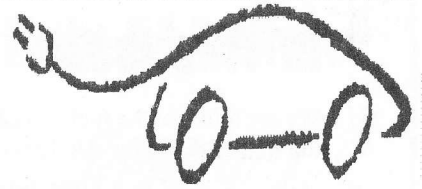


CURRENT EVENTS



August-September '00

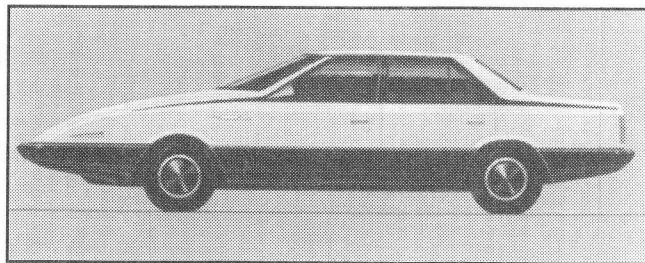
Promoting the use of electric vehicles since 1967

Vol. 32 No. 8&9

EAC TO PRODUCE 20,000 FUEL CELL/BATTERY ELECTRIC VEHICLES

Electric Auto Corporation of Ft. Lauderdale, Florida announced that it plans to start production in California of a full performance, zero-emission, electric "SILVER VOLT" Sport Utility Vehicle (SUV) equipped with its new APOLLO(tm) FUEL CELL and LEAD-COBALTBATTERY which will sell at the same average price as today's SUV with a gasoline engine. The fuel cell is the same type that took American astronauts to the moon in NASA's Apollo Space Mission of the 1960s. NASA continues to use this type of "alkaline fuel cell" which is considered to be very reliable, with 40-years of research and development behind it. It has a higher efficiency and voltage than other types of fuel cells under development by several new companies. The Apollo(tm) Fuel Cell has been adapted for use on Earth utilizing new materials and processes, which has made it possible to produce for far less cost than the NASA Space Fuel Cell. A number of patents are pending on the Apollo(tm) Fuel Cell.

The Lead Cobalt Battery was developed in 1966 and won the two 3,500-mile electric vehicle Cross Country Races in 1968 and 1970 run by students between the California Institute of Technology in Pasadena, California and the Massachusetts Institute of Technology in Cambridge, Massachusetts. The battery has undergone



many improvements over the years, the latest being covered by pending patents.

Performance of the Silver Volt SUV is expected to match that of a gasoline powered SUV - top speed 90 mph, acceleration 0-60 mph in 10-seconds, range 350-400 miles, fill-up time 5-minutes with a liquid ammonia based Propulsion Fuel or Methanol. The fuel cell charges the battery con-

tinuously much as the alternator charges the battery in a gasoline car. Production is planned to start in Santa Ana, California at 35 vehicles per month, building up to 2,000 per month. The marketing plan calls for sales and service to be provided by existing auto dealers throughout the state who will receive special training from EAC's California Tech Center to be setup in Orange County, California.

Under EAC's projected timetable, batteries will be produced in 2001 at the Florida Tech Center and Plant in Ft. Lauderdale, which the Company is in the process of setting up now. Fuel cells will be produced in 2002 at a 195,000 square-foot, 14-acre facility in Valley, Alabama called the Riverdale Mill, a former textile mill owned by WestPoint Stevens. An agreement was made in August 2000 for the purchase of the Mill by EAC from the Industrial Development Authority of Chambers County in Lanett, Alabama. EAC maintains a development laboratory in Ft. Lauderdale and at the Technical University

Continued on page 18

In This Issue

- 1** We are told that the fuel cell car is the future, were also told it is years away. The big auto companies talk fuel cell but are moving very slowly in that direction. What we need is a grass roots company to push the technology in the right direction and that's just what Electric Auto Corporation seems to be. Lead by Robert Raymond Aronsson, a legend in his own right, EAC is putting two solid technologies together, the lead-cobalt battery and the Apollo style fuel cell. This combination of two proven technologies is just what might be needed to advance the fuel cell hybrid into the marketplace.
- 4** At the hart of the EAA has always been nuts and bolts how to do it advise. This month in CE Mike Brown continues his regular column with the subject "What kind of car to convert, part 1". Probably nobody knows better than Mike the ins and outs of what type of car to convert and why pick it?
- 6** Can pigs fly? Can an electric car run off of on-board solar power? Many believe that this idea is just not practical. In contrast to this point of view we are seeing better and better solar powered vehicles. The I J Lander is just such a machine. Take a moment and review it's specs, you might rethink the whole notion again.
- 8** Once a year it is held. It makes a good meeting ground for everything green. It's a great excuse to bring together lots of EVs, ofcourse it's earthday. Scott Cornell covers this month, Earthday 2000, The Fun and Frustration.
- 10** It's the biggest, it's the best, it's the Silicon Valley 2000. Theirs nothing quite like it. It draws people from all over the country. Just flip through the pages of our photo essay and relive this great event.
- 16** The small car is in again, the Smart Car, the Hypermini, the Ford Think City. Let Will Beckett take you for a test drive in the Ford Think and you will be ready to buy one.
- 20** A better battery is the key to the future of the EV. When a company claims they can double our range we take a closer look, such is the case with the Bipolar Battery.
- 22** News in Brief - Four more pages of the most interesting news releases we could find.
- 29** Member Want Ads - Why lease an expensive new EV when you can find a real bagain through our want ads?

PHOTO CREDIT - COVER

Electric Auto Corporations New Silver Volt II. Range: 350 to 400 miles between 5-minute refueling stops. Top speed: 100 miles per hour.

COPYRIGHT 1999 c Current EVents is a publication of the Electric Auto Association. All rights reserved. While Current EVents and the Electric Auto Association strive for clarity and accuracy, we assume no responsibility for usage of this information. Permission to copy for other than commercial use is given, provided that full credit is given to originator of material copied. This permission does not extend to reprinted articles.

Editor N' Chief/Publisher /Graphic Design

Kurt Bohan
2701 Monarch Street, Suite 142, Hangar 20
Alameda, California 94501
Tele: (510) 814-1864
Fax: (510) 864-9293
E-mail: eanews@aol.com

News In Brief

Ruth Shipley

CE Reporters/Contributors

Kurt Bohan, Michael Brown, Scott Cornell,
Lee Hemstreet, Will Beckett

Photo credits:

Kurt Bohan, Scott Cornell, Will Beckett

Calendar of Events

Anna Cornell

Advertising Manager

Roy Kaylor
1918 Menalto Ave.
Menlo Park, CA 94025
Tele: (831) 338-2200 Fax: (510) 864-9293
E-mail: Kaylor@access1.net

Article Submissions

The deadline for articles is the 1st of every even numbered 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.

Advertisements

A full advertisers information package and Rate Sheet can be sent by U.S. Mail, Fax or E-mail. Please contact advertising manager or CE staff for details.

National EAA

www.eaaev.org
Tony Cygan tonyc@144volts.com

Membership/Address Changes

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



John Newell's Dream

By Kurt Bohan

It seems like just yesterday that John had asked me. We were at the Peninsula Chapter meeting and he had just learned that the company I was working with would be one of the first to move into Hangar 20, the CalStart hatchery. John explained that they had often talked about taking some space somewhere and asked if we might be able to subrent a little of ours. Sadly at the time we had taken no Hangar floor space and could not help. Happily we were able to open the Hangar up to the EAA for meetings and events. First through JPP, then through three more companies I would work for, I was able to sponsor our association.

It's been nearly five years now and at the beginning of the fifth year we got our big break. For the first time we finally landed our own lease at Hangar 20. It wasn't a lot of room but it was enough to change our image in a way that we never experienced before. We now had an office to do CE in. We had some Hangar floor space to use as a workshop and access to a half million dollars in machine tools. Now projects could be undertaken like Jack Swartz's solar powered hybrid car, and of course there is "Cars For Clean Air".

The Cars For Clean Air program was made possible through the use of Hangar 20 space, and what a success it is. This year we have raised nearly \$8,000.00, more than the cost of the office. Cars For Clean Air not only paid for our new space but also made us money.

The biggest benefit our commercial storefront brought to us was a whole new world of opportunity. People could now find us like any other business and ask for help. From this location offers were made could never have taken place working out of a bedroom. During the last year the EAA was

offered up to \$250,000.00 of risk free money to take over Hangar 20 and run a world class electric vehicle hatchery and research facility. We were also given the opportunity to take ownership of a zinc-air superbattery project that the government had spent over \$130,000.00 on. And this was just the beginning.

When I think back to my talk with John Newell I think how pleased he would be and how far we have come. Non of us know what the future will bring but at least Hangar 20 has served as a blueprint of what the future can be. - KB



Help EAA Grow *Support* Cars for Clean Air

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

The EAA has already made \$8,200.00 from the Cars For Clean Air Program so far and generated handsome tax credits for those who have donated vehicles. 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.

Contact information:

For the San Francisco Bay Area:
Kurt Bohan
EAA, Hangar 20
2701 Monarch St. Suite 142
Alameda, CA 94501
Tel. (510) 814-1864
Fax (510) 864-9293
E-mail: eaanews@aol.com

For the Sacramento area:
Tim Loree
7428 Wisconsin Dr.
Citrus Heights, CA 95610-7432
Tel. (916) 967-3044
Fax (916) 863-0303
E-mail: loreet@2xtreme.net

CONVERSION WORKSHOP:

WHAT KIND OF CAR TO CONVERT, PART I

BY MICHAEL P. BROWN

In the last installment of the Conversion Workshop, we discussed why electric vehicles made sense in general, and why converting an existing gas or diesel vehicle made even more sense. Now we will go through the process of choosing the type of vehicle to convert.

Define Your Mission

The first step in the process is deciding what you want to do with your EV. If the EV is for commuting to work, with the occasional need to carry a passenger, a bag of groceries, or the dry cleaning, a small coupe or sports car would be a good candidate. On the other hand, if the EV is a kid hauler that also needs room for a week's groceries, then one of the subcompact sedans or station wagons is what you are looking for.

The commuter who also needs to haul small amounts of materials for weekend projects might choose one of the small pickup trucks to convert. A small pickup conversion would also work well for a business that makes light deliveries to people or other businesses in a small local area.

Once you have decided what you are using your EV for, it's time to start looking for the donor car or truck for your conversion project. There are several requirements that the car or truck must meet to be a suitable candidate for conversion. Let's go through them one at a time.

Weigh the Alternatives

One of the most important things to consider in determining if a certain car or

truck is a suitable donor is weight. The 6-volt lead acid golf cart battery is the most widely used battery for conversions, due to its good capacity, longevity, and affordability. However, if you multiply the weight of a battery by the number of batteries needed to power a vehicle, you will quickly see that a car or truck is guaranteed to gain weight during the conversion process.

A 96-volt conversion (sixteen 6-volt batteries) will gain about 800-900 pounds,



The Porsche 914 makes one of the best conversions.

a 120-volt conversion (twenty 6-volt batteries) will gain 1,000-1,200 pounds. For this reason, the lighter the car or truck is to start with the better conversion it will make (with a few exceptions that we'll talk about a little later). The heavier an EV is the lower the range and the slower its acceleration will be. Adding more batteries to extend range and allow more amps for acceleration is only partially successful. After a certain point, the added weight of the batteries cancels out any added energy storage.

Experience has shown that the best cars for conversion are found in the subcompact category. These cars are the two-door, four-door, and hatchback cars like the VW Rabbit, Honda Civics (from 1980), Ford Escorts, Nissan Sentras, and cars of a similar size from other manufacturers. The weights of these cars range from 2,000 to 2,500 pounds.

The small trucks that have made good conversion donors are the pickups from Nissan, Mazda, and Toyota, along with the Chevy S10 and Ford Ranger. My rule of thumb is, "Do not attempt a conversion on a car that weighs more than 2,800 pounds as a gas or diesel car". Trucks should not weigh more than 3,000 pounds as a gas or diesel truck.

Since physically weighing all of your possible candidates could be difficult, a little library time might be in order. Take your list of potential donors and search the back issues of Consumer Reports for a road test of that make and model. Road and Track used to publish a yearly list of specifications for cars sold in the US. There may be other publications that give the specifications of cars and trucks.

The important thing to remember is that we are looking for the 'curb weight', which is the actual weight of the vehicle, not the 'gross vehicle weight', which is the curb weight plus the amount of people and cargo it can be expected to haul. Both numbers are important, but the 'curb weight' is the one we need to know to determine suitability for conversion.

Size Does Matter

The next thing we need to look at is the size of the car or truck. Specifically, how much space is there to put batteries into while still maintaining room for the people and/or cargo you have decided the EV needs to haul?

This requirement for battery space eliminates some cars that, due to their light-weight, would seem to be good choices. Cars like the Austin Mini and Honda 600 Coupe are very light weight, but are so small that even if you use small low capacity 12-volt batteries, there isn't room for enough of them to make a practical road-going EV.

Two other very light donor cars the - VW Bug and the 1975-1979 Honda Civic - will make good EVs, but will lose the backseat to battery boxes, limiting them to the two-seat commuter category.

The VW Rabbit, late Honda Civic, and Ford Escort class of cars seem to be the donors of choice having, enough room for the necessary number of batteries, while still keeping four passenger seating.

With the small pickups, the battery space question comes down to three choices. The first choice is to take the easy way out and put the batteries in a box in the bed, which means giving up cargo space. The second choice is to put in a little more work and place the batteries under the bed, with access hatches built into the bed floor. The third choice, which is a little more work yet but worth it, is to install a tilt bed kit, allowing you to install the batteries under the bed in the space where the gas tank and exhaust system went.

Strength in Numbers

The strength of the chassis is another issue. As mentioned above, the car or truck gains weight when it is converted. We beef up the suspension to handle the weight increase but the chassis has to be strong enough at its pick up points, the places where the suspension attaches to the chassis.

If the chassis is too lightly built, the increased weight will, in time, deform the chassis at the pick up points. The effects of

this deformation could range from problems with the car's wheel alignment to outright failure of the pick up point and serious damage to the chassis.

This is where the gross vehicle weight (GVW) comes into play. The GVW is usually posted on the driver's doorframe or can be found in the magazines we talked about above. The numbers you want to compare are the curb weight and the GVW. You are looking for the car with the lowest curb weight and the highest GVW. This is a good indication of how much strength is built into the chassis.

The small trucks have no problem in the chassis strength area because they are built to haul a load. The two-seat sports cars might not do as well in the weight comparison, as they were designed to haul two people and a small amount of luggage. However, they also were built with strong, stiff chassis to anchor the heavy duty suspensions that gave them their "sports car handling". This stronger chassis helps make up for a GVW gap.

