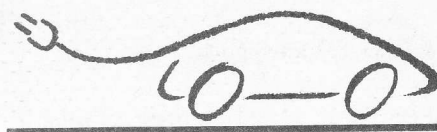


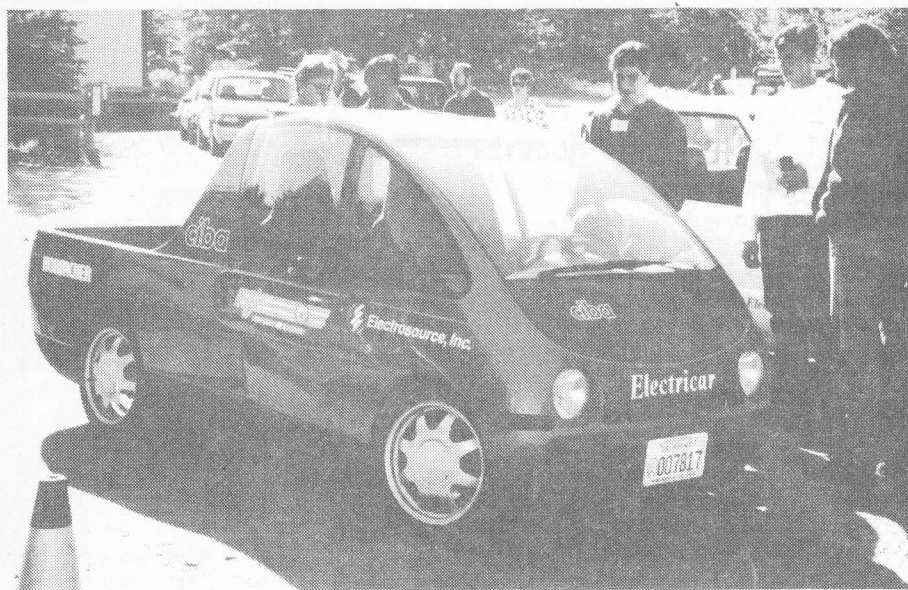
CURRENT EVENTS



DECEMBER 1994

PROMOTING THE USE OF ELECTRIC VEHICLES SINCE 1967

Vol. 26 No.12



SMUD Tests Super-Efficient EV

The Sacramento Electric Transportation Consortium has just crossed a major milestone in its development of super-efficient electric vehicles. The Consortium is made up of the Sacramento Municipal Utility District (SMUD) McClellan Air Force Base and private industries such as US Electricar and Electrosources. In a recent test, SMUD's newest electric vehicle was driven 110 miles on a single charge in city traffic. The composite pickup truck, which weighed in at 1700 pounds curb weight and had 2 passengers at the time of the test, was powered by a 16.1 kWhr (at the 3 hour discharge rate) pack of Electrosources Horizon advanced lead-acid batteries. The vehicle got 9.23 miles/DC kWhr during the test.

The test, which was conducted by SMUD, and witnessed by an engineer from the US Department of Energy's Argonne National Laboratory was stopped when one of the batteries in the pack reached 80% depth of discharge. Once the battery pack is fully balanced, it is expected that the vehicle will be capable of at least 120 miles in urban driving conditions. Highway range has yet to be tested.

"Argonne Laboratory has one of the most extensive databases on electric vehicles and provided the data acquisition system for the test. Argonne sees a lot of potential with the Electrosources Horizon battery and we are very interested in testing this new

Continued on page 4

Horizon Battery at ARPA Race

SMUGGLER'S NOTCH, VERMONT, 10/12/94. In the first public demonstration of Electrosources Inc.'s (NASDAQ:ELSI) high-performance Horizon batteries, a pickup truck powered by the Electrosources batteries took first place in the hill-climb event at the Advanced Research Projects Agency (ARPA) Electric/Hybrid Vehicle Technology Race held Saturday at Smuggler's Notch.

The Electrosources-powered electric pickup truck, entered by the Sacramento Electric Transportation Consortium—comprised of McClellan Air Force Base and the Sacramento Municipal Utility District of California—won the first event, a 1.5 mile hillclimb.

"The event was a tremendous success," a spokesperson said. "We proved on the road what we've have consistently documented in the lab—that our batteries can deliver the power and performance electric vehicles need in order to be a

Continued on page 4



Inside this Issue

Cloud E-boat Record	6
Ecostars Return	6
Tropica Update	8
New Electric Car Magazine	9

Editor's Note

BY CLARE BELL



This editorial is going to be short & sweet. With Christmas nearly upon us by the time this issue hits your mailbox, this month's CE brings Evers a sort of Christmas present in the form of good news about the Horizon batteries.

I felt, when I first heard and wrote about Horizon technology, that this would be the first one that proved out. The design was based on a careful and thoughtful analysis of the flaws and failure modes of existing fluid-filled deep cycle (OK, I'll say it—technology is going to make a huge difference to the EV movement, especially once it gets into fullscale production.

Best wishes for a peaceful and electric New Year. — CB & staff.



FRONT COVER PHOTO:

SMUD's composite-bodied EV pickup blitzes Vermont hillclimb.

COPYRIGHT 1993© Current EEvents is a publication of the Electric Auto Association. All rights reserved. While Current EEvents and Electric Auto Association strives for clarity and accuracy, we assume no responsibility for liability 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.

Current Events Staff

Managing Editor

Clare Bell
799 36th Avenue
San Francisco, CA 94121
(415) 221-9678
Fax: (415) 759-5189

Contributing Authors

Steve Lough
Shannon Cash
Michael Kaiser

News In Brief

Ruth Shipley

Calendar of Events

Anna Cornell

Photography Credits

Ruth MacDougal

Advertising & Production

Susan A. Hollis (PCTEK)
(408) 374-8605
Fax: (408) 374-8750
18297 Baylor Avenue
Saratoga, CA 95070

Article Submissions

If you would like to submit an article for Current EEvents—the preferred form is on a floppy disk, formatted for DOS (Ascii Format) along with a printed copy of the article. Also include camera-ready photos or graphics or include TIF formatted files with your copy.

Articles and graphics or line art may also be submitted for the MAC. Please specify PC or MAC and identify software used. Please include a hard copy.

The deadline for articles is the 1st of the month. Articles submitted after the 1st of each month will be retained for future issues of Current EEvents. Contact Clare Bell, Managing Editor for further information.

Advertisements

If you would like to submit an ad, refer to Advertising Rate Sheet or contact contact Susan Hollis, Advertising Mgr. at (408) 374-8605.

Membership/Address Changes

For information on new membership or change of address, please send your requests to:

EAA Membership

Hal & June Munro
2710 St. Giles Lane
Mountain View, CA 94040



DEPARTMENT OF ENGINEERING,
INFORMATION SYSTEMS AND
TECHNICAL MANAGEMENT

ANNOUNCES THE SHORT COURSE

ELECTRIC VEHICLE TECHNOLOGY

This course provides engineers, scientists, managers, and marketing specialists with a comprehensive overview of electric vehicle technology based on the extensive hands-on experience of the instructors. Lessons learned from the history of electric vehicles are presented, and participants examine current systems in a wide variety of vehicles. Powered road-way concepts; with their significant future potentials, are also discussed.

