



Electric Auto Association

CURRENT EVENTS



June-July '99

Promoting the use of electric vehicles since 1967

Vol. 31 No. 6&7

Encouraging Smarts with Electric Karts

by Clare Bell

How do you get local Alameda 5th graders enthusiastic about improving math skills while gaining pride in their community and expertise in EVs? Hank Ryan of Concrete Action has an incentive they can't resist — electric go-karts.

Ryan has come up with an innovative thematic EV education package designed to be used by substitute teachers in order to introduce EV readiness and awareness without having to displace any other subjects in the middle school curriculum. In addition, Ryan's program makes use of a proposed Alameda After-School EV Design and Build facility which includes an after-school learning center to reinforce and supplement the in-school instruction. Through the Alameda design/build center, kids can build their own EV go-karts. They earn parts by successfully completing specially designed computer modules in math and science. Alameda businesses with an interest in developing technologically proficient people for EV and renewable energy industries can pledge additional premiums toward wheels, motors, frame components and other e-kart parts.

The more the kids learn, the further along they move toward completing their own EV go-kart.

Here's a closer look.

"EV Hands-On" with Substitute Teachers

Developing a new curriculum and encouraging a school district to adopt it is difficult because any new subject has to compete with existing ones. Ryan

avoids this direct and frustrating competition by using the substitute teacher format. Often a nonproductive "baby-sitting" session results when illness or personal concerns prevent the regular teacher from being in class. Ryan changes that completely by having the substitute plan ahead with the full-time teacher to bring in a full day series of lessons focusing on EVs and local renewable resources. These lessons are designed to be as much "hands-on" as possible,



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IN THIS ISSUE

In This Issue

- 1 It really all begins with education. Plant an idea like a seed and it will take root and grow through adulthood. This month Clare Bell explores the educational revolution taking place in Alameda and how this model could spread across the country.
- 3 For 30 years the EAA has grown by helping each other and working together. It is no different today than it has been in the past as EAA members pass the tradition on. No better example of this can be found than Terry Wilson's own experience with "The EAA Way".
- 6 Sometimes with technology we can get lost in the details. Here Fred Miekka steps back and takes in the big picture with AC/DC motor technology.
- 9 With electricity deregulation is the environment better off today than it was in the past ? Reading Stan Skokan's report might surprise many.
- 10 For many in the electric vehicle movement the development of a motorwheel is one of the great goals to work toward. Today Fred Miekka has developed what some believe is the ultimate motorwheel for an E-bike. He calls it his Air-Gap Magnetic Drive.
- 12 Through the years EAA members have dreamed of what it would be like to have EV charging stations throughout the country. Today we are seeing it come true, but not the way we expected it. The charging stations being put in are inductive systems and incompatible with EAA style conversions. Chuck Hursch explores this issue as he reports from the Larkspur Ferry Terminal.
- 22 **News in Brief** - Over three more pages of the news nuggets we look forward to each month.
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CALL FOR BOARD MEMBER NOMINATIONS

It's election time again and the EAA is looking for volunteers to serve on it's board of directors. If you think you would enjoy working on the board why not be placed on the EAA national ballot ? Nominations should be sent to:

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EAA Election Committee
P.O. Box 6661
Concord, CA 94524

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spcorn@pacbell.net
- or -
ebeaa@juno.com

PHOTO CREDIT - COVER

Alameda students proudly pose for a group shot with their experimental vehicles.

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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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Working Together

The EAA Way

By Terry Wilson
EAA Historian

This is a story about an Antique Electric Car at the Palo Alto Concours d'Elegance, held June 20 th at Stanford University. It is also a story about cooperation and accomplishment.

Silicon Valley Chapter President Will Beckett sent 2 proposals to the History Museums of San Jose asking permission for the Electric Auto Association to have their 1916 Detroit Electric auto, trailered to Stanford University on September 18 '99 for the Silicon Valley Electric Auto rally and also to the Concours. Both proposals were accepted. Linda Poe is the Registrar at the History Museums, and from the start I found her attitude outstanding, here was someone who we could work with. Linda is currently being trained to drive the Detroit, and will be driving it around at the rally in September. So with her cooperation the Detroit was sent with 2 Museum representatives, Allan Greenberg and Bob Young. At the Concours some vehicles are selected to drive up a ramp in front of the grandstand and the driver interviewed. The Detroit was selected and as the official wrote down the information about the vehicle he asked who would be the driver. Both Allan and Bob pointed to each other. The official then turned to face Bob and said, "And what is your name sir?" Bob said, "Allan Greenberg". And that is how Allan became the driver. During the interview Mr. Greenberg was kind enough to thank the Electric Auto Association for bringing them to the Concours. Could this have been due to the subtle hints by Will Beckett?!!?

The Detroit got a lot of attention. Even before I left home, Bruce Parmenter called and said the car was drawing well, and I should hurry up and get there cause he

needed a brake! There is one very special feature about this car. Yeah it's electric, yeah it's tiller steering, yeah it's really old. But this car can be driven from the front seat, or from the back seat! Will Beckett says he was told if your spouse didn't like your driving,

shunt had burnt out. Well guess what I had brought to display? I had purchased a dash gauge from a turn of the century Baker Electric car, at a swap meet, and it is the same gauge as the Detroit! I had passed the gauge on to Ed Holzinger, past president



The History Museums of San Jose's 1916 Detroit Electric.

they could commendeer the vehicle from the back seat! The ability to drive from the back seat allowed your guests to turn the 2 front seats around to face the driver, who could look past the passengers and watch the road ahead. At the turn of the century the speed limit was from 3mph to 10mph and later to 20mph. So the Electric Vehicle was preferred by wealthy socialites, and these vehicles were marketed especially to women, wealthy women. As early as 1907, Electric cars cost from \$1500 to \$4000.

When I arrived at the Concours, Bob Young told me that their amp meter and

of the East Bay EAA chapter, to display at his EV museum, the EV Mobile Museum, at his home in Berkeley, Ca. Ed and I had agreed if the History Museums of San Jose ever needed the gauge, it would be preferable to have the working components, in the working vehicle, we just wanted a display. So I had borrowed it to display at this and other upcoming events.

Shortly after turning over the gauge, a man walked up to me while I stood next to the Detroit and asked if anyone would have a use for a dash gauge out of an old Rauch Lang Electric car. (oh hell yes) So I walked out

to his car, he had it in his trunk, wondering how many other people besides us were driving around with these thing in their cars. Sure enough it was the same gauge also! As I was explaining that I couldn't help them with the shunt, Bob Schneewis walked up, took a look and said he would make them one!!

What a day!

This type of cooperation is the reason I decided to write this, my first, article. Instead of everyone out to "get" for themselves, we all helped each other "get" what the others needed. And after all the Concours is a charitable event. So the Concours got a vehicle that drew the patrons, the patrons enjoyed this rare and unusual vehicle, the History Museums of San Jose got the public exposure, and the EAA got exposure (and a chance to show how we can help with the resources of

our membership).

Working together we accomplished so much good.

Thank you to everyone involved.

Terry Wilson<eaa.historian@n2.com>

History Museums of San Jose
1650 Senter Rd.
San Jose, CA 95112
(408)287-2290

ride the antique Electric trolley and there is more to see

Ed's EV Mobile Museum (private residence, please call first)

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(510) 849-4973

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The Detroit was selected to be driven up the display ramp.



The little electric got lots of attention.

DID THE DOG EAT YOUR EV PREVIEW 2000?

Or did your gasoline car leave oily tire tracks on the cover?

Well, never fear! EAA in its wisdom bought EXTRA copies (for those unfortunates who harbor magazine-eating puppies or vengeful petro-mobiles). So just order up another for your friendly EAA store and it'll be right in your mailbox. Just be sure that the above-mentioned malevolent entities don't get to it first.

For those unfortunates who aren't members and did not receive this excellent survey of EVs and HEVs available by the year 2000, JOIN EAA NOW! and order a copy via the EAA store order form, conveniently located on p. 31.

ELECTRIC VEHICLE COMPONENTS

Wilde EVolutions wants to be your source for Electric Vehicle components. We stock hundreds of items and most orders are filled and on their way within 24 hours.

Our photo-packed catalog is a comprehensive resource for all the items you need to build and maintain your Electric Vehicle. You may order your personal copy by mail, fax or our toll-free phone number. For \$5.00 you get both the best EV parts reference available and a \$10.00 "Wilde Cheque" good toward your first order.

Experience gained through years of building, racing and driving EVs daily allows our parts team to provide you with service unmatched in the EV industry. Our only business is helping you meet your EV goals. Please call and tell us how we can be of assistance.

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AC and DC Electric Motors

an overview

by Fred Miekka

Electric motors are devices designed to convert electrical energy into mechanical work. One of the first electric motors was built by Benjamin Franklin. Benjamin's device consisted of a suspended metal ball between two bells. When the bells were statically charged oppositely, the suspended metal ball transferred electric charge thereby ringing the bells. Although the motor did not produce rotating torque, this device can be considered to be a motor since it does convert electrical energy into mechanical work. Although other electric motors have been made which use the attraction and/or repulsion of charged members to create mechanical work, virtually all electric motors ever built utilize magnetic force rather than electrostatic force.

Electric motors employing magnetic forces (almost every electric motor ever built) use magnetism as the driving force. A changing magnetic field causes rotation between the rotary part of the motor (the rotor) and the stationary part of the motor (the stator).

Electric motors can be classed into one of two different categories. AC electric motors, and DC electric motors.