If you want to do a sports car but are worried about the chassis strength, check out the aftermarket parts suppliers and see if any "stiffener kits" are made for the car that you are looking at.

Rust Never Sleeps

There are some other concerns related to chassis strength and suitability. One is rust. If you live in an area where rust is a problem, it is important to have your potential donor car checked for rust damage, particularly around the suspension pick up points. Cosmetic body rust is not good either, as the rust spreads. Since you are making a large investment in a long lasting powertrain, you want the rest of the car to hold up and remain attractive for a long time also.

Even if you live in an area where rust is not generally a problem, it is still a good idea to have the chassis inspected for hidden rust by a shop that specializes in your make of car. At the same time, take a look at the condition of the brake system, wheel bearings, and drive train items such as universal joints on drive shafts and constant velocity

joints on drive axles.

No Damaged Goods

The other concern about the physical condition of the donor car is body damage from collisions. Obvious unrepaired cosmetic damage is enough to disqualify a car as a potential donor, as the cost of body repair added to the expense of the conversion might put the project out of reach financially.

Less obvious but more troublesome is body damage that has been repaired to look good cosmetically, with less attention paid to the straightness or strength of the chassis. The problems that such a repair causes range from difficulty in achieving or maintaining proper wheel alignment to catastrophic failure of the chassis. These problems would come up even if the car remained gas powered, so adding the weight of a battery pack just makes it worse.

Your best bet is to keep searching until you find a donor vehicle that is clean and has never been wrecked. Faded paint is okay. Even if you have owned the donor since it was new and know its history, the rust and mechanical inspections are still a good idea and might save you some grief down the road.

Get Into Gear

Since I am writing an article and not a book, I am not going to discuss the "Transmission Trio Questions": Why does an EV need a transmission? What about an automatic transmission? Why do I need a clutch when I use a manual transmission? If you would like my thoughts on these subjects contact the editor of Current EVents and if there is a sufficient interest I'll do an article on them.

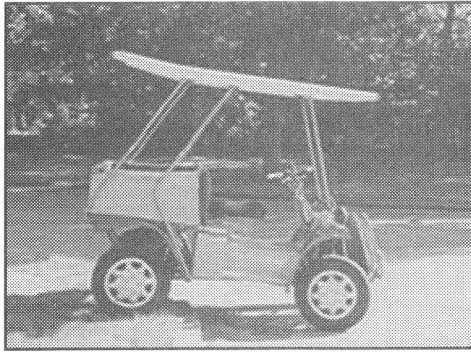
The majority of successful, efficient conversions have been done using a manual transmission with a clutch, so let's make that one of the criteria for that makes a car or truck a suitable candidate for conversion.

We'll continue next time talking about the make and model of the donor car, ease of conversion, age, and accessories.

Mike Brown, electro@cruzio.com

The IJlander Solar Powered Light Utility Vehicle

Designed for Commercial and Private Use On & Off the Road



Zero pollution - zero input - zero noise
zero maintenance - zero corrosion

It requires no fuel. It's squeaky green, reasonably priced and easy and economical to use. At the current level of development, and considering that - despite the available power and range, all vehicle journeys in the USA and Europe average only about 50 km (30miles) a day. And 75% of vehicle journeys in the USA, Europe and other developed economies are under 8 km (5 miles). And already our Solar-electric Light Vehicles, using photovoltaic modules to accumulate in batteries enough power from the sun for about 25km (15miles) of continuous use each day, plus built-in battery reserve can add an additional 50km (30miles) of use. They could perform, even today, 20% or more of all vehicular tasks worldwide.

We use a solar vehicle daily, in and out of our factory, on our farm and to go to the supermarket, the bank, around the town, to take the garbage to the dump and to run errands in the countryside outside town. And it hasn't been plugged in since May, in north Holland!!

Think what could it do in Colorado, Arizona, California, Miami, South America or the Caribbean or Spain, the Middle East, or the Far East!!!

Product Line:

- ◆ PD-Quad4, \$7,740.-
- ◆ "Tandem" 2seater PD-Quad4 1+1, \$8,240.
- ◆ PD-Quad6 (6wheeler+big pickup tray), \$9,940.
- ◆ PD-Quad6 1+1 (2seater+pickup tray), \$10,440

Features:

- ◆ Wide track & low center of gravity
- ◆ Automobile standard steering
- ◆ Real world suspension
- ◆ Automobile standard brakes
- ◆ Greater clearance than 4x4s
- ◆ Low ground pressure
- ◆ 2, 4 or 6 wheel drive options

Specifications:

- ◆ Pre-set speeds - 15kph(10mph) or 25kph(15mph) or 45kph(25mph) or 65kph(40mph)
- ◆ Climbing to 30% on slower models
- ◆ Options for front, rear or 4WD
- ◆ Daily range from full batteries alone - 50km(30m)
- ◆ Sustainable daily from solar, up to 25KM(15m) day after day
- ◆ Batteries + solar up to 75km(45m)
- ◆ Loads from 250kg(550lb) to 750kg(1650lb)
- ◆ No mystery, no input, no maintenance and no corrosion

General:

- ◆ Other models include Utes, Shaws, Grunts Golfs and Gofers
- ◆ With 2, 4 and more seater and wheel steering
- ◆ Sizes from golfcart to full pick-up

Terms:

- ◆ One World - One Price
- ◆ Reservation deposit of \$1,000.-
- ◆ Delivery 6 months
- ◆ Delivered to your nearest port of entry or bonded freight terminal
- ◆ 18 models make up introductory offer
- ◆ More about that later

Contact: WWATT

Ijlander@wwatt.com

Tel: +31 (0)251 31 67 05

Fax: +31 (0)251 31 67 06

Commercial & Fleet buyers

Contact +31 622 94 96 19

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.

And be sure to visit us on the World Wide Web.



Phone
800 Fast EVs
800 327-8387
360 385-5770
520 634-8445



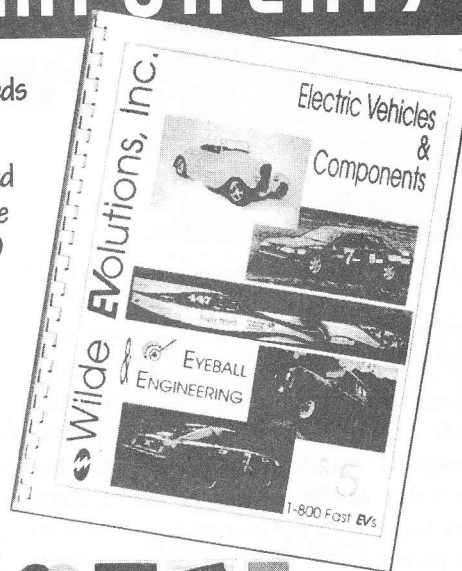
Mail
Wilde EVolutions, Inc.
P.O. Box W
Jerome, AZ 86331



24 Hour Fax
360 385-9295
520 639-0857



Internet
carguys@Wilde-EVolutions.com
<http://www.Wilde-EVolutions.com>



Wilde EVolutions, Inc.

EVA WORKS FOR YOU

- ▼ **Reliable EV components**
- ▼ **Custom designed EV packages**
- ▼ **Personalized customer service**
- ▼ **Expert EV services**
- ▼ **Competitive pricing**

For EV components and service, CONTACT

Electric Vehicles of America, Inc.

P.O. Box 2037 11 Eagle Trace Wolfboro, NH 03894
Tele: (603) 569-2100 Email: EVAmerica@aol.com

EVA - "Customer Service is No. 1" ©

Our Customers Say It All

Bangor-Hydro Electric
Commonwealth Energy
Co.

Cleveland Electric Co.

Tennessee Valley
Authority

Marblehead Light

U.S. Air Force

Briggs & Stratton

John Deere Company

Clearwater Electric Boats

Long Island Railroad

No. Carolina
Dept of Transportation

Hewlett Packard

Bolton High School

Contra Costa County Earth Day Celebration

Fun and Frustration

By
Scott Cornell

Contra Costa County's Earth Day celebration was held at the Concord Pavilion on Sunday, May 30, 2000 - attended by about 30,000 people during the beautiful, sunny day. All manner of exhibits and presentations relating, some very loosely, to the human experience on the planet Earth. The part that concerned me most was called the "Green Power Zone" this year, and included exhibits by many providers of off-grid and clean on-grid power, as well as a wonderful, highly diverse exhibit of electric and gas/electric hybrid automobiles.

Included in the vehicle portion of the exhibit (thanks to Andriko Zavadell's good contacts and persistence) were the following vehicles (the most we've had at this Earth Day event):

- ◆ "White Lightning" - Ed Dempsey's 254 mph Bonneville salt flat speed record setting streamliner
- ◆ A Nissan Altra - Lithium/ion powered family car - provided by Nissan motors
- ◆ A Nissan Hypermini - Nissan's cute little town car - provided by Nissan motors
- ◆ A Corbin Sparrow - provided by one of the Sparrow dealers
- ◆ A GM Gen II EV1 - provided by one of the leasees
- ◆ A Honda EV Plus - again provided by one of the leasees
- ◆ A Toyota RAV 4 EV - provided by PG&E's EV program director - another leasee
- ◆ 2 Ford Ranger EVs - provided by their owners / leasees (one used to bring in another exhibit)
- ◆ A Bradley GT II Electric - provided by its

owner

◆ A VW Karmann Ghia Electric - provided by the author

◆ "Third Degree Burner" - the Stanford University Solar car - displayed by members of the Stanford Solar Car team

◆ A Toyota Prius hybrid - provided by its owner

◆ A Honda Insight hybrid - provided by its owner



The Nissan Hypermini at one of its north American appearances.

An interesting, but not too "green" vehicle was also present in the Green Power area - a gasoline powered VW Beetle that had been extensively decorated with stained glass, marbles, and other glass objects (the Glass Quilt).

As each of the exhibitors, including me, answered the usual questions about their vehicles (how far will it go, how fast will it go, how long does it take to re-charge, how much does it cost, etc.), I noticed that the people who were most interested in obtaining an EV were also the most disappointed - they couldn't buy or lease any of the new commercial vehicles they saw at the exhibit, nor could we direct them to any currently available EVs except the Sparrow. The Toyota RAV 4 and the Nissan Altra are only available to fleet operators,

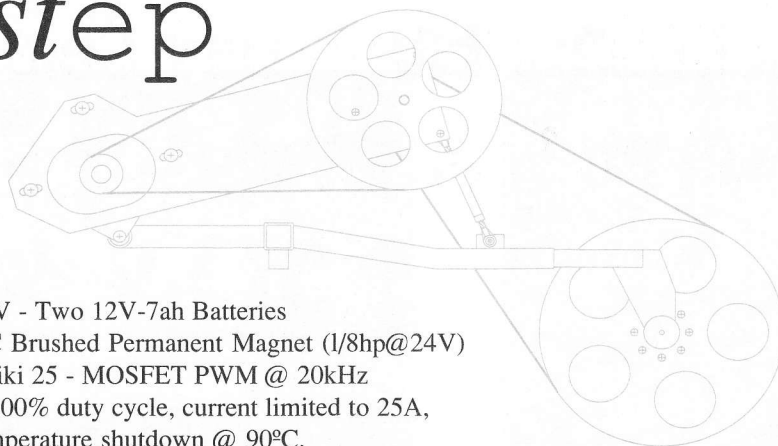
and in very small quantities. The Honda EV Plus is out of production and all available units are leased out. The older GM EV1s have been recalled, and there won't be any Gen II EV1s available until after August or September of this year, and those will probably go to those whose older EV1s were recalled. Ford has slowed production of the Ranger EV to the point that the local dealer barely acknowledges their existence and indicated that they aren't really available now. The Corbin Sparrow is being produced as fast as the plant can produce them, but the time-to-delivery is currently about 9 months to a year. The Nissan Hypermini is not planned to be available in this country - at this point it's only a prototype, and will only be available in Europe if / when it's produced. When asked where one could obtain an EV right now, all I could say was that a person could by an existing conversion used, a new conversion from a converter such as Solectria, they could convert a vehicle to electric themselves with the help of one of the many books on the subject and/or the help of an EAA member, or they could contract to have a vehicle converted for them. That's almost the same pitch I was making at the 1991 Contra Costa Earth Day Celebration when all we had on display was a few (nice) conversions and a few University-built solar cars.

I certainly hope that the large number of dedicated EV drivers that showed up at the California Air Resources Board (CARB) meeting in April were successful in convincing CARB to hold the line and continue to require a definite percentage of vehicles sold in California a few years from now to be Zero-Emission Vehicles (in addition to a requirement for Super Low Emission Vehicles (SLEVs), and Ultra Low Emission Vehicles (ULEVs))

Scott Cornell, spcorn@pacbell.net

..a journey of a thousand miles begins with the...

Firststep^{electric propulsion}



Designed and Built in U.S.A.



2530 Berryessa Road #453
San Jose, CA 95132

Phone: 408-929-2777

Fax: 408-929-3777

E-mail: kwanms@aol.com

Website: www.kwanms.com

- Voltage: 24V - Two 12V-7ah Batteries
Motor: DC Brushed Permanent Magnet (1/8hp@24V)
Electricals: Keiki 25 - MOSFET PWM @ 20kHz
0-100% duty cycle, current limited to 25A,
temperature shutdown @ 90°C.
(60V Absolute Maximum Input Voltage)
Mechanical: Two-stage - Belt/Pulley system ratio: 4:1 & Chain/Sprocket system ratio: 5:1
Freewheeling clutch system lets the bicycle coast when the motor is off.
Misc: Charger included.
Price: \$599.00 + shipping (8.25% tax for CA residents)

• Easy bolt-on system to standard mountain bikes with 26" rims or hybrid bikes with 700c rims (~27" diameter rims).

• Kit is a "direct-drive" system and not a friction drive.