The primary thrust of the course is to present state-of-the-art tools and components as they are used today. Participants have the opportunity to actually drive an electric vehicle, learn how to set up computer-controlled battery tests, analyze a transistorized controller used in a car in the Phoenix 500 EV Race, study a new bipolar battery, and examine a Switched Linear Induction Motor (SLIM). Topics are structured to be tutorial and not programmatic.

COORDINATOR AND LECTURER

ERWIN A. ULBRICH, JR., MSEE, PE, President, Twenty First Century Electric Vehicles. Mr. Ulbrich is his firm's principal investigator on computerized battery testing. He is also a researcher at Arias Research Associates where he specializes in computer models of complicated electrochemical cells.

LECTURERS

GEORGE AGORTSAS, MS, Senior Project Engineer, Hughes Aircraft Company. Mr. Agortsas is responsible for the systems engineering and digital controls for the GM electric vehicle.

JEFFREY ARIAS, President, Arias Research Associates. Mr. Arias's company is currently developing a new high-power battery for electric vehicles that is being funded by the SCAQMD and the Los Angeles Department of Water and Power, among others.

JOHN G. BOLGER, Owner, Inductran Corporation. Mr. Bolger prototyped his concept for inductively-coupled electric highway systems for the DOE in the 1970s and has since led the development of automated peplemovers, amusement rides, and automatic battery-charging systems.

DAVID L. HARBAUGH, MS, PE, Vice President of Engineering, Arias Research Associates. Mr. Harbaugh has primary responsibility for the engineering interface between vehicle and battery design. He previously worked for Disney where he designed the world's largest battery-powered passenger vehicle.

ZDENEK (STAN) E. SKOKAN, Consultant. Mr. Skokan founded Electric Vehicles, Inc. in 1979 and has delivered and serviced factory-built electric vehicles to government agencies as well as individuals. He serves as Chairman of the Board of the Electric Auto Association.

PAUL WUEBBEN, MA, Clean Fuels Officer, South Coast Air Quality Management District. Mr. Wuebben oversees commercialization and technology transfer activities related to clean fuels. He is also the Chairman of the Technical Review Committee established under SB 2297 to oversee the allocation of vehicle registration fees for clean fuels R&D programs.

DAILY SCHEDULE

MONDAY, FEBRUARY 6

- History of Electric Vehicles in the United States, Europe, and Asia (Ulbrich)
- Current Status of Electric Vehicles (Lecturer to be announced)

TUESDAY, FEBRUARY 7

- Air Quality Rationale of Electric Vehicles (Wuebben)
- Battery Technology (Arias)

WEDNESDAY, FEBRUARY 8

- History of Motor Technology in the United States (Skokan)
- Automotive Engineering (Harbaugh)

THURSDAY, FEBRUARY 9

- Electric Controller Technology (Agortsas)
- Auxiliary Equipment and Instrumentation (Ulbrich)

FRIDAY, FEBRUARY 10

- Inductively-Coupled Power System Technology (Bolger)
- Powered Roadway Technology (Bolger)

The course fee of \$1,495 includes lecture notes distributed on the first day.

TO REQUEST A DETAILED BROCHURE,

contact Alex Hennessy, UCLA Extension, Department of Engineering, Information Systems and Technical Management, Short Course Program, 10995 Le Conte Avenue, Suite 542, Los Angeles, CA 90024-2883;
TELEPHONE: (310) 825-1047
FAX: (310) 206-2815
E-MAIL:
mhenness@unex.ucla.edu

February 6-10, 1995 at UCLA

SMUD Tests

Continued from page 1

vehicle and battery pack," said Spencer Quong from Argonne.

"This range is significant, said Mike Wirsch, Manager of SMUD's Electric Transportation Department. "According to recent research by Ford Motor Company and others, it meets or exceeds the 'acceptance requirement of many delivery and fleet operators for their everyday use."

The prototype electric pickup, dubbed the "Fleet" by its designers, incorporates a state-of-the-art alternating current drivetrain, regenerative braking, on-board battery management and low rolling resistance tires. It is capable of running at 80 mph and is designed to meet 1996 National Highway Traffic Safety Administration (NHTSA) standards for safety and crashworthiness.

Since 1992, the Sacramento Consortium has been developing dual-use electric and hybrid electric technology through a program at McClellan Air Force Base. The multi-year Department of Defense/Advanced Research Projects Agency (DOD/ARPA) program will develop safe lightweight electric vehicles, better batteries and energy conversion devices. McClellan's resident Air Force Composite Organization (ACPO) provides significant expertise to the consortium in the development of composite structures ideal for electric vehicles. ACPO also provides repair capability.

The Consortium will continue its testing and evaluation of the advanced Horizon battery system over the course of the next two years. The Consortium's

Solectria Force (converted Geo Metro) equipped with Horizon batteries is getting 40% more range than its previous batteries. A hybrid version of the the lightweight electric truck, using advanced fuel-cell technologies, is also under development and is expected to be tested late next year.

Because they can operate effectively on lower cost lead-acid batteries, high-efficiency EVs of this type are expected to cost only 3.5 cents/mile, including the cost of batteries and electricity, assuming an expected 80,000 mile life on the battery pack.

For more info, contact Ruth MacDougal, Sacramento Municipal Utility District. (916)732-6625.

HorizonBattery

Continued from page 1

cost-effective solution to air pollution in California, the Northeast states and around the world."

The Electrosource/McClellan SMUD composite pickup was leading the second event — a distance drive — until the event was interrupted at the halfway point for a scheduled acceleration test. At the beginning of that test, the truck's motor mounts failed under the torque generated by rapid acceleration and the truck was unable to complete the remainder of the course. The truck is the second of 16 Sacramento Electric Transportation Consortium EVs being retrofitted with Electrosource Horizon batteries under a contract with ARPA and SMUD.

"The positive results of the entire event lend additional credibility to the Ozone Transport Commission's position in the Northeast that electric vehicles are viable with today's technology and that our battery is capable of meeting the requirements of cost-effective, practical electric vehicles," Semmens said.

Six teams participated in the event organized by the Vermont Electric Vehicle Demonstration Project and the Northeast Alternative Vehicle Consortium (NAVC) and sponsored by ARPA. ARPA is a research arm of the Pentagon and is funding electric vehicle development projects throughout the US. At an electric vehicle conference preceding the race, Vermont Governor Howard Dean said, "Electric vehicles

clearly are the future of transportation and other alternatives are only very short-term solutions — other states will soon come to realize this."

Electrosource is currently ramping up production and test units of its Horizon battery in its now 88,000 square-foot manufacturing plant in San Marcos, Texas. The company maintains its headquarters in Austin, Texas and is engaged in the production and continued development of a new generation of advanced batteries for a broad range of applications, including electric vehicles, and industrial, utility and telecommunication products.

Contact Jim Rosel, vice president, finance, law and contracts at Electrosource, Inc. (512) 445-6606.