In AC electric motors, alternating power is supplied to the motor causing the magnetic field produced by the motor windings to alternate or change. This change is independent of rotor position. The rotor then tries to catch the changing magnetic field produced by the stator windings. Various interactions are possible including magnetically dragging the rotor in the resulting rotating field, or even inducing temporary magnetic poles in the rotor. The important thing to bear in mind is that in AC electric motors the magnetic field in the stator

windings is externally alternated independently of the rotor position. This definition of AC electric motors is not found in most textbooks, and many engineers may disagree with it. I have found that from personal experience this definition helps to clear the air in distinguishing the differences between

electromagnet windings are electrically connected to isolated strips of copper called a commutator. The brushes ride along the commutator surface to provide power to various rotor electromagnet windings based on position.

One type of electric motor which has



Pictured is the placement of the magnets in the inside wheel rim and the commutation sensor.

AC motors and DC motors.

In DC electric motors, the rotor position determines which electromagnets are switched on and with what polarity. In this sense, a DC electric motor is like a dog chasing its tail. The faster the dog chases, the faster the tail moves away. The magnetic field in the motor is always kept ahead by rotor position sensing. Traditional DC electric motors use brushes to transfer and switch power to the electromagnet windings in the rotor. The rotor

been around for some time has one set of electromagnets in the stator, one set of electromagnets in the rotor, and brushes. The windings are wired in series. Because of the properties of electromagnets in electric motors, the rotor of such motors will spin the same direction regardless of the direction of current flow. Thus when AC power is applied, the rotor continues the same direction of motion despite the fact that the current is changing direc-



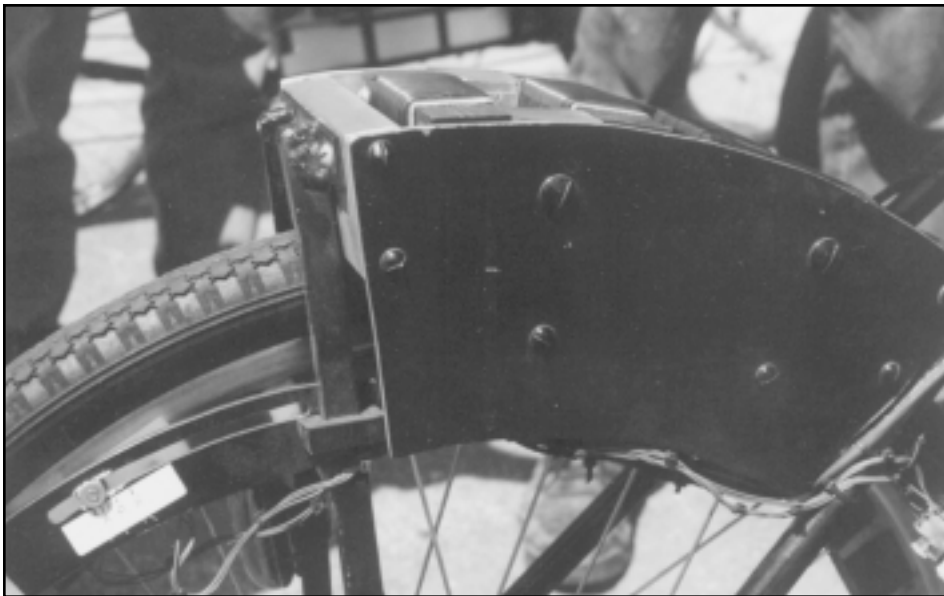
BASICS

tion. Such motors are called universal motors and will also run on DC power. Based on the above definition, such universal motors would be classed as DC motors since power is switched based on rotor position even though it may be running on AC power.

Stepper motors are motors having definite stable rotor positions at key points along the rotation path. When electric power is applied, the rotor takes a step. This occurs each time the current in the stator electromagnets is reversed. Although most people view stepper motors as DC motors, according to the above definition, these motors would be classed as AC motors. The rotor follows changes in externally applied voltage rather than the electromagnet voltage

these motors are DC is the fact that their torque curves are almost identical to brush timed permanent magnet DC motors. (maximum current draw and torque at stall)

In the DC brushless electric motor the rotor has permanent magnets and the stator has electromagnets. Because there are no electromagnet windings in the rotor, no electric power needs to be provided to any moving parts. Rotor position sensors (photo cell gates, Hall effect sensors, reed switches and other devices) can be used which sense rotor position without contact. The signal from the sensors is then used to switch power into the electromagnets via a transistor interface. In short these motors have similar torque characteristics to brush timed permanent magnet DC electric motors, without the



Shown is the placement of the four large coils with commutation sensor.

changing based on rotor position

In recent years, electronic control circuitry has become simple and cost effective. Such circuitry has evolved to the point that brushes can be eliminated from DC electric motors. The result is increased reliability. Because these motors are brushless, some engineers would class these motors as AC. I class them as DC since electric power is switched in electromagnet windings based on rotor position. Further evidence that

added motor friction and wear associated with brushes. Because they are true DC motors, they can be made to run very efficiently from simple controllers.

By contrast, AC electric motors run best off of a sine wave shaped alternating voltage curve. Such sine wave curves are difficult to obtain from battery power.



Call / Request for Technical Articles

A new emphasis will soon be placed on technical articles in Current Events. Anyone who would like to share their design ideas, or experience in hardware are encouraged to submit articles to CE. For those interested, please contact Kurt Bohan at (510) 814-1864 or Fax and message number at (510) 864-9293.

A Call for Letters to the Editor

Read something in CE you would like to comment on? Do you feel something is being left out? Send us a "Letters to the Editor". You can E-mail us, Fax us or use snail mail at the addresses below:

E-mail: eaanews@aol.com

Fax: 510-864-9293

Snail mail:

**EAA/Current Events
Hanger 20, Suite 146
2701 Monarch St.
Alameda, CA 94501**





Official Notice of The Electric Auto Association's National Endurance Range Rally

A call to all national members for a chance to win and hold the historic EAA **perpetual trophy**. Help us return to the spirit of the early EAA national rally competition for **ultimate range** and performance.

Organized by the East Bay Chapter's Special Events Committee.
To be held on the East Bay Chapter's traditional rally date of:

10:00 am, Saturday, August 28 1999

at: Pacific Bell, 2600 Camino Ramon, San Ramon, CA



How to get there:

From highway 680 heading north through San Ramon - exit at Bollinger Canyon Rd and head to the right (east), then turn left (north) on Camino Ramon (about 1/4 mi.). Pacific Bell Building is on the left about 1/4 i. north on Camino Ramon. Turn in at Pacific Bell sign, and head immediately to the right.

From highway 680 heading south through San Ramon - exit at Bollinger Canyon Rd and head to the left (east), then turn left (north) on Camino Ramon (about 1/3 mi.). Pacific Bell Building is on the left about 1/4 mi. north on Camino Ramon. Turn in at Pacific Bell sign, and head immediately to the right.

Public Transit - From either Walnut Creek or Dublin BART stations, take the County Connection route 121 bus (\$1.25) and get off at the San Ramon Transit Center just off Camino Ramon. Cross Camino Ramon heading west, and walk south on Camino Ramon - the Pacific Bell building is the only building on the right (west) side of Camino Ramon on that block.

Facilities available: Very limited charging (2 EVI 100s - new models so some cheater cords won't work). Restrooms are available in the building. Fast food restaurants are located on Camino Ramon about 1 mile north of the site or on Bollinger Canyon Rd about 2/3 mile south of the site. Lots of parking for tow vehicles, friends, etc. Trees in parking lot offer some shade.

Rally route: 3 miles, mostly flat surface streets. Speed limits from 25 to 40 MPH.

for more information, contact:

Anna Cornell, Special Events Coordinator

Tel. 925-685-7580 (10 am to 6 pm) or Email: ebeaa@juno.com



Is the Electricity Deregulation Helping the Environment?

Report By Stan Skokan

Our legislators told us not long ago that the deregulation of the power industry will promote the growth of environmentally friendly renewable energy sources. Recently I noticed a statistic enclosed with my electric bill from PG&E. I compared recently published numbers with the ones published by the same company ten years ago. Here they are for you to judge:

Table 1.

It appears there are some improvements and some setbacks. In general in 1989 about 20% of PG&E's sources could be classified as "Renewables", Today only 10% are listed. There was a decline in the percentage of power generated from Biomass Geothermal and Cogeneration. The good news is that the proportion of Solar and Wind approximately doubled. The bad news is it still only amounts to 2% of the total.

The worst news is the increase in the proportion of Coal generated power. In 1989 PG&E did not use any Coal power. Today the proportion is over 20%. There was slight increase in generation of Hydroelectric and Natural gas power. The decline in the Nuclear power proportion is only due to the increase in total generated power. The Diablo Canyon power plant is still the only one and generates the same amount of power as it did ten years ago.

One can get the impression from observing the above numbers that the only major growth accomplished by deregulation process is the growth of coal power. Is it that the industry is focused more on profits today? The power industry was regulated ten years ago to serve the public interest. Are we making social and environmental protection progress, or are we getting greedier?

Pacific Gas & Electric Power sources:

Source	1989	1999	trend
Renewable	%	%	
Biomass	3		red
Geothermal	11	5	red
Small Hydro/Cogen.	6	2	red
Solar	0.5		green
Wind	0.5	1	green
Other Sources			
Oil	2	0	green
Coal	0	21	red
Large Hydro	19	23	green
Natural Gas		30	green
Nuclear	19	15	green
Other	10	0	
Total	100	100	

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ONE MONTH FREE MEMBERSHIP

All EAA members who have an active membership, or have currently renewed right now, will get a one month membership extension free. It's our way of saying thanks for being so patient during CE reorganization, and to just let you know that the EAA is your association. For more information call Anna Cornell at: (925) 685-7580 - or - E-mail: ebeaa@juno.com



Birth Of The Air-Gap Magnetic Bicycle

by Fred Miekka

When I was 18 years old my older brother Jim talked me into taking a bicycle trip from Sudbury Massachusetts (where we lived at the time) to Spruce Knob West Virginia and back. It was a two week trip covering 1,500 miles. I rode a three speed for comfort reasons while he rode on his ten speed. Things went reasonably well until we climbed out of the Delaware river valley. It was 103 degrees out and the humidity was high. I was sweating profusely. I was also tiring quickly and was straining to climb out of the valley. It was at this point that I was starting to have second thoughts about finishing this trip. As cars sped by me I wished that I was riding in one of them. While riding through the central portions of Pennsylvania I was very tired and started thinking seriously about the benefits of adding propulsion to a bicycle.