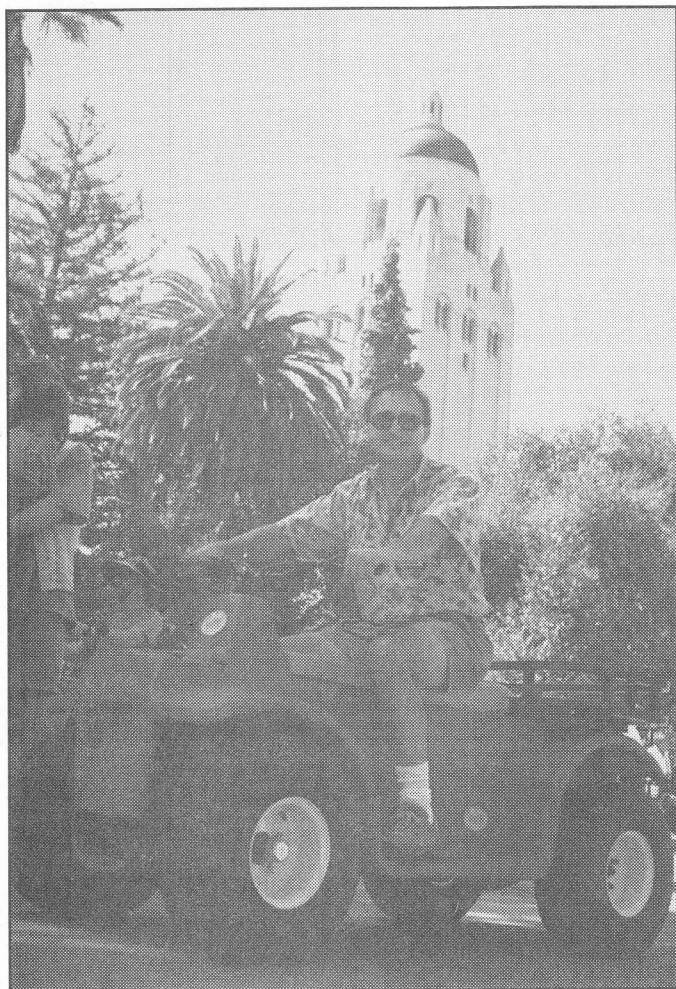
For folks interested in baking from scratch, here is a list of circuits of my '95 homebuilt Electro-Metro with associated experiments, published previously in the DEVC. The schematics are \$2 per page, and the software (3.5" floppy) for projects using a microprocessor is \$10. For those who want a pre-programmed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

Order from:

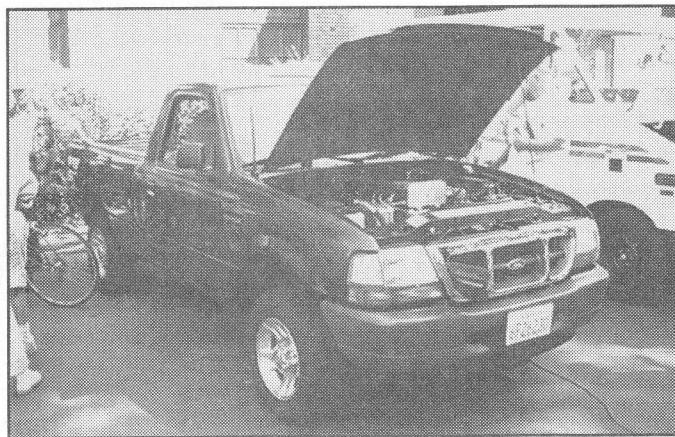
Solectrol
184 Vista Lane
Fincastle, VA 24090
540-473-1248

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)



Long time EAA member and EV designer Rick Doran riding his new product, the Gorilla Vehicle.



A Ford Ranger EV, this is one of the few production EVs that some people have been able to buy outright.

SILICON VALLEY RALLY 2000

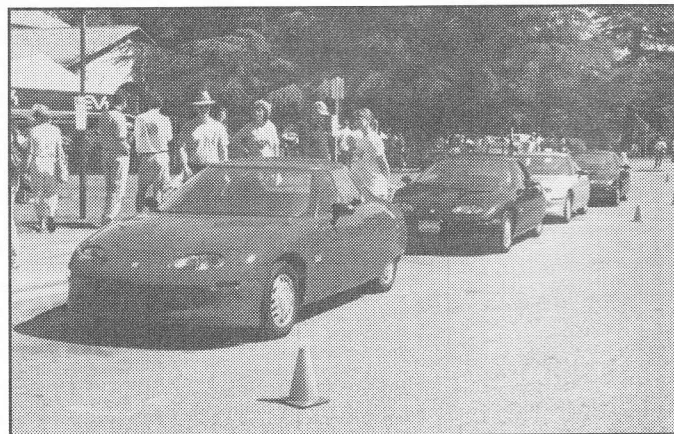
The BIGGEST and Still the BEST

Stanford University, 9/23/2000

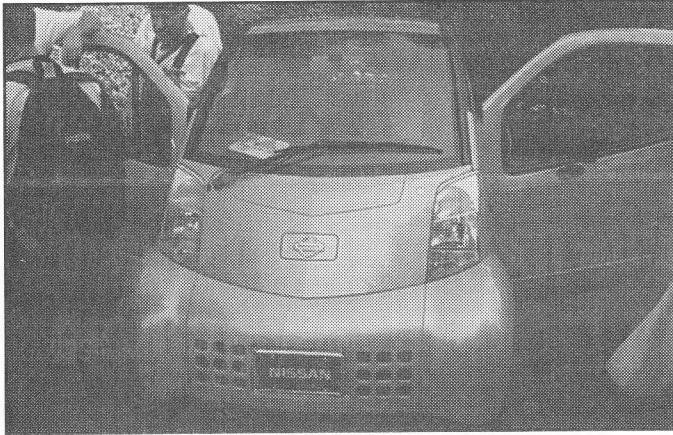
Eager volunteers started setup work by 7:00 AM. With 12 EV's registered, the run started on time at 10:06. On display were two vintage EV's, the 1916 Detroit and Bill Palmer's duplicate of the 1904 Olds curved dash runabout. There were 16 commercial and display vehicles.

New this year were:

- ◆ AC Propulsion's T-ZERO, pre-production
- ◆ Nissan Hypermini with lithium-ion battery
- ◆ U.S. Postal Service van by Ford/Gruman
- ◆ New Ford "Think City"
- ◆ Toyota Prius, ride & drive



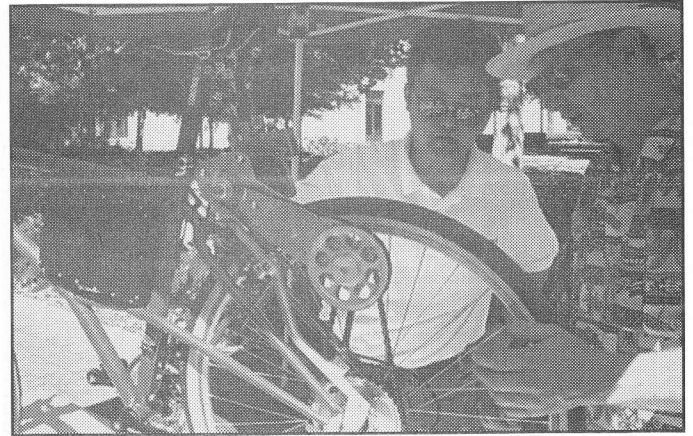
The GM EV 1 ride and drive was again a big hit this year.



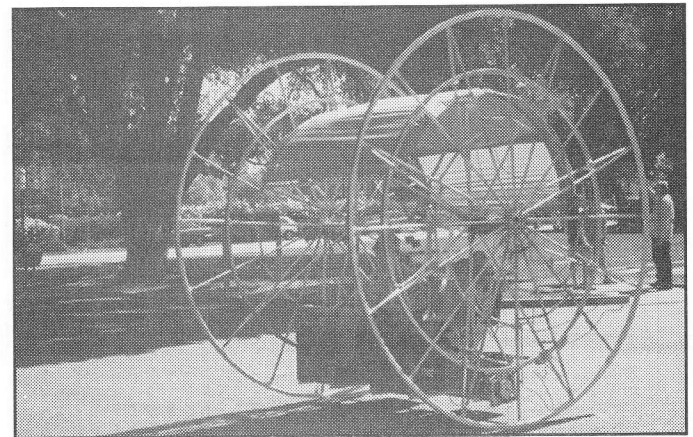
The Nissan Hypermini is powered by an exotic Lithium-Ion battery.

The GM "road show" van supplied power to charge seven EV-1s for ride & drive. The Prius (a gasoline powered hybrid), did not require any charge. Unfortunately, there is no external provision for charging. Bob Wheeler provided 2 charging stations for rally (150 amps) and display cars (100 amps). Once again this year, Bob Schneeveis charmed the people with his colorfull "carnival ride". It had ten foot wheels and two seats rocked as it circled and wheeled up and down the street.

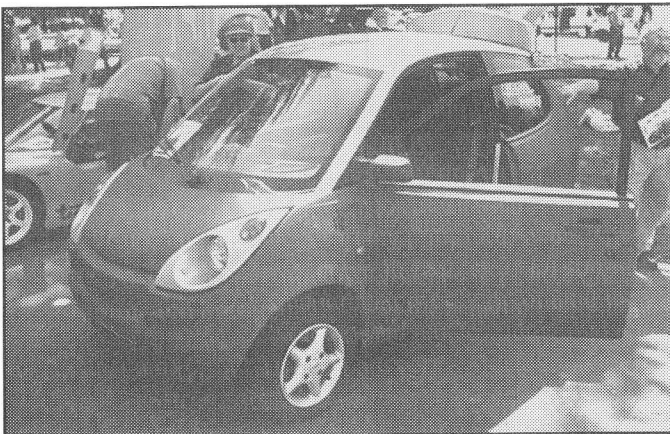
The San Jose Mercury News reported that there were 2000 in attendance and it has been our experience that many come and stay for an hour or so. This year there were



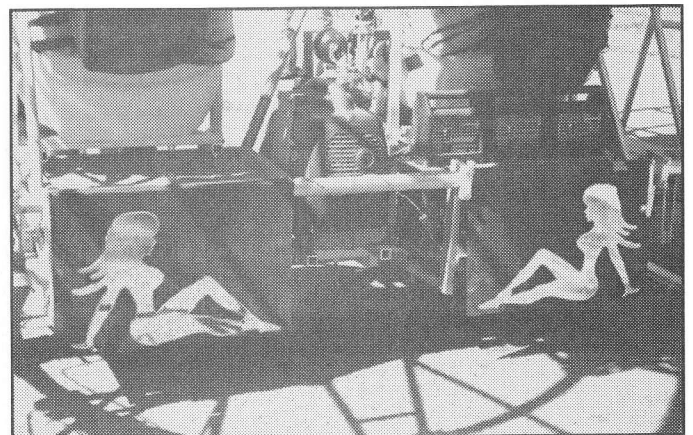
Bob Schneeveis examines the hot new KWAN electric bike kit with it's designer .



Bob Schneeveis's hybrid "Carnival Ride" big wheeler was built for this years Burning Man event.



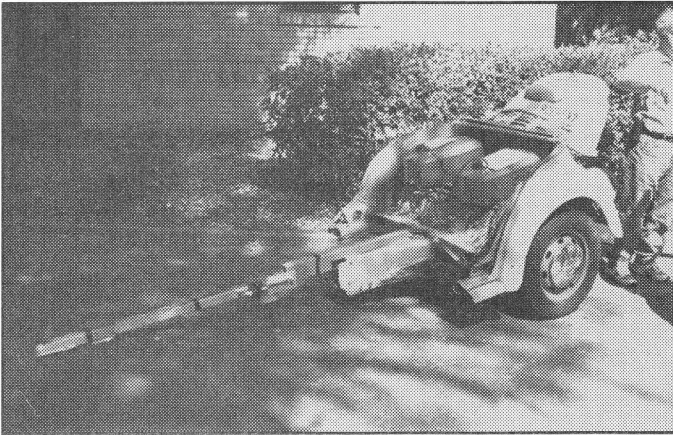
The Ford Think City showed many advancements over the old Pivco CityBee.



Schneeveis's hybrid is powered by two Optima batteries charged by a .9 KW Honda APU placed between the seats.



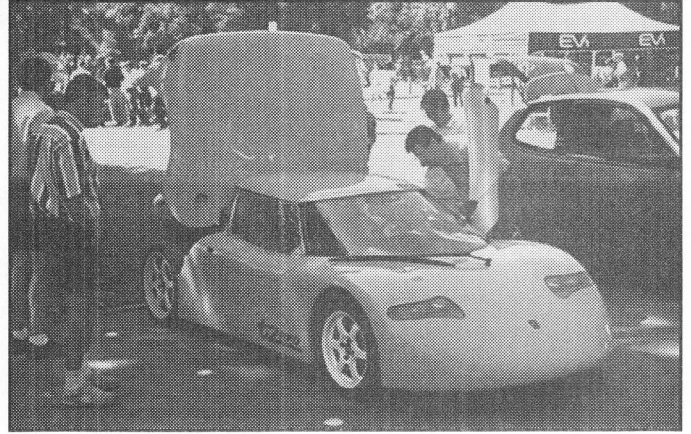
Something new for SV Rally 2000 was JB Straubel's Pusher. Unlike a generator APU the trailer pushes the EV.



This VW powered pusher was Straubel's first design. The Bug based unit was harder to disengage.



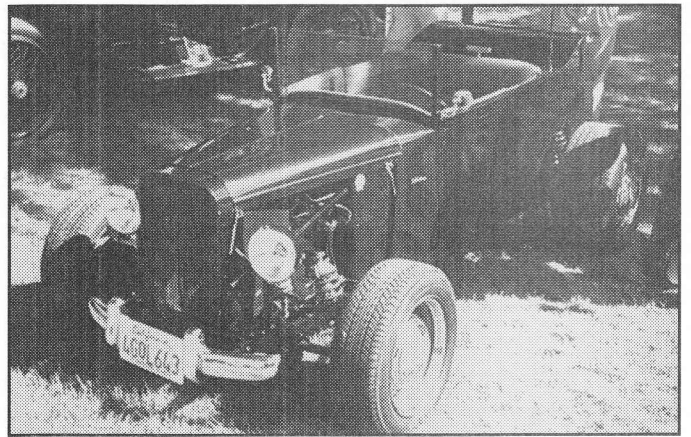
The past and the future side by side. These two postal vehicles are separated in time by two decades.



Shown with it's rear lid up is the T-Zero. This vehicle like many has failed to come to market.

enough people so that test drives were heavy all day and there were always riders for the rally cars. There was also a constant crowd of people in the personal vehicle (scooters, bikes, the Gorilla), section of the rally as well. Channe1 2 (Tom Vacar) came to the rally and interviewed many at the rally. This video was presented on the news after the Giants game.

Seven awards were given to winning drivers including Stanford football press box tickets, restaurant coupons, theatre tickets, and a \$100 credit at Palo Alto hardware store. Free ice cream coupons were given to all volunteers by Rick's Rather Rich ice cream. Burritos & chips were catered by Senor Taco. San Jose chapter sold soft drinks.



