspapers
Woman Motorist.com
MotorWeek

A complete media attendance list is contained in Section 2.

Overall Media Coverage

Print

"No doubt FutureTruck participants of the future will be evaluating a whole range of new technologies in their quest for a better SUV."

-As reported by
Design News
May 5, 2003

Associated Press
Pittsburgh Post-Gazette
Austin American-Statesman
Wisconsin State Journal
Milwaukee Journal Sentinel

Edmonton Sun
National Post
Windsor Star
Design News

Available data shows that more than 12 million print impressions were made throughout the 2003 competition year. Additional print coverage is anticipated, and highlights of the coverage located thus far include:

Select print clips are contained in Section 3.

Television

Broadcast stories aired throughout the year in the universities' local markets (viewership not available). In addition, nineteen broadcast stories aired about the FutureTruck Competition finals. Based on available information, television news stories, generated by the video news release (VNR) distributed just before the finals and just after competition, reached an audience of more than 660,000 viewers. This conservative estimate includes:

Atlanta, GA market – 1 story
Madison, WI market – 5 stories

Santa Barbara, CA market – 9 stories
Clarksburg, WV market – 4 stories

A more detailed tracking report for television stories generated by the VNR are contained in Section 4.

Radio

Several teams participated in radio interviews during 2003 and as a result of regional media programs. All 15 FutureTruck teams conducted interviews in each of their states prior to the competition finals as part of the armchair radio tour. The top three winning teams also participated in arranged interviews after the event. Highlights of the leading radio outlets include: 60 local outlets.

The complete radio interview schedule is contained in Section 5.

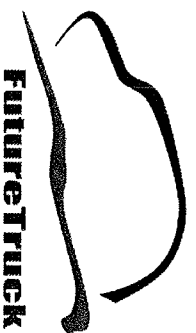
On-Line

Many on-line media attended Media Day at the MPG Proving Grounds in Michigan and more than 40 website hits were discovered throughout the year.

On-line coverage includes, but is not limited to:

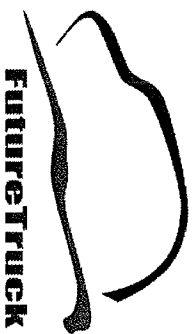
The Autochannel.com
Car Connection.com

Electronic Vehicle Online Today
Supercomputing Online



FutureTruck 2003 Coverage Report
October 2002 – June 2003
Total Audience Reach: 12,501,720

Date	Outlet	Audience Reach	Headline
June 27, 2003	National Post	396,413	Students Aim to Keep Us Trucking
June 27, 2003	Winnipeg Free Press	125,903	University Students take Ford Truck Challenge, Make Vehicle Environment Friendly Without Sacrificing Performance
June 26, 2003	Cornell Chronicle	N/A	FutureTruck Team Gets a Top Award, Finishes Sixth
June 26, 2003	The California Aggie	23,092	Engineering Students Place Second in Nationwide Hybrid Truck Competition
June 26, 2003	Penn State	N/A	Penn State's SUV Finishes Among Leaders at FutureTruck 2003 Events
June 24, 2003	FCN	N/A	FutureTruck Generates News Environmental Ideas
June 23, 2003	Electric Vehicle Online Today	N/A	UW-Madison Wins First Place at FutureTruck Competition
June 20, 2003	Associated Press, Idaho	N/A	Idaho's Hydraulic Vehicle Turns Heads
June 20, 2003	Electric Vehicle Online Today	N/A	UT Wins FutureTruck 2003 Virtual Instrumentation Award
June 19, 2003	Wisconsin State Journal	88,245	Students Produce Power with Efficiency



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June 19, 2003	Motioncontrol.com	N/A	University of Tennessee Wins FutureTruck 2003 Virtual Instrumentation Award
June 18, 2003	Woodland Daily Democrat, CA	9,874	\$500, 000 in Grants for Clean Air Projects
June 18, 2003	EurekaAlert!	N/A	Hybrid SUV Takes Second Place in FutureTruck Competition
June 18, 2003	UC Davis News & Information	N/A	Hybrid SUV Takes Second Place in FutureTruck Competition
June 17, 2003	HoustonChronicle.com	N/A	University of Tennessee Wins FutureTruck 2003 Virtual Instrumentation Award
June 17, 2003	University Communications, News @ UW-Madison	N/A	UW FutureTruck Wins Second National Title
June 16, 2003	Autotech Daily	N/A	Wisconsin Students Win FutureTruck Competition, Again
June 14, 2003	Capital Times	21,000	UW Students' Vehicle Design a Winner
June 13, 2003	Green Bay Press-Gazette	60,000	Spotlight
June 13, 2003	Supercomputing Online	N/A	Cornell University Wins the MathWorks Modeling Award at FutureTruck 2003



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June 6, 2003	Ithaca Journal	20,000	CU Team Ready to Truck into SUV Hybrid Vehicle Competition
June 6, 2003	WFNR, Radford, VA	N/A	Tech Team Competes in FutureTruck Competition
June 4, 2003	Lubbock Avalanche-Journal	58,952	Tech Students Explore Hydrogen Power at Vehicle-Building Competition
June 4, 2003	Energy Efficiency and Renewable Energy, Department of Energy	N/A	FutureTruck Competition Now Underway Near Detroit
June 3, 2003	Observer-Reporter (Waynesburg, PA)	39,014	Two WVU Students from Greene Participating in National Competition
June 2003	Analogzone.com	N/A	Green Means Go: FutureTruck Competition Brings Fuel Efficiency to Trucks/SUVs
June 2003	Department of Mechanical Engineering, University of Maryland	N/A	David Holloway is NSF Outstanding Advisor of the year
June 2003	Rebuild America, Department of Energy	N/A	FutureTruck 2003
May 28, 2003	The Romeo Observer	6,146	New Manager Brings New Mission to Proving Grounds
May 28, 2003	West Virginia University Newsroom	N/A	WVU's FutureTruck Entry Runs on Electricity, Diesel and Soy



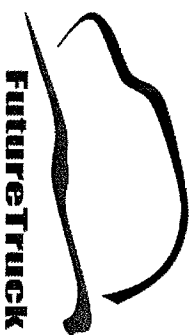
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Date	Outlet	Audience Reach	Headline
May 23, 2003	Business First: The Greater Columbus Business	12,215	High-Tech Driving
May 23, 2003	Electric Vehicle Online Today	N/A	Alberta Students Unveil Entry in FutureTruck Competition
May 21, 2003	Edmonton Journal	152,506	Technology Holds Canada's Edge in Diamond Cutting--Dhaliwal
May 21, 2003	University of Alberta Express News	N/A	Students Design Truck of the Future (online)
May 21, 2003	University of Alberta Engineering News	N/A	FutureTruck 2003 Road Warriors
May 16, 2003	WBNS, Channel 10, Columbus, OH	N/A	Tour De Sol
May 13, 2003	WTOP-AM	N/A	University of Maryland Student Engineers Show Off Their Hybrid SUV
May 13, 2003	WMAR-TV (ABC, Baltimore, MD)	N/A	University of Maryland Student Engineers Show Off Their Hybrid SUV
May 13, 2003	WBAL-TV (NBC, Baltimore, MD)	N/A	University of Maryland Student Engineers Show Off Their Hybrid SUV
May 5, 2003	Design News	180,070	In Pursuit of a Better SUV



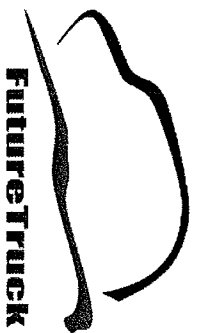
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Date	Outlet	Audience Reach	Headline
May 1, 2003	Monroe Evening News	22,498	Student Taking Part in FutureTruck Competition
May 2003	MPG MillerPost	N/A	Edsel B. Ford II, Spotlighting a Century of Family Business
April 24, 2003	The Dexter Leader	3,200	Keller Participating in Competition
April 22, 2003	Midland Daily News	24,067	Midlanders Part of Engineering Competition
April 15, 2003	The Daily News	9,858	KHS Grad Works on 'Future'
April 14, 2003	Undercar Digest Short Line	500	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 10, 2003	Capital Times	21,000	Engineering Expo Opens at UW
April 10, 2003	Des Moines Register	153,792	Buzzword: 1306 Vehicles Today
April 10, 2003	Poughkeepsie Journal	40,974	Working on the Future
April 10, 2003	The Daily Times	27,904	Working on the Future



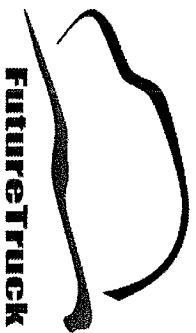
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Date	Outlet	Audience Reach	Headline
April 3, 2003	The Winchester Star	21,513	Efficient Vehicles
April 3, 2003	Electric Vehicle Online Today	N/A	Students Predict Improved Vehicle Performance
April 2, 2003	Valley News Dispatch	36,000	New Requirements Will Force Better SUV, Truck Fuel Economy
April 2, 2003	The Diamondback	30,646	Electric Truck Builders Hope to Zap Competition
April 2, 2003	AutoTech Daily	N/A	Students Ready Future Truck Designs
April 2, 2003	CanadianDriver.com	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 2, 2003	The Car Connection.com	N/A	Headlines From the Latest Press Releases
April 1, 2003	HoustonChronicle.com	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 1, 2003	DallasNews.com	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 1, 2003	NBC6.com, Charlotte, NC	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction



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April 1, 2003	<i>Wlive.com</i>	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 1, 2003	<i>Craigslist.com</i>	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 1, 2003	<i>Finance Canada.com</i>	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 1, 2003	<i>Cnet.com</i>	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 1, 2003	<i>Automotive e-sources Online</i>	N/A	Students Predict Improved SUV Fuel Economy/Emissions Reduction
April 2003	<i>Advanced Battery Technology</i>	1,000	Electric Vehicles
March 11, 2003	<i>The Inter-Mountain</i>	10,907	WVU Engineering Students Working on Next Generation SUV
March 11, 2003	<i>NASA Tech Briefs Insider</i>	200,000	Industry News
March 8, 2003	<i>WJBK-TV (FOX, Detroit, MI)</i>	1,899,910	FutureTruck
March 7, 2003	<i>WXYZ-TV (ABC, Detroit, MI)</i>	1,899,910	FutureTruck



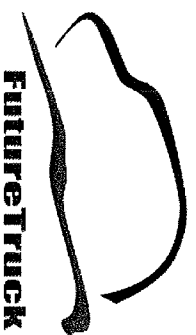
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Date	Outlet	Audience Reach	Headline
March 7, 2003	WXYZ-TV (ABC, Detroit, MI)	1,899,910	FutureTruck
March 7, 2003	WWJ-AM	1,899,910	Newswatch
March 4, 2003	The Gazette	140,137	Students working on fuel-efficient SUV
March 3, 2003	Lewiston Morning Tribune (Idaho)	27,000	UI dispatches experimental truck
March 1, 2003	Mechanical Engineering-CIME	111,361	Students to redesign efficiency of SUVs; Computing; Brief article
March 2003	Trailer/Body Builders	15,438	Future Truck Program Rolls On
March 2003	Advanced Fuel Cell Technology	1,000	Competition creates fuel-efficient SUVs
February 28, 2003	Ottawa Citizen	139,398	Students try to engineer less thirsty SUV: Universities compete in FutureTruck stakes
February 27, 2003	Metrowest Daily News	49,362	The MathWorks again sponsors FutureTruck
February 26, 2003	The Autochannel.com	N/A	The Mathworks Joins Ford Motor Company and Department of Energy in Continued Support for FutureTruck Competition



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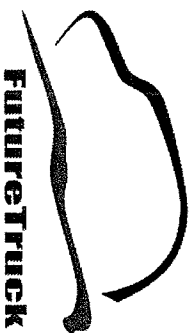
Date	Outlet	Audience Reach	Headline
February 26, 2003	Electronic Engineering Times Online	N/A	The Mathworks Joins Ford Motor Company
February 25, 2003	Daily Journal of Commerce	5,500	Students gear up FutureTruck for show
February 19, 2003	The California Aggie	23,092	Hydrogen research: An era of good fuelings?
February 19, 2003	The California Aggie	23,092	National Engineering Week
February 18, 2003	Milwaukee Journal Sentinel	255,098	Michigan Tech wins awards
February 13, 2003	Transportation Communications Newsletter	N/A	Website of the Day
February 11, 2003	Windsor Star	84,000	Cutting thirst for fuel is their goal; Aim of student engineers
February 11, 2003	WKOW-TV, Channel 27, Madison, WI	N/A	Bio-Diesel
February 10, 2003d	Electronic Engineering Times	160,310	Green Means Go – FutureTruck Competition Brings Fuel Efficiency to Trucks and SUVs
February 9, 2003	The Work Circuit.com	N/A	Competition looks to create fuel-efficient SUVs



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<i>Date</i>	<i>Outlet</i>	<i>Audience Reach</i>	<i>Headline</i>
February 7, 2003	<i>Electronic Engineering Times</i>	160,310	Competition looks to create fuel-efficient SUVs
February 3, 2003	<i>Electronic Engineering Times</i>	160,310	Bizarro world and SUV-envy
February 1, 2003	<i>R and D</i>	N/A	Students Making Cleaner SUVs
<i>Anticipated</i>	<i>CBC-TV</i>	N/A	FutureTruck
January 31, 2003	<i>Edmonton Journal</i>	152,506	U of A Students In Fuel-Efficiency Race: University Joins Contest to Make A Sport Utility That's Easier on Gas
Jan./Feb. 2003	<i>Traffic Safety Magazine</i>	20,000	Engineering Students Build Gas-Saving SUVs
January 13, 2003	<i>Electric Vehicle Online Today</i>	N/A	Engineering Students Attend FutureTruck 2003: Students Attend FutureTruck Summit to Improve Knowledge of National Instruments Corp.'s LabVIEW Software
January 10, 2003	<i>Austin Business Journal</i>	7,000	Building a Better SUV
January 9, 2003	<i>KEYE - CBS</i>	N/A	FutureTruck
January 9, 2003	<i>KXAN - NBC</i>	N/A	FutureTruck



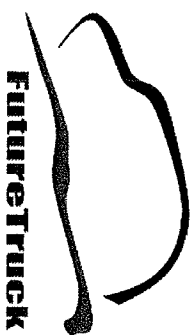
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Date	Outlet	Audience Reach	Headline
January 9, 2003	TV 8 - Independent	N/A	FutureTruck
January 9, 2003	Fox Affiliate	N/A	FutureTruck
January 9, 2003	KUT-FM, Austin	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas
January 9, 2003	KENS-AM, San Antonio	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas
January 9, 2003	KTXK-FM, Texarkana	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas
January 9, 2003	KPDR-FM, Amarillo	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas
January 9, 2003	KROD-AM, El Paso	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas
January 9, 2003	KEYS-AM, Corpus Christi	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas



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Date	Outlet	Audience Reach	Headline
January 9, 2003	KURV-AM, Edinburg	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas
January 9, 2003	KJAK-FM, Lubbock	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas
January 9, 2003	KBBW-AM, Waco	N/A	Students Designing SUVs of Tomorrow for Better Fuel Economy/Cleaner Air FutureTruck Arrives in Texas
January 9, 2003	Supercomputing Online	N/A	Students Compete in FutureTruck 2003
January 9, 2003	Automationtechies.com	N/A	Ford, U.S. Department of Energy, National Instruments Highlight Latest Technology for Designing Next-Generation SUVs
January 9, 200.	Yahoo! Finance Online	N/A	Ford, U.S. Department of Energy, National Instruments Highlight Latest Technology for Designing Next-Generation SUVs
January 2003	Automotive Engineering International	123,221	Educating Engineers
December 15, 2002	Trukin's Sport Utility Vehicle Magazine	30,000	FutureTruck
December 2002	St. Albert's Gazette	N/A	N/A



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Date	Outlet	Audience Reach	Headline
November 20, 2002	<i>Wisconsin State Journal</i>	88,245	Building Engineered with Innovation
November 10, 2002	<i>Wisconsin State Journal</i>	88,245	Technology Costs Would Eat Up Fuel Savings
November 8, 2002	<i>The Edmonton Sun</i>	74,102	FutureTruck Contest Goal to Build a Better Vehicle
November 2002	<i>Automotive Engineering International</i>	123,221	Educating Engineers
November 2002	<i>Marketplace Magazine</i>	15,000	Miller Electric Plays Role in Fuel-Efficiency Competition
October 2002	<i>Assembly</i>	60,241	Competition Holds Key to Fuel Efficiency
October 2002	<i>Diesel Progress-North American Edition</i>	28,952	90-Day Wonder
October 2002	<i>Automotive Body Repair News</i>	60,045	Explorer Enters 2004 Cleaner, Efficient
October 2002	<i>TransTech Online</i>	N/A	DOE and Ford Kick off FutureTruck 2003
March 2002	<i>Engine Technology International</i>	N/A	Fluid for Thought
Total Audience Reach:		12,501,720	

SECTION 2

**Media Attendance at FUTURETRUCK Media Day
Ford Michigan Proving Grounds
Romeo, MI
June 11, 2003**

Media Attendance at FutureTruck Media Day
Ford Michigan Proving Ground, Romeo, MI
June 11, 2003

Auto Bureau
Automotive Engineering Intl.
Auto Design Production
BBC
Carlisle Productions
Carlist.com
Edmonton Sun
Focus on the News
IEEE Spectrum
Jefferson Press
Meguiars
Meguires

Motor Trend Radio
National Post
Nikkei Newspapers
Northwest Auto News Service
Popular Mechanics
Springer Publishing
Today Newspapers
Toronto Sun
Woman Motorist.com
Dan McCosh—Freelance
Laura Byrd—Freelance

SECTION 3

Selected Print/On-line Clips

National Post

6/27/03

Students aim to keep us trucking

BY: David Menzies

Earlier this month, I was feeling somewhat like Marty McFly, the Michael J. Fox character in the Back to the Future movie trilogy.

No, I did not acquire a DeLorean DMC-12 equipped with a time-space continuum device. Rather, I attended two events -- one offering a glimpse back at the vehicular world of yesteryear, the other providing a look ahead to the (maybe) automotive world of tomorrow. After being exposed to the past and wannabe future, I can safely say this: When it comes to the cars of yesteryear and those yet to come, there is much to be desired.

My first experience: Ford of Canada's centenary celebrations at the company's headquarters in Oakville, where I drove a 1904 Model C. While piloting the horseless carriage was a hoot, this 100-year-old jalopy made me appreciate modern cars with renewed passion. The Model C produces 10 horsepower and lacks all creature comforts.

The next week, I was off to the Ford Proving Grounds in Romeo, Mich., for a competition called FutureTruck 2003. FutureTruck is billed as "a unique program that brings together the resources of industry, government and academia in a co-operative effort to address environmental and energy-related issues." Fifteen teams of engineering students from North American universities re-engineered 2002 Ford Explorers. Their goal was to increase fuel economy by at least 25% "without sacrificing performance, utility, safety and affordability."

While the heavily modified Fords looked like off-the-lot Explorers, these SUVs were radically different: They had electric motors, high-tech batteries, lightweight aluminum body parts and, in some cases, hydrogen tanks. Does such tinkering work? You bet. The Explorer of the winning team, from the University of Wisconsin-Madison, was 35% more fuel efficient than stock. Good thing, too: Shelley Launey of the U.S. Department of Energy stressed there has never been a more urgent time in history to develop more fuel-efficient vehicles. The United States produces only 9% of the world's oil, but it consumes 26% of it. It funnels more than US\$100-billion annually to the economies of nations that export oil to satiate its ever-growing thirst for Texas tea.

Given that many of the FutureTruck teams spent more than US\$100,000 per vehicle to realize fuel savings, the question is: Do the ends justify the means?

Sadly, no. Some of the Explorers equipped to run on hydrogen had almost the entire cargo area taken over by huge tanks. (So much for the "utility" part of the sport-utility vehicle.)

It was during the FutureTruck media briefing that I had an epiphany regarding the competition. Namely, is it not bizarre that so much time, money and effort is devoted to squeezing increased fuel efficiency out of a category of vehicles -- SUVs -- that, due to their inherent nature, are woefully fuel-inefficient?

One of the reasons gasoline gluttony exists in North America is the demand for SUVs. Since the early '90s, the SUV has grown increasingly common on North American roads. SUVs and light trucks now account for more than 50% of all new vehicle sales.

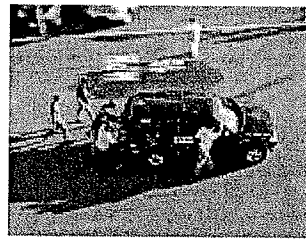
Visit any number of European countries -- where the price of gas is exorbitant -- and SUVs are the exception, not the rule. Somehow, some way, even those with large families that shop at Costco get by with smaller, lighter, fuel-efficient cars.

Al Kammerer, an executive director with Ford, says automakers are producing SUVs simply to respond to consumer demand. To his credit, Mr. Kammerer admits that, in most cases, buying an SUV is "a psychological purchase, as opposed to a true-needs purchase."

In other words, many North Americans have bought into the rough-hewn, outdoorsy marketing image of the SUV -- even though most drivers never leave the asphalt jungle of suburbia. But aren't automakers responsible for the disingenuous image of the SUV in the first place?

My bottom line is, if there is to be a Ford in my future, I'd much prefer a reasonably sized car with an existing (and affordable) fuel-efficient powerplant to an obese SUV lugging around six figures' worth of fuel-saving technology.

Perhaps, if others felt this way, engineering students wouldn't need to endlessly tinker with trucks to eke out a few more miles to the gallon. Rather, significant fuel efficiency gains could be realized overnight.



The push to reduce fuel consumption? Engineers can build more fuel-efficient SUVs -- or North Americans can buy smaller cars.

Winnipeg Free Press

6/27/03

University students take Ford truck challenge, make vehicle environment friendly without sacrificing performance

Now in its fourth year, FutureTruck is an annual competition that challenges teams of university students to build a more fuel-efficient vehicle. During 2003, 15 student teams endeavoured to turn a stock Ford Explorer into a lower-emissions vehicle with at least 25 per cent improved fuel economy. The challenge was to make the Explorer more environmentally friendly without sacrificing the performance, utility, safety, and affordability consumers demand. To meet this challenge, the teams employed cutting-edge automotive technologies, advanced propulsion systems, lightweight materials, and alternative fuels such as hydrogen, ethanol, and biodiesel.

With Ford as a major sponsor, FutureTruck 2003 was held at Ford Motor Company's Proving Ground in Romeo, Michigan. Fourteen American universities, as well as a team from the University of Alberta, went head-to-head designing, building, and perfecting what they believed would be the best alternative fuel option.

The Calgary team converted their Explorer (donated by Ford) to run using a combination of an electric motor and an internal combustion engine fueled by ethanol (made by distilling grain). At low speeds only the electric motor propels the vehicle. At highway speeds the electric motor shuts off and the ethanol-powered engine kicks in, while under heavy loads, both powerplants work hand-in-hand to move the vehicle forward. The team believes ethanol to be a viable option because it's plentiful, and although more expensive to produce than gasoline, would cost less at the pumps due to the fact that gas is taxed at a much higher rate, at least for now.

Another team employed a hydrogen-powered Ford Focus engine running on ethanol to power their Explorer.

Another thought an electric motor coupled with a diesel engine might be best. Another, still, believed a bio-diesel alternative (diesel made from soybeans and rape seed mixed with regular diesel in a 35/65 mix) was the way to go.

Every competing team applied their own mix of similar environmentally-friendly solutions: hydrogen power, ethanol, bio-diesel, and the electric motor. One team even thought of injecting urea right into the exhaust system to mix with the oxides of nitrogen (a harmful emission) to trigger a chemical reaction that would turn these poisons into a harmless cocktail of nitrogen, water and carbon dioxide.

Regenerative braking, as seen on commercially available hybrid vehicles, was another recurring theme as students came up with ways to recapture spent energy and reuse it. Judging targets for the vehicles included the following: Vehicles had to demonstrate at least a 25 per cent improvement in fuel economy, achieve California ULEV exhaust emissions standards, demonstrate a 1/8 mile acceleration time of less than 11.5 seconds, provide seating for at least 5 adults, demonstrate a towing capacity of 2,000 lbs., and maintain a fully-functioning vehicle with A/C and all power accessories.

All participating students are studying towards an engineering degree at their respective universities, be it mechanical, electrical, computer, or other.

The winner of the FutureTruck 2003 competition proved to be the team from the University of Wisconsin-Madison. Scoring 841 out of 1,000 possible points, this is the second year in a row they finished in first place. The team gets a trophy and a cheque for \$6,000.

Their version of the Explorer uses a "high efficiency 2.5 litre, turbo-charged, compression ignition common rail, direct-injection engine supplying approximately 100 kW of peak power and an AC induction motor that provides an additional 33 kW of peak power."

The team believes this hybrid drivetrain is an attractive alternative to the large displacement V6, as it provides comparable performance with similar emissions and drastically reduced fuel consumption numbers - 6 L/100km (39.4 mpg).

FutureTruck team gets a top award, finishes sixth

By Bill Steele

Cornell's Hybrid Electric Vehicle (HEV) student team won first prize for mathematical modeling in their vehicle design at the 2003 FutureTruck Competition June 2-12, while placing sixth overall.

The annual contest, held at the Ford Motor Co. Proving Grounds in Romeo, Mich., challenges engineering students to upgrade a standard 2002 Ford Explorer sport utility vehicle (SUV) for lower emissions and at least 25 percent higher fuel economy. The goal, according to sponsors, is to make the popular SUV more environmentally friendly while providing the features consumers demand. The competition is sponsored by the U.S. Department of Energy, Ford and several other companies.



Cornell's hybrid SUV maneuvers during competition in Romeo, Mich. *Courtesy of the U.S. Department of Energy*

"We're very happy with sixth," said team adviser John Callister, the Harvey Kinzelberg Director of Entrepreneurship in Engineering in Cornell's Sibley School of Mechanical and Aerospace Engineering. "It was a very stiff competition." Cornell won \$1,000 for placing sixth. Last year's team placed fourth.

Cornell also received the first MathWorks modeling award, which includes a \$1,050 cash prize, for the best use of MATLAB and Simulink software in creating mathematical models of the engine, motor, transmission, controllers and other subsystems. Mathematical modeling is now a crucial step in the automotive design process, Callister said. MathWorks, the company that markets the software, will showcase Cornell's FutureTruck vehicle at the company's headquarters in Natick, Mass., in July.

All of the entries used a hybrid power train, in which an internal combustion engine is used in tandem with an electric motor to drive the wheels.

The Cornell entry, dubbed "Corona," used a turbocharged, 2-liter gasoline engine and a 150-kilowatt electric motor powered by a 336-volt battery pack. The design utilized regenerative braking, which recaptures braking energy usually dissipated as heat.

The Cornell vehicle earned 589 out of a possible 1,000 points. Scoring is based on a complex formula that includes not only fuel economy and emissions, but also acceleration, off-road performance and other features important to consumers. The University of Wisconsin-Madison placed first overall for the second year in a row with 841 points. Second was the University of California-Davis, and Michigan Technological University placed third.

The leader of the Cornell team, which included 30 undergraduate and master's students, was Jake Timm '04. Functional areas were led by Anthony Rivara '04, Patric Lowe, M.Eng '03, Adil Ahamed '04, Jeffrey Ho '03, Matt Kenney, M.Eng '03, and Jonathan Schoenberg '03.

The California Aggie

6/26/03

Engineering students place second in nationwide hybrid truck competition

By BEN ANTONIUS
Aggie Campus Editor

For a team of UC Davis engineering students, the idea of a sport utility vehicle that gets more than 30 miles to the gallon is not a dream — it's a reality. Yosemite, a hybrid gas-electric Ford Explorer designed by a UCD team, recently took second place in the annual FutureTruck competition, a Michigan-based event including teams from 14 other universities nationwide.

The UCD team participates regularly in the FutureTruck competition, winning seven times in the past 10 years. The objective of the competition is to take a stock vehicle and dramatically improve fuel efficiency without sacrificing overall performance. Judges evaluate a vehicle's off- and on-road performance and emissions, as well as marketability and vehicle safety.

"Overall the competition went very well; we're definitely satisfied," team member Aashish Dalal said. "We had a very firm design, which I think we showed. You learn a lot of theory in class, but these competitions are a chance to actually apply what you learn."

According to team members, Yosemite can achieve about 30 to 35 miles per gallon, travel nearly 60 miles before needing to engage the gas engine and recharge its batteries through a standard household outlet. For long-distance highway driving the car relies on both the gas motor and two large battery packs.

The design team also modified the "creature comforts" of the vehicle, team leader Chris Carde noted, adding such innovations as a wireless Internet connection to the dashboard for access to services such as weather and traffic reports.

However, for those hoping to buy a similar vehicle, there's a catch: Yosemite cost the UCD team nearly \$1 million to produce, most of which came from outside sponsors. The Ford Explorers were provided by the Ford Motor Company, which, along with the U.S. Department of Energy, is a primary sponsor of FutureTruck.

Both the financial burden and other factors keep the number of participating schools small, though FutureTruck Technical Coordinator Nicole LeBlanc said competition organizers typically pare the pool of about 30 applicants down to fewer than 20. She said

the demands on the workforce were also high because the vehicle design requires a range of engineering skills.

"Over the years, we've found that there tends to be only a core group that can afford it on the monetary side and the personnel side, because the scope of competition is pretty broad," LeBlanc said.

FutureTruck Director Bob Larsen said the competition was intended to inspire technological innovations, not to produce production-ready vehicles.

"[FutureTruck] brings a chance for academics, government and industry to collaborate to improve fuel economy," he said. "[The teams] don't have to comply with the processes of a mass production vehicle, or a lot of the government regulations. But sometimes an idea comes out of the competition that is really immensely valuable to the industry."

Mechanical and aeronautical engineering professor Andrew Frank, the UCD FutureTruck advisor, said the team usually consists of 20 to 30 students, mostly undergraduates. Dalal said the team was open to engineers and non-engineers alike, and that most students committed between five and 10 hours a week to the project.

"It takes a lot of initiative for the person to actually come in and get involved, without necessarily being guided into the project," he said. "The nature of the entire design process promotes a lot of freethinking. If [newcomers] have an interest in any certain area, we try to introduce them to the person handling that area; then they're often on their own."



Penn State's SUV Finishes Among Leaders at FutureTruck 2003 Events

June 26, 2003

University Park, Pa. --- Penn State's Wattmuncher, a 2002 Ford Explorer re-engineered into a hybrid electric vehicle by student volunteers, won the Built Ford Tough Award at the just-concluded FutureTruck 2003 competition.

Dr. Daniel C. Haworth, associate professor of mechanical engineering and the students' faculty adviser, says, "The team received the award for entering the competition with a working and debugged vehicle, completing every event on the first try and being the first team to complete several of the events."

The Penn State vehicle finished fifth overall, the same position it won last year. However, only six points out of a possible 1,000 separated Penn State from this year's third place holder, Michigan Technological University. The University of Wisconsin, Madison, won the competition as it did last year but improved its score by just 2.5 points over 2002. Penn State's point total moved up 150 from a year ago after the team made substantial improvements to Wattmuncher. Penn State also won the oral design presentation award with a perfect score of 100 points.

Fifteen universities, selected by proposal, competed in events that began June 2 at Ford's Michigan Proving Ground and concluded with an awards dinner June 12 in Dearborn, Michigan. The events involved trailer towing, emissions testing, fuel economy, acceleration, off-road performance, the oral presentation, and judgments of design and consumer acceptability. Vehicles must first pass a technical inspection and qualify on braking and handling courses.

The competition challenges student teams to turn a stock Ford Explorer into a hybrid electric vehicle that achieves lower emissions levels and a 25 percent increase in fuel economy without sacrificing vehicle performance and consumer acceptability. An internal combustion engine, complemented by an electric motor and battery pack, powers a hybrid electric vehicle.

The U.S. Department of Energy, Argonne National Laboratory and Ford were headline sponsors for the 2002 and 2003 competitions, and will continue in 2004. A host of other corporations and governmental and non-profit organizations also back the competition, including Delphi Automotive Systems, which awarded Penn State third place in its Advanced Powertrain Technology Award ratings.

More than 40 volunteers, many of them members of the student chapter of the Society of Automotive Engineers, worked on the vehicle during the 2002-2003 academic year. Fourteen team members and Dr. Haworth attended the competition. Penn State and its Pennsylvania Transportation Institute (PTI), as well as corporations and organizations, supported the team.

Details on Penn State's accomplishments at FutureTruck can be viewed in the news section of the PTI

Web site, www.pti.psu.edu Daily results from the competition and background information can be found at www.futuretruck.org on the Internet.

The FutureTruck team members who attended the competition are:

Brad Beebe, Rome, NY; Krishan Bhatia, Newark, DE; Henry Chance, State College; Elana Chapman, State College and native of Dayton, OH; Jeff Gonder, Denver, CO; Ryan Harrier, Pinckney, MI; Brian Herrold, Selinsgrove, PA; Eugene Kung, Mount Vernon, NY; Paul Minear, Wyomissing, PA; Gary Neal, Port Matilda, PA and native of Punxsutawney; Eric Reischer, Chadds Ford, PA; Jim Schmalzried, Erie, PA; Kandler Smith, State College; Jon Weidner, Sinking Spring, PA.

****gd****

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FutureTruck Generates New Environmental Ideas

By Mary Ann Hupp

DEARBORN, Mich., June 24, 2003 (FCN) -- What can automakers do to ensure a greener future for the environment?

College students set out to answer that question by participating in FutureTruck, a competition that has students from 15 North American Universities re-engineering a conventional, midsize Ford Explorer into a lower-emissions vehicle with at least 25 percent higher fuel economy. The challenge is, they have to do it without sacrificing the performance, utility, safety and affordability consumers want.

Ford Motor Company and the U.S. Department of Energy are the main sponsors of Future Truck, which was recently held at Ford's Michigan Proving Ground. Students incorporated cutting-edge technologies like advanced propulsion systems, lightweight materials and alternative fuels, including hydrogen, ethanol, and biodiesel, into their redesigns.

Al Kammerer, executive director, SUVs and Body on Frame, said students in the competition give Ford Motor Company some great ideas.

"Clearly they're new ideas that we have to work through our production capabilities. But, it is a fertile area ... we're also fostering a mindset among university students that there are things that we as mankind can do to improve our environment," said Kammerer.



Ford Motor Company and the U.S. Department of Energy are the main sponsors of Future Truck, which was recently held at Ford's Michigan Proving Ground.



FutureTruck vehicles were judged in more than a dozen events, including negotiation of off-road obstacles

Nick Manor, team leader, Michigan Technological Institute, said he enjoyed competing in the project.

“The experience we get working on vehicles like this, working in the groups, working with different disciplines -- mechanical, electrical, computer science -- you’re able to get a really good feel for all these people have to do and what it really takes to build a vehicle that works.”

FutureTruck vehicles were judged in more than a dozen events that evaluated their technical performance and design. Goals for the re-engineering included:

- the ability to pull a 2,000-pound trailer
- negotiate off-road obstacles
- accelerate quickly to highway speeds
- provide seating for at least five adults
- maintain a fully functioning vehicle with air conditioning and all-power accessories
- reduce total greenhouse gas emissions
- achieve California's Ultra-Low Emissions Vehicle exhaust emissions standards.

The competition ended with a vehicle display and awards ceremony announcing the winners. The University of Wisconsin-Madison took first place, University of California, Davis won second, and Michigan Technological University won third.

Phil Martens, vice president, Product Creation, presented one of the trophies. He assured the students that the work they’re doing is worthwhile.

“I can tell you what you’re working on today and what you’re looking for in terms of efficiencies in vehicles and how they operate, is the way the industry is going in the future,” said Martens.

Shelley Launey, director of Clean Cities and FutureTruck Program Administrator, U.S. Department of Energy, said that the partnership with Ford Motor Company works because Ford is a leader in environmentally sound automotive technologies.

“Ford has a reputation of being a green vehicle manufacturer, and so it was really a perfect combination for FutureTruck,” said Launey.

This is the second year that Ford has sponsored the competition. Ford provides the Explorer SUVs that the teams modify, almost \$200,000 in seed and prize money, engineering consultants for each team, competition facilities and operational support.

Competing universities for FutureTruck 2003 were:

- California Polytechnic State University, San Louis Obispo
- Cornell University
- Georgia Tech
- Michigan Technological University
- The Ohio State University
- Pennsylvania State University
- Texas Tech University
- University of Alberta
- University of California, Davis
- University of Idaho
- University of Maryland
- University of Tennessee
- University of Wisconsin-Madison
- Virginia Tech
- West Virginia University.

For more information visit www.futuretruck.org.



Ford provides the Explorer SUVs that the teams modify, almost \$200,000 in seed and prize money, engineering consultants for each team, competition facilities and operational support.

June 23, 2003

SECTION: Pg. 0

IAC-ACC-NO: 104033205

LENGTH: 189 words

HEADLINE: UW-Madison Wins First Place at **FutureTruck** Competition; Brief Article

AUTHOR-ABSTRACT:

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BODY:

The University of Wisconsin-Madison (UW-Madison) recently announced that a team of students from its College of Engineering won first place at the **FutureTruck** 2003, a competition challenging students from 15 top North American universities to re-engineer a mid-size 2002 Ford Motor Company Explorer sport-utility vehicle to improve fuel economy and lower emissions while maintaining safety, performance and comfort levels," which was held earlier this month in Dearborn, MI.

The university said the team scored 841 points out of a possible 1,000, outdistancing the second-place team from the University of California-Davis by more than 50 points.

According to UW-Madison, the team was ranked first in the categories of "best on-road fuel efficiency; best vehicle design report; best off-road performance; best workmanship; and best technical report."

The team was awarded a "first-place trophy" and a check for \$ 6,000 for finishing first in the competition.

Contact: Phil McDade, UW-Madison, phone 608-265-8592, e-mail mcdade@engr.wisc.edu.

(EIN STAFF: 6/23)

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IAC-CREATE-DATE: June 23, 2003

LOAD-DATE: June 25, 2003

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The Associated Press State & Local Wire

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June 20, 2003, Friday, BC cycle

SECTION: State and Regional

LENGTH: 276 words

HEADLINE: Idaho's hydraulic vehicle turns heads

DATELINE: MOSCOW, Idaho

BODY:

The University of Idaho's experimental hybrid vehicle did not win the Society of Automotive Engineers Congress competition in Detroit, but it caught the U.S. Army's attention.

Frank Albrecht, the university's **FutureTruck** adviser, returned from Michigan with his student team Thursday. The event is considered the nation's most prestigious auto show.

The altered Ford Explorer did not take best of show, but its hydraulic components turned heads. The world's first triple-hybrid vehicle uses biofuel, including waste vegetable oil; electricity; and hydraulic power.

The hydraulic system works when the vehicle's brakes are compressed. As the truck stops, pressurized liquid is forced into a hydraulic pump, then released as it accelerates. It sets the Idaho project apart from competitors.

Idaho is one of three schools in contention to build hybrids for the Army.

Economically, the triple-hybrid was rated the most realistic vehicle to bring into production.

Team member Erik Cegnar said some of the competitors cost more than \$100,000 to assemble. He said that kind of price does not make sense in a consumer-driven market.

The best known hybrids are available at the local Toyota and Honda dealerships. But those cars have a short lifespan. Albrecht said they operate on batteries that represent more than half the total cost of the cars. When the battery dies, the car is useless, he said.

"Hydraulics last indefinitely, and have multiple applications," he said. "We started hydraulics because we are in a central location, the system can be used not only for on-road vehicles, but off-road vehicles like farm equipment."

LOAD-DATE: June 21, 2003

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Electric Vehicle Online Today

June 20, 2003

SECTION: Pg. 0

IAC-ACC-NO: 103847492

LENGTH: 201 words

HEADLINE: UT Wins **FutureTruck** 2003 Virtual Instrumentation Award; Brief Article

AUTHOR-ABSTRACT:

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BODY:

National Instruments (NI) recently announced that a team of engineering students from the University of Tennessee (UT) received the "Most Innovative Use of Virtual Instrumentation" award during the **FutureTruck** 2003 competition held earlier this month at Ford Motor Company's proving grounds in Romeo, MI.

According to NI, the UT team used NI virtual instrumentation technology to redesign a standard, mid-size Ford Explorer into "a more environmentally friendly vehicle with higher fuel economy and significantly reduced greenhouse gas emissions." NI said the team won the award for its "effective use of virtual instrumentation throughout the design cycle of the hybrid electric vehicle."

"The ease of use and flexibility of LabVIEW Real-Time and Compact FieldPoint proved vital to the development of our vehicle's data acquisition and control system," said UT **FutureTruck** team leader David Smith. "We used LabVIEW throughout the entire design process from initial system simulation to implementing the powerful, parallel hybrid control system."

Contact: Ernest Martinez, National Instruments, phone 800-258-7022.

(BUSINESS WIRE: 6/17)

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IAC-CREATE-DATE: June 21, 2003

LOAD-DATE: June 24, 2003

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June 19, 2003 Thursday, ALL Editions

SECTION: BUSINESS; Pg. E1

HEADLINE: STUDENTS PRODUCE POWER WITH EFFICIENCY

GRAPHIC: FILE PHOTOS

A Ford Explorer rebuilt by a team of UW-Madison students drove its way to victory in Ford Motor Co.'s **FutureTruck** Competition in Michigan last week. The group of some 50 UW-Madison engineering students won the competition, with scores based on fuel economy and performance, for the second year in a row. Their design used an aluminum frame and a combination of a small diesel engine and a second electric motor to get 35 miles per gallon in the city and 38 on the highway while preserving the same acceleration and tailpipe emissions of a standard Explorer. The vehicle is shown driving at the Ford Proving Grounds in Romeo, Mich.

At right, Katie Orgish, the leader of the **FutureTruck** team, is shown beside the winning vehicle. Her team's entry scored 841 points out of a possible 1,000, beating 14 other teams and outdistancing the runner-up by 54 points.

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News in Motion

University of Tennessee Wins FutureTruck 2003 Virtual Instrumentation Award - Competition Sponsored by Ford, DOE and National Instruments Challenges Students to Build Energy-Efficient Vehicles

Jun 19, 2003

Dearborn, MI - National Instruments (Nasdaq:NATI) awarded a team of University of Tennessee engineering students the Most Innovative Use of Virtual Instrumentation award at the FutureTruck 2003 competition. The team used an innovative virtual instrumentation approach by combining NI LabVIEW Real-Time software and Compact FieldPoint industrial measurement and control hardware to simulate, design, test and implement their hybrid control system in a re-engineered 2002 Ford Explorer.

Using National Instruments virtual instrumentation technology, the Tennessee team redesigned a standard, midsize Ford Explorer into a more environmentally friendly vehicle with higher fuel economy and significantly reduced greenhouse gas emissions. The team won the award for its effective use of virtual instrumentation throughout the design cycle of the hybrid electric vehicle.

"The ease of use and flexibility of LabVIEW Real-Time and Compact FieldPoint proved vital to the development of our vehicle's data acquisition and control system," said David Smith, team leader of the University of Tennessee FutureTruck team. "We used LabVIEW throughout the entire design process from initial system simulation to implementing the powerful, parallel hybrid control system."

NI is a major sponsor of FutureTruck, a four-year engineering competition focused on making sport utility vehicles more energy efficient and environmentally friendly. FutureTruck student teams re-engineer SUVs into lower-emission vehicles with at least 25 percent increased fuel economy while preserving the vehicle's performance, utility, safety and consumer acceptability. Students from 15 top North American universities participated in the FutureTruck 2003 competition from June 2 to June 12 at Ford's Michigan Proving Grounds in Romeo, Mich. Primary sponsors of the FutureTruck 2003 competition include the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, Ford and the Argonne National Laboratory's Center for Transportation Research.

"National Instruments is committed to supporting educational initiatives in engineering and science," said Ray Almgren, NI vice president of product marketing and academic relations. "Students participating in FutureTruck apply theoretical knowledge they gain in the classroom towards a real-world engineering challenge with project deadlines and constraints."

About FutureTruck

The Future Truck competition demonstrates how industry, government and academia can develop more energy-efficient and greener automotive technologies to improve the economy and the environment. The FutureTruck 2003 competition took place at Ford Motor Company's Proving Grounds in Romeo, Mich., from June 2-12, where judges evaluated vehicles on technical performance and design, including acceleration, trailer towing, off-road handling, on-road fuel economy and engineering design review. The competition culminated in a vehicle display and awards ceremony held in conjunction with Ford's Centennial Anniversary at Ford World Headquarters on June 13 in Dearborn, Mich. For more information about this unique competition, visit www.futuretruck.org.

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National Instruments is a technology pioneer and leader in virtual instrumentation -- a revolutionary concept that has changed the way engineers and scientists approach measurement and automation. Leveraging the PC and its related technologies, virtual instrumentation increases productivity and lowers costs for customers worldwide through easy-to-integrate software, such as the NI LabVIEW graphical development environment, and modular hardware, such as PXI modules for data acquisition, instrument control and machine vision. Headquartered in Austin, Texas, NI has more than 3,000 employees and direct operations in 40 countries. In 2002, the company sold products to more than 25,000 different companies in more than 80 countries around the world. For the past four consecutive years, FORTUNE magazine has named NI one of the 100 best companies to work for in America.

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Woodland Daily Democrat, CA

June 18, 2003

\$500,000 in grants for clean air projects

Yolo, Solano transit efforts get funding

At the June board meeting, the Yolo-Solano Air Quality Management District board of directors approved distribution of \$500,000 for projects in Yolo and Solano counties that support the goal of the District's Clean Air Funds program.

Thirty-one proposals were submitted in four categories with 26 proposals receiving full or partial funding for the fiscal year 2003-2004. Projects receiving grants either reduce air pollution from motor vehicles or will be used for related planning, monitoring, enforcement and technical studies necessary for the implementation of the California Clean Air Act.

In the Clean Fuels and Infrastructure category, the cities of Davis and Vacaville received funding for infrastructure for electric vehicles and Yolo County Health Department received partial funding for two neighborhood electric vehicles and charging stations. Unitrans received funds toward the purchase of a compressed natural gas support vehicle.

Alternative transportation projects receiving funds include the Davis Farmers Market "Shop-by-Bike," Rio Vista's Main Street Pedestrian Enhancement project, and Vacaville's Park and Ride Lot located at Bella Vista and I-80. Bicycle facility projects between Dixon and Davis, in Vacaville and in Yolo County were granted funds.

The fourth and final phase of the Dixon-Davis Bikeway is expected to be completed next year.

Solano Transportation Authority's Commuter Incentives Program, UCD TAPS Trainpool Program and Yolo Transportation Management Association's Rideshare Incentive Program will continue to attract riders who want to reduce vehicles on the road. The city of Winters' 1906 Railroad Trestle over Putah Creek will be renovated for use by bicyclists and pedestrians. **UC Davis' HEV Center was granted funding for the development of a plug-in electric vehicle for the Future Truck 2003 competition.**

Transit services receiving funding are Route 30 (Fairfield/Suisun Transit), Solano Bart Express in Vacaville, River Cats Shuttle from Woodland, Davis and West Sacramento,

and two student transportation programs, Summer Sizzler and the Wolfpack Shuttle, run by Yolo County Transportation District.

In an effort to get information out to youth on clean air practices, the American Lung Association's Clean Air Curriculum and the Extreme High School Clean Air Challenge received funding in addition to Explorit Science Center's mobile activity station "The Air We Breathe."

A bike map for Solano and Yolo counties will be updated and Yolo TMA's pilot program "Rid Yourself of Strandaphobia" will educate drivers how to reduce single occupant vehicle trips by changing driving patterns and attitudes. A regional public opinion survey in Solano and Yolo counties will give residents an opportunity to express concerns on air quality and transportation issues with responses used to assist planners. These projects were funded in the public education and information category.

"It is our mission to protect human health and property from the harmful effects of air pollution and we feel that these projects will, either directly or indirectly, help to reduce air pollution and also offer viable alternatives for commuters," said Larry Greene, executive director.

The projects are funded through vehicle registration fees and Solano County Northeast property tax proceed.

PUBLIC RELEASE DATE: 18-JUN-2003

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Hybrid SUV takes second place in futuretruck competition

A Ford Explorer sport utility vehicle rebuilt by UC Davis engineering students to run as a gas-electric hybrid has won second place in the national FutureTruck competition.

The results were announced June 12 in a ceremony in Dearborn, Mich., where the competition was held. The University of Wisconsin-Madison took first place overall. The UC Davis team also won a prize for Best Dynamic Handling and the Cisco Systems award for telematics.

"The competition went very well, there were a lot of competitive cars running," said team leader Dahlia Garas, a graduate student in mechanical engineering at UC Davis.

The UC Davis entry, "Yosemite," is a "plug-in" hybrid electric vehicle. It is designed to achieve fuel economy of about 30 miles per gallon with the same performance as a standard model Ford Explorer SUV. Batteries and electric motors power the vehicle during low-speed city driving.

A small, fuel-efficient gasoline engine powers the vehicle for extended highway driving and keeps the batteries charged. The vehicle also can be plugged into a domestic power outlet overnight to charge the batteries with off-peak electricity.

The UC Davis team won the competition in 2001 with a hybrid Chevrolet Suburban, "Sequoia." Major sponsors of the competition are the Ford Motor Company and the U.S. Department of Energy.

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Hybrid SUV Takes Second Place in Futuretruck Competition

June 18, 2003

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Additional information:

[FutureTruck Competition](#)

[UC Davis FutureTruck Team](#)

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June 17, 2003, 9:05AM

(BW) University of Tennessee Wins FutureTruck 2003 Virtual Instrumentation Award

Business Editors/High-Tech Writers
(c) 2003 Business Wire.

DEARBORN, Mich.--(BUSINESS WIRE)--June 17, 2003--

Competition Sponsored by Ford, DOE and NI Challenges Students to Build Energy-Efficient Vehicles

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About National Instruments

National Instruments (<http://ni.com>) is a technology pioneer and leader in virtual instrumentation -- a revolutionary concept that has changed the way engineers and scientists approach measurement and automation. Leveraging the PC and its related technologies, virtual instrumentation increases productivity and lowers costs for customers worldwide through easy-to-integrate software, such as the NI LabVIEW graphical development environment, and modular hardware, such as PXI modules for data acquisition, instrument control and machine vision. Headquartered in Austin, Texas, NI has more than 3,000 employees and direct operations in 40 countries. In 2002, the company sold products to more than 25,000 different companies in more than 80 countries around the world. For the past four consecutive years, FORTUNE magazine has named NI one of the 100 best companies to work for in America.

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 NOTABLE**UW FutureTruck wins second national title**

(Posted: 06/17/03)

For the second year in a row, a team of students from UW-Madison has won the national [FutureTruck Competition](#).

The UW-Madison team, based in the [College of Engineering](#), took first place among the 15 teams competing from universities throughout North America. The team scored 841 points out of a possible 1,000 points, outdistancing runner-up University of California-Davis by 54 points.

The competition pits student teams that have spent a year modifying sport-utility vehicles provided by the Ford Motor Co. Points are awarded in a number of categories, including handling, braking, fuel efficiency, workmanship, towing capability, off-road performance, design, acceleration and technical reports.

The competition allows student teams to conduct research and work on better fuel efficiency, emissions and materials technology for sport utility vehicles, without being restricted by the technical and financial constraints typically involved in a mass-production vehicle.

This year's competition was held from June 1-12 at Ford's test tracks in Michigan. The UW-Madison team won a first-place trophy and a check for \$6,000 for its win. Following the competition, the UW-Madison FutureTruck stayed at Ford's Dearborn, Michigan, headquarters to take part in Ford's Centennial celebration honoring the company's 100 years in the automotive business.

The UW-Madison team garnered first-place wins in the categories of: best on-road fuel efficiency; best vehicle design report; best off-road performance; best workmanship; and best technical report. The team also won the Delphi Advanced Technology Award.

Ford Motor Company and the U.S. Department of Energy are the primary sponsors for the FutureTruck competition.

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Argonne National Laboratory, a DOE research and development facility, provides competition management, technical and logistical support. Some 16 other government and industry sponsors also support the program.

[\(View a full news release version of this story\)](#)

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autotech *daily*[™]

MONDAY
JUNE 16, 2003
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FUEL CELLS POTENTIALLY HAZARDOUS TO THE OZONE LAYER

Hydrogen used in fuel cells could leak into the stratosphere and expand holes in the ozone layer, according to researchers at the California Institute of Technology. In a report published in *Science* magazine, they warn that up to 20% of hydrogen throughout the supply chain—from pipelines, storage facilities, processing plants and fuel cells in vehicles and other applications—could inadvertently leak.

Since free-flowing hydrogen tends to rise upward, widespread fuel cell use could triple the volume of hydrogen molecules traveling into the stratosphere, the researchers forecast. They estimate such a scenario would result in an 8% depletion of ozone, causing larger and longer-lasting holes at the Earth's poles.

At higher levels, hydrogen oxidizes and forms water. The researchers theorize an increased level of hydrogen would result in cooling of the lower stratosphere, thereby altering the makeup of the ozone layer that shields the Earth from harmful ultraviolet light.

Other scientists doubt that fuel cell-related hydrogen leakage would be as severe as the California Technology team predicts. And the researchers themselves concede, there is little practical information about the hydrogen cycle. They also point out that new technologies could be developed along as fuel cells are introduced to minimize leakage.

At this point, however, they say hydrogen's potential impact on the ozone layer must be taken into account when assessing environmental benefits of the technology.

NEW PROBE TO STUDY CROWN VIC FUEL TANK

The National Association of Attorneys General has formed a task force to investigate safety concerns about Ford Motor Co.'s Crown Victoria Interceptor police cruiser. The car, which accounts for more than three-fourths of the U.S. police fleet, has been blamed for 18 deaths—including a Missouri state trooper last month—in high-speed rear-end collisions that result in its fuel tank exploding.

Prior to announcing the task force, the bipartisan group heard presentations from the automaker and a plaintiff's attorney involved in Crown Vic lawsuits during the



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group's national meeting in Oklahoma City last week. Specific plans of the new probe have not yet been released.

The initiative is the latest in a flurry of recent activity related to the controversial cruisers. Late last month, Dallas suspended purchases of Interceptors until it conducts its own fuel tank crash tests. Louisiana also has issued a moratorium on Crown Vic cruisers, and the Chicago police union has asked the city to drop plans to buy a new fleet of the vehicles. Various cities and counties have launched a class-action lawsuit that seeks a recall and/or damages, as well as access to internal company engineering information.