There are many benefits of bicycle riding including quiet transportation and fresh air. Because of these benefits you can really enjoy the outdoors. Adding a gasoline engine to a bicycle creates noise and fumes. As I continued riding, my thoughts kept drifting further and further into the area of electric propulsion. A quick calculation revealed that an ordinary car battery could theoretically provide a range of 40 miles. Unfortunately getting the energy efficiently from the battery to the road is no easy task. Furthermore if the desire is to use the system as an assist, keeping the propulsion system from interfering with pedaling while at the same time assisting seemed impossible. After that two week trip I built several friction drive electric bicycles. Friction drive is the use of a roller placed against one of the tires to transfer motive power from the electric motor to the wheel. Unfortunately the overall efficiency of friction systems from power in the battery to mechanical work at the road is only about 35 %.

Over 10 years had passed since my bicycle trip to West Virginia when I woke

up out of a dream. In the dream I rode an electric bicycle having an advanced magnetic propulsion system. I quickly grabbed a pen and paper and sketched out as much as I could remember. I looked at what was in that sketch and everything seemed to be there for making a working system. It looked too good to be true. Could this system really be what I wanted to have back when I was bicycling through the state of Pennsylvania? An electric propulsion system offering high efficiency, not interfering with pedaling, and having no added moving parts to wear out.

A couple of years later I built a prototype wheel mounted onto a wooden box, filed a patent application, and founded Miekka Magnetics. Several prototype electric bicycles were built using this advanced magnetic propulsion system. This system directly drives the wheel from the edge using magnetic force. The driving magnetic field is produced in an electromagnet assembly. This field crosses a small air gap to interact with permanent magnets located

at the edge of the wheel. There are no added moving parts to wear out, and the electromagnet assembly is constantly cooled by moving air. The open design allows rain and mud to wash right through the propulsion package without incident.

The first commercial electric bicycle to be sold is called "easy bike" it employs 5 pounds of ceramic permanent magnets in the rear wheel, a 15 pound electromagnet package, 14 pounds of lead acid batteries, and a couple of pounds of other assorted hardware. The introductory MSRP of this bicycle is \$1,495.00

This particular magnetic bicycle is a pleasure to ride. As you slow down, more propulsive power is provided. Lightly touch the switch and you have substantial power adding to your effort at high efficiency and without interference. There are two speed ranges on this particular model.

The propulsion system has been tested for overall efficiency under the conditions of dynamic load. At 20 MPH the high speed



A full picture of Freds newest model Air-Gap Magnetic Drive E-bike.

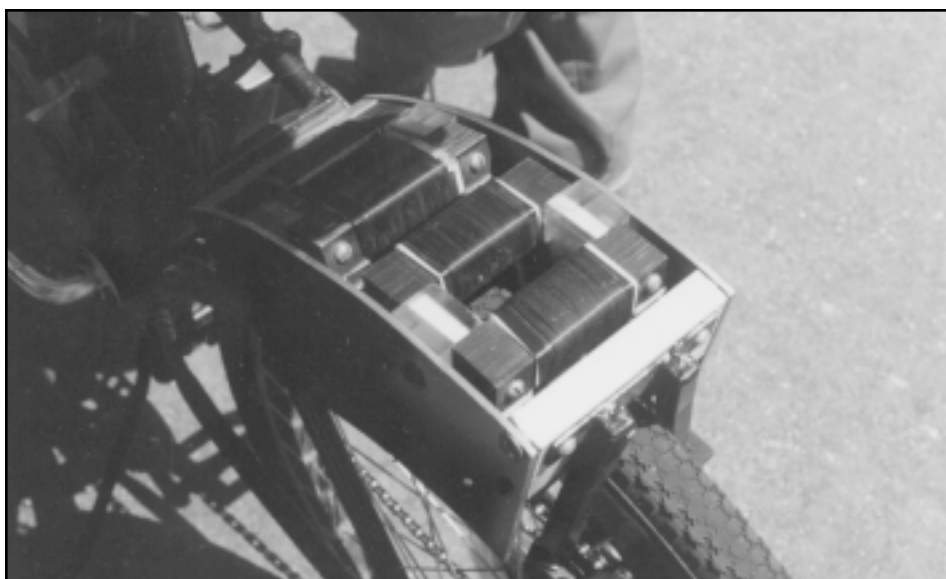


Shown is a good view of the inside rim magnets that are at the hart of Air-Gap Magnetic Drive Technology.

range will draw 100 watts from the battery and contribute 90 watts of mechanical work to the road. An efficiency of 90 percent. 90 watts is about half of the power required to travel 20 MPH on the level. Under these conditions the range on the level is over 30 miles. At 15 MPH the high speed range will draw 200 watts of power from the batteries and deliver 150 watts of mechanical work to the road. An efficiency of 75 percent. 150 watts is

enough power to propel the bicycle on the level at 15 MPH. Under these conditions the range on the level is about 15 miles.

The second model will be unveiled at the beginning of the millennium. It will have a more powerful propulsion system and increased range. It will be called "stealth rider" because of its power and whisper quiet operation. The suggested MSRP of the stealth rider will be about \$ 2,000.00.



Pictured are the four large coil windings that react against the magnetic motorwheel rim.

Help EAA Grow Support Cars for Clean Air

**Donate a car
and receive a
tax deduction**

EAA has already received its first donated gasoline car (in Sacramento), made \$700 on it and generated a handsome tax credit for its owner. Help continue this program by finding other cars. Donate your own, persuade a friend or relative, or talk to your local mechanic, who often has customers that decide not to repair a car and need to get rid of it. Do yourself a favor by knocking something off your income tax while helping EAA.

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NO Conductive Charging For First Free Public EV Station in Marin County, Calif.

By Chuck Hursch

President, SF North Bay Chapter, Electric Auto Assoc.

Present was Inductive but NO Conductive Charging in the First Free Public EV Station in Marin County, Calif.

Bob Wing and I showed up the morning of June 10 for the ribbon-cutting ceremony dedicating two new public inductive charging stations and accompanying reserved spaces at the Larkspur Ferry Terminal in Marin County. As I walked from my own EV on the far side of the large and very full parking lot to the ceremony area, my thoughts were that this is turning into an inductive charging world, even though there are more EVs in California using some form of conductive. "The only publicly-accessible charging stations in Marin that I am aware of are right here, and they are inductive charging". "All those years of loyal EVers looking forward to a comprehensive charging infrastructure, and now they can't use it, since they can't use the inductive charging technology" was the other thought competing for space in my head.

These are troubling thoughts! Once I reached the place where the ceremony was to happen, I found nine beautiful GM EV1s. Four were leased, driven by Jerry Hudgins of Point Reyes



*What all the fuss is about, GM's Magnecharger.
Photo by Chuck Hursch*

Station, by Michael Schwabe, Union City, Dale Missimer, San Rafael and Scott Gaidano, Novato. The others EV1s came by van, licensed from other states as part of the GM tour. Some were driven from the local San Rafael Saturn dealer. The media were there to cover all the shiny new metal and plastic. Additionally, a lone Honda EV-Plus driver showed up, parking his conductively-charged car in the distance, no charging stations here being available to him.

Marin County Supervisor Hal Brown opened the ceremony welcoming the new clean air vehicles. Ellen Garvey, Executive Officer of the Bay Area Air Quality Management District (partially funded with state and federal money) urged greater use of alternative fueled vehicles, and Scott Gainado told of his advantages in using his EV 1 for most SF Bay area trips. When he needs to go longer distances he has two gas cars, but has not used his Lexus hardly at all in the last year and will put it up for sale.

On the GM table at the morning's ceremony was Edison EV's list of "Public Inductive Charging Stations",



LOCAL NEWS



View of the opening ceremonies. Rick Ostrov of GM addressing the crowd at the Lakspue Ferry Terminal. Photo by Chuck Hursch

12 pages long, each charging site taking one line (the So Cal sections are awesome). So I decided to call Edison EV the afternoon after the ceremony, and was somewhat pleasantly surprised that there were live and busy phone lines, even a wait before I got a real human. I had pretty much thought they were shutting up shop, but I certainly didn't get that feeling on the phone (maybe it will be a long drawn-out process). I

ordered a comparable list for conductive charging stations, which has since arrived - not bad, but still humbled in my thoughts by that impressive inductive list.

Other northern California counties have public conductive charging stations, many at Costco stores. The city of Sacramento, a hotbed of EV activity, has over 230 free charging stations at public parking garages, with free parking if you use an EV, along

with other locations. State employees can use a State credit card to drive between the Capitol and the Sacramento airport in rented EVs. Other SF Bay area locations have charging stations at Alameda Point, the deactivated Naval Air Station, one at SFO and others.

I had a nice conversation with Rick Ostrov, the GM Manager of Electric Vehicle Marketing Services San Rafael, whom I met once before at the Stanford EV Rally, in '97. When asked about whether someday it might be possible for owner-built EVs to ever use the inductive technology, he encouraged me to write a letter that he will forward to GM management. Basically, the feeling I got was that he was encouraging me to explore this possibility, and for us to work with GM, rather than being antagonistic. There should be some thought given as to whether this could be made to work. As GM staff noted, the prices are coming down on their Magnecharge technology.

