WINTER 2006

EVAmerica

COMMITTED TO QUALITY, SERVICE, AND SAFETY

George Berbari – Inventor
with his Patented "Flywheel Driven Vehicle"

IN THIS ISSUE -

CONGRATULATIONS TO GEORGE !
THANKS TO ALL EVA CUSTOMERS !

2005 was a great year for EVA and a number of EVA Customers! In this issue we celebrate the hard work and persistence of George Berbari of Virginia. George received Patent No. 6,962,223 dated November 8, 2005. George contacted EVA in early 2004; we were able to help him select the Advanced DC motor, Curtis controller, etc. for his specific application. Like so many customers, George is now a friend who calls just to say "hi" or ask a question. Read more about George and his invention on Page 3.

We did not have enough customer pictures for a Fall Newsletter, I apologize. But this issue is packed with lots of information thanks to George Berbari, John Vecchio, Matt Newton, Ross McCurdy, Mike Forsting, Mike Domanski, and Ken Moran. Thank You all for sharing pictures and information!

Electric Vehicles of America, Inc. had a record year! We want to thank our many customers. Many have returned year after year, but God also blessed EVA with a number of new and unique projects:

- *A 150 Ton rail vehicle to move steel ingots in Chicago.*
- *A 40 Ton rail vehicle in an industrial plant in California.*
- *A 8000 lb industrial prototype vehicle for a major automobile plant.*
- *An ATV conversion for the Caribbean.*
- *EV conversion of airport tug and other ground support vehicles for Bangor International Airport.*
- *A number of auxiliary upgrades for sailboats.*
- *A propulsion vehicle for transporting underwater divers.*
- *A submarine.*

In addition, our battery sales increased substantially thru the Trojan dealers and others across the country. Most were for on-road EVs, sailboats, or industrial vehicles, but we also sold to Comcast for their facilities.

All this in addition to our first love – on-road EVs! We worked with a number of people who converted cars and trucks. Mike Moore completed a truck conversion in under 40 hours – he is now doing truck conversions for other people; EVA is his supplier. A Brazilian company completed two conversions; we look forward to many more. Other countries, we shipped to include Canada, El Salvador, England, Germany, Iceland, Mexico, Puerto Rico, Singapore, and Thailand.

If you like our EVAmerica Newsletter via email, feel free to forward a copy to friends! Also send a picture of your EV with a brief writeup to be included in upcoming issues.

Bob Batson
Electric Vehicles of America, Inc.

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*EVA gave **$16,810** in EVAmerica Discounts in 2005!*
Just part of EVA's Customer Service!
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REMINDER !

Members of EVAmerica are entitled to a 10 percent discount on EVA components up to a total discount of $30 each quarter. Simply remind us when you place your order. A 1-year membership is automatic when you buy $300 or more in a single order or pay $30 for membership.
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George Berbari
Flywheel-Driven Vehicle
Patent No. 6962223