Announcements

1995 EV Buyer's Guide

EAA and Spirit Publication are co-publishing the *1995 EV Buyer's Guide*. This special issue will be sent to the EAA members in lieu of the February issue of *Current EVents*. The Buyer's Guide is completely revised and should be a useful EV source to our members. If you are looking to purchase an EV in 1995, this is the place to start looking.

The 1995 EV Buyer's Guide—coming soon to your mailbox!

EAA Annual Meeting

The EAA Annual Members Meeting took place as scheduled. EAA Board members prepared and presented year-end reports. Minutes from this and the EAA Board Meeting will appear in the next issue of CE.

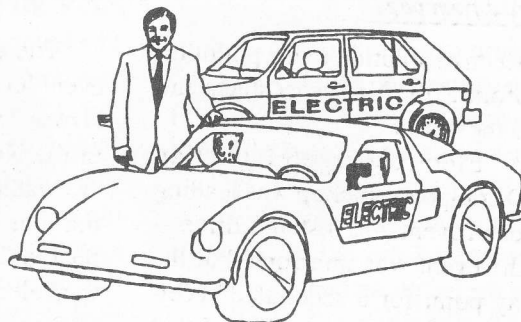
Calendar Items

We need your HELP! The Calendar items have been shrinking each month. Our faithful EVent Coordinator, Anna Cornell, needs your help in reporting EVents for the CE calendar. Send a brief description to include the date, phone number and contact person for EVents in your local area. Fax your info before the 15th of each month to Anna at (510) 685-7580. Thanks.

Next Issue - January '95 CE

Tech Guru begins in our next issue of CE. *Letters to the Editor* returns as well as *DIY*. *DIY* will feature Paul Bell's nifty battery monitoring setup with integral fuses. Stay tuned for those and more in the EVentful year of 1995 and please don't forget to send us your comments, suggestions and letters.

YOU'VE READ THE BOOK. YOU'VE SEEN THE VIDEO. NOW TAKE THE NEXT STEP— CONVERT IT: THE WORKSHOP



No other conversion workshop can offer this level of expertise in an instructor: *15 yrs. professional conversion experience *28 yrs. professional automotive experience *Tech advisor to the Dept. of Energy's Mid Atlantic High School Electric Vehicle Competition *Author of **CONVERT IT**, the industry standard how-to manual, now in its third edition *Creator of the **PRO-MECH PROGRAM** which has provided training for mechanics at a dozen conversion shops across the country.

Now you can get the hands-on experience of putting together an electric car under Mike Brown's direction. He'll show you what to do, what not to do—and why. Space is limited, so register now. **WHEN:** February 22-25 1995. **WHERE:** Electro Automotive, Felton, CA. **COST:** \$400.00.

**ELECTRO
AUTOMOTIVE (408) 429-1989**

**POB 1113-EAA
FELTON, CA 95018**

E-Boat Record, Ecostars Return

Seattle E.V Association members Norm Boddy, and Dave Cloud of Electrathon fame, set a **WORLD SPEED RECORD** for Electric Powered boats as certified by the American Power Boat Association (APBA) at an average of 55.913 mph on two runs through a 1 km course. This brings back the coveted record to America. The previous record had been held by an English team which set a record of 50.825 mph back in 1989. It should be noted that the Boddy/Cloud budget was less than 1/10th of the \$200,000.+ that the English team invested back in 89. The Yanks' rule ?? KISS ! A 38V used Prestolite motor being pushed to 120 V DC by Interstate 12V batteries, a knife switch to pass from 120 V in series to 6 V series/parallel, a DiSilva runabout hull, and a bottom unit from a used Mercury outboard, and of course, COURAGE !!

Not to be overlooked: Burton Gabriel, of NOPEC, Port Ludlow, Washington came in at 50. 173 mph to set an American record for electric hydroplane hulls. Donald Crabtree of Seattle achieved 49.228 mph.

Our hats are off to the brave electro-nauts of the North West for bringing the lightning boat glory back to the U S of A.

Steven Lough. AKA Captain Electric
cptev@aol.com Eco-Motion, Seattle
(206) 524-1351

Ecostars Plugged In Again

Ford's electric Ecostar test fleet goes back into operation today. Two battery fires led Ford to ground the Ecostars in June. An investigation found that one fire was caused by a faulty weld and

another by a fuse malfunction. To prevent future difficulties Ford created special software that will shut down the vehicle if battery problems develop. The 30-month Ecostar trial is meant to test the reliability and durability of new electric vehicle technologies and to learn more about how customers use and relate to electric vehicles. Ford says it picked the Ecostar — a small van with a 1,000-pound payload — rather than a little car because it is likely that initial use of electric vehicles will be among commercial customers with short, fairly predictable driving patterns and a need to haul cargo. By year-end, all 103 Ecostars in Ford's fleet will in the hands of 22 fleets, which including utility companies and research organizations.

Cliff Weathers (CLIFFW422@aol.com),
Online Services Editor, aol Car&Driver.

ZEV Reprieve for N.E.?

The Environmental Protection Agency may delay making a decision on allowing 12 Northeast states to adopt California's "zero-emission" car rule. The EPA is in the process of considering a petition by the Ozone Transport Commission (OTC), a group of Northeast environmental regulators, to allow them to initiate a vehicle-emissions program similar to California's. This would, in effect, require the sale of electric cars. "It's beginning to look as if the parties are still interested in an alternative, and the November 10 deadline may slip," an EPA official told Reuters. The EPA said its proposal was "for discussion purposes only" and offered some provisions for electric, natural gas and other alternative ve-

hicles. Detroit wants the EPA to deny the petition and as an alternative have offered to develop the LEV (Federal Low Emission Vehicle), which would use conventional technology but would be 99% clean. Electric and natural gas industries spokespersons were unhappy with the compromise, saying it would be an insufficient incentive to stimulate development of electric cars. The American Automobile Manufacturers Association took the position that it would amount to "a technology-forcing mandate" for natural gas cars, or for super-clean gasoline cars that are beyond current technology. Some advocates of the OTC plan, which is backed by environmentalists and the gas and electric industries, said they feared that the EPA could put off action indefinitely.

Gas Prices May Rise

Even though gasoline prices have fallen in some areas recently, sharply higher prices may be on the way. New standards set by the Environmental Protection Agency could drive prices up by five to 5 to 15 cents per gallon by January 1. The EPA rule requires nine metropolitan areas in the U.S. with ozone problems to provide reformulated gasoline — which is more highly refined and more expensive — to consumers by the end of the year. In addition, the EPA is requiring gas stations in areas which do not meet federal air-quality standards to install vapor-recovery systems by November 1 to prevent emissions when pumping gas.

Cliff Weathers (CLIFFW422@aol.com),
Online Services Editor, aol Car&Driver
Thanks to Bruce Parmenter.