Chuck Hursch <chuck@sl.com>
NBEAA



A pair of EV1's sippin the juice. Photo by Chuck Hursch

SHOP
AT THE
EAA
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SEE PAGE 31



EV EDUCATION

Karts *Continued from page 1*

mixing applied science and math with real EV hardware. “Teachers and parents perceive strong added value when students are challenged by and respond enthusiastically to the EV teaching experience,” Ryan states in his proposal. This is not just an armchair claim, for Hank Ryan has done it several dozen times with grade levels 4-7 and witnessed the excitement it generates. One of his favorite gambits in new classrooms is to offer simple algebra to fifth graders disguised as “Find the Apple” and “Topsy-turvy”. When the class works to successfully solve the problems, he then shows them the eighth grade algebra book (page 151), the exact same problems came from. “Teachers do what they do for reactions I get from kids when they discover they have such potential. Kids really love challenges and this method helps them build confidence.”, Ryan claims.

Palo Alto JLS Middle Helps Out

In order to get a taste of what such a program might be like, Ryan visited Jane Lathrop Middle School in Palo Alto. Teacher Brad Booth and his students run the Electric Moose Club, an after-school program where kids build small EVs (see back issues of CE for Electric Moose EV-entures). They use modular EV-building kits of frame parts, motors, wheels and batteries that can be disassembled and reassembled into any type of lightweight EV the kids want to build. Originally these cars had solar panels that stuck up like moose antlers, thereby earning themselves the “Moose Club” designation. Recently, though, the cars have been made as straight electrics with a mobile battery-swapping solar-powered charging station. These build-your-own EV kits were designed and fabricated jointly by Bob Schneeveis, Brad Booth and the students in his class and they are reused each year. Teams of students, including all-girl teams and teams captained by girls, have competed to design and build the most efficient and best performing EVs for the last four years.



Students getting advice from teaching staff.

To jump-start interest in the Alameda school community, JLS students have helped by giving Ryan encouragement, help and hardware, in the form of a loaner kid-built EV

from the most recent Moose club effort. This little car has visited Alameda classrooms as an EV ambassador and inspiration.

Here’s an excerpt from a letter by a regular elementary school teacher in Alameda.

“When Mr. Hank Ryan first substituted in my classroom, I expected the usual complaints from my students. I was surprised when my students expressed nothing but enthusiasm for what had taken place in my absence. With my permission, Mr. Ryan had introduced my students to the EV program by incorporating those materials into my plans for the day. As a veteran teacher with 28 years in the classroom, I especially appreciate substitutes who bring fresh ideas and materials into the classroom to which my students might otherwise be exposed...”

“After that initial encounter, Mr. Ryan and I have collaborated on my plans whenever it was necessary for me to be absent. I write out my plans for the day and then we discuss how these plans can possibly be modified to also address



Leading Alameda into an EV future during the Mayor’s Fourth of July Parade.



Assembling the rear drive mechanism on a prototype experimental vehicle.

and approach. The most obvious links are the Science and Math curriculums. EV readily adapts itself for a review and augmentation of previous FOSS Science curriculum, especially in the area of Electricity and Magnetism, a fourth grade unit at our school. In addition, the Fifth grade math curriculum dealing with designing and interpreting graphs and the early introduction of percentages (usually addressed toward the end of the year) has been enhanced..."

"My students thoroughly enjoy this real life" approach to learning. Many students who thought Science and Math were "boring" have now expressed interest in these subjects and are approaching them with a new mind set."

The Fun Part - the Go-Kart

The fun part for the kids, and the greatest incentive for learning, is being able to build their own go-kart EVs. Girls as well as boys jump at the chance not only to have their own small EV, but to get the experience of designing and putting it together.

Go-Kart Parts for Smarts

The proposed learning center is a fee-based neighborhood after-school academic enrichment facility that provides both private session and computer-based programs.



No it really doesn't need gas, just clowning around during the Fourth of July Parade

These are designed to increase proficiency in reading comprehension, analytical skills, and general math and science. Learners are given credits toward e-kart parts for successful completion of 20-minute computer modules. Cases in the center display parts for student-built electric karts. This is the sole connection essential for steering local business investment towards EV-related enrichment of local students.

After-School Design and Build

An off-campus mobile design and build center will be centrally located in Alameda. Efforts towards fundraising for an Electric Citivan by Solectria, along with collaboration with Solectria to create a template for a fleet of mobile Design Build Centers for other school districts is underway. The focus of the center will be to serve middle school age students from all five middle school facilities within the Alameda Unified School District, one on each day of the week. The center will be staffed by professional teachers, offering special encouragement to

retired volunteer assistants with family connections to students. Individuals from the local EV community (EAA members!) could be invited to participate.

One advantage of such a set-up would be to enable kids whose families couldn't buy them a go-kart to have one. By building it themselves, they would also know how to repair it.

Why Do It?

Successful EV business and industry development in Alameda or in any community requires capital, physical plant and equipment, and the aggressive development of a highly motivated and trained human resource base. This last factor is especially important, as shown by the growth of the high-tech, high-profit Silicon Valley semiconductor industry. The explosive growth of electronics and computers sector was fueled by the flow of knowledgeable and enthusiastic engineers and programmers from Stanford, Cal Berkeley and other



EAA

Membership Drive

The goal is to **double** our membership by year's end '99

The Board of Directors approved the first recommendation of the membership committee, consisting of Roy Kaylor and Scott Cornell

For each new member sponsored by an existing member, the existing member will receive a free three-month extension of his or her membership!

This **trial benefit** is good for a test period of six months, ending August 31, 1999.

Sign up four new members before August 31, 1999 and get a **free** extension of your membership for a whole year! (A \$39.00 reward)

Just think;

Sign up a hundred new members and get a 25 year **free** extension of your membership (A \$975.00 reward)

Hey! Sign up a thousand new members and get a 250 year free extension of your membership plus a **free** license plate holder. (A 9750.00 + reward)

With a hundred thousand members, we could be a real **political force.**

If this membership drive is **successful**, then the other recommendations may also be implemented, which would be of benefit to all

For more Info. call:

Roy Kaylor

831-338-2200

(kaylor@access1.net)

Silicon Valley EAA Rally

The big yearly EV rally!

SATURDAY

September 18 th 1999

10:00 a.m. - 4:00 p.m.

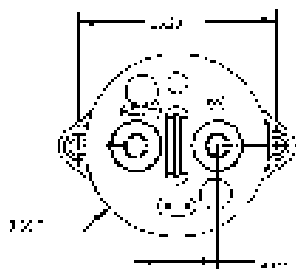
Stanford University, Palo Alto

In front of Encina Hall & Burnham Pavilion (just south of Hoover Tower on the corner of Galvez & Serra).

Website <http://www.evcl.com/eaasv/>

Contact: Will Beckett

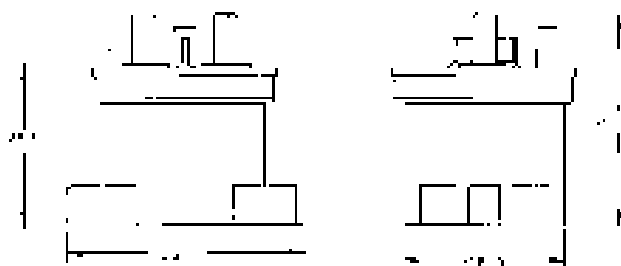
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For folks interested in **baking from scratch**, here is a list of circuits of my '95 home-built Electro-Metro with associated experiments, published previously in the DEVC. The **schematics** are \$2 per page, and the software (3.5" floppy) for projects using a microprocessor is \$10. For those who want a **pre-programmed microprocessor chip**, they are \$25.

Order from:
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For Sale - Circuits Published in DEVC

- ◆ **DC-DC Converter**, 300 W buck converter, non-isolated-used in Commuta-Car.....(3 pgs)
- ◆ **PPM variable frequency motor speed control** used in Commuta-Car, tractor.....(4 pgs)
- ◆ **Individual Battery Charger**, used on Electro-Metro to keep batts at + or -0.1(5 pgs + micropr)
- ◆ **Commuta Car Speed Control 2**, 60V controller for tractor, NEV, or golf.....(5 pgs + micropr)
- ◆ **LiteBar**, LED lightbar for brake lights, etc, using HP ultra-brights.....(1 pg)
- ◆ **Solar Heating System_Controller**, controls Grundfos circulating panel.....(3pgs. + micropr)
- ◆ **Metro Charger and dashboard display, batt gauge, tach, temp, amps etc....**(6pgs + micropr)
(uses PFC Ferro-Resonant transformer, or individual secondary transformer)
(36% more power to batts with PFC <PF of .91> Ferro, 12A vs 7.5A <PF .64>)
- ◆ **Metrol**, 800A 120V motor speed control.....(2pgs + micropr)
- ◆ **1800W Switching charger** with PFC, if into pain, lotsa parts.....(5pgs + micropr)
- ◆ **300W Individual Supply** (one per battery) charger with PFC, if into pain.....(4pgs)
- ◆ **Instructions for converting a microwave oven transformer to a battery charger**.....(1pg)
- ◆ **Log Annunciator**, controls fan & plays "Put Another Log on the Fire".....(2pgs + micropr)
- ◆ **Golf-Tractor speed control & charger** 48V, 400A.....(3pgs + micropr)
- ◆ **Battery Scanner**, my favorite, displays all batteries & indicates bad batt.....(3pgs + micropr)
- ◆ **Surround Sound Demystified**, shows simple hook-up for surround sound.....(1 pg)
- ◆ **200 W Class-D amp 95% efficient audio amp** for batt applications.....(2pgs)



Karts *Continued from page 15*

A good view can be seen of the perforated metal construction material.

Bay Area colleges.