Meanwhile, the police officers' union in New York is recommending that its troopers avoid any "non-emergency traffic stops" on high-speed roads. Proponents contend the Crown Vic's fuel tank location between the rear axle and rear bumper makes it more susceptible to rupturing and causing a fire following high-speed rear-end collisions, a hazard for police vehicles stopped on the side of the highway.

The U.S. National Highway Traffic Safety Administration closed an investigation into the fuel tanks last year, deeming the Crown Vic no more likely than a Chevrolet Caprice police cruiser to catch fire following a rear impact. At about the same time, however, Ford agreed to offer retrofit plastic shields that could be fitted around the fuel tank. The cruiser involved in the Missouri fatality was outfitted with the shield as was an unoccupied Dallas police car that also burst into flames last month after being rear-ended.

Ford maintains that the vehicles are safe but continues to look at alternatives. Among those being considered are a fire-suppression system, a fire panel and foam bladders.

ISUZU TO REPAIR SUV FRAMES IN JAPAN

Isuzu Motor Co. is recalling four SUV models, including two its produced for Honda Motor Co., to fix defective frame welds. Affected Isuzu models include nearly 51,000 Big Horns and about 10,000 MUs produced between 1993 and 1996. A combined 3,500 Honda Horizons and Jazz trucks made during the time frame also are being recalled.

PLASTIC INTAKE MANIFOLDS BECOMING A COMMODITY?

More than half of the intake manifolds in Europe (64%) and North America (53%) are now made of plastic, and such applications may soon assume commodity status, according to a new study by The ITB Group Ltd. The Novi, Mich.-based consulting firm cautions that constant pressure from OEMs to reduce costs may stymie future induction-related technical innovations.

ITB's global analysis of the induction manifold market expects the use of active manifolds to increase as a means to boost engine performance and cut emissions. Such a system allows the geometry of the manifold to be changed based on engine speed.

It also says nylon 6 is rapidly displacing nylon 6,6 as the material of choice for intake manifolds in Europe and North America. This is due to the emergence of vibration welding processes for which the former is better suited, according to ITB. Of plastic manifolds, some 78% now are welded in Europe and 48% are attached this way in North America. Lost-core casting accounted for 23% and 14% of the market in North America and Europe, respectively. Other methods include welded/lost-core hybrids, injection molding, snap-fit, adhesives and what it describes as a hot-plate laser.

In addition to nylon, European manifolds are made of aluminum (32%), magnesium

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(4%) and a phenolic/magnesium blend (less than 1%). The remaining 47% non-plastic units in North America are all aluminum. Magnesium applications likely will increase in the future to help reduce weight, the firm says, but it notes that plastic systems typically are the most cost-efficient design.

ITB expects noise and vibration issues will continue to affect the design and cost of intake manifolds. It says the use of exhaust gas recirculation will have little impact on material selection, especially when EGR coolers or internal recirculation are used.

BERU TO BUY JCI SPARKPLUG UNIT

Germany's Beru Group, a supplier of sparkplugs and other ignition parts, has signed an agreement to acquire Johnson Controls Inc.'s EYQUEM sparkplug business in France. Terms of the deal, expected to be completed by the end of July, were not disclosed.

Following the acquisition, Beru says it will become the largest sparkplug supplier to the French market. EYQUEM generates the majority of its sales in the aftermarket but also supplies PSA Peugeot Citroen, Renault and Volvo. Negotiations with other OEMs also are underway, according to Beru, which expects the new unit's sparkplug output to grow by 25% in the next five years.

WISCONSIN STUDENTS WIN FUTURETRUCK COMPETITION, AGAIN

For the second year in a row, students from the University of Wisconsin beat out 14 other North American university teams to take top honors at this year's FutureTruck challenge. During the competition, teams made modifications to a 2002 Ford Explorer SUV to lower emissions and improve fuel economy while maintaining existing safety, performance and comfort levels.

By using aluminum and other lightweight components and redesigning the fuel system to run on biodiesel, the Wisconsin team was able to boost fuel economy by 35% and reduce greenhouse gas emissions by 39%.

The second-place design, developed by students at the University of California in Davis, featured a parallel plug-in hybrid system that used ethanol fuel when operating under its internal combustion engine.

Cornell University received the first-ever Modeling Award for its innovative use of advanced software during the competition. The award was determined by Natick, Mass.-based The MathWorks Inc., which donated its modeling tools to each team and provided mentors and technical support.

The U.S. Department of Energy and Ford Motor Co. were the title sponsors for this year's competition. The 10-day competition began June 2 at Ford's Michigan Proving Ground in Romeo and the Allen Park Test Lab in Allen Park, Mich., with teams competing in acceleration and off-road performance tests.

Argonne National Laboratory provided competition management, technical and logistical support for the event. Other corporate sponsors were ArvinMeritor, BP, Cisco Systems, Dana, Delphi, Goodyear, National Instruments and Ricardo. The U.S. National Science Foundation, Natural Resources Canada, The Aluminum Association, Illinois Department of Commerce and Economic Opportunity, and Renewable Fuels Association also supported the program.

Capital Times (Madison, WI)

June 14, 2003

UW STUDENTS' VEHICLE DESIGN A WINNER

A team of students from the University of Wisconsin-Madison took top honors at this year's FutureTruck challenge by re-engineering a base 2002 Ford Explorer to achieve a 35 percent increase in on-road fuel economy while simultaneously reducing greenhouse gas emissions by 39 percent.

The winning vehicle, which implemented lightweight components such as aluminum, ran on a mixture of bio-diesel fuel.

The FutureTruck competition attracted 15 engineering teams from universities across North America. The second place vehicle design, re-engineered by students at the University of California-Davis, was a parallel plug-in hybrid system and was fueled by ethanol.

The goal of the annual FutureTruck challenge is to lower emissions and achieve a 25 percent increase in over-the-road fuel economy of SUVs while maintaining the safety, performance and comfort levels that consumers demand. The U.S. Department of Energy and Ford Motor Co. were the title sponsors for this year's competition, which took place at Ford's Michigan Proving Grounds in Romeo - in time for the company's 100th anniversary celebration.

The competing teams employ creative approaches to achieve both short- and long-term solutions to improving the fuel efficiency and environmental impact of SUVs.

"This is not only a victory for the University of Wisconsin, but a promising contribution to the future of light-duty vehicle design," said Glenn Bower, the team's facility adviser. "We were pleased to be a part of the FutureTruck challenge once again."

Other teams participating in the 2003 challenge included California Polytechnic State University, San Luis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of Idaho; University of Maryland; University of Tennessee; Virginia Tech; and West Virginia University.

GRAPHIC: FORD FUTURETRUCK PUBLIC AFFAIRS

The UW-engineered Explorer runs on a mixture of bio-diesel fuel.

UW-Madison team leader Katie Orgish puts the finishing touches on the Badger competition SUV, as adviser Glenn Bower (right) oversees the project.

Green Bay Press-Gazette

June 13, 2003

Spotlight

BODY:

College honors

* Joe Bassindale, a graduate of Bay Port High School, and Jesse Severance, a graduate of Green Bay Preble High School, were among more than 60 Michigan Technological University students taking part in the national FutureTruck competition. FutureTruck is a joint government-industry project created by the Department of Energy to explore alternative propulsion systems and fuels through student competition. The program's goal is to help raise the environmental performance of the SUV segment while keeping the amenities and features that have made it so popular. The competition is organized by Ford Motor Company and the U.S. Department of Energy's Argonne National Laboratory.

Supercomputing Online

June 13, 2003

Cornell University Wins The MathWorks Modeling Award At FutureTruck 2003

NATICK, Mass. -- The MathWorks today announced that Cornell University is the recipient of The MathWorks Modeling Award at the FutureTruck 2003 competition. Cleve Moler, The MathWorks founder, chief scientist, and creator of MATLAB, presented the award last evening at the FutureTruck awards ceremony to the Cornell FutureTruck team in recognition of the school's achievements in utilizing the Company's flagship tools, MATLAB and Simulink, for innovative automotive design.

In July, The MathWorks will showcase Cornell's FutureTruck vehicle at the Company's headquarters in Natick, Massachusetts.

"We are honored to accept the first-ever Modeling Award at FutureTruck," said John Callister, engineering professor and FutureTruck team advisor at Cornell University. "The MathWorks added a crucial element to the overall competition this year. Because modeling is such an important part of modern-day automotive design, we're proud to have been chosen out of a very impressive group of competitors."

A corporate sponsor of FutureTruck for the past three years, The MathWorks introduced its Modeling Award this year. The award recognizes student teams who have created working models of engine, motor, transmission, controllers, and other subsystems that result in a more energy-efficient vehicle. In addition to leveraging MATLAB and Simulink, the student teams utilized the MATLAB-based Power Systems Analysis Toolkit, PSAT, developed by Argonne National Laboratory, throughout the months-long design process.

FutureTruck is a unique four-year engineering program that brings together the resources of industry, government, and academia in a cooperative effort to address important environmental and energy-related issues posed by the growing demand for SUVs. For the overall FutureTruck competition, student teams were challenged to redesign a 2002 Ford Explorer for lower emissions and 25 percent higher fuel economy. The MathWorks role at FutureTruck 2003 included a year-long commitment made through the donation of a complete suite of its tools to each student team, the provision of mentors, technical contacts, and judges for the overall FutureTruck competition.

"With our ever-increasing participation at FutureTruck, we have been able to see for the past three years how our tools are furthering environmentally-friendly technologies," said Cleve Moler. "FutureTruck provides a critical link between the automotive industry and the innovation that is happening at academic research labs and schools across the country. The MathWorks is proud to be engaged in this collaborative effort and to help drive automotive technology advancements."

The MathWorks Modeling Award competition drew several competing student teams from top engineering programs across the country. Joining Cornell University on the award podium were

teams from Georgia Institute of Technology, receiving second place, and West Virginia University, honored with the Most Improved award for its commitment to continuous improvements in the design process.

"In the FutureTruck setting, students are able to experiment with automotive technology in ways the industry cannot, creating a vast educational opportunity for academics and industry professionals alike to witness the creativity and innovation contained within each award-winning design," said Bob Mull, director, vehicle evaluation & verification at Ford Motor Company.

"Additionally, the event provides a critical opportunity for students to leverage an open forum to articulate their needs for innovative products and technologies."

Ithaca Journal

June 6, 2003

CU team ready to truck into SUV hybrid vehicle competition

By JESSICA KELTZ
Journal Staff

ITHACA -- Coming off a fourth-place finish in last year's competition, the first of its kind, Cornell University's FutureTruck team members say they have built a better hybrid engine for this year's event. The competition pits teams from 15 universities against each other to build the best gas/electric hybrid Ford Explorer. Tom Klose, an engineering student on the team, said each group starts with a 2002 Explorer exactly like one a consumer would get from a dealer. Their challenge is to improve its fuel economy by 25 percent by converting the engine to a hybrid.

"The most interesting part of it is that everyone started with the same product," Klose said. "You start at the same point and you get to the same point, but everyone takes completely different paths to get there." John Callister, the team's adviser, said that last year the team used a "souped-up" Mazda Miata engine with a lot of custom-made and custom-fitted parts.

"It wasn't very reliable," he said. "We didn't really have the ability to get it working." This year, they found an engine that could work on its own -- one from a Nissan Silva, a car that's usually sold only in New Zealand but can be found in California. The team was able to purchase one from a wrecked vehicle and couple it with an electric motor, Callister said.

Although the team took the car on the road some locally, it rode on a trailer to Michigan, where the contest is held.

"We're expecting fuel economy of roughly 22 miles a gallon if it's up and running," Callister said. He said the Explorer typically gets 16 miles per gallon.

The competition started Monday; winners will be announced next Thursday. As of Wednesday afternoon, Cornell's vehicle had passed the braking, handling and safety tests needed to move on to the other tests such as towing a trailer, emissions, acceleration and on-road fuel economy, Klose said.

Callister said this year's vehicle drives better than last year's, which had a standard transmission. Ford engineers will inspect the vehicles to see if they would appeal to consumers, even looking at the interiors. The team members, who number 18 this year, get academic credit for the two semesters they spend working on the FutureTruck. Even that time is not as much as they would like, Callister said.

"The gasoline engine has been running for about two months," he said. "The electric motor has been the problem, trying to get that running -- it's only been a few weeks."

Since arriving in Michigan early this week, the team has begun work on the vehicle at 6:30 every morning. Work is allowed to continue throughout the competition, Callister said.

"It's probably a good thing for us not to be in Ithaca and be distracted by classes and things," he said. Klose said the competition has taught him the practical application of some of what he's learned in classes. "It's a chance to apply theory, but actually build something and make it into a tangible product," he said. "It's taught me a lot about working with people and meeting deadlines and just kind of making things happen. Something has to get done and it gets done."



Tech team competes in FutureTruck competition

Marty Gordon, WFNR News

A group of engineering students from Virginia Tech are in Michigan for the next two weeks as part of the FutureTruck 2003 competition. During the event, 15 teams from colleges around the country will optimize a conventional Ford Explorer into a low emissions vehicle with at least 25 percent higher fuel economy without sacrificing the performance, safety, or affordability to consumers.

Doug Nelson is a professor of mechanical engineering from Virginia Tech that accompanied the students. He said the students used a hybrid fuel cell last year, but had to change it to a hydrogen cell this time out.

"So this year, we are attempting to run a hydrogen combusting engine. So it looks a fairly conventional gasoline engine that were converting to run on hydrogen. And which has some advantages, it's not quite as good as a fuel cell. Doesn't have a big efficient benefit. But it's still internal combustion engine. But it certainly will run cleaner, burning hydrogen than running gasoline."

To watch the Future Truck competition in progress checkout the web at: www.futuretruck.org.

local_news-06/06/2003

JUNE 4, 2003



••• Bacons

Tech students explore hydrogen power at vehicle-building competition

BY HEDI TOTH
AVALANCHE-JOURNAL

When it comes to automobiles, Michael Parten realizes that childlike enthusiasm knows no age.

"When we got it running a few days ago, the guys were just jumping around," said Parten, a Texas Tech professor of electrical engineering.

What he, another Tech professor and a team of engineering students got running, after seven months of intense labor, was a 2002 hydrogen-powered hybrid Ford Explorer.

Twelve members of that team, along with adviser Jim Maxwell, are in Dearborn, Mich., with teams from 14 other schools, participating in the Future Truck competition, which is sponsored by the U.S. Department of Energy, the Ford Motor Company and other automotive companies and government sponsors. The purpose is to give students the

chance to research alternative fuels and hybrid cars.

Each team gets a Ford Explorer fresh off the lot to play with, Parten said. Of course, it doesn't stay looking new for long.

"The first thing you do is take it apart and try to figure out what you're going to do with it," he said.

In the competition, the customized vehicles should improve fuel economy by 25 percent and reduce overall emissions while maintaining the safety, performance and comfort of the original vehicle.

Tech has participated in the program for several years, Parten said, and the team members usually try for the most cutting-edge technology available. This year the vehicle is a hybrid and has a hydrogen-based internal combustion engine as well as an electrical component.

Tech joins Virginia Tech in

being the only schools using hydrogen, Parten said. The benefits are numerous.

"Hydrogen is the most abundant material in the universe, and by using hydrogen as fuel, you have significantly cut down on pollution," he said, adding that hydrogen, unlike fossil fuels, is a renewable resource.

Using hydrogen as fuel would also cut down the United States' dependency on imported oil. Bush recently announced a multibillion-dollar initiative to bring hydrogen-powered cars to the nation's roadways.

However, all good things come with a price. Tech's Explorer went from a 6-cylinder gasoline-powered engine to a 4-cylinder hybrid, resulting in a loss of power.

In addition to the research benefits, participating in the future truck competition is good experience for students.

Parten said.

"Because of the intensity they get to see what it's really like sometimes to work on a rush program," he said. "You can't really find something in the academic environment that does that, that well."

And with all these benefits, there is one more, important one, he said.

"What engineers really enjoy is the challenge of trying to achieve something that's difficult and finally

accomplishing that," he said.

Team member Andrew Leslie agreed with Parten.

"You couldn't describe it," the graduate student from Lubbock said of the feeling he had when they finally got the car running.

For him, the project is a combination of many of his favorite pursuits.

The competition runs through June 12, the day the winner will be announced.

Hedi Toth • 796-5716



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News and Events

Hawaiian Efforts Support Renewables, Efficiency, Fuel Cells

Recent public and private efforts to advance renewable energy, energy efficiency, and fuel cells in Hawaii—including plans to spend up to \$10 million in support of power projects—are giving the state a new prominence in the clean energy

The Hawaiian Electric Company (HECO) is involved in many of these action items, including low-interest loans and rebates for solar hot water systems in Honolulu and of the Hawaii Fuel Cell Test Facility, also in Honolulu. And in late May, HECO announced that its subsidiary, Renewable Hawaii, Inc., is requesting proposals for renewable energy projects on the island of Oahu. The company has approval to invest \$10 million in grid-connected power projects that draw on renewable energy. See [press releases](#) and the [Renewable Hawaii Web site](#).

HECO also worked with the State of Hawaii and DOE's National Renewable Energy Laboratory (NREL) to generate new high-resolution wind resource maps for the islands of Oahu, Maui, Molokai, and Lanai. Although the full set of maps is currently being validated by a local meteorologist and by NREL, the [50-meter wind speed maps for each island](#) are now available.

Hawaii is also showing leadership in its State Energy Program and Weatherization Assistance Program, which earned the praise of Deputy Secretary of Energy

Assistance Program, which earned the praise of Deputy Secretary of Energy McSlarrow during a visit on May 30th. Hawaii's State Energy Program is set to develop wind and solar energy and is working to implement a Model Energy Efficient Buildings Program. Hawaii's Weatherization Assistance Program works in cooperation with community organizations to improve residential energy efficiency for low-income families. The two programs will receive a total of \$526,000 from DOE for the 2004 fiscal year. See the [DOE press release](#).

New One-Megawatt Solar Installations Online on Both Coasts

Two large solar power installations, both weighing in at a megawatt in capacity, went online in late May in California and on Long Island, New York.

In California, BP Solar installed 9,700 solar panels on the roofs of 11 stable Mar Fairgrounds near San Diego, providing a combined peak generating capacity of one megawatt. The \$4.8 million project will produce enough power each year to meet the annual electrical needs of 300 homes and is expected to save the fairgrounds more than \$250,000 per year. The San Diego Regional Energy Office (SDREO) provided a financial incentive of nearly \$2.3 million for the project. See the SDREO press release (PDF, 10 KB). [Download Acrobat Reader](#).

On Long Island, Shell Solar and PowerLight Corporation dedicated a one-megawatt solar power system at Fala Direct Marketing, one of the nation's leading direct marketing companies. The system consists of 13,464 solar panels covering nearly 2.4 acres of three buildings. See the [Shell Solar press release](#) and the [Long Island Power Authority Web site](#).

New Minnesota Law Supports Renewables, Requires Xcel Energy to Double Funds and Install 300 Megawatts of Wind Power

A new law in Minnesota requires Xcel Energy, the state's largest electric utility, to double its contribution to a renewable energy fund, install at least 300 megawatts of new wind power capacity, and install renewable energy technologies whenever they are the most cost-effective resource. The legislation, signed into law in late May by Minnesota Governor Tim Pawlenty, affirms a settlement between Xcel Energy and the Prairie Island Indian Community that allows the continued operation of the Island nuclear plant by approving additional storage of nuclear waste at the site. As part of the settlement, Xcel Energy will contribute \$16 million per year to the Renewable Development Fund for as long as the nuclear plant continues to operate.

The new bill also provides an additional \$4.5 million to subsidize small wind installations totaling 100 megawatts in capacity, and provides \$1.5 million for biogas projects on farms. It requires the state's utilities to develop formal plans to produce 10 percent of their power from renewable energy sources by 2015. The bill provides a \$10 million grant and \$2 million in annual funding to the Minnesota for research and development of hydrogen and other renewable energy sources. See [Governor Pawlenty's press release](#).

Iowa Utilities Propose a Wind-Powered Energy Storage Plant

A group of municipal utilities in Iowa are proposing to build a unique power plant that will combine wind power with a compressed-air energy storage (CAES) facility. The proposed Iowa Stored Energy Plant (ISEP) will use a 100-megawatt wind power plant to pump air into an underground aquifer, compressing the air. During times of high power demand, the compressed air will be supplied to 200 megawatts of combustion turbines that are fired with natural gas, allowing the turbines to operate at higher efficiencies. The group places the cost of the ISEP at \$215 million and hopes to start the project this fall, with a startup date in mid-2006. See the [ISEP Web site](#) and [Background page](#).

CAES plants work by replacing a combustion turbine's compressor with a

compressed air. Nearly two-thirds of the natural gas supplied to a conventional combustion turbine is used to drive the compressor, so a CAES plant burns more natural gas than a conventional combustion-turbine plant. Currently, two CAES plants exist: a 290-megawatt plant in Germany and a 110-megawatt plant in Alabama. A 2,700-megawatt CAES plant has also been proposed by CAES Development LLC for construction in Norton, Ohio. See DOE's [Distributed Energy Resources](#) and the [CAES Development Company Web site](#).

Efficiency Vermont Wins Award for Excellence in Government

Efficiency Vermont—the nation's first independent, ratepayer-funded "utility" devoted to delivering energy efficiency rather than power—was awarded the prestigious Innovations in American Government Award in May. Efficiency Vermont was one of 10 awardees among nearly 1,000 applicants, and will receive a \$100,000 grant.

In 1999, Vermont's Public Service Board contracted with the private, nonprofit Energy Investment Corporation to deliver energy efficiency services throughout the state. In its first three years, the program generated over 99,000 megawatts of electricity savings and is also saving 109,000 gallons of propane, 29 million gallons of gas, 123,000 gallons of oil, and 50 million gallons of water annually. See the [release](#) from the Council for Excellence in Government.

According to the American Council for an Energy Efficient Economy (ACEEE), energy efficiency is a resource that can help electric utilities maintain reliability, defer distribution system investments, and reduce peak demand. You can learn more by attending ACEEE's "National Conference on Energy Efficiency as a Resource" on June 9th and 10th in Berkeley, California. See the [ACEEE conference Web site](#).

FutureTruck Competition Now Underway Near Detroit

Teams of students from 15 top universities converged near Detroit on June 3 to demonstrate how the Ford Explorer can achieve low air emissions while boosting economy by at least 25 percent. No, this was not some form of environmental challenge but rather a competition by engineering students to find the best way to significantly cut emissions for Ford Motor Company's sport utility vehicle. The re-engineered Explorers include such features as hybrid electric drives, lightweight components, and engines fueled with hydrogen and other alternative fuels.

The FutureTruck competition, sponsored by Ford and DOE, takes place from June 3 through the 12th at Ford's Michigan Proving Ground in Romeo, Michigan, and at the Allen Park Testing Lab in Allen Park. The vehicles are judged in a number of categories to evaluate their technical performance and design. DOE's Argonne National Laboratory is managing the competition, which concludes with a press conference on June 12. The winning team will then display their vehicles at the Ford headquarters through June 15. See the [FutureTruck Web site](#), and follow the progress of the teams on the [FutureTruck Competition 2003 Web site](#).

Site News

Center for Energy Efficiency and Renewable Energy

The Center for Energy Efficiency and Renewable Energy (CEERE) at the University of Massachusetts Amherst provides economic analyses and technological innovations relating to energy and the environment. The CEERE research program draws on scientists that specialize in renewable energy, energy efficiency in buildings, industrial energy efficiency, and environmental technologies.

Energy Facts and Tips

California Power Outlook Positive Despite First Power Alert

The California Energy Commission (CEC) released its summer power forecast on May 25th, indicating that the state's power supplies should be adequate to meet peak demand, even with a hotter-than-normal summer. The CEC credited 1,000 megawatts of new generation added since the power crisis of 2000 and 2001. See the [CEC press release](#).

Following the CEC announcement, the California Independent System Operator (CAISO), the organization responsible for operating the state's power grid—joined a coalition of California utilities and state agencies on May 27th to launch this summer's conservation campaign. Despite the CEC's forecast, the group still emphasizes the importance of energy conservation, noting that high electricity use could deplete the state's stores of natural gas, potentially impacting this summer's and next summer's natural gas prices. See the California ISO press release ([PDF 55 KB](#)). [Download](#) the press release.

Ironically, the state's conservation message was driven home the very next day when the California ISO declared a Stage One electrical emergency due to unusually high temperatures in the state. At 3 p.m., the ISO asked consumers to avoid using electrical appliances until after 7 p.m. Although a dip in operating reserves was reported, power emergency, the state did not reach the higher alert levels associated with possible power blackouts. See the California ISO press release ([PDF 23 KB](#)).

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U.S. Department of Energy

Content Last Updated: June 11, 2003

Washington Observer Reporter, PA

June 3, 2003

Two WVU students from Greene participating in national competition

Two Greene countians are among West Virginia University engineering students relying on electricity, diesel and soy-derived fuel to earn the "green" thumbs-up from judges looking for the most fuel-efficient sport utility vehicle in North America.

Casey Himel of Waynesburg and Kenneth McGowan of Wind Ridge are part of WVU's 25-member team competing in FutureTruck 2003 now through June 12 at Ford Proving Grounds in Romeo, Mich., and the automaker's world headquarters in Dearborn, Mich. WVU of Morgantown, W.Va., one of 15 schools from the United States and Canada competing, has finished sixth overall the past two years and shared the winning title with the University of Maryland in 2000.

"We're running again as a hybrid vehicle, part diesel and part electric," said Nigel Clark, a mechanical and aerospace engineering professor and the team's faculty adviser. "We are using a Detroit diesel engine, which will burn a 35 percent soy diesel/65 percent petroleum diesel blend. This year, we are using the electric motor employed in the production of the electric Ford Ranger pickup."

The use of soy as a fuel reduces diesel smoke and greenhouse gas emissions, Clark said. The soybean plants utilize carbon dioxide when they grow, so adding soy as a fuel source does not contribute any more of the greenhouse gas to the atmosphere, he added.

FutureTruck is a unique engineering program that brings together industry, government and academia in an effort to address environmental and energy-related issues posed by the growing demand for sport utility vehicles. Ford and the U.S. Department of Energy are the main sponsors, and Argonne National Laboratory's Center for Transportation Research manages the program.

Participants take a Ford Explorer donated by the automaker and re-engineer the insides to improve fuel economy and exhaust emissions without sacrificing performance, safety and affordable price. Ford also donates parts and \$5,000 to each school.

Other features of WVU's vehicle include a particulate trap to eliminate smoke emissions, urea injection to reduce nitrogen oxides and new control system using National Instruments hardware.

FutureTruck provides hands-on experience for the students, and several WVU graduates have landed jobs at the Big Three automakers as a result of their participation in the program, Clark said.

"At this time in a tight job market, employers are interested in engineers who have practical experience and can hit the ground running," he said.

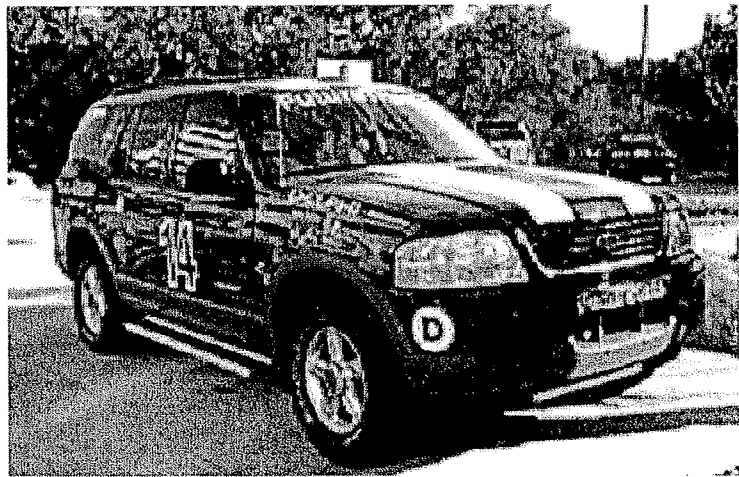
Other schools participating are California Polytechnic State University at San Luis Obispo; Cornell (N.Y.) University; Georgia Institute of Technology; Michigan Technological University; Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta (Canada); University of California-Davis; University of Idaho; University of Maryland; University of Tennessee at Knoxville; University of Wisconsin at Madison; and Virginia Tech.

Green Means Go: FutureTruck Competition Brings Fuel Efficiency to Trucks/SUVs

by Lee Goldberg

Greetings from Austin, Texas, the self-proclaimed "live music capital of the world," and what appears to be the highest per-capita concentration of tattoo parlors in any developed nation. And while the tattoos, blues, and booze that characterize Austin's 6th Street music district would be the destination of choice for most students: But a group of electrical and mechanical engineering majors seem just as excited to sit in a darkened conference room, boning up on hybrid vehicle technology. They have come to National Instruments' North Austin campus from 15 North American universities to attend one of several technical briefings they get as participants in the FutureTruck 2003 competition.

Conceived and managed by the U.S. Department of Energy's (DoE) Argonne National Labs, the FutureTruck event is a bold initiative that challenges 15 university teams to re-engineer a conventional mid-sized truck or SUV into a lower emissions vehicle (LEV) with at least 25% better fuel economy. Contestants in the current two-year competition cycle have all been given identical 2002 Ford Explorers from Ford Motor Corp. as their baseline vehicle. They can modify their truck using virtually any technology, fuel, or construction technique, but must do their best to maintain as much as possible of the original performance, utility, safety, and affordability that the original truck delivered.



Last year, the teams ran their vehicles in the first of two performance "bake-offs" that factor in fuel efficiency, emissions, acceleration, handling, consumer acceptance, and off-road performance to determine the overall winner. Now a bit more than halfway through the two-year challenge, they are busy further modifying and refining their entries for the final competition this summer.

...download complete report [here](#) (359kb PDF file)

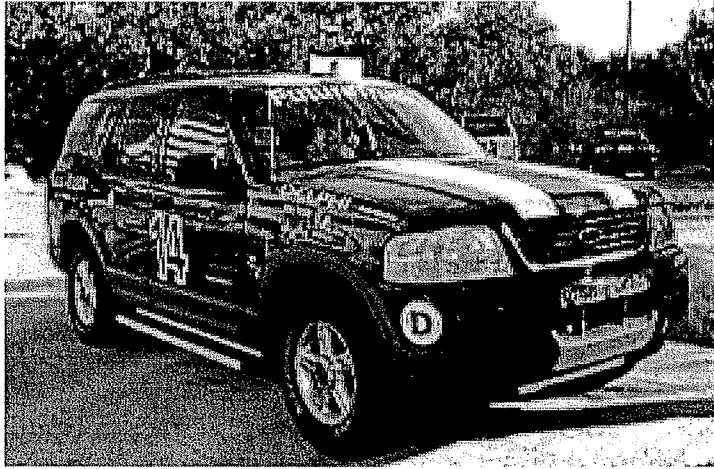
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Green Means Go: FutureTruck Competition Brings Fuel Efficiency to Trucks/SUVs

by Lee Goldberg



Penn State FutureTruck Head-On

Greetings from Austin, Texas, the self-proclaimed “live music capital of the world,” and what appears to be the highest per-capita concentration of tattoo parlors in any developed nation. And while the tattoos, blues, and booze that characterize Austin’s 6th Street music district would be the destination of choice for most students: But a group of electrical and mechanical engineering majors seem just as excited to sit in a darkened conference room, boning up on hybrid vehicle technology. They have come to National Instruments’ North Austin campus from 15 North American universities to attend one of several technical briefings they get as participants in the FutureTruck 2003 competition.

<http://www.futuretruck.org/>

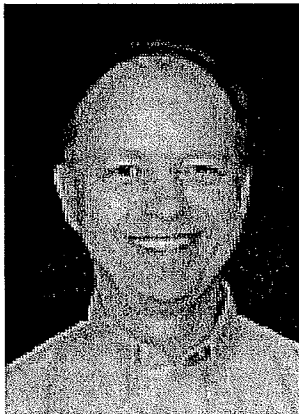
Conceived and managed by the U.S. Department of Energy’s (DoE) Argonne National Labs, <http://www.anl.gov/> the FutureTruck event is a bold initiative that challenges 15 university teams to re-engineer a conventional mid-sized truck or SUV into a lower emissions vehicle (LEV) with at least 25% better fuel economy. Contestants in the current two-year competition cycle have all been given identical 2002 Ford Explorers from Ford Motor Corp. as their baseline vehicle. They can modify their truck using virtually any technology, fuel, or construction technique, but must do their best to maintain as much as possible of the original performance, utility, safety, and affordability that the original truck delivered.

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The Next Logical Step

Although Robert Larsen, Director of the Center for Transportation Research at Argonne Labs, laid the foundation for FutureTruck around 15 years ago, the recent concern over America's dependence on a high percentage of imported petroleum, the pressure to require tailpipe emissions from SUVs be as clean as those from automobiles plus the possible specter of global warming makes the program even more timely today. This, coupled with the fact that over 50% of US new vehicle sales are either light trucks or SUVs means that the technologies the students are using could play a critical role in reducing both our fuel consumption and cleaning our air.

The innovative fuel-saving technologies being pioneered by Ford, GM, Honda, Toyota, and others that will be showcased at FutureTruck are essential for improving the economy of both cars and heavier vehicles. Pat Ford, Project Manager of the FutureTruck program at Ford Motor (no relation to the company's founding family), explained that the incremental improvements being made in conventional cars and trucks were approaching their limits.



Ford's Pat Ford, "Conventional fuel-saving technologies are approaching their limits. Hybrid technologies are the next step."

Larsen pointed out that over the years manufacturers have squeezed most of the practical savings possible from reduction of aerodynamic drag. And while vehicles can be made a bit lighter, most of the "low hanging fruit" is already picked. "There are just darned few cost-effective materials that are light and strong enough to replace steel in most structural parts," he sighed. Pat Ford added that he expects to see another 5%-10% reduction in vehicle mass with aluminum and composites in the next 5 years, but not much more.

By pushing traditional design practices to their limits most officials at the FutureTruck conference expect the industry to coax 5%-10% mileage gains from a conventional five-passenger Taurus-class vehicle. From that point most future energy savings will have to come from so-called exotic technologies, such as fuel cells and hybrid-electric propulsion systems.

While they still rely on a small conventional internal combustion engine (ICE), hybrid vehicles also have an electric drive subsystem to provide bursts of added power for acceleration and climbing hills. This allows them to use a smaller, lighter, gasoline engine that can easily maintain the car at cruise speeds. Surplus engine power and energy recovered from dynamic braking are turned back into electricity and pumped back into the on-board battery for the next hill or stoplight.

Depending upon the specifics of the hybrid technology the manufacturers add to the equation, they expect to see a 25%-50% improvement in a vehicle's overall fuel efficiency, with the most gains in stop-and-go traffic. Roughly 50% of the savings will be realized from engine downsizing, while 20-30% will come from regenerative energy capture. The rest of the efficiency gains will come from sophisticated engine control features, such as allowing the engine to run within a tighter RPM range and letting it turn off and on at stoplights and other low-demand situations.

Improved control strategies for ICEs may boost efficiency even further. Larsen explained that today's automotive electronics afford excellent control over engine spark and fuel, but electronic valve actuation is still under development. "Once the intake and exhaust are under reliable computer control," he said, "We'll be able to manage the combustion process even more tightly. And more control," he grinned, "Means more efficiency."

A Potpourri Of Technologies

The once-stock trucks have evolved to incorporate an interesting cross-section of clean-burning, high-efficiency propulsion systems. While most of the trucks still run ICEs under their hoods, the power plants replacing the original 4.0-liter V-6 range from an Ethanol-burning (85% Ethanol/15% gasoline) 4-cylinder, 1.8-liter turbocharged Mazda unit, to an assortment of compact diesel engines outfitted with experimental catalytic soot traps. Most of the diesels also burn a 35/65 "bio-diesel" blend of soybean-derived and petroleum-based fuel.

The design of the hybrid-electric elements that augment the smaller engine's performance also vary wildly, with teams placing engines ahead of, behind, and even in parallel with the transmission. At least two teams have chosen a "through-the-road" hybrid system where the "gas" engine does the majority of the heavy lifting through the rear wheels while a completely separate electric drive on the front wheels provides additional boost and braking. Unfortunately, the two schools that developed hydrogen fuel cells have had to move on to different technologies when their fuel cell supplier was acquired by General Electric last year and dropped out of the program.

To manage all the additional systems, these vehicles pack a bunch of extra electronics. While a production hybrid vehicle will use purpose-built automotive control modules, the students' prototypes make heavy use of data acquisition and control modules supplied by National Instruments (NI) as part of its sponsorship role. Peter Zogas, vice president of sales at National Instruments, explained how NI's ruggedized PC-based instrumentation modules provide a "quick-and-dirty" way to develop and implement control algorithms

for vehicle management functions. “Typical tasks might include a drive-by-wire throttle that smoothly blends electric and gasoline power, or managing energy flow during regenerative braking,” he said.

In a different configuration the same module can be used to perform most of the elaborate monitoring and analysis tasks required to understand the overall performance of the vehicles, and their subsystems. Since much of the scoring is based on efficiency and performance each team will outfit its vehicle with the electronics necessary to measure its energy consumption, speed and acceleration and compare it to environmental and the road conditions. By correlating this against distance traveled - derived by GPS and augmented by inputs from the odometer and wheel position - the teams and the judges can get a detailed picture of how the car uses its energy under varying road conditions.

Under The Hood

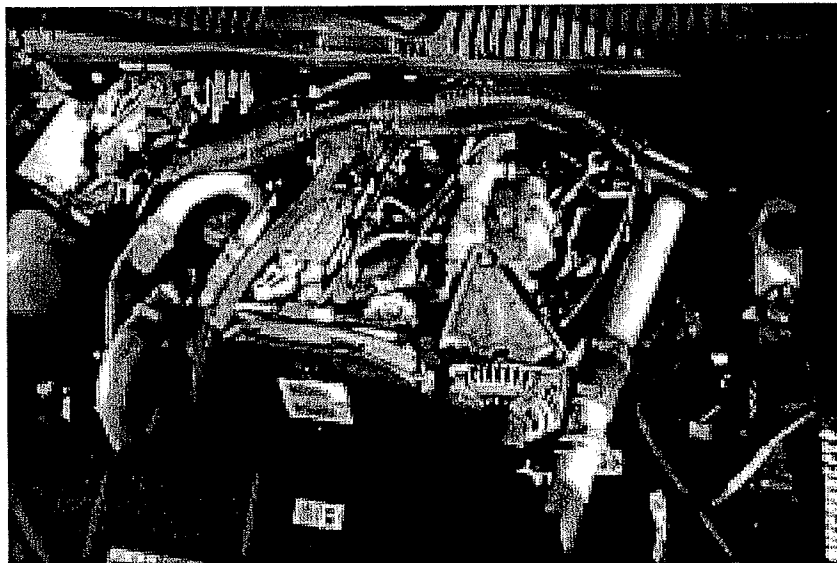
Since facts and figures don’t mean much unless they translate into a vehicle that’s easy and fun to drive, my pedal foot was just itching to get hold of one of the FutureTruck machines. Happily, our hosts were more than happy to oblige. I was introduced to Paul Minear, and Jon Weidner, a pair of EE majors at Penn State, who had brought their team’s hybrid diesel-electric Explorer out to Austin with them.



**FutureTruck contestants Paul Minear, Jon Weidner,
pose with Penn State’s truck and mascot**

At first glance, the Penn State entry looks pretty much like a stock Explorer...well pretty much stock, as long as you ignore the dozen-odd sponsors' stickers plastered all over its hood and hindquarters. The resemblance begins to fade quickly as soon as you pop the hood and find a cute little 4-cylinder 2.5-liter Detroit Diesel unit tucked in where the gas-burning 4-liter V-6 used to be. This, a few dozen yards of added plumbing, several mysterious boxes of electronics, and some non-Ford cable bundles that are obviously designed to carry high amperages all give you the idea that this truck has seen some *serious* modification.

A brief crawl under Penn State's creation reveals the electric side of the drivetrain – a 37-kW ac induction motor originally used as the primary drive in a Solectria Force www.solectria.com electric car. It's coupled in parallel with the output shaft of the truck's 5-speed transmission, just ahead of the transfer case.



Under the hood, a 2.5-liter diesel, and a 37-kW electric motor

Most of the Explorer's stock interior has been left intact, with the lead-acid battery pack tucked neatly in the rear of the vehicle. One might never suspect the big changes lurking behind the firewall, except for a few non-stock switches on the dash, and a large heap of sensing and control modules that have been shoehorned between the first two passenger seats. While rather messy-looking, the electronics are well-positioned to make the frequent tweaking and reprogramming with new software uploads fast and easy. A large LCD mounted above the electronics allows the "flight engineers" in the back seat to call up various monitoring and diagnostic screens, as well as make real-time tweaks to the control algorithms that govern the behavior of the electrical systems.



Inside the prototype - several computers, loose wires, and fuzzy dice

The software is one of the things still undergoing significant changes as the car approaches its final configuration for the 2003 competition this spring. While all the functions, such as transitions between pure diesel and diesel-electric propulsion and regenerative braking are functioning, the algorithms are still being refined to yield the best efficiency, and the best possible driver experience.

Green Means Go!

And speaking of driver experience, I was able to talk Jon and Paul into letting me take the left seat in their hand-built vehicle. I slid into the leather bucket seat, adjusted the mirrors, turned the key, and was rewarded with the burbling rattle of the sweet little Detroit mill at idle. Unlike some hybrids (such as the Toyota Prius) the Penn Truck's simpler parallel drivetrain usually requires the petro-engine to be turning in order to be driven. My preflight instructions were pretty simple - don't touch the extra (non-stock) switches embedded in the dashboard, try to keep the engine below 3000 RPM, and don't crash into anything.

Easing in the clutch with about one-third-throttle produced a pleasant, beefy push into my seat as we pulled away from the curb. At this point, Paul told me, we were still under straight diesel power, but the low-end torque characteristics gave it a very satisfying punch. Once underway the diesel's perking noises faded and my experience of driving around the grounds of the National Instruments' campus became indistinguishable from a conventional SUV. I still wanted to see what the truck would do when pressed, so I located a patch of straight road and punched the throttle down.

With the truck in second gear and the pedal to the floor, there was a very slight hesitation as the diesel adjusted to the load and the electric drive system decided what to do. Once the systems made up their mind the Explorer hunkered down and began to do its stuff. The pull from 20 mph was quite brisk and continued to glue my butt into the seat as we shifted to third gear at around 40 mph, just before we ran out of straight road. Although I have not driven a stock Explorer to compare it to, the 4-cylinder hybrid felt very much like the other V-6-powered light trucks and SUVs I've been in. Jon said that their truck actually accelerates slightly better than with the original equipment, and I believe him.



The author at the wheel, "I've gotta get me one of these!"

Deceleration and braking were smooth and effective, hauling us down to a reasonable speed before the truck encountered the guard rail at the curve that loomed in the windshield. The brake action was so seamless that I had to take Jon's word that the regenerative braking system was actually taking much of the kinetic energy and putting it back into the batteries. Jon also explained that the slight hesitation I felt was a

shortcoming of the control system that read throttle position and blended the electric power into the drivetrain. The original system they developed only reads throttle position in coarse increments of around 25%, causing small, but noticeable, surges and lags. I'm sure that well before the Penn State Explorer arrives for its final competition in Detroit this June, the new throttle hardware (and matching software) will have sufficient granularity to completely mask the slight hesitation from the diesel and provide a very seamless blending between the two power systems.

Bad News/Good News

These, and other changes to the vehicle, should make it perform as well, or better, than an out-of-the-box Explorer under most conditions. Extremely long uphill pulls with a large trailer in tow, or highly-demanding off-road conditions will eventually deplete the reserves in the electric drive system faster than they can be replaced, and force the car to rely solely on diesel power. But 90% or more of the folks who drive these kinds of trucks will rarely, or never, encounter those conditions.

For those that need full power all the time they can keep their 12-15-mpg trucks. The rest of us may soon be able to enjoy the 25-50% increase in fuel economy that hybrid trucks are expected to deliver. While the Penn State Explorer has only been able to demonstrate fuel economy roughly equivalent to the 15 mpg that the unmodified control vehicle delivered on the FutureTruck test course, everyone agrees the future looks bright. Last year, during the 2002 competition (when the trucks were not modified or fine-tuned), seven of the 15 vehicles were able to equal or better the stock SUV mileage. The best mileage for 2002 was delivered by the University of Wisconsin's diesel-electric hybrid, which turned in an impressive 21.85 mpg (Vs. the 15.06 for the control vehicle), a 45% improvement.

All the trucks are expected to do much better when they meet in Detroit in June, after a full year to refine their designs. For Paul and John, this will mean spending the next several months installing and testing software tweaks, and making some last-minute reductions in structural and rotating mass, with perhaps a few last-minute surprises.

We pulled into the parking space and I reluctantly turned off the engine. This had been fun and I was already trying to imagine how much a "civilian" version of such a FutureTruck vehicle would cost, and when it would be available. Noticing the wistful look in my eye, Pat Ford told me that Ford was preparing to bring a hybrid version of its Escape mini-SUV to market some time in 2003. <http://www.hybridford.com/index.asp> He said that Ford's goal is to be able to offer it for sales at only a slight premium over the cost of a conventional Escape. It's expected to deliver 35-40 mpg in city driving, and 29-30 mpg on the highway.

Besides giving environmentally-minded consumers their first chance to buy American, the hybrid Escape may signal the start of a growing market for the sophisticated control electronics that make the dual-system vehicle operate smoothly and efficiently. This in

turn would mean more opportunities and jobs for electrical engineers and technicians who design, manufacture, and support these vehicles, and their successors.

While its smaller size may not make it useful to some current truck owners, it should address a good percentage of the public who want a sporty vehicle with a bit more capacity and capability than a conventional sedan. In any case, it will still be a good start towards improving the fuel efficiency of the American fleet.

The hybrid Escape represents the fruit of many years of research by Ford, but it also borrows ideas from university research and earlier student engineering competitions like FutureTruck. In time, we can expect to see the cars and trucks we drive reflecting the lessons learned by John, Paul, and their colleagues as they learn to turn their engineering dreams into practical realities. And in doing so they create a better world for all of us.

*For more information on the FutureTruck competition, and its associated events, point you browser to <http://www.futuretruck.org/>, or contact Kristen De La Rosa, Project Manager Argonne National Laboratory 2206 East 22nd St., Austin, TX 78722
e-mail: kdelarosa@austin.rr.com, phone: 512/481-8876.*

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David Holloway is NSF Outstanding Advisor of the Year

At the FutureTruck 2003 Awards Ceremony held June 12 in Dearborn, Michigan, Professor of Mechanical Engineering David Holloway received the National Science Foundation Outstanding Faculty Advisor of the Year Award.

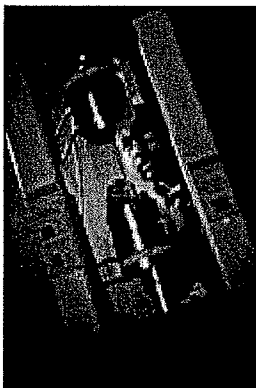


The FutureTruck team — Dr. Holloway is standing at far right

Dr. Holloway received this award for his outstanding work in incorporating the Advanced Vehicle Technology Competition (AVTC) activities into the classroom and for his significant impact on the engineering education of his students. This award carries a \$20,000 fund to be used to enhance the integration of AVTC activities into the undergraduate curriculum for the benefit of the students.

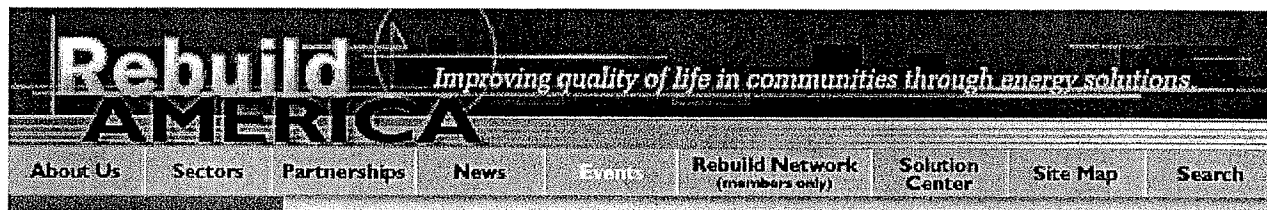
Over the past three decades, Dr. Holloway has selflessly and quietly dedicated himself to improving the educational experience of our students. He has made profound contributions to integrating automotive technology into the curriculum and engaged hundreds of students in real-world projects aimed at advancements in vehicle technology: lower fuel consumption, improved performance, better environmental characteristics and enhanced functionality. He motivates the students and brings the best out of them.

In announcing this award to the University, Clark School of Engineering Dean Nariman Farvardin stated, "Please join me in congratulating Dr. Holloway for this outstanding national recognition and in thanking him for what he has done for the institution over the past 32 years."



[[Archived 2002 News Stories](#)]

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Rebuild Events

FutureTruck 2003

Community

Partnership Events

Start Date: 6/2/03**End Date:** 6/12/03**Location:** Romeo, MI

Strategic

Partnership Events

During the 2003 competition, 15 student teams will optimize a conventional Ford Explorer emissions vehicle with at least 25% higher fuel economy without sacrificing the performance, safety, and affordability consumers want. To meet this challenge, the teams will employ cutting-edge automotive technologies, advanced propulsion systems, lightweight materials, and alternatives such as hydrogen, ethanol, and biodiesel.

Business

Partners Events

Submit an Event

FutureTruck 2003 will be held at Ford Motor Company's Michigan Proving Ground in Romeo, MI. Vehicles will be judged in events that will evaluate their technical performance (acceleration, towing, off-road handling, and on-road fuel economy) and design (consumer acceptability, design review, and oral presentations). The competition will culminate in a vehicle display ceremony held in conjunction with Ford's Centennial Anniversary in Dearborn, Michigan.

This event is sponsored by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, Ford Motor Company, and others.

For more information [click here](#).



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The Romeo Observer

May 28, 2003

New manager brings new mission to Proving Grounds



KING OF THE MOUNTAIN. Ford Michigan Proving Grounds Manager Mark-Tami Hotta stands on top of Trombly Mountain which is the highest point in Macomb County at an elevation of 1,167 feet. Ford uses the knoll formed by ancient glaciers in Bruce Township to test vehicle abilities on various grade slopes. In the background are some of the 100 miles of test tracks that make up the 3,880 acre facility. (Observer photo by Karen Hamilton)

by LARRY SOBCZAK
Observer Staff Writer

Mark-Tami Hotta drove an SUV around one of the banked turns at the Michigan Proving Grounds at 90 mph -- but no hands on the steering wheel.

It wasn't a demonstration of carelessness by the MIT and Stanford engineering graduate, it was to show that forces controlling an automobile aren't always obvious.

As an engineer and an amateur race car driver, he knows that when a vehicle reaches a certain speed that gravity and centrifugal force balance out and the car will naturally follow the banked curve without turning the steering wheel.

"It's called neutral speed," said Hotta who is the newest manager of the Ford Michigan Proving Grounds.

"A little bit faster and the vehicle goes higher up into the turn. A little slower and it drops down out of the bank," he said.

Being in control is natural for Hotta who has worked as a management consultant and investment banker before coming to Ford.

His career at Ford includes product planning, engineering, finance and manufacturing. He has been chief engineer on six vehicle programs with his last position leading Ford's Windstar program.

"I'm an interesting blend of a business transformationalist and a driving enthusiast," he said.

Ford brought Hotta to the Proving Grounds last year to steer the 3,880 acre Bruce Township facility from strictly a product durability testing facility into a center for engineering development, media and marketing events, student programs and advanced driver training programs.

"We are transforming the Michigan Proving Grounds from an internal Ford durability testing facility into a multi-dimensional growth business. We're not eliminating the traditional testing," he said. "We're better utilizing our assets. Our operations didn't make sense economically."

For the first time in the test facility's 47 year history, competing automobile companies and their suppliers are now able to rent use of the 100 miles of test tracks, 4x4 tracks, specialty road surfaces and special test buildings.

In addition, outside clients are able to hire the expertise of the Proving Ground's 180 employees to perform the tests for them.

"It isn't a good utilization of our resources to keep this facility for internal durability testing alone," Hotta said.

Isuzu Motors, of which General Motors owns a 35 percent stake, was one of the first competing companies to use the facility.

He explained in order to accommodate Isuzu, Ford had to modify its confidentiality and safety policies to include a non-Ford company.

The staff and facility policies need to be modified to accommodate for outside companies.

The modifications included an investment of \$2 million for an all-wheel drive testing facility as well as temporary office space for outside clients.

"We weren't set up for outside customers. We did not have someone on staff whose job is to coordinate outside customers," Hotta said.

Hotta said that Isuzu engineers could have chosen the GM Proving Grounds in Milford but that its policies and staff were organized to accommodate only GM division products.

"It was just a lot more convenient for them (the Isuzu engineers) to make an hour and a half commute here instead of going to Milford," he said.

He said that the Proving Grounds has had several non-Ford customers since the change last year.

"There is actually more demand for the service than we have the ability to provide right now," he said.

Another new use for the facility is as a media and marketing event site. He said that Ford dealers, marketing staff and members of the media can now come to the proving grounds for specialty "ride and drive" events to learn about products.

"It's a lot safer and easier to let them drive on our test tracks than the open roads," Hotta said.

Hotta, who embraces teaching and mentoring programs, envisions opening the Proving Grounds to students.

Next month, three students from Utica Community School's science and engineering program will begin an internship program every Friday for half of the day.

"I would love to hook-up with more school systems. That's the kind of relationships we like to develop," he said.

The facility is hosting "Future Truck 2003" June 2-12 with more than 500 students participating from 15 North American universities.

The student teams will optimize a conventional Ford Explorer into a lower-emissions vehicle with at least 25 percent higher fuel economy without sacrificing the performance, utility, safety and affordability.

A certain level of personal enthusiasm grows as he speaks about plans to bring advanced driver training programs to the proving grounds.

Since 1990, Hotta has participated in auto cross races which is a style of racing where drivers race standard-equipped automobiles against the clock through a closed course in a parking lot or race track.

He said that aspiring racers pay tuition in excess of \$5,000 to professional driving schools in order to learn or to improve their driving skills.

"I think we can do it for much less," Hotta said. "Maybe for the cost of a few birthday presents we can offer the same kind of lessons."

The time spent overseeing all of the changes under way at the Proving Grounds is cutting into his weekend racing but not his driving enthusiasm.

"Unlike managers of other proving grounds, I'm out on the track a lot more," he said.

"This kind of satisfies some of my need to race because I'm getting a decent amount of seat time on the track."