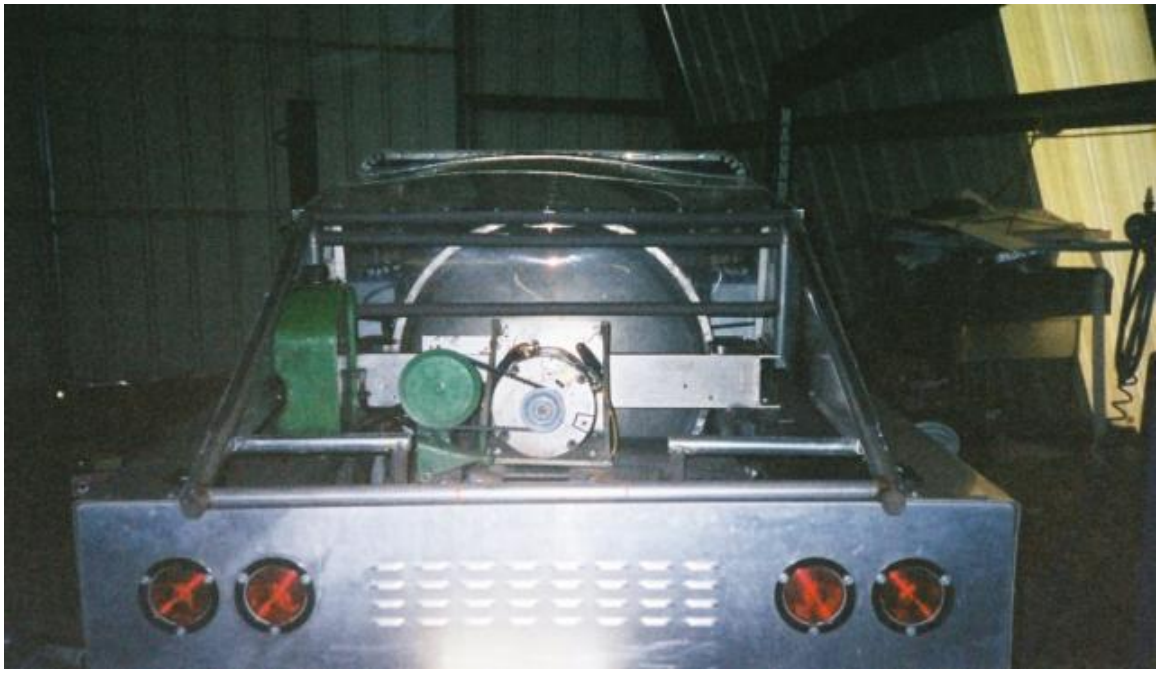
There can be no sweeter sound to an inventor than their first patent. George has been working and perfecting his design for more than 25 years; he started in 1979. That is persistence – and a committed belief that the concept is correct; it is just a matter of finding the correct parts. George has been a Maritine engineer as well as a Service Manager for 800 trucks in Saudi Arabia. He is a hands on guy! This is his second prototype vehicle.

The Abstract of the patent reads:

A flywheel-driven vehicle is powered by an electric motor. The rotation of the flywheel is initiated and maintained by an electric motor, wherein the electric motor is powered alternatively by a plurality of batteries (or sets of batteries). A charger assembly is connected to the plurality of batteries. In operation, one battery at a time powers the electric motor while, simultaneously, the other battery(s) is/are being recharged.

The patent is available on-line at www.uspto.gov. You can see that George had to build the vehicle from scratch in order to prove his design. According to George, the vehicle is capable of maintaining 60 mph for hours and hours. He had to be escorted by the Sheriff's Department; they claimed George went as high as 68 mph! Once DMV inspected the vehicle, George ran the vehicle for more than 2 hours; the battery pack decreased in voltage by only 0.3V from 159V initially. Amazing!