Microcomputer Solar System Controller

Features:

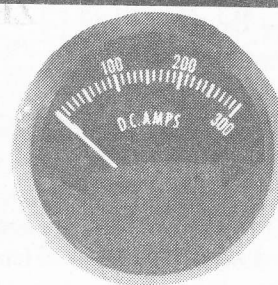
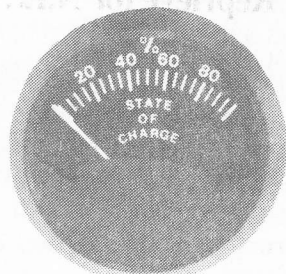
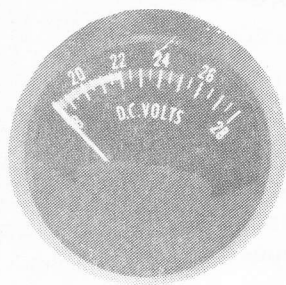
- Rugged Industrialized Metal Case
- Differential Control of Circulator Pump
- Can also control Blower in Air Circulation System
(Differential can be changed upon request for air)
- Turns on Pump when Collector is 40 Degrees hotter than Tank
- Turns off Pump when Tank is within 30 Degrees of Collector
- Detects Open or Shorted Wires through onboard Microcomputer
- Compatible with Leak Detector (Float) & shuts off pump
- Turns off Pump when Tank is 160 or 180 Degrees Select Limit
- Turns off Pump when Collector is Below 75 Degrees
- Turns off Pump when Tank is Below 41 Degrees
- Turns off Pump when Collector exceeds 350 Degrees for Steam
- Digital Display of Tank & Collector Temperature
- Displays all Decision Information on Alpha-Numeric Display
- Probes Included with 100 feet of wire for Collector Sensor

Mark E. Hanson
c/o Solar Electric Control Systems
7042 Vista Lane
Fincastle, VA 24090
(703) 473-1248

Price \$495.95

Please allow 4-6 weeks for delivery.

ELECTRIC VEHICLE INSTRUMENTS



Analog Instruments to Monitor

- ▼ VOLTAGE
- ▼ AMPERAGE
- ▼ BATTERY TEMP.
- ▼ MOTOR TEMP.
- ▼ VEHICLE SPEED

High quality instruments for electric vehicles are available in a number of scale ranges, included expanded scale voltmeters for *fuel quantity*. Voltage and temperature instruments may be ordered with a optional *solid-state super bright warning light feature* which will warn of a battery "LOW FUEL" or a "HIGH TEMPERATURE" condition. Instruments are available in 2" & 3" round automotive style case made of MIL-SPEC nylon. Contact your local dealer or the factory for ranges available.

WESTBERG MFG. INC.

3400 Westach Way, Sonoma, CA 95476 U.S.A. Phone (707) 938-2121/Fax (707) 938-4968



Update on Tropica

The Renaissance Car (Bob Beaumont) Tropica lineup begins the Signatures Series" 1st Edition roadster, (reviewed in the April '94 Current Events). 400 of these are to be built, with a projected MSRP under \$15K. They will be numbered, with special paint, equipment, and signage. The rest of the line includes:

DINA

A multi-purpose vehicle which is 18 inches longer than the roadster, with several hundred pounds of carrying capacity in the enlarged rear section. Available in 1995.

COUPE

A fully enclosed vehicle with windshield wipers, washers and a recirculating air system. Available late 1995.

TROPIVAN

A multi-purpose van-like vehicle with a top cover to protect cargo during delivery. Available 1996.

Tropica Insurable in 50 States

Progressive Insurance Company and State Farm have assigned a favorable insurance rating to Tropica. Product liability is provided by Acceptance Insurance Company with excess handled by Northfield Insurance Company. Both are A rated companies.

Standard Safety Equipment

- ▼ Stainless steel safety roll-bar
- ▼ Main power disconnect switch
- ▼ Non-lock, zero drag 4-wheel disc brakes
- ▼ 3-point passive restraint system
- ▼ Impact-resistance polymer bumpers
- ▼ Energy-absorbing safety side door beams
- ▼ Front/rear anti-sway bars
- ▼ Hydraulic columnless steering
- ▼ Permanently attached occupant seating

Note: The entire Tropica line of EVs will meet or exceed all applicable federal crash worthiness standards.

Federal Tax Credit

A federal tax credit of 10% of the purchase price went into effect July 1, 1993.

Drivetrain

Twelve long-lasting, deep-cycle batteries power twin Advanced DC motors in the sporty roadster for 60 to 80 miles with a top speed of 60 mph. A 90 minute supplemental charge can give 100+ mile daily range for about 96 cents of electricity, or less if off-peak power is utilized.

Tropica has a built-in charger, with retractable cord, plugs into 110 VAC outlet with ground.

Environmental Impact

Tropica emphasizes durability coupled with responsible recycling. The body is comprised of a vacuum-formed ABS composite; the same material used in football helmets and white-water canoes. The material is rustproof, will not degrade and retains its acrylic color additive indefinitely. The entire vehicle is more than 90% recyclable.

Tropica features an anti-theft key system, a quick connect/ disconnect automatic and metered watering system, and a built-in battery charger weighing less than 10 pounds.

Over 4 million codes are provided in the electric "communicate and verify" key lock system which will remain tamper proof even if the key lock is physically destroyed.

The unique watering system eliminates battery cap removal and automatically meters the correct amount of distilled water to all 36 cells of the 72 volt power-pak in less than one minute.

Availability

Vehicles will be sold only through the company dealer network. The first roadsters are due in dealers hands by the end of this year.

New Production Facility On-Line

A 45,000 sq. ft. assembly complex became operational May 2, 1994. Marshall

Kett, Director of Operations, said that the plant is capable of producing up to 700 Tropicas monthly. Kett was formerly General Manager of Donzi Boats, a high volume boat manufacturer in Florida.

Renaissance Cars has an info package about the Tropica, including a sheet with photos of the Roadster & Dina, and an artist's drawing of the Coupe. It has the *Car and Driver* review article and a postcard with a picture of the prototype roadster.

Thanks to Shannon Cash <CASH@acc.fau.edu>. For information, call (407) 676-2228 or (407) 616-2229 Fax.

Specifications

Motors: 2 - 72V series wound DC

Power pack: 12 - 6V H.D., deep cycle, lead based batteries

Controller/Charger: Solid state/ Renaissance design

Suspension: Front independent upper & lower control arms, coil-over shocks, anti-roll bar suspension, rear independent trailing arms, coil-over shocks, anti-roll bar

Brakes: 4 wheel disc, zero drag

Wheels: 15 X7 Aluminum alloy

Tires: Goodyear 205/55R15, low rolling resistance, 44psi

Body: ABS polymer, impact resistant

Chassis: Aircraft quality aluminum, Central spine

Speed: 55 - 60 mph

Range: 60 - 80 miles per charge

Daily range: 100+ miles, with 90 min supplemental charge

Dimensions: 156" x 72" x 48"

Ground Clearance: 5"

Leg room: 45"

Shoulder room: 59"

Hip room: 24"

Overall length: 156" (plus 18" for the Dina)

Weight: 1960 lbs.

