

CURRENT EVENTS

Promoting the use of electric vehicles since 1967

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Florida Sun Energizes 6th Annual SunDay Challenge

Cocoa, Florida - On Saturday, Sept. 27th, solar electric -powered and alternative-fueled vehicles rallied once again in Central Florida for the Sixth Annual SunDay Challenge - a 70 mile course along public roadways. Thousands of people came out to view the start of the SunDay Challenge at the Florida Solar Energy Center (FSEC) in Cocoa and see the finish at EPCOT in Walt Disney World near Orlando. Previously, the vehicles completed a day of performance testing with an autocross in the Brevard Community College/ University of Central Florida- Brevard parking lot.

Solar, electric, hydrogen and natural gas-powered vehicles participated from all parts of the country, as well as from Canada. Vehicles were designed and built by universities, corporations, and entrepreneurs. The "high-tech" showcase, sponsored by the Florida Solar Energy Center, the Florida Department of Community Affairs, and the Florida Energy Office, promotes a "better way" to travel now as well as in the future and is designed to call attention to the practical and environmental benefits of alternative fuel commuter vehicles.

The event featured five categories of non-gas-guzzling vehicles"

- Production Commuter, was won by Spyder Juice.- Al Simpler



- The Tour de Sol Commuter category was won by Sol Machine - Patrick Mainey and Matt Ficher.
- The American Commuter category was won by HondaEV - Frank Hickling
- Various alternatively-fueled vehicles competed in the Open category won by the Hy-TestPickup - Todd D'Vorak and the EV Bikes, won by George Henley
- Cross Continental solar facing category won by Reality - Alvin Collins

The overall Grand Prize went to the "Mastretta" owned by Triple Crown Motor Works and driven by Scott Lightsey. Coming in a close second was the "Sol Machine, built by the New York

high school team from Newburg Free Academy.

The rally finished at EPCOT in Walt Disney World near Orlando, where the race vehicles were exhibited for three days.

The SunDay Challenge is designed to promote the use of vehicles powered by clean alternative fuels to meet the energy and environmental needs of the future. The primary purpose of this rally is to develop the technology and the market for practical alternative-fuel cars and help solve today's air problems by reducing pollution and our need for imported oil, as well as educate the public about the environmental concerns caused by conventional vehicle fuels.

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- 1 The Florida Solar Energy Center's SunDay Challenge keeps growing and improving. CE's cover story this month has the report and results.
- 3 Heads up, EV drivers! The state of New York is offering substantial tax credits on EVs and equipment. Use it.
- 4 So what is all this excitement about the gasoline fuel-cell? Is it a Christmas present to Evs or is it a "fool-sell" designed to benefit the oil industry and sidetrack Evs and hydrogen fuel-cell development? CE's editor warns the EV community not to be "fueled" by all the recent hype.
- 6 The Gizmo Neighborhood EV from Eugene Oregon may look a bit like a Dalek out of Dr. Who, but it has some rather ingenious features and an affordable price
- 8 EVA's Bob Batson continues keeping CE readers well informed, this time about controllers and potboxes. Safety and maintainability are key points.
- 13 Providing charging stations for EV-driving customers rewarded one Southern California bank - \$500 K worth of deposits.
- 18 You want it, you got it — Toyota. From the makers of the RAV4 comes a new hybrid car for the mass market. The \$17.7K Prius went on sale in Japan recently and Toyota is considering bringing it to the US. Although they might consider changing the computer-generated name.

PHOTO CREDIT — COVER

The starting line of the Sixth Annual SunDay Challenge — The EV Honda takes off from Florida Solar Energy Center with Frank Hickling at the wheel. Photo - FSEC

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Managing Editor

Clare Bell
E-mail: CE96ed@aol.com
c/o Green Motorworks
Tele: (510) 521-4300
or (510) 864-9293
Fax: (510) 864-3010

News In Brief

Ruth Shipley

CE Contributors

Bob Batson, Electric Vehicles of America
Sparkz
Clare Bell

Calendar of Events

Anna Cornell

Publisher/Advertising

Clare Bell
Tele: (510) 521-4300

Article Submissions

The deadline for articles is the 25th of each month for the next issue of CE. Articles received after this date will be retained for future issues of CE. Contact the editor for more information.

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EAA Membership
2710 St. Giles Lane
Mountain View, CA 94040

National EAA

1-800-537-2882 or www.eea.org
Tony Cygan
tonyc@144volts.com

Christmas Presents to EV Drivers

Tis the season once again (although this is actually being written before Halloween, such are the realities of a monthly production cycle) and Santa actually does have some goodies for EV advocates, drivers and prospective purchasers. Two of these are in California, one in New York. OK, been good? Read on.

New NY Tax Credit

Doughty New York has not only upheld the banner of ZEV that California was forced to drop, but the Empire State is also putting its money where it's mouth is. New York has just passed a financial incentive (details in boxed sidebar) to purchase and use EVs. It is fairly substantial and can knock as much as \$5K off the price of an EV. I would urge those New Yorkers who have been on the fence about buying an EV to go ahead and use it as a way to test how solid the credit really is.

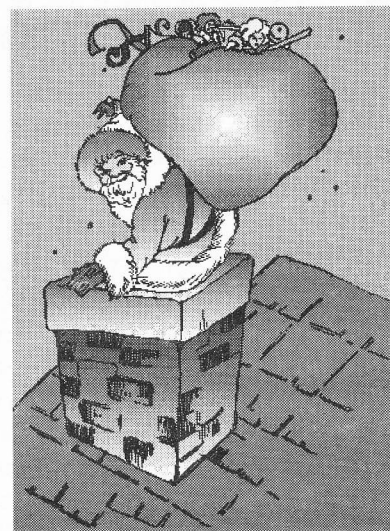
Not JUST (Gasp!) for Fleets?

Those who want to buy an EV truck from a Detroit manufacturer have always been tantalized by various announcements about the new products that always end "will be available to fleet purchasers only." Well, finally, one of them, namely Ford, has made the Ranger EV available not only to fleet managers but to individuals. Yes, you heard it. You can go down to a number of dealerships (see News in Brief on P. 18 for a list) and (Gasp) actually buy a Ford-built EV Ranger pickup. Not that you couldn't get a good conversion truck previously, since shops such as Canadian EVS, EcoElectric, Electric Vehicles of America and others electrify both Rangers and Chevy S-10s. But for those hold-outs who want it right off the Detroit assembly line, this stocking stuffer is for you.

Zinc-Air Batteries for Alameda

This is a little bonus for my part of the world. The Kummary Zoxy-Blitz Zinc-Air cells that powered B.A.T's record-run Club-Car EV (remember Nellie of the 1,053-odd wind-blown miles?) will make their US appearance in Alameda. Kummarow, the City of Alameda, and the Alameda Bureau of Electricity (see sidebar) have agreed to supply the cells and a regenerating station, which may be located here in Hangar 20. Imagine EVs belonging to utilities, the city and pioneering individuals going in for a quick battery swap, say every week or every two weeks. Stay tuned. Since it may well happen right here, I'll be monitoring and reporting on the project (with permission from Kummarow and all other parties involved - also, CE will respect any proprietary information.). Many of the EVs here in the hangar could become candidates for zinc-air installation, including perhaps my Tiger-car project and also another EV 914. 0000, an EV Fourteener that would go 300-400 miles per swap. I could actually commute to Santa Cruz from Alameda in it!

- ◆ Hey, what more could we want (I know, lots, but at least this is a start).
- ◆ Hey Santa, could an EV1 possibly fit in my Christmas stocking?
- ◆ Anyway, to quote me mum when she gets a wee bit tiddly during the hollydaze, "Happy Christmas and Merry New Year."—CB



EV Tax Credits Available in NY

The state of New York has enacted legislation providing an alternative fuel vehicle tax incentive program for EVs, clean fuel vehicle property and clean fuel vehicle refueling property. The incentive program applies to vehicles and property in service beginning January 1, 1998 and expires on February 28, 2003. A sales tax exemption scheduled to expire this year has been extended and expanded as well. The tax credit is for 50% of the incremental cost of the vehicle, or the difference in cost between an EV and a gasoline vehicle similar in size and style. The estimated cost for an EV without the use of state and federal incentives is \$30,000, and \$22,960 if these incentives are used. The maximum credit per EV is \$5,000.

Gasoline Fuel-Cell is Fool-Sell

BY CLARE BELL

It's being touted in the media as the breakthrough development that will finally put fleets of Evs on the nation's roads. It also promises to end the opposition of established interests to the spread of Evs, since it will give them a big chunk of the cut, keeping them happy. Two annoying birdies kayoed with one stone and we zoom forward into a brighter future, right? Buzz into your local gas station, fill up and away you go, with your fuel cell bubbling in your emission-free machine. Well, that is what the gasoline companies would have you believe.