A functional Driver's area

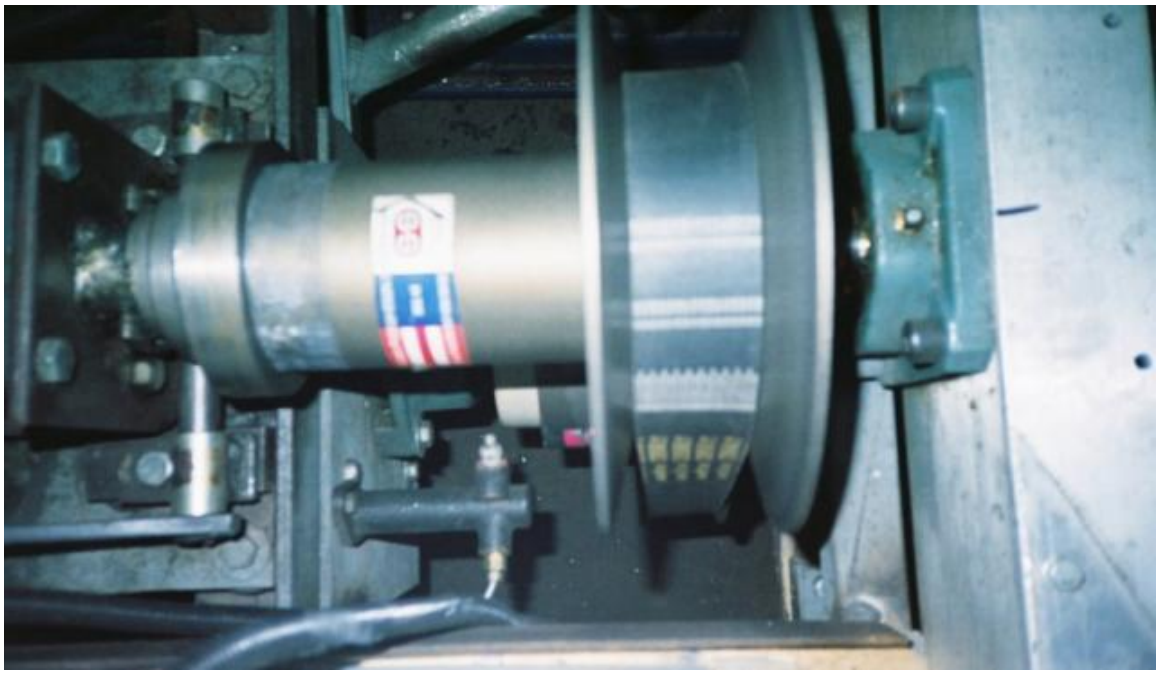


Rear View
Of the Motor, hydraulic pump,
And flywheel chamber

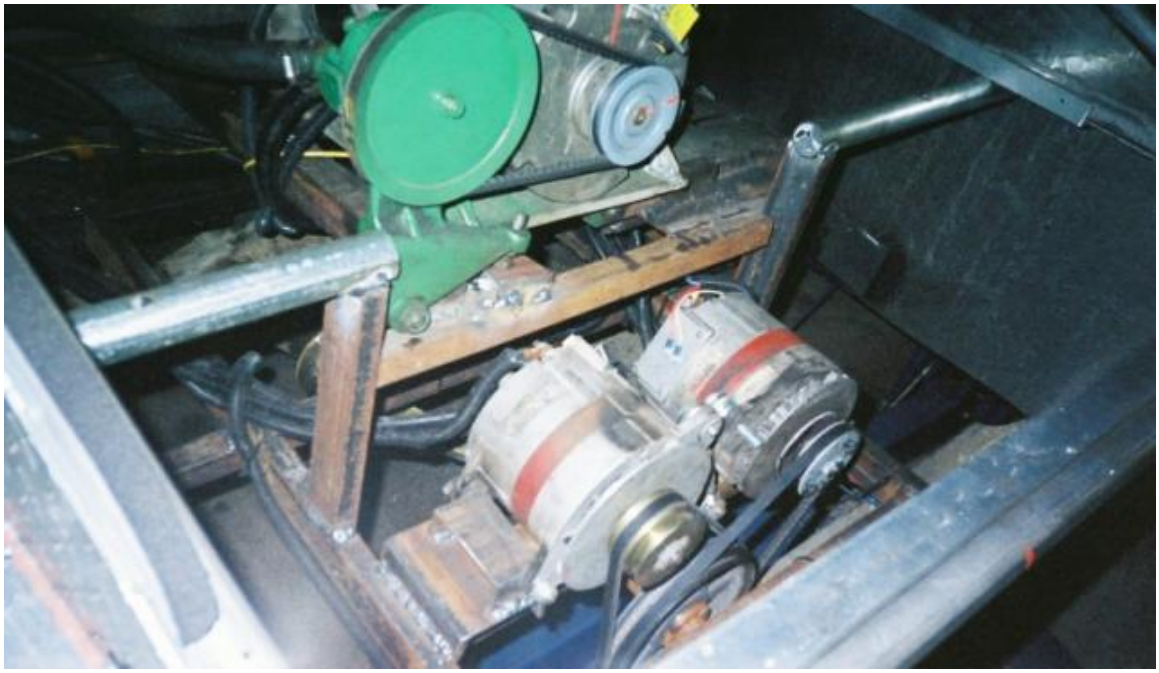
The vehicle is driven by the flywheel operated at a constant 4500 rpm.
The tail shaft of the FB1-4001A motor drives the hydraulic control system.