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News Release[Back to Newsroom](#)

Wednesday May 28, 2003

Tofu Truck**WVU's FutureTruck entry runs on electricity, diesel - and soy****CONTACT:** Nigel Clark, College of Engineering & Mineral Resources 304-293-3111, ext. 2311

West Virginia University engineering students are relying on electricity, diesel and soy-derived fuel to earn the "green" thumbs-up from judges looking for the most fuel-efficient sport utility vehicle in North America.

WVU is one of 15 schools from the United States and Canada competing in FutureTruck 2003 June 2-12 at the Ford Proving Grounds in Romeo, Mich., and the automaker's world headquarters in Dearborn. WVU has finished sixth overall the past two years and shared the winning title with the University of Maryland in 2000.

"We're running again as a hybrid vehicle, part diesel and part electric," said Nigel Clark, a mechanical and aerospace engineering professor and the team's faculty adviser. "We are using a Detroit Diesel engine, which will burn a 35 percent soy diesel/65 percent petroleum diesel blend. This year, we are using the electric motor employed in the production of the electric Ford Ranger pickup."

The use of soy as a fuel for the second year in a row reduces diesel smoke and greenhouse gas emissions, Clark said. The soybean plants utilize carbon dioxide when they grow, so adding soy as a fuel source does not contribute any more of the greenhouse gas to the atmosphere, he added.

FutureTruck is a unique engineering program that brings together industry, government and academia in an effort to address environmental and energy-related issues posed by the growing demand for sport utility vehicles. Ford and the U.S. Department of Energy are the main sponsors, and Argonne National Laboratory's Center for Transportation Research manages the program.

Participants take a Ford Explorer donated by the automaker and re-engineer the insides to improve fuel economy and exhaust emissions without sacrificing performance, safety and affordable price. Ford also donates parts and \$5,000 to each school.

Other features of WVU's vehicle include a particulate trap to eliminate smoke emissions, urea injection to reduce nitrogen oxides and new control system using National Instruments hardware.

FutureTruck provides hands-on experience for the students, and several WVU graduates have landed jobs at the Big Three automakers as a result of their participation in the program, Clark said.

"At this time in a tight job market, employers are interested in engineers who have practical experience and can hit the ground running," he said.

Members of WVU's team are captain Lawrence "Tony" Feragotti, Jason Cheslock, Michelle Felice, Jason Gill, Andy Hunnell, Russell King, Bill McCartney, Petr Sindler, Brad Taylor, Patrick Thomas and Nick Thompson, all of Morgantown; Matt Barnes of Keedysville, Md.; Andrew Cullipher of Newport News, Va.; Jason Drennen of Summersville; Mark Frosino of Rochester, N.Y.; Casey Himel of Waynesburg, Pa.; Daniel Judy of Uniontown, Pa.; Jill Kowaleski of Bramwell; Kenneth McGowan of Wind Ridge, Pa.; G. Kurt Miller of Wheeling; Paul Parise of Bethel Park, Pa.; Mike Pitzer of Monmouth Junction, N.J.; Jeremi Robinson of Bluefield; and Rich Rothery of Elizabeth, Pa. Axel Radermacher, a graduate research assistant, is a co-adviser.

Other schools participating are California Polytechnic State University at San Luis Obispo; Cornell University; Georgia Institute of Technology; Michigan Technological University; Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California-Davis; University of Idaho; University of Maryland; University of Tennessee at Knoxville; University of Wisconsin at Madison; and Virginia Tech.

For more information about FutureTruck 2003, visit the program's Web site at <http://www.futuretruck.org/>.

jd/5/28/03

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**BUSINESS FIRST: THE
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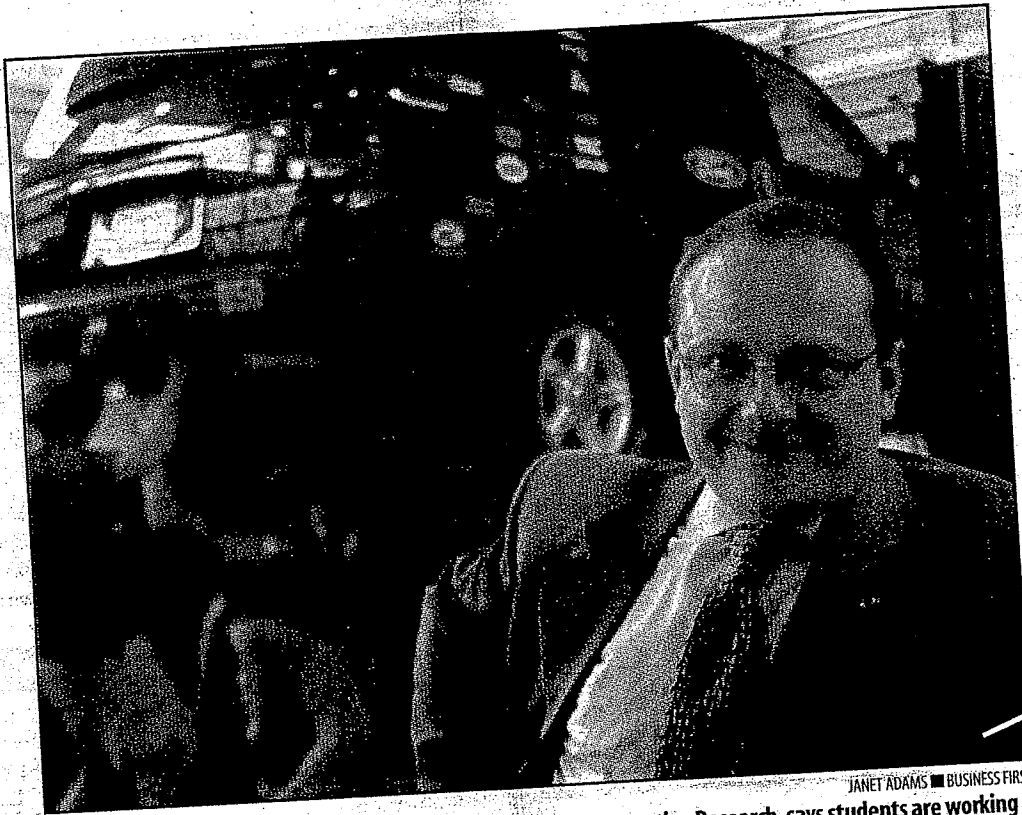
MAY 23, 2003



Bacon's

P23A

1968



JANET ADAMS ■ BUSINESS FIRST

Giorgio Rizzoni, director of Ohio State University's Center for Automotive Research, says students are working on the Ford Future Truck, a hybrid electric vehicle that runs off of biodiesel fuel.

HIGH-TECH DRIVING

*Alternative fuel research programs
generating local business opportunities*

WEL: Increased, in-state production of ethanol and biodiesel on the horizon

IN PAGE A23

ds in its bid, OSU could have a fleet of fuel-cell cars running a few years.

Fuel cell power opportunities

cells produce energy through chemical reactions rather than combustion and are as much as 50 percent more efficient than combustion engines. Since water vapor is the by-product, harmful emissions are virtually eliminated.

Ohio Development Department estimates the current U.S. cost for fuel cells is about \$218 per kilowatt and projects it will rise to \$7 by 2009. Applications include everything from large-scale electric-power generation, motor vehicles, portable electronic equipment, and military and aerospace products.

ner Inc., located in Hilliard, supplies power conversion equipment that, in the future, could yield small, mobile fuel cells for tractor trailers to power a truck's overnight. The trucks wouldn't have to idle the engine for hours at a stretch.

The 25-year-old company has entered partnerships with companies working on fuel cell technologies and received a \$1 million grant from the state's Third Frontier initiative to further develop its product's applications.

"There is a real need in the trucking industry right now, and there are probably 1 (million) to 2 million trucks on the road right now just in the U.S.," says Alec Cook, chief technology officer for Vanner. "I think the potential is huge."

NexTech Materials Ltd. is one of the companies worldwide to produce ceramic materials and technological processes specific to the nascent fuel cell industry. The 8-year-old company has more than 90 customers globally, has grown from two to 26 employees and is moving to a 54,000-square-foot facility in



The OSU team working on Future Truck is Mary Gilstrap, left, Giorgio Rizzoni, Kevin Do, Emanuela Calo, Matt Keener and Larry Slone.

Alternative fuel production sites needed

The story with other alternative fuels is very similar. Each technology is at a different stage of advancement, and the role played by Ohio farms or companies in their production varies.

Ethanol and biodiesel are in production around the country. During the summer, just about every car in Ohio is fueled with a mixture of 90 percent gasoline and 10 per-

cent ethanol, an alcohol-based chemical made from corn. State law requires the phasing out of the use of MTBE, a potentially toxic gasoline additive that is already replaceable by ethanol, by 2005.

Ethanol can increase the cost of gasoline roughly one cent per gallon per percent that it is blended with gas (a gallon of 10 percent ethanol blend would cost 10 cents extra). But that price could come down if an in-state producer of the fuel existed.

A 2001 study by Thomas Spofford, a professor in the OSU agriculture department, estimated the economic impact of an Ohio ethanol facility at between \$78.7 and \$104 million per year.

Biodiesel, another fuel alternative, is made from soybean oil or other vegetable or even animal oils. Any diesel engine made after 1994 can run on 100 percent biodiesel.

Biodiesel, currently blended with regular diesel, is slightly more expensive than regular gasoline. And like ethanol, in-state production facilities could not only lower the price of biodiesel but be a boon to farmers.

"Right now, biodiesel is more expensive

because of economies of scale. Think - there are tons of petroleum manufacturers out there and probably eight to 10 biodiesel manufacturers. But that has increased ... so it's a growing industry," says John Lumpe, director of new use development for the Ohio Soybean Council.

Lumpe says in-state production of biodiesel may not be far off. The council recently finished a feasibility study which showed such a facility could be profitable both for the fuel producer and for local farmers.

A vision of a future with corn- or soy-fed fuel-cell cars emitting nothing but water vapor and getting phenomenal fuel efficiency begins to emerge - but is not likely to happen within our lifetime, says Lumpe.

"(Biodiesel) is not going to completely replace regular diesel," says Lumpe. "There's just not enough soy grown in the whole U.S. But it can help reduce our dependence on foreign oil."

Guezennec agrees, "The fallacy the general public hears often is that we will be able to soon replace gasoline. But, more realistically, we will see a fragmentation of energy sources, a coexistence of many technologies and fuels from different sources."

to 20 employees and is moving to a new, 54,000-square-foot facility in Delaware County.

NextTech's fuel cells can be used to supply electric power and heat to homes using only natural gas, eliminating the need for villages and homes in remote areas to be on an electric grid.

Another fuel cell will soon be feeding enough electricity into the grid in Westerville to power 180 homes. Funded in part by an Ohio Fuel Cell initiative grant of about \$840,000, a \$1.26 million, 250-kilowatt plant being installed by American Municipal Power - Ohio is the first fuel cell to be installed at a utility substation to help meet baseload power demands. The plant is smaller than most traditional power stations so it's difficult to compare capital outlays, but it runs significantly more efficiently and will require almost no maintenance, according to AMP-Ohio Marketing Director Kent Carson.

"There is a lot of interest in potential commercialization but, realistically, it's still a few years out," says Vanner Inc.'s Cook of fuel cell technologies. "The ones we're working on are probably a factor of five to 10 times too expensive. They're not that far off from being viable in terms of cost but there are real-world installation issues, and probably it will be two to three years before we see the first real commercial applications." W

Electric Vehicle Online Today

May 23, 2003

Alberta Students Unveil Entry in FutureTruck Competition.

Natural Resources Canada (NRCan) recently announced that a team of engineering students from the University of Alberta has unveiled its entry in the upcoming FutureTruck 2003 competition, which requires participating teams to reengineer a Ford Motor Company Explorer sport-utility vehicle (SUV) to "become 25 percent more fuel efficient without sacrificing performance, safety and affordability."

"Over the past eight months, students have put together a powerful hybrid electric vehicle that runs on ethanol fuel to reduce greenhouse gas emissions," said University of Alberta dean of engineering David Lynch.

During the FutureTruck 2003 competition, which will be held June 2 through 12 in Michigan, NRCan said the team's HEV will compete against entries from 14 other U.S. universities, undergoing tests to determine "acceleration and on-road fuel economy, off-road performance and emissions testing." The agency noted that the University of Alberta HEV will be the "sole Canadian entry" in the competition.

"Encouraging our next generation of automotive engineers to keep the environment in mind as they design tomorrow's vehicles is essential," said natural resources minister Herb Dhaliwal.

Contact: Sherrell Steele, University of Alberta, phone 780-492-4514; FutureTruck 2003, website <http://www.futuretruck.org>.

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SEARCH RESULTS - STORY

Technology holds Canada's edge in diamond cutting -- Dhaliwal

David Finlayson

The Edmonton Journal

Wednesday, May 21, 2003

EDMONTON - Technology can help Canada's secondary diamond industry compete with cheaper labour costs in cutting centres such as India, Thailand and Armenia, federal Natural Resources Minister Herb Dhaliwal said Tuesday in Edmonton.

"Technology will be very important. They are now using lasers to polish and cut. We have to focus on areas where we can compete, and where we have advantages."

Dhaliwal said gaining a competitive edge will be one of the main issues at the country's first Diamond Roundtable today. The meeting has drawn more than 100 stakeholders, including governments, producers, processors, jewellers and the RCMP.


It's necessary to bring all the stakeholders together to plan the future of an industry that will eventually develop in Quebec and Manitoba, as well as the North, said Dhaliwal.

"We want to be a leader in the

**CREDIT: Brian Gavriloff, The Journal**

Federal Natural Resources Minister Herb Dhaliwal unveils the University of Alberta's entry in the Future Truck 2003 competition, in which students convert a Ford Explorer into an environmentally friendly vehicle. Dhaliwal is in town to take part in a diamond-mining roundtable discussion.

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diamond industry all the way from mining to processing to cutting and polishing. It's a huge opportunity for Canada."



Diamond processing companies in Yellowknife have said the high cost of living and doing business in the Northwest Territories is a handicap. The aboriginal-owned Deton Cho Diamonds, one of the first cutting and polishing companies in Yellowknife, closed down last year after only two years in business.

Also high on the agenda will be the need to develop skills to keep the processing industry going, Dhaliwal said.

Yellowknife's Aurora College has a course for would-be diamond workers, but doesn't produce enough graduates to fill the demand.

At least one company has brought cutters in from Armenia.


The roundtable is closed to the public and media.

An action plan will be released at the end of the event today, Dhaliwal said.

dfinlayson@thejournal.canwest.com

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Students design truck of the future
By Richard Cairney

May 21, 2003 – A group of engineering students from the University of Alberta will be the sole Canadian team in an international competition to design fuel-efficient automobiles.

The students will bring their modified 2002 Ford Explorer to the Ford Motor Company's annual FutureTruck competition in Michigan, running June 2 – 12. Participating teams re-engineer a Ford Explorer to become 25 per cent more fuel efficient without sacrificing performance, safety, and affordability. During the competition, the SUV will undergo a battery of tests to evaluate its performance, fuel efficiency, and emissions.

**Herb Dhaliwal
checks under the
hood of the U of A
Future Truck with
engineering student
Darnell Orr**

"I know the fuel efficiency will be better because we've converted it to ethanol," said Clayton Bond, a third-year mechanical engineering student who leads the project. "But how much better is the mileage? I'll let you know in a couple of weeks."

Students have made some dramatic changes to the vehicle. They pulled the SUV's V-6, four-litre engine and replaced it with a two-litre engine from a Ford Focus. An electrical motor supplements the engine. Under different operating conditions, the electrical and gas motors kick in to support one another.

At high speeds, the electrical motor kicks in to support the gas engine, making it more fuel efficient. "And at low speeds, the effect is the opposite--it runs on the gas engine and the electrical motor kicks in," Bond said of the vehicle, dubbed 007.

He said that in all, about 20 students--from mechanical engineering, electrical engineering, computing sciences, and the School of Business--have been involved in the project. No credits are awarded for work on the project, which is considered strictly extra-curricular.

"This is really all about the students," said Dr. David Checkel, an engineering professor who oversees the FutureTruck project. "The students are the real legacy. They are going to be the real product."

Bond hopes that's true. During a send-off for the group held Tuesday, Ford regional manager Jim Hartford said students who had participated previously in FutureTruck competitions, have designed a new gas-electric hybrid Ford Escape that will be rolling off assembly lines this fall.

"I'm hoping that this will help lead to a good job, in the end," said Bond, whose interest lies in automotive engineering.

But besides helping to develop students' strengths, the competition will help the environment, said Herb Dhaliwal, the federal natural resources minister, who was on hand Tuesday for the send-off party. "Climate change is one of the most pressing environmental challenges we face," he said, adding that Canada is aiming to reduce greenhouse gas emissions from automobiles by 25 per cent by the year 2010.

The competition, Dhaliwal said, focuses on developing new knowledge and technology, taps the potential of "eager young minds", and connects the country's environmental goals with economic potential.

"This will have a very real impact," he said. "What we are seeing today is how we can take advantage of the opportunities that are going to be out there, in terms of climate change."

And the fact that the U of A is the only Canadian team in the competition "says something about the excellence of the U of A engineering faculty and its students," Dhaliwal added.

Dr. David Lynch, Dean of Engineering, offered the students words of encouragement. "This work is not only important to us, it's important internationally," he said, adding that the Faculty of Engineering is an international leader in clean energy research. "The FutureTruck 2003 competition provides an excellent opportunity for us to demonstrate our support of Canada's goal of a environmentally sound future."

Related stories

Getting their hands dirty (Report to the Community 2001-2002):
<http://www.report.ualberta.ca/stories/engineering/hands.htm>

Chasing a hybrid dream (ExpressNews, Feb. 7, 2002):
http://www.expressnews.ualberta.ca/expressnews/articles/news.cfm?p_ID=1901&s=a

Related links – internal

The U of A FutureTruck 2003 Project website:
<http://www.ualberta.ca/~future/>
The U of A Faculty of Engineering website:
<http://www.engineering.ualberta.ca/>

Related links – external

The FutureTruck website:
<http://www.futuretruck.org>
The Natural Resources Canada website:
<http://www.nrcan-rncan.gc.ca/inter/index.html>

this article: www.expressnews.ualberta.ca/expressnews/articles/printer.cfm?p_ID=4406

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FutureTruck 2003 Road Warriors

Students in Mechanical and Electrical Engineering at the University of Alberta today unveiled FutureTruck 2003 and announced that they are fired up for North-America-wide competition.

What is the FutureTruck 2003 challenge? To build a Ford SUV designed for lower emissions and 25% higher fuel economy – keeping performance, utility, safety and affordability as design guidelines.

Over the past eight months, U of A Engineering students have put together a powerful hybrid electric vehicle that runs on ethanol fuel to reduce greenhouse gas emissions. Now it's time to test its performance.

The FutureTruck 2003 team is about to travel to Ford's Michigan Proving Ground to compete against 14 U.S. teams. They are the only Canadians in the competition. The year's competition will take place from June 2 - 12 in Michigan.

Natural Resources Canada (NRCan) is a sponsor of Future Truck 2003 and a team. "Encouraging our next generation of automotive engineers to keep the environment in mind as they design tomorrow's vehicles is essential," said the Honourable Herb Dhaliwal, Minister of NRCan. "We have ambitious targets for greenhouse gas emissions in the transportation sector, and with our brightest minds at work, I'm sure we'll succeed."

Dr. David Lynch, Dean of Engineering, sent his students off with the following encouragement. "The Faculty of Engineering is an international leader in clean research. The FutureTruck 2003 competition provides an excellent opportunity to demonstrate our support of Canada's goal of an environmentally sound future."



pictured above is Herb Dhaliwal, Minister of Natural Resources Canada

DESIGN NEWS

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MAY 5, 2003



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AUTOMOTIVE DESIGN



WINNING WHEELS: The Penn State team of 2002 converted this Explorer into a parallel hybrid electric vehicle—combining a diesel engine and an ac induction motor (operating as both motor and generator) to power the vehicle.

In Pursuit of a Better SUV

Students apply their design skills to curb the appetite of a gas-guzzler

MADISON, WI—"Last year, I preached to the team: 'If we get down to work early, we can win,'" says Jason Helgren, leader of last year's FutureTruck team from the University of Wisconsin. His inspiration worked. The team dug in early and won the top prize for its fuel efficiency-improved redesign of a Ford Explorer. "Our biggest key to achieving fuel economy was to use a high-efficiency diesel engine, and we kept our weight down," says Helgren. The team's effort was a symbolic attempt to reconcile the SUV to newly emerging concerns over its high gas consumption and dirty emissions.

While more than half of all passenger vehicles are light trucks, a category that includes SUVs, Americans are becoming more aware of the environmental downside of running gas guzzlers. Add to this the new concern over our reliance on foreign oil and the vulnerabilities that dependence brings, and it's not too surprising that consumers are interested in efficient gas consumption, even if they don't want to give up their roomy SUVs.

In Search of Fuel Economy

As the automotive industry struggles to reconcile these conflicting desires with new technology, a handful of companies have teamed up with the

U.S. Department of Energy (DOE) to encourage the spirit of developing fuel-efficient, environmentally friendly SUVs by sponsoring FutureTruck (www.futuretruck.org), a competition in which teams of students from 15 top North American universities are challenged to re-engineer a conventional mid-size vehicle. The goal is to lower emissions while increasing fuel economy by at least 25%, all without sacrificing performance, utility, safety, or affordability. Companies in the auto industry work with DOE to support and judge the competition.

During the first two years of the competition, in 2000 and 2001, student teams worked with co-sponsor General Motors Corp. on Chevy Suburbans. Last year, the competition shifted to Ford Explorers donated by the automaker.

Judging for this year's competition will take place over ten days beginning June 2 at the Ford Michigan Proving Ground in Romo, MI, and at the Allen Park Testing Laboratories in Allen Park, MI. Team award ceremonies will be held June 12 in conjunction with Ford's Centennial Anniversary in Dearborn.

The University of Wisconsin team won in 2002 by reducing the Explorer's greenhouse gas index by 50% and increasing over-the-road fuel

economy by 45%, achieving a respectable 21.83 miles per gallon. The team re-engineered components and used advanced materials such as an alu-

FUTURETRUCK DESIGN GOALS

- Provide a high-quality engineering education experience for all participants.
- Apply and demonstrate advanced technology to reduce total life cycle Greenhouse Gas (GHG) emissions of production light trucks by two-thirds as compared to the stock vehicle.
- Achieve California ULEV II exhaust emissions with comparably low evaporative and running loss emissions.
- Maintain a fully functioning vehicle with air conditioning and all power accessories that the stock vehicle has.
- Demonstrate a towing capacity of 2,000 lbs.
- Demonstrate a 0-60 mph acceleration time of less than 12 seconds.
- Provide seating capacity for at least five adults with 45.7 ft³ of luggage capacity.
- Build popular awareness of and support for improving the energy efficiency and reducing the environmental impact of light-duty trucks.

M

FUTURETRUCK, Continued

minum and steel hybrid frame and a titanium exhaust system. Seven out of ten teams achieved better overall over-the-road fuel economy compared to the base 2002 Explorer. Two of the teams managed to exceed the Explorer's base performance while make environmentally sound changes to it.

Three of the modified Explorers actually qualified as Ultra Low Emissions Vehicles by controlling pollutants

such as non-methane organic gases, carbon monoxide, and oxides of nitrogen. Student teams were also required to maintain the Explorer's performance. The second-place Michigan Technology University team and the University of Idaho team both beat the stock Explorer in the eighth-mile acceleration test.

Halgren's University of Wisconsin team strolled off with highest honors last year, and now fellow 2002 team member Katie Orgish hopes to take the team back to the top spot this June. For Orgish, the allure of the FutureTruck competition is the opportunity it gives her to get away from her desk. "I don't think I'd mind working in the automotive industry," says Orgish. "I like working with a team and I liked getting out in the field and away from the computer."

Orgish is well-prepared to take the helm of the defending team, since this year will be her fourth year in FutureTruck competition. She spent last year in the know-all, help-all position as team "Radar"—a position modeled after the role of Radar in the "M.A.S.H." television show. "Just like Radar, I had to take care of all the details," says Orgish.

Software Plays a Supporting Role

Student team leaders gathered in Austin, Texas in January to kick off this year's competition and to train with co-sponsor National Instruments Corp. (www.ni.com) on the company's LabVIEW Real-Time and other virtual instrumentation technology provided to the student teams. National Instruments also gives each team access to an applications engineer who stands ready to advise the teams on their technological remakes of their Explorers. "The LabVIEW real-time is the brains that help preserve fuel economy for the hybrid vehicles," say Brent Boetking, data acqui-

sitions product manager at National Instruments.

For corporate sponsors, the involvement in the competition mirrors their own efforts to re-engineer SUVs for fuel efficiency and low emissions. Like the student teams, automotive OEMs and their suppliers are challenged to make these improvements without letting the vehicle's price and performance standards slip. "This is our fourth year participating. We do it because we're interested in education and fuel efficiency," says Misty Matthews, coordinator for company and government relations at Delphi Corp. She notes that even though the company doesn't turn to the innovations implemented by the student teams, the team members are viewed as potential employee candidates.

Sponsors Scout For Talent

National Instruments also scrutinizes the teams for potential engineering talent. "We've hired some of the graduates of the program," says Ray

IN 2002, THREE OF THE MODIFIED EXPLORERS ACTUALLY QUALIFIED AS ULTRA LOW EMISSIONS VEHICLES BY CONTROLLING POLLUTANTS SUCH AS NON-METHANE ORGANIC GASES, CARBON MONOXIDE, AND OXIDES OF NITROGEN.

Almgren, vice president of product marketing and academics at National Instruments. The company also benefits from its involvement by watching how team members work with National Instruments' products. "We see it as a great opportunity to understand how engineers interact with our tools in these applications," says Almgren. The match-up is very appropriate, since many of National Instruments tools are designed to solve fuel efficiency challenges in the real world. "Our applications are designed for controlling next-generation automobiles, and our tools are used extensively in fuel cell and hydroelectric products."

No doubt FutureTruck participants of the future will be evaluating a whole range of new technologies in their quest for a better SUV.

—Robert Spiegel



TWO-FOLD BENEFITS: "We see it as a great opportunity to understand how engineers interact with our tools in these applications," says Ray Almgren of National Instruments, a sponsor of the FutureTruck program.



WINNING TEAM: The University of Wisconsin took home top honors in the FutureTruck 2002 competition for its fuel efficiency-improved redesign of a Ford Explorer.

FUTURETRUCK 2003 TEAMS

- California Polytechnic State University, San Luis Obispo
- Cornell University
- Georgia Institute of Technology
- Michigan Technological University
- The Ohio State University
- Pennsylvania State University
- Texas Tech University
- University of Alberta
- University of California-Davis
- University of Idaho
- University of Tennessee-Knoxville
- University of Wisconsin-Madison
- Virginia Tech
- West Virginia University

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- Allen Park Test Lab
- Natural Resources Canada
- Illinois Department of Commerce & Community Affairs

For information on how your company can sponsor FutureTruck, contact Kristin De La Rosa, Argonne National Laboratory, kdelarosa@austin.nsl.com.

MAY 1, 2003



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COLLEGE NOTES

Student inducted into honor society

YPSILANTI - Cherish

Hughes, a student at Eastern Michigan University, was recently inducted into the Golden Key International Honor Society. She was awarded the Golden Key/Ford Motor Co. Scholarship for \$500.

She is the daughter of Ronald and Judith Hughes of Temperance and a 2000 graduate of Ida High School. She is majoring in finance. She is also a member of Phi Kappa Phi honor society and Beta Gamma Sigma honor society for business. She received a \$250 award from EMU for outstanding achievement in finance.



CHERISH HUGHES

MCCC awards scholarship

Christine M. VanDevelde of Monroe has been awarded the Independent Accountants Association of Michigan Scholarship for \$500 from Monroe County Community College. She is majoring in accounting and is a graduate of Monroe High School.

Local student earns honors

ANN ARBOR - Erin L. Birkam, a junior at the University of Michigan, has been named a John B. Angell Scholar. She also received the Muenzer Memorial Honors Psychology award and the Mary Shipman Stevens Scholarship.

She is a psychology major and recently represented the UM chapter in the Golden Key International Honor Society regional conference.

She is the daughter of George and Dianne Birkam of Monroe. She is a 2000 graduate of St. Mary Catholic Central High School.

Student receives

Pacemaker award

TOLEDO - Jon-David Heilman, a junior at the University of Toledo, was honored at the UT College of Business Administration's awards dinner April 11 as one of 12 Student Pacemakers.

The award recognizes academic achievement and service to the university and local community.

He is majoring in finance and is a graduate of St. Mary Catholic Central High School.

Student to study abroad

MOUNT PLEASANT - Derek Kaiser, a student at Central Michigan University, will travel to China this summer. He is the son of Kent and Denise Kaiser of Monroe. He is majoring in mechanical engineering technology.

Student presents honors project

TIFFIN, Ohio - Amber

Boetefuer, a student at Heidelberg College, recently presented her honors project at Pfeiderer Hall on campus.

She is a senior majoring in biology and chemistry.

Her presentation was "VNTR Polymorphism in a Group of Heidelberg Students: An Experiment in Forensic Science."

Students volunteer during spring break

MOUNT PLEASANT - Abigail Penny of Flat Rock, Stephanie Reaume of Newport and Christie Stelmach of Monroe, all students at Central Michigan University, worked as volunteers during their recent spring break.

Abigail, a junior majoring in family and women's studies, worked in a soup kitchen in Washington, D.C. She is the daughter of Charles and Karen Penny.

Stephanie worked with Habitat for Humanity in Paterson, N.J. She is the daughter of Dave and Denise Reaume.

Christie built and repaired houses in the Appalachia Service Project in Jonesville, Va. She is the daughter of Kevin and Barb Stelmach.

Student taking part in FutureTruck competition

Nick Manor, a graduate of Ida High School, is among more than 60 Michigan Technological University students taking part in the national FutureTruck competition.

The FutureTruck is a joint government-industry project to explore alternative propulsion systems and fuels through student competition.

The goal is to raise the environmental performance of sport utility vehicles while keeping its popular amenities.

This year's competition is June 2-12, held on the Ford Michigan Proving Grounds.

Welding student heading to nationals

Shawn Powers, a freshman at Washtenaw Community College, won post-secondary overall honors in a state welding competition held April 4 at the college.

The graduate of Flat Rock High School will go on to national competition June 22 in Kansas City, Mo.

While a senior at FRHS, Mr. Powers was an American Welding Society Detroit Section winner.



NICK MANOR



SHAWN POWERS

EDSEL B. FORD II

SPOTLIGHTING A CENTURY OF FAMILY BUSINESS

*MPG Luncheon Meeting
The Proud Bird Restaurant
April 1, 2003*

MPG Vice President Mark Williams: There are not many automotive companies that can say they've been around for 100 years. Ford Motor Company can. Naturally that means some pretty amazing success stories have come out of Dearborn in the past, and there will need to be a pretty strong strategy pointing in the right directions aimed at the future.

Without further delay, it's my honor and privilege to introduce today's speaker, Mr. Edsel B. Ford II.

Edsel Ford II: Good afternoon, everyone. My wife is now visiting the set of West Wing. I think I'd rather be here, personally. With all the decisions being made in Washington nowadays, it's probably safer being here.

Well, I'm delighted to be with all of you today. I know that all of you were sitting here wondering why I would come and speak to you on April Fool's Day. So I did some very interesting research to see just what an April Fool is.

It turns out, about 450 years ago Europe switched to a more accurate calendar, the Gregorian calendar. This changed New Year's from the first of April to the first of January. Some people were either forgetful or obstinate, and continued to celebrate the New Year in April. They were called April Fools.

So I guess if you dwell on what used to be, instead of what is today, that makes you

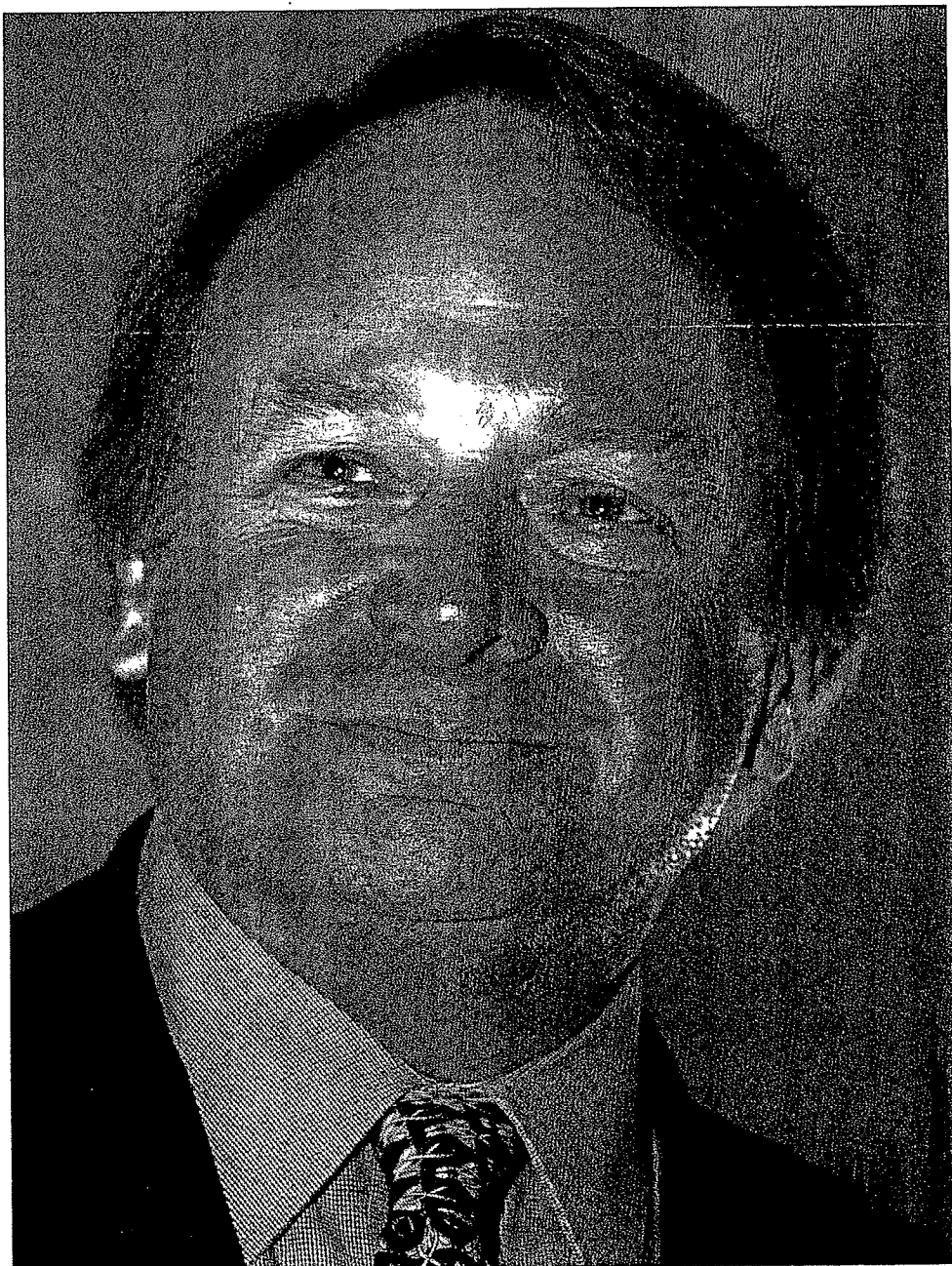


PHOTO BY PETE LYONS

MPG

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A MESSAGE FROM THE PRESIDENT

Unfortunately I was on vacation during the last meeting. But Mark Williams tells me the turnout was huge. In fact he said we had over 120 of you there to see Edsel B. Ford II—and that's an all-time record for MPG attendance at a luncheon. Hey maybe I should take vacation more often. If you couldn't make it to the meeting you can read Mr. Ford's remarks in this issue.

By now, you should have received your copy of the 2003 Membership Roster and Media Guide. You will notice it is much thicker than past editions. That's because MPG is bigger than ever before. We have about 100 more members listed in the Guide than last year—somewhere around 650 total. We also added two new sections to the book and spent many long nights proofreading the text. What this means is that our staff worked overtime to bring you the most thorough, informative and up-to-date contact book in the industry. I hope the exhaustive time spent by Ron Sessions, John Rettie, Allison Altzman, Al Vinakour and David Bird shows in the product. I sure think it does. Next year, you can expect an equally thorough Media Guide delivered to your door at least one month earlier.

Along with the Media Guide, you also received your 2003 membership card. For journalist members, this card is an international press credential that gains you admittance to auto shows around the world. But it works much better if it has your photo on it sealed by a laminated coating. To help encourage you to do this, we will now be offering a free lamination service at every lunch meeting. So bring your card next month with a passport-style picture and we will have your card laminated by the end of the meeting.

And if your contact information changes in the coming months, be sure to let us know at info@motorpressguild.com. ■

Sincerely,



Ben Stewart
MPG President

EDSEL B. FORD II

an April Fool — and I'm here to look back at the past 100 years of my company's history! I'm not sure I like the implications.

But before I take you down memory lane, I'd like to put Ford's Centennial into a little perspective. While Ford Motor Company has a long and colorful history, we are not a company that dwells on the past. Even with my great-grandfather's

very first car, he made the front windshield considerably larger than the rearview mirror — a practice that we continue to this very day! Our focus is on the road ahead.

Henry Ford didn't see much use in looking backward. On his 83rd birthday, a journalist made a big thing about his longevity. Henry said, "I don't see what all the fuss is about. All I did was grow old, and I took longer to do it than most people."

As all of you have probably heard, my

SUBMISSIONS: MPG invites members to post items of specific interest to fellow members, including changes of address or position, job openings, event announcements and reports, commentary, etc., as well as free classified ads (see elsewhere in this issue). Acceptance and editing are at the discretion of the editor. MilePost does not publish general industry PR or paid ads. Items run one time only unless renewed. Deadline is the Monday after each month's MPG meeting. Send text only (not images, please) via email to editor Pete Lyons at bigbearlyons@earthlink.net. Images should go directly to art director Dave Bird at birdstudios@cox.net or 24782 Queens Ct., Laguna Niguel, CA 92677.



PHOTO BY PETE LYONS

great-grandfather wasn't big on history in general. He used to say, "The only history that's worth a tinker's damn is the history that we make today."

Well, I believe Ford Motor Company is making history. 2003 is Ford's Centennial, but even more important, it is our year of revitalization. We went on some fool's errands a couple of years back, which I won't enumerate here today except to say that we are now totally focused on getting back to the basics and regaining our leadership momentum.

One of the ways we're doing that is with an unprecedented array of new and innovative cars and trucks. More new vehicles, in fact, than at any time in our 100-year history. At this year's Detroit Auto Show, which I know many of you came to, we introduced 16 new and advanced vehicles. That is a record for our company.

In fact, we publicly announced that over the next several years we are going to introduce 20 new models every year. That is an all-time record for any auto company.

This approach is not without precedent. Henry Ford's favorite story, in fact, was about a farmer who asked that he be buried in his Model T Ford. When they asked him why, the farmer said, "The car has gotten me out of every hole I've ever gotten into."



PHOTO BY PETE LYONS

"The only history that's worth a tinker's damn is the history that we make today."

(Edsel Ford quoting his great-grandfather)

As my cousin Bill (William Clay Ford, Jr., Chairman of Ford Motor Company) has been pointing out, over the past century the introduction of outstanding new products has gotten Ford Motor Company out of every hole we've gotten into as well.

Now, we're not exactly starting from a hole in terms of products. Ford still produces five of the top-selling vehicles in America. Ford is the best-selling brand of cars, the best-selling brand of trucks, and the best-selling brand of SUVs in America.

Which reminds me: while I'm here in Southern California, I should take time out and congratulate our California Ford dealers. 2002 marked the 20th consecutive year that California buyers have made Ford Division the best-selling brand of cars and trucks in the state.

So, with all of that information, I hope I've made my point that Ford is not distracted from the road ahead, even while we're glancing back to celebrate our Centennial year.

And there's lots of good reasons to celebrate beyond the obvious fact that it's one hell of a good excuse to have a nice party. And despite what my great-grandfather said, I really do believe that longevity does make a difference.

There is a reason why the public looks to the date a company was established, and

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that most businesses actually advertise their start dates. How long have you endured speeches more eloquently than advertising of ongoing commitment to meet the needs of customers, employees and investors year after year?

Yet there is another element to Ford's longevity. More than a company, Ford has survived in more than just name only. Ford is a family business. In fact, there has never been a day in the past 100 years where a Ford family member was not working for the company.

At my cousin Bill's first annual meeting as chairman, he said and I quote, "Close family involvement in the business separates Ford from other companies." And if you look at the results, it's clear that the family association has much more than just sentimental value.

The benefits of family businesses are many. Customers identify with family businesses, because it's not just a faceless corporate monolith. You're dealing with a real family, with real faces and real personalities. The public understands that when your name is over the door, you are committed to the long-term reputation and success of your company in ways that no

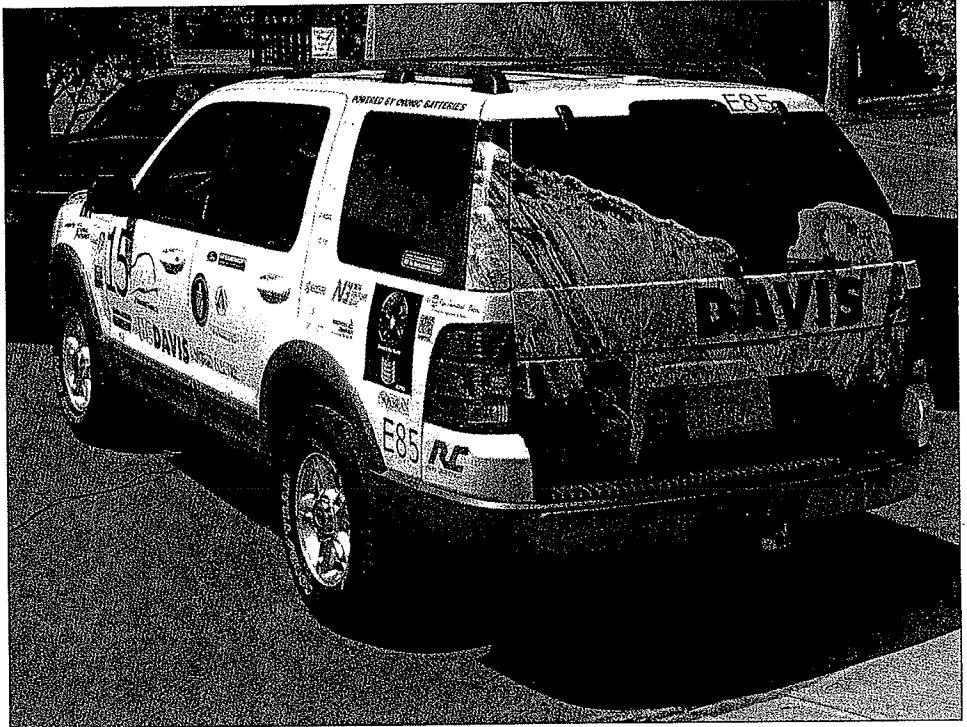


PHOTO BY PETE LYONS

UC Davis' Future Truck: Caught recharging before the meeting, this Ford Explorer modified by engineering students at the University of California, Davis campus, is one of 15 entries in the 2003 Future Truck competition. Luncheon guest Bob Larsen, Director of the Center for Transportation Research at Argonne National Laboratory, briefly spoke about the national program to improve SUV mileage. Sponsored by the US Dept. of Energy and Ford Motor Co., final exams are in Michigan in June; see www.futuretruck.org.

paid professional can ever be.

Employees identify more strongly with a family business. A family company is usually one with a long and colorful history, which employees feel as a part of members of an extended family.

And I think investors and shareholders invest in us because they realize that a single family, with a majority vote, lends

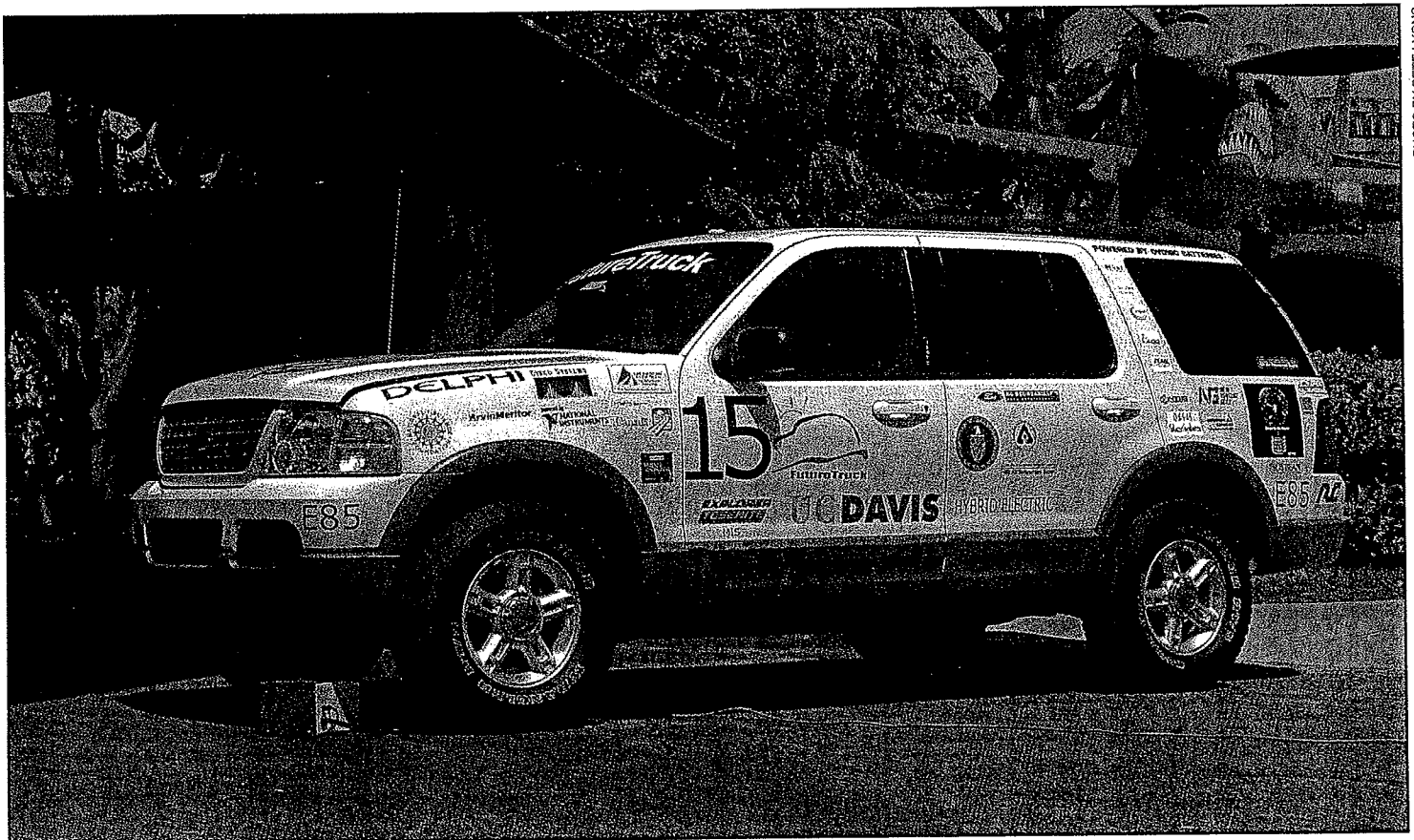


PHOTO BY PETE LYONS

tremendous stability and makes even a publicly-traded family business virtually immune from palace coups and hostile takeovers.

As I speak of Ford, I most often relate stories of our dealerships around the world. In America, the vast majority of our dealerships are family-owned and -operated. Second-, third- and fourth-generation family dealerships are the norm, not necessarily the exception. There have been some around forever, like Theodore Robins in Costa Mesa, which just celebrated their birthday, and they were established in 1926, when the entire range of Ford Motor Company products was just the Model T.

Still others, especially in more affluent metropolitan areas, are on the first generation of what we know are going to be dynasties in the making.

My experience is that it really doesn't matter if the family business happens to be the largest in the world, like Ford, or a small, rural dealership in a local community. We have a great deal in common. Everywhere I go, dealers tell me family stories about working directly with my great-grandfather, my grandfather (Edsel B. Ford), or even with my father (Henry Ford II).

Yet there's more. There's an understanding that with family businesses, there is no separation between personal and professional. These businesses are our lives. That may explain why I, personally, feel such a strong bond with our dealers and our employees.

When I retired from the company a couple of years ago, I immediately volunteered to be Ford Motor Company's ombudsman with our dealer community. In the previous 25 years at Ford, in every position I held — in Marketing, in Sales, and even when I was at Ford Credit — I purposely tilted toward direct and frequent contact with our dealers.

I feel most at home in a dealership, probably because I got my education in one. When I was 16 years old and my father wanted me to learn the car business, he didn't send me to our World Headquarters in Dearborn. He called a dealer who happens to be a friend of mine in Providence, RI, named Bob Tasca, and my father said to Bob, "Bob, teach my kid the business." And he did.

For five generations my family has believed that the dealership is what the car business is all about. It's where the public

meets our products and our representatives. Where, as we say, the rubber meets the road.

We believe that the franchise dealer is an institution, and can continue to be one as the years go on. We think it's the best way for all of us to serve our customers for generations to come.

So my point is that Ford and our dealers have a special relationship. We are family.

You know, there is no consumer product that is more complicated, or requires more parenting, than the automobile. Ten thousand parts, and as many people touching each one of those parts. People at Ford and supplier partners, fleet operations, dealers and loyal customers in more than 200 countries on five continents.



PHOTO BY PETE LYONS

*"I simply assemble
into a car the
discoveries of other
men, behind whom
were centuries of
work, and the
discoveries of still
other men who
preceded them."*

*(Edsel Ford quoting
his great-grandfather)*

As we celebrate the 100th anniversary of Ford Motor Company this summer, the tendency will be to place the spotlight entirely on the founding family and on a few executives in our history. I've decided that my task will be to remind everyone that Ford is the biggest extended family in the world, and over the past 100 years, generations have given their all as contributors to the Ford global family.

And of course, we will honor the achievements of Henry Ford. Yet again, that's not just for our immediate family. For I believe that Henry Ford isn't just my great-grandfather. He really belongs to all of you.

Henry Ford's Model T wasn't just a car. It was a concept of personal mobility for working-class men and women, and Henry Ford literally put the world on wheels. He brought low-cost, high-quality products to the public for the first time. He did it through the moving assembly line, vertical integration, and all manners of innovations to achieve cost and quality leadership.

He initiated the \$5-a-day, a fair working wage so American families could experience the fruits of their own labor. His concept of low-cost products and working-class buying power fathered our mass market.

And there's more, there's much more. Ford was the first equal-opportunity company. As far back as 1914, Henry Ford insisted that his plants be representative of the communities in which they were located. They served hiring minority workers as well as blind and other handicapped people. Henry Ford established an inclusive organization, with a few exceptions. Not even as many exceptions as the great Mahatma Gandhi, who once wrote, "I believe in equality for everyone, except for the reporters and photographers." (chuckles)

Henry Ford included the press in his personal circle.

As important for us in the Ford family is that my great-grandfather established a legacy of enduring values, of community involvement, of philanthropic responsibility and environmental stewardship. Over 100 years later, those values have become Ford traditions. Environmentalism, for example, was Henry Ford's greatest concern. He sponsored endless projects to improve the environment and eliminate waste, from hybrid engines to biodegradable plastics made of soybeans.

The tradition continues. Today, more

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than half of the entire research budget goes to environmental, energy and safety research and development, and Ford produces more alternative fuel vehicles than any other company in the world.

You saw one of those innovative vehicles at the Los Angeles Auto Show, where we introduced the Ford Focus PZEV, the Partial Zero Emissions Vehicle. This year it starts in California only, but next year the ultra-efficient PZEV engine will be sold in Focuses nation-wide.

✱ As mentioned earlier, we sponsor a wide range of programs to promote environmental improvements. One of them, which I actually saw earlier, is called Future Truck. In fact, Future Truck from UC Davis is right outside and I had a chance to see it before I came in, and I would highly recommend all of you, at least on your way out, just take a closer look for a few minutes. I think you will be very impressed.

This is a combined effort with Ford, the Department of Energy and many other sponsors to challenge engineering students in the 15 top universities. They're asked to re-engineer Ford Explorers to reduce fuel consumption by 25 percent, while also lowering emissions.

It is significant to note that, even while we are attempting to revitalize our company, our commitment to such efforts continues. That's important, for if we sacrifice our values for a quick turnaround, then we will have turned away from the traditions that make us who we are.

Lou Holtz, the famous Notre Dame football coach, I think said it best. He said, "We have instant coffee, instant tea and instant restaurants. Everybody looks for a quick fix. There isn't any. You built it day by day. You don't panic, you don't overreact, and most importantly, you don't change your principles."

So much of what our culture is today comes from many of Henry Ford's pioneering concepts and the traditions of social responsibility he inspired that is really a part of every American's heritage. Henry Ford belongs to all of our personal family histories.

Yet again, as remarkable as Henry Ford was, he was only one man. Everything he achieved was accomplished with the help of other people. One man cannot make a legacy. One man or woman's generation

cannot make a tradition. Henry Ford understood this.

Let me read you something that he wrote in 1929, because I think I summarizes my point extremely well. He said, and I quote, "I simply assemble into a car the discoveries of other men, behind whom were centuries of work, and the discoveries of still other men who preceded them. Progress happens when all the factors that make for it are ready, and then it is inevitable. To teach that a comparatively few men are responsible for the great forward steps of mankind is the worst sort of nonsense. Each generation adds to the forward momentum, and all along the way those values stand the test of time, become tomorrow's abiding traditions."

So that's why I believe the 100th anniversary of Ford Motor Company is significant. Mark Twain once said, "The first of April is the day we remember what we are the other 364 days of the year." If celebrations of our heritage is a fool's errand, then perhaps that's true and the joke is on all of us. For it is our continuity, recognition of our common values, and valuing each other's individual contributions that make us a family. It is all relative. We do not relate to others as the person we are; we are who we are in relation to others.