Cargo volume: 8.6 cubic ft. (more in the Dina)

Electric CAR Premiere Issue

by Michael Kaiser

I just got a copy of the Winter 1994, premiere, issue of Electric Car magazine published by Argus Publishers Corp. Now available on newstands, it looks like a good source of information on the electric automobile industry. This issue has no ads, but I'd bet future issues will have plenty. Here are the contents of this first issue:

- ▼ The Cocconi Factor — One man's crusade to develop battery power to the ultimate.
- ▼ AC Propulsion Honda — A 200hp electric - soon available!
- ▼ Racing Electric — An all-woman team builds and races a VW Rabbit EV (by Current EVents editor Clare Bell!)
- ▼ Edison's Electrics — Southern California Edison, Southern California's major utility gears up
- ▼ GM Impact — America's first widespread public evaluation begins
- ▼ VW Elektro-Hybrid — Perfect for the inner city or long-distance runs
- ▼ City Stromer — Driving VW's champion EV on the track
- ▼ City of Light — Palm Desert, California takes the ecological route
- ▼ A Brief Look — At man's flirtation with electric car
- ▼ Chrysler TEVan — The mini-van goes electric
- ▼ Volvo EEC — A hybrid virtually ready for the showroom
- ▼ Kewet El-Jet — The first DOT-approved, purpose-built EV
- ▼ EV News — roundup of organizations and associations
- ▼ The Berger Project / Art Center College of Design students look to the EV's future
- ▼ Honda EV — The Japanese manufacturer builds a small test fleet
- ▼ Mitsubishi Libero EV — A joint project with Tokyo Electric
- ▼ Nissan FEV — A "future electric vehicle" begins a road test
- ▼ Catch 22 — Or how one man wants to clean up the environment
- ▼ Electric Blue — Sacramento's Drive Electric Geo Prism conversion
- ▼ Wilde EVolution — Builders of high-performance and utility EVs
- ▼ American Electric's Red Rocket — Indy legend Roger Ward's second career

The publisher is offering Charter Subscriptions for \$15.00/year (quarterly). The subscription address is: Electric Car Magazine P.O. Box 450 Mount Morris, IL 61054-7880.

Thanks to: Mike Kaiser <michael.kaiser@tcs.wap.org>.

FOR SALE



The original Doran Electric Prototype
Sleek and sexy. Every aspect professionally designed: 30,000 miles of road use and track testing. Raced twice at Phoenix Electric 500. Exhibited twice at the L.A. Auto Show.

\$60,000.00

Professionally built molds for manufacturing bodies and all design and manufacturing rights.

\$60,000.00 plus royalties

FOR SALE

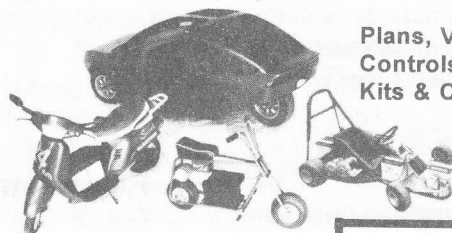


Electric Motorscooter Business
Proven design. Years of development, Beta-testing and on-road use by dozens of satisfied customers. DOT and CARB certified.

Sale includes: molds, supplier lists, designs, schematics, customer lists, marketing research, potential foreign markets and all design rights. Consulting on production start-up.

\$65,000.00 plus royalties

ELECTRIC CARS, GO-CARTS & SCOOTERS



Plans, Videos, Motors, Controls, Instruments, Kits & Complete Vehicles

Our famous Electric or Subaru powered car plans w/catalog package. **\$39.95**

DORAN MOTOR COMPANY

6290 SUNRISE MEADOWS LOOP
RENO, NV 89509 USA
(702) 359-7356

Color brochure & catalog-information package.

\$5 Refundable (order by mail only)

SATISFACTION GUARANTEED
OVERSEAS ORDERS ADD \$5.00

Winter Special Sale !

SAFETY ELECTRIC VEHICLE HEATER

The RUSSCO Safety Electric Vehicle Heaters heat and circulate coolant through the original equipment heater, replacing the source of heated coolant supplied by the internal combustion engine. Nine models are available, providing up to 1500 watts, 2000 watts, 2500 watts, and 3000 watts in systems of 84 to 240 volts. Heaters are supplied with hose, insulation, clamps, fittings, wiring, mounting hardware and easy-to-follow instructions. RUSSCO Heaters are warranted for one year.

SPECIFICATIONS

- 84-240 Volt input
- H-15, 1500 W H-20, 2000 W
- H-25, 2500 W H-30, 3000 W
- Coolant temp. rise, H-15, 1/2°F/sec
- Air temp. rise, H-15, 70°F
- Size 4" D x 8" H x 16"-22" L
- Weight - 6 1/4-7 lb

Model H-15

\$345

Model H-25

\$445

CALL or WRITE
FOR DETAILS

SAFETY FEATURES

- Double fused
- Triple shut off
- Thermally protected
- Coolant loss protection
- "Heater On" dash indicator light
- No exposed high voltage
- High voltage warning label

Model H-20

\$395

Model H-30

\$495

\$50.00 Off on Above Prices

Expires Dec. 25, 1994

RUSSCO ELECTRO-MECHANICAL ENGINEERING

PO BOX 3761, SANTA ROSA, CA 95402 (707) 542-4151

News in Brief . . .

Compiled by Ruth M. Shipley from Environmental Information Network. If this is reprinted, please credit CE and Ruth Shipley.

U.S. Electricar Activities

The New York Power Authority plans to buy up to 50 EVs that will be built by U.S. Electricar in a new plant in the Syracuse area. Some of the cars will be used as station cars to transport commuters to and from one or more railroad stations in Westchester during a 2-year project with the Metropolitan Transportation Authority.

The company will also join with Grupo Industrial Casa, S.A. de C.V. (CASA) of Mexico City to create two jointly owned corporations — one in the U.S. and one in Mexico — to develop, manufacture and market several thousand industrial EVs and buses over the next several years throughout North, Central and South America. For more information, contact John Micek at (707)525-3227.

(SYRACUSE HERALD-JOURNAL: 9/29; U.S. ELECTRICAR NEWS: 10/6)

Chrysler Shifts Costs of EV Development

Chrysler Corporation Chairman Robert Eaton said his company plans to increase the cost of its gas-powered cars and trucks sold in California by \$2,000 in order to offset the costs of producing its electric minivan. Production costs of the minivan total \$45,000, yet the company needs to compete with other minivans that typically sell for \$18,000.

"Chrysler is obviously trying to scare consumers about costs — part of its ongoing campaign to block the introduction of cleaner cars," said Michael Gage, CALSTART's president and CEO. "We already know that the prices of these vehicles and technologies are rapidly dropping."

(KNIGHT-RIDDER: 9/29)

SMUD Tests Horizon Battery

Electrosources Inc., will make its Horizon battery available to the Sacramento (CA) Municipal Utility District (SMUD) for a long-term, on-road demonstration project. The batteries will be tested in 16 SMUD and McClellan Air Force Base EVs, including buses, pickups, vans, three-wheelers and an ultra-light-weight composite pickup truck.