This all-electric hot-rod is distinguished by being driven by a massive shunt wound vertical forklift motor.

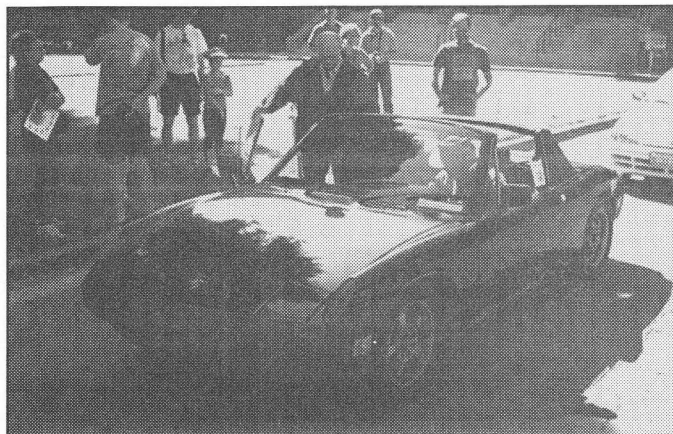


Always looking great is Scott Cornell's red Karmann Ghia.

The 4 wheel. distance winners were Richard Hilleman's 1957 Porche replica (thought this was a Spider) , and Scott Cornell's red Kharman Ghia. Both ran over 62 miles (28 laps). The two winning bike EV's ran over 30 laps (66 miles). They were Mike Saari and Mike Crumrine. They ran out of time, not battery power.

Scott Leavitt made an excellent video, which will be available thru Bob Wheeler. Bob Wheeler and Chuck Hursch stayed at the site so that charging was available until 7pm for cars that participated in the rally.

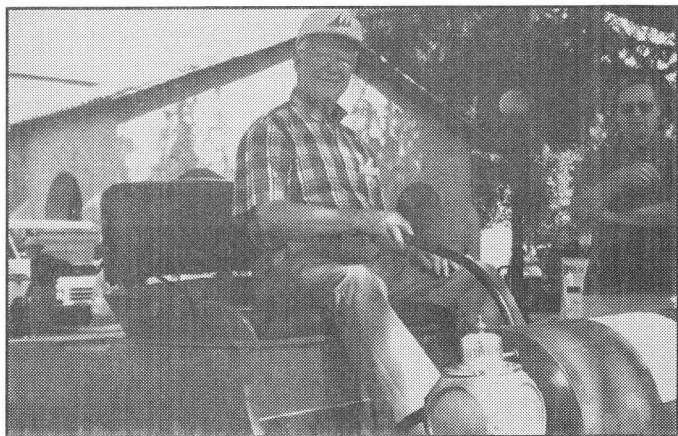
Story by Lee Hemstreet, Photo's by Kurt Bohan



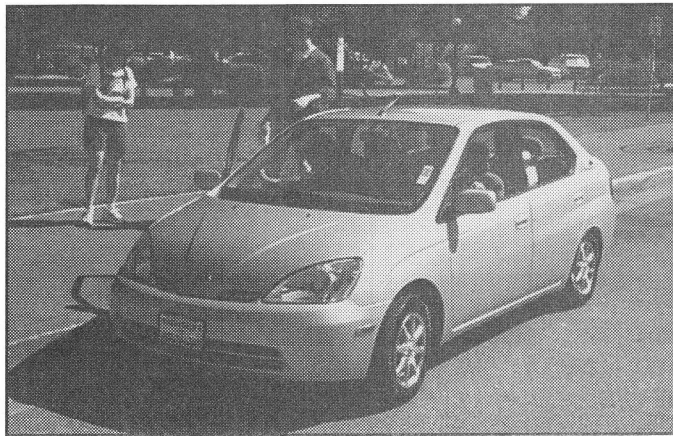
The 914 Porsche pictured here is Black Magic, the prototype and first Mike Brown Porsche kit.



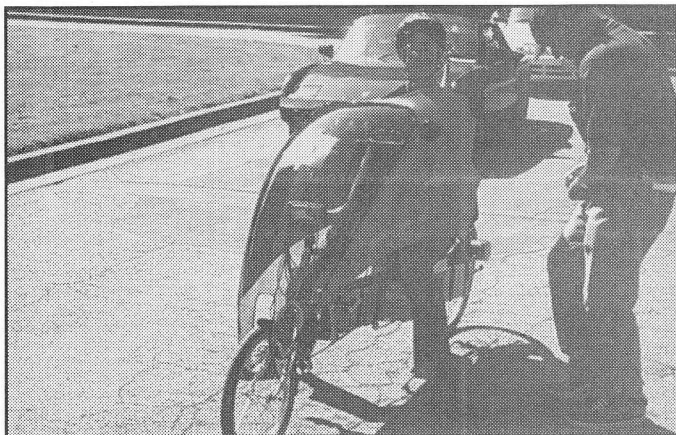
Will Beckett is seen speeding off in his new Solectria Force EV, one of the few full size EVs you can buy today.



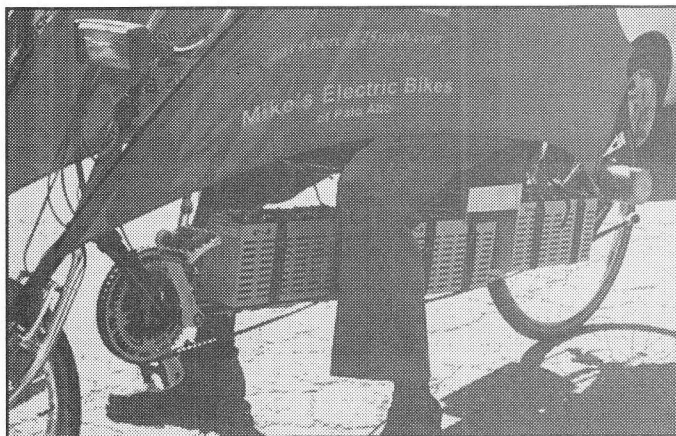
Pictured with tiller in hand is Bill Palmer in his Palermobile, the oldest EAA built vehicle.



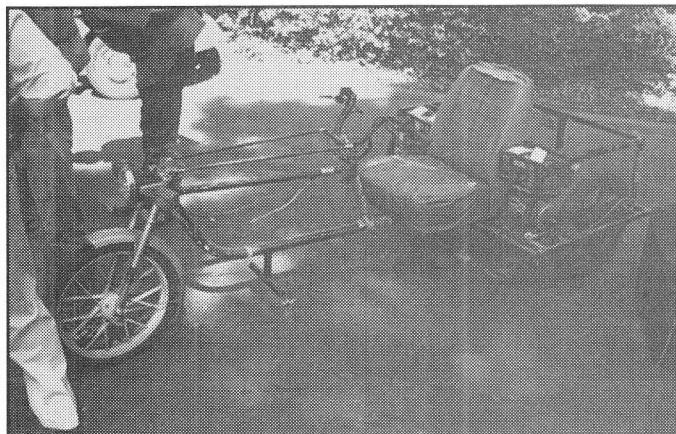
Seen for the first time at the SV Rally, were owner operated, commercially bought hybrids. Pictured is a Toyota Prius.



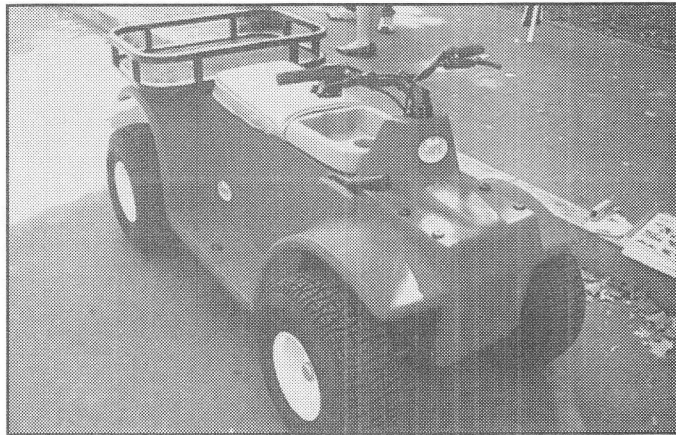
Shown setting another distance record this year is Mike Sarri on one of his E-Bikes.



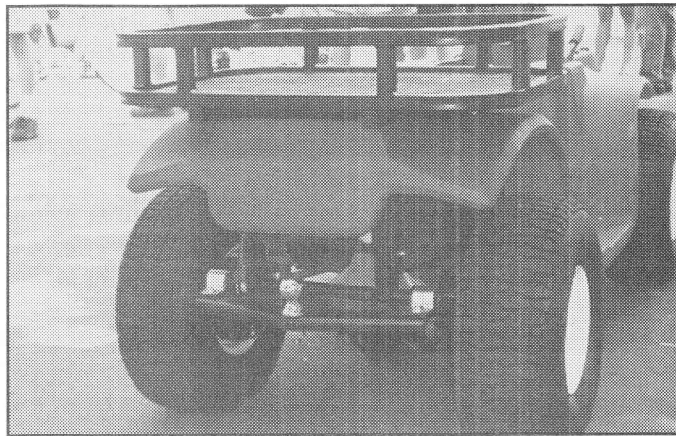
Pictured is a close-up of E-Bike's nickel-zinc batteries. E-Bike is the first commercially offered EV to use nickel-zinc.



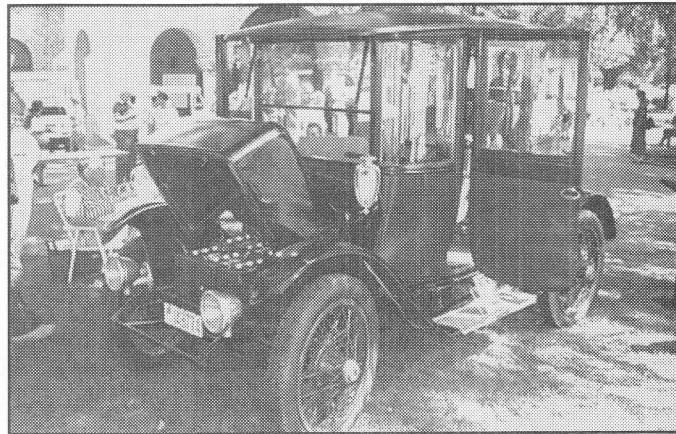
Jerry Karmin's trike is legally an electric moped. At just under 2 HP this vehicle can reach speeds of nearly 30 MPH.



Rick's new Gorilla Vehicle is based around a rugged one piece roto-mold body with batteries down the center.



The Gorilla Vehicle seen from the rear. Don't let it's size fool you, it can haul or tow just about anything.



Back for a repeat performance, the History Museums of San Jose's 1916 Detroit Electric.

Electro Automotive

Since 1979

- ★ **Books:** including *Convert It*, the hands-on how-to manual
- ★ **Videos:** from introductory to technical
- ★ **Components:** Advanced DC Motors, Curtis/PMC Controllers, taperlock adaptors, and much more
- ★ **Kits:** Universal kits to fit any suitable chassis, and custom bolt-in *Voltsrabbit* and *Voltsporsche* Kits for plug-and-play conversion

For catalog, send \$6.00 to:

Electro Automotive, POB 1113-CE, Felton, CA 95018

Or visit us on the internet: <http://www.eleetroauto.com>

Email: electro@cruzio.com

Phone: 831-429-1989



THE WINNING COMBINATION

A very special battery with a long history of success - the new Fifth Generation Tri- Polar Lead Cobalt Battery - and a very special fuel cell, the Apollo Tm Fuel Cell, a modern version of the NASA Alkaline Fuel Cell which took U.S. Astronauts to the moon, - have joined forces to potentially revolutionize the way we drive our cars and the way we power our homes.

For more information contact:
Howard Alm, Jack Brookner
or Robert Aronsson at Tel: (888)783 7050

Electric Auto Corporation

4747 North Ocean Drive, Suite 223
9 Fort Lauderdale, Florida 33308
Tel. 954/785-2228 -or - 954/783-7050
Fax 954/785-0656
E-mail: electricauto@worldnet.att.net
Web: <http://www.electricauto.com>

Help Support ZEV while you Eat

Looking for a good EV outing? If you live in Concord California you could go out to dinner and support ZEV at the same time. It's simple, just make your next EV trip out to dinner at T.R.'s Restaurant in Concord. T.R.'s is owned by Contra Costa County supervisor and restaurant owner Mark Desaulnier. Mark was appointed to the CARB board by Gov. Pete Wilson in 1994. For Mark the zero emission vehicle program is an example of what "smart growth is supposed to be all about - changing the way we plan our communities so they are sustainable". So if you live close to Concord, help support people who think the same way we do by making your next EV trip out to eat at T.R.'s Restaurant!

Help EAA Grow

Support Cars for Clean Air

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

The EAA has already made \$8,200.00 from the Cars For Clean Air Program so far and generated handsome tax credits for those who have donated vehicles. 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.

Contact information:

For the San Francisco Bay Area:
Kurt Bohan
EAA, Hangar 20
2701 Monarch St. Suite 142
Alameda, CA 94501
Tel. (510) 814-1864
Fax (510) 864-9293
E-mail: eaanews@aol.com

For the Sacramento area:
Tim Loree
7428 Wisconsin Dr.
Citrus Heights, CA 95610-7432
Tel. (916) 967-3044
Fax (916) 863-0303
E-mail: loreet@2xtreme.net

Think City

Report

By Will Beckett

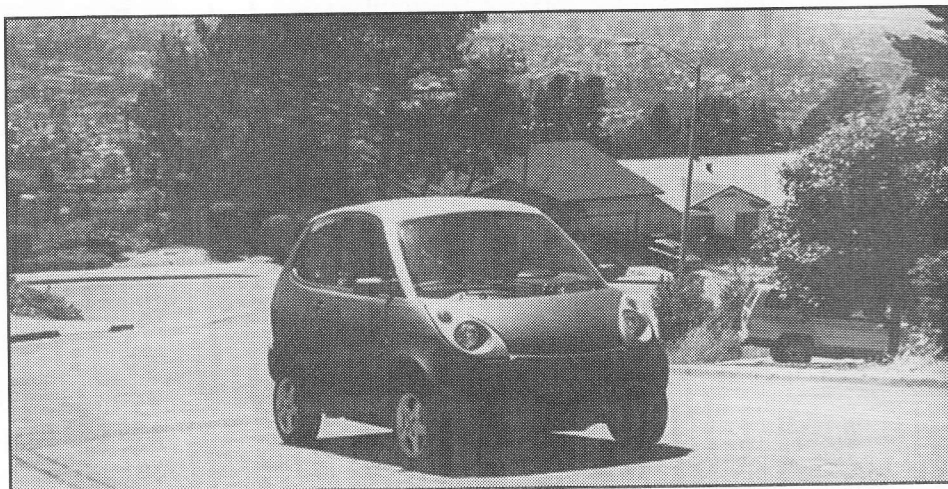
I have been lucky enough to have been asked by Ford to be the point of contact in Palo Alto, CA, for a Ford TH!NK City test drive. I was asked to manage the car between the City of Palo Alto, Stanford University and companies in the Stanford Research Park which includes HP and EPRI among others. I have had the car now for over a week and it has been great fun to drive. It's unusual shape and size gets a lot of attention and many smiles.