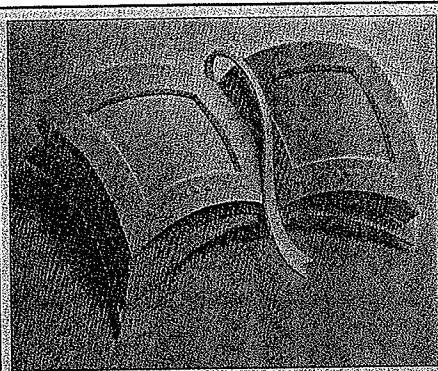
My great-grandfather seemed to have the right words on lots of different things. In this case, he was fond of saying, "There is no such thing as independence, only interdependence." Ford's Centennial is a celebration of our interdependence. This is certainly true with Ford's relationship with the automotive media. We appreciate your vital role, your continuing vital role, in telling the ongoing story of this great industry. Thank you very much.

?? QUESTIONS ??

Steve Ford: What is Ford's strategy regarding hybrid cars, alternative-fuel cars, performance cars...

Edsel Ford: Let me preface this by telling you that I left Ford Motor Company five years ago, and I couldn't possibly answer that question with the kind of correctness that you'd want. It would be inappropriate for me to answer it. John Clinard's here... (laughter)

Steve Ford: What would you like to see, as a car buff?



LOOKING FOR VOLUNTEERS TO PROMOTE LITERACY

MPG exists to serve its members. However, I think it's time that we, as a group, reach out and help others in our community too.

Dan Gardner and I have been working with a group called the South Bay Literacy Council. They are a non-profit organization located in Torrance, California that has been working for the past 20 years to help adults learn to read, write and speak English.

Here are some things to think about:

- 49% of the US adult population is functionally illiterate
- 75% of unemployed adults have reading and writing trouble
- 50% of those unemployed adults can't even fill out a job application



A few of us have already signed up to become tutors. And I would love to see some of you get involved too. This is essentially teaching a skillset that you use everyday. And even if you don't want to become tutor, there are other ways to get involved. You can help organize fundraising events, work on the newsletter and generally help publicize the cause. So if you are inclined to volunteer some of your time, please let us know. I can be reached at 310-664-2923 or bcstewart@hearsst.com. And Dan can be reached at 310-489-3094 or dan@aboutgardner.com. You can find out more by going to their website, www.southbayliteracy.org ■

-Ben Stewart

Edsel Ford: Well, as a car enthusiast, and what we see from the Board of Directors' point of view, it does seem to me that Ford's doing a lot. Now if you said specifically, "Edsel, what are you doing," we've got the Ballard relationship, we tried very hard with the electric car program that we had, and I've seen the stuff with universities like UC Davis. Do we have something on the road today? Yes, we're actually, as you know, the largest seller of alternative-fuel cars. Every taxicab that's a Ford in the city of Las Vegas is, I think, alternative fuel. And you can actually go to a Ford dealer and order a Crown Victoria with LP fuel. Are we going fast enough? I don't know. You'd have to ask someone a little bit closer than I am. I'm afraid that's about as good an answer as I can give you.

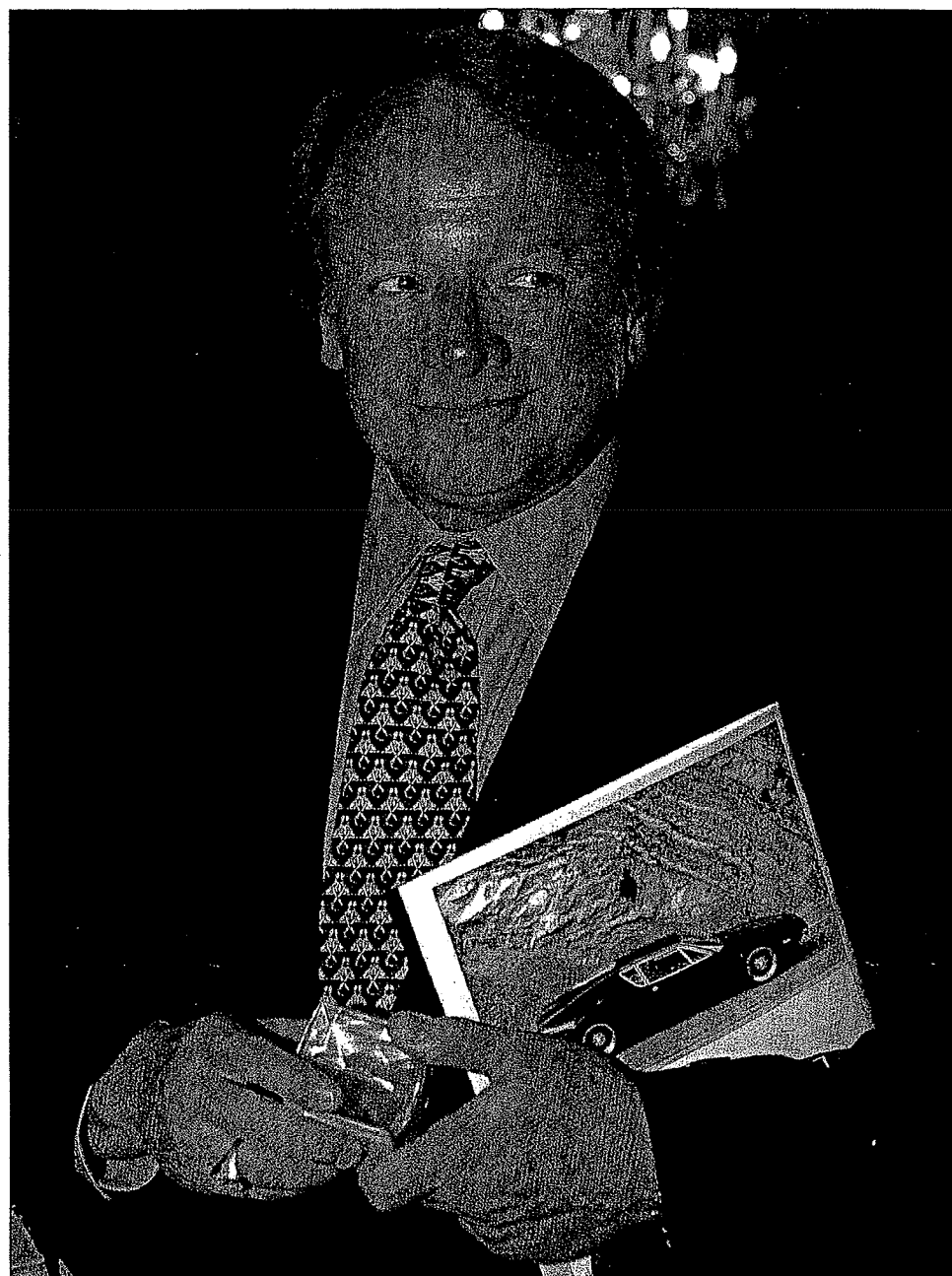
Mike Magda: You were talking about family values; one of the great family relationships was Ford and Firestone. From your view today, how is that relationship?

Edsel Ford: I think "tarnished" might be a good adjective! Again, I go to work at Ford every day, but I don't know what the relationship is with Firestone. But clearly, what happened was something that tarnished our relationship. I don't know where it is or what's going on, unfortunately.

Phil Skinner: After the Centennial celebrations, are there any continuing plans at Ford to keep the tradition of its company in the public eye?

Edsel Ford: Not that I know of. We're all wondering what's going to happen after June 17th. Does all of this just fall off a ledge, or what happens? I hope that we continue to celebrate our longevity. As I said in my speech, I think that really makes a big difference. Having been around 100 years and seen so much, I think it helps us navigate the future. So I can't tell you specifically what we're going to do. My hope is that we'll continue.

Zoran Segina: As you probably know, a gallon of gas in Southern California is \$2.50. Today's report in the Los Angeles Times indicates that the sales of SUVs have dropped by 5 percent. (Does that) create impetus for Ford to put...electrical or hybrid Explorers on the market sooner rather than later?



Edsel Ford: I think all of these things are in cycle plans and we're looking at all these opportunities. We wouldn't have done what we've done with UC Davis and Cal Poly and lots of other California universities to look at alternative fuel SUVs. My sense is that we want to take this down the road, and we clearly have to look at everything.

I was here in Los Angeles in the 70s, living here, and I always thought the big issue was not necessarily the price per gallon, but the availability. I mean, I stood in lines like everybody else did in California in the 70s, and that's what really got people angry, and that's what really caused the shift, as everybody knows, to smaller cars. It wasn't necessarily the price of fuel, it was the availability.

Bruce Armstrong: If we were to go back to the celebrations, can you tell us what to expect and how best to partake of the festivities?

Edsel Ford: Well, I think there's a lot going on. It really starts on, I think Friday the 13th, it'll go all the way through our annual shareholder's meeting. If I were you, I'd just buy a share of Ford stock just to go to the shareholder's meeting. Quite honestly, the 100th anniversary of a company and its shareholder's meeting is really, I think, going to be quite something.

Putting aside that, there are going to be some absolutely beautiful cars. We have 40 acres of land at our World Headquarters, and every single inch has been taken by either us or by car clubs. One of them, a

THE DEXTER LEADER

Dexter, MI

Circ - 3,200
Thu

APRIL 24, 2003



Bacon's

¹⁹⁰⁸
**Keller participating
in competition** ^{P3A}

Patrick Keller, a graduate of Dexter High School, is among more than 60 Michigan Technological University students participating in the national FutureTruck competition.

Michigan Tech is among 15 top North American universities competing to re-engineer a sport utility vehicle to improve gas mileage while reducing emissions.

The FutureTruck competition, organized by Ford Motor Co. and the U.S. Department of Energy's Argonne National Laboratory, will inspire the best and brightest engineering students with a real-world application of their skills while bringing recognition to their universities.

FutureTruck is a joint government-industry project created by the Department of Energy to explore alternative propulsion systems and fuels through student competition. The program's goal is to help raise the environmental performance of the SUV segment while keeping the amenities and features that have made it so popular.

Ford has taken over the program from General Motors Corp. as the automa

tive manufacturer sponsor, joining more than 17 other government and industry sponsors who will support the final two years of the four-year program.

FutureTruck 2003 is scheduled June 2 through 12. Events will be held at Ford Michigan Proving Grounds. Vehicles will be judged in events that will evaluate their technical performance (acceleration, trailer towing, off-road handling and on-road fuel economy) and design (consumer acceptability, engineering design review and oral presentations). The competition will culminate in a vehicle display and awards ceremony held in conjunction with Ford's Centennial Anniversary in Dearborn.

For more about the FutureTruck 2003 program, visit www.futuretruck.org.

APRIL 22, 2003



Bacon's



Photo provided

Michigan Tech students are pictured in front of a Ford Explorer, an SUV they will re-engineer as part of the FutureTruck competition organized by Ford Motor Company and the U.S. Department of Energy.

Midlanders part of engineering competition

Wes Garrett, Mike Wolanin and Scott Wylie, graduates of Midland High School, are among more than 60 Michigan Technological University students taking part in the national FutureTruck competition.

Michigan Tech is among 15 North American universities competing to re-engineer a sport utility vehicle to improve gas mileage while reducing emissions. The FutureTruck competition, organized by Ford Motor Company and the U.S. Department of Energy's Argonne National Laboratory, gives engineering students a real-world application of their skills while bringing recognition to their universities.

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The 14 other competing universities for FutureTruck 2003 include California Polytechnic University - San Luis Obispo, Cornell University, Georgia Institute of Technology, Ohio State University, Penn State University, Texas Tech University, University of Alberta, University of California at Davis, University of Idaho, University of Maryland, University of Tennessee, University of Wisconsin-Madison, Virginia Tech and West Virginia University.

For more about the FutureTruck 2003 program, visit <http://www.futuretruck.org>.

APRIL 15, 2003



Bacon's

KHS grad works on 'Future'

ortl competes
engineering test
Michigan Tech

HOUGHTON - Jeremy Mortl, a graduate of Kingsford High School is among more than 60 Michigan Technological University students taking part in the national FutureTruck competition.

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MTU Photo

KINGSFORD HIGH SCHOOL graduate Jeremy Mortl, front row, middle, is a member of the FutureTruck team at Michigan Technological University. The team is entered in a nationwide competition to improve the mileage and reduce the emissions of a 2003 Ford Explorer. Team members include, from left; back row, Phillip Sorensen, Gwinn; Steve Ruspakka, Ishpeming Township; and Jay Rich, Negaunee; and, front, Blake Fecteau, Sault Ste. Marie; Mortl; and Jeff Richard, Sault Ste. Marie. The competition is sponsored by the U.S. Department of Energy and Ford Motor Co.

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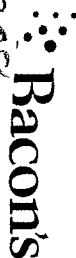
nic University- San Louis Obispo; Cornell University; Georgia Institute of Technology; Ohio State University; Penn State University; Texas Tech University; University of Alberta; University of California at Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Vir-

ginia Tech; and West Virginia University.

For more about the FutureTruck 2003 program, visit <http://www.futuretruck.org>.

Circ - 500
Semi - Monthly

APRIL 14, 2003



1908 Students Predict Improved SUV p.3 Fuel Economy/Emissions Reduction

With less than two months remaining before the finals of the 2003 FutureTruck competition, teams of students are confident they'll exceed the goal of achieving 25% better over-the-road fuel economy in SUVs and also are certain they can reduce overall emissions significantly.

FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular. The competing teams employ many novel ideas and approaches that provide both near-term and long-term solutions to increasing efficiency and decreasing the overall environmental impact of light-duty vehicles.

By integrating hybrid-electric-vehicle (HEV) design strategies, lightweight materials and hydrogen internal-combustion engines and applying various fuel applications, the teams are forecasting that their SUVs will surpass the competition goals for 2003.

//

Capital Times (Madison, WI)

April 10, 2003

ENGINEERING EXPO OPENS AT UW

BYLINE: Aaron Nathans The Capital Times

When Mark Polster and David Nuelle were mechanical engineering students at UW-Madison, one of the highlights of their education was taking part in the biennial Engineering Expo. A large number of students volunteer to run the expo and compete in events like the **Future Truck** competition, building high-tech vehicles. Polster recalled taking part in the robot competition.

The 2000 graduates are back on campus this week as engineers working for Ford Motor Co. in Dearborn, Mich. A team of 10 UW alumni-turned-Ford-engineers are showing off new Ford models, including the Escape Hybrid, the first combination electric-and-gas-powered sport utility vehicle. It will be formally unveiled at the New York International Auto Show later this month.

"It doesn't sacrifice anything," Nuelle said.

The Engineering Expo opens today, and continues through Saturday at the UW-Madison Engineering Campus from 9 a.m. to 4 p.m. Exhibits will be spread throughout almost all of the engineering buildings, including a fancy new building that opened last summer. Unlike previous years, where the cars were outdoors, they will be inside the engineering building at 1550 Engineering Drive.

Exhibits and events will include the concrete canoe competition, a cryogenic tissue pulverizer, a bridge building competition, and a presentation on the wonders of physics. Other exhibitors include General Electric, IBM, Motorola and Plexus.

The expo is expected to attract more than 10,000 people, with buses lining the streets, bringing grade school students to campus. The Engineering Campus is located on the corner of University and Randall avenues.

Ticket prices at the door are \$4.50 for adults; students and senior citizens pay \$3.50, and children 4 and under are free.

"We all grew up in Wisconsin," Polster said. "We got our education here. We're showing what we do."

GRAPHIC: HENRY A. KOSHOLLEK/THE CAPITAL TIMES

Mark Polster, a UW graduate, preps the new Ford Hybrid Escape for the Engineering Expo, which begins today on campus. The first combination electric-and-gas-powered sport utility vehicle will be formally unveiled at the New York International Auto Show later this month.



Bacon's

1908

BUZZWORD: inch pebbles: Small, incremental achievements. "The first tasks (milestones) into multiple small tasks (inch pebbles)"
Source: Buzzword.com

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FASHION BATTLE

R. Diddy - homeys are trying to catch his vapor as he takes care of his latest business. Dig?

The rapper-turned-clothing-designer is a nominee for the Menswear Designer of the Year from the Council of Fashion Designers of America's (CFDA).

When the former Sean "Puff Daddy" Combs' music career stalled, he introduced his Sean John fashion collection, which pulled in \$215 million last year.

He's up against tough competition in fashion's equivalent of the Oscars, with Michael Kors and Ralph Lauren rounding out the nominees.

Womens wear nominees include Donna Karan, Marc Jacobs, Carolina Herrera and Narciso Rodriguez.

The event will take place on June 2 at the New York Public Library. To find out more, visit the official Web site at style.com. Absolutely fabulous, dahling!

ARCHIVES

1790: Robert Gray became the first to circumnavigate the planet when he arrived back in Boston Harbor after three years and 42,000 miles.

1849: Walter Hunt of New York patented the safety pin. Elizabeth Hurley cleverly used that device almost 150 years later when she wore a dress (barely) held together with giant gold safety pins.

>> 534 ITEMS TODAY

R careerbuilder

WORK GOES ON

Could your company function without you?

You should hope so, says Barnett Helzberg Jr., author of "What I Learned Before I Sold To Warren Buffett: An Entrepreneur's Guide To Developing A Highly Successful Company."

"If you fell dead tomorrow and your company would prosper quite nicely without you, it's a sign that you have been a good leader," he says.

"If the soul of the company is wrapped around the entrepreneur, its long-term survival is questionable," Helzberg says.

"In fact, I think entrepreneurs who put their own ego before the company's welfare aren't thinking about the people who are left behind, who helped build the company and have a stake in its future."

TREND TRACKER

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The number of new people who move to Florida every day.

Source: epa.gov

>> **DID YOU KNOW...** The average baker in the U.S. earns about \$24,000 per year with bonuses and benefits.
Source: salaryexperts.com

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Thomes

IT'S IN A PAYMENT?

You send your check to the mortgage company every month. And your principal loan amount doesn't seem to be dwindling all that much.

Where's all that money going?

Usually, most house payments go toward interest.

Things:
Principal: The repayment of the original amount borrowed.

Interest: The cost of borrowing the principal amount.

Taxes: Real estate (property) taxes.

Insurance: Homeowners insurance on the home.

AIRY HOME HUNTING

When your roommate has four legs and sees a vet, apartment hunting can get tough.

Some apartments

in the Des Moines

charge extra rent,

extra deposit or both

tenants who have

pets.

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friendly apartments or

offer other suggestions if

you get stuck. Call 262-9503, ext. 101.

When you're shopping for an apartment, it's

important to remember that just because an ad

doesn't specifically say pets are allowed doesn't

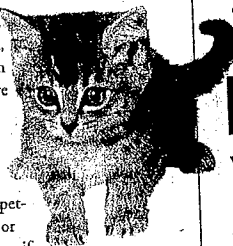
mean they aren't - so it's best to call and check.

Often one pet is allowed with an extra security

deposit amount charged. And, after all, the

extra cost is negligible compared to the joy pets

bring to our lives.



>> 879 HOMES TODAY



BEEP-BEEP

1969 Plymouth Road Runner convertible: \$26,000. SOLD.

Finding a rust-free classic car is getting harder by the day as the supply just keeps dwindling.

That's probably why this 118,000-mile 1969 Road Runner convertible fetched \$26,000 after 45 bids. The car was billed as a rust-free, one-owner Arizona machine with its original 335-horsepower, 383 V8/column-shift/bench-seat layout.

>> 1306 VEHICLES TODAY

YOUR TURN

Okay, students, it's your turn.

Ford's FutureTruck competition challenges

teams of stu-

dents from

top North

American

university

engineering

departments

to re-engineer

a mid-size 2002 Ford Explorer to improve fuel

economy and lower emissions while maintain-

ing safety, performance and comfort.

The winning university team will be announced at a press conference June 13.



APRIL 10, 2003



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- National Siblings Day
- National Teach Children to Save Day
- Vote Lawyers Out of Office Day

IT'S A STYLISH HONOR

P. Diddy — is there anything this dude can't do?

The rapper, entrepreneur and general bon vivant is now a nominee for the Council of Fashion Designers of America's (CFDA) Menswear Designer of the Year for his Sean John collection. He's up against tough competition in fashion's equivalent of the Oscar awards, with Michael Kors and Ralph Lauren rounding out the nominees.

Womenswear nominees include Donna Karan, Marc Jacobs, Carolina Herrera and Narciso Rodriguez.

Anna Wintour, the longtime editor of "Vogue," will be receiving the Lifetime Achievement Award for her tireless devotion to the world of fashion.

So, if you get nominated for designing bras for female actresses, would you be a Best Actress Supporter nominee? (Ba dum bum! Thanks, we're here all week... try the veil!)

The event will take place on June 2 at the New York Public Library. To find out more, visit the official Web site at style.com.

Absolutely fabulous, dahling!



ONLINE stuff POLL

Have you ever bought an antique that you knew was worth more than what you paid?
Visit resourcepolls.com to respond.

TODAY'S ARCHIVES

1790: Robert Gray completed his circumnavigation of the planet when he arrived back in Boston Harbor. His 42,000-mile trek took almost three years, and he became the first person to do so.

1849: Walter Hunt of New York patented the safety pin. It was a device cleverly used by Elizabeth Hurley almost 150 years later when she wore a dress (barely) held together with giant gold safety pins.

1916: The Professional Golfer's Association held its first championship tournament at Siwanoy Golf Course in Bronxville, N.Y.

Jobs

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MMM, FRESH BREAD

- The average baker in the U.S. earns about \$21,000 per year. With bonuses and benefits, it's closer to \$24,000.

Source: salaryexperts.com

A WELL-OILED MACHINE

Could your company function without you there? Barnett Helzberg, Jr., author of "What I Learned Before I Sold To Warren Buffett: An Entrepreneur's Guide To Developing A Highly Successful Company," says that should be your goal.

"If you fell dead tomorrow and your company would prosper quite nicely without you, it's a sign that you have been a good leader."

"If the soul of the company is wrapped around the entrepreneur, its long-term survival is questionable. In fact, I think entrepreneurs who put their own ego before the company's welfare aren't thinking about the people who are left behind, who helped build the company and have a stake in its future."

ONLINE jobs POLL

Do you think you get enough vacation time each year? How much do you get?
Visit resourcepolls.com to respond.



THE WATER COOLER

Random news, facts and intriguing info from the work world

Bad Customer Service 101

Customer service might be at an all-time low right now. It's so bad that Louise Anderson, president of Anderson Performance Improvement Company, has released a list of the top ways that companies can anger customers.

Here are some highlights — and keep in mind that this isn't a "how-to" list, but rather a "how-not-to" list:

■ Amaze customers with a voicemail maze that eventually leads callers back to square one. Don't forget to remind them that their call is very important to you!

■ If a customer takes the time to visit your store to purchase something, make sure your salesperson accepts a telephone call from someone else — the customer doesn't mind waiting, honest.

■ Make customers feel as though they are always wrong — they love that!

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Jobs & Wheels

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separate section every Friday & Sunday
www.poughkeepsiejournal.com

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www.hv-homes.com
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89 apartments listed

141 vans listed today

TREND TRACKER

900

The number of new people who move to Florida every day.

Source: epa.gov

ONLINE

homes POLL

What's your spring cleaning ritual like?
Visit resourcepolls.com to respond.



APARTMENT DIGS

Tips, news and wisdom about apartment life

Furry Friends Welcome?

When you're looking for apartments, it can be a challenge to find places that will accept you and your best buddy (of the four-legged variety, that is).

One good resource is the Humane Society. Many branches have lists of area pet-friendly rental housing. It's also worth noting that, when you're looking at housing ads, just because an ad doesn't specifically say pets are allowed doesn't mean they aren't — so don't discount those options, either.

Speaking of discounts, the bad news is, it often will cost you more in rent if you're searching for a pet-friendly place to live. At the very least, you'll probably have to pay an extra security deposit for your little buddy — and you may have to fork out additional monthly rent for him, too.

But the extra cost is negligible compared to the joy pets bring to our lives, right?



DISSECTING A PAYMENT

Every homeowner has to make monthly mortgage payments. But what do these payments really cover? Well, your payment goes towards four things:

- **Principal:** The repayment of the original amount borrowed on a monthly basis.
- **Interest:** The cost of borrowing the principal amount.
- **Taxes:** Real estate (property) taxes paid to a local government agency.
- **Insurance:** Homeowners Insurance on the home. Also any mortgage insurance, which protects the mortgage company.



ON THE BLOCK

1969 Plymouth Road Runner convertible, sold, \$26,000: Finding a rust-free classic car is getting harder by the day as the supply just keeps getting smaller. Finding a desirable rust-free car is even more difficult. That's probably why this 118,000-mile 1969 Road Runner convertible fetched a hefty \$26,000 after a whopping 45 bids. To its credit, the car was billed as a rust-free, one-owner Arizona machine with its original 335-horsepower, 383 V8/columb-shift/berch-seat layout. Nothing too fancy, just a straight, clean and desirable muscle car. And with only a couple of thousand of these hot sun cruisers ever made, there's really only one place the price can go, and that's up.

ONLINE

wheels POLL

Which feature would you prefer your car had: A CD player or a cupholder? Why?
Visit resourcepolls.com to respond.

OVERHEARD

"It's OK to get facked up and head out onto the highway, but I've been there and I can tell you that the fast lane is littered with countless smoldering wrecks."

Hunter S. Thompson



WORKING ON THE FUTURE

Ford's FuturaTruck competition challenges teams of students from top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining safety, performance and comfort.

The winning university team will be announced at a press conference June 13 as part of Ford's centennial celebration in Dearborn, Mich.

This year's competitors come from one Canadian and 14 American colleges.

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2. If you are selling an item, always include the price.
3. Start your ad with the name of the item you're selling, or the job you are filling.
4. Place yourself in the reader's position.

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Mon. ads: Fri. 5 p.m.

Display and legal ads: 4 p.m. two days before publication

Sun. Display ads: Thurs. 5 p.m.

Real Estate deadlines differ. Deadline also applies to all corrections and cancellations.

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THE DAILY TIMES
Salisbury, MD

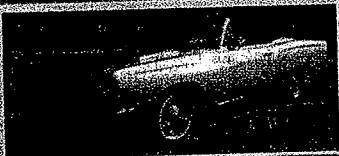
Morning Circulation - 27,904
Daily

APRIL 10, 2003



Bacon's
Wheels **cars.com**

6 classic cars



ON THE BLOCK

1969 Plymouth Road Runner convertible, sold \$26,000. Finding a rust-free classic car is getting harder by the day as the supply just keeps getting smaller. Finding a desirable rust-free car is even more difficult.

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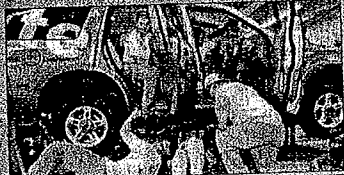
ONLINE
wheels POLL

Which feature would you prefer your car had: A CD player or a cupholder? Why?
Visit resourcepolls.com to respond.

OVERHEARD

The BX loved it, picked up and head out onto the highway, but we been there and I can tell you that the fast lane is filled with countless smoldering wrecks.

Hunter B. Thompson



WORKING ON THE FUTURE

Ford's Future Truck competition challenges teams of students from top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining safety, performance and comfort.

The winning university team will be announced at a press conference June 13 as part of Ford's centennial celebration in Dearborn, Mich.

This year's competitors come from one Canadian and 14 American colleges.

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DAILY NEWSPAPER

THE WINCHESTER STAR

Winchester, VA

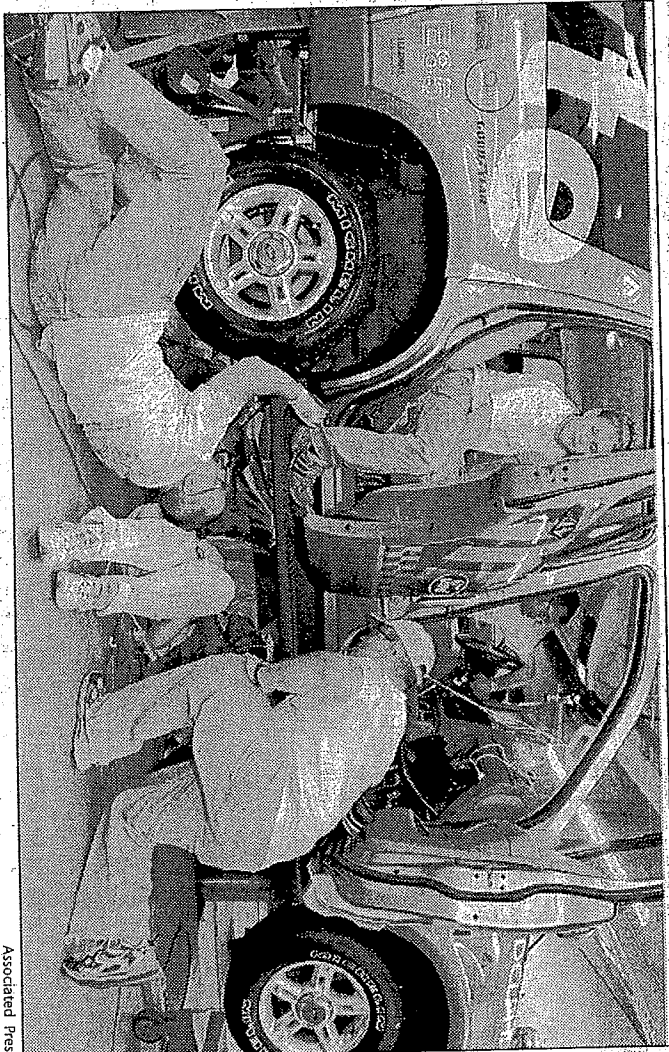
Morning Circulation - 21,513
Daily

APRIL 3, 2003



Bacon's

Efficient Vehicles



Associated Press

University of Tennessee students work to enter in the competition to improve fuel make modifications on their FutureTruck economy and reduce emissions. Other uni- Ford Explorer. These students are among 15 versities with teams include Virginia Tech, teams from North American universities en- West Virginia University, and Georgia Tech.



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Electric Vehicle Online Today

April 3, 2003

SECTION: Pg. 0

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LENGTH: 261 words

HEADLINE: **FutureTruck** Students Predict Improved Vehicle Performance; Brief Article

AUTHOR-ABSTRACT:

THIS IS THE FULL TEXT: COPYRIGHT 2003 Environmental Information Networks, Inc.

BODY:

FutureTruck program officials recently announced that the student teams participating in the 2003 **FutureTruck** competition have expressed confidence that they will "exceed the goal of achieving 25 percent better over-the-road fuel economy in [sport-utility vehicles (SUVs)] and...significantly reduce overall emissions" through the integration of "hybrid electric vehicle (HEV) design strategies, lightweight materials, hydrogen internal combustion engines and...various fuel applications."

According to officials, the **FutureTruck** competition challenges students from 15 top North American university engineering departments "to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining...safety, performance and comfort levels."

"The experimental vehicles that are developed in the **FutureTruck** competition give the engineering students the opportunity to explore various automotive technologies and use creative applications to reach the program's technological goals without being restricted by development, production or cost processes typically associated with mass vehicle production," said Ford Motor Company SUV and body on frame executive director Al Kammerer.

Program officials noted that **FutureTruck's** final competition, which is less than two months away, involves "more than 10 days of intense testing, such as acceleration and off-road performance events."

Contact: Future Truck, website <http://www.futuretruck.org>.

(PR NEWswire: 4/1)

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IAC-CREATE-DATE: April 3, 2003

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Document 1 of 14 [next](#) ➤

APRIL 2, 2003



1908
Bacon's

New requirements will force better SUV, truck fuel economy

By H. Josef Herbert
The Associated Press

WASHINGTON: The Transportation Department increased fuel economy requirements slightly for sport utility vehicles, vans and pickups, but these vehicles still will be allowed less stringent standards than passenger cars.

Under the new rule introduced Tuesday, manufacturers will have to attain a fleet average for vehicles in the "light truck" category of 22.2 miles per gallon beginning with the 2007 models, an increase of 1.5 mpg over current requirements.

Critics argued that the increase, which is to be phased in over three model years, reflects no more than what automakers already have been planning to achieve with

their SUV fleets.

Fuel economy for passenger sedans, which are required to meet a fleet average of 27.5 mpg, is not affected by the new regulation announced by the department's National Highway Traffic Safety Administration.

NHTSA Administrator Jeffrey Runge noted that the rule change marks the first increase in the fuel economy standard since the mid-1990s and demonstrates that the Bush administration "is committed to improving vehicle fuel economy while protecting passenger safety and American jobs."

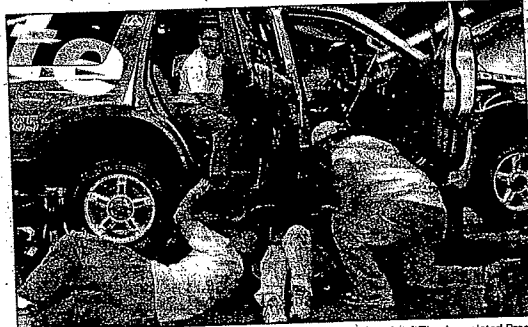
But environmentalists and many congressional Democrats have criticized the administration for refusing to "push" for more substantial improvements in auto fuel economy

as a way to reduce the country's demand for oil, much of it imported.

A particular target for greater fuel efficiency has been the SUVs, which generally get poor gas mileage than passenger cars and have grown in such popularity that they — along with passenger vans and pickups — account for about 45 percent of vehicles sold.

Sens. Dianne Feinstein, D-Calif., and Olympia Snowe, R-Maine, have introduced legislation to close the gap between SUV and passenger car fuel economy. The bill calls for SUVs to achieve 27.5 mpg by 2011. That would save 1 million barrels of per day and reduce dependence on foreign imports by 10 percent, they argue.

The country uses 8.8 million gallons of gasoline per day, according to the Energy Department.



The Associated Press

University of Tennessee students at work on their Future Truck Ford Explorer. There are 15 North American universities entered in the competition to improve fuel economy and reduce emissions on SUV's.

On-Campus

Today @ Maryland

Native American dance performance
From 11 a.m. to 2:30 p.m., Nyumburu
Amphitheater

Electric truck builders hope to zap competition

By RACHAEL JACKSON
Staff writer

A group of anxious student engineers are eyeing the finish line in an automotive competition that will be won by more than speed alone.

Led by Gregory Herwig and Sarabpreet Bumra, both senior mechanical engineering majors, about 50 students are nearing completion of a massive project to re-engineer a full-size 2002 Ford Explorer into a cleaner hybrid electric vehicle that requires less fossil fuel, but still functions as a powerful sport utility vehicle.

Fifteen to 20 of the students, who participate in the project as university coursework, will travel to Michigan in June with the Explorer hauled on a roll-back truck, where they hope their fuel-efficient, smooth-running masterpiece will outperform 14 modified Explorers entered by other schools.

Herwig is confident in the team's submission. "We'll be in the top three this year again," he predicted. "Certainly in the top five."

Last year, the university team placed eighth, but over the past 15 years the university has participated in automotive engineering competitions, the Terrapin team has usually ranked near the top, placing first and third in recent years.

"This is our NCAA tournament for engineers," said David Holloway, the group's faculty sponsor. "You want to be in the Final Four if you can every year."

Given the popularity of SUVs, the mission of the competition is to make the vehicles, which have always required more fuel than their small-car counterparts, more efficient. The competition is primarily sponsored by the Department of Energy and Ford Motor Company.



CHRIS LAUBER-THE DIAMONDBACK

Students stand by the engine and frame of their solar-powered Ford Explorer. They are entering the SUV in a Michigan competition, sponsored by the Department of Energy and Ford Motor Company.

Hybrid cars, self-charging cars that alternate between electric and gasoline power, can achieve a fuel economy near 60 miles per gallon, while the most efficient SUVs peak at about 30 miles per gallon, according to the Environmental Protection Agency.

The FutureTruck competition is an attempt to put industry, government and academic heads together to bring the technology of the small hybrid car to the trendy SUV American consumers demand.

To prove itself, a FutureTruck entry must pass emissions tests, navigate an off-road course complete with a sand bed and a steep, wet boulder hill and demonstrate at least a 25 percent improvement in fuel economy. Herwig and Holloway said they will increase it by at least that much, and possibly up to 50 percent.

Since fall 2001 the group has labored on the car, which it dubbed the "Excite," a name combining "Explorer" and "Insight" because the electric motor being used is from a Honda Insight. The car, an automotive minor gasbored with a Japanese electric motor, battery packs from Toyota Priuses and an engine from a Lincoln LS sedan, runs on an ethanol-based fuel.

Ethanol, a cleaner-burning, renewable fuel created domestically by fermenting sugar from farm waste like corn stalks and husks already blended into more than 10 percent the gas sold in the United States, according to the Department of Energy. However, it is not yet cost-effective enough to replace traditional gasoline.

Herwig attributed last year's disappointing finish to a problem with fuel delivery, but said they used what they learned from last year's mistakes to design a better vehicle.

Holloway has been working on solar and electric car projects since 1982. He said the team's hybrid vehicle will perform better than the stock Explorer.

"It will accelerate faster," he said. "It will turn itself off at a stop light so you're not emitting gas. When you're going down a hill, regenerative braking captures kinetic energy of the vehicle. It's got a lot of nice features to it."

As the technology is refined, hybrid cars are becoming more and more common. Holloway said Toyota has pledged that by 2005 all of its vehicles will be hybrids.

"Hybrid electric vehicles are here to stay," Holloway said.

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WEDNESDAY
APRIL 2, 2003
PAGE 1 OF 3

NEW TRUCK CAFE STANDARD FINALIZED

It's official. The U.S. National Highway Traffic Safety Administration is raising corporate average fuel economy standards 1.5 mpg for 2005-2007 model trucks. The agency announced the plan in December and had until yesterday to issue the final rule in time for it to take effect for 2005 vehicles.

NHTSA touts the move as the largest increase in fuel economy standards in the last 20 years and says even bigger changes may come after 2007. To this end, it plans to publish a notice in coming months to solicit input on possible improvements, including reclassifying different types of vehicles and updating how fuel economy is measured.

The new rule raises truck CAFE requirements from today's 20.7 mpg to 21.0 mpg for the 2005 model year, 21.6 mpg for 2006 and 22.2 mpg for 2007. The requirements had been frozen since 1996. The standard for cars is left unchanged at 27.5 mpg.

The 10-member Alliance of Automobile Manufacturers called the standard challenging but promised "to work constructively" to meet it. Earlier this year, however, General Motors Corp. had complained that a 1.5 mpg increase would cost it \$1 billion and lead to changes that would reduce the safety of affected vehicles.

NHTSA stands by its original analysis that calculates the higher standards will result in a net economic benefit despite adding an estimated \$47 to the cost of a vehicle. It says affected trucks will save more than 3.6 billion gallons of gas over their lives.

Environmental groups pooh-pooh the rule, noting that most OEMs already planned to raise truck fuel economy by more than the new standards. They also note the standard could be met simply by offering more vehicles that run on fuels other than gasoline.

MATSUSHITA UNITS FORM NEW PANASONIC AUTOMOTIVE OPERATIONS

Matsushita Electric Corp. of America has combined three of its businesses to form a new venture called Panasonic Automotive Systems Co. of America. The company consolidates the sales and development operations of the former Panasonic Automotive Electronics Co. with the product development and production operations of Matsushita Communication Industrial Corp. of U.S.A. in Peachtree City, Ga., and Matsushita

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WEDNESDAY
APRIL 2, 2003
PAGE 2 OF 3

Communication Industrial de Mexico, S.A. de C.V. in Reynosa, Tamaulipas, Mexico.

Panasonic Automotive Systems will be based in Southfield, Mich. Its goal is to become the largest supplier of in-vehicle multimedia systems and components in North America. Current products include audio systems, DVD rear-seat entertainment systems, speakers and displays. It also produces sensors, switches, motors and batteries.

Secaucus, N.J.-based Matsushita Electric Corp. is the principal North American subsidiary of Japan's Matsushita Electric Industrial Co.

FIAT DIVISION SHOWS FUEL CELL BUS

Fiat SpA's Irisbus arm unveiled a prototype of its upcoming CityClass fuel cell-powered bus yesterday in Madrid. Irisbus, which once was partially owned by Renault SA, plans eventually to supply production versions of the bus to Madrid, Berlin, Paris and Turin.

United Technologies Corp. supplied the vehicle's fuel cell, and Spanish oil group Repsol-Ypf is providing hydrogen fuel to the project. Ansaldo, the engineering division of Italian aerospace and defense firm Finmeccanica, produced the electrical drive unit. Fiat says the vehicle's battery can operate for up to 16 hours on a charge.

SUPPLIERS ON THE HOT SEAT AS NISSAN NEARS LAUNCH OF MISSISSIPPI PLANT

Nissan Motor Co. plans to ramp up production at its new Canton, Miss., truck plant at the end of next month as scheduled, reports *Automotive News*. But the automaker says some of its suppliers have not yet met quality targets.

AN says a handful of suppliers were taken to task earlier this year during a meeting with Emil Hassan, Nissan's senior vice president for North American manufacturing, purchasing, quality and logistics. Hassan, who has a reputation for being tough on vendors, wasn't happy with the quality of pre-production vehicles tested in January. Although mistakes are expected to be uncovered and corrected during this period, Hassan found the quality and attitude of some suppliers less than acceptable.

One unidentified company's vice president of engineering said he was aware of the problems and planned to have them fixed later. Hassan's response: A defective part should never have been shipped to begin with.

The \$1.5 billion facility is due to start building Nissan's redesigned Quest on May 27. This will be followed by the Pathfinder Armada SUV in mid-August and full-size Titan pickup in October. A new Infiniti SUV and Altima sedan will be added next year.

Nissan also is launching an in-sequence manufacturing system in Canton with an inexperienced workforce. Hassan admits this is a lot to take on and will require more effort than originally thought.



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**WEDNESDAY
APRIL 2, 2003**

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To help out, the automaker has formed 65 support teams to work with suppliers, some of which are expanding or building new plants near the Canton final assembly complex. The goal is for key suppliers to deliver parts and built-up modules to Nissan 90 minutes after receiving an order. The automaker hopes the system will cut build-to-delivery time by two-thirds to 14 days compared to its other North American facilities.

POLAND AMENDS BIOFUEL LEGISLATION

Poland's government has introduced a new bill that would require gasoline sold in the country to contain at least 3.5% biofuel additives this fall and 4% next year. President Aleksander Kwasniewski vetoed a similar proposal in January that would have set the minimum biofuel content at 4.5%.

Announced yesterday, the new plan also aims to lower annual excise taxes on gasoline by \$245 million. Proponents say this would offset the cost of organic additives to keep fuel prices the same as conventional gasoline.

The European Union, which Poland hopes to join next year, aims to increase biofuel content to 2% of gasoline by 2005 and 5.75% by 2010. Currently, Germany's self-imposed 1.3% bio content is the highest in Europe.

Automakers and several consumer groups have argued that fuel shipments to and from Poland will be restricted if the country adopts a non-EU standard. There's also concern that older vehicles wouldn't be able to run on the organic fuel blend. And the new proposal still doesn't give consumers a choice between traditional gasoline and new biofuels—one reason President Kwasniewski vetoed the earlier proposal.

The bill, which still must clear Poland's parliament, is good news for farmers. Although fuel companies are free to use materials from other countries, local suppliers are expected to increase the harvest of feeder crops such as rapeseed, rye and potatoes by nearly 1 million tons each per year if the measure is adopted.

STUDENTS READY FUTURE TRUCK DESIGNS

Some 15 North American universities are competing in this year's FutureTruck competition, which will culminate with 10 days of performance testing next month. The winner will be announced June 15 during Ford Motor Co.'s centennial celebration in Dearborn, Mich.

The goal of the program, now in its fourth year, is to develop next-generation SUVs capable of achieving a 25% improvement in fuel economy while maintaining current safety, performance and comfort levels. Seven of 10 teams accomplished this feat last year, including the winning group from the University of Wisconsin.

As this year's primary OEM sponsor, Ford is providing Explorer SUVs for the teams to modify. The automaker will evaluate the vehicles at its proving grounds in Romeo and Allen Park, Mich.

Teams are encouraged to explore a variety of near- and long-term solutions, including internal combustion-electric hybrids, lightweight materials, hydrogen-fueled IC engines and innovative fuel systems. They are instructed to ignore potential development, manufacturing or cost restrictions associated with mass production.

More than 16 other government and industry groups also support the program, including the U.S. Dept. of Energy. The Argonne National Laboratory provides competition management, technical and logistical support.

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PRN) Students Predict Improved SUV Fuel Economy/Emissions Reduction

PRNewswire

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Students Predict Improved SUV Fuel Economy/Emissions Reduction



FUTURETRUCK FORD EXPLORER AND UNIVERSITY OF TENNESSEE

University of Tennessee students at work on their FutureTruck Ford Explorer. There are 15 North American universities entered in the competition to improve fuel economy and reduce emissions on S.U.V.'s. (PRNewsFoto)[AG]
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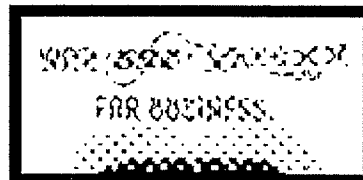
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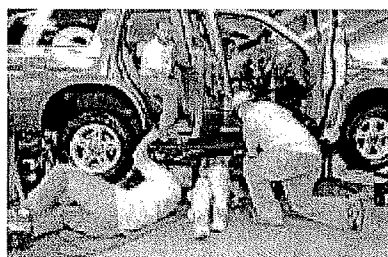
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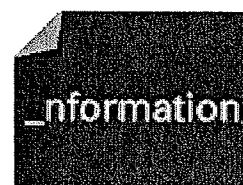
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PR Newswire - Tuesday April 1, 2003

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Students Predict Improved SUV Fuel Economy/Emissions

Reduction

4/1/03 5:01 AM

Source: PR Newswire

FutureTruck Nearing Final Stage of Competition

LOS ANGELES, April 1 /PRNewswire/ -- Less than two months remain before the finals of the 2003 FutureTruck competition and teams of students are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in SUVs and also are certain they can significantly reduce overall emissions.

Photo: <http://www.newscom.com/cgi-bin/prnh/20030401/DCTU003>)

FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular. The competing teams employ many novel ideas and approaches that provide both near-term and long-term solutions to increasing efficiency and decreasing the overall environmental impact of light-duty vehicles.

The experimental vehicles that are developed in the FutureTruck competition give the engineering students the opportunity to explore various automotive technologies and use creative applications to reach the program's technological goals without being restricted by development, production or cost processes typically associated with mass vehicle production," said Al Kammerer, Executive Director, SUV and Body on Frame, Ford Motor Company. "These efforts reflect Ford's own goals to develop advanced technologies to continuously improve fuel economy and emissions in our vehicles."

By integrating hybrid electric vehicle (HEV) design strategies, lightweight materials, hydrogen internal combustion engines and applying various fuel applications, the teams are forecasting their SUVs will surpass the competition goals for 2003.

Last year, seven out of ten teams achieved better overall over-the-road fuel economy compared

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to the base 2002 Ford Explorer. The University of Wisconsin at Madison achieved a greenhouse gas reduction greater than 50% and increased the Explorer's over-the-road fuel economy by 45 percent. The team re-engineered components and used advanced materials such as an aluminum/steel hybrid frame and a titanium exhaust system.

"More than 50 percent of all new vehicles sold are SUVs and light duty trucks, which have historically been less fuel-efficient than passenger cars," said Bob Larsen, Director of the Center for Transportation Research at Argonne National Laboratory. "By increasing the fuel efficiency of vehicles, including SUVs, it will help decrease our dependence on foreign oil and help boost our economy."

The final competition involves more than ten days of intense testing, such as acceleration and off-road performance events to determine which team will win the challenge. Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced at a press conference June 13th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Luis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

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Students Predict Improved SUV Fuel Economy/Emissions Reduction



FUTURETRUCK FORD EXPLORER AND UNIVERSITY OF TENNESSEE

University of Tennessee students at work on their FutureTruck Ford Explorer. There are 15 North American universities entered in the competition to improve fuel economy and reduce emissions on S.U.V.'s. (PRNewsFoto)[AG]
LOS ANGELES, CA USA 04/01/2003

FutureTruck Nearing Final Stage of Competition

LOS ANGELES, April 1 /PRNewswire/ -- Less than two months remain before the finals of the 2003 FutureTruck competition and teams of students are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in SUVs and also are certain they can significantly reduce overall emissions.

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Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

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Bacon's

April 2003

ELECTRIC VEHICLES

Competition Creates Fuel-Efficient SUVs

According to *EE Times*, electrical and mechanical engineering students in the FutureTruck 2003 competition are modifying 15 identical 2002 Ford Explorers using virtually any technology, fuel, or construction technique while maintaining the qualities that made the model popular. Managed by Argonne National Laboratory, the competition challenges 15 university teams from the U.S. and Canada to re-engineer a mid-size truck or SUV for lower emissions and 25% better fuel economy.



The Penn State FutureTruck team includes a Nittany Lion.

In the current two-year competition cycle, contestants have run their vehicles in the first of two performance competitions for fuel efficiency, emissions, acceleration, handling, consumer acceptance and off-road performance to determine the overall winner. Now, more than halfway through the challenge, they are further modifying and refining their entries for the final competition in June.

Pat Ford, project manager of the FutureTruck program at Ford Motor Co., estimates that traditional design practices could improve mileage another 5% to 10% in a conventional five-passenger Taurus. But beyond that, he said, most future energy savings would probably need to come from fuel cells and hybrid-electric propulsion systems.

While most of the trucks in the FutureTruck program still run internal combustion engines under their hoods, the power plants replacing the original 4-liter V-6 range from an ethanol-burning four-cylinder, 1.8-liter turbocharged Mazda unit to an assortment of compact diesel engines outfitted with experimental catalytic soot traps.

The two schools that developed hydrogen fuel cells are

being forced to move to different technologies after their fuel cell supplier was acquired by General Electric last year, and dropped out of the program.

Penn State EE students Paul Minear and Jon Weidner recently brought a hybrid diesel-electric Explorer to a FutureTruck event at National Instruments Corp. in Austin, Texas. At first glance the hybrid looks like a stock Explorer, but the resemblance fades under the hood, where a little four-cylinder 2.5-liter diesel unit has replaced the gas-burning 4-liter V-6. It also carries a few dozen yards of added plumbing, several mysterious electronics boxes, and some non-Ford cable bundles that are designed to carry high amperages.

A crawl under the vehicle reveals the electric side of the drive train – a 37kW ac induction motor originally used as the primary drive in a Solectria Force electric car, coupled in parallel with the output shaft of the truck's five-speed transmission, just ahead of the transfer case.

Most of the Explorer's stock interior has been left intact, with the lead-acid battery pack tucked neatly in the rear of the car. One might never suspect the big changes under the hood except for a few non-stock switches on the dash and a large cluster of sensing and control modules shoehorned between the first two passenger seats.

Software remains one of the things still undergoing significant change as the car approaches its final configuration for the 2003 competition in June. While all the functions, such as transitions between pure-gas and gas-electric propulsion and regenerative braking all work, the algorithms continue to be refined to yield the best efficiency and the best possible driver experience.

These and other changes, they said, should make the vehicle perform as well as an out-of-the-box Explorer under most conditions, and perhaps even better. But extended uphill pulls with a large trailer in tow or highly demanding off-road conditions will eventually deplete the electric drive system's reserves faster than they can be replaced, forcing the car to rely solely on diesel power.

Last year, when the trucks were not fully modified or fine-tuned, seven of the 15 vehicles matched or bettered stock SUV mileage.

Ford is preparing to market a hybrid version of its Escape mini-SUV in 2003, Pat Ford said, with a goal of offering it at only a slightly higher cost than a conventional Escape. It's expected to deliver 29mpg to 30mpg in city driving and 35mpg to 40mpg on the highway. The hybrid Escape caps years of research by Ford but it also borrows ideas from university research and earlier student engineering competitions such as FutureTruck.

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MARCH 11, 2003


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WVU Engineering Students Working on Next Generation SUV

West Virginia University students are among 15 North American universities gearing up for FutureTruck 2003, an annual competition that challenges participants to build a next generation sport utility vehicle (SUV) with 25 percent better fuel economy and reduced emissions.

The annual competition, organized by Ford Motor Co. and the U.S. Department of Energy's (DOE) Argonne National Laboratory, is inspiring more than 300 of the best and brightest engineering students with a real-world application of their skills benefiting both consumers and the environment.

Among students on the West Virginia University team is Nicholas Thompson of Elkins.

The West Virginia team has been working on its vehicle for the past several months, building on the lessons learned from last year's event.

Team leader Tony Feragotti says the team can't wait to put their new and improved "FutureTruck" on the road.

"This competition is giving us first-hand exposure to new technologies and the opportunity to help develop more energy-efficient, 'greener' automotive technologies," Feragotti said. "We're really excited to see what our SUV can do."

WVU will introduce the same design as a year ago with a few different components. A Ranger motor, which has been used in Ford Ranger electric trucks, will be replacing the previous Unique Mobility motor. There is also talk of using new equipment to control the vehicle, meaning the end of the PIC chip.

National Instruments is donating the new, more user-friendly equipment. Weight reduction is also a major area of concern for the team this year, and fiberglass materials are being considered to replace various components of the truck.

The expectations of this year's team are set high in accordance with last year's team who placed first, in the off road event and placed sixth overall.

The students, with guidance from faculty and technical help from DOE and Ford, are attempting to reengineer a 2002 Ford Explorer into a lower-emissions vehicle with at least 25 per-

cent higher fuel economy — without sacrificing performance, utility, safety and affordability. To meet these challenges, the students are employing cutting-edge automotive technologies, including lightweight materials, fuel cells and other advanced propulsion systems, and alternative fuels, such as ethanol, biodiesel and hydrogen.

FutureTruck is a joint government-industry project created by DOE to explore alternative propulsion systems and fuels through student competition. The program's goal is to help raise the environmental performance of the popular SUV segment while keeping the amenities and features that have made it so popular. FutureTruck 2003 is the program's fourth and final year.

Ford is providing the 2002 Explorer SUVs that the teams are modifying, more than \$400,000 in seed prize money, engineering consulting for each team, competition facilities and operational support. DOE, through its Argonne National Laboratory facility, is providing competition management, team evaluation and technical and logistical support.

FutureTruck 2003 is scheduled for June 2-12. Teams will compete in more than a dozen static and dynamic evaluations in Romeo and Allen park, Mich., including tests for acceleration and on-road fuel economy, off-road performance and emissions testing. The competition will culminate with awards ceremonies, a vehicle display and oral presentations at Ford World Headquarters in Dearborn, Mich., as part of Ford's centennial anniversary celebrations.