A preliminary field test of the Horizon battery in a SMUD program vehicle demonstrated marked improvements in range and performance over earlier tests with other batteries. For more info, call Stephanie Winn-McCorkle of SMUD at (916)732-5591.

(ELECTROSOURCE NEWS: 9/29)

EV America Begins Performance Evaluations

Five of the manufacturers selected for Phase I of EV America, the electric utility-led program to speed the introduction of EVs into the marketplace, began vehicle testing in October in Phoenix, AZ. BAT International, Chrysler, Solectria, Unique Mobility and U.S. Electricar submitted 8 compact pickups, sedans and minivans for a 30-day evaluation.

The testing, funded by the Department of Energy, will be conducted by Electric Transportation Applications, supported by Failure Analysis Associates and managed by Arizona Public Service. Vehicles will be evaluated on acceleration, braking, road handling and overall durability. Range and cold weather performance will be tested in an environmental dynamometer capable of dropping the temperature to 10 degrees F.

For more information, contact Gloria Quinn at (202)506-5659.

(EV AMERICA NEWS: 10/3)

Suntera Produces EVs for Utilities

Suntera has been selected to produce EVs to be used as "station cars" for the National Station Car Association. These 2-person commuter vehicles are designed for suburbanites to use for travel between their starting and final destinations and mass transit stations. Demonstrations of an anticipated 100 station cars are scheduled to begin before the end of the year in southern Florida, Long Island, northeastern Illinois, Sacramento and the San Francisco Bay Area.

For more information, contact Angela Lavigne at (808)261-7733.

(TRANSITIONS: 8/94)

Saft Introduces Faster-Charging NiCad Battery

Saft (Valdosta, GA) exhibited its latest nickel cadmium battery, the STM 5-100 MRE, at the Paris Auto Show in October. The 6-volt, 100-ampere-hour battery was developed jointly with French carmakers PSA Peugeot Citroen and Renault, along with backing from France's Ministry of Industry.

The new "monoblock" battery features an efficient hydraulic cooling system integrated into the monoblock, lower maintenance requirements, 10% greater capacity compared to prototype batteries used in the vehicles now being tested, smaller volume and faster recharge capability. Manufactured on a new production line at Saft's Bordeaux factory, the battery will be shipped next year. For more information, contact Jim Miller at (912)247-2331.

(SAFT NEWS: 10/4)

News in Brief . . .

Chrysler to Use Horizon Battery

Electrosources Inc. has announced that Chrysler will use the Horizon battery in prototypes of its NS-series electric van. The van is expected to be completed by early 1995.

Electrosources will package the Horizon advanced battery for the minivan, including development of tooling and manufacturing support equipment. The agreement followed field testing of the Horizon Battery in minivans at Chrysler's Arizona proving grounds in August. The agreement is subject to further review and documentation, and a final contract is expected to be signed in the near future.

For more information, contact James Rosel of Electrosources at (512)445-6606.

(ELECTROSOURCES NEWS: 10/5)

1,000+ Expected at 12th Int'l EV Symposium

More than 1,000 of the EV industry's key members from around the globe are expected to attend the 12th International EV Symposium & Exposition, December 5-7 in Anaheim, CA to discuss the industry and its challenges.

Invited speakers include Vice President Albert Gore, and executives from Chrysler, Daihatsu, Fiat, Ford, GM, PSA Peugeot Citroen and Toyota. Technologies to be explored in depth will include batteries, flywheels, ultracapacitors, fuel cells and infrastructure issues. More than 40 EVs will be on site for demonstration drives after 20 EVs are featured in a kick-off parade. For more information, contact Pam Turner, EVS-12 Symposium Manager, at (415)855-8799.

(EVOLUTION: 8 & 9/94)

Ford Tests Saft NiCad Batteries

Saft America Inc. has announced that its nickel cadmium modules are being tested by Ford as part of Ford's ongoing EV research and development program.

Company officials say the modules have demonstrated their reliability in testing carried out on large numbers of EVs and batteries. Saft has the largest contract for EV batteries in the world with major European auto manufacturers. The company plans to move from nickel cadmium to advanced nickel cadmium, nickel metal hydride and lithium chemistries.

In addition to producing proven nickel cadmium EV batteries, the company has contracts totaling \$37 million with the USABC to develop mid-range and long-range EV power solutions.

For more information, contact Jim Miller at (912)247-2331.

(BUSINESS WIRE: 10/12)

Cold Weather Won't Stop These Batteries

Electric Fuel Corp. President and CEO Yehuda Harats recently challenged claims that EVs are not practical in cold-weather climates.

ENVIRONMENTAL  INFORMATION
networks, inc.

ALTERNATIVE ENERGY NETWORK

*A Daily News Summary Service on
Alternative Fuels & Transportation*

- Reports on electric, fuel cell, biofuel, natural gas, & hydrogen vehicles
- Over 500 domestic & international sources monitored
- Updates on legislative, regulatory, business, science & technology issues

Facsimile ♦ Magazine ♦ Online

Call for a Free Trial
(703) 683-0774

other news services available:
Clean Air • Ozone Depletion • Global Warming

Harats told attendees of the Sustainable Transportation Symposium in Providence, R.I., that his company's zinc-air battery has been extensively tested at 0 degrees F. The independent German standards and testing institute TUV Bayern Sachsen locked a Mercedes-Benz 180E van with its installed zinc-air battery in a climate chamber at 0 degrees F and then ran acceleration and capacity tests on a dynamometer. The vehicle was ready to run without any problems at 0 degrees F and subsequent tests could be performed "practically without any capacity losses."

For more information, contact Todd Fogarty at (212)593-2655.

(ELECTRIC FUEL CORP. NEWS: 10/13)

Events Calendar

DEC 5-7

The 12th Annual Electric Vehicle Symposium at the Disneyland Hotel and Convention Center, Anaheim, Ca. is expected to pull 1,500 delegates from around the world to a series of presentations, workshops and breakout sessions on EV technical and policy issues. Subjects include batteries, hybrid drives, infrastructure, fuel cells and vehicle development. A large exposition of products by EV makers, component suppliers, infrastructure and conversion firms will be open to the public on Dec. 3 and 4 for \$5 a person. Cost to be a delegate - \$800 per person. Contact: Pam Turner, EPRI, (415) 855-2010 or Athena Miller, EVAA, (415) 249-2690.

FEB 10 1995

UCLA Extension will present the short course, "ELECTRIC VEHICLE TECHNOLOGY" on the UCLA campus in Los Angeles. (See ad on Page 3 for list of instructors). This course provides engineers, scientists, and technical managers with a comprehensive overview of electric vehicle technology based on the extensive "hands-on" experience of the instructors. Lessons learned from the history of electric vehicles are presented, and participants examine current systems in a wide variety of vehicles. Powered roadway concepts, with their significant future potentials, are also discussed. The primary thrust of the course is to present state-of-the-art tools and components as they are used today. Participants have the opportunity to actually drive an electric vehicle, learn how to set up computer controlled battery tests, analyze a transistorized controller used in the winning car in the Phoenix 500 EV Race, study a new bipolar battery, and examine a switched linear induction motor (SLIM). Topics are structured to be tutorial. For additional information and a complete course description, please contact Marcus Hennessy at: UCLA Extension 10995 Le Conte Ave, Room 514 Los Angeles, CA 90024 (310) 825-1047 (310) 206-2815 fax mhenness@unex.ucla.edu

JUN 21-25

An Interdisciplinary Conference on the Environment will be held in Boston, June 21-25, 1995. You may participate as session organizer, presenter of one or two papers written at layperson's level, chair, panelist, or observer. The deadline for paper submission and participation is December 15, 1994. For more information please contact Demetri Kantarelis through Fax: (508) 799-4502, or E-mail: dkantar@eve.assumption.edu.