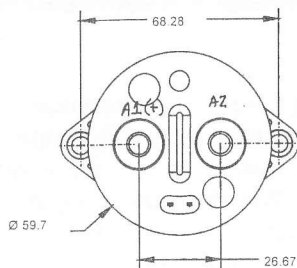
Having driven the D-Chrysler Smart, I feel that although the Smart is a better vehicle, the TH!NK City drives better. It has great handling and quick acceleration. Top speed is 55mph with a reported range of 50 miles but I haven't tested this yet. I find it to be a very roomy car (more so than the Smart) and although it is clearly a small car from the outside, I don't have that feeling when I am inside the car. I had it at our last EAA meeting and it was a big hit. Even Amanda Krusoe (Saturn), our guest speaker, took it out for a spin.

On Friday we ran into some trouble with the car. Turns out the park locking pin was jammed, so it would not shift into gear (a figure of speech only). Yesterday, an engineer from Michigan, flew out and traveled down for SFO to my home in Palo Alto and spent about two hours working on the car in my front yard. He had his computer and complete kit of tools. He loaded new software in the car and together we took the front part of the body off the car to fix the stuck part. I learned a lot about the car and found that there are many components from the Ranger EV now in the TH!NK City.

Anyway, the car is up and running again and out being used by people in the area. It leaves here for its next destination on Monday. I took some outside pictures of the vehicle (they didn't want me to take under-the-hood pictures) and can post these on the Silicon Valley site in the next week or so.

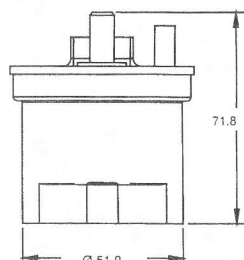
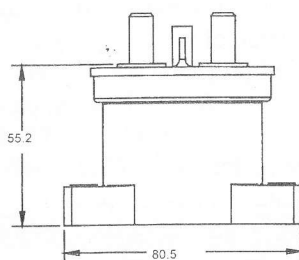
Will Beckett <will_beckett@hp.com>





New from Kaylor Energy Products **KILOVAC Czonka 3**

High Power Switching Contactor



All dimensions in millimeters unless otherwise specified.
Tolerances: 0.X = ± 0.77 mm 0.XX = ± 0.25 mm

Kaylor Energy Products
20,000 Big Basin Way
Boulder Creek, CA 95006

Tel. (831) 338-2200
E-mail:
kaylor@access1.net

- ◆ Maintenance Free
- ◆ 320 Volts
- ◆ 200A Continuous
- ◆ 2000A Maximum
- ◆ 12 Volt Coil
- ◆ Make & Break at 250A
- ◆ Uses less than 1/10 Ampere
- ◆ Magnetic & Gas Arc Quenching
- ◆ Hermetically Sealed: arc contained
- ◆ Weighs Less Than One Pound
- ◆ Size less than 2.58" X 2.83" X 3.16"
- ◆ Mounting hardware provided

\$69.95

+\$5.00 S&H
+8.25% tax in CA

Mike's E-Bikes

30 miles at 25+ MPH
for only a nickel

Glide by traffic

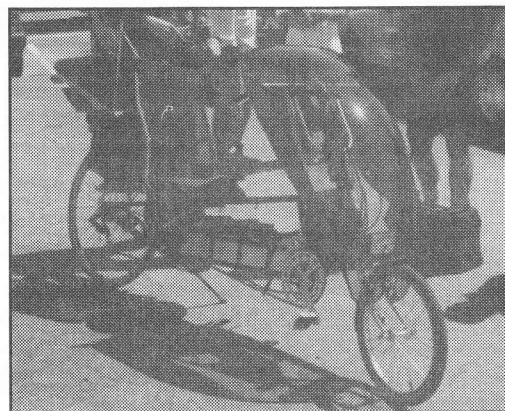
No parking hassles

Recharge anywhere

Very comfortable

Use the **E-BIKE** for "no-sweat" commuting! Whatever your normal bicycle performance, the **E-BIKE** will add 20 miles to your range, and will add 10 MPH to your average speed. You can use your **E-BIKE** for errands, nature rides, shopping, and recreation.

E-Bike is easy to ride! The **E-BIKE** is far more comfortable than an ordinary "head-first = sore back/neck" bicycle. Pedal as much as you want or as little as you want.



Prices starting under
\$2,000

Mike's E-Bikes
2270 Yale Street
Palo Alto, CA 94306

Tel. (650) 493-7633
E-mail: saari@aol.com

EAC to produce vehicles *Continued from page 1*

of Graz in Austria where prototype Apollo(tm) Fuel Cells can be seen and demonstrated.

EAC has signed an agreement with a major car manufacturer for the body and chassis of the SUV and is seeking an arrangement with a second carmaker as a backup source.

Three pioneers stand behind the technical development of the company: Robert Raymond Aronsson invented the Lead Cobalt Battery in 1966 and has 27 patents in his name. He is chairman of EAC and EAC's licensor, Electric Fuel Propulsion Corporation, which was formed in 1966 and produced over 100 highway electric vehicles in Detroit from 1967 to 1980. Professor Dr. Karl Kordesch is the man behind the Apollo(tm) Fuel Cell. He has 150 patents in his name and built the first practical Fuel Cell/Battery hybrid electric car in 1970 which he drove on city streets and highways for over three years. Dr. T. Nejat Veziroglu is a professor at the University of Miami and has been engaged in hydrogen research since the 1960s. He has developed a master plan to switch the U.S.A. to a hydrogen economy and has been nominated for the 2000 Nobel Prize in Economics for this work.

EAC will demonstrate its Apollo(tm) Fuel Cell, an Ammonia Cracker and related equipment at the International 2000 Fuel Cell Seminar to be held on October 30 - November 2 in Portland, Oregon at the Oregon Convention Center where over 1,000 scientists and engineers from all over the world are expected to attend. EAC will deliver three technical papers at the Seminar.

THE COMPANY BEHIND THE PROGRAM

Electric Auto Corporation (EAC) was formed in 1994 as a Delaware corporation with headquarters in Fort Lauderdale, Florida. It is a privately owned company with paid in capital of over \$1 million in cash. The amount of money invested by the Company and its predecessors to bring this project to its present state of development is

\$17.7 million according to available audited financial statements (the actual amount is around \$25 million, but some audited financial statements are missing to back up this figure). EAC is the exclusive worldwide licensee of Electric Fuel Propulsion Corporation (EFP), a corporation formed by Robert Raymond Aronsson in 1966. EFP is a patent holding company with 37 patents on batteries, electric vehicles and electric vehicle propulsion system components, but has had no operations since 1983. EFP built and sold over 100 electric vehicles from 1967 to 1983, many of them to electric utility companies. The Company is emerging from the development stage into commercialization and expects to be in production of Lead Cobalt Batteries, Apollo(tm) Fuel Cells and Ammonia Crackers (for extracting hydrogen from ammonia) in 2001 and 2002. The Company is not in the vehicle manufacturing business, but expects to sub-contract the assembly of electric vehicles to professional auto assemblers.

The combination of Lead Cobalt Battery and Apollo(tm) Fuel Cell can be used in all types of electric vehicles from golf carts to fork lift trucks to cars, vans, buses and boats. It also can be used in what EAC calls its Apollo(tm) Power Plant, an on-site power plant for homes, farms, commercial and industrial establishments, independent of the electric power grid. Further information can be found in EAC's new Web Site: www.electricaauto.com

SOME OF THE MEN BEHIND THE COMPANY

Robert Raymond Aronsson founded Electric Auto Corporation in 1994 and Electric Fuel Propulsion Corporation in 1966 and is Chairman and Director of both companies. He has been in the battery manufacturing business all of his life and expanded that activity into the electric vehicle business in 1966 when he invented the Tri-Polar Lead-Cobalt Battery. He has 27 patents in his name. He has had battery plants in: Puerto Rico; New Orleans, Louisiana; Troy (Greater Detroit), Michigan; Korea and

China. He studied mechanical and chemical engineering at the University of Idaho in Moscow, Idaho and Business Administration at Woodbury University in Los Angeles, California, earning a Bachelor's Degree, Magna Cum Laude, from that school.

Professor Dr. Karl Kordesch is a Vice President and Director of the Company and is in charge of the Company's Apollo(tm) Fuel Cell project at the Technical University of Graz, Austria heading up a team of 12 scientists and engineers. Dr. Kordesch has been in the fuel cell and battery business all his life and has 150 patents in his name. He has written a number of books and published hundreds of technical papers on fuel cells and batteries. He invented the Alkaline Primary Battery Cell for flashlight batteries which replaced the Zinc-Carbon cells. This battery is now sold by Eveready, Energizer, Duracell and Rayovac which have 75% of the market in the USA. While working as a scientist for Union Carbide, he developed the world's first practical hybrid Fuel Cell / Battery

Electric Car, an A-40 Austin, which he drove on city streets and highways for over three years. From 1977 to 1992 he was Director of the Institute of Inorganic Technology and Analytic Chemistry at the Technical University of Graz. He received his Doctorate from the University of Vienna, Austria.

Professor Dr. T. Nejat Veziroglu is a Vice President of the Company and is in charge of Hydrogen and Fuel Cell development. In 1965 he joined the University of Miami Engineering Faculty and later organized the Clean Energy Research Institute for which he acts as director. He is editor and chief of the monthly scientific journals International Journal of Hydrogen Energy and International Journal of Energy Environment Economics. He teaches Heat Transfer, Mass Transfer, Hydrogen Energy and Nuclear Engineering and has published over 200 scientific reports and papers. He has been an invited lecturer and/or consultant on energy research and education to many countries of the world. He was graduated from the City and Guilds College, the Imperial College of Science and Technol-

ogy, University of London with degrees in Mechanical Engineering (A.C.G.I., Sc), Advanced Studies in Engineering (D.I.C.) and Heat Transfer (Ph.D).

For more information contact:
Howard Alm, Jack Brookner
or Robert Aronsson at Tel: (888)783 7050

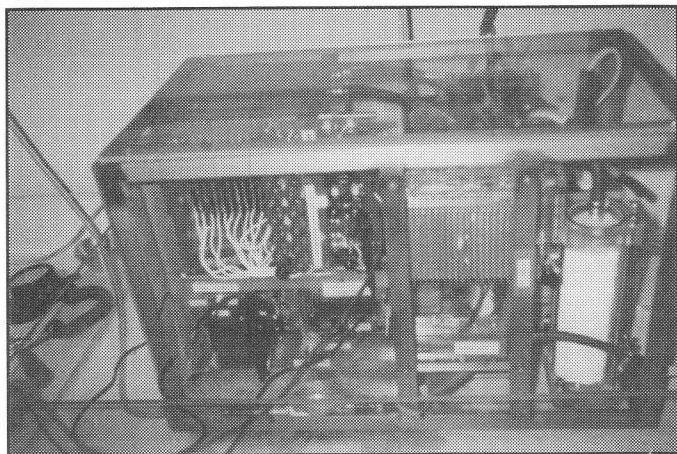


DID THE DOG EAT YOUR EV PREVIEW 2000?

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 petromobiles). 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. 23.



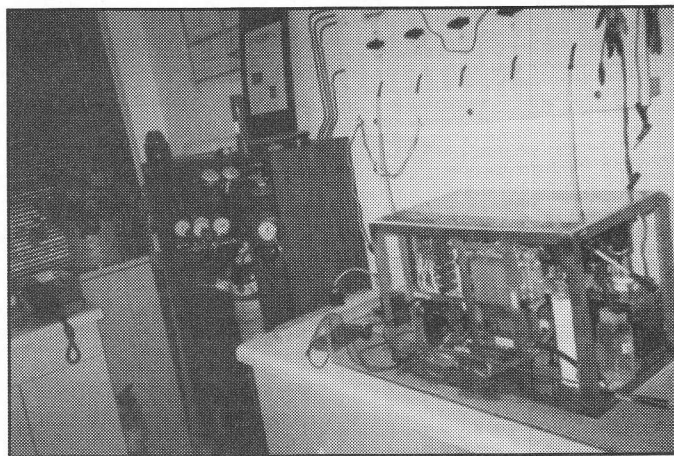
APOLLO TM FUEL CELL fed by a tank of Hydrogen. Air is taken in through a tube (right, front corner) and passes through white soda lime (also in right, front corner). The soda lime acts as an air cleaner, extracting carbon dioxide from the air.

Noisy, power consuming air compressors, humidifiers, and other accessory equipment are not required for Apollo Tm Fuel Cells. They are necessary for PEM Fuel Cells which operate over 500 C.

At the right, rear corner, is a tank of potassium hydroxide (KOH) which is circulated through the fuel cell stack continuously as part of the thermal management system. When the fuel cell is shut down, the KOH drains back into the tank.

It is very advantageous, for a number of reasons, to be able to shut down a fuel cell. Shutting down the Apollo TM Fuel Cell on an intermittent basis, when power is not needed, extends the life of its electrodes, improves safety, especially at night, and allows for maintenance. PEM Fuel Cells can be shut down but care must be taken to keep the membranes moist. If they are allowed to dry out, a humidification process must be started to re-wet the membranes.

High temperature fuel cells (Phosphoric Acid, Liquid Molten Carbonate and Solid Oxide) are difficult and costly to shut down.



The APOLLO TM FUEL CELL has its power producing "stack" in the upper left hand corner, and its white soda lime air cleaner in the lower right hand corner.

This fuel cell produces the highest voltage of any low temperature fuel cell (0.8 volts per cell under load) and does not require noisy and power consuming air compressors, humidifiers, and other expensive accessories required by PEM fuel cells.