The 15 competing universities for FutureTruck 2002 include: California Polytechnic State University — San Luis Obispo; Cornell University; Georgia Institute of Technology; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

NASA Tech Briefs INSIDER

3/11/03

INDUSTRY NEWS

Engineering students from 15 North American universities recently attended the FutureTruck Summit, designed to help them prepare for the 2003 FutureTruck competition to be held this summer. Sponsored

by Ford Motor Co., the U.S. Department of Energy, and National Instruments, the competition challenges student teams to redesign a Ford Explorer SUV for lower emissions and higher fuel economy, without sacrificing performance, utility, safety, or affordability.

Ford and the DOE, through its research facility at the Argonne National Laboratory, participated in the training as part of their sponsorship of FutureTruck. Research done by the FutureTruck teams supports ongoing work of Ford and the DOE in increasing the fuel efficiency of SUVs. As a major sponsor of FutureTruck, National Instruments donates LabVIEW software and measurement hardware to teams for monitoring and controlling their vehicles.

"We are excited to play such an active role in FutureTruck," said Ray Almgren, National Instruments' vice president of product marketing and academic relations. "It not only illustrates how engineers can use technology to improve everyday life, but also helps us in our continuing commitment to educate and inspire engineers around the world."

Sessions held during the training summit included Ford representatives discussing electric vehicle systems designed for its Ford Ranger trucks, as well as telematics and wireless networking. The FutureTruck competition culminates June 2 at the Ford Michigan Proving Ground in Romeo, MI, and the Allen Park Testing Labs in Allen Park, MI. The winner will be named on June 12 in conjunction with Ford's Centennial Anniversary in Dearborn, MI.

Visit <http://link.abpi.net/l.php?20030311A5> for more information on FutureTruck.

BROADCAST TRANSCRIPT

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Date March 07, 2003
Time 04:00 PM - 05:00 PM
Station WWJ-AM Radio
Location Detroit
Program Newswatch

JAYNE BOWER, co-anchor:

Some college engineering students are answering the call for more fuel efficient vehicles, the Future Truck Program, passing through Detroit today. Director Bob Larson says students compete to build the most energy efficient SUV.

Mr. BOB LARSON (Director, Future Truck Program): It's important for our long-term economic and political health to find a way to have sustainable transportation without relying on so much imported oil.

BOWER: Larson says the Future Truck Program was building hybrid vehicles five years before they were first introduced to the market. They are now finding ways to make hybrids more fuel efficient and doing research on the fuel cell-powered vehicles of the future.

#

MARCH 4, 2003



Bacon's

1908

Students working on fuel-efficient SUV

CHARLES GALT
CanWest News Service

Sport utility vehicles aren't known for their fuel efficiency, but a group of University of Alberta students hopes to change that.

The U of A engineering students are part of a North American competition to re-engineer a conventional Ford Explorer into a higher-fuel-economy vehicle without sacrificing its performance, utility, safety or affordability.

The competition is called FutureTruck. Primarily sponsored by Ford Motor Co., it's a collaborative project of government, industry and academia. The U of A is the only Canadian university in the competition. It's up against 14 U.S. universities.

"We're aiming for a fuel efficiency of 30 m.p.g.," said Clayton Bond, project leader for the U of A's FutureTruck team. (Thirty miles per U.S. gallon is about 7.8 litres per 100 kilometres. Natural Resources Canada lists the efficiency of the 2002 Explorer at about 16 litres per 100 kilometres for city driving and 11 litres for highway driving.)

The fuel for the hybrid vehicle is called E85, a blend of 85 per cent ethanol and 15 per cent gasoline. All the competitors are using hybrid electric

At low speeds and mild acceleration, the electric engine will be the main source of power, Bond explains.

As speeds increase, or as acceleration becomes more intense, both the gasoline engine and the electric one will work together until cruising speeds are reached. Then the gasoline-powered engine will take over.

By using both engine types at different accelerations and speeds, the team hopes to increase fuel efficiency and lower emissions.

In fact, it aims to meet or surpass the vehicle's current fuel efficiency by at least 25 per cent, a requirement of the competition.

This year marks the fourth anniversary of the competition, this year's team at the U of A is composed of about 25 students, each of whom puts in about 10 to 15 hours a week, said Neil Freeman, who was project administrator until late December.

"We seem to spend a lot of time looking for sponsors, and trying to get time in shops to do work," said Keith Boyle, a fourth-year electrical engineering student at the U of A working on the project.

The team needs sponsors because money is scarce. "Say we need to buy a part," said Boyle. "A lot of our deci-

Gizmos &

Gadgets

available as opposed to what we would really like to put into it. Sometimes you just have to settle for second best.

As an electrical engineer on a mechanical engineering project, Boyle soon discovered there was a lot of computer programming and electrical work involved in what initially seemed like a mechanical project. Now, he and five members work on the project's controls systems.

"At first there's a bit of a learning curve. I had to learn how gas engines deliver power to the powertrain, which is something that would be taught to a mechanical engineer but not necessarily to an electrical engineer," he said.

But the FutureTruck team is not completely made up of engineering students. Richard Bubalo is a fourth-year arts student who recently joined the team to help with marketing and fundraising.

"I feel privileged to work on a project like this," Bubalo said.

"I can help out on this project from what I learned in school and I don't need to be an engineer to do it, that's great."

Mark Cannon, a science student on the project, explained that the vehicle is powered by

lithium-ion batteries produced by Womley Batteries. Womley donated the batteries for last year's project, which continued into this year. The team chose the batteries because of their high cycle life, or durability, and peak power.

The team now is looking for a special lithium-ion charger to replace the old one from last year.

"There are other hybrids out there but they're smaller vehicles," said Cannon. "If we could make this Ford Explorer powerful and yet hybrid that would be great for the average person."

The Explorer came with a stock six-cylinder 4.0-litre engine, which the team will replace with a 2.0-litre, four-cylinder Ford Focus engine (2.0 Tech). It will add an electric motor and fuel cells that will power the vehicle.

Ford supplied the competing teams with 2002 Ford Explorers, as well as \$10,000 in seed money. The U of A team needs a total of \$75,000 to finish the project. It has raised \$55,000 of that on its own from local city sponsors.

Lexus announced recently it will make hybrid automobiles in all of its lines by 2012. This type of competition can influence what goes into vehicles of the future. Bond and Freeman say the Ford competitions of the early to mid-1990s greatly influenced Ford hybrid engine designs.

The competition ends in June, when the team will take its modified Explorer to the United States to be judged at a test site.



Neil Freeman (right), and Clayton Bond hope to make this Ford Explorer at least 25 per cent more fuel efficient. They're part of a team of U of A students in a competition against 14 U.S. universities.



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Lewiston Morning Tribune (Idaho)

March 3, 2003 Monday

SECTION: Pg. 9A

LENGTH: 312 words

HEADLINE: UI dispatches experimental truck

BODY:

MOSCOW -- The University of Idaho's experimental No. 13 Summit **FutureTruck** is headed to the Society of Automotive Engineers Congress today to demonstrate its triple-power systems.

The converted Ford Explorer runs on gasoline, electricity and stored hydraulic power -- no batteries. "We won't have the passive cooling system installed on the roof yet, but the hydraulic-assisted energy system, hybrid electric, modified gas engine and other redesigned energy and emissions features are ready for the show," says Frank Albrecht, the team's faculty adviser.

Starting with a stock 2002 Ford Explorer, the team completely dismantled the truck and redesigned it to use less energy and to reduce emissions.

The engine is modified for improved efficiency and to run on 85 percent ethanol, which helps reduce greenhouse gases.

Emissions are reduced by heating the catalytic converters before the engine is started. This is done with salts, adds Albrecht.

"The same technology that keeps hands warm on the ski hills will be used to help keep our air clean."

Fuel economy is improved by reducing the amount of work required from the engine, says Albrecht.

Normal hybrid vehicles

capture electrical energy during deceleration, store the energy in batteries and then reuse it.

"The Summit uses both electrics and hydraulics for hybrid operation and stores energy in ultra-capacitors rather than in batteries."

Finally, a control system with sensors, computers and displays is the brain for the energy-efficient vehicle.

The vehicle even has the capability for precise GPS tracking and Internet access.

The student team has been part of a four-year project to reengineer a conventional truck into a lower-emissions vehicle with at least 25 percent higher fuel economy -- all without sacrificing performance, utility, safety and affordability.

LOAD-DATE: March 4, 2003

Document 1 of 11 [next](#) ➤



Bacon's

1908 STUDENTS TO REDESIGN EFFICIENCY OF SUVs

As part of the 2003 FutureTruck competition, 15 student teams are redesigning Ford Explorers to reduce emissions and increase fuel economy. However, the redesigned sport utility vehicle must still meet current Explorer utility, safety, and cost standards. The redesigned vehicles will be judged at a group gathering in June.



Participants in the FutureTruck competition use data acquisition hardware and software (inset) to monitor vehicles when redesigning a Ford Explorer so that it meets low-emissions standards.

In January, engineering students from 15 North American universities attended the FutureTruck Summit for advanced technical training. The session showed students how to prepare their SUVs for the competition, which is sponsored by Ford Motor Co., the U.S. Department of Energy, and National Instruments of Austin, Texas.

At the summit, students learned about computer programs that would help them with their redesigns. Pri-

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marily, they studied LabView from National Instruments, which lets users create, test, measure, control, and automate applications using graphical development.

The National Instruments software and measurement hardware, primarily data acquisition hardware, helps teams monitor their vehicles. Student units learned about how the software and hardware could be used to design engine control and monitoring systems, said Bruce Billian, who leads the FutureTruck team from Virginia Tech in Blacksburg, Va.

At the summit, Ford representatives also discussed electric vehicle systems that have been designed for its line of Ford Ranger trucks. Other sessions covered FutureTruck judging requirements, telematics, and wireless networking.

The competition culminates in 10 days of judging, beginning on June 2 at the Ford Michigan Proving Ground in Romeo, Mich., and the Allen Park Testing Laboratories in Allen Park, Mich. Vehicle evaluations include technical performance—such as acceleration, handling, and fuel economy—in addition to a review of vehicle design.



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March 1, 2003

SECTION: No. 3, Vol. 125; Pg. 16; ISSN: 0025-6501**IAC-ACC-NO:** 98953972**LENGTH:** 306 words**HEADLINE:** Students to redesign efficiency of SUVs; Computing; Brief Article**BYLINE:** Thilmany, Jean**BODY:**

As part of the 2003 **FutureTruck** competition, 15 student teams are redesigning Ford Explorers to reduce emissions and increase fuel economy. However, the redesigned sport utility vehicle must still meet current Explorer utility, safety, and cost standards. The redesigned vehicles will be judged at a group gathering in June.

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IAC-CREATE-DATE: March 20, 2003**LOAD-DATE:** March 21, 2003[◀ prev](#) Document 2 of 12 [next ▶](#)



Bacon's

1908 —

Future Truck Program rolls on

TMC Committee poised to tackle key issues, from advanced propulsion to better tires

By Rick Weber

THE Future Truck Program was initiated by the Technology and Maintenance Council's Board of Directors in 1984 as Tomorrow's Truck Committee, with the purpose of bringing the unified voice of the equipment user to vehicle manufacturers and the end goal of influencing future truck design.

At the time, this was a shift in focus from TMC's traditional approach, which concentrated on solving problems as they arrived.

The program was based on the premise that equipment users knew vehicles best, since they used them. Traditionally, manufacturers only had performance data through warranty period. TMC believed that equipment users *really* knew best about equipment limitations and shortcomings.

The program became a TMC Committee, reporting directly to Council's Board of Directors. TMC's Future Truck Committee promotes activities that improve transport equipment, its maintenance, and maintenance management by influencing future equipment design through collective user input. TMC believes the method is more effective for fleets than relying on direct fleet-to-manufacturer relationships, and it achieves industry standardization through broad consensus.

Nineteen years after the formation of the program, it is still going strong.

"I think it has achieved a lot of things since 1984," TMC technical director Robert Braswell says. "It has had a lot of disappointments, too, because some things are maybe unachievable until the

technology gets better."

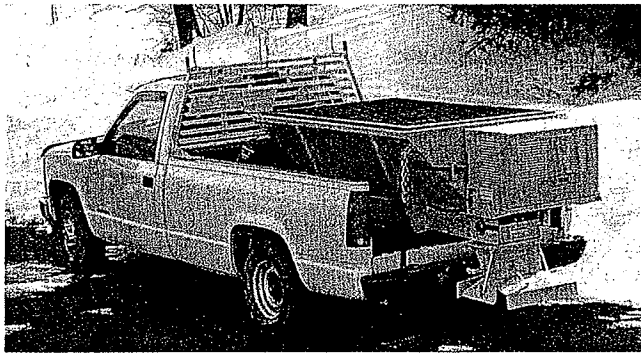
- Million-mile engine. Engines more than doubled service life from early 1980s, while drain intervals increased, and valve adjustment became a thing of the past.

"Part of that was due to electronic controls, which were basically mandated by EPA emissions standards," Braswell says.

"But a lot of it had to do with



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working in partnership with engine manufacturers with fleet experience. Fleets used to do overhauls. You don't do overhauls like you used to. You're not overhauling an engine at 400,000 miles."

- Fuel economy increased significantly, with MPG improving from 4.5 to 6.5 by the early 1990s and good prospects for continued improvement, thanks to growing use of electronic controls and aerodynamics.

"Fuel economy improvements over the last 20 years have been phenomenal, not just from engines, but also from all of these different aerodynamic devices, better specification of components, more lightweight components, and reduced rolling resistance," he says. "All of this is not necessarily just because manufacturers built a better product but because fleets are truly the systems integrator when it comes to building a truck. The customer basically tells the manufacturer based on their experience, 'This is our spec. This is how we want to put it together.' Learning from that field experience helps manufacturers deliver a better product overall for all their customers. There are a lot of different aerodynamic devices, but through TMC we've identified certain aerodynamic devices that will give you more bang for the buck. Those lessons learned stem out of Future Truck and out of TMC, and are fed back to the whole development mechanism.

"Often manufacturers really only care about the product through the warranty period. That's where they have their data, because of the way their systems are set up. The customers working through TMC can feed back the experience beyond warranty and give their suggestions.

"Now, it is a complicated thing. There are so many different systems within the vehicle. The beauty of TMC is that you have volunteer members that are well-versed in certain areas and they work within those areas, and that's where we get a better product, because the people that know are working to better the industry from beyond just their own parochial interest. If there's a good product out of it, it's all because of those volunteer members, on both the fleet side and the manufacturing community."

- J1587/J1708 standards simplified the on-board datalink. Proprietary solutions for data communication were avoided, the industry shared common protocols and connections, and a joint SAE/TMC effort saved fleets millions of dollars.

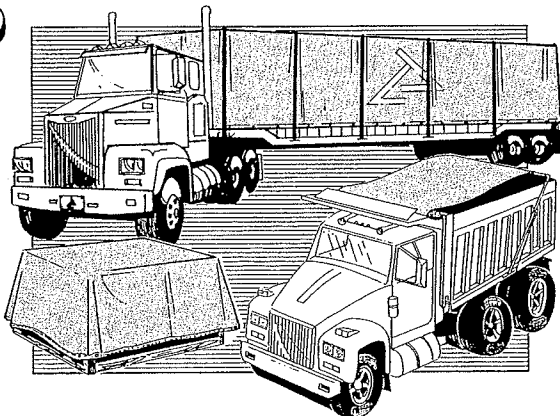
- Programmability of engines for efficiency and control.
- Several manufacturers introduced new models featuring improvements directly attributed to Tomorrow's Truck papers: Volvo VN, Kenworth T600/T2000, and Freightliner Century Class.

The disappointments

- Brake systems are still maintenance sensitive, and there has been little improvement in Scams.

"There have been evolutionary improvements, but there are other ways it can go, too," Braswell says. "Will air disc brake revolutionize that? Is the cost justifiable? Is the maintainability there? These are the issues.

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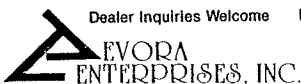
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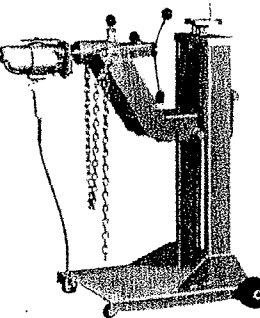
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A wish list for future trucks includes improved brake durability, greater use of standardized connectors, industry-wide standards, color-coded wiring, and improved serviceability.

"Air disc brake has a lot of potential, but until you get the timing issues resolved . . . And how do you do that? Do you need ECBS (Electronically Controlled Braking Systems)? And if you do get the ECBS, can you eliminate the pneumatic overlay for the triggering? That could really save meets maintainability and make it more cost-affordable. Or are you just going to have both overlaying systems and just make it more complex and not necessarily get all the benefits? Those are the things that Future Truck can wrestle with—where it gets complicated towards achieving the goal."

- The run-flat tire was not achieved.
- Cab durability still needs improvement. Fleets still report the same problems in TMC surveys.
- Cooling system durability: Smaller underhood profiles due to aerodynamic designs put more pressure on packaging and radiator sizes.
- Connector chaos: Too many variations, and reliability and durability remain troubling with electrical systems.
- Unintended consequences of design improvements to aerodynamics have made maintenance more difficult, also increasing workload of braking systems.

Annual meeting

New issues were discussed at TMC's Annual Meeting and Transportation Technology Exhibition March 11-14 in Ft Lauderdale, Florida. The theme was "Driving Truck Technology—Vision to Reality."

Some of the most intriguing sessions:

- More electric power, less emissions, less idling.

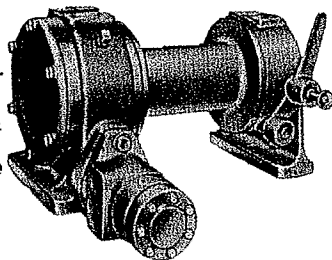
"There is a whole lot of interest in the advanced propulsion

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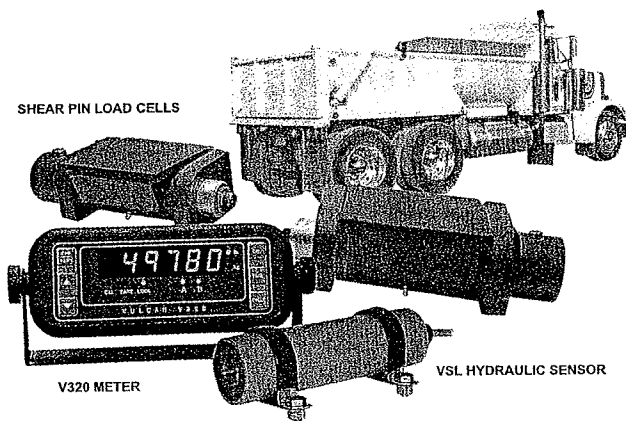
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Future Truck . . .

sion system in medium-duty and light-duty markets, and even heavy-duty to a certain extent," Braswell says. "Some of it was precipitated by ever-increasing admissions standards—most recently 2002 and mostly notably 2007 in the future. People are thinking, 'Well, maybe there's another way to achieve these things besides continuing to modify just diesel.' There's interest in diesel hybrid electric. There's interest and support from the Bush Administration on hydrogen fuel-cell technology. Maybe some things with natural gas will be revisited.

"But the idea of alternate propulsion is now attracting some attention—particularly with fleets like UPS and FedEx. I think that's really an interesting way to go. You'll see, especially on the light-duty side, the big guys—Ford, GM, Dodge—coming out with some kind of a gasoline hybrid electric very soon. They already have plans for 2004-2005 pickup trucks. This could translate into the medium- and heavy-duty markets. I think diesel will be around for a long time, but this whole idea of advanced propulsion is very interesting."

- Connector chaos. "The weakest link is the connector," he says. "What's the best connector? We don't have one. Packaging connectors on the electrical side is an issue.

"I think there is a real debate whether we need the so-called 42-volt electrical system. I think even the manufacturers are starting to revisit that. That's a misnomer, from our point of view. It's really a 36-volt system. You can't find a 42-volt battery anywhere. They don't make such an animal. If you go to an auto parts shop, it's a 12-volt battery. In Europe, they have 24-volt batteries. The convention has always been to name the electrical system based on the storage battery. If you're a technician and you hook up a volt meter and it says 12.0 volts, that's a dead battery. It's really a 12.6 battery. Now they have these new electrical systems, these new 42-volt so-called systems. They decided to name the electrical system after the charging voltage instead of the storage-battery voltage. I never got a straight answer as to why they decided to do that, other than a consortium at MIT wanted to do it that way.

"This is a classic example of where you're getting confusion for no good reason. Because now, if they continue with that convention—and this is a Future Truck request—don't make it more complicated than it needs to be.

"Going forward, you're going to have technicians look and say, 'OK, I've got a 42-volt system and a 12-volt system. Now, the 42-volt system is supposed to charge at 42, but I'm looking for a 42-volt battery that will make it. But on the other hand, I'm doing the exact opposite on the older systems. It's a disparity in nomenclature that doesn't make any sense at all. Are they going to convert all the 12-volt systems into 14.4-volt systems and start calling them that? I doubt it. I don't think you'll ever see the battery guys sell 42-volt batteries when they're really 36-volt batteries. It's hard enough for a technician to do his job without this kind of silliness. That's a Future Truck request: Keep it simple for the technician and customer."

- Tires. "You're always looking for a better tire," he says.

"The run-flat tire is something we've asked for a long time, and you're starting to see it in the passenger-car side. Maintaining tire pressure is a big problem for the industry. Whether that's achieved or solved by an automatic inflation system or by the run-flat tire, I don't know. Under-inflation is the main problem, and that's primarily a maintenance issue. They blame it on retreads a lot. But it's all tires. Inside trailers are getting the least attention, and they're the ones that perhaps go the most."

The history

TMC's Future Truck Committee directs the program by identifying equipment user agenda for future truck design; establishing benchmarks for various aspects of equipment (reliability, maintainability, etc); communicating user needs to the industry; and partnering with others to further its goals.

The committee creates task forces to develop position papers on user needs and expectations for future vehicle designs. These task forces state what users want, leaving manufacturers to determine how, through their own efforts, SAE and TMC recommended practices, and other industry standards development.

There are currently seven active task forces: future electrical, future tire, future propulsion, future cab, future trailer, future technician, and future LMV.

The first Tomorrow's Truck Position Paper was published in 1985 through the Society of Automotive Engineers (SAE) to best reach vehicle engineers at that time. A technical paper was presented at SAE Truck and Bus in 1985, with a follow-up paper presented in 1987.

The first papers asked for million-mile engine life; cooling systems to last life of engine; improved durability of most vehicle systems, especially electrical/lighting; braking systems that are less maintenance sensitive; better entry and egress of vehicle; and improved tire life, fuel economy.

A 1962 truck reliability study showed that the most common failures (in miles to repair) were electrical (7,885), engine (12,799), fuel (13,884), cooling (13,949), body/chassis (15K), lubrication (16K), and brakes (32K).

A wish list for future trailers:

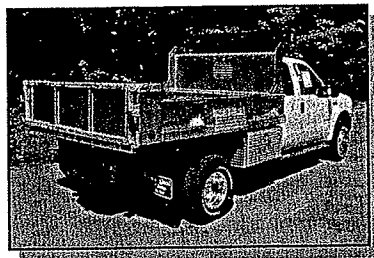
- **20% weight reduction**
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A 1999 TMC reliability survey showed the probability of system failure per year: tires, tubes, liners and valves (64%), lighting (29%), brakes (18%), cranking (16%), charging (11%), HVAC (9%), fuel (7%), powerplant (4%), cooling (3.5%).

The survey revealed that 46% of responding fleets have 1-7% of their vehicles out of service due to unscheduled maintenance. This equals about 18,000 TMC member fleet vehicles, accounting for as much as \$5 million annually (based on modest \$300 per maintenance event).

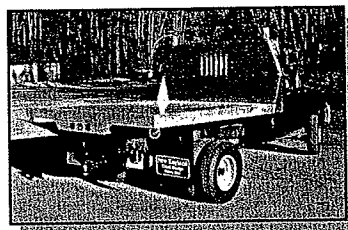
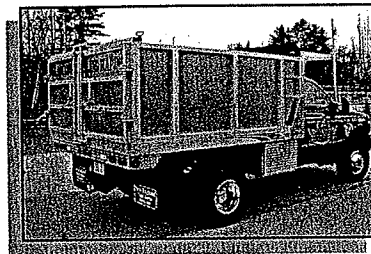
In the big picture, TMC members want heavy-duty Future Trucks to have a service life of 10 years/One

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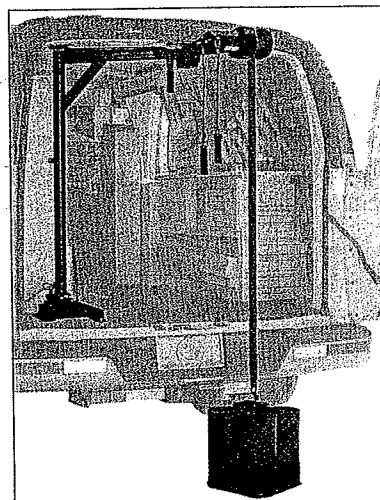
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Million Miles for all vehicle systems. For LMVs, the design goal is 250,000 miles or 25 years for all vehicle systems.

TMC fleets have said they are willing to pay up to double the cost for twice the service life and reliability.

With this understanding, service life expectations can be shortened if the overall cost of operation is lower by operating the so-called "throw-away truck." In this case, a trouble-free truck with X-cents per mile of cost guaranteed is OK in a shorter time/mileage frame. But TMC believes this approach must apply to the vehicle as a total system.

Requests

Electrical requests from members:

- Connector standardization.
- Better grounds. As much as 60-70% of electrical failures are ground-related, surveys and studies show.
- Color-coded wiring standards need to be industry-wide.
- Improve reliability, durability, maintainability, and serviceability under all operating conditions.
- Minimize the number of electrical interfaces.
- All circuits should have adequate electrical protection in case of fault.
- Harnesses should allow for installation of additional equipment.
- Cable/harnesses should meet needs of the application intended.

Trailer requests from members:

- Reduce overall weight by 20%.
- Target trailer full use life of 20-plus years.
- Do not adversely affect maintenance costs.
- Do not reduce reliability, durability to achieve weight reduction.
- Cost should be acceptable to user.

In the long term, smart trailers must be backwards compatible; five-year/500,000-mile trouble-free service for all suspension, brake, and running gear systems; better aerodynamics without sacrificing cube; better security systems; improved corrosion prevention; better durability of paints/finishes; long-life lighting standard.

The future

Looking well into the future, these are the long-term fleet user goals for equipment on Future Trucks:

- 2004: EBS for trucks (currently under test under the IVD); remote control of reefer climate.
- 2005: Turbocompounding on engines; camless valve activation on engines;
- 2006: hybrid vehicles in use (\$87-million market); frontal aggressivity regulations (tractors); side under-ride regulations; alternative fuel mandate for private fleets (vehicles less than 8,500 lb).
- 2007: engine emissions regulations; EPA requires 15ppm diesel fuel; regenerative braking systems in trucks capture more than 50% of braking energy; "electric" truck available, no belt-driven accessories (currently in development).

- 2009: tare weight of tractor-trailer combinations reduced 20%; rollover avoidance technology available.

- 2006-2010: automatic fire protection systems in heavy trucks; resonant macrosonic synthesis (RMS) refrigeration compressors available-acoustic compressor; magnetic refrigeration and thermoelectric refrigeration possible; advanced materials (fireproof liquid crystal polymers, carbon/aramid fibers used in commercial vehicle construction); hydrogen-fueled vehicles become cost competitive with petroleum fueled vehicles; Mach 3 transport in operation; tilt rotor aircraft in shuttle runs; first segments of intelligent vehicle/highway system open; truck stop electrification (shore power for trucks) underway on large scale; electric vehicles in use.

'The people that know are working to better the industry from beyond just their own parochial interest.'

—Robert Braswell, TMC technical director

- 2012-2015: trans-atmospheric aircraft enter service; recyclable plastic components used in making 50% of a passenger vehicle; ceramic engines in commercial vehicles, require no cooling system; autonomous (driverless) cars on smart highways.

- 2016-2018: fuel cell vehicles in use; autonomous (driverless) truck convoys using electronic "tow bars" in use.

- 2020: alternate forms of freight movement, e.g. air freight (perhaps lighter-than-air), high-speed marine vessels, pneumatic tunnels, erode trucking market share; fuel cell trucks become commercially viable.

Scenarios

The long-term projections for various scenarios of the environment in which we will be operating:

- 2005: Dow Jones Industrial average reaches 15,000.
- 2006: Last coal mine closes; trucking industry freight volume hits 8.2 billion tons; \$446.2 billion gross revenues for the industry; US industry will need 155,000 mechanics (up from 137,000 in 2001).
- 2011: Software will be able to repair itself.
- 2012: Machine learning—computer programs learn by trial and error to adjust their behavior—becomes common; worldwide air cargo business triples over 1998.
- 2015: World population reaches 7.2 billion; computers evolve to have almost human-like intelligence.
- 2017: Human knowledge exceeded by machine knowledge.
- 2020: Computers overtake humans in overall intelligence; earliest date forecast for 50% of ultimate oil resources expended, decline in production thereafter; truck traffic doubled over 2000—consultants say as many as 62 million more vehicles on highways in 2020.
- 2020: Half of all goods sold electronically. □

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Monthly**MARCH 2003****Bacon's****1908** **Competition Creates Fuel-Efficient SUVs** **R12**

According to *EE Times*, electrical and mechanical engineering students in the FutureTruck 2003 competition are modifying 15 identical 2002 Ford Explorers using virtually any technology, fuel, or construction technique while maintaining the qualities that made the model popular. Managed by Argonne National Laboratory, the competition challenges 15 university teams from the U.S. and Canada to re-engineer a mid-size truck or SUV for lower emissions and 25% better fuel economy.

In the current two-year competition cycle, contestants have run their vehicles in the first of two performance competitions for fuel efficiency, emissions, acceleration, handling, consumer acceptance and off-road performance to determine the overall winner. Now, more than halfway through the challenge, they are further modifying and refining their entries for the final competition in June.

Pat Ford, project manager of the FutureTruck program at Ford Motor Co., estimates that traditional design practices could improve mileage another 5% to 10% in a conventional five-passenger Taurus. But beyond that, he said, most future energy savings would probably need to come from fuel cells and hybrid-electric propulsion systems.

While most of the trucks in the FutureTruck program still run internal combustion engines under their hoods, the power plants replacing the original 4-liter V-6 range from an ethanol-burning four-cylinder, 1.8-liter turbocharged Mazda unit to an assortment of compact diesel engines outfitted with experimental catalytic soot traps.

The two schools that developed hydrogen fuel cells are being forced to move to different technologies after their fuel cell supplier was acquired by General Electric last year, and dropped out of the program.

Penn State EE students Paul Minear and Jon Weidner



With a modified 2002 Ford Explorer, their entry in the FutureTruck 2003 competition, are Penn State EE students (from right) Jon Weidner and Paul Minear with a "lucky Nittany Lion."

recently brought a hybrid diesel-electric Explorer to a FutureTruck event at National Instruments Corp. in Austin, Texas. At first glance, the hybrid looks like a stock Explorer, but the resemblance fades under the hood, where a little four-cylinder 2.5-liter Detroit diesel unit has replaced the gas-burning 4-liter V-6. It also carries a few dozen yards of added plumbing, several mysterious electronics boxes, and some non-Ford cable bundles that are designed to carry high amperages.

A crawl under the vehicle reveals the electric side of the drive train – a 37kW AC induction motor originally used as the primary drive in a Solectria Force electric car – coupled in parallel with the output shaft of the truck's five-speed transmission, just ahead of the transfer case.

Most of the Explorer's stock interior has been left intact, with the lead-acid battery pack tucked neatly in the rear of the car. One might never suspect the big changes under the hood except for a few non-stock switches on the dash and a large cluster of sensing and control modules shoehorned between the first two passenger seats.

Software remains one of the things still undergoing significant change as the car approaches its final configuration for the 2003 competition in June. While all the functions, such as transitions between pure-gas and gas-electric propulsion and regenerative braking all work, the algorithms continue to be refined to yield the best efficiency and the best possible driver experience.

These and other changes, they said, should make the vehicle perform as well as an out-of-the-box Explorer under most conditions, and perhaps even better. But extended uphill pulls with a large trailer in tow or highly demanding off-road conditions will eventually deplete the electric drive system's reserves faster than they can be replaced, forcing

the car to rely solely on diesel power.

Last year seven of the 15 vehicles matched or bettered stock SUV mileage.

Ford is preparing to market a hybrid version of its Escape mini-SUV in 2003, Pat Ford said. He said his company's goal is to offer it at only a slightly higher cost than a conventional Escape. It's expected to deliver 29mpg to 30mpg in city driving and 35mpg to 40mpg on the highway. The hybrid Escape caps years of research by Ford but it also borrows ideas from university research and earlier student engineering competitions like FutureTruck.



908
Bacon's

Universities compete in FutureTruck stakes

BY CHARLES CAL
Edmonton

Sport-utility vehicles aren't known for their fuel efficiency, but a group of University of Alberta students hopes to change that.

The U of A engineering students are part of a North American competition to re-engineer a conventional Ford Explorer to improve fuel economy without sacrificing its performance, utility, safety or affordability.

The competition is called FutureTruck. Primarily sponsored by Ford Motor Co., it's a collaborative project of government, industry and academia. The U of A is the only Canadian university in the competition. It's up against 14 U.S. schools.

"We're aiming for a fuel efficiency of 30 m.p.g.," said Clayton Bond, project leader for the U of A Future Truck team.

(Thirty miles per U.S. gallon is about 7.8 litres per 100 kilometres.) Natural Resources Canada lists the efficiency of the 2002 Explorer at about 16 L/100 km for city driving and 11 L/100 km for highway driving.)

The fuel for the hybrid vehicle is called E85, a blend of 85 per cent ethanol and 15 per cent gasoline. All the competitors are using hybrid electric designs.

At low speeds and mild acceleration, the electric engine will be the main source of power. Mr. Bond explains:

As speeds increase, or as acceleration becomes more intense, the gasoline engine and

Students try to engineer less thirsty SUV

Pete



CLAYTON BOND, FORD FUTURETRUCK SERVICE

Neil Freeman, right, and Clayton Bond are part of a team that hopes to make this Ford Explorer at least 25 per cent more fuel efficient. The University of Alberta is the only Canadian entry in a competition against 14 U.S. universities.

The electric one will work to the speeds, the team hopes to increase fuel efficiency and lower emissions. In fact, it aims to meet or surpass the vehicle's current fuel efficiency by at least 25 per cent, a requirement of the competition.

By using both engine types at different accelerations and speeds, the team hopes to increase fuel efficiency and lower emissions. In fact, it aims to meet or surpass the vehicle's current fuel efficiency by at least 25 per cent, a requirement of the competition.

This year marks the fourth anniversary of the competition, and this year, teams at the U of A

is composed of about 25 students, each of whom puts in about 10 to 15 hours a week, said Neil Freeman, who was project administrator until December.

"We seem to spend a lot of time looking for sponsors, and trying to get time in shops to do work," said Keith Boyle, a fourth-year electrical engineering student at the U of A working on the project.

The team needs sponsors, because money is scarce. "Say we need to buy a part," said Mr. Boyle. "A lot of our de-

sions are based on what is available as opposed to what we would really like to put into it. Sometimes you just have to settle for second best."

As an electrical engineer on a mechanical engineering project, Mr. Boyle soon discovered there was a lot of computer programming and electrical work involved in what initially seemed like a mechanical project. Now, he and five teammates work on the project's "controls" systems.

"At first there's a bit of a learning curve. I had to learn how gas

school and I don't need to be an engineer to do it, that's great." Matt Cannon, a science student on the project, explained the vehicle is powered by lithium ion batteries produced by Woudley Batteries. Woudley donated the batteries to last year's project, which continued into this year. The team chose the batteries because of their high cycle-life, or durability, and peak power. The team now is looking for a special lithium ion charger to replace one from last year.

There are other hybrids out there but they're smaller vehicles," said Mr. Cannon. "If we could make this Ford Explorer powerful and yet hybrid, that would be great for the average person."

The Explorer came with a stock six-cylinder, 4.0-litre engine, which the team will replace with a 2.0-litre, four-cylinder Ford Focus engine (Zetec). It will add an electric motor and fuel cells to power the vehicle.

Ford supplied the competing teams with 2002 Ford Explorers and \$10,000 in seed money. The U of A team needs \$75,000 to finish the project. So far, it has raised \$55,000 from local sponsors.

Toyota announced recently it will make hybrid autos in all its lines by 2002. This type of competition can influence what goes into vehicles of the future. Mr. Bond and Mr. Freeman say the mid-1990s greatly influenced Ford's hybrid engine designs.

The competition ends in June, when the team will take its modified Explorer to the U.S. to be judged at a test site.

CanWest News Service

FEBRUARY 27, 2003



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Business Digest

Monster partners with NAACP

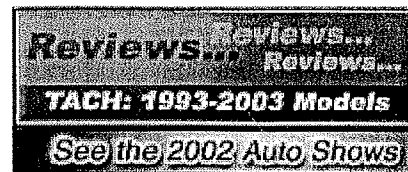
MAYNARD - Monster and the National Association for the Advancement of Colored People announced a strategic online recruiting partnership. Under the agreement, Monster will become the exclusive online career partner of the NAACP, the nation's oldest and largest civil rights organization.

The MathWorks again sponsors Future Truck

NATICK - The MathWorks yesterday announced that for the third straight year, it is a major sponsor of FutureTruck, joining other longtime sponsors such as Ford Motor and the U.S. Department of Energy. FutureTruck challenges student engineering teams from 15 North American universities to re-engineer a Ford Explorer for lower emissions and higher fuel economy, while maintaining performance, safety, and affordability. To mark its longstanding support for the program, The MathWorks has also established a special modeling and simulation competition for FutureTruck 2003. The MathWorks Modeling Award competition will be featured at SAE 2003 World Congress, which is being held March 3-6 in Detroit.



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The MathWorks Joins Ford Motor Company and Department of Energy in Continued Support For FutureTruck Competition

SAE World Congress to Feature MathWorks Modeling Competition for FutureTruck

NATICK, Mass., Feb. 26 -- The MathWorks today announced that for the third straight year, it is a major sponsor of FutureTruck, joining other longtime sponsors such as Ford Motor Company and the U.S. Department of Energy. FutureTruck challenges student-engineering teams from 15 North American universities to re-engineer a Ford Explorer for lower emissions and higher fuel economy, while maintaining performance, safety, and affordability. To mark its longstanding support for the program, The MathWorks has also established a special modeling and simulation competition for FutureTruck 2003. The MathWorks Modeling Award competition will be featured at SAE 2003 World Congress, which is being held March 3-6 in Detroit, Michigan.

"The MathWorks tools are critical to our student teams, since accurately modeling their systems is an essential step in developing a sophisticated

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Torbjornsen
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control system that makes all the difference in the ultimate successful product," said Bob Larsen of the DOE's Argonne National Laboratory and director of FutureTruck. "Knowledge of MATLAB(R) and Simulink(R) are essential for engineering students worldwide in their training to become productive professionals. FutureTruck enables the students to use this multi-purpose software in a hands-on setting and is great preparation for a fast-track career."

Underscoring its commitment to advanced vehicle technology, The MathWorks established The MathWorks Modeling Award to encourage student teams to implement a model-based design approach that saves time and errors, improves understanding of the complex nature of a hybrid electric vehicle, and enables the synergistic operation of the various vehicle components. Using MATLAB, Simulink, and the PNGV Systems Analysis Toolkit (PSAT), the 15 FutureTruck teams will model and simulate subsystem and overall vehicle behavior; develop, implement, and test new control strategies; and assess and optimize component behaviors in the context of the overall vehicle. PSAT, a state-of-the-art tool built on MATLAB and Simulink for vehicle simulation and powertrain analysis, was developed at Argonne National Laboratory with support from Ford, General Motors, and DaimlerChrysler.

To compete for the Modeling Award, the FutureTruck teams will be judged on their abilities to develop MATLAB and Simulink models of the engine, motor, transmission, controllers, and other subsystems that result in a more energy-efficient vehicle. Participating teams will present progress reports to the panel of judges on March 6 at the SAE World Congress in Detroit. The session is open to all SAE conference attendees.

The MathWorks, which donated its software to each team, will announce the Modeling Award winners at the FutureTruck 2003 competition, which takes place June 2-12 at Ford Motor Company's Michigan Proving Ground in Romeo, Michigan.

"The MathWorks supports the technological,

educational, and environmental advances that FutureTruck facilitates, which is why we have supported the competition for the past three years," said Cleve Moler, Chief Scientist at The MathWorks and creator of MATLAB. "We hope that our contribution to FutureTruck will encourage the ideas and skills of these students as they design innovative engineering solutions while improving the earth's atmosphere and saving natural resources."

SAE World Congress attendees are invited to visit The MathWorks in booth # 1814.

About Future Truck

FutureTruck is a unique four-year engineering program that brings together the resources of industry, government, and academia in a cooperative effort to address important environmental and energy-related issues posed by the growing demand for SUVs. FutureTruck student teams are challenged to redesign their vehicle for lower emissions and 25 percent higher fuel economy. This unique competition demonstrates how industry, government, and academia can develop more energy-efficient and greener automotive technologies to improve the economy and the environment. For more information about this unique competition, visit www.futuretruck.org.

About The MathWorks

The MathWorks is the world's leading developer of technical computing software for engineers and scientists in industry, government, and education. With an extensive product set based on MATLAB and Simulink, The MathWorks provides software and services to solve challenging problems and accelerate innovation in automotive, aerospace, communications, financial services, biotechnology, electronics, instrumentation, process, and other industries. The MathWorks was founded in 1984 and employs more than 1,000 people worldwide, with headquarters in Natick, Massachusetts. For additional information, visit www.mathworks.com.

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EE TIMES

The Mathworks Joins Ford Motor Company

y PRNewswire

February 26, 2003 (9:31 a.m. EST)

JURL: <http://www.eet.com/story/59677>

The MathWorks Joins Ford Motor Company and Department of Energy in Continued Support For FutureTruck Competition

AE World Congress to Feature MathWorks Modeling Competition for FutureTruck

NATICK, Mass., Feb. 26 /PRNewswire/ -- The MathWorks today announced that for the third straight year, it is a major sponsor of FutureTruck, joining other longtime sponsors such as Ford Motor Company and the U.S. Department of Energy. FutureTruck challenges student-engineering teams from 15 North American universities to re-engineer a Ford Explorer for lower emissions and higher fuel economy, while maintaining performance, safety, and affordability. To mark its longstanding support for the program, The MathWorks has also established a special modeling and simulation competition for FutureTruck 2003. The MathWorks Modeling Award competition will be featured at SAE 2003 World Congress, which is being held March 3-6 in Detroit, Michigan. (Photo: <http://www.newscom.com/cgi-bin/prnh/20030226/NEW013> <http://www.newscom.com/cgi-bin/prnh/20030110/MTWLOGO>) "The MathWorks tools are critical to our student teams, since accurately modeling their systems is an essential step in developing a sophisticated control system that makes all the difference in the ultimate successful product," said Bob Larsen of the DOE's Argonne National Laboratory and Director of FutureTruck. "Knowledge of MATLAB(R) and Simulink(R) are essential for engineering students worldwide in their training to become productive professionals. FutureTruck enables the students to use this multi- purpose software in a hands-on setting and is great preparation for a fast- track career." Underscoring its commitment to advanced vehicle technology, The MathWorks established The MathWorks Modeling Award to encourage student teams to implement a model-based design approach that saves time and errors, improves understanding of the complex nature of a hybrid electric vehicle, and enables the synergistic operation of the various vehicle components. Using MATLAB, Simulink, and the PNGV Systems Analysis Toolkit (PSAT), the 15 FutureTruck teams will model and simulate subsystem and overall vehicle behavior; develop, implement, and test new control strategies; and assess and optimize component behaviors in the context of the overall vehicle. PSAT, a state-of-the-art tool built on MATLAB and Simulink for vehicle simulation and powertrain analysis, was developed at Argonne National Laboratory with support from Ford, General Motors, and DaimlerChrysler. To compete for the Modeling Award, the FutureTruck teams will be judged on their abilities to develop MATLAB and Simulink models of the engine, motor, transmission, controllers, and other subsystems that result in a more energy- efficient vehicle. Participating teams will present progress reports to the panel of judges on March 6 at the SAE World Congress in Detroit. The session is open to all SAE conference attendees. The MathWorks, which donated its software to each team, will announce the Modeling Award winners at the FutureTruck 2003 competition, which takes place June 2-12 at Ford Motor Company's Michigan Proving Ground in Romeo, Michigan. "The MathWorks supports the technological, educational, and environmental advances that FutureTruck facilitates, which is why we have supported the competition for the past three years," said Cleve Moler, Chief Scientist at The MathWorks and creator of MATLAB. "We hope that our contribution to FutureTruck will encourage the ideas and skills of these students as they design innovative engineering solutions while improving the earth's atmosphere and saving natural resources." SAE World Congress attendees are invited to visit The MathWorks in Booth # 1814.

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SEATTLE EDITION

FEBRUARY 25, 2003



1908
Bacon's

Students gear up FutureTruck for show 13

MOSCOW, Idaho — The University of Idaho's experimental "#13 Summit" FutureTruck is headed to the Society of Automotive Engineers Congress in Detroit March 3-6 to demonstrate the first concept truck with triple-power systems.

The converted Ford Explorer runs on gasoline, electricity and stored hydraulic power.

"We won't have the passive cooling system installed on the roof yet, but the hydraulic-assisted energy system, hybrid electric, modified gas engine and other redesigned energy and emissions features are ready for the show," said Frank Albrecht, the team's faculty adviser.

The team dismantled a stock 2002 Ford Explorer and redesigned it to use less energy and reduce emissions. They are part of a four-year project to re-engineer a conventional truck into a lower-emissions vehicle with at least 25 percent higher fuel economy.

FEBRUARY 19, 2003

Hydrogen research: An era of good fuelings?

By THE CALIFORNIA AGGIE EDITORIAL BOARD

February 04, 2003 - It sounds almost too good to be true: Hydrogen fuel cells, running on an efficient, virtually inexhaustible and universally available supply, could provide the nation's vehicles with clean energy and wean our government off dependence on foreign oil. Now all we have to do is build a distribution infrastructure, find an effective way to produce hydrogen, address safety and storage issues, overcome petroleum interests' resistance to modifying the national energy base, and convince the American public to accept hydrogen fuel cells as a viable and cost-effective technology.

Our society's dependence on petroleum carries with it entanglements that make any possibility of alternative fuels a welcome one. Aside from the obvious environmental issues, a program that encourages the development of clean transportation resources makes for good foreign policy. With oil production expected to peak and then decline within the first half of this century, a workable hydrogen energy economy could effectively insulate the United States from the inevitable problems an eventual oil shortage would bring.

For better or worse, Americans are not known for being particularly patient, and for all the marvels of technology our research institutions and their industrial partners can produce, fuel cells will not catch on unless the public sees them as more than a fringe element championed by idealistic environmentalists and unrealistic emissions legislation.

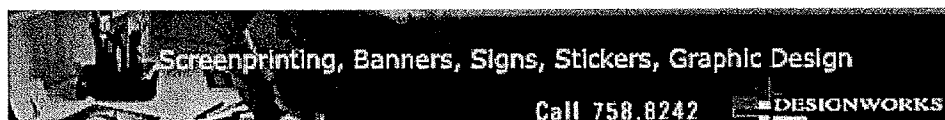
To that end, the Davis community — both on campus and in the city — has displayed an admirable willingness to be at the forefront of such promotion. Specialized parking spaces and electric-car recharging stations around town, as well as multi-pronged research initiatives at UC Davis, demonstrate that alternative fuels are more than a passing fad. With the addition of a fuel-cell-powered Toyota Highlander to its arsenal, UCD's Institute of Transportation Studies is primed to bring the fuel cell debate further from the academic arena into a realistic, practical domain.

However, significant hurdles remain. An infrastructure of hydrogen production and distribution, which is vital for a so-called hydrogen economy, is still a long way off. The "market-ready" Toyota Highlander

prototype, for instance, gets only 120 miles on a full tank — barely half the range of an average car. And even though hydrogen fuel cells themselves can be far more efficient than traditional gasoline vehicles, producing hydrogen gas is an energy-intensive process that currently all but negates a fuel cell's advantages.

In light of this, UCD should not drop all other alternative-fuel technologies, but should aggressively develop them in parallel. For example, hybrid-electric vehicles, which run on gasoline and electricity, offer a significant efficiency advantage over gasoline-only vehicles. Running on standard gasoline and electricity grids, they can use an energy infrastructure that has existed for years. Practical research programs such as UCD's FutureTruck should not fall by the wayside when funding for fuel-cell programs is ramped up.

The promises of clean, plentiful energy made by supporters of a hydrogen economy are tantalizing — but until some of the formidable technical and financial hurdles they face have been cleared, the university should keep its options open to other alternative-fuel avenues.



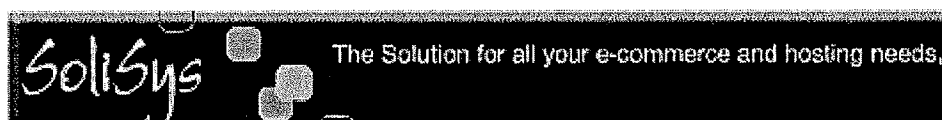
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FEBRUARY 19, 2003

National Engineering Week

By

February 19, 2003 - February 18-21 marks the 52nd annual National Engineering Week. The Engineering Joint Council, which represents all of the student engineering clubs on campus, will coordinate special events and activities at UC Davis, including egg drops for local school children and an exhibition of the low-mileage FutureTruck built by mechanical engineering students. For a schedule of events and more information, visit eweek.engineering.ucdavis.edu.



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NEXT STEP

Michigan Tech wins awards

If you're looking for educational excellence at a medium-sized college with beautiful surroundings, Michigan Technological University may be your best choice. On a campus located just 10 miles from Lake Superior, 6,600 students pursue degrees in engineering, the sciences, business, forest resources, technology, and communications in a safe Michigan college town.

Just a short walk from campus, downtown Houghton, Mich., features coffee shops, eateries, restaurants and more.

Top-notch learning

Michigan Tech (MTU) is ranked among the top-60 public universities in the nation, according to the U.S. News and World Report. Kiplinger's rates the school as a top-100 Best College in Higher Education.

A Michigan Tech education offers many chances to excel:

- Students will build a satellite with help from NASA and the Air Force, and work with local high school students.
- Last April, MTU business students won a national stock market competition, opened the NASDAQ market and appeared on the CNBC program "Squawk Box."
- The FutureTrack team won first place for emissions, acceleration, and outstanding advisor, and second overall, in the 2002 national competition held in Arizona.
- The men's basketball team has been ranked as high as No. 1 in the nation in NCAA Division II this season, and has recently won regular season and tournament titles while sporting a grade point average higher than that of the student body.
- One computer science sophomore took fourth place in a national code-writing competition, ranking with seniors from Cal Tech, Stanford, and Cal Berkeley.
- Michigan Tech hosts the national Clean Snowmobile Challenge this year. Student teams from all over the nation converging on the school's Keweenaw Research Center.
- Each Michigan Tech graduate averages 9.75 job interviews. In a recent survey, 95% of reporting graduates were employed, enrolled in graduate school, or in military service.
- A 12-to-1 student-faculty ratio and the 800,000-volume J. R. Van Pelt Library have helped Michigan Tech achieve some of the nation's largest enrollments in civil and environmental engineering, mechanical engineering, and geological engineering and sciences.
- The scientific and technical communication program is also one of the largest in the nation.

Unwinding

The new Rozsa Center for the Performing Arts offers students a variety of live

performances. This year's line-up included comedians Gallagher and Lewis Black, country star Brad Paisley, the Hubbard Street Dance Company of Chicago, Shanghai Acrobats of China, and bluegrass legend Sam Bush.

For wintertime fun, the Winter Carnival features colossal snow statues and MTU's NCAA Division I men's ice hockey team.

In addition to men's basketball, MTU teams are competitive in football, women's basketball, and volleyball, men's

and women's tennis, cross-country running, and Nordic skiing. The school has its own ski hill and cross-country ski trails, as well as an 18-hole golf course.

There are nine musical groups on campus to join, from Gospel Choir to Symphony Orchestra to the Pep Band. The student newspaper, "Lode," was named best in the nation in 2001 and best in Michigan in 2002.

Summer programs

Michigan Tech offers summer programs to help pre-college students learn more about the college experience and to explore potential academic paths. The Summer Youth Program (SYP) exposes stu-

dents to engineering, the sciences, technology, ecological studies and the creative arts.

In addition to SYP, the school offers the following special programs: The Women in Engineering Workshop, The Explorations in Engineering Workshop, The American Indian Workshop and The Honors Orchestra Program. For more information, contact the Youth Programs Office at

www.edopp.mtu.edu/sap/yp/ or call 906-487-2262.

For further information about Michigan Tech, please contact the MTU office of admissions at 888-MTU-1895, e-mail mtu4u@mtu.edu, or visit www.mtu.edu.



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Windsor Star

February 11, 2003 Tuesday Final Edition

SECTION: AUTOMOTIVE; Pg. B2

LENGTH: 744 words

HEADLINE: Cutting thirst for fuel is their goal;
Aim of student engineers

SOURCE: CanWest News Service

BYLINE: Charles Gal For CanWest News Service

DATELINE: Edmonton

BODY:

Sport utility vehicles aren't known for their fuel efficiency, but a group of University of Alberta students hopes to change that.

The U of A engineering students are part of a North American competition to re-engineer a conventional Ford Explorer into a higher-fuel-economy vehicle without sacrificing its performance, utility, safety or affordability.

The competition is called **FutureTruck**. Primarily sponsored by Ford Motor Co., it's a collaborative project of government, industry and academia. The U of A is the only Canadian university in the competition. It's up against 14 U.S. universities.

"We're aiming for a fuel efficiency of 30 m.p.g.," said Clayton Bond, project leader for the U of A's **FutureTruck** team.

(Thirty miles per U.S. gallon is about 7.8 litres per 100 kilometres. Natural Resources Canada lists the efficiency of the 2002 Explorer at about 16 litres per 100 kilometres for city driving and 11 litres for highway driving.)

The fuel for the hybrid vehicle is called E85, a blend of 85-per-cent ethanol and 15-per-cent gasoline. All the competitors are using hybrid electric designs.

At low speeds and mild acceleration, the electric engine will be the main source of power, Bond explains.

As speeds increase, or as acceleration becomes more intense, both the gasoline engine and the electric one will work together until cruising speeds are reached. Then the gasoline-powered engine will take over.

By using both engine types at different accelerations and speeds, the team hopes to increase fuel efficiency and lower emissions.

