# THE CONSULTANT

The Newsletter of the IEEE Consultants Network of Long Island

*Volume 26, Number 4* *May 2009*



## *Newsletter Editorial – Dick LaRosa*

The last issue was No. 3, in March. I think it had a correct announcement of the April meeting. I can't tell from my notes. If it was about software engineering for LabView applications it went right by me and I didn't write a single thing down. My notes do say that we voted to spend $150 on our TypePad blog. I got an account and am figuring out how to post something on it. Haven't found the page break tool that Jerry talks about, so maybe my first attempt will be limited to two paragraphs..

The last newsletter had an incorrect announcement for the May meeting. The speaker's schedule got changed and David Pinkowitz saved the day with a talk on Facebook, Linkedin, and Twitter. Dana DeMeo started a Linkedin group for us. Terry Stratoudakis told us about a real neat use of Twitter to coordinate activities of his group at a conference. So now we have eight ways to communicate:- Newsletter, TypePad blog, Facebook, Linkedin, Twitter, LICN website, Section website, and good old emails to members@consult-li.com. The last one works well if someone needs help with a problem or the loan of some equipment.

We'll sort this out eventually, or maybe we won't if things keep changing. I would say that the Newsletter is redundant for announcing upcoming meetings. It may be useful as a history of recent meetings.

Marty Kanner called me and said he had an article written about hybrids vs. pure EVs, so it's in Newsletter No. 4 for May. Don't look for the April issue. It never was, and we will probably skip some more. Marty suggests the installation of charging stations at malls and other places, and that reminded me of my experience with the Polytechnic University EV about ten years ago. We were using deep-cycle lead acid batteries and we really had to discharge them almost completely to build up their memory. I think Carl Schwab mentioned something similar in the case of NiMH batteries. So if we make short trips to the mall and recharge while there, we may not be cycling them properly.

It seems like one advantage of the hybrid is that it can control the charge-discharge cycle regardless of the driving schedule. Any thoughts on this?

# *Meetings, Past, Present, Future*

## *December 3, 2008*

**Topic: "Ultrasound Imaging in Medical Application: Fundamantals and Current Technology"**
**Speaker: Howard Fidel, Senior Engineer, Schick Technologies**

## *January 7, 2009*

**Topic: Some History of the Electronics Component Business On Long Island**
**Speaker: Barry Yonenson, CEO, KRP Electronics**

## *February 4, 2009*

**Topic: "I'm a Consultant!... NOT a Salesperson!" Sales and Sales Management Process Improvement**
**Speaker: Richard Isaac, President, Legend Development Services, Inc.**

## *March 4, 2009*

**Topics: "Microchip's Design Partner Program" "Zigbee and Miwi Protocals"**
**Speakers: Grainne (Grawnya) Josaphat, Field Sales Engineer Jerry Fogarty, Field Applications Engineer, Microchip Corp.**

## *April 1, 2009*

**Topic: "Software Engineering for LabView Applications"**
**Speaker: Newton de Faria, PhD, National Instruments**
**Directions: See our website www.consult-li.com.**

## *May 6, 2009*

**Topic: "Using Facebook, Linkedin & Twitter Social Networks For Business"**
**Speaker: David Pinkowitz, DCP Marketing Services LLC**

## *June 3, 2009*

**Topic: "Planning for Retirement in Today's Financial Climate"**
**Speaker: Tony Borelli, Investment Advisor, MML Investor Services**
**Times: 6:45 PM refreshments available.**
**7:00 PM LICN business meeting begins.**
**7:30 PM Presentation begins.**
**Place: Briarcliffe College, Great Room**
**1055 Stewart Avenue, Bethpage, NY.**
**Guests are welcome. No charge. No preregistration, but email peterbui@optonline.net so we can order refreshments.**

## *Other Meetings*

**Consult the Events Calendars on the Section website: www.ieee.li and the LICN site: www.consult-li.com**
**Remember to inform the members about seminars and other items**

***THE CONSULTANT*** is published monthly by the IEEE Long Island Consultants Network and is available free of charge to its members.
*Address All Correspondence to:*

IEEE Consultants Network
Of Long Island
P.O. Box 411
Malverne, NY 11565-0411

Tel: (516) 379-1678
Web: http://www.consult-li.com

**Newsletter Staff**
Editor: *Dr.Richard LaRosa*
*Tel: (516) 486-7827*
*e-mail: r.larosa@ieee.org*

Associate Editors:
*John Dunn, Ambertec, Inc.*
*Tel: (516) 378-2149,*
*e-mail: ambertec@ieee.org*