I don't think so, sports fans!. Beware of pump-purveyors bearing gifts. Or smoke and mirrors (they are very good at generating smoke). The gasoline fuel cell is more a "fool-sell", a cleverly disguised attempt to once again knock the EV movement for a loop. It is a way to justify the preservation of the status quo and to take the wind out of the sails of ZEV-mandated states such as New York.

The gasoline fuel cell is more notable for what it DOESN'T DO than what it does. Don't let this new brand of hype "fuel" you.

What the gasoline fuel cell doesn't do

It doesn't do much for the greenhouse effect. The end product of gasoline combustion is CO₂, whether you burn the fuel in an engine, or chemically oxidize it to release hydrogen in a reformulator (the hydrogen is then fed to the fuel-cell directly or tanked for later use). Combustion, by definition, uses up oxygen and releases CO₂. What improvement in CO₂ emissions comes about as a result of using an electric drivetrain.

Don't think about sitting in a closed garage with a running fuel-cell car with

Fuel-cells are best used in a complete hydrogen energy cycle, which uses renewable solar or thermal energy sources to generate hydrogen from water without releasing CO₂.

a gasoline reformulator on-board. You may not die from hydrocarbons or NOX, but you will still suffocate.

Fuel-cells are best used in a complete hydrogen energy cycle, which uses renewable solar or thermal energy sources to generate hydrogen from water without releasing CO₂. Stored hydrogen then is used to drive hydrogen fuel-cell Evs, which emit only water vapor.

If we are going to use fuel-cells, let's use the hydrogen ones. Even methanol isn't so bad, since it can be produced from corn.

It doesn't get ride of the bloody yoke of oil dependency that harnesses this country to militarism, exploitation and violence. Whether that gasoline is burned in your Chevy V8 or trickles through a gasoline reformulator, Big Oil still sucked it out of the ground, refined it and is making profit off it.

It does nothing about making this country less vulnerable to economic and social disruption that could ensue as a result of an oil shortage.

It does nothing about environmental damage due to extraction, processing, transport and shipping of petroleum. Nothing is going the change the way gasoline is obtained.

It does nothing to discourage wasteful driving habits or building heavy inefficient vehicles. We could end up with the ghastly contradiction of monster trucks powered by fuel cells that still only get 15-20 miles per gallon.

It actually doesn't do much of ANYTHING except get the oilies and auto manufacturers off the ZEV hook for 2003. If you read the fine print, it will be another eight or ten years before gasoline fuel cells are actually in manufactured vehicles that you can go out and buy.

A gasoline fuel-cell car is NOT, by any reasonable definition, an alternate energy vehicle. It's like saying that an addict who shoots Demerol instead of heroin isn't still hooked.

Infernal combustion is still infernal combustion, whether through a reformulator/fuel cell or through spark ignition in a cylinder. It uses a hydrocarbon fuel, uses up oxygen and releases carbon dioxide.

What all the gasoline fuel-cell hype does do is:

Take money and effort away from other EV and renewable energy technologies that would offer true energy independence

Deflect effort and resources from developing a complete integrated hydrogen energy cycle system, which includes hydrogen fuel cells

Delay the development and implementation of current fuel-cell vehicles that use stored hydrogen or methanol, since those technologies are further along in development than the gasoline fuel-cell. Ballard in Canada is building fuel-cell busses and Mercedes is close to offering a fuel-cell passenger car.

The gasoline fuel-cell? No gift to EVs!

It's a "fool-sell" from the oilies and their allies. Don't buy it!

—CB

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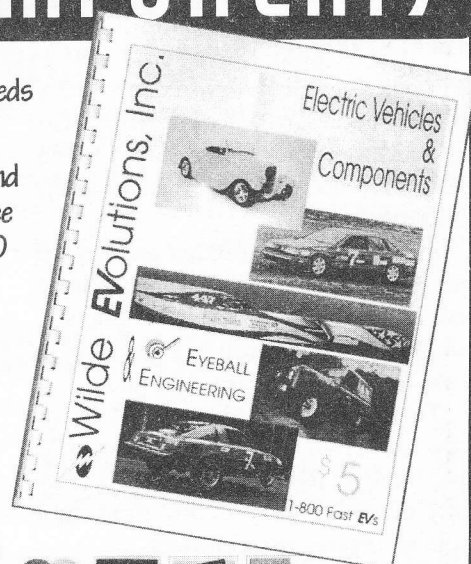
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Give Utilities EV Credits for Leasing Batteries

BY BOB BATSON, ELECTRIC VEHICLES OF AMERICA

In my previous message regarding the Energy Policy Act, I briefly mentioned that our recommendation:

"Allow utilities and other fleets to meet the requirements of the Energy Policy Act by leasing batteries to individuals and businesses in exchange for the vehicle credit as an Electric Vehicle." This would encourage new battery technology.

I would like to expand briefly on this since all of us are interested in better batteries at a reduced costs. If electric utilities can lease batteries in exchange for EV credits, an aggressive utility can set up leasing for 200 - 1000 battery packs around the country. This would give them an equal number of EV Credits. The utility is not limited to its specific service territory because this is not an air quality issue. The goal is simply to decrease the use of imported oil. If a utility can purchase 1000 battery packs from the manufacturer - that translates into 20,000 batteries (6V). That is quite a demand and incentive for new technology.

The utilities will win because the battery leasing costs significantly less than buying EVs from the Big Three at \$40,000. Battery leasing will cost almost nothing because the utility is leasing the batteries to recover their costs.

The EV enthusiasts win because they get the new technology at competitive prices. The utilities will see all EV users as a market. I have committed myself to make this change happen. I ask your support by contacting your utilities, legislators, and other EV enthusiasts. As EV enthusiasts, we must actively try to shape the future.

For additional information, please contact me Bob Batson (EVAmerica@aol.com), <http://www.inc.com/users/evainc.html>, Electric Vehicles of America, Inc. (EVA), Tel# 508-897-9393, Fax# 508-897-6740, 48 Acton Street, Maynard, MA 01754 USA

Gizmo EV for City Commutes

Four Eugene entrepreneurs have formed the area's first car company — NEVCorp. — to market an eco-friendly road warrior called the Gizmo.

Innovator Carl Watkins teamed up with two former bicycle makers from Burley Design Cooperative and Phoenix Industrial Park owner Bill Snyder to found NEV Corporation in January.

Their one-person Gizmo isn't flashy. It sports only one gear and tops out at 35 mph. Many of its components were originally made for motorcycles, ultra light airplanes, even yard trimmers.

The appropriately named Gizmo (the styling is reminiscent of a Dalek out of the TV show *Dr. Who*, but it has a certain retro-appeal) is a 370-pound vehicle that's less versatile than a full-size car but offers a faster and more comfortable than a moped or bicycle. As Gizmo co-builder Mark Murphy says, it fits "between a bike and a Buick."

The Gizmo uses a 2-hp motor and a fiberglass body wrapped around a steel-tube chassis. Instead of a steering wheel, the vehicle has two control levers, one on each side of the seat. To turn right, the driver pushes the left one forward while



Gizmo's Flip-up nose and canopy provides easy access you just sit down and the car closes around and over you.

pulling the right one back. Throttle, brake and turn signal switches are also located on these steering levers. Instruments include a speedometer and a state-of-charge meter.

NEVCorp is trying to patent the Gizmo's most distinctive feature: a full-length fiberglass and fabric canopy that hinges behind the seat.

To enter the vehicle, the driver swings the upper half of the car (including the nose) out of the way. This clears access to the seat from the front, so the driver can just sit down in it as one would do with a chair. Then the canopy

comes down and locks in place in front of the driver. The driver's feet tuck into the nose (don't forget to lift them up before taking off!).

The 4-by-8-foot runabout stows two to four lead-acid batteries, offering a range of 50-100 miles per charge. The vehicle's nose contains a reel-out electrical cord with a three-prong plug that fits into a standard 110V household outlet.

For roughly 50 cents worth of electricity, an owner can charge up the Gizmo overnight or top it off while at work, NEV Corp. owners say.

By installing a canopy and control levers, the inventors avoided using a heavy chassis needed to support doors and a steering column.

NEV Corp. held down the cost of the Gizmo by using wheels, hand grips and a seat originally made for other types of products. The vehicle should retail for less than \$7,000.

So far, they've spent about \$150,000 to build the prototype Gizmo and to create molds and modest tooling that will be used to make production models. The Gizmo guys are taking orders for their first 10 production models. If the firm can round up \$250,000 from new investors, full-scale production will soon follow, Watkins says.



Getting ready to go Gizmo style

Source: JOE KIDD The Register-Guard

Don't Let Apathy Cripple EAA

The chair of the election committee reports that as of mid-November, he hasn't received ANY nominations for the EAA Board of Directors. That's pretty bad. Don't folks want to have a say in what happens in this organization? With the changes that are coming in the EV field, shouldn't EAA play an increasing part? Or should it retreat back to just being a hobbyist play-with-cars-on-weekends club and let another organization take on the serious advocacy role? C'mon, members! Why do I work so hard on this newsletter every month if not to keep EAA going as a vital and essential EV resource? But neither I nor the present Board can do it alone. Jump in and roll up your sleeves. Even though the commercial manufacturers are coming out with EVs, our job is far from done. Or have we decided, after all this time that we don't want to do it any more? As they say about another subject, if you don't use it, you lose it.