Right Now - Future Engineers of Alameda

Ryan and the kart kids aren't waiting for someone else to fork out in order to support the project. Though they have made proposals to funding sources, the group, calling themselves Future Engineers of Alameda, are raising money independently. The means? A stock of early model (1989-92) compact fluorescent lights left over from Ryan's east coast High Efficiency Lighting business, which is being relocated to the west coast to be used as a platform for continued fundraising. Working together with the Alameda Bureau of Electricity and locally owned Pagano's Hardware, Ryan arranged to direct a \$5.00 rebate coupon offered by the local utility into a "kart parts" fund that will provide some of the materials used in the student built vehicles. Ninety-one compact fluorescents went to the students, which they then installed in their homes. The lights benefit the families and the community as well as the go-kart fund.

CFLs Fund Karts, Help Families

By making a math lesson out of the transaction and measuring all the costs and energy savings from the compact fluorescents,



One advantage of these small scale vehicles is that you can drive them inside the classroom.

the kids discovered that the lights really made a difference. For instance, one student might install a 15 watt CFL in place of a 60 watt incandescent lamp and that lamp might burn for four hours per day. Using a chart from the Alameda Bureau of Electricity, the class determined the lamp would save \$8.23 per year.

The total first year saving for all the lamps installed in student's homes was \$683.30. The lights will save all the families around \$4046.00 over the lifetime of the bulbs, which is 10,000 hours. This means that, at an average of four hours per day, these lamps will still be burning 6.9 years from now, just about the time these fifth graders graduate from high school!

\$455 for E-karts

Ericka Wicks, a student in the class wrote, "Raising money with the CFL's protects the earth. We're raising money with the CFL's so we can get all the tools and parts to build our go-cart." Raise money they did, as they now have \$455.00 waiting to be turned into e-karts.

Next year the Future Engineers of Alameda hope to expand the lighting sales out into the general community. The Alameda Bureau of Electricity offers a \$5.00 coupon for each CFL purchased by consumers. Ryan, the teachers he works with, and the kids all hope they'll be able to get individuals and groups signed up to purchase and install large numbers of these lights and to donate the coupon value for their e-kart building program.

Ryan has decided to develop his own individualized computer based math exercises based on curriculum offered by Kaplan Testing. He says "The key is that every student participant takes at least 20-30 minutes before entering the design/build center to work through exercises that raises the math or reading/writing ability."

If the Future Engineers of Alameda can set up the program so utility subscribers can pay for the lamps over twelve months through their electric bill, most CFL users will see positive

cash flow immediately, the Alameda Bureau of Electricity will have a tool for retaining and gaining new loyal customers in this new era of deregulation, and they'll have a fundraising tool that could make the 82,000 inhabitants on this [Alameda] island just off San Francisco that most efficient group of homeowners anywhere!

Even Funny Go Karts Equal "Big Math"

Mangala Gopal, a student in our class, writes, "Building electric go-karts is fun. If you want to do this get ready for some big math!" Ryan feels that's true, and in fact, his benchmark for success in this program is simple. He says, "I want these and other fifth graders on a non-stop track to trigonometry in high school. If I can help these kids make and reach that goal, we all win, even if our karts look funny!"

Guidelines

EV curricula should be delivered within the existing classroom format, though its application (e.g. go-karts) can happen outside. It should be designed to encourage students in the higher elementary and middle school grades to attempt challenging high school math and science disciplines necessary for acceptance to university engineering programs.

An EV curriculum should be hands-on when possible, drawing lesson plans from local EV and renewable resources examples. Doing so maximizes community pride and involvement from citizens and extended family.

It should also be gender-neutral, encouraging children of both sexes to assume all roles and responsibilities. This is exceptionally important in showing young girls that there are alternatives to traditional female life-ways.

Finally, an EV curriculum should provide an attractive platform for local business investment into the intellectual growth of Alameda students from all socioeconomic backgrounds.



Bob Schneeveis, inventor of the Smarts-Karts educational tool, talks to students.

Upping Test Scores

Developing EV-related questions that are designed much like the questions on standard level tests gives students and teachers

a better understanding of these multiple-choice exams. Helping increase these important test score through a local EV-based curriculum creates an innovative marriage of EV education goals with the growing emphasis on classroom accountability.



Hank Ryan, spark plug behind the Alameda EV educational movement, seen riding one of his vehicles.

Karts in the 4th of July Parade?

Future Engineers of Alameda has assembled two teams to begin building karts to replace the loaner from Palo Alto. Ryan is also encouraging an Alameda 5th grade girl who wants to build a kart and start an all-girls team. This would be a sister team to the JLS girls in Palo Alto. The goal for the Future Engineers is to have three e-karts driving in the Fourth of July parade. Then, hopefully these three karts can serve as the starting point for better versions next year.

Harnessing Driving Passions

Kids (of all ages!) love driving their own vehicles. It seems to be an ingrained human desire to get on something with wheels and go. Kids also (until society discourages them) are natural builders, using anything they can get their hands on. The genius of

Hank Ryan's proposal is that it harnesses this energy and enthusiasm, channeling it back into learning. The results? Smarter, more motivated kids and more EVs. Can't argue with that.—CB

Contact: Hank Ryan
Concrete Action (510) 769-8082

Call for builder write-ups

Proud of your car ? Would you like to share what you have done with others ? Why not send in photos and a short (or long) written description to CE so we can print it. For the last 30 years the EAA has grown strong by members sharing with members the technology they have used in creating their cars. Help continue this tradition. Take some pictures of what you think stands out most about your vehicle and send it in with a description (photo essays are OK). Don't forget to send your contact information, including, telephone number, mailing address, and E-mail if you have it, to:

Kurt Bohan
EAA Current Events
2701 Monarch Street, Suite
146
Alameda, CA 94501
- or E-mail to -
EAA NEWS@AOL.COM

Events Calendar

June 5

5th Annual San Francisco Bay Electric Auto Rally (SFBEAR). Tanforan Mall Parking lot in San Bruno just off El Camino Real 10 a.m. to 4 p.m.
SFPEAA ,bj@bjharding.com

June 13-16

EnV '99, Ypsalanti, MI. Seventh Annual Environmental Vehicles and Alternate Fuels Conference & Expo Twelve sessions during a three day conference.

June 19-20 - 24

Hour Le Mans Endurance Race at Bugatti Road Circuit, Le Mans, France. Contact Auto Club De L'QUEST 33 2 43 40 24 00. Fax 33 2 43 40 24 88.

June 20-July 1

Sunrayce 99, Washington DC - Ocala, FL. Biennial road contest of solar cars making the rounds through Washington, Winchester, Linchburg, Research Triangle Park, Charlotte, Clemson, Atlanta, Macon, Tallahassee, and Ocala. 1-800-606-8881

July 24 - 25th

SOLWEST RENEWABLE ENERGY FAIR. Grant County Fairgrounds, John Day, OR. Check out the SOLWest site at: www.eoni.com/~solwest/
e-mail to: solwest@eoni.com

August 17-19

SAE Future Transportation Technology Conference and Exposition, Costa Mesa,

CA. The FTT Conference will feature advanced transportation technologies that have the potential for making real, practical improvements in vehicle and highway systems. Contact: Karin Bolcschazy, SAE. (724) 776-4841, Fax (724) 776-6622, E-mail: karinb@sae.org

August 19-20

The Changing World of Industrial and Specialty Electric Vehicles, Orlando Florida. Conference sponsored by EPRI on electric off-road vehicle technologies. Discussions of applications of new technologies and exhibits of related products. Contact: Michele Samoulides, EPRI. (650) 855-2127, Fax (650) 855-2900.

August 28

EAA National Endurance Range Rally. Hosted by the East Bay chapter of the Electric Auto Association. To be held in San Ramon, CA. Event runs on a 3-mile endurance course, just like the old Silicon Valley rallies. Shade trees, too! Public hours: 10am -4pm. Limited charging available; lots of trailer room. Contact Anna Cornell at (925) 685-7580 10am - 4pm M-F. Or E-mail Anna at eebaa@juno.com

September 11

Triangle EV Education Day, 10 am - 3 pm, Chapel Hill, NC. EV display, ride-and-drive. Town lot #5, West Franklin Street, Chapel Hill, NC. For more information, contact Jon Mauney at (919) 834-4077 or E-mail: teaa@rtpent.org

September 18

Silicon Valley EAA Rally ,10:00 a.m. - 4:00 p.m. The big yearly EV rally! Stanford University, Palo Alto, in front of Encina Hall & Burnham Pavilion (just south of Hoover Tower on the corner of Galvez & Serra).

Website <http://www.evcl.com/ea-sv/>
Contact: Will Beckett
BeckettW@corp.hp.com 650-857-3859

September 12-15

Moving California's Transportation System into the 21st Century, Sacramento, California. Fifth annual meeting of the California Alliance for Advanced Transportation Systems. Contact: Randi Dixon. Phone: (916) 325-0473. Fax: (916) 325-0471. E-mail: RandiDixon@caats.org

September 19-20

Canadian Electric Vehicle Conference 99, Montreal, Quebec, Canada. A two-day conference on electric vehicles. Focus is on the close between an organization's business success and its environmental stewardship. Conference will also offer advice on managing a company's environmental public image as well as provide information on clean air technologies and products. Contact: EVAC. Phone: (613) 723-3127. Fax: (613) 723-8275. E-mail: evac@evac.ca

October 13-16

16th International Electric Vehicle Symposium and Exhibition (EVS 16), The 16th annual Electric Vehicle Symposium and trade show in Beijing, China will be hosted by EVAAP, CES and SEA-C. 86-10-6853-3347 Web: www.ces.org.cn E-mail: evs16@ces.org.cn

November 1-3

California Transit Association Annual Fall Conference, Oakland, California. The annual conference of CTA discussing topics important to transit operators. An expanded all-day maintenance track, a general managers' panel discussion, and indoor bus vendor show are part of the event. Contact: Donna Pate, Phone (510) 891-4778

November 8-12

6th World Congress on Intelligent Transportation Systems, Toronto, Canada. Conference will focus on the latest ITS components, deployment, how systems architecture is being used, the role of public-private partnerships, and issues surrounding tele-

communications. Exhibit Opportunities available. CALL FOR PAPERS due February 1, 1999. Contact: ITS America. Phone: (202) 484-4542. Fax: (202) 484-3488.