Peter Buitenkant
*Tel: (631) 491-3414*
*e-mail: peterbui@optonline.net*

Printing and Distribution:
*Dr. Richard LaRosa*
*Tel: (516) 486-7827*
*e-mail: r.larosa@ieee.org*



---

**Deadlines: Flexible**
Articles for publication in ***THE CONSULTANT:*** Send them in. We need them.

---

The IEEE Consultants' Network of Long Island maintains a referral service of engineering, computer, managerial, and technical professionals. Call or write for more information. There is no charge to the client for this service.

Referral Service and Voice Mail:

516-379-1678

---

Web Page: http://www.consult-li.com

**that might be of interest. E-mail them to members@consult-li.com.**

---

## *A Hybrid ??---------- Marty Kanner*

Are you touting or are you even considering buying a hybrid? You have to be kidding. After all engineers are trained in the fundamentals and to deal with things in a quantitative manner, not qualitatively. So let's take a deeper look and try to put this into some perspective.

What is a hybrid? Isn't it nothing more than a compromise? "Nicht ah heen, nicht ah her". This translates literally to "neither here nor there". However, the emotional impact in English is lost. That is exactly what a hybrid vehicle is. It is not the best possible gasoline powered vehicle and it surely is not a decent electric car. Instead it is a more complicated, more expensive means of transportation and is not the green car everyone thinks it is. Let me sidetrack with a couple of stories that may explain why I say the hybrid is the wrong way to go.

I had been working on the design and fabrication of an electric car when the Toyota Prius was introduced in dealer show rooms. I was anxious to see what they had, to make sure I was on the right track. The dealer showed me a brochure that went into a great deal of detail. The salesman was quite anxious to make a sale and it would have cost about $18,000.00 with all the company and government rebates. I didn't buy it only because I didn't need another car. I felt that they were giving the car away because I estimated the car's real value to be between $50,000.00 and $60,000.00. That mental estimate was based on the added technology and complex electrical and electro-mechanical mechanisms that were added. When I left I came to this simple conclusion; this has to be one of the most brilliant pieces of engineering I have ever seen, but totally pointless. I knew at that time that any gas saving one derived will never cover the real cost of the technology and mechanisms that went into the car. (My opinion; it's gimmickry, they're just trying to take us in as they did with these tremendous trucks they're calling passenger cars-who ever heard of rollover before these so called passenger truck/cars came out). Well the cost of the hybrid is up to around $30,000.00 and more, but don't go away, as soon as they take in more of the public and the politicians, the cost will easily get to $60,000.00.

One more story relating to compromise: Some of you may recall that years ago McNamara tried to reduce development cost of the advanced fighter by having one design for both the navy and the Air Force. He couldn't do it and so we ended up with the F14 and the F15. He never would have even tried if he ever witnessed the landing of the F15 and the F14 at the Nellis Air Force Base in Las Vegas, as I happened to see. I was there to see the first flight test of Republic's A10. The Nellis airstrip has got to be a couple of miles long. The F15 swooped down to tree top level, used almost the entire strip and gracefully landed. On the other hand, the F14 came almost straight down and so called, crash landed in the middle of the airstrip. There is no way that a carrier based aircraft could be 'hybrided' with a land based aircraft. The requirements are so radically different; as are the electric car and the gasoline engine powered car.

For this reason, the hybrid car is not the way to go. An indication that the car industry is admitting to the problem, is their introduction of the plug-in hybrid. Reminds me of my introduction into sales philosophy. If there is a problem, develop a solution to the problem. On the other hand if you have a solution, create the problem. Obviously, what I am saying is, forget about the hybrid, it is sales hype. At least as engineers we shouldn't be taken in.

Well, what should we do? Let's take a look of where and how we use the car. I'm guessing now but I would say on average we put 12,000 miles a year on a car. I would also guess that on average, 90 to 95% of that mileage is around town with one or two people in the car and we go less than 40 miles in a day. I'm therefore proposing that a low cost electric car that would carry two people 100 miles at speeds up to 60 mph on a single charge, would satisfy 90% of an average family requirement.