If you have candidates for the Board, or if you want to be a candidate, please contact Tony Cygan at (916) 441-4758. Do it!

Needed, 2M77

EAA member Marty Newman is looking for a replacement aircraft generator motor for his Kaylor-Kit VW. Because Marty lives at the top of a steep grade in the Santa Cruz Mountains (5x the grade of Highway 17), he needs the 2CM77, which provides more torque and will survive under that kind of load. Anyone who has a running 2CM77 or equivalent and would be willing to sell it, please call Marty Newman at (408)426-0523, Clare Bell at (510) 521-4300 or Roy Kaylor at (510) 521-8887. Help Marty put his VW back on the road. Thanks — CB

Current Events Seeks New Publisher/Advertising Manager

After seven years, Susan Hollis, Publisher and Advertising Manager of Current EVents, is leaving the staff of Current EVents. She is very grateful for the opportunity to work with so many great people in the EAA organization and will always be an advocate of EVs. If you know of anyone who may be interested in taking on the design/layout, printing, advertising, or publishing of CE, contact Clare Bell at (510) 864-9293.

Current Events (Once Again) Seeks Co-Editor

Our previous co-editor, George Wilson, had to withdraw from participation in CE for personal reasons and thus we are again seeking a person or persons to work with me (CB) as co-editors.

CE would like to find a Letters Editor, so we can restore the Letters to the Editor Forum as it was under Paul Brasch. CE would also like a EV List Editor to track the Internet EV List for stories and events that should be covered.

CE would like to set up regional editors for all the areas in which EAA has chapters. Compensation possible and negotiable, depending on load, commitment, resources and other factors. CE has become too much a one-person show and that isn't good for the one person (CB) or the community it serves. Especially when the one person now has a regular job in the EV field and would like to live a semi-normal life once in a while. Those interested should be computer- and Internet-literate and be fairly flexible, and enthusiastic about EVs.

Please contact Clare Bell at Green Motorworks, (510) 864-9293 or email cb96ed@aol.com. And once I have unburied myself from this issue, I will answer my e-mail.

Controllers and Potboxes

BY BOB BATSON

ELECTRIC VEHICLES OF AMERICA, INC.

This series of articles is written to provide some ideas about installation and troubleshooting of various EV components. Controllers are straightforward and typically have few required connections. However at EVA (Electric Vehicles of America, Inc.), we utilize a unique arrangement for our controller and other electrical components.

This material on controllers is written to supplement the information that you receive from your EV component supplier and the manufacturer. It is not intended to supersede that information. This specific article is based on Curtis controllers because (1) they are the most popular controllers and (2) we are most familiar with them. We contacted other controller manufacturer and requested their input for this article; however, we received no response.

We have attempted to not repeat the information in the Curtis PMC Manual; however, the manual is so complete that it is difficult. Hopefully, you will gain a new perspective or one or two new ideas.

Installation Tips

Before starting to discuss the controller, it is necessary to describe our specific design. At EVA, we locate the controller and its associated cooling heat sink and fan on a 3/4 inch thick MDO (2-sided) above the motor. MDO is a special form of plywood that is used for street signs; consequently, it is weatherproof. It is very workable and relatively inexpensive. This MDO is called our "Control Board".

The Control Board serves as the mount for the controller, contactors, potbox, DC/DC Converter, shunt, and control fuses. One contactor is located on each side of the controller to maintain separation between the "live" connections. The "live" connections from the

batteries to the batteries come up through slots cut in the board; the slots allow for removal of 2/0 cable. Lay out your components on a piece of cardboard or artist board to get an idea. Then lay out your wiring using scrap pieces of wire or cable. This exercise helps you visualize how components are related and connected. Remember, the potbox location is based on the flexibility and length of the accelerator cable. It requires a smooth motion and a complete stroke to achieve optimum use of the potbox and maximum performance from your EV.

Advantages of the MDO Design

- The MDO is an insulator. If you locate the high voltage components on an aluminum or steel plate, or one made from other conductive material, you have the potential of creating an electrical short from one component to the next. As well as to the frame of the vehicle, which you are probably touching. Locating the high voltage on an insulator is a safer design.

- The MDO insulator minimizes noise. The 1.5 kHz used for smooth acceleration in the "C" controllers is not resonating through the steel and the EV. Maybe, this is why we never understood the "screeching" that others complained about.

- The MDO is relatively inexpensive and available at many lumberyards. Unfortunately, they usually sell it only in a 4ft x 8 ft sheet.

- MDO board can be cut and drilled easily. Our cabling to/from contactors, controller and motor are installed through slots cut into the MDO. It creates a very clean and neat appearance.

- The MDO board can be painted in any color to assist you in displaying your EV. Cover the edge with an edge trim strip (also available from the lumberyard) prior to painting.

- When you use the MDO, we recommend that you locate and wire all of your components first. Then you can disassemble the wiring and remove the components prior to painting. Also, do not mark the board; use masking tape to locate components. Pencil marks will

show up later if you use a light colored paint.

- The Control Board is mounted off the transmission bell housing, so that it will pivot up. This allows complete access to the motor below for inspection or removal. This design allows removal of most components in about 15 minutes. Even the motor can be removed in about 30 minutes. Design for maintainability and you will be rewarded for many years.

The Controller

The controller is an electronic piece of equipment and must be installed correctly by:

- Locating it so that it is maintainable
- Allowing sufficient cooling.
- Locating it in a clean environment.

A clean environment is essential if you want long life for your controller. The controller and the potbox should be located where they will not be exposed to dirt, water, or battery acid. Contamination will deteriorate the seals on the unit and eventually lead to internal corrosion. By locating the controller and potbox on the MDO above the motor, they become part of a cleaner environment. The front grill of the car is blocked off to improve aerodynamics as well as to protect the components from the elements.

Maintainability

Locate your controller right side up and facing you, so that it is maintainable. It sounds simple, yet we see controllers mounted upside down or with electrical connections facing the firewall. This means that you must re-orient yourself every time you test connections. Is B+ on the left or the right? When the controller faces the firewall, maybe the trick is to use a mirror when maintenance is performed. Simplicity improves reliability.

Allow access so that controller connections can be checked and tightened, if necessary. Always tighten these connections using two wrenches in order to prevent breaking the seal around each terminal.

Cooling

The controller should be mounted on a heatsink (e.g., a finned heat sink or an aluminum plate) and be in the airflow or forced flow from a fan. If you locate it inside the vehicle or in a corner without air flow, it will overheat, which will shorten its life.

Our preference is to use an active heat sink which consists of an aluminum plate with a 12V fan blowing on it. See Figure 1 - Controller and Heat Sink Arrangement. The controller is mounted to an aluminum plate with heatsink compound between the plate and the controller. The heatsink compound helps conduct the heat from the controller to the plate. We use silicon based heat sink compound and spread it evenly on the base of the controller before mounting. Directly beneath the plate is a 12 V fan that is actuated by the ignition switch, so cooling starts immediately. The heatsink acts as a reservoir to receive heat that is removed by the fan. Remember the bottom of the controller is where the heat is generated.

Start Cooling Before the Controller Gets Hot

The 12V fan starts cooling as soon as the ignition is turned on. The reasoning is this starts cooling immediately. This design maximizes heat transfer and keeps the controller cool. A passive heat sink **MUST** get hot to transfer heat, so that means the controller is hot in order for heat transfer to occur.

Water cooling is another option often discussed in very hot environments like Arizona or New Mexico. But you must still "cool" the water using ambient air and another a radiator to "dump" the heat to the same ambient temperature. This introduces a water pump and a larger cooling fan requiring more auxiliary power. Adding another 12V fan and a larger aluminum plate should suffice an eliminate the complexity of a water cooling system.

Again, we must emphasize that it is essential that you use the Installation Requirements of the specific controller manufacturer.

Troubleshooting

(APPLICABLE TO CURTIS CONTROLLERS ONLY)

- ☛ After you install the controller, there are only four reasons why it may not work.
- ☛ No battery input to terminals B+ and B-.
- ☛ No signal to the KSI terminal (terminal #1). The KSI needs to see a signal from the traction battery pack.
- ☛ No potbox signal at terminals #2 and #3.
- ☛ High Pedal disable is preventing operation.

Table 1 summarizes the testing and corrective actions required.

continued on pg 10

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Corrective Action For Controller Not Operating

Possible Cause	Recommended Testing	Corrective Action
No power to B+, and B-	Check operation of contractors Check power fuse for continuity	Provide power to close contactor. Replace, if required.
No KSI signal	Check source of power and possible loose connection.	Repair or replace as required.
Missing potbox signal	Test potbox with ohmmeter 0-5000 ohms after removing leads from controller.	Check for loose connections.
High pedal lock-out disable	Test the sequence of the potbox signal vs. the KSI signal	Readjust potbox or correct sequence.