The Apollo TM type fuel cell (hydrogen-air, alkaline) is the only kind of fuel cell that can be easily and safely shut down for a rest when power is not required. This is a big advantage not shared by other fuel cells. It allows for maintenance when necessary and also extends the life of the electrodes of the fuel cell. In addition, it adds a safety feature, especially when power is not needed continuously at night.

This type of fuel cell, with oxygen as an oxidant, has been used by the NASA Space Program since the Apollo Moon Project of the 1960s. It has been found to be very reliable, with over 40-years of research and development behind it.

But most important of all, Apollo TM uses less noble metal catalysts and does not need all the accessory equipment required by other fuel cells. It's price is projected to be US\$100 to 150 per kW, far lower than projected prices of the PEM fuel cell shown in the media and in published papers.

New Bipolar Battery should double the range of EVs

Management teams from Power Technology and Bipolar Power International (BPI) made a comprehensive presentation to the attending shareholders. Mr. Jeff Arias, BPI President, presented his company's background as well as the results of their work to date with Power Technology's patented reticulated metal-foam battery plates. BPI has built a number of test cells to compare the performance of ordinary lead-acid battery plates versus test plates made with Power Technology's reticulated foam and BPI's proprietary high performance paste formulation. The test results showed major benefits in combining the companies' two unique technologies.

Mr. Arias stated, "Preliminary test results indicate that material-utilization efficiencies were more than doubled using BPI paste with Power Technology foam." (Utilization efficiency is the measure of how much electricity a battery can deliver per pound of active material inside.) "Furthermore," he continued, "this is a major improvement, since typical battery efficiencies are around 30%."

Other test data presented showed the result of the life-testing on the test cells. The test cells show no decrease in capacity after 120 charge-discharge cycles, and testing is still continuing. "We have only been at this for 2 months," noted Mr. Arias, "but these preliminary test results look very good." He then demonstrated the first laboratory prototype 2-volt battery cell, built with the Power Technology+BPI-technology plates. To demonstrate the prototype, Mr. Arias powered a cooling fan with complete success.

B.C. Research Inc.

(www.bcresearch.com)

also provided Power Technology's management with the first test results from their team efforts at their dedicated facility. The initial tests of Power Technology's patented reticulated lead plates showed the following advantages over standard grid plates:

- ◆ Up to 300% higher charge capacity
- ◆ Up to 200% longer discharge time
- ◆ Up to 200% higher specific energy

Research and development are continuing in the following areas:

- ◆ Comparisons of foam vs. plate performance with different pastes
- ◆ Corrosion studies of foam plates
- ◆ Characterization and optimization of structural and compositional aspects of lead foams
- ◆ Mathematical modeling of reticulated lead-acid battery for design and construction of 12-, 36- and 42-volt prototypes

Novel battery technologies have an "image and perception problem" when compared to fuel cells. Generally speaking, the fuel cell technology is much better promoted and marketed. As a result, fuel cells are somewhat unjustifiably perceived by both the investment community and the general public, as the most important or furthermore, the only and ultimate alternative clean (green) technology which is destined to replace the internal combustion engine. Problems regarding the mass production, commercialization and the extensive infrastructure associated with fuel cells are generally disregarded during "marketing."

Dr. Elod Gyenge, a senior consultant and electrochemist for BCRI, stated that, "Batteries are usually perceived as useful only for consumer electronics and some smaller niche markets, such as golf carts, wheel chairs or small utility vehicles. Whilst, fuel cells are promoted as the technology which will revolutionize the car market and it will change completely the automotive industry, batteries are perceived in a low-key fashion."

The truth is that hybrid (gasoline-electric) vehicles are already on the market and novel, high performance battery technologies which are being developed, could indeed power tomorrow's cars in a more cost effective and straightforward manner than fuel cells (e.g., virtually no new fueling infrastructure should be developed). "Therefore, the image of batteries as mostly consumer electronic power sources must be changed and is time to think 'big' regarding batteries. The Power Battery technology has to be promoted and perceived by the general public and the investment community as an excellent and more feasible alternative to the internal combustion engine."

Power Technology, Inc. is a Las Vegas-based technology development company, which holds several patents in the power generation and power storage fields, and is working to provide innovative and practical technology solutions for commercial, government, and industrial applications worldwide.

Contact:
Princeton Research
Product Information:
702/251-7163 - voice
702/251-7165 - fax

Events Calendar

September 23

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

September 25-29

ISATA 2000, Dublin Ireland. International Symposium on Automotive and Transportation Technology. Contact: ISATA
Tel. +44 1372 720 620
Fax +44 1372 720 101
E-mail: isata@compuserve.com

October 1-3

CAATS 6th Annual Meeting: E-Transportation - The California Advantage, Palm Springs, California. Information technology and e-commerce solutions for mobility and safety. Contact: Randi Dixon
Tel. (916) 325-0473 Fax: (916) 325-0471
E-mail: Randi_Dixon@caats.org

October 16-18

International Electric Vehicle Symposium, Montreal, Canada. EVS-17 will be hosted by the Electric Vehicle Association of the Americas. Contact: EVAA
Tel. (415)249-2690 Fax (415)249-2699
E-mail: ev@evaa.org

October 16-18

Convergence 2000, Dearborn, Michigan. Annual conference by the Convergence Transportation Electronics Assn. that features speakers, panels and exhibits in the field of automotive electronics.

Contact: Ravi Rajagopalan, Delphi Automotive Systems. Fax: (781) 828-9992
Web: www.convergence2000.org

October 18-20

New Visions in Transportation - Accelerating Emerging Technologies and Innovative Designs, Aspen, Colorado. The purpose of the conference is to help build a new consensus and advance innovative transportation systems. Contact: Bill Flanigan, NVT
Tel. (970) 963-6824
E-mail: staff@nvt2000.com
Web: www.nvt2000.com

November 6-9

7th World Congress on ITS: From Vision to Reality, Turin, Italy. An international forum on the latest in ITS technology developments.
Contact: Mrs. Kip Stacy Ports, Congress ITS Tel: (202) 484-4542 Fax: (202) 484-3483 E-mail: kstacy@itsa.org
Web: www.itsa.org

November 27-28

EEOCO 2000 Environment and Energy Conference, Toronto, Ontario CANADA. EEOCO will focus on how companies are incorporating new environmental strategies and technologies into their businesses and how governments are developing new policy options to meet the economic and social goals of the Great Lakes region of North America.
Contact: GLOBE Foundation
Tel: 800) 274-6097
E-mail: info@eeco.apfnet.org

December 4-6

SAE International Truck and Bus Meeting, Portland Oregon. International conference on the latest in truck and bus technologies and products.
Contact: SAE
Web: www.sae.org

- 2001 CALENDAR -

January 6-14, 2001

L. A. Auto Show, Los Angeles, California. The First major auto show of the new year displaying new model vehicles both conventional and alternative fuel.
Web: www.laautoshow.com

January 30 - February 1

SAFE Highways of the Future 2001, Cannes, France. Conference is focused exclusively on technologies and means to improving safety on highways
Contact: Abinger House
Tel: +44 (0) 1306 743744
Fax: +44 (0) 1306 877411
E-mail: safehighways@ukintpress.com

April 16-19

Beijing International PSE on Electric Vehicles, Clean Cars Technology. Beijing, China. Conference on electric and alternative fuel vehicle technologies with emphasis on automotive technology in China.
Contact: Ms. Yun Liu
Tel: 86 10 68321889 Fax: 86 10 68344994
E-mail: gcchb@bj.col.com.cn

June 4-7, 2001

Eleventh annual ITS meeting and expo, Miami Beach, Florida. Contact: ITS America
Tel.(202) 484-4847 Fax: (202) 484-3483
Web: www.itsa.org

October 20-24

EVS-18, Berlin, Germany. EVS-18 will be in Montreal and hosted EVAA.
Contact: EVAA
Tel: (415) 249-2690 Fax: (415) 249- 2699
E-mail: ev@evaa.org
Web: <http://evs18.tu-berlin.de>

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 EIN Publishing, Inc. If reprinted, please credit CE and Ruth Shipley.

EV Enthusiasts Rally in Sacramento

About 100 EV owners and enthusiasts recently gathered in Sacramento, CA, to express their support for a 10-year-old mandate from the California Air Resources Board (CARB) requiring automakers to make a certain percentage of their 2003 model year automobile fleet in California zero-emission vehicles (ZEVs). The so-called "ZEVent" included a 30-mile road rally running through downtown Sacramento. The road rally included all types of EVs — minivans, pickups and sedans. According to CARB, there are approximately 2,600 EVs on California's roads today, with the majority of those vehicles leased to utilities, government agencies and companies for fleet use. The ZEVent was specifically timed and designed to counter the automobile industry's opposition to CARB's upcoming ZEV mandate. Most automakers want the board to drop the requirement, saying that there is no market demand for EVs. However, environmental groups and state officials believe the additional cost of EVs will decrease as technology and marketing improves.

(SACRAMENTO BEE: 8/18)

Report Says ZEV Requirement Spurs Technology

A new report was released by research experts showing that California's zero-emission vehicle (ZEV) requirements have dramatically accelerated technological developments in batteries, motors, air conditioning units and tires. "Progress in Electric Vehicle Technology and Electric Vehicles from 1990 to 2000" shows that EVs are well-liked by drivers and that demands for EVs will trigger manufacturing demands which will further refine present technologies. The report claims EVs are no

longer prototypes and golf carts, but are now "high-performance, high-quality transportation tools." It cites several examples of technological advancements, including EV-related patent activity, battery packs such as nickel metal hydride and advanced lead-acid battery packs, charging technology, motors and controllers, and other components such as air conditioning and heating units expressly designed for EVs. "We can attribute this progress to the California Air Resources Board's leadership, vision and courage to support the ZEV production requirements," said California Electric Transportation Coalition (CaETC) executive director Dave Modisette. "Without the ZEV production requirements, we never would have seen this progress."

(CAETC RELEASE: 8/17)

Metallic Power Develops Zinc-Air Technology

Metallic Power recently announced that it has successfully tested and demonstrated a portable, safe and recyclable fuel cell-based power source. The company said it generated one kilowatt hour (kWh) of electricity for a lighting system with the latest version of its zinc-air fuel cell. "Never before has anyone demonstrated a technology that comes close to our combination of energy density, robustness and ease of use, with a fuel cell that is safe, abundant and completely recyclable," said Metallic Power Chief Executive Officer Jeff Colborn. Metallic Power claims its technology is unique in that it does not require high temperature, high pressure or reformers like many other fuel cell technologies. The company said the fuel cell will offer a safer, more cost-effective approach to renewable energy because of the system's fundamental simplicity. Because the fuel cell is quiet, energy efficient, emission free, non-flammable and completely recyclable, Metallic Power said its zinc-air fuel cells have a distinct advantage over conventional generators such as gasoline engines and other fuel cells. Metallic Power said the fuel cells will be relevant to many applications including transportation, home, emergency

and recreational use.

(METALLIC POWER RELEASE: 8/15)

Georgia Tech Researches Fuel Cells

Georgia Tech Research Institute is taking a "multidisciplinary" approach to researching fuel cells and battery related research. The facility will focus on fuel cell and battery technology for wireless telecommunications, ultra-low emission vehicles and distributed stationary power supplies. Georgia Tech will use its expertise in fuel cell and battery research including basic and applied work in electrochemistry, materials science, nanostructures, micro-electro-mechanical systems fabrication, fluid dynamics, acoustics and controls, modeling and simulation, power transmission and distribution, and systems level integration. Thus far, Georgia Tech has contributed to fuel cell and battery technologies with the development of thin-film electrolytes and mixed-conducting electrodes for fuel cells. In addition, it has extended fuel cell technology for use with electrochemical membrane devices that clean fuel and other substances. Georgia Tech is also responsible for the development of an advanced room-temperature, sodium-based battery for high power and energy density, the development of new electrode alloys and polymer electrolytes for lithium batteries and the development of new methods for faster, more efficient battery charging.

(GEORGIA TECH RELEASE: 8/1)

GM, ExxonMobil Develop Fuel Cell Processor

General Motors (GM) Corporation and ExxonMobil Corporation recently announced the joint development of a new gasoline fuel processor for fuel cell-powered vehicles. The new processor uses gasoline to create a "high-quality stream of hydrogen" that can be used to power a fuel cell. GM plans to demonstrate the technology on a test vehicle within the next 18 months. "The gasoline processor could be the bridge between today's conventional vehicles and tomorrow's hydrogen fuel cell vehicles," said GM Vice Chairman Harry

Pearce. "While we view hydrogen as the future fuel for automotive applications, we have significant commercial challenges, such as designing and building a large number of hydrogen refueling stations, developing feasible on-board fuel tanks and agreeing to industry-wide specifications." GM and ExxonMobil paired on a three-year research program to design, develop, build and operate a gasoline fuel cell processor that exceeds 80% efficiency. GM hopes to conduct a laboratory demonstration of the gasoline processor combined with a 25-kilowatt fuel cell stack later this year. The companies expect the 25-kW demonstration fuel cell stack to achieve an efficiency of nearly 40%.

(BUSINESS WIRE: 8/10)

HBT Receives Grant for Fueling System

Hydrogen Burner Technology, Inc. (HBT) recently announced that it has been awarded a grant from the California Air Resources Board (CARB) for a hydrogen fueling station for fuel cell-powered vehicles. The hydrogen fueling system will be installed at SunLine Transit Agency to support its new hythane- and fuel cell-powered buses. HBT said its fueling system is based on under-oxidized burner (UOB) technology that can convert virtually any infrastructure fuel into pure hydrogen. HBT President David Moard said that the state's natural gas infrastructure could be used as a transportation mechanism for hydrogen fuel. Additionally, Moard noted that the SunLine project will also explore new sources of hydrogen such as unharvested, vented or flared natural gas. The grant was awarded as part of CARB's Innovative Clean Air Technologies (ICAT) program. The ICAT program is focused on the development of technologies that will provide numerous environmental and health benefits to California residents. HBT manufactures on-site hydrogen generators for industrial markets as well as stationary and transportation hydrogen processors for supplying hydrogen to the fuel cell market. (HBT RELEASE: 8/9)

TI Predicts Solid-Oxide FC Success

Technical Insights (TI) recently released a briefing on the future of solid-oxide fuel cell (SOFC) technology. According to the briefing, as many as 30 million vehicles per year could utilize fuel cells as an auxiliary power unit which would power the vehicles' electrical systems. "Although the proton exchange membrane is the established leader for vehicle applications, investors, executives, and strategic planners should pay attention to the SOFC," said Futuretech Manager Leo O'Connor. TI said Global Thermoelectric has successfully tested a SOFC system capable of producing 800 watts of electricity from a stack of 20 cells. Global said the cells utilized an integral reformer to convert natural gas into a stream of hydrogen gas that was used to fuel the system. According to Global President and CEO Jim Perry, the original objective was to produce an output of 1,000 watts with a stack of 50 fuel cells. Due to the greater performance and versatility of a smaller stack, the company decided to continue development of the 20 cell stack. (TI RELEASE: 8/8)

Honda Plans Hybrid Electric Civic

Honda Motor Company recently announced that it expects to sell 6,500 hybrid electric Insight cars in the U.S. Honda Research and Development Chief Engineer Kazuhiro Tsunoda also said the company expects the hybrid electric technology to become profitable when it is incorporated into the company's mass market Civic. According to Tsunoda, Honda currently loses money on every Insight, which sells for about \$20,000. However, he said that Honda will be able to "make some profits" from sales of the hybrid Civic, which will first be available in the two-door hatchback model. Honda said the hybrid Civic will compete with the Toyota Prius, which begins selling in the U.S. this month. Both vehicles will have

ELECRIC VEHICLES ONLINE TODAY Month-in-Review

Executive News Summary Service

- ♦ Electric Vehicles
- ♦ Fuel Cells
- ♦ Hydrogen
- ♦ Hybrids

Tracks current legislation, regulations, science, and technology, industry initiatives, conference announcements and more.