November 18-19

North American Electric Vehicle and Infrastructure Conference (NAEVI), Atlanta, Georgia. Conference focuses on commercialization issues of electric and hybrid electric vehicles and EV infrastructure in North America. Contact: Pam Turner, EVAA. (650) 548-9464, Fax (650) 548-9764. E-mail: firstopt@aol.com

November 20-21

SAE Automotive Electronics and Alternative Energy Vehicles, Kenpur, India. This symposium is designed to bring scientists, engineers, experts, and policy makers together to discuss the increasing use of electrical and electronics in vehicles and their contribution toward fuel efficiency and pollution reduction. Contact: Professor V. Sinha, Secretariat for international Symposium on Automotive Electronics and Alternative Energy Vehicles. Phone: +91-512-597070 Fax: +91-512-590063 E-mail: vsinha@iitk.ernet.in

October 3-5

17th Annual NGV Conference, Minneapolis, Minnesota. The annual conference of the Natural Gas Vehicle Coalition. Contact: NGVC Phone: (703) 527-3022.

October 17 - 26

5th World Solar Challenge in Australia! This event is for Solar cars ! 42 entries will represent 11 nations in this event! No other entries accepted at this time. Runs from Darwin to Adelaide. It's a grueling, yet beautiful test of technology and wits!

October 18 - 24

ETSA Power World Solar Cycle Challenge in Australia. Starts in Alice Springs and finishes in Adelaide. There are four

classes of converted bicycle entries; 1. Non-Aerodynamic Standard bicycles. 2 Non-Aerodynamic Experimental bicycles, 3. Experimental 3-wheeled vehicle, 4. Aerodynamic 3- wheeled production vehicles. Entries are still accepted at this event. Contact Chris Selwood for event information at Phone: 61 8 8303 2337 Fax 61 8 8303 2339 or website: www.wsc.org.au.

Year 2000

March 20-21

California Strategic ITS Planning Retreat, Yosemite, California. Meeting of the California Alliance for Advanced Transportation Systems to discuss ITS applications in transportation in California. Contact: Randi Dixon. Phone: (916) 325-0473. Fax: (916) 325-0471 mail: RandiDixon@caats.org

April 2-6

Future Car Congress, Arlington, Vergina. A government-industry conference focusing on a collaborative approach to the development of new automotive technologies. Discussion topics range from fuel cells to supercomputer applications and high-tech transportation workforce for the 21st century. Contact: Meeting Promotion, SAE. (724) 776-4841 ext. 7340. Fax (724) 776-1830. E-mail: rodman@sae.org

October 16-18, 2000

International Electric Vehicle Symposium, Montreal, Canada. EVS-17 will be hosted by the Electric Vehicle Association of the Americas.

For more information, or to add an Event to this calendar, please call Anna Cornell (925) 685-7580 (10 AM to 4PM, PST only, please!)

News in Brief

Compiled by Ruth M. Shipley from information supplied by EIA Publishing. If reprinted, please credit CE and Ruth Shipley

Clean Vehicle Program Expands in Europe

One hundred and fifty European cities are throwing their weight behind clean-fuel vehicles in an effort to reduce air pollution in downtown areas and to help spur the market for low-emissions transportation technology. The Alternative Traffic in Towns (Alter) project, which began more than a year ago at a meeting of transportation and environment ministers from around the continent, originally included just six cities. In recent months, however, that number has swelled. The Italian government recently announced that it will buy 10,000 electric- and gas-powered vehicles to lease to 35 cities. Utility companies are also helping by installing charging stations, and Piaggio and other manufacturers are now selling electric-powered scooters cheaper than scooters powered by conventional fuels. "This shows what can be done by governments and cities acting together," said Alter-Europe chairman Stuart Holland. "Joint action can realize volume production of green vehicles, lower unit costs and lower prices." From the original six cities involved in the project — Athens, Barcelona, Florence, Lisbon, Oxford and Stockholm — Alter officials hope to expand the program to 500 cities in total. (FINANCIAL TIMES: 6/21)

Catalytica, McDermott Work on Fuel Processor

Catalytica Advanced Technologies and McDermott Technology, Inc. were recently awarded a contract from the Department of Energy (DOE) for the development of a compact catalytic fuel processor for fuel cell vehicle applications. DOE will provide \$3.8 million in funding for the development of a fully-integrated system capable of producing hydrogen-rich gas from a number of different

fuels to power proton exchange membrane fuel cells. Since last year, Catalytica and McDermott have been working on the development of a gasoline desulfurizer for the preparation of gasoline to be converted to hydrogen for use in fuel cell-powered vehicles. The two will spend the next 30 months developing, testing and demonstrating catalytic fuel processor technology. Catalytica Advanced Technologies is a subsidiary of Catalytica, Inc. McDermott Technology is an operating unit of the global energy services company McDermott International, Inc. (BUSINESS WIRE: 6/22)

Motorcycle Sets New Speed Record

An electric motorcycle powered by thin metal film (TMF) batteries has set a new National Electric Drag Racing Association speed record, according to BOLDER Technologies Corporation, the Golden, CO-based developer and manufacturer of advanced, high-power rechargeable batteries based on its patented TMF technology. The "Killa-Cycle" completed a quarter-mile race in 13.995 seconds at the Bandimere Speedway, a National Hot Rod Association member track in Denver, CO. BOLDER said this is the fastest official time recorded for an electric motorcycle in the quarter-mile race. The Killa-Cycle time compares with a quarter-mile time of 12.7 seconds set by a high-performance Dodge Viper car equipped with a V-10, 450-horsepower engine. The previous electric motorcycle record was 16.1 seconds set on May 22, 1999. "Based on the performance I have seen to date, I believe that when the full power potential of TMF cells is exploited, electric vehicles can have a power-to-weight ratio greater than that found in high-performance gasoline engines," said Bill Dube, an engineer at the National Institute of Standards and Technology who designed and built the Killa-Cycle using 64 pounds of BOLDER's TMF battery cells. (BOLDER RELEASE: 6/18)

Trib Lauds Toyota's Prius Hybrid

A recent review of Toyota's Prius hybrid electric vehicle in the Chicago Tribune gave "kudos to Prius engineers" for designing a roomy, low-pollution vehicle that can operate in today's refueling infrastructure. The car, which is comparable in size to Toyota's Corolla, is powered by batteries and a gasoline engine, solving the "nagging problems of battery electric cars, especially the required six- to eight-hour recharge after 50 to 100 miles." The author was especially impressed with Prius' spacious interior, congratulating Toyota engineers for "coming up with a compact economy car with the cabin room of a midsize." While the author warned Prius owners not to expect "to lay a patch of radial residue on the pavement at takeoff," it acknowledged that "Prius is lively enough to keep up with traffic." The only drawback, the author noted, was the smaller trunk storage space in the Prius, which was sacrificed to make room for the vehicle's 240 D-cell batteries. In addition, the batteries prevent the rear seat backs from folding down for extra storage. (CHICAGO TRIBUNE: 6/17)

FCV Runs in Tour De Sol

While many people consider fuel cell vehicles (FCVs) a car of the future, last month's 250-mile Tour de Sol put one on the road here and now. The NJ Venturer, a twice-converted Geo Metro sedan FCV, took second place honors among the internal combustion engine-based hybrid electric vehicle entries. The NJ Venturer was originally a 1996 Solectria Force. In addition, the Force features 27 Saft nickel cadmium batteries for a 190 volt system. However, a consortium of state, industry and education institutions in New Jersey decided to add a 5-kW fuel cell to extend range. The fuel cell is made by Belleville, NJ-based H Power Corporation, and is fed by a dozen canisters of hydrogen. It weighs 125 pounds and measures 12 inches by 10 inches by 10 inches and is located under the controller under the front hood of the car. The hydrogen for the FCV was shipped in from Quebec and

was produced using hydropower, which means NJ Venturer's fuel manufacturing process was virtually emission free.!

The NJ Venturer reached the highest speed of all the hybrid vehicles, achieving 69.8 mph. The team lost points in overall time, however, because the vehicle was slower in accelerating.

(EV NEWS: JUNE 1999)

VA Tech Demonstrates Hydrogen Technology

A Chevrolet Lumina hybrid electric vehicle powered by an advanced proton exchange membrane (PEM) fuel cell stack from Energy Partners finished second overall in the 1999 FutureCar Challenge competition and first in emissions testing. Students and faculty of Virginia Tech converted the Lumina for the competition, successfully showing the environmental and performance benefits of hydrogen fuel cell technology while maintaining all of the conveniences of the original vehicle. The fuel cell-powered Lumina traveled up to a speed of 80 mph with high fuel efficiency. In the emissions test conducted during the competition by a Ford testing facility, the fuel cell stack produced no carbon monoxide or hydrocarbon emissions, winning the award for lowest emissions. The goal of the FutureCar Challenge is to re-engineer a mid-size American car to get double or even triple the current fuel economy. Each team converts a similar later model vehicle — a Chevy Lumina, Dodge Intrepid, Ford Taurus or Mercury Sable — to be evaluated on fuel economy and performance, including handling, braking and acceleration. The vehicles also are judged on consumer acceptability criteria such as design, interior climate control, passenger comfort and luggage space.