Controllers and Potboxes

continued from page 9

The light bulb test (light bulb replaces motor) is an excellent way to test the controller. This test method is described in the Curtis Manual.

Operating Problems

Our experience is that most controllers rarely have a problem once installed. Typically, the cause is a loose connection or some other minor problem with the installation. To eliminate loose connections, use a good crimping tool for your control wiring. Rarely does your 2/0 cable present a problem. When it does you will see a melted post or a weld mark. However, a loose connection in your control wiring can keep you from operating and contributes to an unreliable EV.

Controller Operating problems that we have identified are listed in Table 2. Also identified is the Recommended Action.

On our Bradley GT II. (a VW Beetle chassis) the potbox was limited to 3000

ohms by the stroke of the accelerator pedal. The 3000 ohms limited acceleration and performance. A simple redesign of the connection restored the full 5000 ohms, and we were able to get a peak current of over 600 amps from our controller originally designed for 500 amps!

Maintenance

There is minimal maintenance associated with a controller. The most important item is to check the connections for tightness and make a visual examination of the seals. At EVA, we like wet (flooded-cell) lead acid batteries not only because they provide more range and better cycle life than sealed batteries. This means low life-cycle costs. But more important, the wet batteries require maintenance. And once a month, preferable the first Saturday of the month, we add water to the batteries and inspect all connections. This requires about 30 minutes. If we consider our EV as maintenance free, we won't perform the periodic inspection required to maintain its reliability and performance.

Today's PWM controllers are designed to be very reliable and efficient with a number of safety features (e.g. high pedal disable, variable speed control (no jumping, thermal protection, undervoltage cutback, etc.) If you install them properly, provide periodic maintenance, and drive correctly, they will last many years.

- ☛ Design your EV for simplicity.
- ☛ Locate your components for maintainability.
- ☛ Periodic Inspection enhances reliability.

I want to thank Henry Voelker of Curtis Instruments and Ken Koch of KTA Services for contributions to the above article.

Bob Balson can be contacted at: Electric Vehicles of America, Inc. P.O. Box 59, 1 Fletcher Street Maynard, MA 01754, (508) 897-9393, (508) 897-6740 fax, EVAmerica@aol.com

Controller Operating Problems

Operating Problem	Possible Cause	Corrective Action
Overheating	Inadequate cooling	Improve cooling air flow. Check operation of cooling fan.
	Operating at low duty cycle	Operating motor at a higher rpm by going to lower gear. Calculate max. speed in each gear.
Controller cuts out	Battery voltage too low	Replace bad battery. Confirm diagnosis by bypassing bad battery test.
Contactor opening	12 V auxiliary	Test and replace 12V auxiliary battery, if required
Insufficient power	Potbox signal too low (> 4500 ohms)	Readjust accelerator cable to obtain sufficient travel of potbox lever (complete stroke.)

OOOPs, We're Sorry

BY MIKE SLOMINSKI

In response to a letter received from Mr. Mick Abraham of Abraham Solar, we would like to set the record straight concerning the PowerPulse TM article written in the July/August issue of Current Events.

In that article it was mentioned that the dealer that Home Power Magazine had purchased their PowerPulse TM units from had gone "belly-up." Since Abraham Solar has been the only company to advertise the PowerPulse TM

products in Home Power Magazine, Mick assumed that we were referring to his company. In actuality the reference was made about an earlier device, called a "DuraPulse" and a dealer that used to carry them.

Abraham Solar is alive and well, and we apologize for the negative reference, Mick. We sincerely hope that this clears things up. Abraham Solar is an authorized distributor for the PulseTech TM line of products, and was the first company to introduce the product to EAA, by way of product literature and an offer to supply sample units for field testing by EAA members.

The PowerPulse line of battery maintainers can be purchased directly from Abraham Solar by calling their toll

free number, 1-800-222-7242 (daytime). Mick is also setting up selected retailers of electric vehicle equipment, so you may be able to purchase the device from your favorite EV dealer. This way you can support the EV industry, benefit from your dealer's experience and still receive the supplementary instructions and information that Mick supplies with every unit. —MS

Shift Microswitch can make EV1 Play Dead

BY SPARKZ

An EV1 leased out of the Los Angeles area gave her driver some recent instruction on how a tiny bit of extra play in a shift lever microswitch could disable an entire car. Now only that, but the problem made the vehicle completely inaccessible as well.

So what happened?

All "gearing" functions (Park, Drive, Reverse, etc.) on the EV1 are controlled by means of a single-throw multi-position shifter that works pretty much like your standard automatic fake four-on-the-floor. Upon arrival at one's destination, the EV1 is placed into "Park" by pushing the shifter all the way forward. OK, child's play so far. Just like an automatic transmission gas car. The shifter has a microswitch which tells the onboard smarts that the car is indeed parked, so that it can deploy the automatically actuated parking brake and some other bells and whistles.

This particular EV1 had some play in the shifter position at "Park". If the shifter were not pushed all the way forward so that the microswitch tripped audibly, the car didn't believe she was in "Park". That led to some complications when the driver, believing the car was indeed suitably parked, shut her down using the Run/Lock button array, put the windows up, got out and ambled away, letting the EV1 lock herself, as she does in normal operation.

A Cocooned EV1

When the driver returned, the problems began. First of all, entering the access code on the EV1's external numeric panel produced no results. The Queen had buttoned herself up and wasn't

going to be unbuttoned, at least not without such a primitive mechanical device as a door key. Such a device was procured and admittance was gained, but the EV1 remained silently aloof to all efforts at entering activation codes.

The driver's first thought was that the 12V battery system had failed, but upon checking it with a meter (by wiggling underneath), found that the auxiliary battery was perfectly healthy.

The second was that the battery security key, which has to be inserted to enable the pack, had somehow been removed. Nope, it was still there. Everything should be working.

So why had the car functionally cocooned herself?

You Piss-ant

The answer came when the driver, expressing some frustration in physical action, addressed the car as "You *@!#!#!" and lightly slapped the shift lever. To his astonishment, the EV1 responded, coming alive and accepting the activation code.

No, it was not the insult that brought the Queen alive.

The slap had knocked the shift lever forward into its proper position, telling the car that she was in "Park" and she then behaved accordingly and agreeably. Some experimentation proved that the problem was repeatable and could be recreated by using the play in the shifter in the "Park" position. If the shifter wasn't all the way forward, tripping that pesky microswitch, the Queen would play dead. Tapping the shifter into position with a finger revived her instantly.

This particular EV1 obviously had either a mis-adjusted shifter or microswitch. She returned to Saturn for other service and the problem was taken care of.

Too Smart?

The fact that the EV1 can outthink herself into immobility is not unique to this car or to the fact that it's an EV. A lot of Detroit's highly computerized productions are often too smart for their own

good, to the frustration of drivers and mechanics alike.

Sleepy EV1?

How many EV1s have this problem is unknown. This car may be the only one. But, if your Queenie doesn't seem to want to get up in the morning, use the mechanical door key to get in and check your shifter position. A gentle push should cause the microswitch to trip audibly and restore a sullen EV1 to tractability. Accompanying vituperative remarks are optional. She'll probably ignore them anyway, but you'll have her back in service. —SZ

Bank Bets on EV Business, Reaps \$500K in Deposits

7/15/97, Manhattan Beach, Calif. - A California bank that recently installed three free electric vehicle (EV) chargers at its Manhattan Beach branch and El Segundo headquarters says it has already received a half-million dollars in deposits from EV owners, reports the Los Angeles Business Journal. According to Hawthorne Savings Executive Vice President David Hardin, "We've probably taken in \$500,000 in deposits from people that drive (General Motors) EV1s, including one guy who opened a \$100,000 CD account just because we had the charger." The company has also leased an EV1, which - with the bank's logo prominently painted on its side - is used for delivering documents to its branches. Source: Calstart News Notes 3/31 and 4/7/97).

<http://www.calstart.org/>
(news@calstart.org), CALSTART Tel# 818-565-5655, Fax# 818-565-5610, 3601 Empire Ave., Burbank, CA 91505 USA

Don't Flatten Queenie's Pack!

BY SPARKZ

Many EV1 owners are new to EVs, having come to the electric car world through GM's new product. This is for you newcomers who haven't already made all the EV newbie's mistakes with a knock-around EV conversion equipped with abuse-tolerant flooded-cell batteries. Instead, you are learning on something that is functionally the Porsche of the EV world. If you abuse it, you can break it. Therefore the cardinal rule of EV driving is even more important to you folks. And it is:

Don't Flatten the Battery Pack!