For a free trial contact:
**ENVIRONMENTAL INFORMATION
NETWORKS**

119 South Fairfax Street, Alexandria Virginia 22314
Phone: (703) 683-0774 Fax: (703) 683-3893

seating capacity for four people. Tsunoda said that although the hybrid Civic cannot achieve the same gas mileage as the 70 mpg, all-aluminum Insight, it will surpass the 52 mpg achievement of the Prius. Contrary to Japanese newspaper reports, Tsunoda said Honda does not yet plan to offer a mid-size hybrid Accord, which is not scheduled to go through the final designing process for several years. So far Honda has recorded 1,900 sales of the Insight in the U.S. since it became available late last year. (REUTERS: 8/8)

Th!nk Group to Move to CA

Th!nk Group, Ford Motor Company's developer of zero emission vehicles, recently announced that it has leased office space in Carlsbad, CA, in order to move its headquarters from Dearborn, MI to California. The new space, which becomes available November 1, will house some 40 employees. Th!nk said it will develop and market a full line of zero-emission battery-powered EVs and bicycles at the new location. Another facility in Poway, CA will be responsible for engineering and fuel cell research.

The Th!nk Group is comprised of Th!nk Mobility, a limited liability corporation devoted to producing and marketing a full line of EVs, and Th!nk Technologies, a group responsible for fuel cell and electric drive system research and development.

(TH!NK GROUP RELEASE: 8/9)

Japanese Researchers Develop Self-Charging EV

Researchers at Mie University and Nagoya University in Japan recently completed development of an EV that is powered by "self-generated hydrogen." The EV burns hydrogen produced inside the car and uses the energy to charge the vehicle's battery, eliminating the need for recharging. The car produces hydrogen by dipping layered metal in a solution of acid and water. The hydrogen is diluted and then burned to generate electricity. The vehicle is able to generate a maximum of 30 kilowatts (kW) of electricity. In normal driving mode, it produces about five kW, which is comparable to existing EV technology. The researchers plan to install the equipment in existing minicars in order to conduct test drives later next year. The hydrogen-burning technology will be placed under the passenger compartment of the vehicles. The team hopes to reduce costs by using mass-produced turbochargers as electricity generators.

(ASIA INTELLIGENCE WIRE: 8/7)

AC Propulsion Builds Electric Beetle

Officials with San Dimas, CA-based AC Propulsion recently confirmed that the company has built an electric-powered version of Volkswagen's (VW) new 2000 Beetle. AC officials said the EV was built under a secret contract with VW, and they could not release any further details about the project. The EV Beetle features lead acid batteries that allow the vehicle to travel an average of 70 miles on a single charge. According to those who have driven the vehicle, it is heavier than a conventional Beetle and "has plenty of power." The vehicle also has

power-monitoring equipment in its center console. In addition, it has a set of "thin-shelled aftermarket racing seats" which allow more room for the vehicle's battery pack. AC Propulsion said the Beetle EV project is not a guarantee that VW will produce more of the electric-powered vehicles. EV industry officials said VW's interest in the Beetle EV is likely the result of California's zero emission vehicle mandate which will require a certain portion of automakers' sales to be EVs starting in 2003.

(LOS ANGELES TIMES: 8/2)

Dynasty NEV Undergoing Performance Testing

Dynasty Motorcar Corporation recently announced that its advanced, low-speed neighborhood EV (NEV) is currently undergoing testing at a facility in Canada. The testing, which is being conducted at the Transport Canada Automotive Test Track facility outside of Montreal, Quebec, will evaluate the NEV's frame, suspension, steering, brakes, tires, wheels, controller, battery pack, management system and full powertrain. The company said it hopes the tests will also validate its PTC Pro/Engineer computer simulations for acceleration, braking steering and overall handling characteristics in actual road conditions. The tests will continue through the end of the month. Richmond, British Columbia-based Dynasty produces low-speed EVs intended for urban, light commercial and recreational markets. The company noted that low-speed vehicles are now licensed in over 30 U.S. states, and Transport Canada is expected to approve a new electric-powered low-speed vehicle classification later this year.

(DYNASTY RELEASE: 7/27)

Solar Car Sets Record

A group of Canadian students recently set a new world record for the longest distance traveled in a solar-powered vehicle. The group noted that the car uses the same amount of electricity needed to power a toaster. The students from Queens University in Ontario traveled 7,043 kilometers

across Canada while using only 1,000 watts of power. They broke the existing record of 4,058 kilometers set by an Australian team. The car traveled an average speed of 80 kilometers per hour (50 miles per hour) and covered about 300 kilometers per day. The students said they had fears about the vehicle falling apart and that rain near the Rocky Mountains slowed them down a bit. The journey took one month — beginning in Halifax on July 1 and ending July 29 in Vancouver. The inside of the car has room enough for one driver who must lie flat because of the vehicle's aerodynamic design. The students said the trip only required the use of \$3 worth of electricity in comparison to the \$600 worth of gasoline used by the minivan used to transport team members and their equipment.

(REUTERS: 7/30)

FL Officials Approve FSEC Hydrogen Center

The Florida Solar Energy Center (FSEC) recently announced that the Florida Board of Regents has named FSEC's Hydrogen Research and Application Center to the state university system's inventory of authorized centers. FSEC said the recognition officially acknowledges the research activities of the hydrogen center. HRAC, along with the Department of Energy, plans to promote hydrogen as a clean, abundant, and locally produced fuel, which can be used in place of gasoline. HRAC will conduct research on ways to produce, store, and apply hydrogen for both space and automotive applications. NASA hopes the results will yield alternatives for the current Space Shuttle fleet and provide automakers with viable fuel alternatives. FSEC noted that Florida is the premier location for space launches and many states and foreign countries are vying for the position. The state held its first Space Summit earlier this year to address this challenge. At the summit, NASA administrator Dan Goldin urged Florida to become a "major research and education partner with NASA." In an effort to meet the challenge, FSEC created the Hydrogen Research and Applications Cen-

ter (HRAC). FSEC is a research institute located at the University of Central Florida. (FSEC RELEASE: 7/26)

London Embraces Honda Insight

Honda's hybrid electric Insight recently made history when it became the only modern-day vehicle permitted to attend London's "Cart Marking Ceremony," a tradition that dates back to the 1500s. The annual event marks the days when traders within the city were not allowed to use their own vehicles for product transport, but were required to use a licensed cart branded with London's coat of arms and issued a number. During the reenactment of the ceremony before Lord Mayor Clive Martin, the city of London's Livery Company for the Transport Industry branded the Insight on a specially-equipped wooden panel. "Our ceremony is usually only for commercial vehicles," said Jack Henley, chairman of the Cart Marking Ceremony. "The new Honda...represents a major advance in motorized transport." The Insight will be the first hybrid to be offered for sale in Britain. The Insight set a record in Britain for its fuel economy by achieving 68 mpg in city driving and 94 in the country. Honda said the hybrid will be available in Britain's showrooms next month and will cost 17,000 pounds sterling (about \$25,000). (M2 COMMUNICATIONS: 7/26)

GEM Produces 5,000th NEV

Fargo, ND-based Global Electric Motorcars (GEM) recently celebrated the production of the company's 5,000th neighborhood EV (NEV). GEM said the production of its 5,000th vehicle gives the company the title of largest producer of licensable EVs in the U.S. "We are very proud of the significant growth our company is experiencing," said GEM Executive Vice President and CFO Rick Kasper. "We have proven that there is a viable market for our GEM products and alternative fuel vehicle transportation in general." GEM has developed various EV models, including two- and four-passenger NEVs as well as utility NEVs. The company said during the first six months of the

year, production and sales exceeded the totals for 1998 and 1999 combined. "The family of vehicles creates diverse market opportunities for us in both the commercial and residential segments," said Mike Hofer, CEO of GEM. "Our vehicles are being used in military bases, planned communities, resorts, university and industrial campuses and cities." The company noted that its NEVs have a maximum allowable speed of 25 mph. More than 30 states in the U.S. have passed legislation allowing NEVs to be driven on roads that are posted at 35 mph or less.

(GEM RELEASE: 7/20)

**EAA MEMBER
SEEKS FUNDS
AND/OR DONATIONS
OF
EV BOOKS,
FILES,
PAPERS
& CARS
TO
PROMOTE
AN EV MUSEUM
PROTOTYPE
EAA CHAPTERS CAN
DUPLICATE
ELSEWHERE, LATER.**

WRITE / CALL :

EAA BRD MEMBER
ED HOLSINGER
2127 RUSSELL ST
BERKELEY, CA 94705

PHONE: (510)849-4973
E-MAIL: evmuseum@hotmail.com

NON-PROFIT STATUS PENDING

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

-or- Snail mail at:

EAA/Current Events, Hangar 20,
2701 Monarch St., Suite 142
Alameda, CA 94501

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 St., Suite 142
Alameda, CA 94501
Tel. (510) 814-1864
Fax (510) 864-9293
- or E-mail to -
EAANEWS@AOL.COM

EAA CHAPTER LISTING

ARIZONA

PHOENIX EAA

Roy Thompson, President (480) 991-5075
7710 Gainey Ranch Road, #155
Meetings: 4th Saturday/month, 9:00 am
location varies in Phoenix Arizona, Contact Roy Thompson
Homepage: http://geocities.com/phoenix_eaa

CALIFORNIA

NATIONAL EAA HEADQUARTERS

Anna Cornell, Membership Secretary
60 Alan Dr., Pleasant Hill, CA 94523-1902
HomePage at <http://www.eaaev.org/>
Tel. (925) 685-7580

EAST BAY EAA

Scott Cornell, President (925) 685-7580
E-mail: spcorn@pacbell.net -or- ebeaa@juno.com
60 Alan Dr., Pleasant Hill, CA 94523-1902
Meetings: 4th Saturday/month, 10:00am (call for Nov-Dec date)
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
Web: www.geocities.com/MotorCity/1756/

Los Angeles EAA

Saxe Dobrin, President (310) 453-1531
1630A Franklin, Santa Monica, CA 90404
Meetings: 1st Saturday 10:00 am
Cal Tech, Winnet Lounge, Pasadena, CA

NORTH BAY EAA

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.
Web: www.geocities.com/MotorCity/1757/

SAN FRANCISCO/PENINSULA EAA

Jean Bardon, Acting President (650) 355-3060
540 Moana Way, Pacifica, CA 94044
Homepage: www.geocities.com/MotorCity/1759
Meetings: 1st Saturday/month, 10 a.m.
San Bruno Public Library.
701 West Angus St. (at El Camino), San Bruno, CA

SAN JOSE EAA

Michael Thompson, Pres., Contact Person (408) 997-2404
E-mail: m.t.thompson@ieee.org
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)

SACRAMENTO ELECTRIC VEHICLE ASSOCIATION

Tim Loree, President (916) 962-3044, (916) 568-3100 ex 2833
2428 Wisconsin Dr. Citrus Heights, CA 95610-7432
E-mail: Loreet@2extreme.net
Meetings: Call Tim for new meeting time, place and date
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
Meetings: 4th Tuesday/month, 7pm (except December)
San Diego Automotive Museum
2080 Pan American Plaza, San Diego, CA.
Enter North-East door and go to the second floor conference room
E-mail: EVASD@WorldNet.ATT.net
Web: <http://home.ATT.net/~EVASD/>

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.evcl.com/ea-sv>
Meetings: 3rd Saturday/month, 10:00-12:00 am
Hewlett-Packard Co., Corporate World Headquarters
lobby A, Auditorium, 3000 Hanover St. Palo Alto, CA 94304
(Page Mill Road and Hanover St.)

COLORADO

DENVER ELECTRIC VEHICLE COUNCIL (DEVCC)

George Gless, President (303) 442-6566
2940 13th St., Boulder, Co, 80304
Meetings: 3rd Saturday/month. Contact George for time and location

MASSACHUSETTS

NEW ENGLAND EAA

Tony Ascrizzi, President (508) 799-5977
34 Paine Street, Worcester, MA 01605
E-mail: tonyascrizzi@juno.com
Meetings: Every 2nd Saturday 2:00 p.m. (call for directions)
HomePage: <http://eaaev.org/necaa>

PIONEER VALLEY EAA

Karen Jones, President (413) 253-1633
P.O.Box 153 Amherst, MA 01004
Meetings: 3rd Saturday/month (Jan.-Nov.), 2pm
Jones Library (Amherst Rm), Amherst, MA

MISSOURI/KANSAS

MID-AMERICA

Bruce Edgeworth, President (816) 524-4734
Mike Chancey, Treas., 1700 East 80th St. Kansas City, MO 64131
E-mail: Mike Chancey evtinker@hotmail.com (816) 822-8079
HomePage at <http://www.geocities.com/MotorCity/Downs/4214/>
Meetings: Contact Mike for meeting time and location.

NEVADA

LAS VEGAS EAA

William Kuehl, President (702) 645-2132
4504 W. Alexander Rd. North Las Vegas, NV 89030
E-mail: billk@anv.net
Meetings: call (702) 642-4000 for time and place.