The Lovejoy Coupling is driving the flywheel;
The tailshaft is driving the hydraulics for acceleration and deceleration.

The opposite end of the flywheel chamber;
Which is maintained under a vacuum.
The batteries are for the auxiliaries.



The sheave is driven by the hydraulic system;
The lower connection is to the transmission.
Therefore, speed is changed.



The alternators are for the auxiliary battery packs
which feed the inverter.

The End …….. No, Just the Beginning !

Congratulations George!

EVA CUSTOMER HOME PAGES

JOHN VECCHIO - 1998 S-10 Conversion

Visit John's Home Page at
www.geocities.com/john_vecchio84/evhomepage.html

Matt Newton – 1996 Saturn SC1

Visit Matt's Home Page at

http://photobucket.com/albums/v46/nonnef/EV%20Project/

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From Page One ...

The Observer

DECEMBER 15, 2005 ...

Scientific Hot Rod Gets Rolling

Students will convert car to fuel cell power

By Ron Scopelliti

For science teacher Ross McCurdy and his students at Ponaganset High School, their ride of choice this winter will not be a one-horse open sleigh, but a 300-horsepower open roadster. The school recently registered a t-bucket hot-rod that they will transform from a fuel-chugging road warrior to an ecologically-friendly, high-mileage, science experiment on wheels.

SEEN WITH the T-bucket roadster that will be converted into a fuel-cell-powered electric vehicle are (l-r) Ponaganset High students Mike Bicknell and Chris Gaudette, and science teacher Ross McCurdy (Observer photo by Ron Scopelliti)

Within a month, students will remove the car's current Chevrolet V-8 engine, and begin the process of converting the roadster into an electric vehicle powered by a fuel cell.

Fuel cells are devices that use a chemical reaction between a fuel (usually hydrogen) and an oxidizer (usually oxygen) to produce electricity. Fuel cells have been the subject of a great deal of research worldwide, because of their efficiency and their low environmental impact.

The goal of the "Fuel Cell T" project, Mr. McCurdy explains, is to create a fuel-cell powered car that can cruise at normal speeds and have normal range.

"And," he adds, "to do this for less than any other fuel cell vehicle available."

While prototype fuel cell vehicles built by General Motors, Toyota, and other major manufacturers generally cost more than a million dollars, the estimated budget for the Fuel Cell T is just $80,000, all coming from grants and donations.

Though the project was unanimously approved by the School Committee in August, the school had to clear a number of hurdles in getting the car insured, registered, and inspected.

fuel cell that will recharge the batteries as they drain.

For the next month, however, the V-8 will stay in, as Mr. McCurdy and the students evaluate the car's current performance characteristics.

"What we want to do is really get the baseline data," says Mr. McCurdy, The timing, however, is not ideal for testing a vehicle with no heater, no windows, and no roof.

"Data collection," he notes, "seems to move a little slower in December."

Still, they are making progress. The car's exhaust emissions have been tested, as has its fuel mileage.

"So far the mileage has been quite low," says Mr. McCurdy, estimating that the vehicle is getting less than 10 miles-per-gallon of gasoline. Despite the vehicle's light weight, he notes that the car is geared low for acceleration, and that this does not lend itself to high mileage.

Students are currently calculating the cars range. Figures like these will be used to compare the vehicle's performance before and after the motor swap.

Mr. McCurdy and the students are also evaluating areas of the car that need to be changed.

They discovered, for instance, that the lights are wired in series instead of in parallel, so they are only running at 6 volts instead of 12 volts. They will be rewired to shine more brightly.

Mr. McCurdy plans to add power brakes, noting that stepping on the current unassisted brakes requires the sort of effort usually reserved for leg-presses at the gym.

There are other obvious changes that will be made to the car. The wide mag wheels and gumball tires on the rear are needed to transmit the V-8's over-the-top horsepower to the road, but will be a performance liability for the low-horsepower electric powertrain.

"Those mags look really cool," says Mr. McCurdy, "but that's a lot of unsprung weight."