If Queenie tells you that she's getting down in energy (one bar is all that's left), LISTEN to her. That display is not just for decoration. READ IT and get your EV1 back home and on the Magnecharger. If she tells you that she's so low that she will only crawl at 5 mph and further driving will damage the battery pack, please believe her! If you have to, park her in a safe place and hike to the nearest pay phone for Saturn's roadside assistance. It is better to experience some inconvenience than risk the Delco Delphi sealed lead-acid batteries. Hey, unlike the Jet Escort driver (unless they have AAA towing coverage), you EV1 jet jockeys HAVE roadside assistance.

Everyone Does It

For those EV drivers who think they'll never have to walk; don't fool yourself. EVERYONE runs the car out sooner or later. It seems to be part of the baptism into EV-dom. It will happen and the best way is just to deal with it, swallow your pride and call the help line. Or find a friendly plug and use the convenience charger. And don't feel so bad. How many times have you run out of gas? More than once, I bet!

Won't Charge!

Another incentive not to run the batteries flat. If the batteries are overdrawn to the point where voltage falls below a certain point, the car's smarts think the pack is damaged and won't let the charger operate. That causes a double whammy where the poor beastie desperately needs to charge, but can't. If that happens, she's got to go on the flatbed truck and be trundled back to Saturn for a high-amp transfusion and (if batteries were damaged) module replacement. That's already happened to at least one California car.

Time-critical

In addition, the revival has to happen fairly fast. Fully discharged lead-acid batteries will sulfate rapidly (generate hard lead sulfate crystals that won't redissolve) if left to sit. Having a stuck car that will get sick if you don't do something about it pronto is not fun, either for Queenie or you.

Why Doesn't She Protect Herself?

One would think that the car would prevent such problems by having a low-battery cutout. That is a device which basically disables the vehicle when the battery falls below a given voltage. The car says to the abusing driver, "Tough luck, turkey, my batteries can't take it and I'm shutting down. See you on the charger." The problem is that such a device is illegal (as far as I know) under US law. You can't market a vehicle with a feature that automatically disables it, since doing so may cause risk to the driver. The best the EV1 can do, if she's getting hungry, is to go into a super-low energy draw mode and crawl at 5 mph while flashing a red warning label in your face. She'll only stop if she's bled completely down and then you get into all the complications detailed above. Also, since you had more than adequate warning, the consequences are your fault, not GM's

Don't Flatten Her

So don't do it. Think ahead, don't push the range, set up a "friendly-plug" network and do whatever you have to be nice to your EV1. And if you do get low, don't try to come in on a wing, a prayer and the last electron. Take it from someone who has done this too many times (with an electric conversion, NOT an EV1) and has had to cope with the consequences. And when the inevitable happens, get your butt out of the car, hoof it to the nearest pay phone and admit to Saturn that you goofed. They aren't going to nail you for it (although I imagine they don't encourage repeats on a regular basis). This is a new technology and they know that people, even with the best intentions, are going to screw up. That's why they have the roadside assistance plan. If you need it, use it!

(I've been hankering for an EV1 ever since they announced, but Queenie, at this point, is out of my budget. When I hear that someone has ignored the warnings and hammered the batteries in their EV1, I get a little Sparkzy under the collar.)

Overdrawing batteries is the quickest way to kill their capacity and performance.

Don't do that to Queenie - she doesn't deserve that kind of treatment.

Don't do it to your home-built or conversion EV either; no EV deserves it.

And if anyone wants to contribute to the Get Sparkz an EV1 Fund, feel free.—S

RALLY RESULTS

Category	Place	Car Name	Organization	City/State
Production Commuter	1st	Spyder Juice	Shelby Motor Cars	Tallahassee, FL
	2nd	EV10	Evermont	Waterbury, VT
	3rd	0 Emissions	Orlando Utilities Commissions	Orlando, FL
Tour de Sol Commuter	1st	Sol Machine	Newburg Free Academy	Newburg, NY
	2nd	Canary II Z.E.V	Sunlighter, Inc.	Tuscaloosa, AL
American Commuter	1st	HondaEV	Christina Lutts	Interlachen, FL
	2nd	Mastretta EV150	Triple Crown Motorworks	Tallahassee, FL
	3rd	Clunn Car II	Steve Clunn	Ft. Pierce, FL
Cross Continental	1st	Reality	FAMU-FSU College of Engineering	Tallahassee, FL
	2nd	Ra	Principia College Solar Car Team	Elsah, IL
EV Bike	1st	The Henley	George Henly	Fairhope, AL
	2nd	EMX Racer	Triple Crown Motorworks	Tallahassee, FL
	3rd	Steel Dreams	Allen Smith	Fairhope, AL
Open	1st	Hy-Test Pickup	NASA/EG&G& Univ. of Central FL	
	2nd	Kinetocar II	Naugatuc Community Technical College	Waterbury, CN
	3rd	EZ Bio Diesel	NOPEC Corp.	Lakeland, FL

Ministry of Transport to Lighten Taxes on Hybrid Cars

Comline Transportation Wire — Japan's Ministry of Transport publicized on August 18 its policy toward reducing emissions of carbon dioxide, which is a major cause of global warming. The Ministry is working on a plan to lighten the taxes levied on the purchase of automobiles for so-called hybrid cars, which employ a

combination electric motor and gasoline engine and therefore have an excellent rate of fuel consumption. The Ministry will incorporate the idea into next fiscal year's request for tax reform. Some automobile makers are scheduled to start sales of hybrid cars as early as this fall. The cars are to emit about half the level of carbon dioxide as ordinary passenger cars, and the Ministry hopes

to encourage their diffusion by creating incentives in the form of reduced taxes. The Ministry also is to deliberate on reducing taxes on other than hybrid cars that have low-fuel consumption.

**Ref: Japan Industrial Journal, 08/19/97, p. 2
[08-26-97 at 11:00 EDT COMLINE.]**



Grand Prize winner, the Mastretta, driven by Scott Lightsey of Triple Crown Motor Works, with Simpler Solar's Spyder Juice. Photo - FSEC



The new and the old. Nearly 80 years separate the 1997 GM EV1 and Ted Holden's 1918 Milburn. Photo - FSEC



Wet road, light spirits. Solar vehicles, left to right: Sol (University of New Orleans), Blue Sky Project (University of Toronto), Sol Machine (Newberg Free Academy) and Reality (Florida State University and Florida A&M University). Photo - FSEC

High-Power BOLDER Battery for HEVs

A new design of lead-acid batteries has been developed based on the use of very thin lead foil, spiral-wound plates for ultra high power, with excellent usable capacity. Additionally, these cells exhibit a flat voltage under a broad range of discharge currents, and are capable of very rapid recharge. Applications for this high power technology cover a broad spectrum such as cordless power tools, UPS systems, pulse power applications, engine starting, and hybrid powered vehicles.

Innovative Design

The Thin Metal Film (TMF TM) battery technology has been developed at BOLDER Technologies Corporation of Denver, CO. The concept represents an unique extrapolation of conventional lead acid technology into a new non-conventional, patented configuration. The original developers of the sealed lead acid gas-recombinant battery technology used thick perforated electrodes and single point current collection. These two physical aspects introduced inefficiency in the operation of the cell. The construction of TMF batteries consists of a thin (0.003") layer of active paste applied to both sides of a solid (0.002") lead foil. The precise pasting operation leaves a thin strip of uncoated foil along one edge. The uncoated area forms the contact to the cell terminal. When compared to conventional flooded and sealed lead acid batteries, this design produces a 16-19 times increase in the ratio of plate surface area to active material, and a 20-80 times decrease in the path length of the electron flow.

The positive and negative elements are wound together in a spiral wrap configuration with a thin (0.008") glass fiber separator. The cell is wound in a manner to permit the uncoated strip on the lead foil collector of each element to protrude slightly from the end of the wound cell. Thus, uncoated areas of each plate polarity protrude from opposite ends of the wound cell (similar to capacitor designs). The lead terminals are cast onto the exposed end of the spirally wrapped cell.

TMF batteries have been tested in a wide variety of applications. For instance, a 12 V TMF battery weighing less than 1.3 lb. (590 grams) successfully started a 3.0 liter automobile engine 20 times in a row without recharging (versus the normal car battery of 40 lb). TMF cells provide outstanding specific power at very high rates. Testing for peak power using the USABC procedure, it was found that the level of 800 W/kg was almost constant over a wide range of depth of discharge. A 600 cell 300 V TMF battery is currently under evaluation in a prototype hybrid electric vehicle.