In fact, it aims to meet or surpass the vehicle's current fuel efficiency by at least 25 per cent, a requirement of the competition.

This year marks the fourth anniversary of the competition and this year's team at the U of A is composed of about 25 students, each of whom puts in about 10 to 15 hours a week, said Neil Freeman, who was

project administrator until late December.

"We seem to spend a lot of time looking for sponsors and trying to get time in shops to do work," said Keith Boyle, a fourth-year electrical engineering student at the U of A working on the project.

The team needs sponsors, because money is scarce.

"Say we need to buy a part," Boyle said. "A lot of our decisions are based on what is available as opposed to what we would really like to put into it. Sometimes you just have to settle for second best."

As an electrical engineer on a mechanical engineering project, Boyle soon discovered there was a lot of computer programming and electrical work involved in what initially seemed like a mechanical project. Now, he and five members work on the project's "controls" systems.

"I had to learn how gas engines deliver power to the powertrain, which is something that would be taught to a mechanical engineer but not necessarily to an electrical engineer," he said.

But the **FutureTruck** team is not completely made up of engineering students. Richard Bubalo is a year arts student who recently joined the team to help with marketing and fundraising.

"If I can help out on this project from what I learned in school and I don't need to be an engineer to do it, that's great," Bubalo said.

Lithium ion batteries

Matt Cannon, a science student on the project, explained that the vehicle is powered by lithium ion batteries produced by Wourley Batteries. Wourley donated the batteries to last year's project, which continued into this year. The team chose the batteries, because of their high cycle-life, or durability and peak power.

The team now is looking for a special lithium ion charger to replace the old one from last year.

"There are other hybrids out there but they're smaller vehicles," Cannon said. "If we could make this Ford Explorer powerful and yet hybrid, that would be great for the average person."

The Explorer came with a stock six-cylinder, 4.0-litre engine, which the team will replace with a 2.0-litre, four-cylinder Ford Focus engine (Z Tech). It will add an electric motor and fuel cells that will power the vehicle.

Ford supplied the competing teams with 2002 Ford Explorers, as well as \$10,000 in seed money. The U of A team needs a total of \$75,000 to finish the project. It has raised \$55,000 of that on its own from local city sponsors.

Toyota announced recently it will make hybrid automobiles in all of its lines by 2012. This type of competition can influence what goes into vehicles of the future.

GRAPHIC: INVESTMENT IN FUTURE: Neil Freeman, right and Clayton Bond hope to make this Ford Explorer at least 25 per cent more fuel efficient. CanWest News Photo: Charles Gal

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ELECTRONIC ENGINEERING
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FEBRUARY 10, 2003



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'Green' means go smart in SUV project

When engineering students from across the continent gathered last month in a darkened room at National Instruments Corp. in Austin, Texas, they were quietly soaking up the technologies that will go into their unusual design project: a fuel-efficient, environmentally friendly sport utility vehicle. As participants in the FutureTruck 2003 competi-

accounting for more than half of the new-vehicle sales in the United States, the technologies the students are using could be critical both in reducing fuel consumption and cleaning the air.

In the current two-year competition cycle, contestants have already run their vehicles in the first of two performance "bake-offs" that factor in fuel efficiency, emissions, acceleration, handling,

consumer acceptance and off-road performance to determine the overall winner. Now, a bit more than halfway through the challenge, they are further modifying and refining their entries for the final competition later this year.

Pat Ford, project manager of the FutureTruck program at Ford Motor Co., estimated that traditional design practices could improve mileage another 5 to 10 percent in a conventional five-passenger Taurus. But beyond that, he said, most future energy savings would probably have to come from so-called exotic technologies, such as fuel cells and hybrid-electric propulsion systems.

Today's hybrid-electric vehicles use conventional internal combustion engines but add an electric-drive subsystem to provide bursts of power for acceleration and climbing hills.

That lets them use a smaller, lighter gasoline engine that can still maintain the car at cruise speeds. Surplus engine power, and energy recovered from dynamic braking, are turned back into electricity >> CONTINUED ON PAGE 80



tion, these electrical and mechanical engineering students are modifying 15 identical 2002 Ford Explorers using virtually any technology, fuel or construction technique while maintaining the qualities that made the vehicle a hit in the first place.

Managed by Argonne National Laboratory, FutureTruck challenges 15 university teams from the United States and Canada to re-engineer a midsize truck or SUV for lower emissions and 25 percent better fuel economy. With light trucks or SUVs

Penn State EE students Paul Minear and Jon Weidner with their entry, a modified 2002 Ford Explorer.

er, lighter gasoline engine that can still maintain the car at cruise speeds. Surplus engine power, and energy recovered from dynamic braking, are turned back into electricity >> CONTINUED ON PAGE 80

Green's the go sign in FutureTruck

►► CONTINUED FROM PAGE 79

and pumped back into a battery (or supercapacitor) for the next hill or stoplight.

Depending on the specifics of the hybrid technology, manufacturers expect a 25 to 50 percent improvement in a vehicle's overall fuel efficiency, with most of the gains coming in stop-and-go traffic. Roughly half the savings will be realized from engine downsizing, while 20 to 30 percent will come from regenerative energy capture. The rest of the efficiency gains will rely on sophisticated engine control features, such as allowing the engine to run in a tighter rpm range and letting it turn off and on at stoplights and other low-demand situations.

The once-stock trucks have evolved to incorporate an interesting cross-section of clean-burning, high-efficiency propulsion systems. While most of the trucks still run internal combustion engines under their hoods, the power plants replacing the original 4-liter V-6 range from an ethanol-burning four-cylinder, 1.8-liter turbocharged Mazda unit to an assortment of compact diesel engines outfitted with experimental catalytic soot traps. Most of the diesels also burn a "biodiesel blend (35/65) of soy-derived, petroleum-based fuel.

Unfortunately, the two schools that developed hydrogen fuel cells had to move on to different technologies after their fuel cell supplier was acquired by General Electric last year, and dropped out of the program.

To manage all their additional systems, the vehicles pack a bunch of extra electronics. While a stock vehicle uses specially built automotive-control modules, the student prototypes make heavy use of data-acquisition and control modules supplied by National Instruments as part of its sponsorship role. Peter Zogas, vice president of sales at National, said the ruggedized PC-based instrumentation modules offer a quick way to develop control algorithms for vehicle management.

Penn State EE students Paul Minear and Jon Weidner brought a hybrid diesel-electric Explorer to Austin. At

first glance, it looks like a stock Explorer, but the resemblance fades under the hood, where a little four-cylinder 2.5-liter Detroit Diesel unit is tucked in where the gas-burning 4-liter V-6 used to be. The modified Explorer also carries a few dozen yards of added plumbing, several mysterious electronics boxes and some non-Ford cable bundles that are obviously designed to carry high amperages.

A crawl under the creation reveals the electric side of the drive train—a 37-kW ac induction motor originally used as the primary drive in a Solectria Force electric car. It's coupled in parallel with the output shaft of the truck's five-speed transmission, just ahead of the transfer case.

Most of the Explorer's stock interior has been left intact, with the lead-acid battery pack tucked neatly in the rear of the car. One might never suspect the big changes under the hood except for a few nonstock switches on the dash and a large cluster of sensing and control modules that have been shoehorned between the first two passenger seats. The electronics content is well-positioned to make the frequent tweaking and reprogramming with new software uploads fast and easy.

Software tweaking

Software remains one of the things still undergoing significant change as the car approaches its final configuration for the 2003 competition in June. While all the functions, such as transitions between pure-gas and gas-electric propulsion and regenerative braking all work, the algorithms continue to be refined to yield the best efficiency and the best possible driver experience.

Except for the diesel's perking noise on startup, which soon faded, driving this Explorer was indistinguishable from a conventional SUV.

With the truck in second gear and the pedal to the floor, there was a very slight hesitation as the diesel adjusted to the load and the electric drive system decided what to do. Once the systems made

up their mind, the Explorer began to do its stuff. The four-cylinder hybrid felt very much like the other V-6-powered light trucks and SUVs.

Deceleration and braking were smooth and effective. Weidner blamed a slight hesitation on a shortcoming of the control system, which read throttle position and blended the electric power into the drive train. He and Minear said the new throttle hardware and matching software will have sufficient granularity to fully mask the slight hesitation from the diesel and seamlessly blend the two power systems by the final competition in June.

These and other changes, they said, should make the vehicle perform as well as an out-of-the-box Explorer under most conditions, and perhaps even better. But extended uphill pulls with a large trailer in tow or highly de-

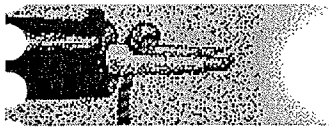
manding off-road conditions will eventually deplete the electric drive system's reserves faster than they can be replaced, forcing the car to rely solely on diesel power.

Mileage, cost

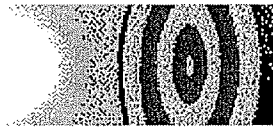
Last year, when the trucks were not fully modified or fine-tuned, seven of the 15 vehicles matched or bettered stock SUV mileage.

Ford is preparing to market a hybrid version of its Escape mini-SUV sometime in 2003, Pat Ford said. He said his company's goal is to offer it at only a slightly higher cost than a conventional Escape. It's expected to deliver 29 to 30 mpg in city driving and 35 to 40 mpg on the highway.

The hybrid Escape caps years of research by Ford but it also borrows ideas from university research and earlier student engineering competitions like FutureTruck.



Is Your Career
on Target?



EE TIMES

Competition looks to create fuel-efficient SUVs

by Lee Goldberg, EE Times

Feb 7, 2003 (9:39 AM)

URL: <http://www.eetimes.com/story/OEG20030207S0031>

When engineering students from across the continent gathered last month in a darkened room at National Instruments Corp. in Austin, Texas, they were quietly soaking up the technologies that will go into their unusual design project: a fuel-efficient, environmentally friendly sport utility vehicle. As participants in the FutureTruck 2003 competition, these electrical and mechanical engineering students are modifying 15 identical 2002 Ford Explorers using virtually any technology, fuel or construction technique while maintaining the qualities that made the vehicle a hit in the first place.

Managed by Argonne National Laboratory, FutureTruck challenges 15 university teams from the United States and Canada to re-engineer a midsize truck or SUV for lower emissions and 25 percent better fuel economy. With light trucks or SUVs accounting for more than half of the new-vehicle sales in the United States, the technologies the students are using could be critical both in reducing fuel consumption and keeping the air cleaner.

In the current two-year competition cycle, contestants have already run their vehicles in the first of two performance "bake-offs" that factor in fuel efficiency, emissions, acceleration, handling, consumer acceptance and off-road performance to determine the overall winner. Now, a bit more than halfway through the challenge, they are further modifying and refining their entries for the final competition later this year.

Traditional and exotic methods

Pat Ford, project manager of the FutureTruck program at Ford Motor Co., estimated that traditional design practices could improve mileage another 5 to 10 percent in a conventional five-passenger Taurus. But beyond that, he said, most future energy savings would probably have to come from so-called exotic technologies, such as fuel cells and hybrid-electric propulsion systems.

Today's hybrid-electric vehicles use conventional internal combustion engines but add an electric-drive subsystem to provide bursts of power for acceleration and climbing hills. That lets them use a smaller, lighter gasoline engine that can still maintain the car at cruise speeds. Surplus engine power, and energy recovered from dynamic braking, are turned back into electricity and pumped back into a battery (or supercapacitor) for the next hill or stoplight.

Depending on the specifics of the hybrid technology, manufacturers expect a 25 to 50 percent improvement in a vehicle's overall fuel efficiency, with most of the gains coming in stop-and-go traffic. Roughly half the savings will be realized from engine downsizing, while 20 to 30 percent will come from regenerative energy capture. The rest of the efficiency gains will rely on sophisticated engine control features, such as allowing the engine to run in a lighter rpm range and letting it turn off and on at stoplights and other low-demand situations.

The once-stock trucks in the FutureTruck program have evolved to incorporate an interesting cross-section of clean-burning, high-efficiency propulsion systems. While most of the trucks still run internal combustion engines under their hoods, the power plants replacing the original 4-liter V-6 range from an ethanol-burning four-cylinder, 1.8-liter turbocharged Mazda unit to an assortment of compact diesel engines outfitted with experimental catalytic soot traps. Most of the diesels also burn a "biodiesel blend" (35/65) of soy-derived, petroleum-based fuel.

The two schools that developed hydrogen fuel cells had to move on to different technologies after their fuel cell supplier was acquired by General Electric last year, and dropped out of the program.

To manage all their additional systems, the vehicles pack a bunch of extra electronics. While a stock vehicle uses specially built automotive-control modules, the student prototypes make heavy use of data-acquisition and control modules supplied by National Instruments as part of its sponsorship role. Peter Zogas, vice president of sales at National, said the ruggedized PC-based instrumentation modules offer a quick way to develop control algorithms for vehicle management.

Tenn State EE students Paul Minear and Jon Weidner brought a hybrid diesel-electric Explorer to Austin. At first glance, it looks like a stock Explorer, but the resemblance fades under the hood, where a little four-cylinder 2.5-liter Detroit Diesel unit is tucked in where the gas-burning 4-liter V-6 used to be. The modified Explorer also carries a few dozen yards of added plumbing, several mysterious electronics boxes and some non-Ford cable bundles that are obviously designed to carry high amperages.

A crawl under the creation reveals the electric side of the drive train — a 37-kW ac induction motor originally used as the primary drive in a Solectria Force electric car. It's coupled in parallel with the output shaft of the truck's five-speed transmission, just ahead of the transfer case.

Most of the Explorer's stock interior has been left intact, with the lead-acid battery pack tucked neatly in the rear of the car. One might never suspect the big changes under the hood except for a few non-stock switches on the dash and a large cluster of sensing and control modules that have been shoehorned between the first two passenger seats. The electronics content is well-positioned to make the frequent tweaking and reprogramming with new software uploads fast and easy.

Software remains one of the things still undergoing significant change as the car approaches its final configuration for the 2003 competition in June. While all the functions, such as transitions between pure-gas and gas-electric propulsion and regenerative braking all work, the algorithms continue to be refined to yield the best efficiency and the best possible driver experience.

Road test

Except for the diesel's perking noise on startup, which soon faded, driving this Explorer was indistinguishable from a conventional SUV.

With the truck in second gear and the pedal to the floor, there was a very slight hesitation as the diesel adjusted to the load and the electric drive system decided what to do. Once the systems made up their mind, the Explorer began to do its stuff. The four-cylinder hybrid felt very much like the other V-6-powered light trucks and SUVs.

Deceleration and braking were smooth and effective. Weidner blamed a slight hesitation on a shortcoming of the control system, which read throttle position and blended the electric power into the drive train. He and Minear said the new throttle hardware and matching software will have sufficient granularity to fully mask the slight hesitation from the diesel and seamlessly blend the two power systems by the final competition in June.

These and other changes, they said, should make the vehicle perform as well as an out-of-the-box Explorer under most conditions, and perhaps even better. But extended uphill pulls with a large trailer in tow or highly demanding off-road conditions will eventually deplete the electric drive system's reserves faster than they can be replaced, forcing the car to rely solely on diesel power.

Mileage, cost

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ELECTRONIC ENGINEERING
TIMESManhasset, NY
Circ - 160,310
Weekly

FEBRUARY 3, 2003



Bacon's



GREEN ENGINEERING

BY LEE GOLDBERG

Bizarro world
and SUV-envy

I'm not sure why I'm writing this column, especially since I had a piece on the future of electronics recycling already written. Maybe it's because I'm depressed about not getting enough hate mail lately, or because we all need a few laughs in these tense times. And what better place is there to enjoy a good chuckle than the latest installment of the sitcom known as U.S. energy policy?

In a logic-defying move on a par with putting a candy counter in a diabetes ward, our president is trying to push through humongous tax breaks to encourage small businesses to buy more of the largest possible SUVs and trucks. When I read that in the paper, I couldn't help but wonder what kind of bizarro alternate universe we've slipped into when our government uses my tax dollars to make it cheaper for doctors, shopkeepers, and other small business owners to buy a 10-mpg Hummer or Lincoln Navigator than a Camry or Taurus that gets two or three times the mileage?

Mind you, millions of people honestly need heavy-duty vehicles to haul their roofing supplies, cattle, welding equipment and field hands out to the

>> CONTINUED ON PAGE 78

>> CONTINUED FROM PAGE 77

job site, or to haul themselves and their families to remote camping spots. These folks are certainly entitled to own and operate the machines they need to do their jobs, but I don't see any need to underwrite them with my tax dollars—especially when much better solutions are close at hand.

A case in point is the diesel-electric hybrid Ford Explorer prototype I drove at the Future Truck Competition last week. It's one of 15 vehicles participating in an event, co-sponsored by the U.S. Dept. of Energy, Ford Motors, and National Instruments, that challenges teams of engineering students to modify a production SUV to deliver better mileage without sacrificing drivability, utility, or safety.

The rig I drove was a work in progress, with a cute little 2.5L diesel engine shoehorned under the hood and a bunch of boxes donated by National Instruments to stand in for the system control ASICs that a production vehicle would use. Nevertheless, the results were impressive. Even with the software in rough shape, the car was a hoot to drive—and a tad quicker than a production Explorer. All this, and 30 mpg.

Much of what is being learned here will be put to use when Ford launches its new hybrid-powered Escape next year. And if our government's misguided policies don't discourage other manufacturers, we can expect to see many more innovative high-mpg trucks and cars on the road by 2005 or so. The huge amounts of electronics that go into every one of these cars could create many more jobs in our industry, while dramatically reducing CO₂ emissions and cutting the flow of oil money that leaks from our borders every day.

If you feel that our tax dollars would be better served developing a greener future for both the environment and the economy, please contact your elected officials today. If you feel I have not gotten my share of hate mail, send your questions, and suggestions for better topics to: lgoldberg@green-electronics.com.



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R and D

February 01, 2003

SECTION: Data Management and Analysis; Pg. 20

LENGTH: 683 words

HEADLINE: Students Making Cleaner SUVs

BYLINE: Tim Studt

BODY:

Students from 15 top US engineering schools will be making use of all their training to win the **FutureTruck** competition this coming June. The four-year engineering program, sponsored by the Dept. of Energy, Ford Motor Co., Dearborn, Mich., General Motors, Detroit, and National Instruments, Austin, Texas require teams to convert a stock SUV into a cleaner running vehicle in less than six months.

For 2002 and 2003, Ford Motor Co. has supplied Explorer SUVs as the test vehicles. Each team is challenged to increase the SUV's gas mileage without reducing performance, utility, or consumer appeal. The vehicles must also be able to pull a 900-kg trailer, negotiate off-road obstacles, maintain some level of acceleration, and provide seating for at least five adults. All of the teams in **FutureTruck** 2003 are converting the Explorer's conventional gasoline internal combustion engines into hybrid electric vehicle (HEV) propulsion designs.

To re-engineer the SUVs, the teams make use of lightweight composite materials, fuel cells, various battery configurations, alternative fuels (including ethanol, biodiesel, and hydrogen), and a number of transmission systems.

To aid the design and development, each group is also provided with National Instruments' LabVIEW software and hardware tools for monitoring their development programs. How the individual teams make use of the NI (and other) donations is totally up to them. "Some teams use our tools to just collect experimental data," says Michael Zeller, NI's academic relations manager. "Others use it as an integrated automated control system." NI sponsored a **FutureTruck** Summit for the teams in January at its Austin headquarters, where the teams received a short training program in LabVIEW.

The 10-day **FutureTruck** competition in June will be held at Ford's Michigan Proving Ground. It includes a safety inspection, acceleration and on-road fuel economy events, off-road performance tests, trailer towing, and static oral and design presentations. To encourage the teams to develop technologies that reduce total cycle greenhouse emissions, there is also an event that measures "upstream fuel-cycle emissions (caused during the production and delivery of a fuel). Points are given for each part and more than two-dozen awards are presented for everything from best performance and dynamic handling to best appearance and best consumer acceptance.

The program is managed by Argonne (Ill.) National Laboratory's Center for Transportation Research. Secondary sponsors include the National Science Foundation, Cisco Systems, ArvinMeritor, Delphi, The MathWorks, Ricardo, California Air Resources Board, Goodyear, Renewable Fuels Association, and even the Wisconsin Soybean Marketing Board.

This year's program is the concluding segment of the four-year program, although, due to its success, some participants and sponsors are already lobbying for a one-year extension. Overall point winners in previous years have included West Virginia Univ. and the Univ. of Maryland (tie) in 2000, the Univ. of California at Davis (2001), and the Univ. of Wisconsin at Madison (2002).

Both General Motors (who supplied Chevrolet Suburban SUVs for the first two years of the program) and Ford have benefited from their sponsorship of the program by obtaining additional insights into the results of variations and extensions of the hybrid re-engineering process. Their own R&D staffs normally work on these projects, but don't always have the time or resources to fully exploit all their various aspects.

Another added benefit for the sponsors is that it has become an excellent source of high-potential new employees, according to NI's Zeller. "We and some of the automotive companies have already hired some of the team members. If they can maintain a full school course load and still find the time to help develop these vehicle transformations, we know they're the type of engineers that would fit well into our company."

Resources

***FutureTruck** Program,202-586-1573,www.futuretruck.org

*National Instruments,800-258-7022,www.ni.com

LOAD-DATE: February 24, 2003

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Edmonton Journal

January 31, 2003 Friday Final Edition

SECTION: Driving; Pg. H1

LENGTH: 900 words

HEADLINE: U of A students in fuel-efficiency race: University joins contest to make a sport utility that's easier on gas

SOURCE: Freelance

BYLINE: Charles Gal

DATELINE: EDMONTON

BODY:

EDMONTON - Sport utility vehicles aren't known for their fuel efficiency, but a group of University of Alberta students hopes to change that.

The U of A engineering students are part of a North American competition to re-engineer a conventional Ford Explorer into a higher-fuel-economy vehicle without sacrificing its performance, utility, safety or affordability.

The competition is called **FutureTruck**. Primarily sponsored by Ford Motor Co., it's a collaborative project of government, industry and academia. The U of A is the only Canadian university in the competition. It's up against 14 U.S. universities.

"We're aiming for a fuel efficiency of 30 m.p.g.," said Clayton Bond, project leader for the U of A's **FutureTruck** team.

(Thirty miles per U.S. gallon is about 7.8 litres per 100 kilometres. Natural Resources Canada lists the efficiency of the 2002 Explorer at about 16 litres per 100 kilometres for city driving and 11 litres for highway driving.)

The fuel for the hybrid vehicle is called E85, a blend of 85 per cent ethanol and 15 per cent gasoline. All the competitors are using hybrid electric designs.

At low speeds and mild acceleration, the electric engine will be the main source of power, Bond explains.

As speeds increase, or as acceleration becomes more intense, both the gasoline engine and the electric one will work together until cruising speeds are reached. Then the gasoline-powered engine will take over.

By using both engine types at different accelerations and speeds, the team hopes to increase fuel efficiency and lower emissions.

In fact, it aims to meet or surpass the vehicle's current fuel efficiency by at least 25 per cent, a requirement of the competition.

This year marks the fourth anniversary of the competition, and this year's team at the U of A is composed of about 25 students, each of whom puts in about 10 to 15 hours a week, said Neil Freeman, who was

project administrator until late December.

"We seem to spend a lot of time looking for sponsors, and trying to get time in shops to do work," said Keith Boyle, a fourth-year electrical engineering student at the U of A working on the project.

The team needs sponsors, because money is scarce.

"Say we need to buy a part," said Boyle. "A lot of our decisions are based on what is available as opposed to what we would really like to put into it. Sometimes you just have to settle for second best."

As an electrical engineer on a mechanical engineering project, Boyle soon discovered there was a lot of computer programming and electrical work involved in what initially seemed like a mechanical project. Now, he and five members work on the project's "controls" systems.

"At first there's a bit of a learning curve. I had to learn how gas engines deliver power to the powertrain, which is something that would be taught to a mechanical engineer but not necessarily to an electrical engineer," he said.

But the **FutureTruck** team is not completely made up of engineering students. Richard Bubalo is a year arts student who recently joined the team to help with marketing and fundraising.

"I feel privileged to work on a project like this," Bubalo said. "If I can help out on this project from what I learned in school and I don't need to be an engineer to do it, that's great."

Matt Cannon, a science student on the project, explained that the vehicle is powered by lithium ion batteries produced by Wourley Batteries. Wourley donated the batteries to last year's project, which continued into this year. The team chose the batteries, because of their high cycle-life, or durability, and peak power.

The team now is looking for a special lithium ion charger to replace the old one from last year.

"There are other hybrids out there but they're smaller vehicles," said Cannon. "If we could make this Ford Explorer powerful and yet hybrid, that would be great for the average person."

The Explorer came with a stock six-cylinder, 4.0-litre engine, which the team will replace with a 2.0-litre, four-cylinder Ford Focus engine (Z Tech). It will add an electric motor and fuel cells that will power the vehicle.

Ford supplied the competing teams with 2002 Ford Explorers, as well as \$10,000 in seed money. The U of A team needs a total of \$75,000 to finish the project. It has raised \$55,000 of that on its own from local city sponsors.

Toyota announced recently it will make hybrid automobiles in all of its lines by 2012. This type of competition can influence what goes into vehicles of the future. Bond and Freeman say the Ford competitions of the early to mid-1990s greatly influenced Ford hybrid engine designs.

The competition ends in June, when the team will take its modified Explorer to the United States to be judged at a test site.

THE SPECS

Vehicle type: 2002 Ford Explorer

Engine type: Inline 4 DOHC

Motor: DC permanent magnet

Displacement: 2.0L

Motor operating voltage: about 200V

HP: 147

Motor peak output: 60kW

Hybrid drivetrain configuration: Parallel pre-transmission

Torque: 135 ft.-lbs.

Brakes (f/r): anti-lock disc/regenerative

Fuel capacity: 8 U.S. gallons

(30.3L)

Optimal fuel economy: 30 m.p.g. (7.8L per 100 km)

Transmission: 4-speed auto

Steering: rack and pinion

Tires: P235/70R16 Goodyear, low rolling resistance

Length: 189.5"

Height: 71.9"

Wheel base: 113.7"

Safety Features: anti-lock brakes, air bags

GRAPHIC: Colour Photo: Charles Gal, The Journal; Neil Freeman and Clayton Bond hope to make this Ford Explorer at least 25 per cent more fuel-efficient. They're part of a team of U of A students in a competition against 14 U.S. universities.; Colour Photo: A rear view of the interior of the 2002 Ford Explorer.

LOAD-DATE: January 31, 2003

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Traffic Safety

January/February 2003

Engineering Students Build Gas-Saving SUVs

Tomorrow's SUVs may not look much different than the ones you see on the road today, but engineering students are working to make them run cleaner and farther on a tank of gas.

For the last four years, the U.S. Department of Energy and a plethora of corporations have sponsored FutureTruck, a competition that challenges university engineering departments to retrofit existing SUVs with cutting-edge technology to improve fuel efficiency and reduce emissions. The challenge is to retrofit without sacrificing other attributes customers demand, including safety. Students worked with Chevrolet Suburbans and Ford Explorers.

Teams from 15 universities gathered at Ford's Arizona Proving Ground in July for safety and dynamic evaluations, then moved to California for emissions tests and design

competitions. Ten teams qualified for the over-the-road fuel economy part of the contest, and seven improved the stock vehicle's gas mileage.

The winning University of Wisconsin team replaced their Explorer's gasoline engine with a clean-burning diesel engine used in European Land Rovers and supplemented it with an electric motor. They installed a five-speed manual transmission and replaced steel bumper beams and running boards with aluminum to lighten the vehicle without reducing size. Their design improved test-course fuel economy by 50 percent, automotive faculty adviser Glen Bower, said.

Organizers admit that wide-scale adoption of such fuel-saving, emission-reducing technologies will depend on the public's willingness to pay for them. Ford, however, is develop-

ing a hybrid-electric version of its small Escape SUV, and GM is modifying prototype Silverados, said Bob Larsen, FutureTruck's executive director and director of the Center for Transportation Research at Argonne National Laboratory. "I think you will see that many of the things that FutureTruck vehicles have will make it to production in the next five to 10 years," Larsen predicted.

The program also has prepared more than 700 young engineers to lead future fuel-efficiency efforts, Larsen added. "Many of the graduates from the hybrid vehicle competition already are working on [the Escape] project," Larsen said. Although originally planned as a four-year-program, Larsen said he hopes Ford and other sponsors will extend FutureTruck to 2003.



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Electric Vehicle Online Today

January 13, 2003

SECTION: Pg. 0

IAC-ACC-NO: 96401626

LENGTH: 297 words

HEADLINE: Engineering Students Attend **FutureTruck** 2003; students attend FutureTrack Summit to improve knowledge of National Instruments Corp.'s LabVIEW software; Brief Article

AUTHOR-ABSTRACT:

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BODY:

National Instruments (NI) recently announced that engineering students from 15 North American universities attended the **FutureTruck** Summit for advanced technical training last week in Austin, TX. According to NI, the training event was designed to prepare attendees for the 2003 **FutureTruck** competition, which challenges student teams to redesign a Ford Explorer to achieve reduced emissions and improved fuel economy "without sacrificing performance, utility, safety and affordability."

NI said students attending the recent summit had the opportunity to improve their knowledge of the LabVIEW graphical development environment and other computer-based tools used to help design more environmentally friendly sport-utility vehicles (SUVs). Additionally, summit training sessions focused on the use of virtual instrumentation in helping design engine control and monitoring systems, the electric vehicle systems featured in Ford Ranger trucks, telematics and wireless networking.

"We are here to gain valuable hands-on experience with NI LabVIEW Real-Time and other virtual instrumentation technologies to develop a hydrogen-fueled vehicle for the competition," said Virginia Polytechnic Institute and State University (Virginia Tech) engineering student Bruce Billian. "Learning to optimize industry-standard tools such as LabVIEW gives us competitive skills that we can apply not only **FutureTruck** but also to school engineering projects and future careers."

NI said **FutureTruck** will culminate in 10 days of judging beginning June 2 at the Ford Michigan Proving Ground in Romeo, MI and the Allen Park Testing Laboratories in Allen, MI.

Contact: Ernest Martinez, NI, phone 800-258-7022.

(PR NEWswire: 1/9)

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IAC-CREATE-DATE: January 13, 2003

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The Austin Business Journal

January 10-16th

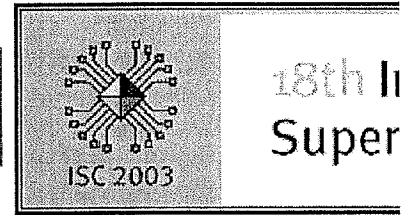
HEADLINE: ...Building a Better SUV

National Instruments Corp. is playing host to 13 student engineering teams as they compete to come up with a more fuel-efficient sport utility vehicle.

Students from 15 North American universities are re-engineering Ford Explorers for better fuel efficiency and reduced emissions as part of a four-year program with the U.S. Department of Energy.

NI donates hardware and software to students in the contest. On Jan. 9 and 10, about 60 students were set to travel to Austin to learn how to use NTs software and tools.

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Students Compete in FutureTruck 2003

Thursday, Jan 09, @ 10:03 PST

AUSTIN, Texas -- Beginning today, engineering students from 15 North American universities are attending the FutureTruck Summit for advanced technical training sponsored by the Ford Motor Co., the U.S. Department of Energy, and National Instruments. The training helps them prepare for the 2003 FutureTruck competition, which challenges student teams to redesign a Ford Explorer for lower emissions and higher fuel economy without sacrificing performance, utility, safety and a

At the Summit, students also have an opportunity to improve their knowledge of the LabVIEW graphical development environment and other computer-based tools to design more environmentally friendly SUVs.

"We are here to gain valuable hands-on experience with NI LabVIEW Real-Time and other virtual instrumentation technologies to develop a hydrogen-fueled engine for the competition," said engineering student Bruce Billian, who leads the Ford team from Virginia Tech. "Learning to optimize industry-standard tools such as LabVIEW gives us competitive skills that we can apply not only to FutureTruck but also to school engineering projects and future careers."

Ford and the DOE, through its research facility at the Argonne National Laboratory, are participating in the training as part of their sponsorship of FutureTruck. The work done by FutureTruck teams supports the ongoing work of Ford and the DOE in increasing the fuel efficiency of SUVs while reducing vehicle emissions.

"By attending the FutureTruck Summit, students gain valuable technical knowledge and learn to apply virtual instrumentation software and hardware tools to real-world issues such as fuel economy and environmental protection," said Ray Allen, president of product marketing and academic relations. "We are excited to play an active role in FutureTruck because it not only illustrates how engineering technology can improve everyday life but also helps us in our continuing effort to educate and inspire engineers around the world."

During training, students learn how virtual instrumentation tools such as Real-Time, NI Compact FieldPoint distributed I/O and other NI data acquisition hardware can help them quickly design engine control and monitoring systems. Ford representatives discuss electric vehicle systems designed for its line of Ranger trucks. Other sessions cover FutureTruck judging requirements, testing procedures and wireless networking.

FutureTruck culminates in 10 days of judging that begins June 2 at the Ford Proving Ground in Romeo, Mich. and the Allen Park Testing Laboratories in Dearborn, Mich. Vehicle evaluations include technical performance, such as acceleration, fuel economy, emissions, safety and utility.

Get details
[here.](#)

handling and fuel economy, as well as a thorough review of vehicle design display and awards ceremony will be held June 12 in conjunction with Ford Centennial Anniversary in Dearborn, Mich.

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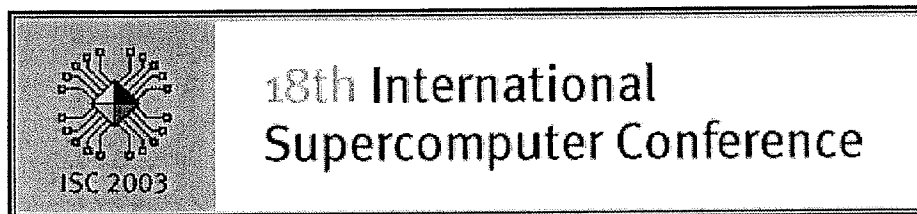
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Ford, U.S. Department of Energy, National Instruments Highlight Latest Technology for Designing Next-Generation SUVs

Students Competing in FutureTruck 2003 Use LabVIEW to Increase Fuel-Efficiency, Lower

NEWS RELEASE --Jan. 9, 2003-- Beginning today, engineering students from 15 North American universities are attending the FutureTruck Summit for advanced technical training sponsored by Ford Motor Co., the U.S. Department of Energy, and National Instruments. The training helps the students prepare for the 2003 FutureTruck competition, which challenges student teams to redesign a Ford E-Series van to achieve lower emissions and higher fuel economy without sacrificing performance, utility, safety and affordability.

At the Summit, students also have an opportunity to improve their knowledge of the LabVIEW development environment and other computer-based tools used to design more environmentally friendly SUVs.

"We are here to gain valuable hands-on experience with NI LabVIEW Real-Time and other virtual instrumentation technologies to develop a hydrogen-fueled vehicle for the competition," said student Bruce Billian, who leads the FutureTruck team from Virginia Tech. "Learning to optimize the use of industry-standard tools such as LabVIEW gives us competitive skills that we can apply not only to FutureTruck but also to school engineering projects and future careers."

Ford and the DOE, through its research facility at the Argonne National Laboratory, are part of the training as part of their sponsorship of FutureTruck. Research done by FutureTruck teams is part of the ongoing work of Ford and the DOE in increasing the fuel efficiency of SUVs while reducing emissions. As a major sponsor of FutureTruck, NI donates LabVIEW software and measurement hardware to teams interested in monitoring and controlling their vehicles using virtual instrumentation which leverage commercially available PC technologies and industry-standard software.

"By attending the FutureTruck Summit, students gain valuable technical skills and learn to apply virtual instrumentation software and hardware tools to real-world issues such as fuel economy and environmental protection," said Ray Almgren, NI vice president of product marketing and public relations. "We are excited to play such an active role in FutureTruck because it not only illustrates how engineers can use technology to improve everyday life but also helps us in our continuing goal to educate and inspire engineers around the world."

During training, students learn how virtual instrumentation tools such as LabVIEW Real-Time Compact FieldPoint distributed I/O and other NI data acquisition hardware can help them optimize engine control and monitoring systems. Also, Ford representatives discuss electric vehicle systems designed for its line of Ford Ranger trucks. Other sessions cover FutureTruck judging requirements, telematics and wireless networking.

FutureTruck culminates in 10 days of judging that begins June 2 at the Ford Michigan Proving Grounds in Romeo, Mich. and the Allen Park Testing Laboratories in Allen Park, Mich. Vehicle evaluation includes technical performance, such as acceleration, handling and fuel economy, as well as a thorough review of vehicle designs. A vehicle display and awards ceremony will be held June 12 in conjunction with the Ford Centennial Anniversary in Dearborn, Mich.

About FutureTruck

FutureTruck is a unique four-year engineering program that brings together the resources of government and academia in a cooperative effort to address important environmental and energy issues posed by the growing demand for SUVs. FutureTruck student teams are challenged to design their vehicle for lower emissions and 25 percent higher fuel economy. This unique competition demonstrates how industry, government, and academia can develop more energy-efficient automotive technologies to improve the economy and the environment. For more information on this unique competition, visit www.futuretruck.org.

About National Instruments

For more than 26 years, National Instruments has revolutionized the way engineers and scientists work by delivering virtual instrumentation solutions built on rapidly advancing commercial technologies, including industry-standard computers and the Internet. NI increases productivity for customers worldwide by delivering easy-to-integrate software, such as the NI LabVIEW graphical development environment, and modular hardware, such as PXI modules for data acquisition and instrumentation. Headquartered in Austin, Texas, NI has more than 3,000 employees and direct operations in 30 countries. In 2001, the company sold products to more than 24,000 different companies in 100 countries around the world. For the past four consecutive years, FORTUNE magazine has named NI one of the 100 best companies to work for in America.

For more information on FutureTruck please visit, ni.com/info and enter "ex3rrx"

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Press Release

Source: National Instruments

Ford, U.S. Department of Energy, National Instruments Highlight Latest Technology for Designing Next-Generation SUVs

Thursday January 9, 10:01 am ET

Students Competing in FutureTruck 2003 Use LabVIEW to Increase Fuel- Efficiency, Lower Emissions

AUSTIN, Texas, Jan. 9 /PRNewswire-FirstCall/ -- Beginning today, engineering students from 15 North American universities are attending the FutureTruck Summit for advanced technical training sponsored by the Ford Motor Co., the U.S. Department of Energy, and National Instruments (Nasdaq: NATI - News). The training helps them prepare for the 2003 FutureTruck competition, which challenges student teams to redesign a Ford Explorer for lower emissions and higher fuel economy without sacrificing performance, utility, safety and affordability.



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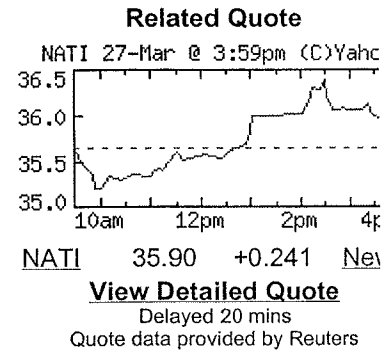
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increasing the fuel efficiency of SUVs while reducing vehicle emissions. As a major sponsor of FutureTruck, NI donates LabVIEW software and measurement hardware to teams interested in monitoring and controlling their vehicles using virtual instruments, which leverage commercially available PC technologies and industry-standard software.

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Readers may obtain investment information from the company's Investor Relations Department at (512) 683-5090, by sending e-mail to nati@ni.com or on the Web at ni.com/nati.

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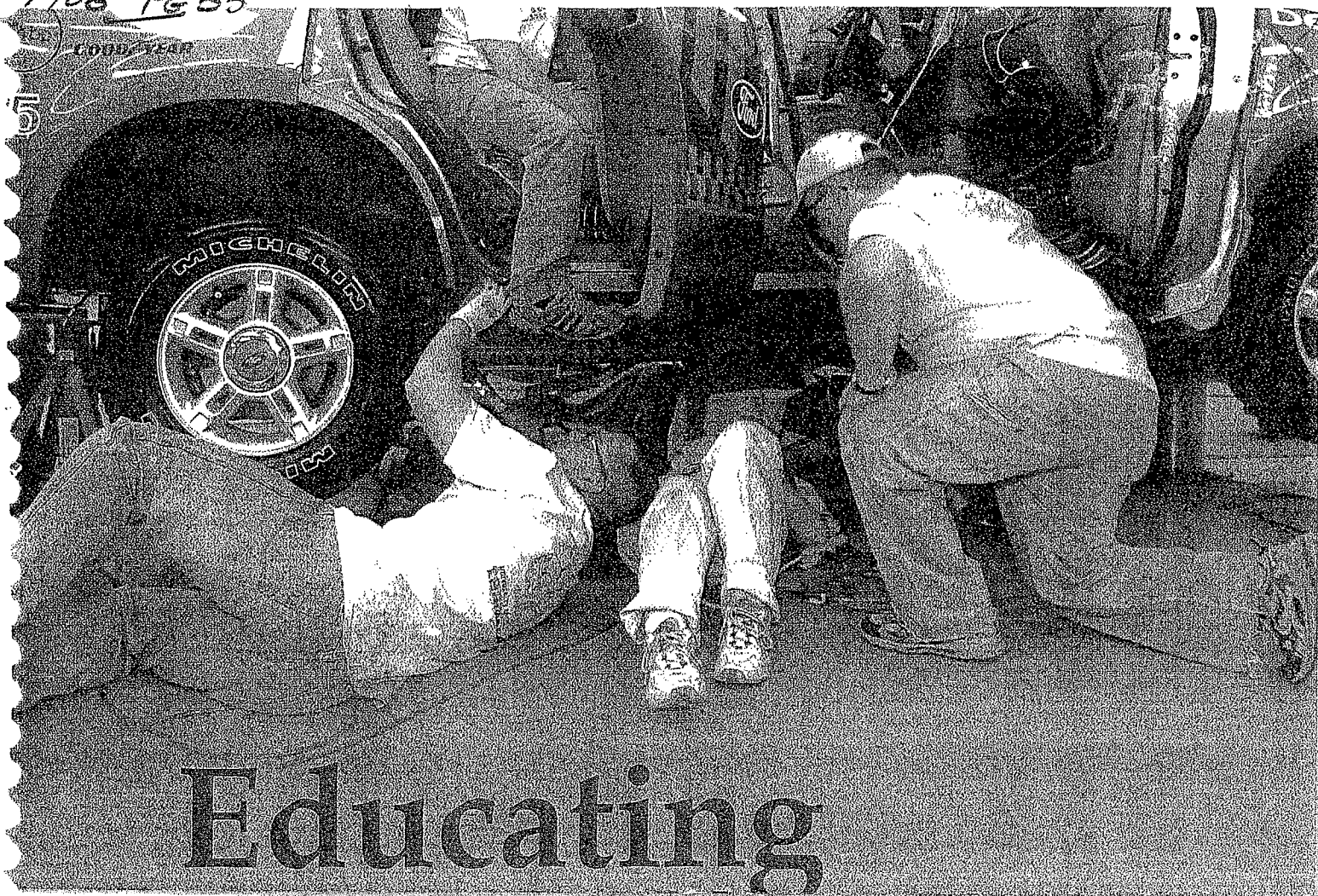
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Educating

The automotive and academic worlds are teaming to ensure that the industry's future is full of qualified engineering talent.

by Ryan Gehm and Stuart Birch

"Engineering is definitely not for the less determined," said Greg Kruger, Vice President of **Kelly Engineering Resources**, in a report released in early 2002 titled "A shortage of engineering talent: What can be done to regain our edge?" "It requires a lot of hard work, discipline, and a commitment to continuing education to keep up with the latest technological advances." As a result, many potential candidates may decide "to pursue less educationally rigorous opportunities," he added.

The automotive engineering profession certainly requires the high level of commitment that Kruger describes, but it appears

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that more students may be ready for the challenge. From the fall of 1996 through 2001, "major growth in enrolled students" occurred in mechanical engineering, as well as in the computer, electrical, and aerospace disciplines, according to **Engineering Trends**, an e-commerce consulting firm that specializes in engineering education. During those five years, full-time undergraduate enrollment in mechanical engineering was up 8%, while master's degree enrollment was up 14%. This trend is good news for the automakers and suppliers whose future depends on young, talented engineers.

Partnering for success

With roller-coaster enrollments in engineering over the past couple of decades and with an ever-changing economy that dictates demand for talent, there is the constant question of whether or not there is an adequate supply of qualified graduate engineers. "Is there an engineering crisis (in the automotive industry)? No, not in today's economy," said Tom Thivierge, Director of Talent Acquisition for **General Motors Corp.** "A couple of years ago I would have answered 'yes' (because) of the booming demand there was at that time. But right now, frankly, at college campuses (we) have to turn away a lot of folks just because of the supply and demand situation.

"But I also think the answer depends on which company you ask," he added. "There's not much of a crisis for the companies that tend to be at the top of the food chain, which we're one of, but I feel sorry for mid-tier companies. The supply of engineers going to college is not growing as much as people would like." Engineering students graduating in the latter half of this decade will be in a much more favorable position if they've chosen engineering careers, according to Thivierge, because there will be more positions than candidates.

He did mention, however, that GM has some shortage areas, software engineers being one of them. "It's not just electronics in the vehicle, it's that we're going to by-wire (technology), so mechanical engineers won't be as in demand as software engineers," Thivierge said. He also mentioned that

people who work with telematics, and how satellite technology "gets beamed into the vehicle," are in demand. It's a challenge "for us to find people who are getting engineering backgrounds in those areas."

Though there may not be a widespread crisis today in terms of supply and demand, "I think there is a crisis in the ability to have an adequate supply of minority engineers," said Thivierge. "In particular, I'm very concerned about (the lack of) Hispanics (in universities) since they're such a growing part of our population in this country." According to a 2001 report by the **American Society for Engineering Education (ASEE)**, Hispanics received 5.4% of the engineering bachelor's degrees awarded in 2001—Caucasians received 66.2%, Asian-Americans 14.1%, and African-Americans 5.3%.

Female engineers are another segment that is notably underrepresented in engineering disciplines, and in the automotive profession. The ASEE report showed that only 14% of the mechanical engineering bachelor's degrees awarded in 2001 were to women. According to Thivierge, GM's workforce is 24% female and about 28% of its hiring is female, "so we continue to grow incrementally," he said, adding,

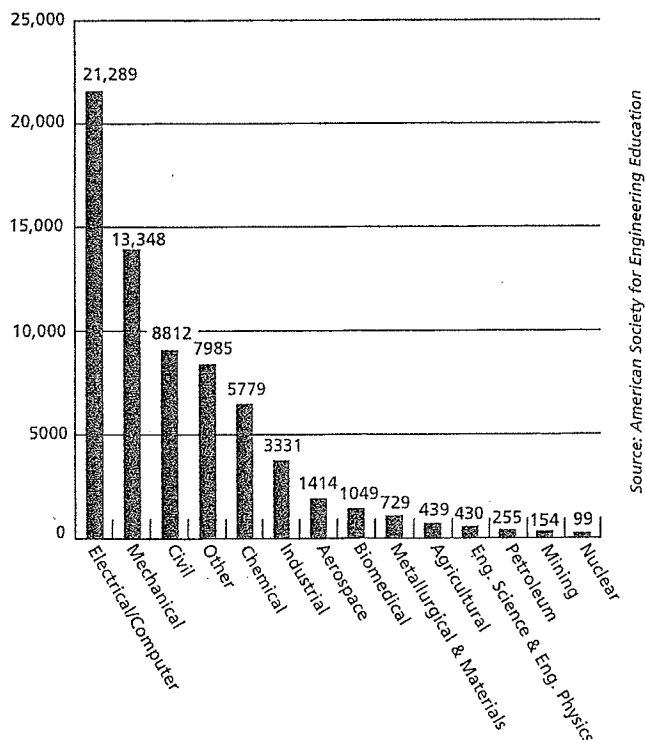
"Are there enough female and minority engineers? No."

A survey released by **Carnegie Mellon University** and nine other leading technical schools in the U.S. and Europe—including the **Massachusetts Institute of Technology**, **Georgia Institute of Technology**, **Imperial College of London**, **Ecole Centrale Paris**, and **ETH Zurich**—identifies key features of successful engineering education. Titled "Successful Practice in International Engineering Education" (SPINE), the survey included interviews with more than 1000 professors, company managers, and graduate engineers with five to 10 years of job experience. It revealed that a more flexible engineering curriculum helped to increase female enrollment and retention of engineering students, in general, at Carnegie Mellon, Pittsburgh.

The school's flexible program—which allows more electives to pursue interest areas outside engineering as well as within, such as an internal-combustion-engine course with lab—is believed to be a main reason why 90% of the students who entered engineering in 2001 remained in the program, compared with only 70% prior to 1990. The university also recently announced a new five-year program in which engineering students can use business electives toward a joint BS/MBA degree. The program will begin in fall 2003.

The study findings also revealed that most European universities have stronger ties to industry sectors and promote a curriculum focused on an international educational experience. In the U.S., universities place more emphasis on specialized courses, including cross-disciplinary and team-based projects. All participants said that problem-solving skills, leadership, and an ability to communicate effectively are key components to future success.

Though this study covers various engineering disciplines, its findings on what skills are necessary for engineers to succeed certainly apply to the automotive industry. GM's Thivierge noted that it is essential for graduating engineers to be able to



Where the supply is.... The largest undergraduate engineering disciplines are electrical/computer engineering (32% of total), mechanical engineering (18%), and civil engineering (11%). The graph shows the number of engineering bachelor's degrees awarded in 2000-2001.

Mechanical Engineering Degrees Awarded, 2000-2001 Top 20 Schools

1. University of Michigan	258
2. Kettering University	239
3. Michigan Technological University	237
4. Georgia Institute of Technology	236
5. Purdue University	234
6. University of Illinois, Urbana-Champaign	216
7. Pennsylvania State University	209
8. Texas A&M University	198
9. University of Minnesota, Twin Cities	184
10. Michigan State University	182
11. North Carolina State University	181
12. University of Texas, Austin	179
13. Virginia Tech	173
14. Rensselaer Polytechnic Institute	171
15. California Polytechnic State University	161
16. SUNY Buffalo	138
17. University of Puerto Rico, Mayaguez	137
18. University of California, Berkeley	132
19. University of Wisconsin, Madison	132
20. University of Washington	131

Source: American Society for Engineering Education

work effectively in a group environment. "It used to be years ago that an engineer learned to be a certain type of engineer and you did a certain thing. Nowadays, an engineer can't do that; an engineer has to be able to be a designing engineer, to work collaboratively in teams, to work with people across the world. So we measure their teamwork ability," he said.

"We find that a lot of students may be getting good grades, but they aren't necessarily being taught in that collaborative, teamwork-oriented environment. (Universities) realize that they have to apply more experiential learning...and a lot of top universities are responding to this challenge," said Thivierge. "If you ask any company today how they make selection decisions, every one of them will tell you that they're making behavior-based decisions; they're measuring initiative, ability to learn, teamwork, their results orientation, how well they make decisions, and how well can they build relationships. So when you look at the engineering talent today, there are enough bright ones out there, but we are having to turn away quite a few new college grads because they haven't quite developed the competencies to come in and hit the ground running."

While the SPINE study found that European universities in general are more connected with industry, many U.S. universities' automotive-related engineering departments are strengthening their ties with automakers, suppliers, and software providers; all parties involved realize that such partnering is essential to ensure a supply of qualified engineers for the future. GM, for example, recruits from 34 top universities mainly in the U.S. and makes donations to every one of them, according to Thivierge. "We donate \$7 million a year to these universities, help them develop curriculum that meets our needs, and make donations of technical equipment that teaches the students the technology that we use in our workplace. With these universities, it's not just recruiting; these are relationship-based situations."

These universities include what Thivierge calls GM's high-volume, or "bread-and-butter," schools: Michigan State University, University of Michigan, Kettering University, Michigan Technological University, and Purdue University, among others. GM's strategy is to have key institutions it goes to every year for talent. In addition to high-volume schools, the automaker places schools into four other categories: mid-volume, such as Georgia Tech and University of Illinois; diversity, including the University of Texas and University of New Mexico for Hispanics, as well as historically African-American colleges such as Howard University; prestige (for example, Stanford University and Cornell University); and design schools (creative studies and the arts) such as Brigham Young University and Cleveland State University.

One relationship GM has is with Carnegie Mellon, donating over \$1 million a year to the school's Satellite Lab, said John Anderson, Dean of Carnegie Mellon's College of Engineering. The goal of the project—which involves students from various disciplines, including electrical, computer, and mechanical engineering, as well as fine arts and design, and psychology—is to design "The car of the future." It involves finding solutions for the human-automobile interface and telematics such as navigation systems.

GM, with its corporate partners, EDS and Sun Microsystems, also has created a program called PACE (the Partners for the Advancement of CAD/CAM/CAE Education) to help prepare the next generation of engineers to design and build cars with the latest tools. In September the



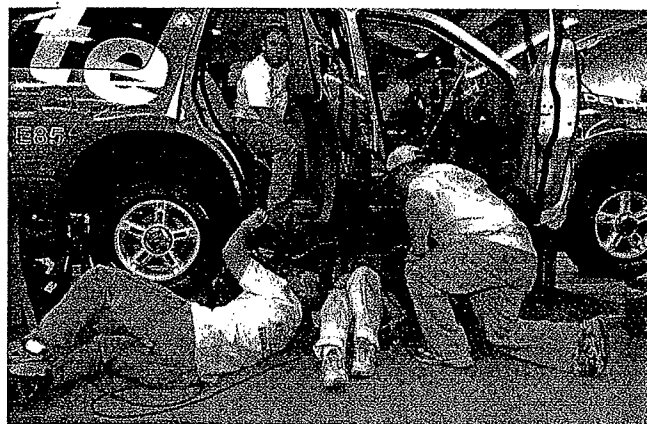
Senior mechanical engineering students from Dalhousie University review an engine schematic using Unigraphics 3-D modeling software provided by GM, EDS, and Sun Microsystems' PACE program.



Asim Smalagic, a senior researcher at Carnegie Mellon's Institute for Complex Engineered Systems, demonstrates the driver identification program in the GM Lab vehicle.



Kenworth engineers worked with students from Seattle University on a device that improves fuel efficiency by cutting the air drag between the tractor and trailer.



University of Tennessee engineering students work on their re-engineered Ford Explorer during this year's FutureTruck competition.