Soon, he will be bringing the T to the scales at Rhode Island Resource Recovery Corporation in Johnston, a sponsor of the project. He and the students will not only measure the total weight of the car, but also the weight on each axle, so they can maintain the car's current weight distribution and handling.

Other sponsors of the program include the Fuel Cell Test and Evaluation Center in Johnstown Pennsylvania, the Rhode Island State Energy Office, Logan Energy, Praxair, Relion Fuel Cells, Bonneville Power Administration, the Fuel Cell Seminar, Sgambato's garage in North Providence, and the Perkins Grant program.

Though the program has had good luck with funding, and has economized in the classic hot-rodding tradition by scrounging used parts, Mr. McCurdy says they are still looking for support to purchase some parts that are too cutting-edge to find used.

"The biggest expense is the fuel cell. We probably need another $20,000 for that."

Individuals who've come out in support of the project include school administrators; building supervisor Joe McGovern, who helped with the registration process; Jim Sullivan, who sold the T to the school at a low price and has offered his skills as an electrical engineer; local contractor Dave Miller who moved a large boulder to make room for the trailer where the T is based, and Dave Ferreira, a neighbor of the school who happens to be a fuel cell engineer.

An early supporter of the school's fuel cell research was Dr. Michael Binder of the Department of Defense, who Mr. McCurdy describes as a "fuel cell guru."

This type of attention from the community and from industry is what Mr. McCurdy hoped the vehicle would bring to the school's science program.

During a brief test-drive of the T, the public interest the car draws is evident. When the vehicle is parked, people immediately come over and ask questions about it. Cruising down Snake Hill Road, pedestrians and other drivers wave enthusiastically as the car goes by.

Mr. McCurdy hopes that the completion of the Fuel Cell T will just be the start, and that the vehicle will be used as a publicity tool that will lead to other projects. The science department is already garnering support for an Energy Learning Lab, to be integrated into the planned update of the High School.

If student enthusiasm for the Fuel Cell T is any indication, the lab will be a big hit.

Walking through the halls after the test drive, a random student calls out, "Mr. McCurdy -- I saw the car. It's wicked cool!"

"These students," says Mr. McCurdy; "some of the kids will stay after school until 9 or 10 o'clock to work on this."

Student enthusiasm was evident in the fervor they showed simply in getting the car out of the trailer for the test drive. As some members of the class scurried inside the school to get teachers' cars moved out of the way, others kicked clumps of snow away from the door of the trailer at Mr. McCurdy's request, rather than wait for snow shovels.

Senior Dan Shippee, one of the students in Mr. McCurdy's year-long fuel cell class, typified the way the T draws students in.

Asked why he joined the class he replied "This looked like something that would be pretty interesting to me."

The specific reason?

"Because of the car."

For more information on fuel cells, visit the following web sites:

- The Fuel Cell Test and Evaluation Center http://www.fctec.com/
- Logan Energy http://www.loganenergy.com/
- EV America http://www.ev-america.com/

From Mike Forsting (Wisconsin)

Bob, here are some pictures from my electric truck that I built thanks to you and my friend Peter Emer. I have put on 1600 miles on truck so far with no problems other than having to put a different heater in. We tried to put a 1500 ceramic heater into the 120 volt system like the manual said but we burned 2 of them up in a matter of minutes. So I decided to buy a 1500 watt power inverter and run it off the 12 volt batterry and that is working very good with great heat. Let me know if the pictures turn out, if they don't I will send you some different ones, I am new at this. THANKS BOB! --------Mike Forsting (Wisconsin)

Operating & Maintenace Tips

Redline Oil

We have been recommending Redline Oil for years. Redline produces a synthetic lubricant that can be used in the transmission and differential. You can call Tech support at (707) 745-6100 or visit www.redlineoil.com

BATTERIES

You do not want to discharge batteries below 1.75 V cell while under power. A cell is equal to 2 volts. So a 12V battery is 6 cells; an 8 V battery 4 cells; and a 6V battery 3 cells. So if you are running a nominal 120V; that is 60 cells. 60 cells x 1.75V/ cell = 105V. To ensure that you are aware of this rule of thumb, block out in red vellum or construction paper, any voltage less than 105V on your voltmeter. This will help you protect your batteries. When you cannot see the needle, decrease your speed. If necessary let the batteries rest 5 minutes before completing your drive.