Contact: Bolder Technologies, Tel. 303-215-7200, fax 302-215-2500

Source: BOLDER Technologies press release

BOARD OF DIRECTORS

Peter Barnes

703-435-5067 (H); 648-6422 (W-USGS, Washington, DC); 648-5464 (FAX); 13148 Ashvale Dr., Fairfax, VA 22033

Clare Bell

510-521-4300 (W-Green Motorworks); 864-3010 (FAX); 408-469-9185 (H); 469-3714 (FAX); 544 Summit Dr., Santa Cruz, CA 95060

Harold Bell

602-956-2477; 954-0571 (FAX); 3252 E. Glenrosa, Phoenix, AZ 85018-3911

Anna Cornell

510-798-0909; 685-7580 (FAX); 60 Alan Dr., Pleasant Hill, CA 94523-1902

Tony Cygan

916-441-4758 (H); 567-7165 (W-MCI); 567-7148 (FAX); 1749 9th Ave., Sacramento 95818; tonyc@144volts.com

George Gless

303-442-6566 (TEL/FAX); 2940 13th St., Boulder, CO 80304

Ken Koch

909-949-7914; 949-7916 (FAX); 944 West 21st St., Upland, CA 91786

Sieve Laugh

206-524-1351; 526-5348 (FAX); 6021 32nd Ave. NE, Seattle, WA 98115

Tim Loree

916-967-3044 (H); 568-3100 (W); 7428 Wisconsin Dr., Citrus Heights, CA 95610-1132

Stan Skokan

415-366-0643; 306-0137 (FAX); 1020 Parkwood Way, Redwood City, CA 94061-3691

Bill Wedmore

602-998-1821 (H); 998-5863 (FAX); 7711 E. North Lane, Scottsdale, AZ 85258-1132

Board Meeting Notes - August 23

The Board meeting started at 10:50 with Harold Bell, Anna Cornell, Tony Cygan, Tim Loree and Stan Skokan present. Proxies were received from Peter Barnes, George Gless, Ken Koch, and Bill Wedmore. Harold read a note from George stating that there was no chapter list in the last issue. Sue says that the list is too cumbersome to put in every issue. The list would take up space needed for articles. It could be put in quarterly.

Our assistant editor is off for two months due to personal problems.

The minutes for 6/14/97 were approved with one change. Anna did not give her proxy for that meeting to Tony in her absence.

Harold Bell moved to accept the agenda for today and it was seconded. All approved. Some agenda items were added.

Stan's Report

The budget for this year is looking up. We have made more sales from the Buyers' Guide than were expected. We are behind about \$1700 since the beginning of the year. Most of the committees are staying within budget except for Newsletter Management. The budget there is about \$100 over. Stan thinks we should do one more CE double issue to recoup Guide overcosts. Tim asked for past budget reports.

Taxes

Taxes were filed late for an extension. Our accountant, it seems, had not done the job right and it was turned down. The penalty for late filing will be about \$20. Stan wants to find a new accountant for EAA by the end of the year.

Election Committee

Tony Cygan is the chair for this year. Anna brought her Election History notes with her. The notes were read and every-

one discussed who should run. Anna pointed out that names have changed since the first round 3 years ago. It was difficult to say who had to go on the ballot, since it wasn't clear who replaced those who had left or relocated. The board members who are running this year are George Gless, Harold Bell (not sure yet) and Tim Loree. The October issue of CE will call for nominations. Close of nominations is October 31. The bios are to be placed in the December issue of CE. Deadline for ballots is Dec. 20th. Announcement of final results will be at the Annual Meeting on Jan. 24th, 1998.

New Membership

Anna said that the 800# message was changed to reflect the dues increase and also mentions the EAA website. The calls are coming in groups of 5 every 3 days and have slowed down since June. Anna is also keeping track of where people are finding the EAA. Phoenix and Sacramento websites have been mentioned. She also mentioned June's problems with Bruce Brooks' system. June is interested in something easier. Anna will ask June what she does and doesn't like about the system she uses now.

Awards

Harold has decided that there will be 4 awards, namely the Keith Crock for Technical Achievement, the Fellow Award (to be given to every dedicated member of EAA), the Corporate Achievement and the Ed Rannberg Award. The awards nominations are to be set in time with the elections. Guidelines and call for nomination are to go in the October CE issue.

Chapter Relations

Harold said that his activity in this area has been slow. He will transition Bill Wedmore to Chapter Relations.

World Wide Web

Tony said that the board members can have email through the website. He also wanted to take pictures of each board member to put on the website along with the names listed there.

Discussion took place on the membership forms and the Board Committees. The results to each subject were: the new membership form will be scanned by Scott Cornell and distributed to all chapters by Anna. It will have the new rates.

EAA Committees

Finance

Stan Skokan

Publications

Clare Bell (possibly have Ken Koch send articles).

Membership

Anna Cornell. June Munro works with her.

Chapter Relations

Harold Bell, Bill Wedmore will be trained.

Awards

George Gless

Promotions

Tony Cygan

Education

Open for now.

Elections

Headed by a board member who is not running for the board in said year.

Next Meeting

In Phoenix at the Phoenix Chapter meeting site, Sat. Oct. 18, 1997, time to be determined.

\$17.7 K Prius is Toyota Image- Booster

Seeking to put itself ahead of rival Honda in both technological innovation and pro-environmental appeal, Toyota Motor Corporation rolled out a combination parallel/series hybrid passenger sedan on Oct. 15th. With a computer generated moniker, the "Prius" started selling in Japan this month for \$17,700, a price which pays for only part of the estimated 30-40K needed to actually build each car. Toyota is absorbing the remaining cost as an advertising expense, which may well prove cost effective, since auto purchasers in Japan (and increasingly so in the US) are demanding environmental sensitivity as well as fuel economy from automotive suppliers.

"If you see the losses as an advertising expense to boost Toyota's image, it's worth it," commented Hideaki Aonuma, an auto analyst for Societe Generale Securities in Tokyo. "Being the first out with a product in the world has tremendous impact." Ed Brogan, auto analyst with Salomon Brothers in Tokyo, added "It can cloak itself in the mantle of an environmental leader."

Toyota is also willing to take a bath on the hybrid in order to have "regular people driving the cars," according to Toyota President Hiroshi Okuda.

Not the First, but the Biggest

Technically Toyota is not the first out the gate with a hybrid, since a number of smaller companies have offered hybrids or hybrid additions to existing EVs. AC Propulsion's Alan Cocconi has been building and selling high performance Honda CRX EVs in a package with a "Long Ranger" auxiliary power unit that makes the car a very practical hybrid. He's proved its viability by crossing the

Toyota is absorbing the remaining cost as an advertising expense.

country several times in his CRX. Roy Kaylor and Clarence Ellers both have offered gasoline and diesel hybrid EVs. Fisher last year announced a commercial APU trailer that could turn an EV conversion such as a Rabbit into a hybrid. These EVs gave performance equivalent or better than the 66 mpg. attributed to the newly announced Toyota.

In the OEM automotive arena, manufacturers have shown a number of hybrid concept cars. Volvo, for a while seemed ready to go with its version of a parallel hybrid, which used a different power train on front and rear axles. Audi, the luxury division of Volkswagen, had planned to put out a diesel-electric hybrid this year, but recently postponed it to April 1998. Earlier, VW had also planned a hybrid electric Golf, which it has not yet put into production.

A number of Neons have been converted to hybrids to run in the Chrysler-sponsored Hybrid Challenge, which has been part of the Arizona Public Service Phoenix Electrics race. Other hybrids, designed and built by universities, high schools and individuals, have run in events such as the American Tour de Sol.

However, if Toyota keeps to its planned production schedule of 1,000 cars a month, it can legitimately claim to be the first out with a modern mass-market hybrid car. Even more so if they carry through with the announced intent of selling the Prius in the US and Europe within six months.

Prius operates primarily as a parallel hybrid, although it can use its 1.5 liter engine to charge its batteries. At start-up, when catalytic converters have delayed effectiveness, and at low speeds, where the gasoline engine does not run efficiently, Prius operates as an EV. It uses its onboard smarts to automatically convert

to gasoline after it picks up speed. Toyota says that Prius doubles the mileage of typical gasoline engines and halves the tailpipe emissions. During testing by Toyota, the Prius got as much as 66 miles a gallon and recorded only half the carbon dioxide output of a regular gasoline engine while trimming other tailpipe emissions by about 90 percent.

Fuel economy is a major plus in Japan, given its high gas prices (\$2.80 per gallon). Low emissions are likely to attract American buyers in the future, said Toyota chief engineer Takeshi Uchiyamada.

The Prius is about 330 pounds heavier than a typical sedan. Half that weight is from the battery.

The US government could do worse than to emulate their compatriots in Japan, who are considering substantial tax breaks and other subsidies for the hybrid, which makes the Prius even more attractive to buyers (see page 14).

In December, Toyota plans to show off the Prius at an international conference in Kyoto on global warming.

Both Honda and Nissan Motor Co. have recently disclosed their own hybrid technology and say they plan to put a hybrid car on the market in the next year. "It is necessary for cars to evolve into an ecological product," Toyota's Okuda said.