What about the other 10%? The answer is simple. We simply would have as a second car, our gasoline engine driven dream car. The cost of the two cars and their maintenance would be less than the hybrid and would resolve three major problems; global warming, pollution in cities around the world and America being held hostage by the excessive requirement for oil. The argument against these claims is that oil is used to generate electricity to charge the electric car's battery so how can these

claims be made. The answer is the greater efficiency of the large power stations compared to the tremendous inefficiency of car engines which operate at variable torque and variable speeds as high as 6000 RPM.

Another question that can be raised is how do city and town pollution problems get resolved when the diesel-driven generators or coal, oil, and natural gas-fired steam turbines are producing much of the electricity? Well first of all, we hope that plant modernization and repowering will make them more efficient than automotive internal combustion engines. Second, the puny pollution controls put into each car could not possibly compete with the efficient sophisticated pollution control systems in the generating stations. Third, much of the grid power is imported from nuclear, hydroelectric, wind, and someday, solar sources. To top off the argument on pollution, consider the pollution generated by all the tankers around the country that distribute the gasoline to the gas stations. How much pollution is generated by the electrical transmission network? Zippo!

One of the most significant concerns is the fear of running out of charge and not being able to 'refuel'. Consider that the electric car was popularly used around town and we traveled 30 miles to a mall. We could get back home since our range is 100 miles. However the mall pays plenty in advertising to get us there and they would surely set up free recharging posts. Why would they do that? Well, a 10 amp, 115 volt recharging post will deliver 1.15 KW. If we recharged while shopping for two or three hours, that's 2.3 to 3.45 KW-hours. That's got to cost the mall between 50 and 75 cents. I'm pretty sure they would be happy to put up charging posts to attract you to their mall. We refuel for nothing and no worries about making it home.

Well, why don't we have the electric car today.? My answer to that is that we can't ask car makers to make an electric car. They make them like cars. In order to have a practical electric car, it has to be made using the technology of an aircraft manufacturer where weight and true aerodynamics are considered. Furthermore, full advantage must be taken of the electric motor's inherent variable speed, variable torque characteristic. Note that the gas or diesel engine wants to be operated at a constant speed and constant torque. Therefore there is the need for a multiple speed transmission and a differential in hybrids and gas engine powered cars. These can be entirely eliminated in the electric car. Furthermore the rack and pinion steering mechanism is also eliminated.

All of the foregoing features are provided by a car that is being designed and under construction. Calculations indicate that the car can deliver the foregoing stated performance and uses 600 pounds of ordinary lead acid batteries which can be recharged overnight for less than $2.00. If lithium battery technology is used, the range will increase from 100 miles to 300 miles.

What is the conclusion? Simply, the electric car is not the car of the future, it is the car of today and solves today's problems around the world. By the way, I've only described a few of the features of the electric car that is under construction. If the consulting group is interested, I'll write again and go into detail about some exciting performance capabilities using the principal of 'KISS'.

---

# *Turbines for Hurricane Reduction in the Gulf of Mexico*

***----- Dr. Richard LaRosa, sealevelcontrol.com***

This article is expanded from an abstract submitted to the Oceans 2009 Conference in Biloxi, October 26-29. It reflects what may be an adequate understanding of the relevant oceanography, but a woefully inadequate knowledge of how to design, build, install, and operate the marine current turbines that are required to extract the excess power responsible for the Loop Current.

It appears possible to eliminate the intrusion of the Loop Current (LC) into the Gulf of Mexico (GoM) and thereby reduce the likelihood of a hurricane gaining strength from deep pools of warm water created by the LC. It seems that the LC dissipates excess hydraulic head that appears at the entrance to the GoM. This hydraulic head comes from wind forces pushing water up into the GoM via the Caribbean Sea and the Yucatan Channel. The head usually exceeds the value required to overcome friction forces opposing gravity flow through the Florida Straits and Florida Current channel, which drains into the Atlantic Ocean at approximately 28°N latitude. The current downstream from 28°N will be referred to as the Gulf Stream. It is fully open to augmentation by recirculation from the interior of the Atlantic Ocean, unlike the Florida Current, which runs in an almost-closed channel.

Most of the water draining out of the GoM via the Florida Straits continues into the Florida Current, which runs between the Florida coast and the Bahama Banks.. However, the Florida Straits are connected at two points to the Nicholas and Santaren Channels, respectively. The Nicholas and Santaren channels come together and connect to the Old Bahama Channel, which runs along the north coast of Cuba. Normally, there is no steady flow through these latter three channels, but this could change, as explained later.

