THE CONSULTANT

The Newsletter of the IEEE Consultants Network of Long Island

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Chairman's Corner – *Jerry Brown, Essex Systems*

Where does your business come from?

One of the questions that came up as we planned the postcard campaign was how to define the target audience. It's necessary to do this in a way that facilitates building a mailing list. The consensus of the committee members was that typical prospects are:

1. Companies located on Long Island and the greater New York City boroughs.

2. Companies under $100 million in sales

3. Companies classified under Standard Industrial Classification prepared by the U.S. Dept of Labor as producing electrical, electronic and software products. This included measuring, analyzing and controlling instruments. [If you're interested, you can find a description of the codes at http://www.osha.gov/pls/imis/sic_manual.html .]

Is this correct? We'd like you to tell us where the majority of your business comes from. The following survey could help us in the future. This is a draft copy. I'll be emailing something like this to you soon.to get your response

For each question below tell us about your last five projects.

Company size in sales (Total company; not just the division you worked for):

1. ____< $1M ; ____< $100M ; ____< $1B
2. ____< $1M ; ____< $100M ; ____< $1B
3. ____< $1M ; ____< $100M ; ____< $1B
4. ____< $1M ; ____< $100M ; ____< $1B
5. ____< $1M ; ____< $100M ; ____< $1B

Company location:

1. ____ on Long Island ; ____ NYC boroughs ; ____ Other
2. ____ on Long Island ; ____ NYC boroughs ; ____ Other
3. ____ on Long Island ; ____ NYC boroughs ; ____ Other
4. ____ on Long Island ; ____ NYC boroughs ; ____ Other
5. ____ on Long Island ; ____ NYC boroughs ; ____ Other

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Meetings

June 4, 2008

Topic: "How I Design Switching Power Supplies"
A Pragmatic Approach for Wide Ranging Applications
Speaker: Martin Kanner, Kanner Electro-Medical Co. (KEMCO)

July 2, 2008

Topic: "State-of-the-Art Laser Triangulation Sensors"
Speaker: Steve Chirichella, Senior Sales Engineer, Keyence America

August 6, 2008

Topic: "The Difference that Industrial Design Can Make in Engineering Projects"
Speaker: Eric Seger, Design Resources USA Inc.

September 3, 2008

Topic: "Embedded Linux Development for Power Architecture"
Speaker: Alex Peck, FAE, Freescale Semiconductor, Inc.

Included in the discussion will be:
- An embedded Linux overview
- An introduction to the Linux Target Image Builder
- Building Uboot, Linux Kernal and Ramdisk
- Bringup and Debugging with CodeWarrior tools
- Linux demo on Freescale MPC8313RDB board

Time: 7 PM

Place: Briarcliffe College, Great Room
1055 Stewart Avenue, Bethpage, NY.
.
Guests are welcome. No charge. No preregistration.
Light refreshments will be served.

Directions: See our website www.consult-li.com.

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

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

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Chairman's Corner continued

Primary Company business:
1. _____ Electrical/Electronics/Computers/Software ; _____ Other
2. _____ Electrical/Electronics/Computers/Software ; _____ Other
3. _____ Electrical/Electronics/Computers/Software ; _____ Other
4. _____ Electrical/Electronics/Computers/Software ; _____ Other
5. _____ Electrical/Electronics/Computers/Software ; _____ Other

Product type
1. _____ Industrial ; _____ Services ; _____ Consumer ; _____ Military
2. _____ Industrial ; _____ Services ; _____ Consumer ; _____ Military
3. _____ Industrial ; _____ Services ; _____ Consumer ; _____ Military
4. _____ Industrial ; _____ Services ; _____ Consumer ; _____ Military
5. _____ Industrial ; _____ Services ; _____ Consumer ; _____ Military

Hardware/Software/Analysis
1. _____ Hardware ; _____ Software ; _____ Analysis
2. _____ Hardware ; _____ Software ; _____ Analysis
3. _____ Hardware ; _____ Software ; _____ Analysis
4. _____ Hardware ; _____ Software ; _____ Analysis
5. _____ Hardware ; _____ Software ; _____ Analysis

Hurricane Reduction in Gulf of Mexico

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

LOOP CURRENT

Hurricane Gustav on the third anniversary of Katrina brings up the question of what we might do to reduce the danger and destruction of hurricanes in the Gulf of Mexico (GOM). To introduce a possible answer, we can visit a website that gives a daily map of sea surface height in the GOM. I always get to this site by googling "sea surface height" and then selecting the link to "Gulf of Mexico Near Real-Time Altimeter Viewer." This site is important because it tells us the location of the deep pools of warm water required to energize a hurricane.

The deep warm pools are formed by the GOM Loop Current, which passes between the Yucatan Peninsula and Cuba, and would like to make a sharp right turn into the Florida Straits. However, its momentum carries it into the interior of the Gulf until it makes a right-hand U-turn to come back to the Straits. It then makes a left turn into the Straits, and then another left turn into the Florida Current, which eventually becomes the Gulf Stream. The Loop Current path in the GOM usually changes slowly. Changes are apparent from month to month, although some changes take less than a week. On August 27, 2008,` it made the U-turn half way between Cuba and New Orleans.