Sources: The birth of the hybrid car, *Daytona Beach News-Journal*, Oct. 15, 1997. New gas-electric hybrid car promises double the mileage. N-J wire services

Calendar of Events

December 2-4

Alternative Fuels Vehicle Conference & Exhibition, being held at the Adam's Mark Hotel in Charlotte NC. Discussions on fuels and electric power for vehicles. Costs & availability will also be discussed. Ride & Drive opportunities too. Registration is \$149 per day or \$249 for full registration. Call (910) 762-6711 to register. Hotel reservations. (704) 372-4100 or fax at (704) 348-4646 (Eastern Standard Time)

December 11-14

EVS14 is being held this year in Orlando, FL at the Walt Disney World Dolphin Hotel. Electric Vehicle Association of the Americas is sponsoring the Symposium.

December 12

Media Day only

December 13 - 14th

Public Days at the Dolphin Hotel. Public Ride & Drive hours: Dec.13th - 10am - 2pm and 4 30pm to 630pm. Dec 14th - 11:30am to 1 30pm Call EVAA at (415) 543-7800 or Fax at (415) 543-3555. (Remember this is Pacific Time)

December 29-30th

Conference for MEDIA AND AUTOMOTIVE INDUSTRY PROFESSIONALS ONLY. "Automobiles & The Environment " will discuss Electric Vehicles, Hybrids, and Clean Fuel Vehicles, in three sessions, This conference is from 1-4pm on Tuesday, December 30th. NOT OPEN TO THE PUBLIC. For information Call VL Communications Group at 1- 916-362-3400 Fax 1 -916-362-3485. In Europe, call Gordon Bruce Associates +44-1628-890-505, Fax +44-1628-890-525. There is a preview for guests from 6:30-11:00 pm, to benefit Homeless Health Care, Los Angeles. Tickets are \$50. Call Homeless Health Care LA in advance at (213) 741-0325.

1 9 9 8

January 2-11

1998 L.A. Auto Show Public Days. View the newest vehicles and those to come. Call VL Communications Group at 1 -916-362-3400 or Toll Free 888-522-8869 for pre-recorded information. Or download info at www.laautoshow.com.

January 19-22

Electro Automotive is forming a conversion workshop for the hobbyist in Santa Cruz CA. Class hours are from 10am to 5pm. Morning lessons are applied in hands-on afternoon sessions. Space is limited Call Electro Auto motive at (403) 429-1989. Fax at (408) 429-1907 or e-mail Shari at electro@cruzio.com

January 19-26

Sunrace '98 in Australia from Adelaide to Melbourne . This is a solar and electric vehicle race across Australia. Back up batteries for electric vehicles are allowed. Contact Sustainable Energy Enterprise Developments (SEED) for more information; 411 Alexandra Ave. South Yarra, Victoria, AU 3141 or call 61-3-9820-9032, Fax 61-3-9820-2027. You may also visit their web site at <http://sunrace.netlink.com>

Eagle Field EV Racing Planned

On June 19, 20, and 21, 1998 in celebration of the Summer Solstice and renewable energy, there will be a potpourri of electric vehicle events at Eagle Field in California, located northwest of Fresno. The planned events include drag racing, auto-cross racing, Electrathon racing, go cart racing, shopping cart racing, and fast furniture, as well as closed course racing, including unlimited categories and rallying. There will be an aerial display of acrobatics and WW2 warbirds. There will be Ride and Drive EVs. More events may materialize (or dematerialize).

Camping with campfires, catered food, Saturday night dinner and dancing with live band, will add additional enjoyment.

We would like to honor the memories of Lloyd Healey and Ed Rannberg for their recent impressive land speed record runs.

Contact numbers; Roy Kaylor (408) 338-2200 and Clare Bell (510) 864-9293 or (510) 521-4300.

News in Brief is compiled by Ruth M. Shipley from information supplied by the Environmental Information Network. If reprinted, please credit News in Brief Information Networks. If reprinted, please credit CE and Ruth Shipley.

EV Travels from Boston to NY

A Solectria Sunrise recently journeyed from Boston to New York City on a single charge of the vehicle's Ovonic nickel-metal hydride battery pack. The Sunrise left Government Center/Boston City Hall Plaza at 9:00 a.m. on Thursday, October 23, after a brief starting ceremony, and made the trip traveling at normal highway speeds. "The Sunrise has repeatedly proven its capability as a long-range, fully equipped EV, providing a driving experience and performance comparable to any conventionally-fueled four-passenger sedan on the market," said Solectria CEO James Worden. "Through this event, we hope to identify other industrial partners who can bring additional production and manufacturing expertise to the Sunrise program."

(SOLECTRIA RELEASE: 10/23)

Electric Station Cars Tested Worldwide

The National Station Car Association (NSCA), a nonprofit corporation that encourages the development, testing and commercialization of electric station cars, recently touted the two-seat minicars as another means of commuting between home and work. According to NSCA, the cars provide commuters instant transportation while eliminating the need to own and maintain a vehicle. The Bay Area Rapid Transit District (BART) in Northern California started the nation's first fleet of station cars. Station car field tests have also been launched in New York, New Jersey, Southern Florida, Atlanta, Southern California and Sacramento, CA. Meanwhile, France has unveiled a multi-city EV network, called the Tulip program, which provides users with a remote telecommunication device that enables them to access the Tulipmobiles.

(CURRENT: VOL. 2, ISSUE 8)

Japanese Develop Cheaper Charger

The Japanese firms Kansai Electric Power and Japan Storage Battery Co. recently announced the development of an affordable battery charging system. The new charger is less efficient than more expensive units, but will only cost about one million yen (about \$8,200). Current EV charging systems can cost as much as 30 million yen (close to \$248,000). The companies say the new charging system is able to charge batteries to 10% of their total storage capacity in a half-hour. The unit would be ideal for use in locations such as shopping malls and public parking facilities. The new system only provides about 20% of the charge EV users receive at established charging stations. The new charging units come with both 100- and 200-volt electrical outlets.

(NIHON KEZAI SHIMBUN: 10/22)

DOE Announces Gasoline Fuel Cell

The Department of Energy (DOE) and engineering firm Arthur D. Little, Inc. have announced a fuel cell that can produce electricity from gasoline, yielding twice as much useful energy per gallon as an internal combustion engine. A fuel cell-powered car could be refueled in minutes from any gasoline station. Moreover, the device produces 90% less pollution and can get twice the gas mileage of a comparable car with an internal combustion engine. Methanol can be reformed more easily than gasoline but a methanol reformer is too big for a car and there are very few methanol fueling stations around the country. Chrysler Corp. has said it will build a fuel cell car that runs on gasoline. The fuel cell should be available by the year 2010.

(NEW YORK TIMES: 10/21)

Rannberg Team Sets New Record

Rannberg Team Racing recently set a new international land speed record for an EV on the Bonneville Salt Flats at the Bonneville Speedway in Utah. The two opposite-direction runs, timed and sanctioned by the Federation Internationale de l'Automobile (FIA), were completed on an 11-mile course at a round trip average of 192 mph. This surpasses the previous record of 183 mph set by General Motors' Impact. Driven by Eric Luebben, the "Lightning Rod" EV was built by Arivett Brothers of San Bernardino, CA. Luebben set a new national record of 207 mph, which was timed and sanctioned by Bonneville National, Inc. (BNI). The BNI record was previously held by Lloyd Healey of San Antonio, TX-based Healey Motorsports at 198 mph. During his second run, Luebben achieved a top speed of 213 mph.

(CYBORTRONICS MEDIA: 10/15)

Students Take EV Challenge

Students will have the opportunity to demonstrate their EV inventions at the EV International Challenge (EVIC) on December 12-14 at the Walt Disney World's Dolphin Hotel in Orlando, FL. The event, which is co-sponsored by Florida Power and Light Company (FPL), Toyota, and the Department of Energy, will be held in conjunction with the 14th Electric Vehicle Symposium. The EVIC will challenge elementary through college students to design, build and operate future EVs with the help of EV industry engineers. Student teams will compete their EVs at various events, including performance tests, video projects and troubleshooting competitions.

(EVIC RELEASE: 10/2)

SatCon Gets HEV Electronics Contracts

Delphi Energy and Engine Management Systems, a supplier to the Department of Energy (DOE)/Chrysler Hybrid Electric Vehicle (HEV) program, has awarded multiple contracts totaling more than \$980,000 to SatCon Technology Corporation. Under the contracts, SatCon will develop advanced, high power-density electrical machines, electronics and controls for Delphi and Chrysler. The contracts will be performed over the next six months and will build on technologies SatCon created for Chrysler under its Patriot Hybrid Electric Racecar Technology Program. SatCon designs, develops and manufactures advanced electric motors, high density power electronics, suspension systems, propulsion systems and flywheel energy-storage systems for a variety of commercial and government customers.

(SATCON RELEASE: 10/6)

Alameda Gets Zinc-Air Battery

Alameda, CA has become the first city in North America to gain access to zinc-air battery technology from the Kummerow Corporation of North America (KCNA). KCNA and the Alameda Bureau of Electricity have signed a two-year agreement to provide the city's EVs with Kummerow's Zoxy Blitz Zinc-Air batteries. "Alameda's goal is to become an internationally recognized center for EV development, demonstration, production and use," said KCNA president Hans Werner Kummerow. The Bureau will have exclusive rights to use KCNA's battery technology in its service territory. Kummerow will assist in the development of a regenerating infrastructure for the Bureau's EV fleet. The Bureau's Public Utilities Board recently endorsed the Alameda Electric Vehicle Model City Strategic Plan.