(ENERGY PARTNERS RELEASE: 6/14)

Electrofuel Battery Shows Potential for EVs

Electrofuel, Inc. of Toronto, Canada said it has almost doubled the previous endurance record of rechargeable batteries with its Lithium Ion SuperPolymer battery. The

battery reportedly has an energy density of 470 watt-hours (Wh) per liter and 183 Wh/kilogram. The company said laptop computers will run 15 or more hours when using one of its fully charged batteries. In addition to its immediate marketability for computers and cellular phones, the battery has a longer-term future market in EVs, electric bicycles and alternative energy businesses such as solar and wind energy storage. The company said the "superpolymer" aspect of the battery enables Electrofuel to mold the battery into virtually any form to fit the shape of any device. Electrofuel said the battery pack can be as thin as a credit card or the size of a briefcase to power EVs, for example. Nomura Research of Japan recently identified Electrofuel's battery as having the highest energy density in the world. Electrofuel said its battery exceeds the long-term performance targets set by the U.S. Advanced Battery Consortium of 250 Wh/liter.

(ELECTROFUEL RELEASE: 6/15)

Canadian Companies Join to Build Infrastructure

Petro-Canada, Ballard Power Systems and Methanex recently announced they hope to significantly expand the number of alternative fuel sources available for Canadians in preparation for the next generation of vehicles powered by fuel cells. The companies have signed a memorandum of understanding under which they will work together to prepare for the establishment of a commercially viable fuel distribution network for fuel cell-powered vehicles. The companies will collaborate on a pilot project to lay the groundwork for the supply and distribution of alternative fuel sources, particularly methanol, in order to facilitate the introduction of fuel cell vehicles. In addition, they will identify a pilot site involving auto manufacturers and implementing methanol fueling technology at the consumer level. Methanex is a world leader in the production and marketing of methanol. Ballard develops,

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manufactures, and markets zero-emission proton exchange membrane fuel cells for use in transportation, electricity generation and portable products. Petro-Canada is one of Canada's largest oil and gas companies, operating in both the upstream and downstream sectors of the industry.

(CANADA NEWSWIRE: 6/11)

Honda Announces Website for VV Hybrid

Honda recently announced the creation of a World Wide Web site designed to provide information about the company's new gasoline-electric hybrid vehicle, known as the VV. The website will provide technical information, product features and specifications, photographs and information on other clean vehicles manufactured by Honda. "This site will allow customers to track developments in the launch of this unique new vehicle," said American Honda Motor Company, Inc. executive vice president Tom Elliott. The VV is expected to go on sale in the U.S. later this year. Visitors to the new website will be able to fill out a survey

that will enable them to receive additional product information in the future. The VV, which will be available fully-equipped for less than \$20,000, can travel over 700 miles on one tank of gasoline. The company's Integrated Motor Assist hybrid power system helps the VV achieve higher fuel efficiency and lower emissions than conventional gasoline vehicles. (AMERICAN HONDA RELEASE: 6/14)

Nan Ya Builds Battery Plant in Taiwan

Northern Taiwan will be the location of a new battery plant that is expected to cost \$10 million to construct, according to Wu Chia-chao, a spokesman with Taiwan's Nan Ya Plastics. Though the plant will begin with the manufacturing of lithium batteries for use in notebook computers and mobile phones, it eventually will also be used to make nickel batteries for EVs, pending testing of the technology, Wu said. Meanwhile, the lithium batteries will be manufactured at the plant using technology provided by Japan's Shin-Kobe electric company, a unit of Hitachi. The plant, to be located in Taipei county, would begin mass production at the end of this year with a monthly capacity of one million units. Nan Ya, a flagship enterprise of the giant Formosa Plastics Group, said it will invest another \$2 billion to build a plant that would produce up to 500,000 EVs per year. The company acquired the right to develop the nearly 800-acre park in May to house the car plant. Construction of the industrial park is scheduled to be completed in 2002.

(AGENCE FRANCE PRESSE: 6/10)

Midtronics Introduces Battery Tester/Charger

Midtronics, Inc. has introduced its PowerLogic battery tester and charger, developed through joint efforts with Johnson Controls. Midtronics said the PowerLogic is the first ever smart charger/tester which truly integrates battery charging and testing. The company said it also is the most accurate and decisive battery analyzer cur-

rently on the market. The device is aimed at providing customer service by solving the customer's battery problem in 40 minutes or less. In addition to reducing warranty waste, service providers will be able to do away with their ineffective battery loaner programs. The PowerLogic uses a "closed-loop" smart charging/testing concept, which incorporates conductance technology and combines testing and charging algorithms to continually test the battery before, during and after charge. Further, its simple user interface allows a continuous dialogue between the user and the machine.

(AUTOMOTIVE WIRE: 6/4)

NECAR 4 Honored With Engine Award

The NECAR 4 fuel cell-powered concept vehicle was honored with the 1999 International Year of the Engine Award last week in Hamburg, Germany. The vehicle was given an award for the best engine concept for the future. The NECAR 4 features fuel cells powered by liquid hydrogen. The magazine based the award in part on the fact that the vehicle emits no pollutants, has a competitive driving range, and exhibits favorable driving characteristics. "We are very proud of the progress we have achieved in the development of fuel cell technology," said Ferdinand Panik, head of DaimlerChrysler's fuel cell projects group. "NECAR 4 is the world's best zero-emission vehicle and represents a significant milestone along the road to the market introduction of the fuel cell vehicle, planned for 2004." The award was conferred upon the NECAR 4 by an international panel of 19 judges, all advisors to the automotive industry or automotive journalists.

(DAIMLERCHRYSLER RELEASE: 6/10)

Ovonic Batteries Do Well at Tour De Sol

Energy Conversion Devices, Inc. (ECD), a developer of alternative energy technologies, recently announced that nickel metal hydride (NiMH) batteries developed by its subsidiary Ovonic Battery Company, Inc.,

powered several electric vehicles to victory at this year's Northeast Sustainable Energy Association's American Tour de Sol competition. Ovonic Battery's Solectria Force had a range of 217 miles, with most of those miles reached at highway speed. That vehicle took second place overall. In the two-wheeler division, a scooter entered by Green Fuel Resources Ltd., powered by Ovonic NiMH batteries manufactured under license by GP Batteries achieved the highest range of over 100 kilometers. "These award-winning performances underscore the superior energy density of Ovonic NiMH batteries, which enable range performance of electric vehicles to approach that of conventional gas-powered vehicles," said Stan Ovshinsky, CEO of ECD and Ovonic Battery. "We plan to continue to aggressively

market Ovonic's clear performance advantages to encourage greater commercialization of electric and hybrid electric vehicles."

(ECD RELEASE: 6/8)

Honda Introduces Fuel Cell Vehicle

In the race to make a viable pollution-free car, Honda has announced that it will spend as much as \$500 million to introduce a fuel cell-powered vehicle by 2003. Tokyo-based Honda, the third largest automaker in Japan, plans to build 300 fuel cell-powered vehicles per year starting in 2003 to be sold in Japan and the United States, said Takeo Fukui, managing director in charge of research and development. The car will run on fuel cells that will be lighter and more compact than those currently offered by Ballard Power Systems, Inc., a leader in the fuel cell field, Fukui said. The car will be based on the EV Plus compact electric sedan. "Fuel cell vehicles will probably overtake gasoline-powered cars in the next 20 to 30 years," said Fukui. Ballard Power Systems, Inc. of Vancouver, British Columbia is working with Ford and DaimlerChrysler to develop fuel cells that combine hydrogen and oxygen in a chemical reaction to produce electricity to power

INDUSTRY NEWS

a vehicle. Fukui said Honda's system will use methanol.
(BLOOMBERG NEWS: 6/2)

Book Examines Profitability of EVs

England's Footnote Publications has announced the release of "Electric Vehicles are Profitable: Where, Why, What Next?," co-authored by Peter and Graham Harrop. The book includes a survey of 444 electric vehicle (EV)-related operations in 26 nations, and contains interviews and analysis related to more than 200 models of success. The authors refute the belief that the EV industry is an unprofitable business more suited to large companies willing to spend considerable sums to develop battery and vehicle technology. They contend that there are many profitable sectors within EV manufacturing, as well as in parts and services, and say EV-related sales will total about \$13 billion this year. The book first examines the structure of both the EV manufacturing and service sectors, then surveys profitability in 26 nations. A section on potential profit strategies examines methods for leveraging from non-EV activities, as well as leveraging between EV activities, mass production and the combining of product lines, and potential hot new EV market sectors. Final sections tabulate the market size and ranking of the most prominent EV-related concerns, and makes forecasts for 2030.

(EIN STAFF: 6/7)

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To get to the track, travel on I-5. Take the OR-214 exit, exit number 271, towards Woodburn/Silverton. Turn right into the Newberg Highway/OR-214. Follow the signs for OR-214 (it's a curvy road). Turn left onto Highway 219.

Hotels in the Area

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120 North Arney Road
Woodburn, OR 97071
(503) 982-1727

Holiday Inn
2887 Newburg Highway
Woodburn, OR 97071
(503) 982-6515

Super 8 Motel
821 Evergreen Road
Woodburn, OR 97071
1-800-800-8000

Days Inn
1-800-329-4466

EAA

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2701 Monarch St., Hangar 20, Room 215
Alameda Point, Alameda, CA (old Alameda Naval Air Station)
From Hwy 880, take Broadway turnoff to Webster St.; from Webster, go through the tube to Atlantic, right on Atlantic to the old Alameda Naval Air Station

Los Angeles EAA

Saxe Dobrin, President (310) 453-1531
1630A Franklin, Santa Monica, CA 90404
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Cal Tech, Winnet Lounge, Pasadena, CA

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Chuck Hursch, President (415) 927-1046
13 Skylark Dr. #13, Larkspur, CA 94939-1270
Email: gandhi!chuck@uunet.uu.net
Homepage: www.ecoalliance.com/nbeaa/
Meetings in Santa Rosa, CA: Call (415) 927-1046 for time and exact location.