PACE program contributed 1205 software packages valued at more than \$116 million to Purdue's schools of engineering and technology. This corporate/educational partnership is an example of the trend toward higher levels of high-tech cooperation between companies and universities, said Frank Colvin, GM Vice President for fuel-cell activities. In addition to hardware, software, and training donated by the three companies, PACE institutions receive a substantial contribution of MSC.ADAMS software from MSC Software Corp. **Altair Engineering**, a software supplier to GM, also has agreed to provide its HyperWorks software products to Purdue.

"Our goal is to simulate, in the university, the world we are sending our students into," said Patrick Connolly, an associate professor of computer graphics in Purdue's School of Technology. "We don't teach software at Purdue; we teach the application of software to problem-solving in the production environment." Under the PACE program, Purdue professors and students also will participate in GM-specific projects with GM content experts, which will likely lead to greater research opportunities.

Another example of corporate/educational partnering was announced in August of last year; **Freudenberg-NOK** decided to shift the focus of the lean-manufacturing teaching company, **The Lean Center LLC**—which it helped create in 2001—from industry to academia. To help the industry meet its need for lean practitioners, the company intends to partner with leading universities to offer The Lean Center's curriculum as a four-semester academic program.

According to Thomas Faust, Freudenberg-NOK Vice President of Growth (Get Rid of Waste Through Team

Harmony) and Continuous Improvement, this partnership will pave the way for perhaps thousands of new engineering and manufacturing graduates to begin their industrial careers with a full working knowledge of lean processes that today is not available in the academic community. By shifting the teaching of lean principles to the university level, the company expects to create "an enormous future stream" of trained and qualified graduates and to lay the foundation for huge potential savings for the industry. These savings could exceed \$10 billion, said Faust.

The heavy-duty side of the industry also takes advantage of relationships with universities. **Kenworth Truck Co.**, a division of **Paccar Inc.**, has been working with universities in Washington State for several years, giving soon-to-be engineers practical experience in truck design. Recently, some of its engineers worked with students from **Seattle University** on "an especially challenging" project, said Alec Wong, Senior Project Engineer for Aerodynamics at Kenworth.

The project involved improving fuel efficiency by cutting the air drag between the tractor and trailer. Kenworth's design team developed a concept for a device that would operate automatically to help smooth airflow and tested it during extensive simulations using computer modeling. "We calculated that adding fairings...would reduce the truck's overall drag by 3%, (which) represents a 1.5% savings in real-world fuel economy," said Wong. The company sought the help of five senior engineering students—three mechanical engineers and two electrical engineers—to build the fairings, which took three-quarters of the school year. Wong and other Kenworth engineers served as advisors.

"They could see real-life application of their work once we put the device on a Kenworth W900 for actual on-highway testing," said Wong. The team got the same 1.5% fuel-economy improvement shown in the computer simulations. He noted that this type of practical experience is invaluable for young engineers entering the industry.

Student design competitions—such as those under **SAE's** Collegiate Design Series—are another area in which students can gain real-life engineering experience, and where potential employers can recruit talent. "Engineering students who participate in these competitions are well equipped for career success and are a top commodity within the mobility industry," said Bob Sechler, Manager of SAE's educational programs. GM's Thivierge agreed, saying that GM as well as **Ford Motor Co.** and **Chrysler Group** are big supporters of SAE design competitions. "How do you help not have an engineering crisis? One of the ways we do that is (by funding SAE's) Mini Baja and Formula SAE events. (They) teach students how to apply the education they're (receiving), so we do as much as we can to put them in a position where they can get that experiential learning," Thivierge said.

Sponsoring the FutureTruck competition, the final stages of which took place last June at the California Motor Speedway, is another way Ford encourages students to apply their knowledge. "FutureTruck gives engineering students invaluable real-world experience and the opportunity to understand the challenge of making breakthrough technologies practical for high-volume vehicles," said Sue Cischke, Ford Vice President-Environment and Safety Engineering. "The challenge every automaker is grappling with is how to

affordably deliver hybrid-electric or fuel-cell technologies in a no-compromise vehicle. That's exactly what this competition is all about."

The FutureTruck challenge was to re-engineer a midsize 2002 Explorer to improve fuel economy and lower emissions while retaining the vehicle's utility and appeal. Ford provided the 15 teams with the SUVs as well as engineering consulting, more than \$200,000 in seed and prize money, and operational and technical support. Other event sponsors included the U.S. Department of Energy, Cisco Systems, ArvinMeritor, Delphi Corp., National Instruments, and The MathWorks. The University of Wisconsin, Madison, took first place in the competition with its biodiesel hybrid-electric system, followed by the Michigan Technological University in second and University of California, Davis, in third.

This type of experience is essential for newly graduated engineers if they are going to hit the ground running once they are hired, which most employers expect of them, according to GM's Thivierge. "A lot of companies—and we're one of them—can no longer afford to train them as long as we used to once they arrive. What we're looking for in technical talent now is for them to be able to come in and do the job right away, and then we'll retrain them very rigorously on an average of every five years because the engineering knowledge life cycle is so short—they really have to stay on top of the latest technology and keep refreshing their skills," he said.

GM works with about a dozen top universities to write a curriculum for its engineers so they can continually upgrade their skills, Thivierge said. The OEM has put about 7000 engineers through the program over the last five years. "So they don't have to go back to school; we'll do it in our workplace using university professors and curriculum," he said.

"Everything's a lot faster now; we're designing new cars in two and three years now, not four and five years," Thivierge added. "So if you take two years to get an engineer up to basic speed, you've just lost a whole model cycle.... We've made it a requirement now that we won't hire new college grads unless they've had an internship—unless they have done real engineering work for some company."

A European perspective

An automotive manufacturer can only be as successful as the quality of its

employees allows. It is their individual abilities that will bring design, development, and manufacturing capability, together with the commercial acumen and momentum that together are vital for that success. But if the people who make all this possible are in short supply, then the automotive industry faces a crisis, for central to any and every automotive manufacturer is the employment of first-rate engineers.

In the German education system, there has been a 30% reduction since 1996 in the number of engineering graduates emerging from universities, according to Ford of Europe. This sounds like a recipe for serious problems for the automotive industry. "We would not use the word 'crisis,' but the recruitment market for qualified graduate engineers is, and will continue to be, very competitive," said Malcolm Thomas, Engineering Director, Ford of Europe. "In the UK there has been a much smaller reduction in the overall numbers available, but many engineering graduates there do not seek employment in engineering in particular. We see an increasing need for, and shortage of, engineers with electronics and control expertise."

Carmen Kasper, Senior Manager for External Recruiting at DaimlerChrysler (DCX), agrees that the situation is not yet critical but warned: "There is not a crisis for DaimlerChrysler, but we know we have to put special emphasis on recruiting, so we need to explain our products (and) career opportunities, detail the challenges we can offer, and underline that innovation is a main driver for us. But we would like to see more university students focusing on engineering. We see ever more companies (that) value that type of background, which means demand for engineers is rising. More work needs to be done to increase the numbers of those choosing automotive engineering and to convince them that the automotive industry offers interesting and challenging career opportunities."

Jürgen E. Schrempp, Chairman of the Board of Management of DCX, made several of these points at a recent company symposium and stressed the importance of social acceptance for science and technology, notably in terms of its effect on the environment. "I am confident that we are thereby creating conditions which will attract a larger number of young people to technical professions again," he said. "Right now there are too few of them. This is a particular problem for small- and medium-sized companies, the backbone of our industry and the sector that plays an

increasingly important role in automotive value creation."

DCX recruited some 2400 university graduates and young professionals worldwide in 2002, according to Kasper. "About 70% of those are engineers or graduates with a technical background, a majority in mechanical and electrical engineering," she said.

An important aspect of recruiting involves allowing graduates and young engineers to gain first-hand experience of the company and of the technology incorporated into products. DCX has also used these events to generate interest among women. Only a few years ago, there was relatively little attention paid by many companies to the potential of recruiting female engineers. All of that has changed at DCX, explained Kasper. "We are trying to increase the number of women engineers because we don't want to neglect half the population. We need the potential of women in the engineering function partly because so many of our customers are women and we need a strong female contribution to our products in design, development, and manufacturing," she said.

"In 2001 for the first time we organized the 'Career Workshop for Top Female Graduates.' We invited almost 50 internationally oriented top female graduates to visit DCX to see and understand just what we do and to meet and talk with our senior executives from various business units," Kasper said. "Of those, we recruited 15, a figure which we regard as being very successful. Now we are trying to increase this type of high-level recruiting. Engineering functions and programs are becoming



"We would like to see more university students focusing on engineering," said Carmen Kasper, Senior Manager for External Recruiting at DCX.

increasingly international.... Engineers need to see the global perspective with a broad experience from marketing to material science; it is important for young people not just to look at engineering from a single perspective. We have an international training program (of 12-15 months) for our graduates, with different project assignments across the world."

DCX is in a special position in terms of recruiting, believes Klaus-Dieter Vöhringer, member of the company's Board of Management. "Leadership in technology and innovative spirit as major principles within the corporation create jobs that are inspiring, demanding, and diversified. DCX is therefore the preferred employer, as verified in numerous surveys. There are few engineers who would not want to work for a corporation that is regarded as a leader in innovation, offering such a large number of opportunities for personal and professional development." Even so, the company has to work hard to ensure it gets the people it wants. In 2001, it ran a recruiting program called the "DaimlerChrysler Europe Tour," which focused on eight major universities across Europe, in the UK, Germany, France, Spain, and Italy. These universities included the Imperial College of London; KTH Stockholm; ETH Zurich; Ecole Centrale Paris; TU Darmstadt; TU Eindhoven; Universidad de Navarra, Barcelona; and SDA Bocconi, Milan.

Ford of Europe also has a strong reputation for innovation and maintains its Research and Engineering Centers in the UK at Dunton and in Germany at Merkenich. And it, too, encourages young

people to experience the reality of the automotive industry during their studies. "We find that graduates who have had industrial experience during their academic program have a clearer vision of their career objectives," said Thomas. "This industrial experience is the norm in Germany

Main Recruitment Schools for Ford of Europe	
United Kingdom	
Loughborough	Birmingham
Manchester	Bristol
Germany	
Aachen	Berlin
Bochum	Darmstadt
Cologne	Stuttgart

and rapidly growing in the UK. We actively encourage and support this trend." Again, like DCX, Ford says it recruits "in almost equal numbers" mechanical and electrical/electronics engineering graduates in both countries.

"We are actively involved in the education community, encouraging young people to consider engineering both as a degree and later as a career," said Thomas. "In the UK, Ford is the 'employer of choice' for engineering graduates. With more than 5000 engineers and support staff based at our Dunton Technical Center, there is an almost incredible range of jobs in designing and engineering Ford cars, commercial vehicles, and engines. With regard to training, we see in the automotive industry a blurring of traditional boundaries between disciplines. Most mechanical systems now have an electrical component and often electronic or software control."

Ford also puts emphasis on recruiting women into the industry. The company's WISE (Women in Science and Engineering) prize was introduced to encourage female engineering students and to promote careers in engineering for women. It is aimed at students in their penultimate year at a UK university. "Along with our efforts to attract engineers with a wide range of skills, there is no doubt that increasing our pool of female engineers makes a significant contribution to ensuring we offer cars of the broadest appeal," said Thomas. "In an ideal world, the gender split in the engineering community would reflect that of our customer base. There is a need for more

young women in education to be shown the opportunities available when opting for engineering as a career."

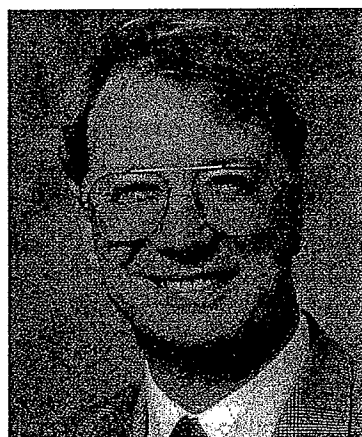
The company also holds an annual event at its Dunton Technical Center, called "Women in Engineering," to try and encourage more female undergraduates to consider working in the motor industry. The most recent, in October last year, was attended by about 100, and they were able to meet senior Ford executives, including Richard Parry-Jones, the company's Group Vice-President for Product Development, and Martin Leach, President and Chief Operating Officer, Ford of Europe.

There is concern at high levels of the European automotive industry about the supply of high-caliber automotive engineers in the coming decade. Although a crisis point may not have been reached, there is little doubt that it could be if the European trend away from engineering continues, particularly as other high-technology industries find they, too, need people who hold the qualifications that make fine car designers, developers, and builders.

Garel Rhys, Director of the Center for Automotive Industry Research at the Cardiff Business School in Wales, is a leading European motor industry academic who says of that trend: "Motor companies in Europe are alert to the problem of the shortage of engineers. Everywhere they are attempting, either (by) themselves or in partnership with governments, to address impending issues and difficulties." Rhys believes it is up to the auto industry urgently to get its message out about its concerns: "But another question is that if young people are trained to become engineers, will they actually enter the profession? It depends on who offers the highest salary—and they may be tempted by the financial world."

Traditionally, Germany does well in training—and retaining—engineers, he said, in part because the title "Herr Dr. Ing." is regarded as socially prestigious. Although the auto industry is not always seen to offer an attractive profession, in countries where manufacturing has performed well it is usually regarded as worthwhile, prestigious, and exciting.

Rhys, like many educators and industry leaders, also believes that the horizons of young engineers need to be broadened: "They need skills that are quantitative, numerate, and literate. Skills training will be even more important in the future than it has ever been in the past." **aei**



"We find that graduates who have had industrial experience during their academic program have a clearer vision of their career objectives," said Malcolm Thomas, Engineering Director, Ford of Europe.

St. Albert's Gazette

December 2002

By Bev Rudolfsen
Staff Writer

The shiny tank-like SUVs on Alberta's roads have been getting a bad rap lately as obnoxious energy-guzzlers spewing bad things in the face of the looming Kyoto protocol.

As rugged and handsome as soap opera stars, the lineup of these fashionable but greedy trucks is becoming politically incorrect as the world's attention turns to ways to reduce greenhouse gas emissions.

Luckily for drivers who'd rather not squeeze their kids, dogs and groceries into compacts, a group of engineering students at the University of Alberta is making inroads in technology to keep those big wheels rolling.

The team of 25 students, including six St. Albert residents, was the lone Canadian contingent chosen to take part in the FutureTruck 2002 project, hosted by Ford Motor Company. The competition challenges students from 15 North American universities to reengineer a 2002 Ford Explorer into running 25 per cent more efficiently, with fewer harmful emissions, all the while preserving the truck's consumer acceptability.

When their big black truck is shipped to Romeo, Michigan next June to gear up against its competitors, the electrical and mechanical engineering students at the University of Alberta hope they'll have something, in some way, that can revolutionize vehicle efficiency.

"It's exciting that this project will be reviewed professionally (by Ford) and that our ideas, whether they work or not for us, could be used," said Neil Freeman, one of the St. Albert students on the FutureTruck team.

Each team was given an Explorer last year to tear apart and reassemble into less of a gas-guzzler. The U of A's model is strewn in bits and pieces behind a chain link fence in a heated parkade off the engineering building. The challenge is in striking a balance without sacrificing performance in braking, handling and power.

"We want to maintain all the good things about the Ford Explorer," said Freeman. Easier said than done, when you're replacing the truck's four-litre, V6 heartbeat with a two-litre, four-cylinder engine taken from the more modest Ford Focus, a mid-sized car.

Freeman and his colleagues plan to create hybrid power for the Explorer, partnering the smaller gasoline engine with an electrical motor fuelled by rechargeable batteries. The combination is called HEV, short for hybrid electric vehicle.

"The idea is to have a vehicle that will run as well as your V6 or V8 SUV, but with the fuel economy of a smaller vehicle," said David Checkel, professor of the university's department of mechanical engineering and faculty advisor to the FutureTruck project.

Ideally, said Checkel, "you could drive the same SUV you had in 1990 and actually meet your Kyoto responsibility. When you put your foot down, you'll get the same power."

The group is just starting to implement the ideas that have been on the drawing board for a year. After team leader Clayton Bond, a fourth-year engineering student from St. Albert, designed a big suitcase-sized, aluminum-clad battery box last year, the students adopted it as a blueprint to create a lighter, more compact version using carbon fibre.

The material is widely used in crafting golf club shafts, aircraft and racing cars. The idea is to add as little weight to the motor as possible.

The students plan to have the Explorer running "on its own power" by late January and as a viable HEV by February. Over the next few months, the students will work on the most challenging, delicate task: merging the two kinds of engines and giving the truck a 'brain' to read what kind of power is needed when the vehicle accelerates or brakes.

In the meantime, the team is asking for the public's help in supporting the project, through cash donations and in-kind contributions of supplies.

Electrician's wire, metal, printing services for public relations pamphlets and business cards, and machine shop time are all needed.

Everyone has a stake in what FutureTruck's whiz kids develop, especially in light of the Kyoto dust-up, said Freeman.

"It shows a commitment by industry to produce a vehicle that uses less fuel and produces fewer emissions. It's an answer, it's in direct response (to Kyoto)."

The students know they're on the cutting edge of emerging technology and are excited to be part of it, despite the long hours they voluntarily put in after regular classes - already a 60-hour week.

"It provides a lot of opportunity because hybrid technology is going to be used a lot in the automotive industry," said Freeman, noting that Toyota plans to unveil an all-hybrid lineup of vehicles by 2012. Toyota and Honda already have HEVs on the road.

Some of the engineering program's graduates have found work with Ford and other manufacturers. "It's about training everyone and getting them acquainted with this kind of technology."

It's also a welcome break from class, said Bond. "It makes you want to continue doing engineering. It's really giving these students a good opportunity to enjoy their educations."

The university's engineering department has already had success with HEV technology. In a three-year competition hosted by Ford, Chrysler and General Motors that began in 1993, students at the U of A changed the face of hybrid electric technology by proving that running an electric motor parallel with a gas engine was more beneficial than running it in series.

The correct application of this idea, demonstrated in two Ford Escorts won the university first place that year, a top-three finish in 1994 and another first-place trophy in 1995.

To learn more about the FutureTruck project and to offer donations, contact nfreeman@ualberta.ca. The Web site for the university team is www.ualberta.ca/~future/

The official competition Web site is www.futuretruck.org brudolfsen@stalbert.greatwest.ca

NOVEMBER 20, 2002



Bacon's

Launching a war against

The council recently took a

A strike would kill thou-

Countries should call

1908

NEW AT UW-MADISON

Building engineered with innovation

The Engineering Centers Building was designed for hands-on learning, the dean says.

By Karen Rivedal
Higher education reporter

UW-Madison student groups, faculty and staff will spend the next few weeks moving into the \$53.4 million Engineering Centers Building, a visually striking and technically innovative facility designed for research, creativity and collaboration across many subject areas.

The four-story building at the southeast corner of Breese Terrace and University Avenue is the newest construction on campus since the \$45 million Pharmacy Building opened last September. It also is the College of Engineering's first completely new building in 30 years.

"It is a great feeling to walk through this building," College of Engineering Dean Paul Percy said recently, while touring the structure. "It is a great facility."

Construction of the 204,000-square-foot building began in June 2000. The price tag included \$22 million in state money, with the balance in private gifts and donations.

Designed by Madison architects Flad and Associates, the building was laid out with student needs in mind and an emphasis on hands-on learning, Percy said. Its first three floors — basement, first floor and mezzanine level — are given over to space for student projects and presentations, with additional rooms for 40 engineering student organizations that formerly were scattered around campus.

One key area is the Student Automotive Center, a state-of-the-art garage/shop for the college's vehicle contests including Future Truck and Formula Car. In each contest, students spend a year redesigning a donated vehicle from the ground up, improving its performance, fuel efficiency and safety.

The car clubs formerly met and worked in garages on Park Street that they shared with

The building's features

The \$53.4 million Engineering Centers Building boasts architectural features that set it apart from more traditional lab-and-lecture space on campus.

◆ A floor-to-ceiling atrium surrounded by tall glass walls adds light and open space to the front lobby, while a hanging metal sculpture shaped like a spiky crystal ball by renowned engineer-inventor R. Buckminster Fuller lends artistic flair. The piece, which weighs 500 pounds and is 9 feet in diameter, was donated by alumni.

◆ In a deliberate bid to blend art and science, planners commissioned Denver artist Scott Parsons to design the building's 11,000-square-foot ground floor, using a mosaic of inlaid marble and granite pieces.

Those pieces in turn form multicolored representations of engineering-related equations and mechanical tools. A design of an automobile transmission, for example, is pictured in the floor outside workshops in the Student Automotive Center.

◆ As a learning tool, designers exposed many of the building's mechanical systems, utilities and air-handling systems. The elevator has glass walls to show how the cage moves up on cables as counterweights slide down. Hallway walls throughout the building also have inset sections behind windows to show how pipes carry water around the building and other functions.

— Karen Rivedal

garbage trucks.

"In the winter, it began to smell pretty bad," said Katie Orgish, a senior mechanical engineering major involved in Future Truck. "This is a lot larger and a lot closer to (the rest of) campus."

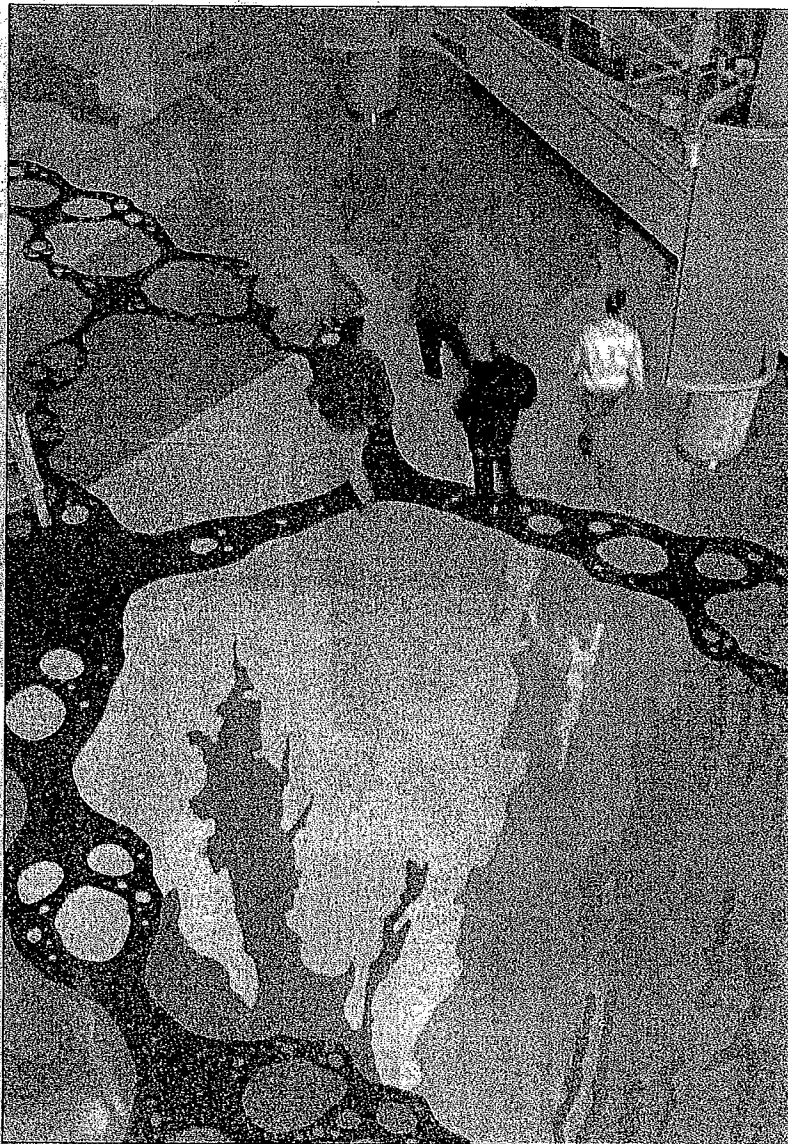
In another plus for students, the building also includes a career services office, where students can get advice and interview with employers for internships and jobs.

On the second and third floors, a series of research labs, major conference rooms and offices dominate. Those floors also will house the department of biomedical engineering, a multidisciplinary

Please see BUILDING, Page B2



The Engineering Centers Building opened this fall at Breese Terrace and University Avenue. A large glassed-in atrium space fills one end of the building from floor to ceiling.



JOSEPH W. JACKSON III/WSJ photos

A ground floor incorporating science- and engineering-related images including this black gasket pattern is one of the features in the newly completed \$53.4 million Engineering Centers Building on the UW-Madison campus. The building will provide a permanent home for student engineering groups, research labs and the College of Engineering's department of biomedical engineering.

190821 Building

Continued from Page B1

field that uses engineering tools to analyze and solve problems in biology and medicine through advances such as improved instruments and therapies.

As the Engineering College's newest department, many of its faculty — some of them freshly recruited for the rapidly growing department — were housed in temporary sites around campus. Bringing faculty and students together in a permanent home should accelerate discoveries, said Rob Radwin, department chairman.

"Getting in one central place allows us to interact with one another," he said. "Having a group of faculty and students working in one place is very helpful in allowing ideas to develop and percolate." //

NOVEMBER 8, 2002



Bacon's

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FutureTruck



CHRISTINE VANZELLA, SUN

University of Alberta second-year mechanical engineering

FutureTruck contest goal to build a better vehicle

University engineers aim to boost efficiency, cut costs

The Edmonton Sun, Friday, November 8, 2002 BUSINESS C3

A University of Alberta team aspires to place high in Ford Motor Company's FutureTruck competition making a cleaner-burning, more efficient vehicle.

About 30 U of A engineering students are working on an Explorer dominated by Ford.

The U of A is the only Canadian university among 15 taking part in

the Ford competition that wraps up with testing in Michigan in June.

"We're hoping to place in the top three, that's our goal," said Neil Freeman, a second-year mechanical engineering student on the U of A project.

Competitors are challenged to convert the Explorer to meet current safety, utility and affordability

levels while cutting emissions and increasing fuel economy by at least 25%.

"To meet this challenge, the teams will employ cutting-edge automotive technologies: advanced propulsion systems, lightweight materials, and alternative fuels such as ethanol and biodiesel," says a Ford promotion of the project.



Bacon's

1908
52 MARKETPLACE November 5, 2002

Miller Electric Plays Role in Fuel-Efficiency Competition

Miller Electric Manufacturing in Appleton can take at least a share of the credit for the national championship FutureTruck that University of Wisconsin students built earlier this year. The company's MIG (metal inert gas) welding technology helped students reduce the weight of the vehicle and thereby increase fuel efficiency, according to Glenn Bower, the faculty advisor for UW's Team Paradigm.

The U.S. Department of Energy sponsors the annual FutureTruck competition, in which teams of students vie to produce the most fuel-efficient, low-emissions sports utility vehicle.

This year, each team started with a 2002 Ford Explorer, donated by the Ford Motor Company. Miller Electric donated a Milleromatic 251 MIG welding system to the UW team.

The UW's winning FutureTruck obtained a 21.85 miles-per-gallon fuel efficiency - a 45 percent increase in fuel economy over the stock vehicle.

The UW's entry also achieved a greenhouse gas impact that was 34 percent lower than the stock vehicle's level.

TECH NOTES

Overall, the UW team scored an impressive 839 points out of a possible 1000 to take home the 2002 FutureTruck championship. Michigan Tech grabbed the second-place trophy by scoring 693 out of a possible 1,000 points.

Thrivent Financial Bank Lauded for Energy-Efficiency

Companies nationwide are learning that work environment can directly affect corporate success. That's why many businesses like Thrivent Financial Bank have focused on developing energy-efficient buildings to raise employee morale while simultaneously lowering operating costs. For example, day-lighting, or the use of windows for maximum natural light, can reduce the need for artificial lighting by 50 percent to 80 percent, lowering energy costs while boosting worker efficiency and comfort, according to a report from the U.S. Green Building Council.

The president and chief executive officer of Thrivent Financial Bank, Richard Jodarski, has already noticed a change since the facility's grand opening in April 2002. "The new building provides the greatest comfort and quality for those who work in our offices," said Jodarski.

"The staff members enjoy the openness of spaces day-lighting provides and the ease of communication that goes along with such an open atmosphere."

Jodarski also commented on a noticeable improvement in morale and attitude and increased worker efficiency that he believes the energy efficient measures promote. "I've noticed an improvement in productivity," he said.

The Focus on Energy Business Program, which encourages Wisconsin businesses to seek energy efficient solutions, notes Thrivent Financial Bank's effective use of day-lighting, sun-screens, light shelves and occu-

panysensors in its new facility. "Thrivent serves as a great role model for commercial establishments in Wisconsin," said Abby Vogen, manager of Focus on Energy's High Performance Building Program.

Along with increases in worker productivity, businesses that use energy-efficiency measures such as day-lighting praise their ability to cut operating costs. The U.S. Department of Energy reports that artificial lighting accounts for as much as 50 percent of energy consumption of commercial and industrial buildings. However, according to one major study, day-lighting can result in electric bill savings of 65 percent annually.

"There are days when it seems the office uses little artificial light at all," Jodarski said. "We really spend very little lighting our facility."

The benefits of day-lighting are not limited to office facilities. Research also indicates that day-lighting increases purchases in retail stores by 40 percent and raises student test scores by 20 percent in schools where the energy efficiency measure is implemented.

TECHNOLOGY

P.52

ASSEMBLY

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OCTOBER 2002



Racon's

Assembly Lines

1908

Competition Holds Key to Fuel Efficiency

APPLETON, WI—The University of Wisconsin-Madison (UWM) has won the U.S. De-

partment of Energy's annual FutureTruck competition.

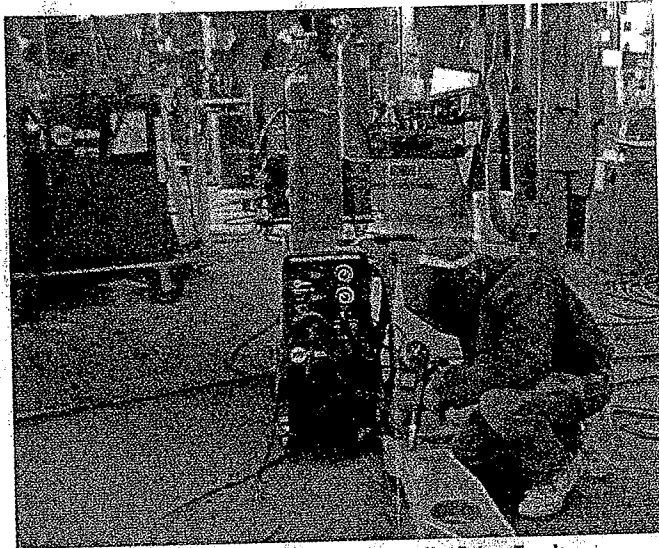
Fifteen schools sent teams of engineering students to the competition, which is designed to develop fuel-efficient, low-emissions sport

utility vehicles (SUVs). Each team received an identical 2002 Ford Explorer. The teams then had to modify their vehicles to get the best mileage and performance.

UWM's Team Paradigm kept the body and threw out the original powertrain. They also lightened the original steel frame by 50 pounds using aluminum crossmembers and bumper beams.

To weld the parts together, Miller Electric donated a Miller-matic 251 all-in-one MIG welding system to Team Paradigm. Previously, the university had used Miller's Syncrowave 350LX. But switching to the MIG system saved the team about 5 hours in welding time. "We used the MIG welder to tack up a lot of parts," says Glenn Bower, faculty advisor for Team Paradigm. "We TIG welded where we needed a cosmetic weld, but the trouble is that tacking everything upside down with a TIG machine becomes a nightmare. Once we had everything tack welded with the MIG, we would unbolt the compo-

ment and do the final weld with the TIG machine." P. 14



The University of Wisconsin took first place in the FutureTruck competition. The university's team used welding equipment from Miller Electric to weld the SUV's parts together.



Bacon's

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North American Edition

alternatives

P 16

90-DAY WONDER

Five companies team up to develop working
hybrid shuttle bus prototype in three months

By Mike Brezonick

When you're talking about developing almost any new product, three months isn't much time. And when a development requires the involvement of five different companies, including an automaker, 90 days is barely the space of a single heartbeat.

Yet in just that amount of time, five companies — Ford, American Axle & Manufacturing, Supreme Industries, TransTec and Magtec — came together to build the prototype of a new hybrid bus targeted for airport shuttle and mass transit use. The FASTM bus, (the designation signifying the first letter of the participant's names) was unveiled during the recent FutureTruck 2002 competition at California Speedway in Fontana, Calif.

"This was a project that brought together advanced technologies from five different companies and we put it together to show what's possible," said Paul Szilagyi, CEO of TransTec, which managed the program and provided hybrid technology. "It is a prototype and was done in 90 days, which might be the greatest story in and of itself, to have these organizations get together for a common goal and get this done."

"Ford is very pleased to be part of the FASTM team," said Paul Moore, director of sales and operations at Ford Power Products. "As an environmentally conscious company, we fully support the development of cleaner running vehicles and the FASTM bus is something we are extremely proud of."

"The goal was to start from a clean sheet of paper to quickly design and



A group of five companies, including Ford Power Products, American Axle & Manufacturing and TransTec developed and built the prototype of a new hybrid shuttle in 90 days. The FASTM bus is initially targeted toward airport shuttle and mass transit applications.

build a completely new hybrid vehicle capable of running in a zero emissions mode," Szilagyi added. "We've done it and we're very proud of that."

The FASTM bus is based on a Ford E450 Econoline chassis that is used in a number of medium truck applications. But once you get past the outward appearance, all similarities to the typical Econoline end.

Instead of the standard V-10 gasoline engine and drivetrain, the FASTM bus is powered by a Ford ESG 642 spark-ignited engine operating on propane. The engine is a 4.2 L, V-6 operating at 1800 rpm, where it produces approximately 70 hp. It incorporates a range of features that allow it to operate on dry fuel, such as hardened valve inserts.

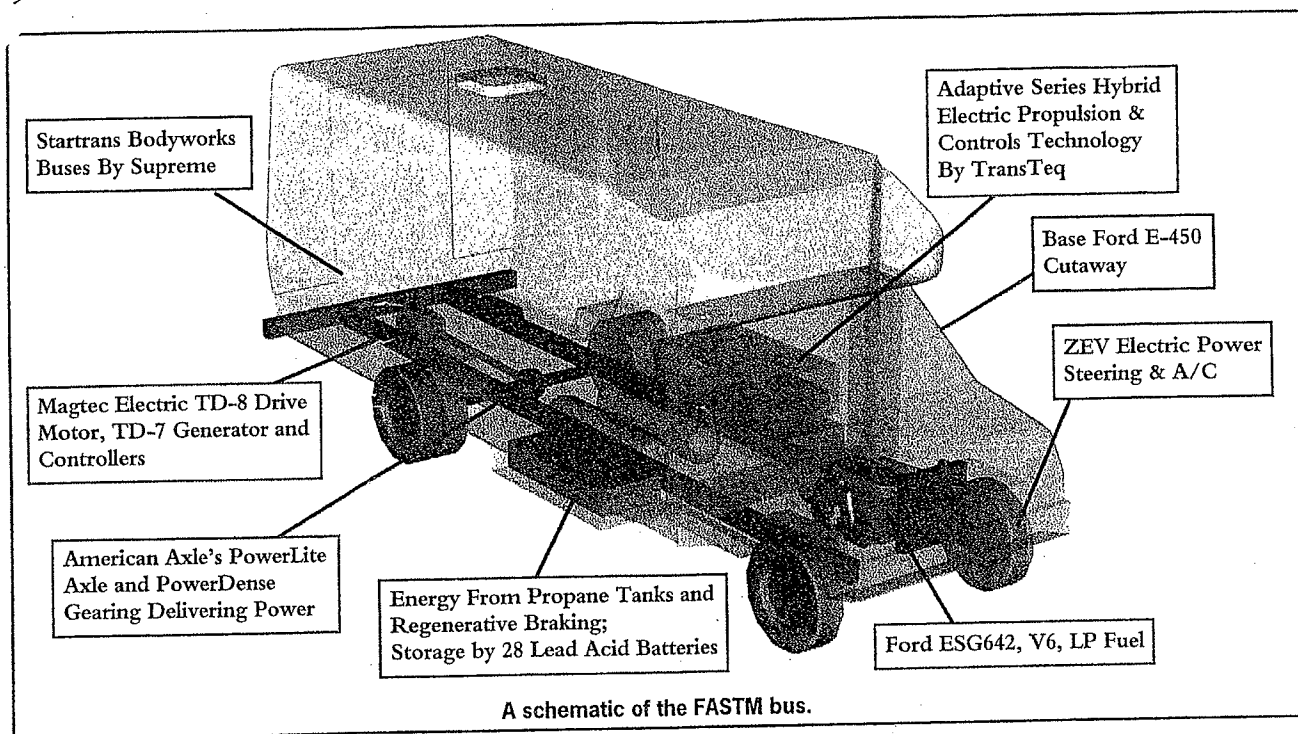
A series type hybrid, there is no direct mechanical connection between the engine and the rear drive wheels. Instead, the engine drives a Magtec 40 kW

generator operating at 370 Vd.c. The generator is used to maintain 28 sealed, 12 V deep cycle lead acid batteries. The batteries power a Magtec TD8 permanent magnet traction motor, as well as all other bus accessories. The motor, which has an integral parking brake assembly, has a maximum output of 134 hp and a peak torque of 405 lb.ft.

The traction motor is positioned behind the AAM rear axle, which is inverted to allow the steel driveshaft connection from the motor to the wheels to come in from the rear. The axle has a GAWR of 9450 lb., with a ring gear diameter of 10.5 in. and a ratio of 4.56:1.

"This is taking series hybrid technology that we have demonstrated in Denver, where we have the world's largest fleet of heavy-duty hybrids," said Szilagyi. "It's not just a concept."

continued on page 18



They're carrying 60,000 people a day.

"Series hybrid electric technology allows you to get the most out of the fuel and you can have different choices. This one is propane because of the availability of that.

"You can get in an argument as to whether parallel or series technology is better. We believe series hybrids give you the maximum flexibility to avoid technological obsolescence and embraces what will happen in the future when instead of an engine, you have a fuel cell."

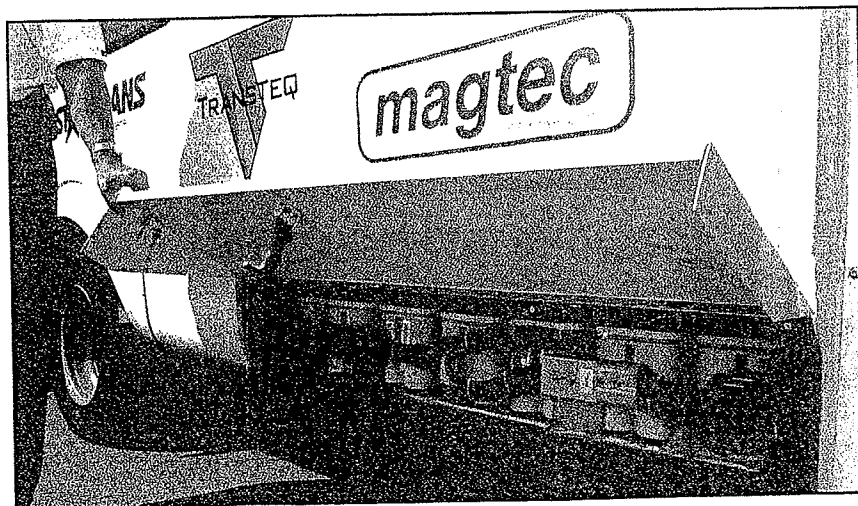
In normal operation, the engine on the FASTM bus is operating about two-thirds of the time, Szilagyi said, keeping the batteries at peak charge. Battery levels are also maintained through regenerative braking.

With a fuel capacity of 180 lb. of propane — the twin tanks are positioned forward of the axle between the frame rails for extra safety — the bus can operate for 10 hours before refueling. Maximum speed is 60 mph. The FASTM bus is also capable of operating with the engine off in a zero emissions mode. "That is especially valuable in sensitive areas, such as airports where you go to pick up people and you might be under a canopy," said Szilagyi. "Then you don't have exhaust considerations and concerns."

The bus can operate for 30 miles in zero emissions mode before engine restart is required. Zero emissions mode can be selected manually or can be programmed to operate on the basis of global positioning, which can be integrated into TransTeq's control electronics. "You can have it so that when you pull under the canopy at the airport, boom, engine off," said Szilagyi. "You pull out, boom, engine on. The system manages the power level and state of charge of the batteries and it will put the engine on when it needs it."

With the interior and body designed by Supreme Industries, the FASTM bus is 24 ft., 6 in. long, 7 ft. 9 in. wide and 9 ft. 7 in. high. It can carry up to 15 passengers with luggage.

Besides airport shuttle service, the FASTM bus concept could be used for a variety of applications, including mass transit or pickup and delivery. "This is a prototype, but we plan to go into production," said Szilagyi. "And obviously, we believe there can be a number of applications where this would work. We just have to spread the word." ★



The FASTM bus uses a Ford Power Products propane engine to drive a Magtec 40 kW generator, which is used to maintain the 28 sealed, 12 V deep cycle lead acid batteries shown here.



Bacon's

1908
FORD POWERS UP

1982

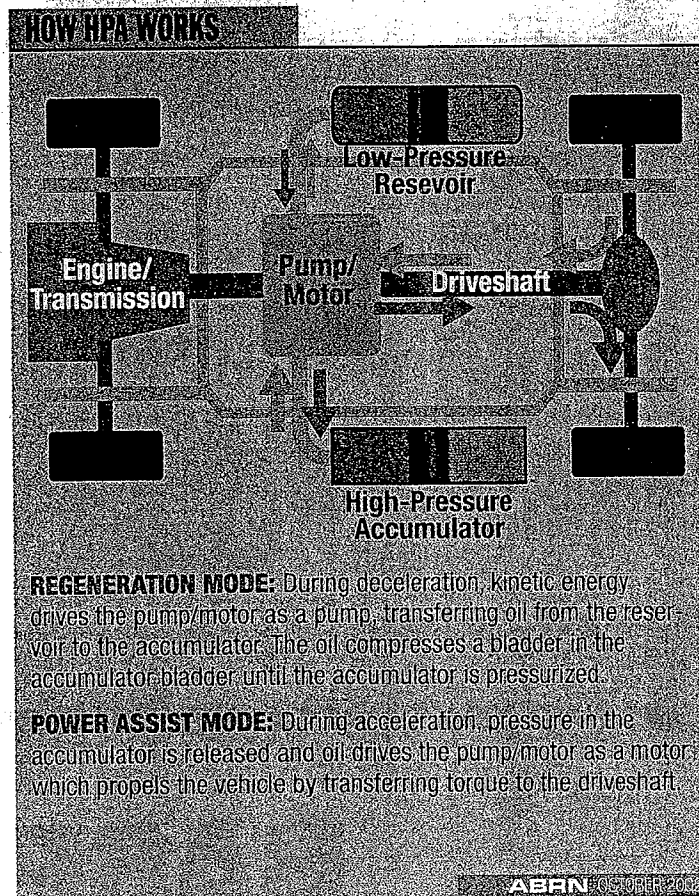
Explorer enters 2004 cleaner, efficient

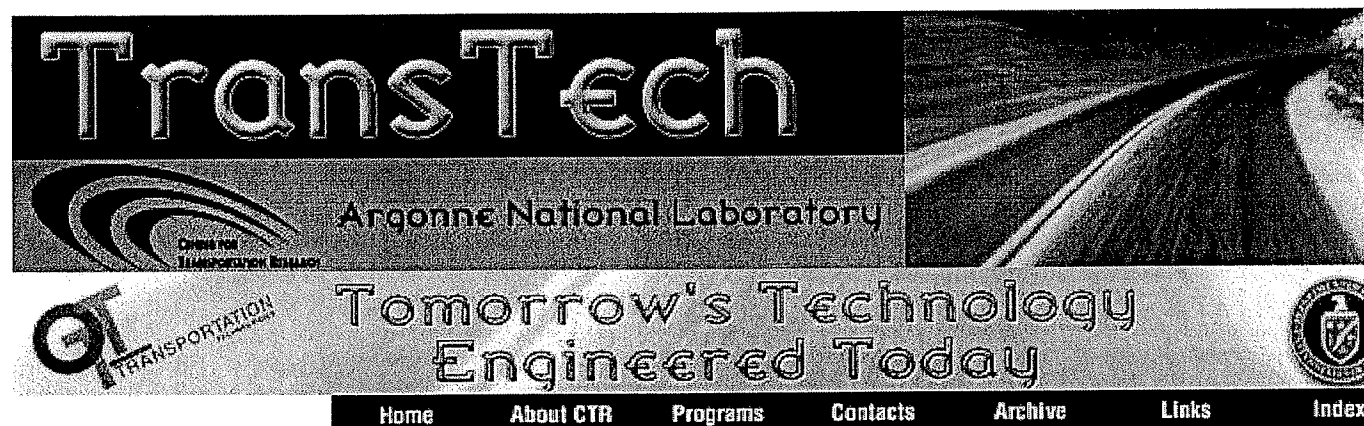
Ford Motor Co. has taken steps to make its line of SUVs cleaner and more fuel-efficient. Future Truck 2002, an alternative propulsion vehicle competition sponsored by Ford, held June 11-21 at Ford's Arizona Proving Grounds in Yucca, served as a backdrop to the company's announcement that the 2004 Explorer will feature new technology capable of increasing fuel efficiency by 5 percent. Among the updates to Ford's top-selling SUV, a drive-by-wire system with Electronic Throttle Control (ETC) replaces the mechanical linkage between the accelerator pedal and the throttle, giving the Explorer more efficient power on demand while making it feel quicker and more responsive. Fuel consumption is further cut by the addition of coated pistons, low-rolling resistance tires, a synthetic rear-axle lube and an exhaust gas return (EGR) system, which reduce friction and "parasitic energy loss." The 2004 Explorer will also run substantially cleaner than its predecessors. Models fitted with the 4.6-liter V8 engine meet the federal government's standards as low-emission vehicles (LEV II). Making this possible are upgrades to the engine air intakes and catalyst system along with a new electronic vapor management system.

Hydraulic power boosts fuel economy

Ford also chose **Ford's Truck 2002** to showcase its newest developments in the area of hydraulic power assist (HPA) technology. HPA improves fuel economy in large trucks by recovering and reusing energy that is normally lost during braking. Working with a high- and low-pressure accumulator, a driveline-driven hydraulic motor/pump recovers deceleration energy and reuses it during the next acceleration cycle (see figure: the blue component is the low-pressure accumulator, and the red component is the high-pressure accumulator with the reversible pump/motor sitting directly in front of it). When a large vehicle begins moving forward after a stop, it consumes much more fuel than is used to keep the same vehicle in constant motion. With an HPA system, the accumulator sends power to the hydraulic motor, giving the vehicle a significant boost during takeoffs. This extra boost allows large trucks to accelerate more quickly and efficiently on less fuel and with fewer emissions.

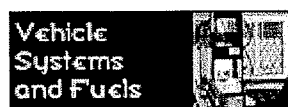
Ford's research indicates that medium-duty trucks fitted with the HPA system could increase fuel efficiency from 30 percent to 35 percent in city driving with a 20 percent cut in exhaust emissions.





OCTOBER 2002 — Vehicle Systems and Fuels

DOE and Ford Kick Off FutureTruck 2003



More than 150 representatives from government, industry, and academia gathered at the Ford Conference and Events Center in Dearborn, Michigan, earlier this month to kick off the FutureTruck 2003 competition. FutureTruck is the nation's premier college-level automotive engineering competition, sponsored by Ford Motor Company, the U.S. Department of Energy (DOE), and more than a dozen industry and government organizations. Argonne's Center for Transportation Research (CTR) manages the competition.



Engineering teams from 15 North American universities are working with government researchers and advanced technology engineers from the auto industry to create a cleaner, higher-mileage sport utility vehicle (SUV) for the future. Now in its second year of partnership with Ford, FutureTruck challenges teams to reengineer a Ford Explorer into a low-emissions vehicle with at least 25% higher fuel economy – without sacrificing the performance, utility, safety, and affordability that customers expect.

At the kick-off, FutureTruck teams participated in a series of technical workshops and a sponsor trade show and reception. They also received special training in hybrid control strategies, powertrain cooling, high-voltage safety, and engine calibration. Representatives from DOE, Ford, Delphi, ArvinMeritor, National Instruments, TI MathWorks, Ricardo, Visteon, Cisco, BP, and Natural Resources Canada participated in the event. Following the technical sessions in Dearborn, the university teams returned home to apply what they learned. After competing in the first year of FutureTruck at Ford's Arizona Proving Ground this past summer, teams will spend the next year optimizing their designs.

"Ford's commitment to dramatically increase SUV fuel economy for 2005 and beyond is a huge ongoing challenge, and we're looking for new, creative ideas that will pay off for our customers," says Bob Himes, Engineering Director for Ford Outfitters. "FutureTruck presents many opportunities for Ford Motor Company, and

the least being the cultivation of engineering technology and talent. Ford will be : to recruit the best and brightest engineers and easily assimilate them into our corporate citizenship culture after they finish school."

While each team faces the same challenge, each has chosen a different path to the solution. Teams employ a variety of advanced technologies including hybrid propulsion systems, fuel cells, lightweight materials, aerodynamic improvements, advanced energy storage devices, computer-based energy management, and alternative fuels such as biodiesel, ethanol, and hydrogen.

After working on the vehicles for a year, teams will return to Michigan in June 2003 for two weeks of intense competition at Ford's Michigan Proving Ground in Romulus and emissions testing lab in Allen Park. The event will culminate with an awards ceremony and a vehicle display at the Ford Centennial celebration at Ford World Headquarters in Dearborn.

Ford has supplied new Ford Explorers, engineering consulting for each team, and almost \$200,000 in seed money and cash prizes. DOE, through the CTR, provides competition management, staffing, team evaluation, and technical and logistical support. Other sponsors include the National Science Foundation, Cisco Systems, ArvinMeritor, National Instruments, Delphi, The Mathworks, BP, The Illinois Department of Commerce and Community Affairs, Natural Resources Canada, The Goodyear Tire and Rubber Company, and Ricardo and Dana.

Sponsor

U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy : Ford Motor Co.

Contact

[Kristen De La Rosa](#)

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Fluid for thought

Ford is creating a simple hydraulic hybrid propulsion system that will enable great efficiency and that will see production by 2009

by Jim McGraw

the Ford Motor Company is working with the US Environmental Protection Agency and industrial giant Eaton Corporation to develop an innovative hydraulic propulsion system as well as technology that may help the city delivery truck of the future to be up to 35 per cent more fuel efficient in stop-and-go driving than they are today.

Ford recently demonstrated the hydraulic system on a Lincoln Navigator luxury SUV (at a price of US\$54,000) at FutureTruck '02, a competition involving 15 North American university teams working to develop a practical means of integrating breakthrough technologies such as fuel cells and hybrid electric powertrains on SUVs of the future.

The Ford/EPA/Eaton hydraulic propulsion system, which was first demonstrated on a concept vehicle called Mighty Tonka, a gigantic work truck built by Ford Design and first shown at the North American International Auto Show in January, reduces fuel consumption and engine emissions (through reduced engine displacement) and increases vehicle performance with that same smaller engine. By adding a hydraulic boost to the drivetrain, HPA

allows the vehicle to accelerate much quicker than the same truck without it, while greatly decreasing fuel consumption and exhaust emissions.

Ford and EPA research indicates that the installation of a hydraulic propulsion system of this size and weight on a medium-duty American truck could increase fuel efficiency in stop-and-go driving by 30 to 35 per cent and cut exhaust emissions by at least 20 per cent. As around half of the energy of the fuel used is wasted as heat in braking, changing over to hydraulic propulsion and braking could recover that braking energy loss, which amounts to 12 to 20 per cent of a city delivery truck driving cycle.

The system, which uses conventional automatic transmission fluid (ATF) as its hydraulic medium, could best be used in commercial trucks and vans operating in stop-and-go duty cycles – such as UPS and FedEx delivery trucks and airport shuttle vans. These fleet vehicles would be ideal for hydraulic propulsion hybridization because their driving cycles would result in a rapid payback to the fleet operator in fuel savings, according to Charles Gray, the veteran researcher who heads the Environmental Protection Agency's lab operations in Ann Arbor, Michigan, USA.

The Lincoln Navigator research vehicle complete with the Ford/EPA launch system built into it, features a



Hydraulic hybrid concept was first shown in Tonka

"A hydraulic system on a medium-duty American truck could increase fuel efficiency in stop-and-go driving by 30 to 35 per cent"

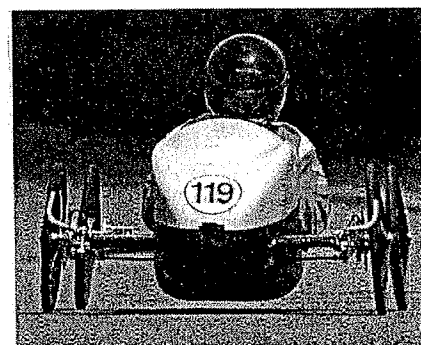
Good, clean fun

A hydraulic propulsion system not clean enough? Then try the Lotus 119, the least powerful single-seater competition car ever built at Hethel, with a brake horsepower of none, so it does quite well to have a maximum speed of around 104km/h (65mph). The car is designed to corner at up to 1.2g. Forward acceleration is possible, but varies according to the angle of incline from zero on the straight and level, to plus 1g at 90° facing downwards, and minus 1g traveling upwards. Emissions are exemplarily very low, confined to driver-emitted CO₂! The car is Lotus' first entry in the Speed Soapbox Challenge, a fun event held at the UK's Goodwood Festival of Speed. Entry to the event was by invitation only, and included cars from Ford, Jaguar, McLaren, Bentley, Prodrive, Cummins, Ilmor, Cooper Car Co., and MIRA.

The body of the open cockpit Lotus Type 119 is split into four main panels – upper nose cone, mainly non structural to push air around the driver; axle cover, again non-structural; the main structural elements such as the tub and the seat; and part of the rear deck which is molded into place. Bicycle wheels, more heavily spoked than usual to prepare for unfamiliar sideways loads are a compromise between large diameter for lower rolling resistance and smaller diameter for an inherently better structure, lateral load-wise. No springs as such are used; 'suspension' uprights allow camber and toe adjustment. Steering is direct via back-to-back universal joints, while brakes are bike-derived hydraulic discs.

So how did it fair? A gallant effort from the Hethel-based team. The Lotus Soapbox finished a commendable third, behind the second placed McLaren team, who were the fastest but docked five seconds due to a no-show at practice, leaving Rolls-Royce to take the glory.