The deep pool of warm water is made by the Coriolis force sweeping water to the right of the path. The Coriolis force is proportional to the velocity, which is greatest at the surface, and decreases with depth. The water is stratified, with the warmest and least dense water closest to the surface. The warmest water is also the fastest, so the warm water is preferentially swept into the center of the loop. The warm water pool is a few hundred meters deep at its center, and it sits on top of the colder water below. Since the warm water is less dense, it can pile up to form a hill about 80 cm above the water surface outside the loop. The radar altimeter in the satellite maps the height contours.

If a hurricane's path is through such a warm pool, the low pressure at the center sucks up the warm water. The winds whip it into spray, which presents a lot of surface area, so that water can evaporate at a great rate The moist air is pulled up the eye wall, and at some height, the water vapor condenses, releasing latent heat, which makes the air expand and rise. The water droplets coalesce and precipitate in the rain bands.

Gustav's path appears to have been right up the inside of the hairpin loop, but because the loop extended only half way to New Orleans, the remaining 440 km of the path to New Orleans was over water which was warm only at the surface. Therefore, Gustav was pulling up some cool water and was a Category 2 when it made landfall at 8 AM on September 1. There were two detached rings of warm water between the hairpin loop and Texas, but they were not involved.

On the other hand, by July 31, 2005, the deep warm water of the Loop Current had come to within 150 km of New Orleans and there was a lot of activity in the area. A warm core ring had detached from the Loop Current on August 11, reattached by August 22, and evolved into a single bent hairpin loop coming to within 250 km of New Orleans. The tip segment of the loop was oriented east-west, headed toward Texas, and ending 440km west of New Orleans. The supply of warm water was more favorable for maintaining Katrina's intensity, and it was Category 3 when it made landfall.

LOOP CURRENT REDUCTION

From the above observations, it seems reasonable that the hurricane danger to New Orleans can be reduced by reducing the volume of the deep warm water pools, and by reducing the intrusion of the Loop Current into the GOM. Reducing the volume transport of the Loop Current should accomplish these objectives, Lower velocity would mean less Coriolis force to sweep warm water into the pools. The reduced flow would reduce the tendency to shoot past the Florida Straits without making the requisite right turn.

As explained on website www.sealevelcontrol.com and in previous issues of the Newsletter, the Loop Current can be reduced by installing arrays of electric power-generating turbines in all of the passages between the Antilles Islands. This would provide power for desalination plants, and for industrial, commercial, and residential electric customers on the Islands. Reduction of the Loop Current would be of great benefit to oil and gas exploration and production in the GOM. The Loop Current and its detached rings deflect rotating drill strings even when there is no hurricane danger The question of who benefits and who pays is a tough one, and it can be deferred until modeling and engineering studies show that the turbine arrays will accomplish the desired Loop Current slowing without bad side effects.

We must examine the source of the Loop Current in order to understand why the turbines in the Antilles passages can reduce its strength without bad side effects. The trade winds blow from east to west in the tropics. The Pacific Ocean has a long path, and water piles up in Indonesia. It comes back as a Kelvin wave confined near the equator and may upwell cold water along the American coast. The Kelvin wave is reflected back toward the west as Rossby waves.

As a result of this back-and-forth in the Pacific, a pool of warm surface water might form near Indonesia, from which moist air rises and causes precipitation on the U.S. east coast. This would be a normal condition. In El Nino years, the warm water is in the mid-Pacific. Moist air rises from the warm area, goes both east and west, and precipitation falls on our east coast. In La Nina years, the warm water is very far west and the eastern Pacific is cool. The precipitation falls on our midwest.

The Atlantic Ocean has a short east-west dimension compared to the Pacific. There are many currents and counter currents, some of which might be identified as Kelvin and Rossby waves. For our purpose here, the dominant ones are the North and South Equatorial Currents, which run parallel to the Equator and are in the low northern and southern latitudes, respectively. They are driven by the Trade Winds, so they run from east to west. The North Equatorial Current closes the circulation path of the North Atlantic Subtropical Gyre. The South Equatorial Current splits where the Brazil coast projects out into the Atlantic. The part that goes south completes the circuit of the South Atlantic Subtropical Gyre. The remainder that goes north is called the North Brazil Current, which undergoes some name changes as it follows the South American coast and passes through some passages between the Lesser Antilles Islands that are closest to South America. This returns the Meridional Overturning Current to the Northern Hemisphere. This is the water that sank in the Arctic, traveled south at great depth, upwelled in the Antarctic Circumpolar Current, and followed the coast of Africa to join the South Equatorial Current.

Most of the North Equatorial Current goes through the passages between the remaining Lesser and GreaterAntilles Islands. Thus, most of the North Equatorial and Meridional Overturning Currents pass through the Caribbean Sea, GOM, Florida Straits, Florida Current, and Gulf Stream. The remaining small part of the North Equatorial Current goes around the outside of the Antilles chain and directly into the Gulf Stream.

Turbines in the inter-island passages will create a back pressure that causes more water to divert around the Antilles Islands and go directly into the Gulf Stream. Less water will go through the Caribbean Sea and GOM. This will reduce the strength of the Loop Current, resulting in less deep warm water and more distance between the warm accumulations and New Orleans. In addition, sea level in the GOM will be lowered 1 cm for every 3 GW of electric power produced, according to a calculation on the website. All of this must be modeled more accurately in more detail.

The survival of New Orleans in Gustav compared to the disaster of Katrina seems to show the value of keeping the warm water deep pockets away from New Orleans. Modeling will tell us whether this is indeed true, and whether the turbine arrays will provide the benefits claimed in this article.