Thanks to Ed Van Herick <vanherer@SCE.COM> Marcus Hennessy. <mhenness@unex.ucla.edu> and Demetri Kantarelis <dkantar@eve.assumption.edu> for calendar items from Internet.

THE CUSTOMER COMES FIRST!

EVA is the First Choice for Electric Vehicle Components and Services.

The Best Components

- Advanced D.C. Motors
- Curtis PMC Controllers
- Curtis DC/DC Converters
- Lester & K&W Chargers
- Trojan Batteries
- EVAmerica® Member Discounts

The Best Service

- EV Calculations
- Installation Book
- Wiring Schematics
- Video Rental
- Tool Rental
- Mastercard/Visa/Discover



When you need components and service call EVA.

We are the first choice!

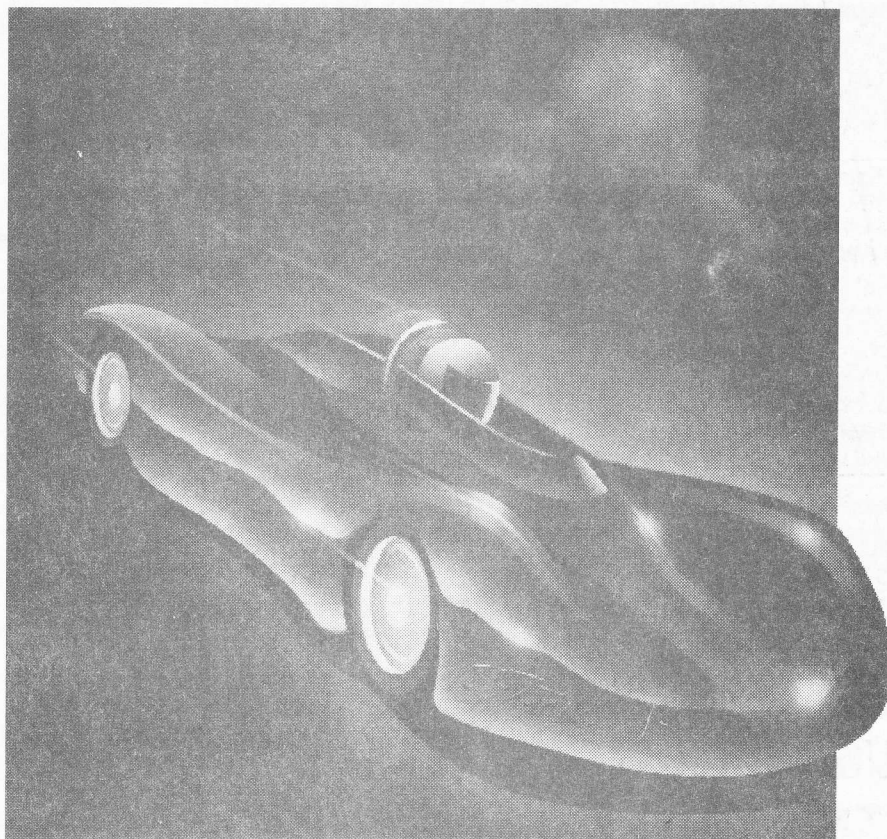
Electric Vehicles of America, Inc.

48 Acton Street PO Box 59 Maynard, MA 01754-0059

(508) 897-9393 Fax (508) 897-6740

Committed to Quality and Safety

Experience the Ultimate Current Event



The '95 APS Electrics, March 3, 4 & 5 Firebird International Raceway, Phoenix

Where can you see electric race cars going 100 miles an hour, with no noise and no dirty, smelly exhaust?

Where can you see electric technologies that will soon show up in car showrooms?

Where can you actually drive an electric car yourself?

Where else but the 5th Annual APS Electrics, the premier electric vehicle race and event. The race for clean air.

Professional race car drivers will put the latest electric vehicle technologies to the test.

Driving under real-world conditions—only faster, these drivers will help bring clean-air technologies closer to the new car showroom.

High school and college students also compete in cars they convert themselves. Through hands-on experience, they learn about the technologies that will take us into the future of driving.

Pit and garage passes are available, so you can see the latest in EV technology up close and experience the excitement.

Join us for *the ultimate current event*.
Call (800) 423-0198 for more information.

APS

Member Want Ads

FOR SALE: 1989 Chevy Spectrum (Red), 120V Trojan T125 low hours. Looks and runs great. Aluminum wheels, new Goodyear low rolling resistance tires, long range, air condition, modified automatic, special built double-shaft GE motor 28 hp, roll bar. Your choice, 2 PMC controllers in parallel, or 1 GE new controller. All gages. Invested \$18,280, sell \$9,500/obo. Free photo & details. Call Gene Cosmano (602) 376-6570/ (602) 840-2497.

FOR SALE: Converted 1975 MGB. Fully restored. Porsche Red, wire wheels, Advanced DC Motor (FB1-4001A), 90V system expandable to 108V, Curtis PMC 1200 series controller, K&W charger, vacuum assist brakes, 5 new Invicta tires. \$14,000/obo. (202) 667-1506 or (202) 667-1507 - fax. Car in Phil., PA.

FOR SALE: Electric Commuter Car, converted 1980 Fiat Strada. 96V system, GE series motor, Curtis PMC controller, 1 1/2 years on batteries, 50-55 mph, 30-40 mpc. \$5000. Call (415) 856-8906.

FOR SALE: 1979 White VW Diesel Rabbit. Disassembled, ready for conversion. Good body, wheels and tires, sunroof. \$400. Call (510) 636-1505.

FOR SALE: Complete G32 Aircraft Generator (20 Hp D.C. motor) with VW Bug adaptor; clutch and flywheel. Also, one G32 motor dismantled in box. Total price \$200. Call Bob (408) 379-3438.

WANTED: Electric Postal Van Manual, made by Commuter Vehicles Inc. 1981. Need copy of manual or operating instructions. Please Help! Phil Allan, 16 Cairn St, Rochester, NY 14611-2416.

ORDERING INFORMATION: \$7 for the first 25 words. Each additional word, 25 cents. Please send check payable to Electric Auto Association, 18297 Baylor Avenue, Saratoga, CA 95070.

Want Ads are available to EAA members for the sale of electric vehicles, equipment and parts. The EAA is not responsible for the accuracy of ads. Please see advertising rates on next page for commercial products.