(BUSINESS WIRE: 10/6)

GM Sells Chevy S-10 Electric

General Motors is now selling its Chevrolet S-10 Electric pickup truck, the first EV built by a major automaker that is engineered to meet the needs of a variety of commercial fleet operators. According to Chevrolet, nearly 20 major utilities—including Arizona Public Service, Southern California Edison, the Sacramento Municipal Utilities District and Virginia Power — have committed to purchasing the S-10 Electric over the next three years. Further, the U.S. Air Force and the U.S. Navy have committed to buying some of the EVs. The sticker price of the S-10 Electric is \$33,305, but the cost can be reduced through tax breaks and other subsidies. The truck reportedly has a top speed of 70 mph, a payload of 950 pounds and a range of 40 to 60 miles on a charge.

(KEEPING PACE: SEPTEMBER 1997)

Mitsubishi Develops Lithium-Ion Battery

Japanese automaker Mitsubishi recently announced that it has developed a lithium-ion battery in a joint effort with the Japan Storage Battery Company. The companies have developed two battery models, one for use in EVs, the other for use in hybrid EVs. Mitsubishi said it hopes to supply the batteries to 2,000 vehicles annually beginning in the year 2000. The new batteries use manganese, instead of cobalt used in current lithium-ion battery technologies. Since manganese is much cheaper and more plentiful than cobalt, the companies say production costs have been cut by approximately 40%. Lithium-ion battery technology offers improvements in energy storage capacity and acceleration over lead-acid batteries commonly used in commercially available EVs.

(KYODO: 10/3)

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Popular Mechanics Reviews EV1, EV Plus

Popular Mechanics magazine recently took the General Motors EV1 and the Honda EV Plus on a test drive to determine performance characteristics. The test drivers said the EV1 can accelerate faster than the BMW Z3 Roadster, handles well and stops effectively. While the test drivers only got 54 miles on a charge, the president of the EV1 Club told the magazine he has driven over 100 miles on a charge. The test drivers found the EV Plus to handle well, and it averaged about 60 miles on a single charge of the vehicle's two dozen NiMH batteries. While the EV1 was much faster and slicker, the test drivers ultimately decided the EV Plus was "more efficient, more utilitarian and more comfortable." The Honda EV Plus is a four-passenger ultra-minivan, while the EV1 is a two-seater.

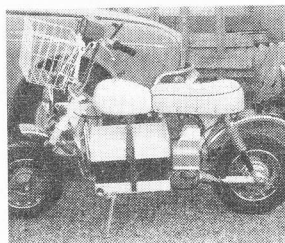
(POPULAR MECHANICS: JULY 1997)

For Sale

1981 Jet Electrica (Ford Escort). Refurbished, 4-spd, 96V/400A, Prestolite, new battery (16x USB 145), DC/DC, new paint. \$8,995. Call (650) 964-3974. (California)

1980 Lectric Leopard, white, good shape, good batteries, original \$2500. Also 1975 CitiCar, S/N2975, near-original, running, but batteries nearly gone, \$900. Also have CitiCar chasis, \$250. Call 912/477-8718 (EST) early evenings. (Georgia)

1992 Geo Metro conversion. Excellent condition. 120VDC-Advanced 8 HP DC motor, Curtis controller, electric heater, 2 KVA on board charger, 4 KVA off board charger. 31,000 miles - 60 mile range at 50 mph. \$11,000. Call Jim 7-9pm at (715) 824-2069. (Wisconsin)



1960 Henny Kilowatt Sedan 12-6 volts, 1-12 volt battery. Built-in 110 charger. \$6000. N.O.S. Auranthentic 1970 Electric motorcycle, \$2000 or both for \$7000. Call Carlo at (1) 702 361-1933. (Nevada)

1980-Jet-600-Electra-Van. 16,000 miles, 21 H.P., G.E. motor, Curtis-1221 controller. \$800. garage wall charge, 12 W. charger. Tow-bar. Range-12 miles. Needs 18 batteries. \$4000. Call (707) 263-6652. (California)

1980 Plymouth Horizon conversion. 4-dr hatchback, 4-sd manual transmission, 96 V Prestolite DC motor, Pulsomatic controller, Lester charger, \$3000. Call Bob at work (650) 572-8875. (California)



1981 VW, 9-inch Advanced motor, Curtis 1221B controller, K&W on-board charger, new tires and 17 T125's (installed 3/97). Nice paint/upholstery. Driven daily. \$3000. also 7 inch Prestolite \$250. Call Nathan Rambo at (805) 482-3702.

1984 Fiero conversion, 9" ADC motor, Curtis 1231C controller, 108V new Trojan batteries, 115 VAC on-board charger, 43K electric miles, call for more information. \$8000/obo. Call (520) 575-4687. (Arizona)

WANT ADS: Print clearly or submit typed copy of your ad with your name, address, and phone number. The EAA is not responsible for the accuracy of ads. Want ads must be received before the 1st of each month and must include payment to run in the next issue of CE.

\$10 for the first 35 words. Each additional word, 25 cents. Want Ads are available to EAA members for the sale of electric vehicles, equipment and parts only. If you want to run your ad in more than one issue, please specify and include payment for each issue requested.

Photographs of your vehicles may be submitted with your ad. If room is available, we run one photo each issue. These photos will not be returned. Contact Clare Bell @ (510) 521-4300 for more information.

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1 ad	\$400 ea
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Ads may be placed for 1, 3 or 12 months. Camera-ready copy for each ad must be submitted along with payment. Ads may be submitted on diskette in TIF or EPS format on the PC or MAC. For 12 ads, an invoice will be billed quarterly. A minimum of 3 ads is required to be prepaid.

Ad Deadline

The Deadline for camera-ready copy is the **1st of the month.** Copy received after the 1st will be run in the next issue. Ads will be placed in the priority received. Prepaid ads will receive 1st priority. Make check payable to EAA. Camera-ready copy and payment for the ad should be sent to: Contact Clare Bell, EAA Editor @ (510) 521-4300 for more information.

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Printed materials

CE	Selected Current EVents (<i>specify specific issue</i>)	\$3.00 each issue
CEFY	Current EVents - Full year (<i>specify specific year</i>)	\$20.00 each year
PB001	Discovered:The Perfect EV Battery	\$ 2.00
FW001	Flywheel Energy Storage	\$ 5.00
BG1997	1997 Buyer's Guide to Electric Vehicles (April 97 issue CE)	\$ 6.00
BG1996	1996 Buyer's Guide to Electric Vehicles (Feb 96 issue CE)	\$ 5.00
BG1995	1995 Buyer's Guide to Electric Vehicles (Feb 95 issue CE)	\$ 4.00
TT001	Team Tucson Land Speed Record Plans	\$ 5.00
IDX001	EAA Current Events Index - 10 Years!	\$ 4.00
XA100	EAA XA-100 Hybrid	\$ 5.00

Other EV Items

BS800	Bumper Sticker with 800 number 3.75x15 inch	\$3.00
BS002	Bumper Sticker with "The Switch is On", 3.75x15 inch	\$3.00
CAP001	100% Cotton Cap, Forest Green with Yellow Ink	\$8.00
DC001	Decal - black and red, 3x9 inch, for Window	\$3.50
KC001	Key Chain with LED light and "30 Years 1967-1997"	\$2.50
MUG002	Thermal Mug	\$6.50
MUG003	Porcelain Mug	\$5.50
PS001	Polo Shirt w/ embroidered logo select shirt color & size: Teal Green, Forest Green or Navy (s,m,l,xl)	\$30.00
SS001	Auto Window Sun Shade with Logo	\$8.00
PN001	Ball point writing pen with EAA and 800 number	\$1.00
CS001	Current Solutions/Motor Show Video Tape (14 minute runtime)	\$15.00
WL001	Window Literature Holder (fits pages 8.5 x 11 inch)	\$25.00
PARK01	'EV Parking Only' Sign (18"x12") green icon	\$25.00

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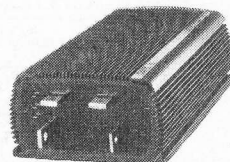
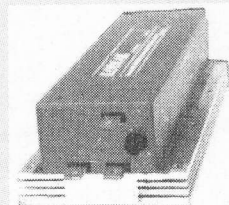
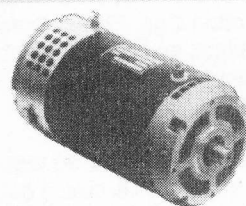
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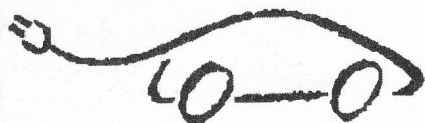
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