Michael Scarlett



Lotus 119 may be clean, but it is not so practical

smaller-than-normal 4-liter, DOHC, four-valve V8 engine developing 290bhp at 6,100rpm, and a peak of 393Nm of torque at 4,250rpm. Designed for the 1,816kg Jaguar XJ8, the engine needs the torque boost from HPA at low engine speeds in order to competitively accelerate the 2,724kg Navigator from stationary.

The system demonstrated on the research Navigator provides up to 814Nm of torque up to 2,000rpm driveshaft speed with 25 per cent less displacement than a standard Navigator. Consider that the Navigator's standard engine is a 5.4-liter 32-valve V8 that develops 300bhp at 5,000rpm and a peak of 481Nm of torque at 2,750rpm, power and torque that are replaced by the HPA system on demand.

Gray, who holds the patents for most of the system, says the development of a hydraulic propulsion system at each front wheel of an experimental vehicle is still under development, with a small-displacement gasoline or diesel engine providing hydraulic power to wheel-mounted hydraulic motors (which would also act as braking media, generating and re-generating motive force with very large savings in engine emissions and fuel economy). Boasting three modes –

drive, neutral and brake – with full ABS, traction control and yaw control capability, such a system could change modes in 20ms, 10 times faster than current powertrains, seamless and transparent to the driver. However, Gray says that it would be more cost-effective with today's technology to use a single hydraulic motor and differential for each drive axle.

The round-trip energy conversion efficiency of such a system, according to Gray, a 30-year veteran chemical engineer and public health officer, compares favorably with conventional engine propulsion at about 20 per cent, electric vehicles with regenerative braking at 20 per cent, and the present hydraulic system at about 60 per cent with its high-efficiency pumps. He says that a patented pump design to be used in the next-generation research vehicle can achieve 80 per cent efficiency.

Gray says that, with improvements in pressure vessels, pumps, and electronic control modules and software, the system could be downsized for a 2.4L/100km (120mpg), 750cc mass-produced minicar for China or upsized for heavier truck and equipment powertrains. He said he expects to see such a production-ready system in 2009. ETI

SECTION 4

Television Tracking Report

FUTURETRUCK 2003 VNR HITS

06/11-06/19

1. WAGA-TV (FOX) Atlanta, GA
6/11/03 5:30 p.m. 204,300
2. WISC-TV (CBS) Madison, WI
6/11/03 6:00 p.m. 67,000
3. KSBY-TV (NBC) Santa Barbara, CA
6/11/03 5:00 p.m. 23,500
4. KSBY-TV (NBC) Santa Barbara, CA
6/11/03 6:30 p.m. 27,600
5. KSBY-TV (NBC) Santa Barbara, CA
6/11/03 11:00 p.m. 22,000
6. WBOY-TV (NBC) Clarksburg, WV
6/11/03 5:00 p.m. 2,700
7. KSBY-TV (NBC) Santa Barbara, CA
6/12/03 5:30 a.m. 8,900
8. KSBY-TV (NBC) Santa Barbara, CA
6/12/03 6:00 a.m. 9,200
9. KSBY-TV (NBC) Santa Barbara, CA
6/12/03 9:30 a.m. 11,600
10. WBOY-TV (NBC) Clarksburg, WV
6/12/03 5:30 a.m. 2,200
11. WBOY-TV (NBC) Clarksburg, WV
6/12/03 6:30 a.m. 20,100
12. WBOY-TV (NBC) Clarksburg, WV
6/12/03 12:00 p.m. 6,400

- | | | | |
|-----|---------------------------------|------------|--------|
| 13. | WISC-TV (CBS) Madison, WI | | |
| | 6/13/03 | 6:00 p.m. | 67,000 |
| 14. | WMTV-TV (NBC) Madison, WI | | |
| | 6/13/03 | 4:30 p.m. | 15,500 |
| 15. | WMTV-TV (NBC) Madison, WI | | |
| | 6/13/03 | 5:00 p.m. | 35,300 |
| 16. | WMTV-TV (NBC) Madison, WI | | |
| | 6/13/03 | 10:00 p.m. | 76,900 |
| 17. | KSBY-TV (NBC) Santa Barbara, CA | | |
| | 6/18/03 | 5:00 p.m. | 23,500 |
| 18. | KSBY-TV (NBC) Santa Barbara, CA | | |
| | 6/18/03 | 6:00 p.m. | 31,900 |
| 19. | KSBY-TV (NBC) Santa Barbara, CA | | |
| | 6/19/03 | 5:30 a.m. | 8,900 |

SECTION 5

Radio Coverage and List of Scheduled Radio Interviews

Future Truck Radio Interview Summary-Total Interviews 60

May 2003

<u>University</u>	<u>Location of Interviews</u>	<u>Number</u>
Michigan Tech-9	Lansing, MI	1-MI News Net. 84 Affiliates
	Tawas City, MI	1
	Ludington, MI	1
	Ishpeming, MI	1
	Marquette, MI	1
	Adrian, MI	1
	Port Huron, MI	1
	Hancock, MI	1
	Houghton, MI	1
Texas Tech-6	Dallas, TX	1-Texas News Net- 132 Affiliates
	Dallas, TX	1-Metro News Net- 70 Affiliates
	San Antonio, TX	1
	Lubbock, TX	2
	Tyler, TX	1
Univ. of Wisconsin-5	Madison, WI	1-Wisconsin News Net 50 Affiliates
	Janesville, WI	1
	Green Bay, WI	1
	La Crosse, WI	1
	Ripon, WI	1
Penn State Univ.-5	Harrisburg, PA	1-Penn News Net. 71 Affiliates
	State College, PA	2
	Johnstown, PA	2
Univ. Calf. Davis-5	Sacramento, CA	3
	Chico, CA	1
	Grass Valley, CA	1
Ohio State Univ.-4	Cleveland, OH	2
	Columbus, OH	1
	Youngstown, OH	1
University of Maryland-4	Baltimore, MD	1 Metro News Net- 11 Affiliates
	Silver Springs, MD	1 Metro News Net- 12 Affiliates
	Hagerstown, MD	1
	Fredrick, MD	1
West Virginia, Univ.-3	Morgantown, WV	1
	Wheeling, WV	1
	Waynesburg, PA	1
Univ. of Alberta-3	Edmonton, AB	3

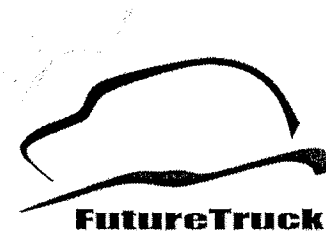
Univ. of Idaho-3	Spokane, WA	2
	Moscow, ID	1
Univ. of Tenn.-3	Nashville, TN	1-Tenn. News Net. 80 Affiliates
	Knoxville, TN	2
Cornell Univ.-3	Binghamton, N.Y.	1
	Ithaca, N.Y.	1
	Elmira, N.Y.	1
Calif. Polytech State Univ.-3	San Luis Obispo, CA	2
	Santa Maria, CA	1
Georgia Institute of Tech-2	Atlanta, GA	1-Atlanta News Bureau 22 Affiliates
	Atlanta, GA	1
Virginia Tech-2	Richmond, VA	1 Virginia News Net. 45 Affiliates
	Roanoke, VA	1

Post-Future Truck Interview Summary-Total Interviews-14
June 2003

<u>University</u>	<u>Location of Interview</u>	<u>Number</u>
University of Wisconsin-4	Madison, WI	1-Wisconsin News Net 50 Affiliates
	La Crosse, WI	1
	Janesville, WI	1
	Ripon, WI	1
Michigan Tech-5	Port Huron, MI	1
	Houghton, MI	1
	Marquette, MI	1
	Hancock, MI	1
	Ishpeming, MI	1
Univ. of Calif Davis-5	Sacramento, CA	3
	Chico, CA	1
	Grass Valley, CA	1

SECTION 6

Media Outreach Documents



MEDIA ADVISORY

STUDENTS BUILD NEXT GENERATION SUV

- What:** (insert name of university) is one of 15 North American universities competing in FutureTruck 2003, a unique program uniting academia, government and industry to address environmental and energy-related issues posed by the growing demand for SUVs. Now in its final year, the competition challenges students to re-engineer a conventional, full-size 2002 Ford Explorer with at least 25 per cent better fuel economy, while continuing to meet customer expectations for safety, performance, functionality and comfort. Meet (insert name of university)'s team, learn about its strategy, and see its "FutureTruck".
- Where:** (fill in exact event location, provide brief directions and rain location if required)
- When:** (fill in day of week, date and time of event)
- Who:** (fill in names of VIPs, and FutureTruck team leader or spokesperson)
- Visuals:** (describe what the photo opportunities will be and what the visuals are for television crews. For example, if the vehicle will be on display in the work area, describe what is being done and what reporters will see there.)
- Contacts:** (fill in the name and phone number of the team member that media can contact)



For Immediate Release
(date)

Contact: (University/Student Contact and phone)
Kimberly Hippler, Strat@comm, (202) 289-2001

(STUDENT NAME) HELPS BUILD NEXT GENERATION SUV

(UNIVERSITY CITY, State Abbrev.) – (Student Name from University name) is one of the participants gearing up for FutureTruck 2003, an annual competition that challenges 15 North American universities students to build a next generation sport utility vehicle (SUV) with 25 percent better fuel economy and reduced emissions. The annual competition, organized by Ford Motor Company and the U.S. Department of Energy's (DOE) Argonne National Laboratory, is inspiring more than 300 of the best and brightest engineering students with a real-world application of their skills benefiting both consumers and the environment.

The (University team name) has been working on their vehicle for the past several months, building on the lessons learned from last year's event. (Team member) says the team can't wait to put their new and improved "FutureTruck" on the road.

"This competition is giving us first-hand exposure to new technologies and the opportunity to help develop more energy-efficient, 'greener' automotive technologies. We're really excited to see what our SUV can do." [Add additional details about the vehicle's design, team's strategy, etc.]

The students, with guidance from faculty and technical help from DOE and Ford, are attempting to reengineer a 2002 Ford Explorer into a lower-emissions vehicle with at least 25 percent higher fuel economy – without sacrificing performance, utility, safety and affordability. To meet these challenges, the students are employing cutting-edge automotive technologies, including lightweight materials, fuel cells and other advanced propulsion systems, and alternative fuels, such as ethanol, biodiesel and hydrogen.

FutureTruck is a joint government-industry project created by DOE to explore alternative propulsion systems and fuels through student competition. The program's goal is to help raise the environmental performance of the popular SUV segment while keeping the amenities and features that have made it so popular. FutureTruck 2003 is the program's fourth and final year.

Ford is providing the 2002 Explorer SUVs that the teams are modifying, more than \$400,000 in seed prize money, engineering consulting for each team, competition facilities, and operational support. DOE, through its Argonne National Laboratory facility, is providing competition management, team evaluation, and technical and logistical support.

FutureTruck 2003 is scheduled for June 2 – 12, 2003. Teams will compete in more than a dozen static and dynamic evaluations in Romeo and Allen Park, Michigan, including tests for acceleration and on-road fuel economy, off-road performance and emissions testing. The competition will culminate with awards ceremonies, a vehicle display and oral presentations at Ford World Headquarters in Dearborn, Michigan as part of Ford's centennial anniversary celebrations.

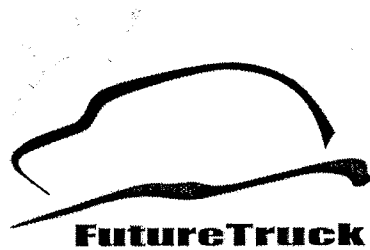
The 15 competing universities for FutureTruck 2002 include: California Polytechnic State University – San Louis Obispo; Cornell University; Georgia Institute of Technology; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Additional information about the FutureTruck 2003 program is available on the Web at <http://www.futuretruck.org>.

###

INTERVIEW OPPORTUNITY

FutureTruck Summit Converges in Austin to Improve SUV Fuel Economy/Clean Air



WHAT:

Teams of engineering students from 15 North American universities are developing technologies for the SUV of tomorrow. Students are gathering in Austin for the FutureTruck Summit, hosted by National Instruments, which includes two days of intense, advanced systems training. The FutureTruck competition challenges teams to reengineer a Ford Explorer to achieve increased fuel economy and lower emissions.

WHO:

Interviews are available with members of the FutureTruck teams (including Texas Tech), FutureTruck, Cisco and National Instruments representatives.

For further information please contact:

Kelly Hysan
FutureTruck
202-289-2001

Kathleen Fisher
National Instruments
512-683-5731

WHEN:

Interviews will be scheduled for January 9, 2002.
Radio read copy also available upon request.

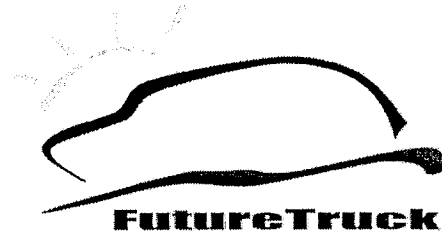
BACKGROUND INFORMATION:

FutureTruck is a unique four-year program that brings together the resources of industry, government, and academia in a cooperative effort to address important environmental and energy-related issues posed by the growing demand for sport utility vehicles (SUVs).

National Instruments has donated software and hardware to FutureTruck teams interested in implementing the concepts of virtual instrumentation. Headquartered in Austin, NI leverages commercial technologies to deliver customer-defined measurement and automation solutions to engineers and scientists worldwide.

*Additional information about the
FutureTruck 2003 program is available
at: www.futuretruck.org*

RADIO "READ" COPY



STUDENTS DESIGNING SUVs OF TOMORROW FOR BETTER FUEL ECONOMY/CLEANER AIR

FutureTruck Arrives in Texas

A new year is underway and the concern for our nation's dependency on foreign oil and the case for cleaner air continue to top the list of major issues for our country.

In an effort to help find solutions to these matters, teams of students from 15 top North American university engineering departments, including Texas Tech, are gathering in Texas today to focus on developing advance technologies for the SUV of tomorrow.

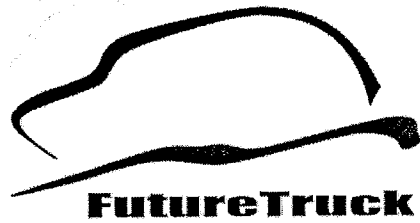
The FutureTruck competition challenges teams to re-engineer a mid-size Ford Explorer SUV to improve fuel economy and lower emissions while keeping the vehicle's utility and customer appeal. The students have spent more than a year implementing these cutting-edge automotive systems and have come together for a technology summit, hosted by National Instruments, to share possible solutions.

Ford Motor Company and the U.S. Department of Energy are headline sponsors for the 2003 competition and National Instruments has donated software and hardware to teams that implement concepts of virtual instrumentation.

Additional information about FutureTruck is available at www.futuretruck.org

Interviews with FutureTruck representatives available January 9, 2003 by calling Kelly Hysan at 202-289-2001 and with National Instruments representatives by calling Kathleen Fisher at 512-683-5731.

###



For Immediate Release
October 15, 2002

Contact: Kimberly Hippler, Strat@comm, (202) 289-2001
Dr. Chris Pascual, Cal Poly University (805) 756-1306

FIRST LADY OF CALIFORNIA VISITS CAL POLY STUDENTS WHO DEVELOPED HIGH-MILEAGE, LOW EMISSIONS "FUTURETRUCK"

(SAN LOUIS OBISPO, Calif.) – During a recent tour at California Polytechnic State University, the First Lady of California, Sharon Davis, pit-stopped to visit with engineering students participating in the 2003 FutureTruck competition. The Cal Poly student team is among 15 top North American university engineering schools competing to reengineer a sport utility vehicle (SUV) to improve gas mileage while reducing emissions.

The FutureTruck challenge is to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while retaining the vehicle's utility and customer appeal. The 15 competing teams employ many novel ideas and approaches that provide both near-term and long-term solutions to increasing the efficiency and decreasing the overall environmental impact of light-duty vehicles.

"It is amazing the technological advancements this group of students have made," said California's First Lady, Sharon Davis. "Challenging the minds of the youth through exercises like the FutureTruck competition is what will help to find solutions to reducing fuel economy and cutting greenhouse gas emissions."

FutureTruck is a joint government-industry project created by DOE to explore alternative propulsion systems and fuels through student competition. The program's goal is to help raise the environmental performance of the popular SUV segment while keeping the amenities and features that have made it so popular. Ford has taken over the program from General Motors Corp. as the automotive manufacturer sponsor, joining more than ten other government and industry sponsors who are supporting the final year of the four-year program.

"FutureTruck provides first-hand exposure to real-world engineering experience, and the opportunity to help develop more energy-efficient, 'greener' automotive technologies. We are excited to participate in the program and very pleased the state of California is interested in our project," said Jon-Michael Kasten, Cal Poly team leader.

- more -



FutureTruck – Page 2

The FutureTruck finals are scheduled for June 2-10, 2003, and the final awards ceremony will be held in conjunction with Ford's Centennial Celebration. Judging events will be held at Ford's Proving Ground in Romeo, MI and at Ford testing facilities in Dearborn, MI.

The 15 competing universities for FutureTruck 2002 include: California Polytechnic State University – San Louis Obispo; Cornell University; Georgia Institute of Technology; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

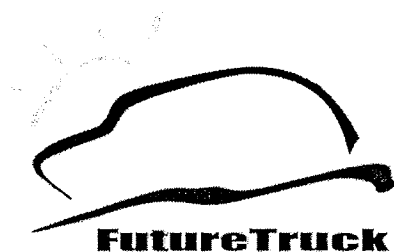
Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

###

** High-resolution photos available*

INTERVIEW OPPORTUNITY

Michigan Tech Students Designing SUVs of Tomorrow for Better Fuel Economy and Cleaner Air FutureTruck Competition Touring Through Michigan



WHAT:

The recent buzz has been about creating a hydrogen-driven future and the types of near-term automotive technologies that have the potential to reduce the Nation's dependency on foreign oil and improve air quality.

In an effort to help find solutions to these matters, Michigan Tech University is touring throughout the state showcasing its advance-technology SUV of tomorrow. The Michigan Tech vehicle took second place in the 2002 FutureTruck competition using a hybrid configuration with reformulated gasoline and is aiming to claim first place in this year's program.

WHO:

Interviews are available with members of the Michigan Tech FutureTruck team, and FutureTruck Representatives.

WHEN:

Interviews will be scheduled for March 7, 2003.
Radio read copy also available upon request.

BACKGROUND INFORMATION:

FutureTruck is a unique four-year program that brings together the resources of industry, government, and academia in a cooperative effort to address important environmental and energy-related issues posed by the growing demand for sport utility vehicles (SUVs).

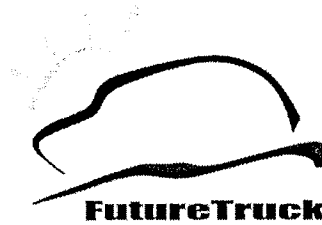
The FutureTruck competition challenges teams to reengineer a mid-size Ford Explorer SUV to improve fuel economy and lower emissions while retaining the vehicle's utility and customer appeal.

For further information please contact:

Kelly Hysan
FutureTruck
202-289-2001

*Additional information about the
FutureTruck 2003 program is available
at: www.futuretruck.org*

RADIO "READ" COPY



MICHIGAN TECH STUDENTS DESIGNING SUVs OF TOMORROW FOR BETTER FUEL ECONOMY AND CLEANER AIR FutureTruck Competition Touring Through Michigan

The recent buzz has been about creating a hydrogen-driven future and the types of near-term automotive technologies that have the potential to reduce the Nation's dependency on foreign oil and improve air quality.

In an effort to help find solutions to these matters, Michigan Tech University is touring throughout the state showcasing its advance-technology SUV of tomorrow. The Michigan Tech vehicle took second place in the 2002 FutureTruck competition using a hybrid configuration with reformulated gasoline and is aiming to claim first place in this year's program.

The FutureTruck competition challenges students from 15 top North American university engineering departments to re-engineer a mid-size Ford Explorer to improve fuel economy and lower emissions while keeping the vehicle's utility and customer appeal. The students have spent more than a year implementing these cutting-edge automotive systems.

Ford Motor Company and the U.S. Department of Energy, are the headline sponsors of the FutureTruck competition, joining more than a dozen other government and industry organizations.

Additional information about FutureTruck is available at www.futuretruck.org

Interviews with FutureTruck representatives available March 7, 2003 by calling Kelly Hysan at 202-289-2001.

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MEDIA INVITATION
Space is Limited – Please RSVP

**OPPORTUNITY TO DRIVE ADVANCE TECHNOLOGY SUVS OF TOMORROW
AS PART OF FUTURETRUCK NATIONAL COMPETITION**

What: The recent buzz in the news is about creating a hydrogen driven future and the types of near-term technologies that have the potential to reduce the Nation's dependency on foreign oil. This is your opportunity to experience advanced vehicle development in the working stage. The FutureTruck student teams are in the second year of implementing cutting-edge automotive technologies that provide near-term and long-term solutions to increase the efficiency and reduce the overall impact of SUVs. Various hybrid electric vehicle (HEV) designs are employed in combination with alternative fuels such as ethanol, biodiesel and hydrogen, the use of advanced battery types, various control strategies, lightweight materials, exhaust after-treatment systems and other technologies.

FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size Ford Explorer SUV to improve fuel economy while retaining the vehicle's utility and customer appeal. The 2002 first and second place teams, The University of Wisconsin-Madison (UW) and Michigan Tech (MTU) respectively, will be available for test drives. Media will also have the opportunity for a comparison drive with a base Ford Explorer.

The First Place vehicle from UW features a parallel HEV configuration with an engine fueled by biodiesel. In conjunction, the vehicle uses nickel metal hydride batteries to supply power to an electric motor and captures braking energy when the vehicle is slowing down. The combination of technologies enabled the team to increase the Explorer's over-the-road fuel economy by 45 percent without sacrificing its performance or utility.

The second place vehicle, from MTU, is a through-the-road parallel HEV configuration in which the engine drives the front wheels and an electric motor drives the rear wheels. The batteries are sealed lead acid and the engine uses reformulated gasoline and a three-way catalyst for emissions improvement.

Ford Motor Company and the U.S. Department of Energy (DOE), through its Argonne National Laboratory, are the headline sponsors for the 2003 FutureTruck competition. More than 16 other government and industry sponsors also support the program.

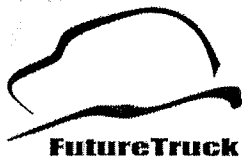
When: **Friday, March 7, 2003**
8:30 a.m. registration and briefing
9:00 a.m. ride and drives begin

Where: **The New Detroit Science Center**
Corner of Warren Ave. & John R (Detroit)
Phone: 313-577-8400

Competing FutureTruck 2003 Universities: California Polytechnic State University San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

** If you are unable to attend the ride and drive, please stop by and visit the teams and vehicles at the SAE World Congress booth # 3323.*

** Additional information about FutureTruck is available on the Web at <http://www.futuretruck.org>.*



Media Contact: Kimberly Hippler
Cell Phone: 202-669-0737

MEDIA INVITATION

MICHIGAN TECH STUDENTS DESIGNING SUVs OF TOMORROW FOR BETTER FUEL ECONOMY AND CLEANER AIR FutureTruck Competition Touring Through Michigan

What: The recent buzz in the news is about creating a hydrogen driven future and the types of near-term technologies that have the potential to reduce the Nation's dependency on foreign oil. This is your opportunity to experience advanced vehicle development in the working stage. The FutureTruck student teams are in the second year of implementing cutting-edge automotive technologies that provide near-term and long-term solutions to increase the efficiency and reduce the overall impact of SUVs. Various hybrid electric vehicle (HEV) designs are employed in combination with alternative fuels such as ethanol, biodiesel and hydrogen, the use of advanced battery types, various control strategies, lightweight materials, exhaust after-treatment systems and other technologies.

FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size Ford Explorer SUV to improve fuel economy while retaining the vehicle's utility and customer appeal. The 2002 first and second place teams, The University of Wisconsin-Madison (UW) and Michigan Tech (MTU) respectively, will be available for test drives. Media will also have the opportunity for a comparison drive with a base Ford Explorer.

Ford Motor Company and the U.S. Department of Energy (DOE), through its Argonne National Laboratory, are the headline sponsors for the 2003 FutureTruck competition. More than 16 other government and industry sponsors also support the program.

When: **Friday, March 7, 2003**
8:30 a.m. registration and briefing
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Where: **The New Detroit Science Center**
Corner of Warren Ave. & John R (Detroit)
Phone: 313-577-8400

Competing FutureTruck 2003 Universities: California Polytechnic State University San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

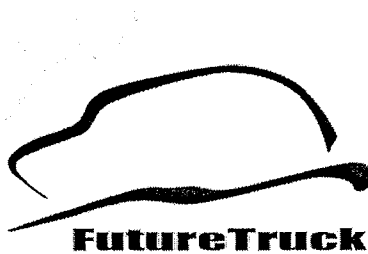
B-roll of competition available, includes:

- Michigan Tech team testing their Ford Explorers in acceleration, off-road performance and trailer towing testing applications
- Sound bites from team members

Photo Opp:

- Two FutureTruck competition vehicles in motion

** Additional information about FutureTruck is available on the Web at <http://www.futuretruck.org>.*



For Immediate Release

Contact: Kimberly Hippler
(202) 289-2001
cell: (202) 669-0737

**STUDENTS PREDICT IMPROVED SUV
FUEL ECONOMY/ EMISSIONS REDUCTION
FutureTruck Nearing Final Stage of Competition**

April 1, 2003 - Los Angeles, Calif. - Less than two months remain before the finals of the 2003 FutureTruck competition and teams of students are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in SUVs and also are certain they can significantly reduce overall emissions.

FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular. The competing teams employ many novel ideas and approaches that provide both near-term and long-term solutions to increasing efficiency and decreasing the overall environmental impact of light-duty vehicles.

"The experimental vehicles that are developed in the FutureTruck competition give the engineering students the opportunity to explore various automotive technologies and use creative applications to reach the program's technological goals without being restricted by development, production or cost processes typically associated with mass vehicle production," said Al Kammerer, Executive Director, SUV and Body on Frame, Ford Motor Company. "These efforts reflect Ford's own goals to develop advanced technologies to continuously improve fuel economy and emissions in our vehicles."

By integrating hybrid electric vehicle (HEV) design strategies, lightweight materials, hydrogen internal combustion engines and applying various fuel applications, the teams are forecasting their SUVs will surpass the competition goals for 2003.

Last year, seven out of ten teams achieved better overall over-the-road fuel economy compared to the base 2002 Ford Explorer. The University of Wisconsin at Madison achieved a greenhouse gas reduction greater than 50% and increased the Explorer's over-the-road fuel economy by 45 percent. The team re-engineered components and used advanced materials such as an aluminum/steel hybrid frame and a titanium exhaust system.

-more-



FutureTruck – page 2

“More than 50 percent of all new vehicles sold are SUVs and light duty trucks, which have historically been less fuel-efficient than passenger cars,” said Bob Larsen Director of the Center for Transportation Research at Argonne National Laboratory. “By increasing the fuel efficiency of vehicles, including SUVs, it will help decrease our dependence on foreign oil and help boost our economy.”

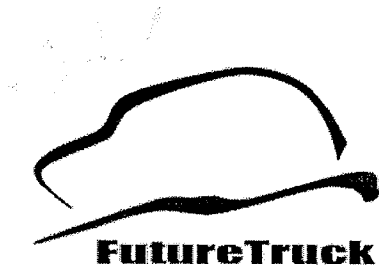
The final competition involves more than ten days of intense testing, such as acceleration and off-road performance events to determine which team will win the challenge. Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced at a press conference June 13th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Luis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

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SATELLITE FEED STATION ADVISORY

STUDENTS UNVEIL SUVs OF TOMORROW – FUTURETRUCK IN FINAL STAGE OF NATIONAL COMPETITION

What: School may be out for summer, but teams of students from 15 top North American university engineering departments are hard at work competing to win awards for their advanced technology SUV designs. The student teams have spent two years implementing cutting-edge automotive technologies, including lightweight materials, other advanced propulsion systems and alternative fuels such as ethanol and hydrogen, to their vehicles in order to compete.

The students are in the final stage of the FutureTruck competition, which challenges teams of students to re-engineer a mid-size 2002 Ford Explorer SUV to improve fuel economy while retaining the vehicle's utility and customer appeal. Students are professionally judged in a series of applications including acceleration, off-road performance, trailer towing and on-road fuel economy. The winning university team will be announced Thursday, June 12, 2003.

When: Wednesday, June 11, 2003
2:00-2:30 p.m. EDT
Satellite feed with B-roll and sound bites from the FutureTruck competition in Michigan

Coordinates: Telstar 6 (c-band), transponder 19, downlink frequency 4080 (vertical)

Competing FutureTruck 2003 Universities: California Polytechnic State University San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of California, Davis; University of Idaho; University of Alberta; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Package Includes:

- Teams testing their Ford Explorers in acceleration, off-road performance and trailer towing testing applications;
- Individual University team sound bites for localized story;
- Sound bites from title sponsors Ford Motor Company and the U.S. Department of Energy; and
- FutureTruck competition overview.

Additional information about the FutureTruck 2003 program is available on the Web at <http://www.futuretruck.org>.



Media Contact: Kelly Hysan
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NATIONAL FUTURETRUCK COMPETITION RESULTS

Team Interview Opportunity and Vehicle Display at Ford Centennial Grounds

What: Last night the University of Wisconsin took top honors at this year's FutureTruck challenge by re-engineering a base Ford Explorer to achieve a 35 percent increase in on-road fuel economy over the stock Explorer while simultaneously reducing greenhouse gas emissions by 39 percent. The winning vehicle, which implemented lightweight components such as aluminum, ran on a mixture of bio-diesel fuel. The competition attracted 15 teams from top universities across North America.

The FutureTruck competition challenges teams of students to re-engineer a mid-size 2002 Ford Explorer SUV to improve fuel economy while retaining the vehicle's utility and customer appeal. Students are professionally judged in a series of applications including acceleration, off-road performance, trailer towing and on-road fuel economy.

Additional Results:

2nd Place: University of California, Davis

3rd Place: **Michigan Tech University**

Ford Motor Company and the U.S. Department of Energy are the title sponsors for the 2003 competition, which is part of the 100th Anniversary of Ford Motor Company taking place in Dearborn, Michigan at Ford headquarters.

When: Friday, June 13, 2003
All 15 SUVs and team members will be on hand at the FutureTruck tent from 10:00 a.m. – 5:00 p.m.

Where: FutureTruck tent – spot "8A" at Ford Centennial Grounds at Ford World Headquarters.

FutureTruck Exhibit:

- See these 15 unique vehicles and explore the novel approaches and innovative technologies employed to increase the efficiency and reduce the overall environmental impact of SUVs.
- Features a multimedia exhibit and vehicle display celebrating the nation's premier automotive engineering competition.

Competing FutureTruck 2003 Universities: California Polytechnic State University San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of California, Davis; University of Idaho; University of Alberta; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

B-roll from the competition and the Thursday night awards ceremony is available upon request.

Additional information about the FutureTruck 2003 program is available on the Web at <http://www.futuretruck.org>.



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Kimberly Hippler
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SATELLITE FEED ADVISORY

UNIVERSITY OF WISCONSIN TEAM WINS NATIONAL FUTURETRUCK COMPETITION

What: The University of Wisconsin took top honors at this year's FutureTruck challenge by re-engineering a base Ford Explorer to achieve a 35 percent increase in on-road fuel economy over the stock Explorer while simultaneously reducing greenhouse gas emissions by 39 percent. The winning vehicle, which implemented lightweight components such as aluminum, ran on a mixture of bio-diesel fuel. The competition attracted 15 teams from top universities across North America.

The FutureTruck competition challenges teams of students to re-engineer a mid-size 2002 Ford Explorer SUV to improve fuel economy while retaining the vehicle's utility and customer appeal. Students are professionally judged in a series of applications including acceleration, off-road performance, trailer towing and on-road fuel economy. Unlike mass vehicle production, the students are not restrained in development, production or cost processes and therefore are able to use creative applications to reach the program's technological goals. As a result of the students efforts, manufacturers will be better able to bring these applications to the market sooner.

Ford Motor Company and the U.S. Department of Energy are the title sponsors for the 2003 competition, which is part of the 100th Anniversary of Ford Motor Company taking place in Dearborn, Michigan at Ford headquarters. Ford will continue its commitment to FutureTruck thru 2004.

When: Friday, June 13, 2003
2:00-2:30 p.m. EDT
Satellite feed with B-roll and sound bites from the FutureTruck competition and awards ceremony in Michigan

Coordinates: Telstar 6 (c-band), transponder 19, downlink frequency 4080 (vertical)

Competing FutureTruck 2003 Universities: California Polytechnic State University San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of California, Davis; University of Idaho; University of Alberta; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Package Includes:

- Teams testing their Ford Explorer in acceleration, off-road performance and trailer towing testing applications
- Winning University team sound bites and footage from awards ceremony
- Sound bites from title sponsors Ford Motor Company and the U.S. Department of Energy; and
- FutureTruck competition overview

** A full b-roll package of the competition is available upon request.*

*Additional information about the FutureTruck 2003 program is available on the Web at
<http://www.futuretruck.org>.*



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SATELLITE FEED ADVISORY

NATIONAL FUTURETRUCK COMPETITION RESULTS

What: The University of Wisconsin took top honors at this year's FutureTruck challenge by re-engineering a base Ford Explorer to achieve a 35 percent increase in on-road fuel economy over the stock Explorer while simultaneously reducing greenhouse gas emissions by 39 percent. The winning vehicle, which implemented lightweight components such as aluminum, ran on a mixture of bio-diesel fuel. The competition attracted 15 teams from top universities across North America.

The FutureTruck competition challenges teams of students to re-engineer a mid-size 2002 Ford Explorer SUV to improve fuel economy while retaining the vehicle's utility and customer appeal. Students are professionally judged in a series of applications including acceleration, off-road performance, trailer towing and on-road fuel economy.

Additional Results:

2 nd Place: University of California, Davis	5 th Place: Penn State University
3 rd Place: Michigan Tech University	6 th Place: Cornell University
4 th Place: Georgia Tech	
Lowest Greenhouse Gas Emissions: West Virginia University	
Best Appearance Vehicle: University of Maryland	
Spirit of the Challenge Award: Virginia Tech	

Ford Motor Company and the U.S. Department of Energy are the title sponsors for the 2003 competition, which is part of the 100th Anniversary of Ford Motor Company taking place in Dearborn, Michigan at Ford headquarters.

When: Friday, June 13, 2003
2:00-2:30 p.m. EDT
Satellite feed with B-roll and sound bites from the FutureTruck competition and awards ceremony in Michigan

Coordinates: Telstar 6 (c-band), transponder 19, downlink frequency 4080 (vertical)

Competing FutureTruck 2003 Universities: California Polytechnic State University San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of California, Davis; University of Idaho; University of Alberta; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Package Includes:

- 1st-3rd place teams testing their Ford Explorer in acceleration, off-road performance and trailer towing testing
- Winning University team sound bites and footage from awards ceremony
- Sound bites from title sponsors Ford Motor Company and the U.S. Department of Energy; and
- FutureTruck competition overview

Additional information about the FutureTruck 2003 program is available on the Web at <http://www.futuretruck.org>.



For Immediate Release

Contacts: Kimberly Hippler, Strat@comm (202) 669-0737
Valerie Rosnik, Ford Public Affairs (313) 206-2058

UNIVERSITY OF WISCONSIN STUDENTS WIN 2003 FUTURETRUCK COMPETITION

Engineering Students Re-design SUV, Improving Fuel Economy and Lowering Emissions

DEARBORN, Mich. – June 13, 2003 – A team of students from the University of Wisconsin took top honors at this year's FutureTruck challenge by re-engineering a base 2002 Ford Explorer to achieve a 35 percent increase in on-road fuel economy while simultaneously reducing greenhouse gas emissions by 39 percent. The winning vehicle, which implemented lightweight components such as aluminum, ran on a mixture of bio-diesel fuel.

The FutureTruck competition attracted 15 engineering teams from universities across North America. The second place vehicle design, re-engineered by students at University of California - Davis was a parallel plug-in hybrid system and was fueled by ethanol.

The goal of the annual FutureTruck challenge is to lower emissions and achieve a 25 percent increase in over-the-road fuel economy of SUVs while maintaining the safety, performance and comfort levels that consumers demand. The U.S. Department of Energy and Ford Motor Company were the title sponsors for this year's competition, which took place at Ford's Michigan Proving Grounds in Romeo - just in time for the company's 100th anniversary celebration.

"The FutureTruck program is just one way the government, industry, and academic worlds are working together to find approaches and solutions to improving vehicle fuel economy," said Department of Energy Secretary Spencer Abraham. "Better fuel economy for all vehicles – including popular SUVs – will help reduce America's petroleum needs, decreasing dependence on foreign oil and boosting our economy."

The competing teams employ creative approaches to achieve both short-and long-term solutions to improving the fuel efficiency and environmental impact of SUVs.

"This is not only a victory for the University of Wisconsin, but a promising contribution to the future of light-duty vehicle design," said Glenn Bower, the teams facility advisor. "We were pleased to be a part of the FutureTruck challenge once again."

- more -



FutureTruck – page 2

FutureTruck competition began on June 2 at Ford's Michigan Proving Ground in Romeo and the Allen Park Test Lab in Allen Park, Mich. Teams participated in ten days of intense vehicle testing that measured criteria such as acceleration and off-road performance.

"This competition fosters tomorrow's engineers by encouraging them to explore clean, fuel-efficient automotive technologies," said Al Kammerer, Ford's executive director of sport utility vehicles and body on frame. "FutureTruck's goals parallel Ford's research on advanced propulsion vehicles and its attempts to make SUVs more fuel efficient while maintaining consumer acceptability."

Other teams participating in the 2003 challenge included: California Polytechnic State University, San Luis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of Idaho; University of Maryland; University of Tennessee; Virginia Tech; and West Virginia University.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. Other major sponsors included the National Science Foundation; Cisco Systems; ArvinMeritor; Delphi; National Instruments; Natural Resources Canada; The MathWorks; The Aluminum Association; Illinois Department of Commerce and Economic Opportunity; Renewable Fuels Association; Goodyear Tire & Rubber Company; Ricardo Inc.; BP; and Dana Corporation.

Additional information about FutureTruck is available on the Web at <http://www.futuretruck.org>.

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SECTION 6.1

Media Outreach Documents: Team pre-event releases



For Immediate Release

Contact: Kimberly Hippler
(202) 289-2001
cell: (202) 669-0737

**UNIVERSITY OF ALBERTA STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of University of Alberta students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The Alberta SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions this year. Alberta's approach to hybrid design was to couple an efficient, yet sufficiently powerful, engine with a regenerative electric motor drive. The SUV also uses Lithium Ion batteries and ultra-capacitors in the hybrid design.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Dr. David Checkel, Team Advisor, for the University of Alberta team. "The students have worked really hard all year, and we are ready to take home first place."

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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FutureTruck – page 2

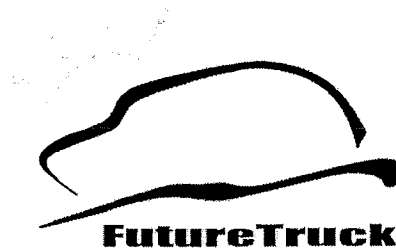
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

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For Immediate Release

Contact: Kimberly Hippler
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**CALIFORNIA POLYTECHNIC STATE UNIVERSITY STUDENTS
RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of California Polytechnic State University students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The team SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Dr. Chris Pascual, Team Advisor, for the Cal Poly team. "The students have worked really hard all year, and we are excited about our vehicle design for this year's competition."

Cal Poly's design strategy attempts to maximize the efficiency of vehicle components and reduce the inefficiencies associated with the conversion of energy from fuel to electricity. The SUV features a 1.9liter, B35 engine and a modified electric-motor enables the team to increase the vehicle's power by 75% while attempting to achieve Ultra Low Emissions Vehicle (ULEV) emission standards.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

-more-



FutureTruck – page 2

Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

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For Immediate Release

Contact: Kimberly Hippler
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cell: (202) 669-0737

**CORNELL UNIVERSITY STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of Cornell University students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The Cornell SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students took fourth place in the 2002 competition and are striving to exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall pollutant and greenhouse gas emissions.

“This competition presents students with a considerable challenge. The students are confronted with rather nebulous objectives, and must define the design requirements, then generate and follow an accelerated engineering, development, and implementation schedule,” said John Callister, faculty advisor for the Cornell team. “The students have worked really hard all year, and we are hoping that a little luck comes our way and we get a strong finish.”

Cornell’s charge-sustaining hybrid design uses a small gasoline engine with high power density and a powerful electric motor. The motor provides low-end torque and power assist to allow the engine to run at its most efficient operating range for steady-state needs. An advanced control system distributes a driver torque demand (measured by how far the driver has depressed the gas pedal) to the motor and engine with a goal of increasing the total fuel economy and maintaining battery charge.

“Training young engineers to solve complex automotive engineering challenges is what this competition is all about,” said Al Kammerer, Ford’s Executive Director of Sport Utility Vehicles and Body on Frame. “FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century.”

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FutureTruck – page 2

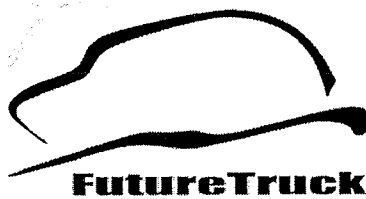
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

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For Immediate Release

Contact: Kimberly Hippler
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**GEORGIA TECH STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of Georgia Institute of Technology students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The Tech SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and are confident they'll exceed the 2003 goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said professor Jerome Meisel, Team Advisor, for the Georgia Tech team. "The students have worked really hard all year, and we are ready to take home first place."

The Georgia Tech truck incorporates a split-parallel design in which the motor is not directly coupled to the engine, as in a normal parallel hybrid. Instead, the motor drives the front wheels while the engine supplements that torque by driving the rear wheels. The increase in fuel efficiency will come from an optimized blending of the torque delivered by the electric motor and the engine. A new computer algorithm is used to implement this torque blending.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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FutureTruck – page 2

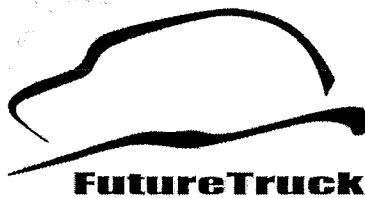
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

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For Immediate Release

Contact: Kimberly Hippler
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**UNIVERSITY OF MARYLAND STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of University of Maryland students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The school's SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions this year.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Dr. David Holloway, Team Advisor, for the University of Maryland team. "The students have worked really hard all year, and we are ready to take home first place."

The University of Maryland SUV is a hybrid electric system composed of a 3.0-liter six-cylinder engine and an electric motor coupled between the engine and the stock transmission. The engine uses an ethanol mixture (E-85) enabling low emissions, and nickel metal hydride batteries provide power for the electric motor. The batteries are recharged through regenerative braking.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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FutureTruck – page 2

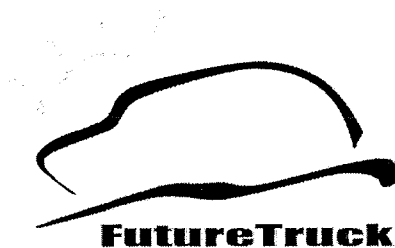
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

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For Immediate Release

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**MICHIGAN TECH UNIVERSITY STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of Michigan Tech University students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The Tech SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students took second place in the 2002 competition and are confident they'll once again exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions.

“This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results,” said John Beard, Team Advisor, for the Michigan Tech team. “The students have worked really hard all year, and we are ready to take home first place.”

The Michigan Tech truck incorporates a split-parallel design in which the motor is not directly coupled to the engine, as in a normal parallel hybrid. Instead, the engine drives the front wheels while the motor supplements that power by driving the rear wheels. Aggressive weight reduction methods are used to further increase the overall efficiency of the vehicle as well.

“Training young engineers to solve complex automotive engineering challenges is what this competition is all about,” said Al Kammerer, Ford’s Executive Director of Sport Utility Vehicles and Body on Frame. “FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century.”

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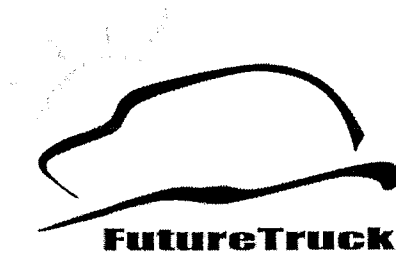
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

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**OHIO STATE UNIVERSITY STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of Ohio State University students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The Ohio State SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions this year.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Frank Ohlemacher, Team Advisor, for the Ohio State team. "The students have worked really hard all year, and we are ready to take home first place."

Ohio State's team implemented a parallel hybrid strategy, using an advanced compression-ignition direct-injection (CIDI) engine for improved efficiency and emissions. The engine uses bio-diesel fuel to significantly reduce the greenhouse gas impact of the vehicle and a user-transparent control strategy was designed to optimize the powertrain performance, reduce fuel consumption and emissions, and manage the battery state-of-charge.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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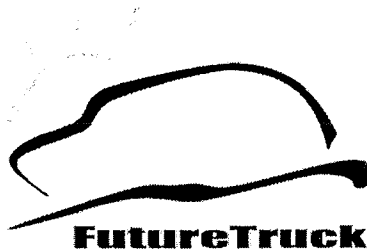
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

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**PENN STATE UNIVERSITY STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of Pennsylvania State University students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The Penn SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students took fifth place in the 2002 competition and received special awards in the areas of telematics and emissions technology. The team is confident they'll once again exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Daniel Haworth, Team Advisor, for the Penn State team. "The students have worked really hard all year, and we are ready to take home first place this year."

The Penn State FutureTruck is a parallel hybrid electric vehicle, primarily powered by a highly efficient 2.5-L Detroit Diesel engine. A 5-speed manual transmission transfers power from the engine to the wheels for maximum efficiency. An electric motor is coupled to the driveshaft just after the transmission, giving the driver extra power during heavy acceleration and recapturing energy through regenerative braking.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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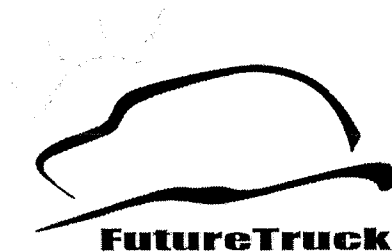
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

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**UNIVERSITY OF TENNESSEE STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of University of Tennessee students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The school's SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and took high honors in dynamic handling and telematics. The team is confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions this year.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Dr. David Irick, Team Advisor, for the University of Tennessee team. "The students have worked really hard all year, and we look forward to the rigor of the competition."

The University of Tennessee's FutureTruck employs a pre-transmission parallel, "heavy" hybrid powertrain. This design incorporates a smaller displacement engine and a large electric motor. As a result, the design allows the engine to stop running when the vehicle is stopped, launch and restart using the electric motor, and operate as a zero-emission vehicle (ZEV) during some phases of driving.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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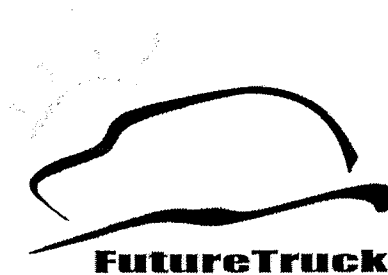
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Louis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

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**TEXAS TECH UNIVERSITY STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of Texas Tech University students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The Tech SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions. This year, Texas Tech chose to implement a hydrogen internal combustion engine parallel hybrid powertrain.

"This competition presents students with real-world design and engineering exercises and challenges them to work as a team to produce real-world results," said Dr. Tim Maxwell, Team Advisor, for the Texas Tech team. "Our students had to work very hard to prepare a new Explorer powered by a hydrogen fueled engine. Development of the hydrogen engine has been challenging, but it is running well now and we expect to be very competitive this year."

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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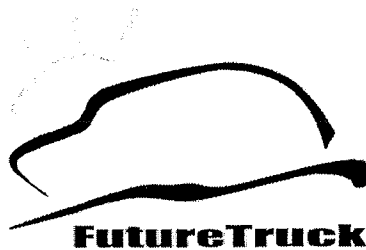
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

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**UNIVERSITY OF IDAHO STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of University of Idaho students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The school's SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Frank Albrecht, Team Advisor, for the University of Idaho team. "The students have worked really hard all year, and we are ready to take home first place."

The University of Idaho students designed the SUV system with special consideration given to weight, reliability, efficiency, emissions, and ease of installation. They selected a soft parallel design that implements a modified engine along with an electronic motor to assist the vehicle under hard acceleration. This design has benefits for keeping the vehicle light while providing assistance to the engine.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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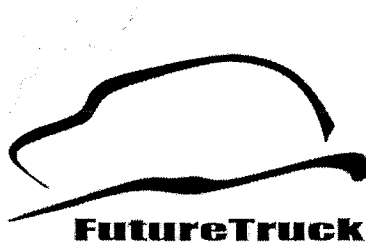
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Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Luis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

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For Immediate Release

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**UC DAVIS STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of University of California - Davis students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The UC Davis SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students took third place in the 2002 competition and are confident they'll once again exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Dr. Andrew Frank, Team Advisor, for the Davis team. "The students have worked really hard all year, and we are ready to take home first place."

This year, UC Davis has designed a parallel plug-in hybrid system. Through the use of lightweight components, aerodynamic improvements, custom powertrain elements, embedded electronics, and an advanced control system, the team's vehicle was designed to double the stock fuel economy while having a minimal greenhouse gas impact on the environment.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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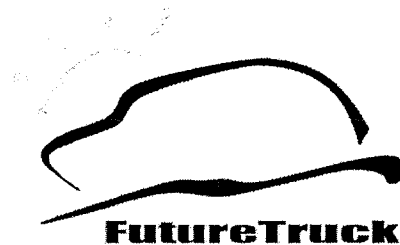
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

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**UNIVERSITY OF WISCONSIN STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of University of Wisconsin - Madison students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The team's SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students were victorious in the 2002 competition and are confident they'll once again exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions this year.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Dr. Glenn Bower, Team Advisor, for the University of Wisconsin team. "The students have worked really hard all year, and we are once again ready to take home first place."

Wisconsin's strategy was to design an efficient hybrid drivetrain and implement lightweight components. The drivetrain includes a common rail direct-injection diesel engine coupled to a 5-speed manual transmission. The team reengineered components from advanced materials to reduce weight, improve dynamic performance, and increase safety.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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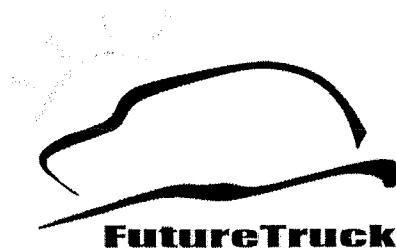
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**VIRGINIA TECH STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of Virginia Tech students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The Tech SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students participated in the 2002 competition and are confident they'll exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Doug Nelson, Team Faculty Advisor for the Virginia Tech team. "The students have worked really hard all year, and we are ready to go up against the other universities."

The Hybrid Electric Vehicle Team (HEVT) of Virginia Tech is a series HEV that uses a hydrogen internal combustion engine coupled to a generator which powers two electric motors for all wheel drive capabilities. This strategy improves energy efficiency and fuel economy and reduces overall emissions from driving the vehicle (both tailpipe and fuel production). Hydrogen fuel results in low tailpipe emissions from the truck and reduces greenhouse gas emissions from hydrogen production.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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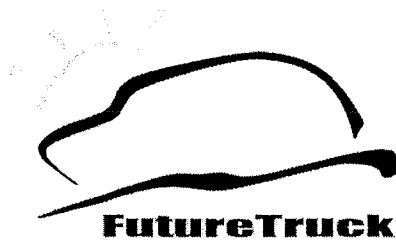
Various judging events will take place at Ford's Michigan Proving Ground in Romeo and the Allen Park Testing Lab in Allen Park, Mich. The winning university team will be announced on June 12th as part of Ford's centennial celebration in Dearborn, Mich.

Ford Motor Company and the U.S. Department of Energy (DOE) are the headline sponsors for the 2003 FutureTruck competition. Argonne National laboratory, a DOE R&D facility, provides competition management, technical and logistical support. More than 16 other government and industry sponsors also support the program.

Competing universities for FutureTruck 2003 are: California Polytechnic State University, San Luis Obispo; Cornell University; Georgia Tech; Michigan Technological University; The Ohio State University; Pennsylvania State University; Texas Tech University; University of Alberta; University of California, Davis; University of Idaho; University of Maryland; University of Tennessee; University of Wisconsin-Madison; Virginia Tech; and West Virginia University.

Additional information about the FutureTruck 2003 program is available on the web at <http://www.futuretruck.org>.

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For Immediate Release

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**WEST VIRGINIA UNIVERSITY STUDENTS RE-ENGINEER SUV WITH IMPROVED
FUEL ECONOMY/ EMISSIONS REDUCTION
Team Enters National FutureTruck Competition Finals**

June 2, 2003 - Dearborn, Mich. – More than ten days of intense testing are ahead for a team of West Virginia University students as they submit a Sport Utility Vehicle (SUV) entry for the 2003 FutureTruck competition finals. FutureTruck challenges teams of students from 15 top North American university engineering departments to re-engineer a mid-size 2002 Ford Explorer to improve fuel economy and lower emissions while maintaining the safety, performance and comfort levels that have made them so popular.

The team's SUV submission faces rigorous testing and evaluation, in areas such as acceleration and off-road performance events to determine which team will win the challenge. The students took sixth place in the 2002 competition and are confident they'll once again exceed the goal of achieving 25 percent better over-the-road fuel economy in the SUV and significantly reduce overall emissions this year.

"This competition presents students with real-world design and engineering exercises and challenges them to produce real-world results," said Dr. Nigel Clark, Team Advisor, for the West Virginia team. "The students have worked really hard all year, and we are ready to take home first place."

The West Virginia team selected a post-transmission parallel hybrid design powered by a Detroit Diesel 2.5-L common-rail direct fuel injection engine for its SUV. The electric motor is connected to the driveline using a chain drive behind the transfer case. Advanced hybrid vehicle controls also were integrated to improve the vehicle's drivability and to increase fuel efficiency.

"Training young engineers to solve complex automotive engineering challenges is what this competition is all about," said Al Kammerer, Ford's Executive Director of Sport Utility Vehicles and Body on Frame. "FutureTruck provides the training ground for hundreds of student engineers to explore advanced vehicle technologies so they are better equipped to lead the automotive industry in the 21st Century."

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