Index of Advertisers

ADVERTISER	PAGE #
APS.	13
DORAN MOTORS.	9
EIN, INC.	11
ELECTRIC AUTOMOTIVE.....	5
EV OF AMERICA, INC.	12
KTA SERVICES	16
SOLAR ELECTRIC CONTROL SYS. ...	6
RUSSCO	9
UCLA EXTENSION	3
VOLTAGE	15
WESTBERG MFG. INC.	7

Electric HOT Plates!

Current EVents will show a vanity license plate from one of our members electric vehicles. If you spot your license, send us a picture and brief description of your car for publication in an upcoming issue of CE.

The issue plate [ELECTRO], featured in the November CE, belongs to M. Tino Pestalozzi of New Mexico, Albq.



Advertising Rates

QTY SIZE		1 AD	3 ADS	12 ADS AD
Full page	7.25" x 9.25"	\$375	\$300 ea	\$250 ea
1/2 page	7.25" x 4.50"	\$175	\$125 ea	\$100 ea
1/4 page	3.50" x 4.50"	\$100	\$ 75 ea	\$ 65 ea
1/8 page	2.0" x 3.5"	\$ 75	\$ 65 ea	\$ 50 ea

- ▼ Ads may be placed for 1, 3 or 12 months. Ads are due and payable at the time of the issue. Full payment for all issues must be received at the initial order along with the camera-ready copy. For 12 ads, an invoice will be billed quarterly. A minimum of 3 ads need to be prepaid per quarter.
- ▼ Provide camera-ready copy for each prepaid AD. Ads may be submitted on diskette in TIF format on the PC or MAC. EPS format is also acceptable. Please contact me regarding questions on file formats. If you would like assistance with the layout or design of your AD, please contact Susan Hollis at the number listed below
- ▼ For changes to the ad copy, new camera ready copy must be received *before the 1st* of each month for the next issue and must be the same size to qualify for the discounted rate.
- ▼ AD size must fall within the sizes listed above. If ad exceeds the size, the next ad size will be charged or a \$10 fee will be charged to reduce the ad. Ad rates are for black and white copy only. For additional color, please add \$100 per color.
- ▼ Deadline for camera-ready copy is the **1st of the month**. Copy received after the 1st will be run in the next issue. Ads will be placed in the priority received. Prepaid ads will receive 1st priority.
- ▼ Please contact Susan Hollis, Advertising Manager, at (408) 374-8605 or by FAX at (408) 374-8750 for additional information or assistance. Camera-ready copy and payment for the ad should be sent to: Electric Auto Association, Attn: Advertising Mgr., 18297 Baylor Avenue, Saratoga, CA 95070.

VOLTAGE, INC.

(310) 532-4536

**Electric Car Racing
EV Propulsion Systems
EV Repairs & Battery Services
Custom Electric Vehicle Conversions**

18422 SOUTH BROADWAY GARDENA CA 90248

EAA Reprints

Ordering information:

Please send check payable to EAA along with your order form. Include \$2 for postage and handling.

Send your reprint request to:

EAA Reprint Request
18297 Baylor Avenue
Saratoga, CA 95070

- ☐ **Discovered: The Perfect EV Battery (\$2.00)**
Facts about the battery that will change the world.
- ☐ **Flywheel Energy Storage**
Dr Richard Post (\$5.00)
Dr. Post updates 1970's thinking and finds a viable solution.
- ☐ **Team Tucson Land Speed Record Plans**
Chuck Lemme (\$5.00)
A wealth of technical considerations and many power and aerodynamic formulas.
- ☐ **EAA XA-100 Hybrid (\$5.00)**
Report on the EAA's Hybrid Vehicle Project (all 3 chapters) (Includes all tables)
- ☐ **Current EEvents (\$3.00)**
Specify month/Year

Please send the EAA reprints to:

NAME: _____

ADDRESS: _____

CITY: _____

STATE/ZIP _____

I have included \$2 for postage and handling. Please allow 2-3 weeks for delivery.

KTA SERVICES INC.

944 West 21st Street — Upland, CA 91784

Tel: (909) 949-7914 — Fax: (909) 949-7916

Established in 1984, KTA SERVICES caters to electric vehicle hobbyists and manufacturers by supplying EV components, publications, and design/consulting services. We are a complete supplier of EV components and certified kits....everything you need except for the batteries. All components we recommend and sell have been selected with safety and reliability foremost in mind. All components have been proof-tested in electric vehicles. All components are new, competitively-priced, and come with full manufacturer's warranties. We proudly stock the following:

- ◆ Curtis-PMC Motor Controllers from 24V/175A to 120V/400A
- ◆ Advanced DC Motors in 7 variations from 4 HP to 22 HP
- ◆ Albright Eng. Main & Reversing Contactors in 4 models
- ◆ General Electric & Heinemann Circuit Breakers
- ◆ Bussman Safety Fuses in 3 models
- ◆ Sevcon DC-DC Conv. from 56 to 128V inp. with 14V/25A out.
- ◆ K & W Eng. Onboard Chargers in 3 models from 48 to 216V
- ◆ Magna Welding Lugs in 3 sizes from #6 to #2/0
- ◆ The latest in EV publications with a growing lineup of videos
- ◆ 6 Conversion Kits Certified for California \$1000 Tax Credit & Sales Tax Exemption
- ◆ Curtis-PMC Throttle Potboxes and Footpedals
- ◆ Curtis Instruments Battery 'Fuel' Gauges in 5 models
- ◆ KTA Services' Expanded-Scale & Dual-Scale Meters
- ◆ Westberg Automotive Style Gauges in 3 configurations
- ◆ Deltec Meter Shunts in 3 models from 50 to 500 A
- ◆ EVCC Adapter Plates, Couplings, Clamps, & Brackets
- ◆ Prestoflex Welding Cable in 3 sizes from #6 to #2/0
- ◆ Battery Cable Assembly Tools
- ◆ Watt-Hr. Electric Meters
- ◆ "VOLTZVOGON" bolt-in kits for VW Bug or Super Btle
- ◆ Complete ELECTRATHON Drive & Instrum. Pkg.

You can purchase your components from us with the confidence of knowing that we specialize in user-friendly customer service. With 10 years of EV experience and engineering expertise, we can answer just about any EV question you can come up with. Additionally, we offer engineering services:

- ◆ Complete System Quotations (free)
- ◆ Project Overview w/Schematic & Recommendations
- ◆ All new K & W Eng. TD-100 Tachometer Drive/Rev Limiter
- ◆ Project Consulting/Engineering Design
- ◆ Computer-based EV Performance Predictions
- ◆ All new K & W Eng. AH-100 Digital Ampere-Hr. Meter

Call or write us with your EV needs!

For a COMPONENTS & PUBLICATIONS CATALOG, send \$5.00 (refundable)

ELECTRIC AUTO ASSOCIATION

2710 St. Giles Lane, Mountain View, CA 94040

• Address Correction Requested •

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



SCOTT P./ANNA CORNELL
60 ALAN DR
PLEASANT HILL CA 94523-1902

10310 EBAY
SEP 1995



• TIME DATED MATERIAL — PLEASE DO NOT HOLD •