NEW MEXICO

ALBUQUERQUE EAA

Neil Wicai, President (505) 899-7660
19 Santa Maria, Corrales, NM 87048
E-mail: neilwicai@upaznm.com Web: www.abqev.org
Meetings: 1st Tues/month, 7:00 PM
Shoney's Restaurant, 6810 Menaul NE,
Albuquerque, NM

NORTH CAROLINA

TRIANGLE EAA

Jon Mauney, President (919) 834-4077
409 Brooks Ave., Raleigh, NC 27607
Meetings: 3rd Tuesday of the month, 5:30 PM, location varies
(Call Jon Mauney for details at 919-834-4077)
Email teaa@rtpnet.org
HomePage: www.rtpnet.org/teaa/

SOUTHEASTERN EVA

Lawson Huntly, President (704) 283-1025
PO Box 1025 Monroe, NC 28111-1025
Meetings: Call Lawson for date, time and location

TEXAS

HOUSTON EAA

Ken Bancroft, Contact Person, (713) 729-8668
4301 Kingfisher St., Houston, TX
Meetings: 3rd Thursday each month 6:30 PM - 8:30 PM
Citizen Environmental Center, 2nd floor, room 280
3015 Richmond, Houston, Texas (Take the Southwest Freeway to Kirby, go north to Richmond, turn left, the Center is on the left, three blocks down Richmond)

NORTH TEXAS EAA

Paul Schaffer, President (972)-437-1584
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

UTAH

WEST VALLEY CITY EAA

Harry Van Soolen, President (801) 989-1130
3622 S. 4840 W., West Valley City, UT 84120
Meetings: Contact Harry for date, time and location

VIRGINIA

CENTRAL VIRGINIA EAA

Brian Murphy, President, (804) 530-7734
1902 Riggers Station Dr., Colonial Heights, VA 23834
Meetings: 3rd Wednesday/month, Richmond Technical Center,
Westwood Ave., Richmond, VA 23834

WASHINGTON

PORT TOWNSEND / NORTHERN OLYMPIC PENINSULA ELECTRIC CAR CLUB (NOPEC)

Karl Schreiber (360) 385-3532
11 Kanu Dr. Port Townsend, WA 98368
Meetings: 3rd Saturday/month, 10 AM
Port Townsend High School Shop

SEATTLE EVA

Steven S. Lough, President, (206) 524-1351, Fax (206) 526-5348
6021 32nd Ave., N.E., Seattle, WA 98115-7230
Meetings: Contact Steve for time and location
E-Mail: slough@halcyon.com
WWW Site: <http://www.halcyon.com/slough/seva.html>

WASHINGTON DC

ELECTRIC VEHICLE ASSOCIATION OF WASHINGTON DC (EVA/DC)

Dave Goldstein (President) (301) 869-4954
9140 Centerway Road, Gaithersburg, MD 20879-1882
E-mail: goldie.ev1@juno.com
Web at: www.evadc.org
Meetings: 2nd or 3rd Tuesday/month at 7 p.m.
National Institute of Health (NIH) Building 31-C, 6th floor
conference rooms, in Bethesda, MD. (Large white building near
Rockville Pike and Cedar Lane) Call for more information or
directions.

CANADA

VANCOUVER ELECTRIC VEHICLE ASSOCIATION

P.O. Box 3456, 349 W. Georgia St., Vancouver British Columbia,
Canada, V6B 3Y4
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)

EAA Chapter List

*Chapter contacts and meeting locations. Most verified as of
9/1/99. For information about the Electric Auto Association,
call 1-925-685-7580*

Board of Directors Electric Auto Association

Chair

Scott Cornell
60 Alan Dr., Pleasant Hill, CA 94523-1902
Tel (925) 685-7580,
E-mail: spcorn@pacbell.net -or- ebeaa@Juno.com

Vicechair, CE Editor/Publisher

Kurt Bohan
2701 Monarch Street, Suite 142, Hangar 20
Alameda, CA 94501
Tel. (510) 814-1864 Fax (510) 864-9293
E-mail: eeanews@aol.com

Secretary

Ed Thorpe
2 Smith Court
Alameda, CA 94502
Tel. (510) 864-0662 E-mail: ethorpe@jps.net

Treasurer

Stan Skokan
1020 Parkwood Wy, Redwood City, CA 94061-3691
Tel (650) 366-0643 Fax (650) 306-0137

Board Members

Anna Cornell (Membership Chair)
60 Alan Dr., Pleasant Hill, CA 94523-1902
Tel (925) 685-7580,
E-mail: ebeaa@juno.com

Ed Holsinger
2127 Russell St.
Berkeley, CA 94705
Tel. (510) 849-4973

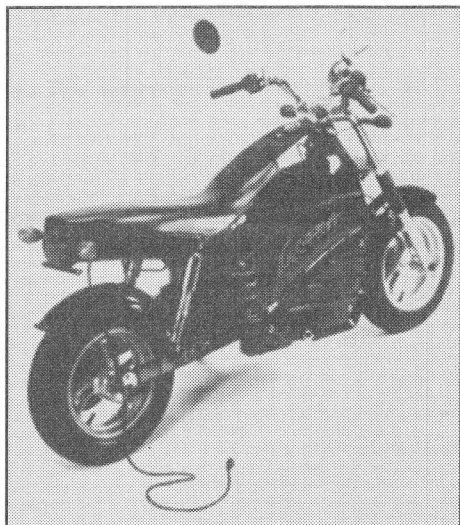
Jesse James
8460 E. Pepper Tree Lane, Scottsdale, AZ 85251
Tel (480) 607-9053 H, (602) 968-8068 W,
Fax (602) 968 9838 E-mail: sunbeltJJ@AOL.com

Roy Kaylor
20,000 Big Basin Way, Boulder Creek, CA 95006
Tel (831) 338-2200 Fax (831) 458-2400
E-mail: kaylor@access1.net

Bruce Parmenter
331 E. Evelyn, Mtn. View, CA 94041
Tel (650) 694-2392
E-mail: brucedp@yahoo.com
-or-
brucedp@iname.com

- FOR SALE - MEMBER WANT ADS - FOR SALE -

For Sale: TRACE INVERTOR TC-500E
220 - 110 12 Volt up-down convertor, \$500 / OBO
Call Dudley at: (831) 423-5995



Gray Lectra for sale, 2000 mi. new batteries, quick acceleration, 12-20 mi. range, 45 mph top speed. Large carry box.. Great for errands, only \$3200.
(new price \$5000-www.zapworld.com). Test drive-www.evworld.com. (415) 431-8428 Bob Burnside, 360 Castro #5, San Francisco, CA 94114

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
2701 Monarch St.
Hanger 20, Suite 142
Alameda, CA 94501

WANTED: Jet Industries Electra Van, dead or alive. Parts car or parts OK. Call Jack Swartz at (408) 872-0725.

For Sale: 1980 Citi-Car/Comuta-Car by Sebring-Vanguard. Body white/white interior, excellent condition. (8) good batteries. Only runs in low + mid-range, needs hi-range contactor or Curtis controller conversion. 1300 original miles. Asking \$2500 as-is or \$4500 after conversion. Come see in Colorado. Call Charlie at (970) 879-5300 days or (970) 879-2408 even.

WANTED: ONE K&W BC-20 CHARGER AND ONE DC-DC CONVETER 108 VDC OR 120 VDC. CALL BRUCE AT (510) 864-9900

1980 Dodge Jet 007 Omni Hatchback Electric Car. 2dr 4 passenger with foldown rear seat. 120 volt with 20 Trojan batteries. 4 speed, PMC Controller, Invicta tires. White with blue interior. All original gauges work for electric indicators. \$3,500.00 (415) 388-0838

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 every even numbered 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) 864-9293. 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 142
Alameda, California 94501

Electric Auto Association (EAA) Membership Application

New Member: _____
Renewal: _____

USA: _____
Canada: _____
Other Country: _____

Note: EAA membership dues are
tax deductible in the USA
as allowed by the IRS.

Date: ____/____/____

Name: _____
Street: _____
City: _____
State: _____ Zip: _____

Company: _____
Phone: _____ Hm-_____ Wk-_____
Fax: _____
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
- 5: _____ Social (Rallies, Shows, Dinners, Other)
- 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
CONV01	Convert-It EV Conversion Book	\$24.95
CATAL1	KTA Electric Vehicles Kits & Component Parts Catalog	\$5.00
BG 1998	1998 Preview 2000 by Electrifying Times (Nov./Dec. 98 CE)	\$5.95
BG 1997	1997 Buyer's Guide to Electric Vehicles (April 97 CE)	\$5.95
BG 1996	1996 Buyer's Guide to Electric Vehicles (Feb. 96 CE)	\$5.95
BG 1995	1996 Buyer's Guide to Electric Vehicles	\$5.95

Other EV items

BS800	EAA Bumper Sticker #1, 3.75x10.5 inch	\$2.00
BS002	EAA Bumper Sticker #2 with "the Switch is On", 3.75x15 inch	\$2.00
CAP002	Embroidered Hat, ajustable fit	\$9.50
DECAL	EAA Decal - (The Switch is on)	\$1.00
KEY01	EAA Key Chain with LED light and "30 Years 1967-1997"	\$2.50
MUG02	Insulated Car Coffee Mug	\$6.50
MUG003	Ceramic Coffee Mug	\$5.50
SHIRT01	Polo Shirt w/ embroidered logo (10 weeks for all colors except Forest) 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
PATCH1	Embroidered Sew-On Patch, white	\$6.50
PATCH2	Embroidered Sew-On Patch, green, (special order allow three weeks)	
PEN01	EAA ball-point pen with EAA 800 number	\$1.00
LICPH1	Electric Auto Association Licence Plate Holder, plastic frame	\$10.00
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 _____

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 SERVICES INC.

Number 1 EV Supplier over the years

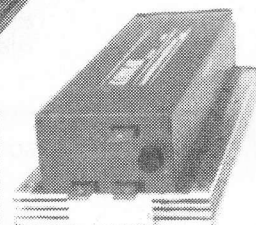
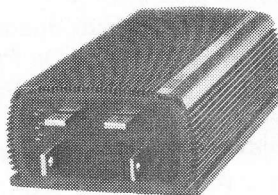
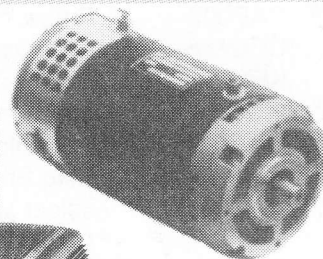
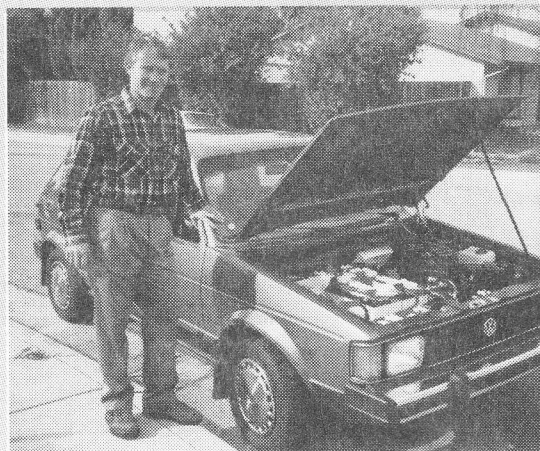
ELECTRIC VEHICLE

Components, Kits, Publications, & Design

Since our beginning in 1984, KTA SERVICES has been dedicated toward supplying the largest variety of safe and reliable components to our EV clients. We provide individual components or complete kits to electrify 2, 3, or 4wheeled vehicles weighing from 200 through 10,000 lbs. total weight.

Our components and tech support have enabled hobbyists and others in 17 countries to create nearly 500 on-road electric cars, pickup trucks, motorcycles, and various racing vehicles. Our technology has found its way into electric powered boats, submarines, aerial trams, golf course mowers, amusement park rides, special effects apparatus for the movie industry, robots, and even a window washing rig. Nobody knows the components or their application better than KTA. All components are new, competitively-priced, and come with full manufacturer's warranties. We stock and sell the largest variety of the very best.

- ◆ ADVANCED DC Motors in 11 variations from 2.0 HP to 28.5 HP
- ◆ CURTIS-PMC Throttle Potboxes & Footpedals
- ◆ CURTIS-PMC Motor Controllers from 24 V/175 A to 144 V/500 A
- ◆ AUBURN SCIENTIFIC Motor Controllers, 72-144 V/600 A to 192 V/700 A
- ◆ ALBRIGHT ENGINEERING Main & Reversing Contactors in 5 models
- ◆ GENERAL ELECTRIC & HEINEMANN Circuit Breakers
- ◆ WESTBERG Automotive Style Gauges in 10 configurations
- ◆ KTA SERVICES Expanded-Scale & Dual-Scale Meters
- ◆ CURTIS INSTRUMENTS Battery Fuel Gauges in 7 models
- ◆ CRUISING EQUIPMENT E-Meters, Prescalers, & DC-DC Converters
- ◆ BUSSMAN Safety Fuses in 4 models from 200 to 800 A
- ◆ DELTEC Meter Shunts in 4 models from 50 to 1000 A
- ◆ SEVCON, TODD, & CURTIS DC-DC Converters from 50 to 200 V input, up to 40 A out
- ◆ K & W ENGINEERING Onboard Battery Chargers and Boosters from 48 to 144 V
- ◆ BYCAN Battery Chargers for 48, 120-132-144 V
- ◆ EVCC Adapter Plates, Couplings, Clamps, Brackets & Motor Mounts
- ◆ Electric Vehicle Heating & Air Conditioning
- ◆ MAGNA Welding Cable Lugs in 3 sizes from #6 to #2/0
- ◆ PRESTOFLEX Welding Cable in 3 sizes from #6 to #210
- ◆ Battery Cable Assembly Tools
- ◆ K & W ENG. TD-100 Tachometer Drive/Rev Limiter
- ◆ 5 Conversion Kits for vehicles from 500 to 5000 lbs. total weight
- ◆ 3 Conversion Kits for Go Karts — up to 90 MPH
- ◆ Complete ELECTRATHON Drive & Instrument. Pkg.
- ◆ The latest in EV publications with a growing lineup of videos
- ◆ Project Consulting/Engineering Design
- ◆ Project Overview with Schematic & Recommendations
- ◆ Computer-Based EV Performance Predictions



*We want to be YOUR #1 source for EV components
For an information-packed 50-page Components &
Publications Catalog, send \$5.00 to:*

KTA Services, Inc.

944 West 21 Street Upland, CA 91784 USA

Tele: (909) 949-7914 Fax: (909) 949-7916

ELECTRIC AUTO ASSOCIATION

P.O. Box 6661, Concord, CA 94524



345
54 P1

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