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540 Moana Way, Pacifica, CA 94044
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701 West Angus St. (at El Camino)
San Bruno, CA

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Michael Thompson, Pres., Contact Person (408) 997-2404
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US Mail: Roy Paulson, 1592 Jacob Ave. San Jose, CA 95118 USA
Homepage: <http://members.aol.com/sjeaa> Tel. 408-269-7937
Meetings: 2nd Saturday/month, 10:00 am (call to confirm), Reid Hillview Airport, 2350 Cunningham Ave. San Jose. (Hwy 680, Capital Expressway (South), right onto Cunningham)

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Tim Loree, President (916) 962-3044, (916) 568-3100 ex 2833
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E-mail: Loreet@2extreme.net
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Homepage: www.calweb.com/~tonyc/sevahome.html

SAN DIEGO ELECTRIC VEHICLE ASSOCIATION

Scott C. Kennedy, President, (619) 658-4152
1621 San Elijo Ave., Cardiff, CA 92007
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San Diego Automotive Museum
2080 Pan American Plaza,
San Diego, CA.

SILICON VALLEY EAA (Founding Chapter)

Will Beckett, Pres., Contact (650) 494-6922, fax (650) 852-8384
4189 Baker Ave, Palo Alto, CA 94306
Homepage at <http://www.geocities.com/MotorCity/1754/>
Meetings: 3rd Saturday/month, 10:00-12:00 am
Hewlett-Packard, Santa Clara facility
5301 Steven Creek Blvd.
Santa Clara, CA
(Lawrence Expressway and Stevens Creek)

COLORADO**DENVER ELECTRIC VEHICLE COUNCIL (DEVIC)**

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 Meetings: 3rd Saturday/month. Contact George for time and location

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 34 Paine Street, Worcester, MA 01605
 E-mail: tonyascrizzi@juno.com
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 HomePage: www.norfolk-county.com/users/ws3f/neeahome.htm

PIONEER VALLEY

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 Jones Library (Amhurst Rm), Amherst, MA

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TEXAS**HOUSTON EAA**

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 Meetings: 3rd Thursday each month 6:30PM
 Citizens National Bank - Activity Center
 5217 Cedar St., Bellaire TX (Take Bellaire exit off West
 610 Loop go west on Bellaire about 1 mile to Ferris, turn right one
 block to Cedar, Activity Center on right)

NORTH TEXAS EAA

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 430 Ridge Crest, Richardson, TX 75080-2532
 Email: pshf@cyberramp.com
 Meetings: 3rd Thursday/mo, see www.engr.tcu.edu/ntea for time and location

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Harry Van Soolen, President (801) 989-1130
 3622 S. 4840 W., West Valley City, UT 84120
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VIRGINIA**CENTRAL VIRGINIA EAA**

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 Westwood Ave., Richmond, VA 23834

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Port Townsend High School Shop

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6021 32nd Ave., N.E., Seattle, WA 98115-7230
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E-Mail: slough@halcyon.com
WWW Site: <http://www.halcyon.com/slough/seva.html>

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National Institute of Health (NIH) Building 31-C, 6th floor
conference rooms, in Bethesda, MD. Call for more information or
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Bill Glazier, Contact (604) 980-5819
3344 Baird Rd. North Vancouver, B.C. Canada V7K 2G7
HomePage at <http://www.veva.bc.ca/> E-mail: info@Veva.bc.ca
Meetings: 3rd Saturday/month 7:30 p.m., BC Transit Center
Cafeteria. (Located off of Kitchener between Boundary and Gilmore
in Gilmore in Burnaby)

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*Chapter contacts and meeting locations. Most veri-
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The National Electric Drag Racing Association (NEDRA) announces its third annual electric drag race in Woodburn, Oregon.

It will be held on Saturday, August 28, 1999, at the Woodburn Raceway, about 30 miles south of Portland, Oregon. As in previous events, this event will feature many of the world's quickest electric vehicles (EVs), among them Wilde Evolutions' "Maniac Mazda," which currently holds the record for quickest street vehicle. This will also be the debut race of the "The Megawatt Monster," a six motor powered electric dragster that will be the first electric car powered by ore than one million watts. At the wheel will be 78-year-old newcomer Bob Boyd, a former WWII pilot and prisoner of war. He will be attempting to set a new world record, which will be quite a feat, considering the current record holder, Dennis "Kilowatt" Berube, in his dragster "Current Eliminator" has been steadily improving his elapsed time (ET) and now holds the world record at 10.229 seconds.

The top competitors always have the latest in high-power controllers, motors, and battery technology. We expect electric-powered vehicles to break into single-digit ETs for the first time at this event.

This year's all-day event will be held in conjunction with a junior dragster race. In addition, the local Dodge Viper club will once again pick their best V10 muscle cars and pit them against the quickest EVs, as NEDRA's most powerful EVs have beaten the Vipers in the first two years of this electric vs. gasser grudge match.

Electric drag racing has attracted much international media attention of late, and this event will have media coverage from around the globe. For more information, visit the NEDRA web site at <http://www.nedra.com>.



For Sale: 1981 Bradley GT II. Fully licensed in CA. Always garaged. Mint condition. 2,700 miles, \$5,000, includes 110/220 charger. (760) 721-2454. I have been a member for a long time now and, pushing 82 years, am in the position where I can no longer care for my Bradley GT II Electric. It is with some reluctance that I must find a new home for this faithful vehicle. Robert M. Linden, Col. USAF (ret.) 5253 Harvest Court, Oceanside, CA 92057-1825. Tel. (760) 721-2454.

MEMBER WANT AD RATES

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.

For corrections or updates, please send a written note or fax to EAA Want Ads at (510) 864-2093. 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. Send your Member Want Ad request and check payable to:

**EAA Want Ads, Hanger 20
2701 Monarch Street, Suite 137
Alameda, California 94501**

Electric Auto Association (EAA) Membership Application

New Member: _____ USA: _____ Note: EAA membership dues are
Renewal: _____ Canada: _____ tax deductible in the USA
Other Country: _____ as allowed by the IRS.

Date: ____/____/____

Name: _____ Company: _____
Street: _____ Phone: _____ Hm-_____ Wk-_____
City: _____ Fax: _____
State: _____ Zip: _____ Country: _____

If a new member, where did you hear about the EAA ? _____
EAA Chapter you attend or support: _____
I need chapter information: _____

Membership / Vehicle Information — Please complete if new or changed

Please identify your primary areas of interest relating to EAA
(Please rank your your choice with a "1" being most important, "2" second, etc.)

- 1: _____ Hobby / Builder
- 2: _____ Professional (EVs are a source of income for you)
- 3: _____ Competition (Rallies, Races, and Records)
- 4: _____ Environmental and Government Regulations for EVs
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- 6: _____ New Technology and Research
- 7: _____ Promotion and Public Awareness of EVs
- 8: _____ Student or General Interest
- 9: _____ Electrathon / Bicycle / Off-road Vehicles
- 10: _____ Owner / Driver of Electric Commute Vehicle
- 11: _____ Other: Please Specify: _____

Number of total EVs you have ever owned ? : _____
Number of EVs you now own ? : _____

Please describe any Electric Vehicles you now own or are building: (if more than one, attach information on each)

Vehicle Lic#: _____ State: _____ Country: _____
Vehicle Type: _____ Make/Model: _____ Model Year: _____
Converted Yr: _____ Number of Wheels: _____ Motor Type: _____
Controller type: _____ Batteries: No./Type: ____/____ %Completed _____
Pack Voltage: _____ Avg. EV Mi./Week: _____ Avg. EV Trips/Week: _____
Other Features: _____
Comments: _____

Please make your check or money order for appropriate amount (see below), payable to the Electric Auto Association, fasten it to this form and mail it to :

Electric Auto Association
P.O. Box 6661
Concord, CA 94524

USA \$39 /yr (U.S. Dollars only)
Canada \$42 /yr International \$45 /yr

Note: All information and statistics in this application are for the exclusive use of the EAA. We never sell or loan our mailing lists.

ver 8/29/97

EAA Store Order Form

Printed materials

CE	Selected Current EVents (specify specific issue)	\$3.00 each issue
CEFY	Current EVents - Full year {specify specific year}	\$20.00 each year
PB001	Discovered: The Perfect EV Battery	\$2.00
FW001	Flywheel Energy Storage	\$5.00
PV 2000	1998 Preview 2000 by Electrifying Times (Nov./Dec. 98 CE)	\$5.95
BG 1997	1997 Buyer's Guide to Electric Vehicles (April 97 CE)	\$5.00
BG 1996	1996 Buyer's Guide to Electric Vehicles (Feb. 96 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

Electric Auto Association Store Order Form EAA Store
 Send order to: 5820 Herma St.
 San Jose, CA 95123-3410

Name _____ Phone _____
 Address _____
 City _____ St, _____ Zip _____

Item#	Size/Color	Quantity	Item Description	Unit Cost	Amount

Subtotal	
Postage(10% of subtotal, for USA*)	
Handling	\$2.00
Total	

* for Canada add 15% or for other foreign destination add 25 % for postage



KTA
p32a899



ELECTRIC AUTO ASSOCIATION

P.O. Box 6661, Concord, CA 94524

● Address Correction Requested ●



● Time Dated Material - Please Do Not Hold ●

NON-PROFIT
ORGANIZATION
U.S. POSTAGE
PAID
SUNNYVALE CA
PERMIT No.
420