UPGRADING A USED EV

1979 Lectric Leopard
Had to do:

1. Battery Charger: Upgraded to a Zivan, the old charger was a vintage 1970's Variac with Full-wave Rectifier, I had no idea if batteries were fully charged, undercharged, or over charged, I had not enough time on my hands to monitor constantly the voltage and current during the charge cycle. Power and range stunk.

2. Batteries: all new 16 Trojan T-105's (I went economy at $55 each) The batteries that came with the vehicle were a mix of 4-year-old US-125's and Interstate U2200's (front and back).

3. Cables, complete rewire. The interconnect battery cables were all "2 Gauge", not 2/0. I replaced all high current cabling, even to the motor. Learned this when I "smoked" a battery terminal on the rear pack.

4. "Correctly" rewire the Curtis 1221C, the KSI (low current input to the controller) "in" was tied to the 12V system key switch, not the 96V per manufacturer instructions.- I had intermittent operation (Thanks, Bob at EV-America for telling me!)

5. New Accessory battery: (an AGM), and charger (a west marine 3-Stage charger). The accessory battery it came with was an automobile starting type, and the charger was a straight 6-amp single stage charger (i.e. transformer and full wave rectifier)

6. Instrumentation: The old 48V system - US electric car "ammeter" used the cable between the controller and the motor as the shunt, another unknown in current measurement. - had to order a calibrated shunt and ammeter. The Volt meter was a 48V meter on a 96V system, modified with a pot resistor to cut the read 96V down to "somewhere" around the voltage of 50V, another unknown. - had to order a voltmeter that reads the correct range of voltage.

7. Accelerator linkage: Accelerator pedal feel was very jerky and sticky. The original accelerator foot pedal cable and linkage assembly was cable-looped and poorly adjusted to the Curtis PB-6, I eliminated this entire assembly and cabled the accelerator pedal directly to the PB--6 by mounting the PB-6 vertically and tying the linkage cable direct to the accelerator cable.

Car runs well, I keep up with traffic, and the performance increase from all my upgrades were well worth it. I did get a great deal on the initial purchase of the vehicle though, and the vehicle cosmetically inside and out was perfect with less than 9k miles on it and garage kept the whole time. I knew in advance that it needed electrical work from my first inspection, so I do not feel taken at all. I am very happy that all my performance enhancements were virtually all "bolt-on" upgrades, and in this process, I never got greasy, like I used to working on the old fossil fuel vehicles.

This car is an everyday driver for me, so I need dependable transportation.

This was a great learning experience for me!

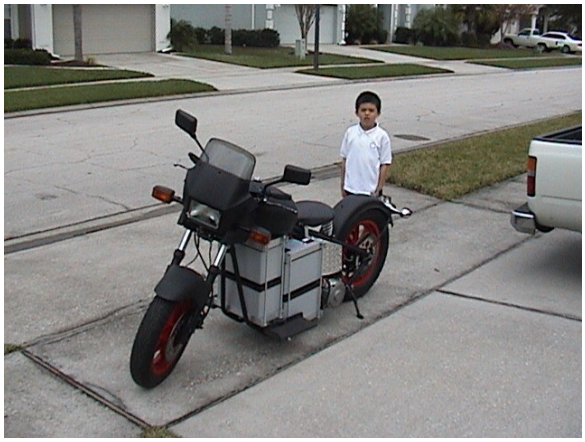
Mike (Domanski)
Pensacola FL

(Thanks Mike for a detailed article……...Bob)

ELECTRIC MOTORCYCLE IN ORLANDO

Hi Bob,

This is Ken in Orlando. We spoke a few months ago on the phone and I purchased a speed controller, anderson disconnect, and main contactor from you. You asked me to send you some pictures when I finished building the bike so here are a few. That's my six year old son in the photo...he's about four feet tall so you have some idea as to the size of the bike. Ken in Orlando.



(Thanks Ken for the pictures……...Bob)