The excess head at the GoM entrance does not increase the volume transport through the GoM because the water arrives via long global circulation paths that limit the quantity of water transported. The North Equatorial Current returns water that comes from the Gulf Stream via the North Atlantic Subtropical Gyre. The South Equatorial Current returns the meridional overturning water from the Arctic branch of the Gulf Stream. These long paths impose their own limitations on the volume transport, so the excess hydraulic head at the GoM entrance must be dissipated by friction. The LC adjusts its length to provide the required amount of turbulent friction loss.

When the excess head is at its maximum, as it was at the time of Katrina in 2005, the LC takes the form of a narrow hairpin loop that comes close to New Orleans and makes an abrupt U-turn west of New Orleans. At other times the LC does not intrude this far. The LC appears to be driven by gravity, so the LC water surface at the U-turn would be lower than the surrounding water, which should be at approximately the same level as the GoM entrance level. The higher surface level outside the U-turn provides the hydrostatic force required to reverse the momentum transport of the LC. Also the hydrostatic pressure of the surrounding water pushes the legs of the hairpin loop together.

The Coriolis force deflects the moving water to the right of the current. The deflecting force is proportional to velocity, so the fastest-moving warm water at the surface is preferentially piled up in the interior of the loop to form a warm water pool about 200 meters deep. This warm water can supply energy to a hurricane that happens to pass through it. The warm water pool is displayed as a raised sea surface level in a radar altimeter map. The surface is raised because a column of warm water weighs less than the surrounding colder water, so it can stand higher.

Properly placed marine current turbines can convert about half of the excess head into electric power supplied to the on-shore grid via submarine cables. Assume that the other half of the excess power is dissipated in equipment losses and eddies launched by the deep sea mooring cables. The excess head would be included in a leveling survey across the Florida Peninsula, along with the head required to force water through the Florida Straits and Florida Current path. Henry Stommel mentions a head of 0.19 meter from such a survey in his book on the Gulf Stream. Without knowing the length of the LC at the time of this survey, we can only say that the head dissipated by the LC is assumed to be approximately 0.19 meter.

Multiplying this assumed head by the volume transport of the current times the water density times the acceleration of gravity yields an LC dissipation of 47.7 GW for a typically-observed volume transport of 25 million cubic meters per second. This means that turbines would have to supply 24 GW to the grid in order to prevent the LC from intruding into the GoM. If each turbine supplies 1 MW, we need 24,000 turbines.

A typical velocity at a depth required to avoid interference with ship traffic seems to be 1.5 m/s. At this velocity, a 1 MW turbine would require a rotor diameter of 40.5 m. A 3-blade rotor operating with a tip speed 5.3 times the current velocity would rotate at 3.75 rpm. A blade would pass by every 5.33 sec. Turbines would be arranged in pairs side-by-side rotating in opposite directions to balance the torque on a rigid floating mounting frame. The rotors are not synchronized, so a creature swimming between them might have to contend with a blade tip every 2.7 seconds. There might be several pairs of turbines on one mounting frame sharing vertical and horizontal tail surfaces. These tail surfaces would enhance pitch and yaw stability. The many turbine blades, framework, floats, tail surfaces, and mooring cables could present a confusing and dangerous

situation to different species trying to navigate through. This will require considerable study.

Suitable locations for turbines are the Yucatan Peninsula shelf, Florida Straits, and Florida Current channel. Initially, the Yucatan location was thought to have the advantage of lowering sea level in the GoM. However it now seems that the incoming water will leak around most of the Yucatan turbines and raise the overall GoM sea level to the entrance level. Downstream turbines will raise the upstream level of the stream, but may have little effect on the GoM sea level outside the stream.

A first impression is that the above locations cannot accommodate the estimated number of turbines. Therefore it is necessary to consider installing turbines in the passages between the Antilles Islands to create back pressure that diverts some flow around the Caribbean and directs it into the Florida Current via the Old Bahama and Santaren Channels.

Hopefully, the 0.19 m estimate is excessive. Also, partial shortening of the LC may suffice. Designing the system to completely absorb the maximum excess power is uneconomical because the turbines will operate at less than their full capacity for too much of the time.